

LM-80 Test Report

This LM-80 testing is performed in accordance with IES LM-80-15.

Part No. NF2W757GR-V3

| | | | |
|------------------------------|-------------------|------------------------------|----------------|
| Issue Date: | October 9, 2020 | Revision Date: | - |
| Test Initiation Date: | February 19, 2018 | Test Completion Date: | March 17, 2020 |
| Test Duration: | 10,000 hours | Report No.: | SQETMS257501 |

Customer Information:

Company Name: Nichia Corporation
 Address: 491-100, Oka, Kaminaka-cho, Anan-shi, Tokushima, 774-8601, JAPAN

Description of Test Samples:

Manufacturer's Name: Nichia Corporation
 Classification: LED Package
 Part Name: White LED
 Part No.: NF2W757GR-V3
 Nominal CCT: 2700 K

Test Summary:

| Data Set | Case Temperature [°C] | Ambient Temperature [°C] | Drive Current [mA] | Luminous Flux Maintenance at 10K hours [%] | Chromaticity Shift ($\Delta u'v'$) at 10K hours | TM-21 Projection L ₇₀ (10K) [hours] | TM-21 Projection L ₈₀ (10K) [hours] | TM-21 Projection L ₉₀ (10K) [hours] |
|----------|-----------------------|--------------------------|--------------------|--|---|--|--|--|
| 1 | 55 | > 50 | 100 | 98.0 | 0.0024 | > 60000 | > 60000 | > 60000 |
| 2 | 55 | > 50 | 150 | 97.7 | 0.0023 | > 60000 | > 60000 | > 60000 |
| 3 | 55 | > 50 | 200 | 97.6 | 0.0027 | > 60000 | > 60000 | > 60000 |
| 4 | 85 | > 80 | 100 | 97.2 | 0.0022 | > 60000 | > 60000 | > 60000 |
| 5 | 85 | > 80 | 150 | 96.7 | 0.0025 | > 60000 | > 60000 | > 60000 |
| 6 | 85 | > 80 | 200 | 96.4 | 0.0028 | > 60000 | > 60000 | > 60000 |
| 7 | 105 | > 100 | 100 | 95.2 | 0.0032 | > 60000 | > 60000 | 33300 |
| 8 | 105 | > 100 | 150 | 95.0 | 0.0035 | > 60000 | > 60000 | 34900 |
| 9 | 105 | > 100 | 200 | 92.9 | 0.0043 | 51500 | 32400 | 15400 |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |



Approved Signatory:

Takara WAKAKI, Lab Manager

Nichia Corporation LED Testing Laboratory

1-1, Tatsumi-Cho, Anan-Shi, TOKUSHIMA 774-0001, JAPAN

Applicable Part Nos.:**This LM-80 test report applies to the following parts:**

| Series | Part No. | Case Temperature [°C] | Forward Current [mA] | Nominal CCT * [K] | Data Set No. |
|--------|-------------------------------|-----------------------|----------------------|-------------------|--------------|
| 757 | NF2W757GR-V3 NF2W757GRT-V3 | 55 | 100 | ≥ 2200 | 1 |
| | | 55 | 150 | ≥ 2200 | 2 |
| | | 55 | 200 | ≥ 2200 | 3 |
| | | 85 | 100 | ≥ 2200 | 4 |
| | | 85 | 150 | ≥ 2200 | 5 |
| | | 85 | 200 | ≥ 2200 | 6 |
| | | 105 | 100 | ≥ 2200 | 7 |
| | | 105 | 150 | ≥ 2200 | 8 |
| | | 105 | 200 | ≥ 2200 | 9 |

* The Nominal CCT category in this document refers ENERGY STAR® Requirements for the Use of LM-80 Data.

IES LM-80 Test Report Requirement :

| | |
|---|--|
| 1. Number of LED light sources tested | See tables |
| 2. Description of LED light sources | See Description of Test Samples |
| 3. Description of auxiliary equipment | |
| Active cooling life test system | Consisting of small boxes, in which each box contains a reliability test board, and a water-cooled heat sink or a heater to control device temperature |
| LED Tester | Consisting of an integrating sphere, a programmable current-source meter, and a spectroradiometer |
| 4. Operating cycle | Constant direct current (DC) |
| 5. Ambient conditions | |
| Ambient Temperature (T_A) | See tables Ambient temperature is the temperature of the air at a distance of 1.5 mm above the reliability test board |
| Air flow | < 0.1 m/s |
| Relative Humidity | < 65 % |
| 6. Case temperature (Test point temperature) | See tables For the case temperature (T_s) measurement point, see the figure 1 |

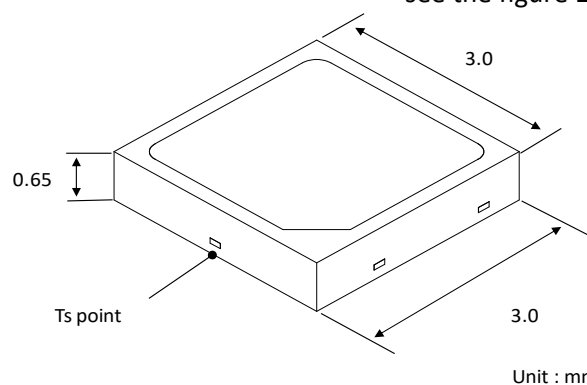


Figure 1: The case temperature (T_s) measurement point

| | |
|--|--|
| 7. Drive current of the LED light sources during lifetime test | See tables |
| 8. Initial luminous flux, forward voltage and chromaticity coordinates | See tables |
| 9. Luminous flux maintenance data for each individual LED light source along with average value, median value, standard deviation, minimum and maximum luminous flux maintenance value for all of the LED light sources | See tables |
| 10. Observation of LED light sources failures including the failure conditions and time of failure | No failure observed |
| 11. LED light source monitoring interval | See tables |
| 12. Photometric measurement uncertainty | |
| Luminous Flux | 2.0 % ($k=2$) |
| Chromaticity | 0.002 ($k=2$) |
| 13. Chromaticity shift reported over the measurement time | See tables |
| 14. Photometric and electrical measurements | |
| Measurement point temperature | 25°C ± 2°C |
| Temperature measurement point location | Sphere ambient air temperature monitor |
| Measurement method | See LM-85-14 section 5.3 |



ENERGY STAR® LM-80 Cover Sheet

Administrative Information

| | |
|--------------------------------|-------------------|
| Tested subcomponent series : | White LED |
| Tested subcomponent Part No. : | NF2W757GR-V3 |
| Report issue date : | October 9, 2020 |
| Report revision date : | - |
| Testing start date : | February 19, 2018 |
| Testing completion date : | March 17, 2020 |
| LED sampling method : | Comply with LM-80 |
| LED sample size : | 25 Packages |

LED Identification

| | |
|---------------------------|--------------------|
| LED manufacturer's name : | Nichia Corporation |
| LED Part No. : | NF2W757GR-V3 |
| Description of LED : | LED Package |

LED Characteristics

| | |
|--|--|
| Total input power (W) : | |
| Average current density per LED die (mA/mm ²): | |
| Average power density per LED die (W/mm ²): | |

| Case Temperature [°C] | Drive Current [mA] | Total Input Power [W] | Average Current density per LED die [mA/mm ²] | Average Power density per LED die [W/mm ²] |
|-----------------------|--------------------|-----------------------|---|--|
| 55 | 100 | 0.60 | 204 | 0.61 |
| 55 | 150 | 0.94 | 306 | 0.96 |
| 55 | 200 | 1.31 | 408 | 1.33 |
| 85 | 100 | 0.59 | 204 | 0.61 |
| 85 | 150 | 0.94 | 306 | 0.96 |
| 85 | 200 | 1.31 | 408 | 1.33 |
| 105 | 100 | 0.60 | 204 | 0.61 |
| 105 | 150 | 0.94 | 306 | 0.96 |
| 105 | 200 | 1.31 | 408 | 1.33 |
| | | | | |
| | | | | |
| | | | | |

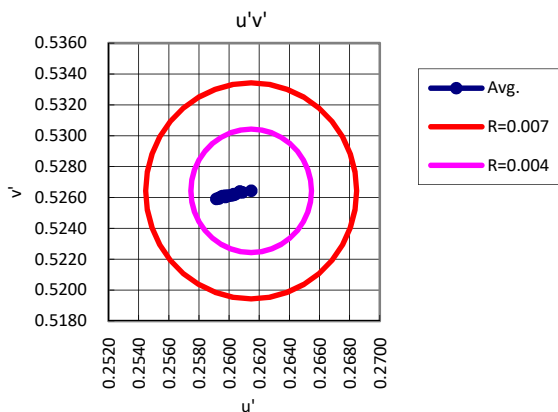
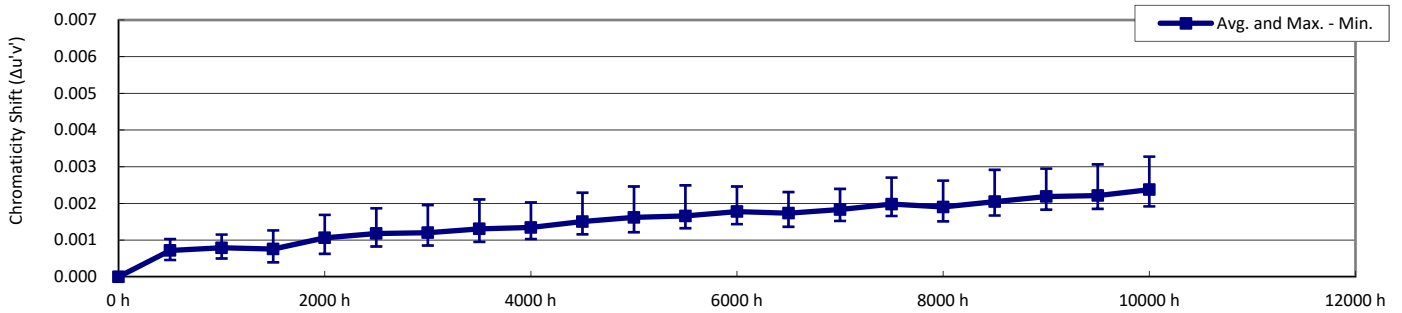
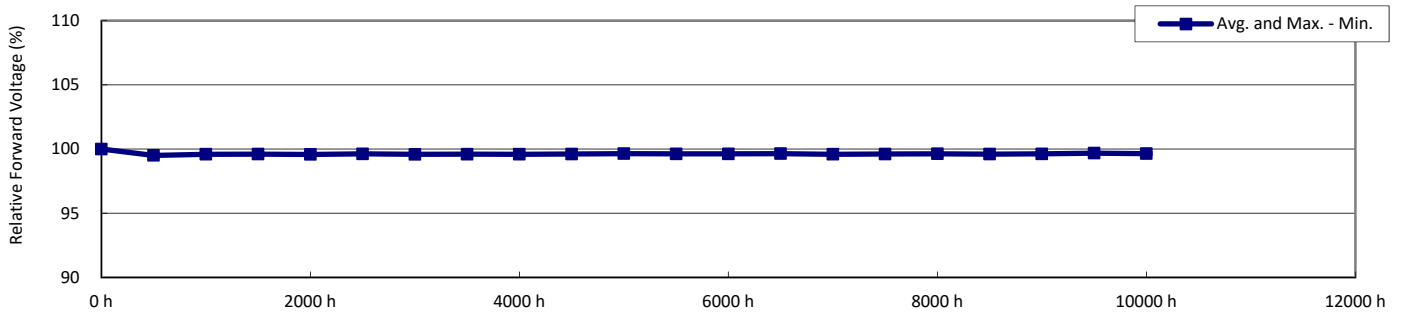
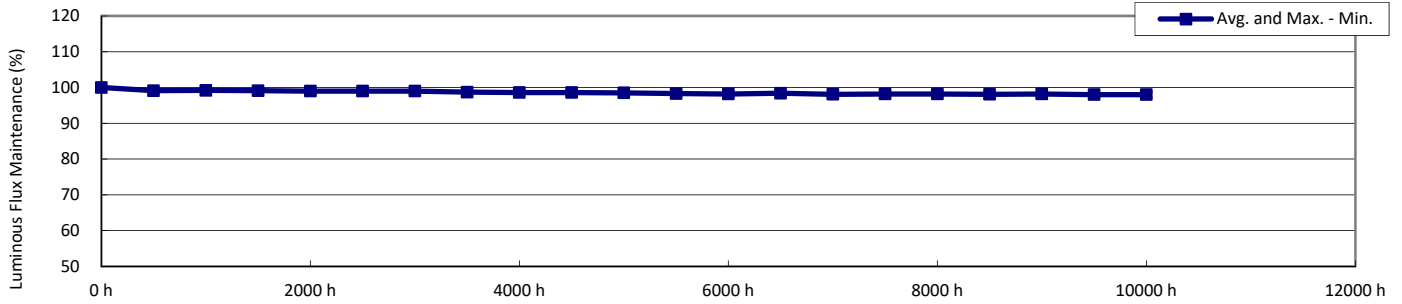
| | |
|--|-----------|
| Representative CRI (Ra) of the tested sample set : | Ra = 83.1 |
| Minimum die edge to die edge spacing : | 0.08 mm |



Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0



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Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 1-1
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | | | |
|---------|---------------------|--------------------|---------------------|-------------|---------|--------|---------|--------|--|--|--|--|--|--|
| | Φ _v [lm] | V _F [V] | T _{CP} [K] | P [W] | x | y | u' | v' | | | | | | |
| 1 | 92.9 | 5.96 | 2687 | 0.60 | 0.460 | 0.409 | 0.263 | 0.527 | | | | | | |
| 2 | 93.7 | 5.95 | 2699 | 0.59 | 0.460 | 0.411 | 0.263 | 0.527 | | | | | | |
| 3 | 93.2 | 5.95 | 2716 | 0.59 | 0.459 | 0.410 | 0.262 | 0.527 | | | | | | |
| 4 | 94.0 | 5.96 | 2790 | 0.60 | 0.450 | 0.404 | 0.259 | 0.523 | | | | | | |
| 5 | 93.8 | 5.96 | 2753 | 0.60 | 0.455 | 0.409 | 0.260 | 0.526 | | | | | | |
| 6 | 94.3 | 5.95 | 2832 | 0.60 | 0.448 | 0.406 | 0.257 | 0.524 | | | | | | |
| 7 | 92.7 | 5.95 | 2693 | 0.59 | 0.457 | 0.405 | 0.263 | 0.525 | | | | | | |
| 8 | 93.1 | 5.94 | 2673 | 0.59 | 0.460 | 0.408 | 0.264 | 0.527 | | | | | | |
| 9 | 94.7 | 5.95 | 2814 | 0.60 | 0.450 | 0.408 | 0.258 | 0.525 | | | | | | |
| 10 | 93.5 | 5.96 | 2736 | 0.60 | 0.455 | 0.406 | 0.261 | 0.525 | | | | | | |
| 11 | 94.7 | 5.96 | 2764 | 0.60 | 0.456 | 0.411 | 0.260 | 0.527 | | | | | | |
| 12 | 94.2 | 5.94 | 2744 | 0.59 | 0.457 | 0.410 | 0.261 | 0.527 | | | | | | |
| 13 | 93.5 | 5.95 | 2631 | 0.60 | 0.470 | 0.419 | 0.265 | 0.532 | | | | | | |
| 14 | 94.0 | 5.96 | 2723 | 0.60 | 0.459 | 0.413 | 0.261 | 0.528 | | | | | | |
| 15 | 93.5 | 5.95 | 2723 | 0.60 | 0.456 | 0.406 | 0.262 | 0.525 | | | | | | |
| 16 | 92.4 | 5.95 | 2700 | 0.59 | 0.456 | 0.404 | 0.263 | 0.524 | | | | | | |
| 17 | 94.1 | 5.95 | 2746 | 0.59 | 0.455 | 0.408 | 0.261 | 0.526 | | | | | | |
| 18 | 93.2 | 5.95 | 2676 | 0.59 | 0.461 | 0.410 | 0.264 | 0.528 | | | | | | |
| 19 | 93.1 | 5.95 | 2682 | 0.60 | 0.461 | 0.411 | 0.263 | 0.528 | | | | | | |
| 20 | 94.2 | 5.95 | 2731 | 0.60 | 0.458 | 0.411 | 0.261 | 0.527 | | | | | | |
| 21 | 93.6 | 5.96 | 2721 | 0.60 | 0.459 | 0.412 | 0.261 | 0.528 | | | | | | |
| 22 | 94.0 | 5.95 | 2781 | 0.60 | 0.452 | 0.406 | 0.259 | 0.524 | | | | | | |
| 23 | 93.9 | 5.94 | 2780 | 0.59 | 0.453 | 0.408 | 0.259 | 0.525 | | | | | | |
| 24 | 93.3 | 5.95 | 2664 | 0.59 | 0.463 | 0.411 | 0.264 | 0.528 | | | | | | |
| 25 | 93 | 5.94 | 2715 | 0.59 | 0.457 | 0.408 | 0.262 | 0.526 | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | | | |
| Avg. | 93.6 | 5.95 | 2727 | 0.60 | 0.457 | 0.409 | 0.261 | 0.526 | | | | | | |
| Med. | 93.6 | 5.95 | 2723 | 0.60 | 0.457 | 0.409 | 0.261 | 0.527 | | | | | | |
| σ | 0.59 | 0.007 | 48.5 | 0.001 | 0.0046 | 0.0033 | 0.0021 | 0.0018 | | | | | | |
| Min. | 92.4 | 5.94 | 2631 | 0.59 | 0.448 | 0.404 | 0.257 | 0.523 | | | | | | |
| Max. | 94.7 | 5.96 | 2832 | 0.60 | 0.470 | 0.419 | 0.265 | 0.532 | | | | | | |



Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 1-2
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 98.7 | 98.6 | 98.2 | 98.0 | 97.9 | 98.1 | 97.6 | 97.8 | 97.8 | 97.7 | 97.5 | 97.6 | 98.0 | 97.6 | 98.1 | 98.0 | 97.8 |
| 2 | 100.0 | 99.1 | 99.3 | 99.3 | 99.2 | 99.2 | 99.2 | 98.9 | 98.7 | 98.8 | 98.8 | 98.5 | 98.5 | 98.7 | 98.4 | 98.5 | 98.5 | 98.3 |
| 3 | 100.0 | 99.7 | 99.9 | 99.8 | 99.8 | 99.8 | 99.7 | 99.4 | 99.3 | 99.3 | 99.2 | 99.0 | 99.0 | 99.1 | 98.7 | 98.9 | 98.9 | 98.7 |
| 4 | 100.0 | 99.2 | 99.2 | 99.2 | 99.1 | 99.1 | 99.0 | 98.7 | 98.7 | 98.6 | 98.6 | 98.3 | 98.2 | 98.4 | 98.0 | 98.2 | 98.1 | 98.0 |
| 5 | 100.0 | 99.3 | 99.3 | 99.1 | 99.0 | 99.2 | 99.1 | 98.6 | 98.5 | 98.5 | 98.6 | 98.1 | 98.0 | 98.2 | 97.7 | 97.9 | 97.8 | 97.6 |
| 6 | 100.0 | 98.8 | 98.8 | 98.7 | 98.9 | 98.7 | 98.8 | 98.6 | 98.6 | 98.5 | 98.5 | 98.3 | 98.1 | 98.4 | 98.0 | 98.1 | 98.1 | 97.9 |
| 7 | 100.0 | 98.8 | 98.8 | 98.5 | 98.5 | 98.5 | 98.7 | 98.4 | 98.4 | 98.4 | 98.2 | 97.9 | 98.0 | 98.1 | 97.8 | 98.0 | 97.9 | 97.8 |
| 8 | 100.0 | 99.1 | 99.2 | 99.0 | 99.0 | 98.9 | 98.9 | 98.7 | 98.6 | 98.7 | 98.5 | 98.3 | 98.3 | 98.4 | 98.2 | 98.3 | 98.2 | 98.2 |
| 9 | 100.0 | 99.2 | 99.2 | 99.1 | 99.0 | 98.9 | 98.8 | 98.5 | 98.4 | 98.4 | 98.3 | 97.9 | 98.0 | 98.1 | 97.8 | 97.9 | 97.9 | 97.8 |
| 10 | 100.0 | 99.3 | 99.4 | 99.5 | 99.3 | 99.4 | 99.3 | 99.1 | 98.9 | 99.0 | 98.9 | 98.6 | 98.6 | 98.8 | 98.4 | 98.5 | 98.4 | 98.4 |
| 11 | 100.0 | 99.0 | 99.0 | 98.9 | 98.9 | 99.0 | 99.0 | 98.7 | 98.6 | 98.6 | 98.6 | 98.2 | 98.1 | 98.3 | 97.9 | 98.1 | 98.1 | 97.9 |
| 12 | 100.0 | 99.2 | 99.2 | 99.2 | 99.2 | 99.1 | 99.0 | 98.7 | 98.6 | 98.6 | 98.5 | 98.3 | 98.3 | 98.4 | 98.2 | 98.2 | 98.2 | 98.2 |
| 13 | 100.0 | 99.1 | 99.3 | 99.2 | 99.3 | 99.3 | 99.2 | 99.0 | 98.8 | 99.0 | 98.8 | 98.7 | 98.5 | 98.8 | 98.5 | 98.5 | 98.4 | 98.5 |
| 14 | 100.0 | 99.3 | 99.3 | 99.2 | 99.3 | 99.3 | 99.2 | 98.8 | 98.8 | 98.8 | 98.7 | 98.4 | 98.4 | 98.6 | 98.3 | 98.2 | 98.2 | 98.3 |
| 15 | 100.0 | 99.2 | 99.4 | 99.3 | 99.3 | 99.4 | 99.3 | 98.9 | 98.9 | 98.9 | 98.8 | 98.6 | 98.5 | 98.7 | 98.5 | 98.4 | 98.4 | 98.4 |
| 16 | 100.0 | 99.3 | 99.4 | 99.1 | 99.1 | 99.1 | 99.0 | 98.7 | 98.7 | 98.7 | 98.5 | 98.3 | 98.2 | 98.5 | 98.3 | 98.2 | 98.2 | 98.2 |
| 17 | 100.0 | 99.1 | 99.1 | 98.8 | 98.8 | 99.0 | 98.9 | 98.5 | 98.5 | 98.4 | 98.5 | 98.1 | 98.0 | 98.1 | 98.0 | 97.8 | 97.8 | 97.8 |
| 18 | 100.0 | 99.2 | 99.2 | 98.9 | 98.9 | 98.9 | 99.0 | 98.4 | 98.6 | 98.5 | 98.3 | 98.0 | 98.0 | 98.2 | 98.1 | 98.0 | 98.0 | 98.0 |
| 19 | 100.0 | 99.3 | 99.4 | 99.3 | 99.3 | 99.3 | 99.0 | 98.8 | 98.7 | 98.8 | 98.6 | 98.5 | 98.4 | 98.6 | 98.2 | 98.2 | 98.2 | 98.1 |
| 20 | 100.0 | 99.2 | 99.4 | 99.3 | 99.3 | 99.3 | 99.2 | 98.9 | 98.8 | 98.8 | 98.6 | 98.5 | 98.4 | 98.6 | 98.2 | 98.3 | 98.4 | 98.2 |
| 21 | 100.0 | 99.3 | 99.4 | 99.4 | 99.3 | 99.4 | 99.2 | 98.9 | 98.8 | 98.8 | 98.7 | 98.6 | 98.5 | 98.7 | 98.4 | 98.4 | 98.4 | 98.3 |
| 22 | 100.0 | 99.1 | 99.2 | 99.1 | 99.1 | 99.0 | 98.8 | 98.6 | 98.5 | 98.5 | 98.3 | 98.2 | 98.1 | 98.3 | 98.0 | 98.0 | 98.1 | 97.9 |
| 23 | 100.0 | 98.6 | 98.6 | 98.0 | 98.0 | 98.1 | 98.2 | 97.8 | 98.0 | 97.9 | 97.8 | 97.6 | 97.4 | 97.6 | 97.3 | 97.4 | 97.3 | 97.2 |
| 24 | 100.0 | 99.1 | 99.2 | 99.0 | 98.8 | 98.9 | 98.8 | 98.5 | 98.6 | 98.6 | 98.4 | 98.3 | 98.2 | 98.4 | 98.1 | 98.1 | 98.2 | 98.0 |
| 25 | 100.0 | 99.4 | 99.3 | 99.3 | 99.3 | 99.2 | 99.0 | 98.7 | 98.7 | 98.7 | 98.6 | 98.4 | 98.4 | 98.5 | 98.2 | 98.1 | 98.2 | 98.0 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.1 | 99.2 | 99.1 | 99.0 | 99.0 | 99.0 | 98.7 | 98.6 | 98.6 | 98.5 | 98.3 | 98.2 | 98.4 | 98.1 | 98.2 | 98.2 | 98.1 |
| Med. | 100.0 | 99.2 | 99.2 | 99.1 | 99.1 | 99.1 | 99.0 | 98.7 | 98.6 | 98.6 | 98.6 | 98.3 | 98.2 | 98.4 | 98.2 | 98.2 | 98.2 | 98.0 |
| σ | 0.00 | 0.23 | 0.28 | 0.39 | 0.40 | 0.41 | 0.33 | 0.37 | 0.29 | 0.32 | 0.32 | 0.34 | 0.33 | 0.31 | 0.32 | 0.29 | 0.30 | 0.32 |
| Min. | 100.0 | 98.6 | 98.6 | 98.0 | 98.0 | 97.9 | 98.1 | 97.6 | 97.8 | 97.8 | 97.7 | 97.5 | 97.4 | 97.6 | 97.3 | 97.4 | 97.3 | 97.2 |
| Max. | 100.0 | 99.7 | 99.9 | 99.8 | 99.8 | 99.8 | 99.7 | 99.4 | 99.3 | 99.3 | 99.2 | 99.0 | 99.0 | 99.1 | 98.7 | 98.9 | 98.9 | 98.7 |

TM-21 Projection

| Test duration used | 5000 h | to | 10000 h |
|----------------------------------|-----------|-------|---------|
| B | 0.9877 | | |
| α | 7.774E-07 | | |
| R ² | 0.6684 | | |
| Calculated L ₇₀ (10K) | 443000 | hours | |
| Reported L ₇₀ (10K) | > 60000 | hours | |
| Calculated L ₈₀ (10K) | 271000 | hours | |
| Reported L ₈₀ (10K) | > 60000 | hours | |
| Calculated L ₉₀ (10K) | 120000 | hours | |
| Reported L ₉₀ (10K) | > 60000 | hours | |

Curve-fit equation:

$$\Phi(t) = B \exp(-\alpha t)$$

Luminous flux maintenance life equation:

$$L_{70} = \ln(B/0.7)/\alpha$$

$$L_{80} = \ln(B/0.8)/\alpha$$

$$L_{90} = \ln(B/0.9)/\alpha$$

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Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 1-2 (Continued)
 Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|--|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 97.9 | 97.8 | 97.9 | | | | | | | | | | | | | |
| 2 | 98.5 | 98.3 | 98.2 | | | | | | | | | | | | | |
| 3 | 98.9 | 98.7 | 98.7 | | | | | | | | | | | | | |
| 4 | 98.1 | 97.9 | 97.8 | | | | | | | | | | | | | |
| 5 | 97.7 | 97.6 | 97.5 | | | | | | | | | | | | | |
| 6 | 98.1 | 97.9 | 97.9 | | | | | | | | | | | | | |
| 7 | 97.8 | 97.8 | 97.8 | | | | | | | | | | | | | |
| 8 | 98.3 | 98.2 | 98.2 | | | | | | | | | | | | | |
| 9 | 97.9 | 97.8 | 97.8 | | | | | | | | | | | | | |
| 10 | 98.5 | 98.4 | 98.1 | | | | | | | | | | | | | |
| 11 | 98.0 | 98.0 | 97.7 | | | | | | | | | | | | | |
| 12 | 98.3 | 98.2 | 98.2 | | | | | | | | | | | | | |
| 13 | 98.5 | 98.3 | 98.2 | | | | | | | | | | | | | |
| 14 | 98.3 | 98.1 | 98.0 | | | | | | | | | | | | | |
| 15 | 98.4 | 98.2 | 98.1 | | | | | | | | | | | | | |
| 16 | 98.3 | 98.1 | 98.0 | | | | | | | | | | | | | |
| 17 | 97.9 | 97.6 | 97.7 | | | | | | | | | | | | | |
| 18 | 98.1 | 98.0 | 98.2 | | | | | | | | | | | | | |
| 19 | 98.2 | 98.0 | 97.9 | | | | | | | | | | | | | |
| 20 | 98.4 | 98.2 | 98.1 | | | | | | | | | | | | | |
| 21 | 98.4 | 98.3 | 98.1 | | | | | | | | | | | | | |
| 22 | 98.0 | 97.9 | 97.8 | | | | | | | | | | | | | |
| 23 | 97.1 | 97.2 | 97.2 | | | | | | | | | | | | | |
| 24 | 98.1 | 98.0 | 97.9 | | | | | | | | | | | | | |
| 25 | 98.2 | 98.0 | 97.9 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 98.2 | 98.0 | 98.0 | | | | | | | | | | | | | |
| Med. | 98.2 | 98.0 | 97.9 | | | | | | | | | | | | | |
| σ | 0.35 | 0.30 | 0.29 | | | | | | | | | | | | | |
| Min. | 97.1 | 97.2 | 97.2 | | | | | | | | | | | | | |
| Max. | 98.9 | 98.7 | 98.7 | | | | | | | | | | | | | |



Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 1-3
Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 |
| 2 | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.6 | 99.7 | 99.6 | 99.7 |
| 3 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 |
| 4 | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 |
| 5 | 100.0 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 6 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 |
| 7 | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 |
| 8 | 100.0 | 99.6 | 99.6 | 99.6 | 99.5 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 9 | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 |
| 10 | 100.0 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 |
| 11 | 100.0 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 |
| 12 | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 |
| 13 | 100.0 | 99.5 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 |
| 14 | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 |
| 15 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 |
| 16 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 |
| 17 | 100.0 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 |
| 18 | 100.0 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 |
| 19 | 100.0 | 99.4 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.5 | 99.6 |
| 20 | 100.0 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 |
| 21 | 100.0 | 99.4 | 99.5 | 99.5 | 99.4 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 |
| 22 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 |
| 23 | 100.0 | 99.5 | 99.5 | 99.6 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 |
| 24 | 100.0 | 99.5 | 99.6 | 99.6 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 |
| 25 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 |
| Med. | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 |
| σ | 0.00 | 0.07 | 0.06 | 0.07 | 0.07 | 0.05 | 0.05 | 0.05 | 0.06 | 0.05 | 0.06 | 0.05 | 0.04 | 0.06 | 0.05 | 0.05 | 0.06 | 0.05 |
| Min. | 100.0 | 99.4 | 99.4 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 |
| Max. | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 |



Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 1-3 (Continued)
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|---|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 2 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 3 | 99.7 | 99.6 | 99.7 | | | | | | | | | | | | | |
| 4 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 5 | 99.7 | 99.8 | 99.6 | | | | | | | | | | | | | |
| 6 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 7 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 8 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 9 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 10 | 99.5 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 11 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 12 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 13 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 14 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 15 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 16 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 17 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 18 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 19 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 20 | 99.6 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 21 | 99.5 | 99.6 | 99.5 | | | | | | | | | | | | | |
| 22 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 23 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 24 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 25 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| Med. | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| σ | 0.05 | 0.05 | 0.05 | | | | | | | | | | | | | |
| Min. | 99.5 | 99.6 | 99.5 | | | | | | | | | | | | | |
| Max. | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |



Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 1-4
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.0000 | 0.0010 | 0.0012 | 0.0013 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | 0.0023 | 0.0025 | 0.0025 | 0.0025 | 0.0023 | 0.0023 | 0.0027 | 0.0026 | 0.0029 |
| 2 | 0.0000 | 0.0007 | 0.0007 | 0.0007 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0019 |
| 3 | 0.0000 | 0.0005 | 0.0005 | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0015 | 0.0017 |
| 4 | 0.0000 | 0.0006 | 0.0008 | 0.0007 | 0.0010 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0018 | 0.0020 |
| 5 | 0.0000 | 0.0007 | 0.0007 | 0.0006 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0019 |
| 6 | 0.0000 | 0.0008 | 0.0008 | 0.0008 | 0.0011 | 0.0010 | 0.0009 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0020 |
| 7 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0015 | 0.0017 | 0.0016 | 0.0018 | 0.0017 | 0.0019 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0026 | 0.0025 | 0.0026 |
| 8 | 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0012 | 0.0013 | 0.0013 | 0.0016 | 0.0015 | 0.0017 | 0.0019 | 0.0019 | 0.0020 | 0.0019 | 0.0021 | 0.0022 | 0.0022 | 0.0023 |
| 9 | 0.0000 | 0.0007 | 0.0009 | 0.0008 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0022 |
| 10 | 0.0000 | 0.0006 | 0.0007 | 0.0006 | 0.0008 | 0.0009 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0016 | 0.0017 |
| 11 | 0.0000 | 0.0007 | 0.0008 | 0.0008 | 0.0010 | 0.0011 | 0.0010 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0018 |
| 12 | 0.0000 | 0.0006 | 0.0007 | 0.0007 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0016 | 0.0017 | 0.0018 | 0.0017 | 0.0018 |
| 13 | 0.0000 | 0.0007 | 0.0007 | 0.0007 | 0.0009 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0014 | 0.0016 | 0.0015 | 0.0017 | 0.0016 | 0.0018 | 0.0019 | 0.0019 | 0.0020 |
| 14 | 0.0000 | 0.0007 | 0.0008 | 0.0006 | 0.0010 | 0.0012 | 0.0012 | 0.0012 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0019 | 0.0021 | 0.0020 | 0.0021 |
| 15 | 0.0000 | 0.0007 | 0.0008 | 0.0006 | 0.0008 | 0.0010 | 0.0010 | 0.0010 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0017 | 0.0016 | 0.0018 |
| 16 | 0.0000 | 0.0007 | 0.0007 | 0.0007 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0015 | 0.0016 | 0.0015 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0017 | 0.0019 |
| 17 | 0.0000 | 0.0008 | 0.0008 | 0.0007 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0018 | 0.0020 |
| 18 | 0.0000 | 0.0006 | 0.0008 | 0.0008 | 0.0011 | 0.0012 | 0.0011 | 0.0013 | 0.0012 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0017 | 0.0019 |
| 19 | 0.0000 | 0.0007 | 0.0008 | 0.0007 | 0.0009 | 0.0011 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | 0.0020 |
| 20 | 0.0000 | 0.0007 | 0.0008 | 0.0007 | 0.0010 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0017 | 0.0019 | 0.0019 | 0.0019 | 0.0020 |
| 21 | 0.0000 | 0.0008 | 0.0008 | 0.0007 | 0.0010 | 0.0011 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0019 | 0.0020 |
| 22 | 0.0000 | 0.0007 | 0.0007 | 0.0006 | 0.0009 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0018 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0020 |
| 23 | 0.0000 | 0.0008 | 0.0010 | 0.0010 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0023 |
| 24 | 0.0000 | 0.0007 | 0.0008 | 0.0007 | 0.0010 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0016 | 0.0017 | 0.0019 | 0.0018 | 0.0020 |
| 25 | 0.0000 | 0.0007 | 0.0007 | 0.0008 | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0014 | 0.0016 | 0.0017 | 0.0018 | 0.0020 | 0.0018 | 0.0020 | 0.0021 | 0.0020 | 0.0022 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0007 | 0.0008 | 0.0008 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0017 | 0.0018 | 0.0020 | 0.0019 | 0.0020 |
| Med. | 0.0000 | 0.0007 | 0.0008 | 0.0007 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0020 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 |
| Min. | 0.0000 | 0.0005 | 0.0005 | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0009 | 0.0010 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0015 | 0.0017 |
| Max. | 0.0000 | 0.0010 | 0.0012 | 0.0013 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | 0.0023 | 0.0025 | 0.0025 | 0.0025 | 0.0023 | 0.0024 | 0.0027 | 0.0026 | 0.0029 |



Data Set 1 : 55 °C, 100 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 56.9 °C |
| Actual Ambient Temperature [T_A] | 55.8 °C |
| Drive Current [I_F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 1-4 (Continued)
Chromaticity Shift

| LED No. | Chromaticity Shift $\Delta u'v'$ | | | | | | | | | | | | | | | |
|----------|----------------------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.0029 | 0.0031 | 0.0033 | | | | | | | | | | | | | |
| 2 | 0.0020 | 0.0022 | 0.0022 | | | | | | | | | | | | | |
| 3 | 0.0018 | 0.0019 | 0.0019 | | | | | | | | | | | | | |
| 4 | 0.0021 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| 5 | 0.0021 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| 6 | 0.0021 | 0.0021 | 0.0024 | | | | | | | | | | | | | |
| 7 | 0.0028 | 0.0029 | 0.0032 | | | | | | | | | | | | | |
| 8 | 0.0024 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| 9 | 0.0024 | 0.0024 | 0.0026 | | | | | | | | | | | | | |
| 10 | 0.0019 | 0.0019 | 0.0020 | | | | | | | | | | | | | |
| 11 | 0.0019 | 0.0021 | 0.0021 | | | | | | | | | | | | | |
| 12 | 0.0020 | 0.0020 | 0.0022 | | | | | | | | | | | | | |
| 13 | 0.0020 | 0.0020 | 0.0022 | | | | | | | | | | | | | |
| 14 | 0.0023 | 0.0024 | 0.0025 | | | | | | | | | | | | | |
| 15 | 0.0019 | 0.0019 | 0.0022 | | | | | | | | | | | | | |
| 16 | 0.0021 | 0.0020 | 0.0022 | | | | | | | | | | | | | |
| 17 | 0.0021 | 0.0021 | 0.0024 | | | | | | | | | | | | | |
| 18 | 0.0020 | 0.0020 | 0.0021 | | | | | | | | | | | | | |
| 19 | 0.0023 | 0.0023 | 0.0025 | | | | | | | | | | | | | |
| 20 | 0.0022 | 0.0022 | 0.0024 | | | | | | | | | | | | | |
| 21 | 0.0022 | 0.0021 | 0.0023 | | | | | | | | | | | | | |
| 22 | 0.0021 | 0.0021 | 0.0023 | | | | | | | | | | | | | |
| 23 | 0.0024 | 0.0024 | 0.0027 | | | | | | | | | | | | | |
| 24 | 0.0022 | 0.0021 | 0.0024 | | | | | | | | | | | | | |
| 25 | 0.0024 | 0.0024 | 0.0025 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.0022 | 0.0022 | 0.0024 | | | | | | | | | | | | | |
| Med. | 0.0021 | 0.0021 | 0.0023 | | | | | | | | | | | | | |
| σ | 0.0003 | 0.0003 | 0.0003 | | | | | | | | | | | | | |
| Min. | 0.0018 | 0.0019 | 0.0019 | | | | | | | | | | | | | |
| Max. | 0.0029 | 0.0031 | 0.0033 | | | | | | | | | | | | | |



Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 1-5
 Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.2637 | 0.2627 | 0.2625 | 0.2624 | 0.2621 | 0.2619 | 0.2618 | 0.2616 | 0.2617 | 0.2614 | 0.2613 | 0.2613 | 0.2613 | 0.2614 | 0.2614 | 0.2611 | 0.2611 | 0.2608 |
| 2 | 0.2628 | 0.2622 | 0.2622 | 0.2621 | 0.2617 | 0.2616 | 0.2616 | 0.2616 | 0.2615 | 0.2613 | 0.2613 | 0.2612 | 0.2612 | 0.2612 | 0.2611 | 0.2610 | 0.2611 | 0.2609 |
| 3 | 0.2621 | 0.2617 | 0.2616 | 0.2617 | 0.2615 | 0.2613 | 0.2613 | 0.2612 | 0.2611 | 0.2610 | 0.2610 | 0.2608 | 0.2607 | 0.2608 | 0.2607 | 0.2605 | 0.2606 | 0.2605 |
| 4 | 0.2597 | 0.2590 | 0.2589 | 0.2590 | 0.2587 | 0.2587 | 0.2586 | 0.2584 | 0.2584 | 0.2582 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2578 | 0.2579 | 0.2577 |
| 5 | 0.2630 | 0.2622 | 0.2623 | 0.2623 | 0.2620 | 0.2618 | 0.2618 | 0.2618 | 0.2618 | 0.2616 | 0.2614 | 0.2614 | 0.2613 | 0.2612 | 0.2613 | 0.2611 | 0.2611 | 0.2611 |
| 6 | 0.2578 | 0.2570 | 0.2570 | 0.2570 | 0.2567 | 0.2568 | 0.2569 | 0.2567 | 0.2568 | 0.2567 | 0.2565 | 0.2565 | 0.2563 | 0.2563 | 0.2562 | 0.2560 | 0.2561 | 0.2559 |
| 7 | 0.2637 | 0.2628 | 0.2626 | 0.2626 | 0.2623 | 0.2621 | 0.2622 | 0.2620 | 0.2621 | 0.2618 | 0.2617 | 0.2616 | 0.2616 | 0.2615 | 0.2614 | 0.2612 | 0.2613 | 0.2612 |
| 8 | 0.2643 | 0.2636 | 0.2635 | 0.2634 | 0.2632 | 0.2630 | 0.2630 | 0.2628 | 0.2628 | 0.2626 | 0.2625 | 0.2625 | 0.2624 | 0.2625 | 0.2623 | 0.2622 | 0.2621 | 0.2621 |
| 9 | 0.2580 | 0.2572 | 0.2571 | 0.2572 | 0.2568 | 0.2567 | 0.2566 | 0.2565 | 0.2566 | 0.2564 | 0.2562 | 0.2562 | 0.2560 | 0.2561 | 0.2560 | 0.2560 | 0.2560 | 0.2558 |
| 10 | 0.2618 | 0.2613 | 0.2612 | 0.2612 | 0.2610 | 0.2609 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2603 | 0.2604 | 0.2602 | 0.2601 | 0.2603 | 0.2601 |
| 11 | 0.2623 | 0.2616 | 0.2615 | 0.2615 | 0.2613 | 0.2612 | 0.2613 | 0.2611 | 0.2612 | 0.2609 | 0.2609 | 0.2608 | 0.2607 | 0.2608 | 0.2607 | 0.2606 | 0.2606 | 0.2605 |
| 12 | 0.2614 | 0.2608 | 0.2607 | 0.2607 | 0.2604 | 0.2603 | 0.2603 | 0.2602 | 0.2602 | 0.2600 | 0.2598 | 0.2598 | 0.2597 | 0.2599 | 0.2598 | 0.2597 | 0.2597 | 0.2596 |
| 13 | 0.2656 | 0.2649 | 0.2648 | 0.2649 | 0.2646 | 0.2645 | 0.2645 | 0.2644 | 0.2643 | 0.2642 | 0.2640 | 0.2640 | 0.2639 | 0.2640 | 0.2638 | 0.2636 | 0.2637 | 0.2636 |
| 14 | 0.2616 | 0.2609 | 0.2608 | 0.2609 | 0.2606 | 0.2604 | 0.2604 | 0.2604 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2597 | 0.2597 | 0.2597 | 0.2596 | 0.2596 | 0.2595 |
| 15 | 0.2622 | 0.2616 | 0.2615 | 0.2616 | 0.2614 | 0.2613 | 0.2612 | 0.2612 | 0.2612 | 0.2610 | 0.2609 | 0.2609 | 0.2607 | 0.2607 | 0.2607 | 0.2606 | 0.2606 | 0.2604 |
| 16 | 0.2639 | 0.2632 | 0.2632 | 0.2632 | 0.2628 | 0.2628 | 0.2628 | 0.2627 | 0.2627 | 0.2625 | 0.2623 | 0.2624 | 0.2623 | 0.2623 | 0.2622 | 0.2621 | 0.2622 | 0.2620 |
| 17 | 0.2632 | 0.2624 | 0.2624 | 0.2625 | 0.2622 | 0.2621 | 0.2621 | 0.2620 | 0.2619 | 0.2618 | 0.2617 | 0.2617 | 0.2616 | 0.2616 | 0.2615 | 0.2613 | 0.2614 | 0.2613 |
| 18 | 0.2645 | 0.2639 | 0.2638 | 0.2638 | 0.2635 | 0.2633 | 0.2634 | 0.2633 | 0.2633 | 0.2631 | 0.2630 | 0.2629 | 0.2629 | 0.2629 | 0.2628 | 0.2627 | 0.2628 | 0.2627 |
| 19 | 0.2636 | 0.2630 | 0.2628 | 0.2629 | 0.2627 | 0.2625 | 0.2624 | 0.2623 | 0.2622 | 0.2621 | 0.2620 | 0.2619 | 0.2618 | 0.2618 | 0.2617 | 0.2616 | 0.2616 | 0.2616 |
| 20 | 0.2613 | 0.2607 | 0.2605 | 0.2607 | 0.2604 | 0.2603 | 0.2602 | 0.2601 | 0.2600 | 0.2598 | 0.2597 | 0.2597 | 0.2596 | 0.2597 | 0.2595 | 0.2594 | 0.2595 | 0.2593 |
| 21 | 0.2618 | 0.2610 | 0.2610 | 0.2610 | 0.2608 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2604 | 0.2603 | 0.2602 | 0.2601 | 0.2601 | 0.2600 | 0.2598 | 0.2599 | 0.2598 |
| 22 | 0.2599 | 0.2593 | 0.2593 | 0.2593 | 0.2591 | 0.2589 | 0.2588 | 0.2587 | 0.2586 | 0.2585 | 0.2584 | 0.2584 | 0.2582 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2580 |
| 23 | 0.2619 | 0.2611 | 0.2609 | 0.2609 | 0.2606 | 0.2605 | 0.2605 | 0.2604 | 0.2604 | 0.2603 | 0.2601 | 0.2600 | 0.2600 | 0.2600 | 0.2599 | 0.2597 | 0.2598 | 0.2597 |
| 24 | 0.2649 | 0.2642 | 0.2641 | 0.2642 | 0.2639 | 0.2637 | 0.2637 | 0.2637 | 0.2636 | 0.2635 | 0.2635 | 0.2635 | 0.2633 | 0.2633 | 0.2632 | 0.2631 | 0.2631 | 0.2629 |
| 25 | 0.2625 | 0.2618 | 0.2618 | 0.2617 | 0.2614 | 0.2613 | 0.2613 | 0.2613 | 0.2612 | 0.2609 | 0.2608 | 0.2608 | 0.2606 | 0.2607 | 0.2606 | 0.2604 | 0.2605 | 0.2604 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2623 | 0.2616 | 0.2615 | 0.2616 | 0.2613 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2608 | 0.2607 | 0.2607 | 0.2606 | 0.2606 | 0.2605 | 0.2604 | 0.2604 | 0.2603 |
| Med. | 0.2623 | 0.2617 | 0.2616 | 0.2617 | 0.2614 | 0.2613 | 0.2613 | 0.2612 | 0.2612 | 0.2610 | 0.2609 | 0.2608 | 0.2607 | 0.2608 | 0.2607 | 0.2606 | 0.2606 | 0.2605 |
| σ | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 |
| Min. | 0.2578 | 0.2570 | 0.2570 | 0.2570 | 0.2567 | 0.2567 | 0.2566 | 0.2565 | 0.2566 | 0.2564 | 0.2562 | 0.2562 | 0.2560 | 0.2561 | 0.2560 | 0.2560 | 0.2560 | 0.2558 |
| Max. | 0.2656 | 0.2649 | 0.2648 | 0.2649 | 0.2646 | 0.2645 | 0.2645 | 0.2644 | 0.2643 | 0.2642 | 0.2640 | 0.2640 | 0.2639 | 0.2640 | 0.2638 | 0.2636 | 0.2637 | 0.2636 |

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Data Set 1 : 55 °C, 100 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 56.9 °C |
| Actual Ambient Temperature [T_A] | 55.8 °C |
| Drive Current [I_F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 1-5 (Continued)
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|----------|-------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.2608 | 0.2607 | 0.2605 | | | | | | | | | | | | | |
| 2 | 0.2608 | 0.2607 | 0.2607 | | | | | | | | | | | | | |
| 3 | 0.2604 | 0.2603 | 0.2603 | | | | | | | | | | | | | |
| 4 | 0.2577 | 0.2577 | 0.2575 | | | | | | | | | | | | | |
| 5 | 0.2609 | 0.2609 | 0.2608 | | | | | | | | | | | | | |
| 6 | 0.2558 | 0.2557 | 0.2555 | | | | | | | | | | | | | |
| 7 | 0.2610 | 0.2609 | 0.2606 | | | | | | | | | | | | | |
| 8 | 0.2619 | 0.2618 | 0.2618 | | | | | | | | | | | | | |
| 9 | 0.2557 | 0.2556 | 0.2554 | | | | | | | | | | | | | |
| 10 | 0.2600 | 0.2600 | 0.2598 | | | | | | | | | | | | | |
| 11 | 0.2604 | 0.2602 | 0.2602 | | | | | | | | | | | | | |
| 12 | 0.2594 | 0.2594 | 0.2593 | | | | | | | | | | | | | |
| 13 | 0.2636 | 0.2636 | 0.2634 | | | | | | | | | | | | | |
| 14 | 0.2593 | 0.2593 | 0.2592 | | | | | | | | | | | | | |
| 15 | 0.2604 | 0.2604 | 0.2601 | | | | | | | | | | | | | |
| 16 | 0.2619 | 0.2619 | 0.2618 | | | | | | | | | | | | | |
| 17 | 0.2612 | 0.2611 | 0.2609 | | | | | | | | | | | | | |
| 18 | 0.2625 | 0.2626 | 0.2625 | | | | | | | | | | | | | |
| 19 | 0.2613 | 0.2614 | 0.2612 | | | | | | | | | | | | | |
| 20 | 0.2592 | 0.2592 | 0.2590 | | | | | | | | | | | | | |
| 21 | 0.2597 | 0.2597 | 0.2595 | | | | | | | | | | | | | |
| 22 | 0.2579 | 0.2579 | 0.2577 | | | | | | | | | | | | | |
| 23 | 0.2596 | 0.2596 | 0.2593 | | | | | | | | | | | | | |
| 24 | 0.2628 | 0.2628 | 0.2626 | | | | | | | | | | | | | |
| 25 | 0.2602 | 0.2602 | 0.2601 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.2602 | 0.2601 | 0.2600 | | | | | | | | | | | | | |
| Med. | 0.2604 | 0.2603 | 0.2602 | | | | | | | | | | | | | |
| σ | 0.0019 | 0.0019 | 0.0019 | | | | | | | | | | | | | |
| Min. | 0.2557 | 0.2556 | 0.2554 | | | | | | | | | | | | | |
| Max. | 0.2636 | 0.2636 | 0.2634 | | | | | | | | | | | | | |



Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 1-6
 Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.5268 | 0.5266 | 0.5266 | 0.5266 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5261 | 0.5263 | 0.5262 | 0.5261 | 0.5262 | 0.5262 |
| 2 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 |
| 3 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 |
| 4 | 0.5238 | 0.5237 | 0.5237 | 0.5237 | 0.5235 | 0.5235 | 0.5234 | 0.5235 | 0.5234 | 0.5234 | 0.5234 | 0.5233 | 0.5233 | 0.5234 | 0.5234 | 0.5233 | 0.5234 | 0.5233 |
| 5 | 0.5273 | 0.5272 | 0.5272 | 0.5273 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 |
| 6 | 0.5242 | 0.5241 | 0.5240 | 0.5241 | 0.5239 | 0.5240 | 0.5240 | 0.5240 | 0.5240 | 0.5239 | 0.5239 | 0.5239 | 0.5238 | 0.5239 | 0.5238 | 0.5237 | 0.5238 | 0.5238 |
| 7 | 0.5247 | 0.5245 | 0.5246 | 0.5246 | 0.5244 | 0.5244 | 0.5243 | 0.5243 | 0.5243 | 0.5242 | 0.5242 | 0.5242 | 0.5241 | 0.5242 | 0.5242 | 0.5242 | 0.5241 | 0.5241 |
| 8 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5262 | 0.5261 |
| 9 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5245 | 0.5245 | 0.5245 | 0.5245 | 0.5244 | 0.5244 | 0.5243 | 0.5243 | 0.5242 | 0.5243 | 0.5243 | 0.5242 | 0.5243 | 0.5243 |
| 10 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5250 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5249 | 0.5249 |
| 11 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 |
| 12 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5269 |
| 13 | 0.5323 | 0.5322 | 0.5322 | 0.5323 | 0.5321 | 0.5321 | 0.5321 | 0.5321 | 0.5321 | 0.5321 | 0.5320 | 0.5320 | 0.5320 | 0.5320 | 0.5320 | 0.5320 | 0.5321 | 0.5320 |
| 14 | 0.5281 | 0.5279 | 0.5279 | 0.5280 | 0.5278 | 0.5279 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 |
| 15 | 0.5250 | 0.5249 | 0.5249 | 0.5250 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5248 | 0.5247 | 0.5246 | 0.5247 | 0.5247 |
| 16 | 0.5245 | 0.5243 | 0.5244 | 0.5243 | 0.5242 | 0.5242 | 0.5242 | 0.5241 | 0.5241 | 0.5241 | 0.5241 | 0.5241 | 0.5240 | 0.5241 | 0.5240 | 0.5240 | 0.5241 | 0.5240 |
| 17 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 |
| 18 | 0.5279 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 |
| 19 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 |
| 20 | 0.5272 | 0.5271 | 0.5271 | 0.5272 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 |
| 21 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5273 | 0.5272 |
| 22 | 0.5246 | 0.5245 | 0.5245 | 0.5245 | 0.5244 | 0.5244 | 0.5243 | 0.5243 | 0.5243 | 0.5243 | 0.5242 | 0.5243 | 0.5242 | 0.5242 | 0.5242 | 0.5242 | 0.5242 | 0.5242 |
| 23 | 0.5266 | 0.5265 | 0.5264 | 0.5264 | 0.5262 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5261 |
| 24 | 0.5285 | 0.5284 | 0.5284 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5281 |
| 25 | 0.5261 | 0.5260 | 0.5261 | 0.5261 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5257 | 0.5257 | 0.5256 | 0.5257 | 0.5257 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5263 | 0.5262 |
| Med. | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 |
| σ | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 |
| Min. | 0.5238 | 0.5237 | 0.5237 | 0.5237 | 0.5235 | 0.5235 | 0.5234 | 0.5235 | 0.5234 | 0.5234 | 0.5234 | 0.5233 | 0.5233 | 0.5234 | 0.5234 | 0.5233 | 0.5234 | 0.5233 |
| Max. | 0.5323 | 0.5322 | 0.5322 | 0.5323 | 0.5321 | 0.5321 | 0.5321 | 0.5321 | 0.5321 | 0.5321 | 0.5320 | 0.5320 | 0.5320 | 0.5320 | 0.5320 | 0.5320 | 0.5321 | 0.5320 |

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Data Set 1 : 55 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 56.9 °C |
| Actual Ambient Temperature [T _A] | 55.8 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 1-6 (Continued)
Chromaticity

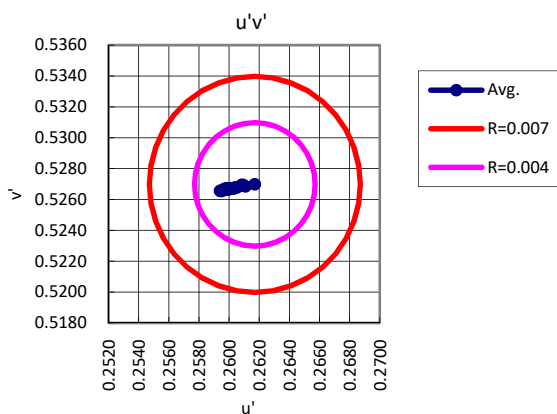
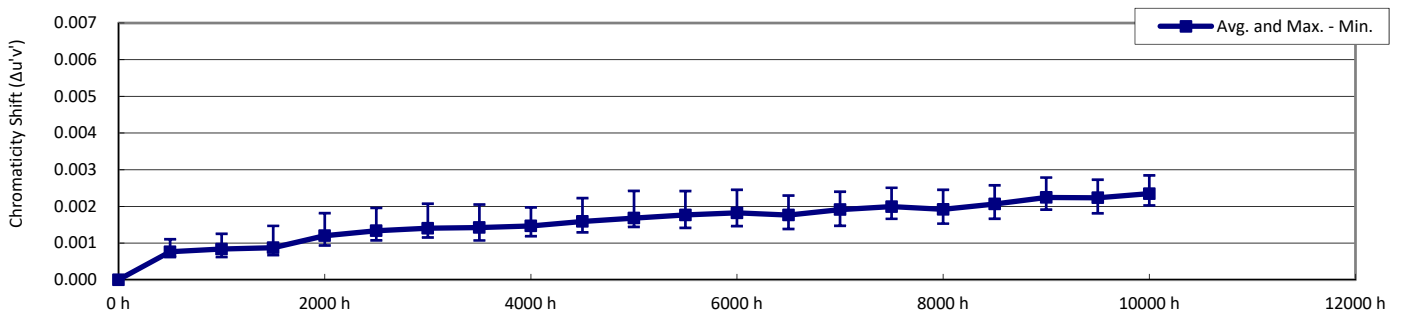
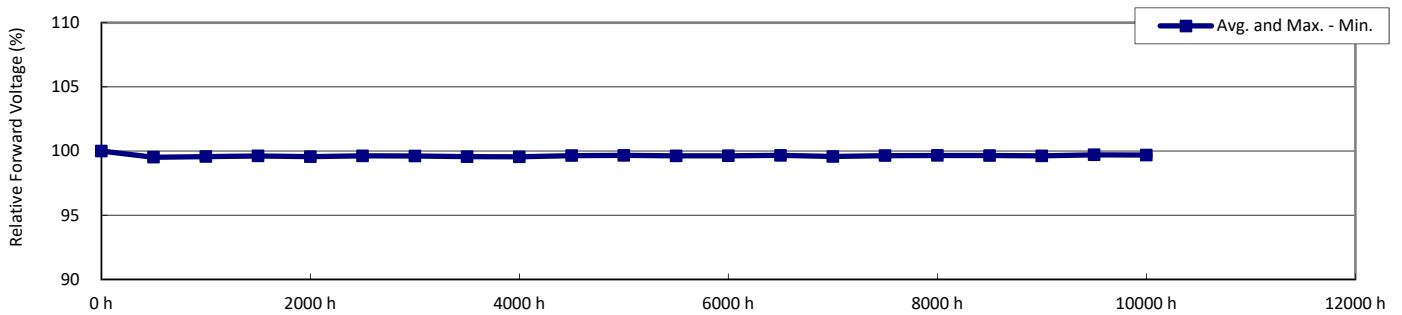
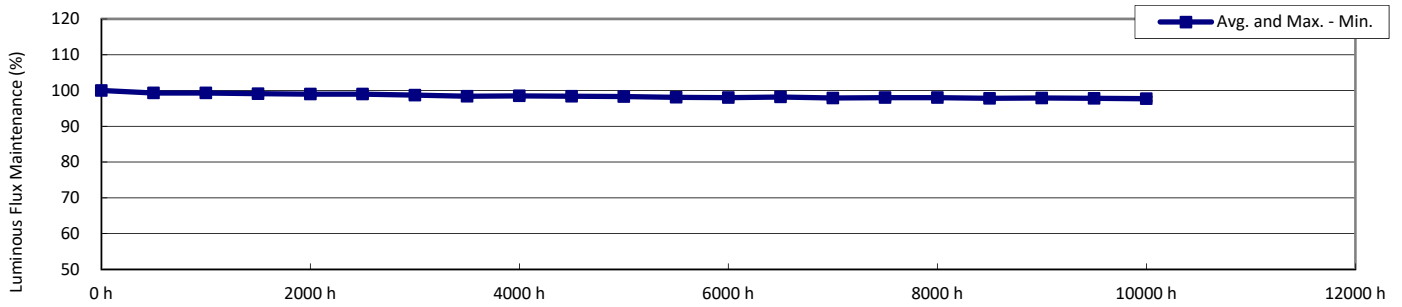
| LED No. | Chromaticity v' | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | |
| 1 | 0.5261 | 0.5260 | 0.5260 | | | | | | | | | |
| 2 | 0.5269 | 0.5269 | 0.5269 | | | | | | | | | |
| 3 | 0.5267 | 0.5267 | 0.5267 | | | | | | | | | |
| 4 | 0.5232 | 0.5232 | 0.5232 | | | | | | | | | |
| 5 | 0.5268 | 0.5269 | 0.5268 | | | | | | | | | |
| 6 | 0.5236 | 0.5237 | 0.5235 | | | | | | | | | |
| 7 | 0.5240 | 0.5240 | 0.5239 | | | | | | | | | |
| 8 | 0.5260 | 0.5260 | 0.5260 | | | | | | | | | |
| 9 | 0.5241 | 0.5242 | 0.5241 | | | | | | | | | |
| 10 | 0.5248 | 0.5247 | 0.5247 | | | | | | | | | |
| 11 | 0.5277 | 0.5277 | 0.5276 | | | | | | | | | |
| 12 | 0.5267 | 0.5267 | 0.5268 | | | | | | | | | |
| 13 | 0.5319 | 0.5320 | 0.5319 | | | | | | | | | |
| 14 | 0.5275 | 0.5276 | 0.5275 | | | | | | | | | |
| 15 | 0.5245 | 0.5245 | 0.5245 | | | | | | | | | |
| 16 | 0.5239 | 0.5240 | 0.5239 | | | | | | | | | |
| 17 | 0.5266 | 0.5266 | 0.5265 | | | | | | | | | |
| 18 | 0.5275 | 0.5275 | 0.5275 | | | | | | | | | |
| 19 | 0.5274 | 0.5274 | 0.5273 | | | | | | | | | |
| 20 | 0.5267 | 0.5268 | 0.5266 | | | | | | | | | |
| 21 | 0.5272 | 0.5272 | 0.5271 | | | | | | | | | |
| 22 | 0.5241 | 0.5241 | 0.5241 | | | | | | | | | |
| 23 | 0.5260 | 0.5261 | 0.5259 | | | | | | | | | |
| 24 | 0.5281 | 0.5281 | 0.5281 | | | | | | | | | |
| 25 | 0.5256 | 0.5256 | 0.5256 | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | |
| Avg. | 0.5261 | 0.5262 | 0.5261 | | | | | | | | | |
| Med. | 0.5266 | 0.5266 | 0.5265 | | | | | | | | | |
| σ | 0.0019 | 0.0019 | 0.0019 | | | | | | | | | |
| Min. | 0.5232 | 0.5232 | 0.5232 | | | | | | | | | |
| Max. | 0.5319 | 0.5320 | 0.5319 | | | | | | | | | |



Data Set 2 : 55 °C, 150 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 57.3 °C |
| Actual Ambient Temperature [T_A] | 55.9 °C |
| Drive Current [I_F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0



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Data Set 2 : 55 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 57.3 °C |
| Actual Ambient Temperature [T _A] | 55.9 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 2-1
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | | | |
|---------|---------------------|--------------------|---------------------|-------------|---------|--------|---------|--------|--|--|--|--|--|--|
| | Φ _V [lm] | V _F [V] | T _{CP} [K] | P [W] | x | y | u' | v' | | | | | | |
| 1 | 135.0 | 6.25 | 2750 | 0.94 | 0.455 | 0.407 | 0.261 | 0.525 | | | | | | |
| 2 | 133.0 | 6.24 | 2642 | 0.94 | 0.461 | 0.405 | 0.266 | 0.525 | | | | | | |
| 3 | 136.1 | 6.26 | 2745 | 0.94 | 0.456 | 0.409 | 0.261 | 0.526 | | | | | | |
| 4 | 134.8 | 6.26 | 2713 | 0.94 | 0.458 | 0.410 | 0.262 | 0.527 | | | | | | |
| 5 | 135.4 | 6.25 | 2702 | 0.94 | 0.461 | 0.413 | 0.262 | 0.528 | | | | | | |
| 6 | 134.5 | 6.24 | 2695 | 0.94 | 0.460 | 0.409 | 0.263 | 0.527 | | | | | | |
| 7 | 135.7 | 6.25 | 2720 | 0.94 | 0.460 | 0.414 | 0.261 | 0.529 | | | | | | |
| 8 | 136.4 | 6.26 | 2740 | 0.94 | 0.460 | 0.416 | 0.260 | 0.530 | | | | | | |
| 9 | 135.5 | 6.25 | 2709 | 0.94 | 0.461 | 0.413 | 0.262 | 0.529 | | | | | | |
| 10 | 135.3 | 6.24 | 2725 | 0.94 | 0.458 | 0.411 | 0.261 | 0.527 | | | | | | |
| 11 | 134.9 | 6.25 | 2697 | 0.94 | 0.460 | 0.410 | 0.263 | 0.527 | | | | | | |
| 12 | 135.1 | 6.26 | 2729 | 0.94 | 0.458 | 0.410 | 0.261 | 0.527 | | | | | | |
| 13 | 134.9 | 6.27 | 2725 | 0.94 | 0.456 | 0.407 | 0.262 | 0.525 | | | | | | |
| 14 | 134.5 | 6.25 | 2661 | 0.94 | 0.464 | 0.413 | 0.264 | 0.529 | | | | | | |
| 15 | 135.3 | 6.26 | 2702 | 0.94 | 0.461 | 0.414 | 0.262 | 0.529 | | | | | | |
| 16 | 136.3 | 6.26 | 2713 | 0.94 | 0.461 | 0.414 | 0.262 | 0.529 | | | | | | |
| 17 | 136.4 | 6.25 | 2813 | 0.94 | 0.451 | 0.410 | 0.258 | 0.526 | | | | | | |
| 18 | 136.7 | 6.26 | 2768 | 0.94 | 0.457 | 0.413 | 0.259 | 0.528 | | | | | | |
| 19 | 134.4 | 6.25 | 2688 | 0.94 | 0.460 | 0.409 | 0.263 | 0.527 | | | | | | |
| 20 | 133.7 | 6.24 | 2674 | 0.94 | 0.460 | 0.407 | 0.264 | 0.526 | | | | | | |
| 21 | 135.2 | 6.25 | 2753 | 0.94 | 0.456 | 0.411 | 0.260 | 0.527 | | | | | | |
| 22 | 134.6 | 6.26 | 2693 | 0.94 | 0.460 | 0.409 | 0.263 | 0.527 | | | | | | |
| 23 | 134.6 | 6.25 | 2689 | 0.94 | 0.463 | 0.415 | 0.263 | 0.530 | | | | | | |
| 24 | 134.4 | 6.25 | 2728 | 0.94 | 0.457 | 0.408 | 0.261 | 0.526 | | | | | | |
| 25 | 135 | 6.25 | 2703 | 0.94 | 0.459 | 0.410 | 0.262 | 0.527 | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | | | |
| Avg. | 135.1 | 6.25 | 2715 | 0.94 | 0.459 | 0.411 | 0.262 | 0.527 | | | | | | |
| Med. | 135.0 | 6.25 | 2713 | 0.94 | 0.460 | 0.410 | 0.262 | 0.527 | | | | | | |
| σ | 0.87 | 0.006 | 35.5 | 0.001 | 0.0028 | 0.0028 | 0.0017 | 0.0013 | | | | | | |
| Min. | 133.0 | 6.24 | 2642 | 0.94 | 0.451 | 0.405 | 0.258 | 0.525 | | | | | | |
| Max. | 136.7 | 6.27 | 2813 | 0.94 | 0.464 | 0.416 | 0.266 | 0.530 | | | | | | |



Data Set 2 : 55 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 57.3 °C |
| Actual Ambient Temperature [T _A] | 55.9 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 2-2
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.1 | 99.2 | 98.9 | 98.8 | 98.8 | 98.5 | 98.2 | 98.3 | 98.3 | 98.1 | 98.0 | 97.9 | 98.1 | 97.8 | 97.8 | 97.7 | 97.6 |
| 2 | 100.0 | 99.2 | 99.2 | 99.1 | 98.9 | 98.9 | 98.6 | 98.3 | 98.3 | 98.3 | 98.0 | 98.0 | 97.9 | 98.1 | 97.7 | 97.7 | 97.8 | 97.7 |
| 3 | 100.0 | 99.2 | 99.3 | 99.3 | 99.3 | 99.4 | 99.0 | 98.7 | 98.8 | 98.7 | 98.5 | 98.3 | 98.3 | 98.5 | 98.2 | 98.2 | 98.4 | 98.2 |
| 4 | 100.0 | 99.2 | 99.2 | 98.9 | 98.7 | 98.7 | 98.4 | 98.1 | 98.2 | 98.1 | 97.9 | 97.7 | 97.7 | 97.9 | 97.5 | 97.6 | 97.6 | 97.5 |
| 5 | 100.0 | 99.4 | 99.3 | 99.2 | 99.0 | 99.0 | 98.7 | 98.4 | 98.4 | 98.3 | 98.2 | 97.9 | 97.8 | 98.2 | 97.6 | 97.7 | 97.8 | 97.6 |
| 6 | 100.0 | 99.3 | 99.3 | 99.0 | 98.8 | 98.9 | 98.7 | 98.3 | 98.4 | 98.4 | 98.3 | 98.1 | 98.1 | 98.2 | 97.9 | 97.9 | 97.9 | 97.8 |
| 7 | 100.0 | 99.3 | 99.2 | 99.1 | 99.0 | 98.8 | 98.6 | 98.3 | 98.4 | 98.3 | 98.1 | 97.9 | 97.8 | 98.0 | 97.7 | 97.8 | 97.8 | 97.6 |
| 8 | 100.0 | 99.1 | 99.0 | 99.0 | 98.6 | 98.1 | 98.0 | 97.8 | 97.8 | 97.7 | 97.7 | 97.5 | 97.3 | 97.6 | 97.2 | 97.3 | 97.4 | 97.2 |
| 9 | 100.0 | 99.2 | 99.2 | 99.2 | 99.1 | 99.0 | 98.8 | 98.5 | 98.3 | 98.4 | 98.3 | 98.1 | 97.9 | 98.2 | 97.9 | 97.9 | 98.0 | 97.8 |
| 10 | 100.0 | 99.2 | 99.0 | 99.1 | 98.9 | 98.9 | 98.7 | 98.4 | 98.4 | 98.4 | 98.3 | 98.1 | 98.0 | 98.2 | 97.9 | 97.9 | 97.9 | 97.8 |
| 11 | 100.0 | 99.2 | 98.9 | 98.9 | 98.7 | 98.7 | 98.4 | 98.2 | 98.3 | 98.1 | 98.4 | 97.8 | 97.9 | 98.0 | 97.6 | 97.6 | 97.7 | 97.5 |
| 12 | 100.0 | 99.4 | 99.3 | 99.3 | 99.2 | 99.1 | 98.9 | 98.6 | 98.5 | 98.5 | 98.5 | 98.2 | 98.2 | 98.4 | 98.1 | 98.2 | 98.1 | 98.0 |
| 13 | 100.0 | 99.5 | 99.6 | 99.5 | 99.4 | 99.2 | 99.0 | 98.7 | 98.8 | 98.8 | 98.6 | 98.3 | 98.2 | 98.5 | 98.1 | 98.3 | 98.2 | 98.1 |
| 14 | 100.0 | 98.9 | 98.9 | 98.6 | 98.3 | 98.2 | 97.9 | 97.7 | 98.0 | 97.8 | 97.7 | 97.5 | 97.4 | 97.9 | 97.5 | 97.9 | 97.9 | 97.7 |
| 15 | 100.0 | 99.4 | 99.5 | 99.5 | 99.4 | 99.2 | 99.0 | 98.7 | 98.7 | 98.7 | 98.6 | 98.3 | 98.3 | 98.6 | 98.2 | 98.4 | 98.3 | 98.2 |
| 16 | 100.0 | 99.4 | 99.5 | 99.3 | 99.2 | 99.1 | 98.8 | 98.6 | 98.6 | 98.6 | 98.5 | 98.2 | 98.1 | 98.4 | 98.1 | 98.3 | 98.2 | 98.1 |
| 17 | 100.0 | 99.2 | 99.3 | 98.8 | 98.7 | 98.8 | 98.4 | 98.1 | 98.4 | 98.2 | 98.2 | 97.7 | 97.5 | 97.9 | 97.5 | 97.6 | 97.6 | 97.4 |
| 18 | 100.0 | 99.5 | 99.5 | 99.4 | 99.2 | 99.1 | 98.9 | 98.6 | 98.7 | 98.6 | 98.5 | 98.3 | 98.1 | 98.4 | 98.2 | 98.2 | 98.2 | 98.1 |
| 19 | 100.0 | 99.0 | 98.8 | 98.9 | 99.2 | 99.0 | 98.8 | 98.6 | 98.5 | 98.5 | 98.4 | 98.2 | 98.0 | 98.3 | 98.0 | 98.1 | 98.0 | 97.9 |
| 20 | 100.0 | 99.5 | 99.4 | 99.4 | 99.3 | 99.2 | 99.0 | 98.7 | 98.7 | 98.7 | 98.6 | 98.4 | 98.2 | 98.5 | 98.1 | 98.1 | 98.2 | 98.0 |
| 21 | 100.0 | 99.6 | 99.5 | 99.5 | 99.4 | 99.2 | 98.9 | 98.7 | 98.7 | 98.6 | 98.4 | 98.3 | 98.1 | 98.4 | 98.0 | 98.1 | 98.1 | 97.9 |
| 22 | 100.0 | 99.4 | 99.3 | 99.2 | 99.1 | 99.1 | 98.9 | 98.6 | 98.7 | 98.6 | 98.5 | 98.3 | 98.1 | 98.4 | 98.0 | 98.2 | 98.3 | 98.0 |
| 23 | 100.0 | 99.5 | 99.4 | 99.3 | 99.2 | 99.3 | 99.0 | 98.6 | 98.7 | 98.6 | 98.6 | 98.2 | 98.1 | 98.3 | 97.9 | 98.0 | 97.9 | 97.7 |
| 24 | 100.0 | 99.4 | 99.3 | 99.2 | 99.2 | 99.0 | 98.7 | 98.5 | 98.6 | 98.4 | 98.4 | 98.1 | 98.0 | 98.2 | 97.8 | 98.0 | 98.0 | 97.8 |
| 25 | 100.0 | 99.2 | 99.2 | 99.1 | 99.3 | 99.3 | 99.1 | 98.7 | 98.7 | 98.7 | 98.7 | 98.3 | 98.2 | 98.4 | 98.1 | 98.2 | 98.3 | 98.1 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.3 | 99.3 | 99.1 | 99.0 | 99.0 | 98.7 | 98.4 | 98.5 | 98.4 | 98.3 | 98.1 | 98.0 | 98.2 | 97.9 | 98.0 | 98.0 | 97.8 |
| Med. | 100.0 | 99.3 | 99.3 | 99.2 | 99.1 | 99.0 | 98.8 | 98.5 | 98.5 | 98.4 | 98.4 | 98.1 | 98.0 | 98.2 | 97.9 | 98.0 | 98.0 | 97.8 |
| σ | 0.00 | 0.17 | 0.21 | 0.23 | 0.29 | 0.31 | 0.31 | 0.28 | 0.25 | 0.28 | 0.28 | 0.26 | 0.26 | 0.24 | 0.27 | 0.27 | 0.26 | 0.26 |
| Min. | 100.0 | 98.9 | 98.8 | 98.6 | 98.3 | 98.1 | 97.9 | 97.7 | 97.8 | 97.7 | 97.7 | 97.5 | 97.3 | 97.6 | 97.2 | 97.3 | 97.4 | 97.2 |
| Max. | 100.0 | 99.6 | 99.6 | 99.5 | 99.4 | 99.4 | 99.1 | 98.7 | 98.8 | 98.8 | 98.7 | 98.4 | 98.3 | 98.6 | 98.2 | 98.4 | 98.4 | 98.2 |

TM-21 Projection

| Test duration used | 5000 h | to | 10000 h |
|----------------------------------|-----------|-------|---------|
| B | 0.9868 | | |
| α | 9.649E-07 | | |
| R ² | 0.7641 | | |
| Calculated L ₇₀ (10K) | 356000 | hours | |
| Reported L ₇₀ (10K) | > 60000 | hours | |
| Calculated L ₈₀ (10K) | 217000 | hours | |
| Reported L ₈₀ (10K) | > 60000 | hours | |
| Calculated L ₉₀ (10K) | 95400 | hours | |
| Reported L ₉₀ (10K) | > 60000 | hours | |

Curve-fit equation:

$$\Phi(t) = B \exp(-\alpha t)$$

Luminous flux maintenance life equation:

$$L_{70} = \ln(B/0.7)/\alpha$$

$$L_{80} = \ln(B/0.8)/\alpha$$

$$L_{90} = \ln(B/0.9)/\alpha$$

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Data Set 2 : 55 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 57.3 °C |
| Actual Ambient Temperature [T _A] | 55.9 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 2-2 (Continued)
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | |
|---------|--|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | |
| 1 | 97.7 | 97.6 | 97.4 | | | | | | | | | | | | |
| 2 | 97.8 | 97.7 | 97.6 | | | | | | | | | | | | |
| 3 | 98.4 | 98.3 | 98.2 | | | | | | | | | | | | |
| 4 | 97.6 | 97.5 | 97.6 | | | | | | | | | | | | |
| 5 | 97.5 | 97.4 | 97.3 | | | | | | | | | | | | |
| 6 | 97.9 | 97.8 | 97.7 | | | | | | | | | | | | |
| 7 | 97.7 | 97.7 | 97.5 | | | | | | | | | | | | |
| 8 | 97.3 | 97.2 | 97.1 | | | | | | | | | | | | |
| 9 | 97.9 | 97.8 | 97.6 | | | | | | | | | | | | |
| 10 | 97.9 | 97.8 | 97.7 | | | | | | | | | | | | |
| 11 | 97.6 | 97.5 | 97.3 | | | | | | | | | | | | |
| 12 | 98.1 | 97.9 | 97.7 | | | | | | | | | | | | |
| 13 | 98.2 | 98.1 | 97.9 | | | | | | | | | | | | |
| 14 | 97.8 | 97.7 | 97.9 | | | | | | | | | | | | |
| 15 | 98.3 | 98.2 | 98.1 | | | | | | | | | | | | |
| 16 | 98.1 | 98.1 | 98.0 | | | | | | | | | | | | |
| 17 | 97.4 | 97.6 | 97.5 | | | | | | | | | | | | |
| 18 | 98.2 | 98.2 | 98.0 | | | | | | | | | | | | |
| 19 | 98.0 | 97.8 | 97.8 | | | | | | | | | | | | |
| 20 | 98.2 | 98.0 | 98.0 | | | | | | | | | | | | |
| 21 | 98.2 | 98.0 | 98.0 | | | | | | | | | | | | |
| 22 | 98.1 | 98.0 | 98.0 | | | | | | | | | | | | |
| 23 | 98.0 | 97.8 | 97.6 | | | | | | | | | | | | |
| 24 | 98.1 | 97.9 | 97.8 | | | | | | | | | | | | |
| 25 | 98.2 | 98.1 | 97.9 | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | |
| Avg. | 97.9 | 97.8 | 97.7 | | | | | | | | | | | | |
| Med. | 98.0 | 97.8 | 97.7 | | | | | | | | | | | | |
| σ | 0.29 | 0.27 | 0.28 | | | | | | | | | | | | |
| Min. | 97.3 | 97.2 | 97.1 | | | | | | | | | | | | |
| Max. | 98.4 | 98.3 | 98.2 | | | | | | | | | | | | |



Data Set 2 : 55 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 57.3 °C |
| Actual Ambient Temperature [T _A] | 55.9 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 2-3
Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.8 | 99.7 |
| 2 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 3 | 100.0 | 99.5 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 4 | 100.0 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.8 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 5 | 100.0 | 99.5 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 6 | 100.0 | 99.5 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 |
| 7 | 100.0 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 |
| 8 | 100.0 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.7 | 99.6 | 99.6 |
| 9 | 100.0 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 |
| 10 | 100.0 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 |
| 11 | 100.0 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 |
| 12 | 100.0 | 99.4 | 99.4 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.6 | 99.4 | 99.6 | 99.5 | 99.6 |
| 13 | 100.0 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 |
| 14 | 100.0 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 15 | 100.0 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 |
| 16 | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 17 | 100.0 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 18 | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 |
| 19 | 100.0 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 20 | 100.0 | 99.5 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 |
| 21 | 100.0 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 |
| 22 | 100.0 | 99.6 | 99.5 | 99.6 | 99.6 | 99.7 | 99.6 | 99.5 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 23 | 100.0 | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | 99.5 | 99.5 | 99.4 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 |
| 24 | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 |
| 25 | 100.0 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 |
| Med. | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| σ | 0.00 | 0.07 | 0.07 | 0.06 | 0.08 | 0.06 | 0.05 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.06 | 0.05 | 0.07 | 0.06 |
| Min. | 100.0 | 99.4 | 99.4 | 99.5 | 99.4 | 99.5 | 99.5 | 99.4 | 99.4 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.4 | 99.5 | 99.5 | 99.5 |
| Max. | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |



Data Set 2 : 55 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 57.3 °C |
| Actual Ambient Temperature [T _A] | 55.9 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 2-3 (Continued)
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|---|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 2 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 3 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 4 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 5 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 6 | 99.6 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 7 | 99.5 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 8 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 9 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 10 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 11 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 12 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 13 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 14 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 15 | 99.6 | 99.6 | 99.7 | | | | | | | | | | | | | |
| 16 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 17 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 18 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 19 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 20 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 21 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 22 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 23 | 99.5 | 99.6 | 99.6 | | | | | | | | | | | | | |
| 24 | 99.6 | 99.8 | 99.6 | | | | | | | | | | | | | |
| 25 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| Med. | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| σ | 0.06 | 0.07 | 0.06 | | | | | | | | | | | | | |
| Min. | 99.5 | 99.6 | 99.6 | | | | | | | | | | | | | |
| Max. | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |



Data Set 2 : 55 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 57.3 °C |
| Actual Ambient Temperature [T _A] | 55.9 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 2-4
 Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.0000 | 0.0007 | 0.0009 | 0.0010 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0021 | 0.0021 | 0.0022 | 0.0024 | 0.0023 | 0.0024 |
| 2 | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0013 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0024 |
| 3 | 0.0000 | 0.0007 | 0.0008 | 0.0008 | 0.0010 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0015 | 0.0017 | 0.0018 | 0.0017 | 0.0018 |
| 4 | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0015 | 0.0016 | 0.0017 | 0.0016 | 0.0017 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0022 | 0.0023 |
| 5 | 0.0000 | 0.0007 | 0.0007 | 0.0008 | 0.0012 | 0.0012 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0020 |
| 6 | 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0011 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0019 | 0.0020 | 0.0019 | 0.0020 |
| 7 | 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0014 | 0.0013 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0023 |
| 8 | 0.0000 | 0.0008 | 0.0008 | 0.0010 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | 0.0022 | 0.0022 | 0.0022 | 0.0024 |
| 9 | 0.0000 | 0.0007 | 0.0008 | 0.0008 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0017 | 0.0019 | 0.0021 | 0.0019 | 0.0021 |
| 10 | 0.0000 | 0.0008 | 0.0007 | 0.0007 | 0.0010 | 0.0011 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0017 | 0.0019 |
| 11 | 0.0000 | 0.0007 | 0.0007 | 0.0008 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0015 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0016 | 0.0017 |
| 12 | 0.0000 | 0.0007 | 0.0007 | 0.0008 | 0.0010 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0015 | 0.0017 | 0.0017 | 0.0017 | 0.0018 |
| 13 | 0.0000 | 0.0006 | 0.0007 | 0.0007 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0018 | 0.0017 | 0.0019 | 0.0019 | 0.0019 | 0.0020 |
| 14 | 0.0000 | 0.0010 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0020 | 0.0022 | 0.0024 | 0.0024 | 0.0025 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0026 |
| 15 | 0.0000 | 0.0007 | 0.0008 | 0.0007 | 0.0011 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0015 | 0.0017 | 0.0018 | 0.0017 | 0.0019 |
| 16 | 0.0000 | 0.0007 | 0.0008 | 0.0008 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0015 | 0.0018 |
| 17 | 0.0000 | 0.0008 | 0.0010 | 0.0010 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0015 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0022 |
| 18 | 0.0000 | 0.0006 | 0.0007 | 0.0008 | 0.0010 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0017 | 0.0018 | 0.0016 | 0.0018 |
| 19 | 0.0000 | 0.0011 | 0.0012 | 0.0011 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0019 | 0.0022 | 0.0023 | 0.0022 | 0.0023 |
| 20 | 0.0000 | 0.0008 | 0.0009 | 0.0008 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0022 |
| 21 | 0.0000 | 0.0007 | 0.0006 | 0.0007 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0016 | 0.0015 | 0.0017 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0018 | 0.0019 |
| 22 | 0.0000 | 0.0007 | 0.0008 | 0.0008 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0014 | 0.0016 | 0.0017 | 0.0017 | 0.0016 | 0.0018 | 0.0019 | 0.0019 | 0.0020 |
| 23 | 0.0000 | 0.0006 | 0.0008 | 0.0007 | 0.0009 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0014 | 0.0017 | 0.0017 | 0.0017 | 0.0018 |
| 24 | 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0017 | 0.0018 | 0.0020 | 0.0019 | 0.0020 |
| 25 | 0.0000 | 0.0010 | 0.0010 | 0.0010 | 0.0012 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0021 | 0.0022 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0019 | 0.0021 |
| Med. | 0.0000 | 0.0007 | 0.0008 | 0.0008 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0017 | 0.0019 | 0.0020 | 0.0019 | 0.0020 |
| σ | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| Min. | 0.0000 | 0.0006 | 0.0006 | 0.0007 | 0.0009 | 0.0011 | 0.0012 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0017 | 0.0015 | 0.0017 |
| Max. | 0.0000 | 0.0011 | 0.0013 | 0.0015 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0020 | 0.0022 | 0.0024 | 0.0024 | 0.0025 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0026 |

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Data Set 2 : 55 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 57.3 °C |
| Actual Ambient Temperature [T _A] | 55.9 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 2-4 (Continued)
 Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.0026 | 0.0027 | 0.0028 | | | | | | | | | | | | | |
| 2 | 0.0025 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| 3 | 0.0019 | 0.0019 | 0.0021 | | | | | | | | | | | | | |
| 4 | 0.0025 | 0.0025 | 0.0027 | | | | | | | | | | | | | |
| 5 | 0.0021 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| 6 | 0.0022 | 0.0023 | 0.0024 | | | | | | | | | | | | | |
| 7 | 0.0024 | 0.0024 | 0.0024 | | | | | | | | | | | | | |
| 8 | 0.0025 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| 9 | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 10 | 0.0021 | 0.0021 | 0.0021 | | | | | | | | | | | | | |
| 11 | 0.0019 | 0.0018 | 0.0020 | | | | | | | | | | | | | |
| 12 | 0.0020 | 0.0020 | 0.0021 | | | | | | | | | | | | | |
| 13 | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 14 | 0.0028 | 0.0027 | 0.0028 | | | | | | | | | | | | | |
| 15 | 0.0020 | 0.0020 | 0.0021 | | | | | | | | | | | | | |
| 16 | 0.0020 | 0.0019 | 0.0021 | | | | | | | | | | | | | |
| 17 | 0.0024 | 0.0024 | 0.0025 | | | | | | | | | | | | | |
| 18 | 0.0020 | 0.0019 | 0.0020 | | | | | | | | | | | | | |
| 19 | 0.0026 | 0.0025 | 0.0027 | | | | | | | | | | | | | |
| 20 | 0.0023 | 0.0023 | 0.0024 | | | | | | | | | | | | | |
| 21 | 0.0021 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| 22 | 0.0022 | 0.0021 | 0.0023 | | | | | | | | | | | | | |
| 23 | 0.0020 | 0.0020 | 0.0021 | | | | | | | | | | | | | |
| 24 | 0.0023 | 0.0022 | 0.0022 | | | | | | | | | | | | | |
| 25 | 0.0024 | 0.0024 | 0.0026 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| Med. | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| σ | 0.0002 | 0.0003 | 0.0002 | | | | | | | | | | | | | |
| Min. | 0.0019 | 0.0018 | 0.0020 | | | | | | | | | | | | | |
| Max. | 0.0028 | 0.0027 | 0.0028 | | | | | | | | | | | | | |



Data Set 2 : 55 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 57.3 °C |
| Actual Ambient Temperature [T _A] | 55.9 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 2-5
 Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.2610 | 0.2602 | 0.2601 | 0.2600 | 0.2596 | 0.2594 | 0.2594 | 0.2594 | 0.2593 | 0.2592 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | 0.2588 | 0.2586 | 0.2587 | 0.2586 |
| 2 | 0.2661 | 0.2653 | 0.2652 | 0.2652 | 0.2648 | 0.2647 | 0.2646 | 0.2644 | 0.2643 | 0.2644 | 0.2642 | 0.2641 | 0.2640 | 0.2640 | 0.2640 | 0.2639 | 0.2639 | 0.2638 |
| 3 | 0.2610 | 0.2603 | 0.2602 | 0.2602 | 0.2600 | 0.2599 | 0.2598 | 0.2597 | 0.2598 | 0.2596 | 0.2594 | 0.2595 | 0.2594 | 0.2595 | 0.2593 | 0.2593 | 0.2594 | 0.2592 |
| 4 | 0.2627 | 0.2618 | 0.2618 | 0.2617 | 0.2613 | 0.2611 | 0.2611 | 0.2611 | 0.2611 | 0.2609 | 0.2607 | 0.2607 | 0.2607 | 0.2607 | 0.2605 | 0.2604 | 0.2606 | 0.2604 |
| 5 | 0.2646 | 0.2640 | 0.2639 | 0.2639 | 0.2635 | 0.2635 | 0.2633 | 0.2633 | 0.2633 | 0.2631 | 0.2631 | 0.2629 | 0.2630 | 0.2630 | 0.2629 | 0.2629 | 0.2628 | 0.2627 |
| 6 | 0.2636 | 0.2629 | 0.2628 | 0.2627 | 0.2625 | 0.2623 | 0.2622 | 0.2623 | 0.2622 | 0.2621 | 0.2620 | 0.2620 | 0.2619 | 0.2619 | 0.2618 | 0.2616 | 0.2617 | 0.2616 |
| 7 | 0.2616 | 0.2609 | 0.2609 | 0.2608 | 0.2603 | 0.2603 | 0.2602 | 0.2601 | 0.2601 | 0.2600 | 0.2598 | 0.2598 | 0.2597 | 0.2598 | 0.2596 | 0.2596 | 0.2595 | 0.2594 |
| 8 | 0.2605 | 0.2597 | 0.2596 | 0.2594 | 0.2591 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2585 | 0.2583 | 0.2583 | 0.2583 | 0.2581 |
| 9 | 0.2620 | 0.2613 | 0.2612 | 0.2613 | 0.2609 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2606 | 0.2604 | 0.2603 | 0.2603 | 0.2604 | 0.2601 | 0.2600 | 0.2602 | 0.2600 |
| 10 | 0.2620 | 0.2613 | 0.2613 | 0.2613 | 0.2610 | 0.2609 | 0.2607 | 0.2609 | 0.2607 | 0.2606 | 0.2605 | 0.2604 | 0.2605 | 0.2604 | 0.2603 | 0.2602 | 0.2603 | 0.2602 |
| 11 | 0.2651 | 0.2644 | 0.2644 | 0.2644 | 0.2641 | 0.2640 | 0.2639 | 0.2639 | 0.2640 | 0.2639 | 0.2637 | 0.2637 | 0.2637 | 0.2638 | 0.2637 | 0.2635 | 0.2636 | 0.2635 |
| 12 | 0.2619 | 0.2611 | 0.2611 | 0.2610 | 0.2609 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2605 | 0.2604 | 0.2603 | 0.2603 | 0.2603 | 0.2602 | 0.2602 | 0.2602 | 0.2601 |
| 13 | 0.2620 | 0.2614 | 0.2613 | 0.2613 | 0.2610 | 0.2608 | 0.2608 | 0.2608 | 0.2607 | 0.2606 | 0.2605 | 0.2604 | 0.2603 | 0.2604 | 0.2602 | 0.2602 | 0.2602 | 0.2601 |
| 14 | 0.2646 | 0.2636 | 0.2633 | 0.2631 | 0.2628 | 0.2627 | 0.2625 | 0.2626 | 0.2626 | 0.2624 | 0.2622 | 0.2622 | 0.2622 | 0.2623 | 0.2622 | 0.2621 | 0.2621 | 0.2620 |
| 15 | 0.2625 | 0.2618 | 0.2617 | 0.2618 | 0.2614 | 0.2612 | 0.2612 | 0.2613 | 0.2612 | 0.2611 | 0.2611 | 0.2609 | 0.2609 | 0.2610 | 0.2608 | 0.2607 | 0.2608 | 0.2606 |
| 16 | 0.2623 | 0.2616 | 0.2615 | 0.2615 | 0.2612 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2609 | 0.2609 | 0.2607 | 0.2607 | 0.2608 | 0.2607 | 0.2606 | 0.2608 | 0.2606 |
| 17 | 0.2600 | 0.2593 | 0.2591 | 0.2591 | 0.2588 | 0.2586 | 0.2585 | 0.2585 | 0.2586 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2580 | 0.2580 | 0.2580 | 0.2578 |
| 18 | 0.2599 | 0.2593 | 0.2592 | 0.2591 | 0.2589 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2582 | 0.2581 | 0.2583 | 0.2581 |
| 19 | 0.2635 | 0.2624 | 0.2623 | 0.2624 | 0.2622 | 0.2620 | 0.2620 | 0.2619 | 0.2618 | 0.2617 | 0.2615 | 0.2615 | 0.2614 | 0.2616 | 0.2613 | 0.2612 | 0.2613 | 0.2612 |
| 20 | 0.2643 | 0.2635 | 0.2634 | 0.2635 | 0.2631 | 0.2630 | 0.2630 | 0.2629 | 0.2628 | 0.2627 | 0.2627 | 0.2626 | 0.2625 | 0.2624 | 0.2624 | 0.2623 | 0.2623 | 0.2621 |
| 21 | 0.2604 | 0.2597 | 0.2598 | 0.2597 | 0.2593 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2588 | 0.2589 | 0.2587 | 0.2587 | 0.2587 | 0.2585 | 0.2585 | 0.2586 | 0.2585 |
| 22 | 0.2637 | 0.2630 | 0.2629 | 0.2630 | 0.2626 | 0.2625 | 0.2624 | 0.2624 | 0.2625 | 0.2623 | 0.2622 | 0.2621 | 0.2620 | 0.2621 | 0.2620 | 0.2619 | 0.2618 | 0.2617 |
| 23 | 0.2650 | 0.2643 | 0.2642 | 0.2643 | 0.2640 | 0.2639 | 0.2638 | 0.2639 | 0.2638 | 0.2635 | 0.2635 | 0.2634 | 0.2634 | 0.2635 | 0.2633 | 0.2633 | 0.2632 | 0.2631 |
| 24 | 0.2622 | 0.2615 | 0.2613 | 0.2613 | 0.2609 | 0.2608 | 0.2608 | 0.2607 | 0.2607 | 0.2606 | 0.2606 | 0.2605 | 0.2604 | 0.2605 | 0.2604 | 0.2602 | 0.2603 | 0.2602 |
| 25 | 0.2628 | 0.2619 | 0.2618 | 0.2618 | 0.2617 | 0.2614 | 0.2615 | 0.2614 | 0.2612 | 0.2611 | 0.2610 | 0.2609 | 0.2608 | 0.2608 | 0.2607 | 0.2606 | 0.2608 | 0.2607 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2626 | 0.2619 | 0.2618 | 0.2617 | 0.2614 | 0.2613 | 0.2612 | 0.2612 | 0.2612 | 0.2610 | 0.2610 | 0.2609 | 0.2608 | 0.2609 | 0.2607 | 0.2606 | 0.2607 | 0.2606 |
| Med. | 0.2623 | 0.2616 | 0.2615 | 0.2615 | 0.2612 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2609 | 0.2607 | 0.2607 | 0.2607 | 0.2607 | 0.2605 | 0.2604 | 0.2606 | 0.2604 |
| σ | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 |
| Min. | 0.2599 | 0.2593 | 0.2591 | 0.2591 | 0.2588 | 0.2586 | 0.2585 | 0.2585 | 0.2586 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2580 | 0.2580 | 0.2580 | 0.2578 |
| Max. | 0.2661 | 0.2653 | 0.2652 | 0.2652 | 0.2648 | 0.2647 | 0.2646 | 0.2644 | 0.2643 | 0.2644 | 0.2642 | 0.2641 | 0.2640 | 0.2640 | 0.2639 | 0.2639 | 0.2638 | 0.2638 |

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Data Set 2 : 55 °C, 150 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 57.3 °C |
| Actual Ambient Temperature [T_A] | 55.9 °C |
| Drive Current [I_F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 2-5 (Continued)
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | |
|----------|-------------------|--------|---------|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | |
| 1 | 0.2585 | 0.2584 | 0.2582 | | | | | | | | | |
| 2 | 0.2637 | 0.2636 | 0.2635 | | | | | | | | | |
| 3 | 0.2591 | 0.2591 | 0.2589 | | | | | | | | | |
| 4 | 0.2603 | 0.2603 | 0.2601 | | | | | | | | | |
| 5 | 0.2626 | 0.2625 | 0.2625 | | | | | | | | | |
| 6 | 0.2614 | 0.2614 | 0.2613 | | | | | | | | | |
| 7 | 0.2593 | 0.2592 | 0.2593 | | | | | | | | | |
| 8 | 0.2581 | 0.2580 | 0.2579 | | | | | | | | | |
| 9 | 0.2599 | 0.2599 | 0.2598 | | | | | | | | | |
| 10 | 0.2600 | 0.2600 | 0.2600 | | | | | | | | | |
| 11 | 0.2633 | 0.2634 | 0.2631 | | | | | | | | | |
| 12 | 0.2599 | 0.2599 | 0.2598 | | | | | | | | | |
| 13 | 0.2599 | 0.2599 | 0.2598 | | | | | | | | | |
| 14 | 0.2618 | 0.2619 | 0.2618 | | | | | | | | | |
| 15 | 0.2605 | 0.2605 | 0.2604 | | | | | | | | | |
| 16 | 0.2604 | 0.2604 | 0.2603 | | | | | | | | | |
| 17 | 0.2577 | 0.2577 | 0.2576 | | | | | | | | | |
| 18 | 0.2579 | 0.2580 | 0.2579 | | | | | | | | | |
| 19 | 0.2610 | 0.2610 | 0.2608 | | | | | | | | | |
| 20 | 0.2621 | 0.2620 | 0.2620 | | | | | | | | | |
| 21 | 0.2583 | 0.2583 | 0.2582 | | | | | | | | | |
| 22 | 0.2616 | 0.2617 | 0.2614 | | | | | | | | | |
| 23 | 0.2630 | 0.2630 | 0.2629 | | | | | | | | | |
| 24 | 0.2599 | 0.2600 | 0.2600 | | | | | | | | | |
| 25 | 0.2604 | 0.2605 | 0.2602 | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | |
| Avg. | 0.2604 | 0.2604 | 0.2603 | | | | | | | | | |
| Med. | 0.2603 | 0.2603 | 0.2601 | | | | | | | | | |
| σ | 0.0017 | 0.0017 | 0.0017 | | | | | | | | | |
| Min. | 0.2577 | 0.2577 | 0.2576 | | | | | | | | | |
| Max. | 0.2637 | 0.2636 | 0.2635 | | | | | | | | | |



Data Set 2 : 55 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _c] | 57.3 °C |
| Actual Ambient Temperature [T _A] | 55.9 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 2-6
 Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5250 | 0.5250 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5249 | 0.5248 | 0.5249 | 0.5248 | 0.5248 | 0.5249 | 0.5248 |
| 2 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5249 | 0.5248 | 0.5249 | 0.5249 | 0.5248 |
| 3 | 0.5262 | 0.5261 | 0.5262 | 0.5262 | 0.5261 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5260 | 0.5259 | 0.5259 | 0.5260 | 0.5259 |
| 4 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 |
| 5 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5291 | 0.5291 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5291 | 0.5290 | 0.5290 | 0.5290 | 0.5290 |
| 6 | 0.5271 | 0.5270 | 0.5271 | 0.5271 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5267 | 0.5268 |
| 7 | 0.5288 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5284 | 0.5285 | 0.5284 | 0.5284 | 0.5285 | 0.5284 |
| 8 | 0.5297 | 0.5296 | 0.5296 | 0.5296 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5293 | 0.5294 | 0.5293 | 0.5293 | 0.5293 | 0.5293 |
| 9 | 0.5286 | 0.5285 | 0.5285 | 0.5286 | 0.5284 | 0.5284 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5283 |
| 10 | 0.5273 | 0.5272 | 0.5272 | 0.5273 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5271 | 0.5271 |
| 11 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5281 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5282 | 0.5281 | 0.5281 | 0.5282 | 0.5281 |
| 12 | 0.5272 | 0.5272 | 0.5272 | 0.5273 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5271 | 0.5270 |
| 13 | 0.5254 | 0.5254 | 0.5254 | 0.5254 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5251 | 0.5252 | 0.5251 | 0.5251 | 0.5250 | 0.5252 | 0.5251 | 0.5251 | 0.5251 | 0.5251 |
| 14 | 0.5288 | 0.5287 | 0.5287 | 0.5287 | 0.5285 | 0.5284 | 0.5285 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5285 | 0.5284 | 0.5284 | 0.5285 | 0.5284 |
| 15 | 0.5286 | 0.5286 | 0.5286 | 0.5286 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5285 | 0.5284 | 0.5284 | 0.5284 | 0.5285 | 0.5284 | 0.5284 | 0.5285 | 0.5284 |
| 16 | 0.5289 | 0.5288 | 0.5288 | 0.5289 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5287 | 0.5286 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5287 |
| 17 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 |
| 18 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 |
| 19 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 |
| 20 | 0.5261 | 0.5260 | 0.5260 | 0.5261 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5257 | 0.5257 | 0.5258 | 0.5257 |
| 21 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5268 | 0.5270 | 0.5269 | 0.5268 | 0.5270 | 0.5268 |
| 22 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5268 | 0.5269 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 |
| 23 | 0.5305 | 0.5305 | 0.5305 | 0.5305 | 0.5304 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 |
| 24 | 0.5262 | 0.5261 | 0.5261 | 0.5262 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5260 | 0.5258 | 0.5259 | 0.5259 | 0.5259 |
| 25 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5269 | 0.5268 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5273 | 0.5272 | 0.5272 | 0.5272 | 0.5272 |
| Med. | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5269 | 0.5269 | 0.5268 | 0.5270 | 0.5269 | 0.5268 | 0.5270 | 0.5268 |
| σ | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 |
| Min. | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5250 | 0.5250 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5249 | 0.5248 | 0.5249 | 0.5248 | 0.5248 | 0.5249 | 0.5248 |
| Max. | 0.5305 | 0.5305 | 0.5305 | 0.5305 | 0.5304 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 | 0.5303 |

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Data Set 2 : 55 °C, 150 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 57.3 °C |
| Actual Ambient Temperature [T_A] | 55.9 °C |
| Drive Current [I_F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 2-6 (Continued)
Chromaticity

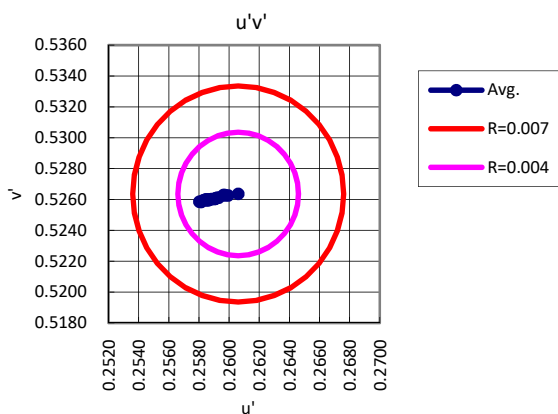
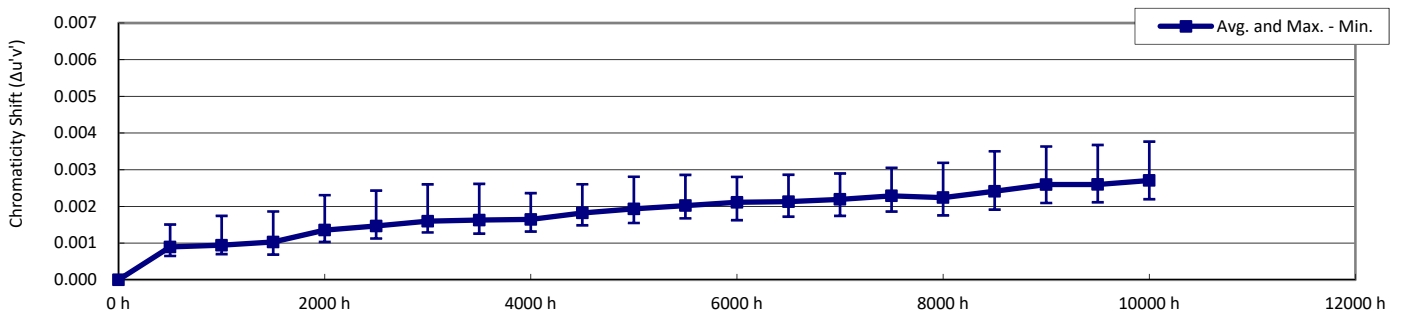
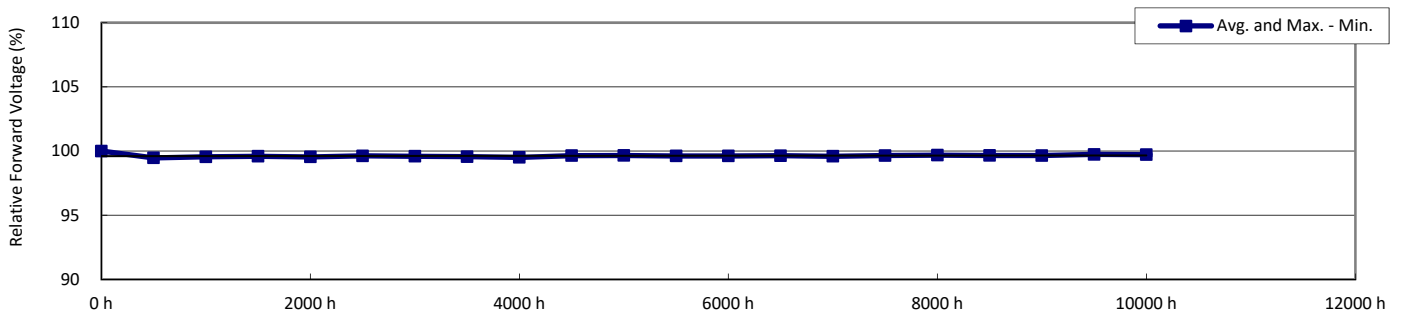
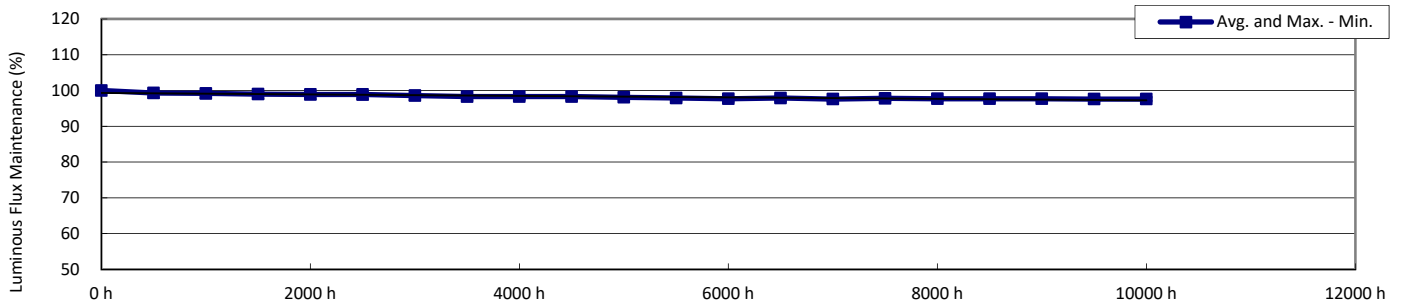
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|----------|-------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.5247 | 0.5247 | 0.5247 | | | | | | | | | | | | | |
| 2 | 0.5247 | 0.5248 | 0.5248 | | | | | | | | | | | | | |
| 3 | 0.5258 | 0.5258 | 0.5258 | | | | | | | | | | | | | |
| 4 | 0.5265 | 0.5265 | 0.5265 | | | | | | | | | | | | | |
| 5 | 0.5289 | 0.5289 | 0.5289 | | | | | | | | | | | | | |
| 6 | 0.5266 | 0.5267 | 0.5266 | | | | | | | | | | | | | |
| 7 | 0.5283 | 0.5283 | 0.5283 | | | | | | | | | | | | | |
| 8 | 0.5292 | 0.5292 | 0.5292 | | | | | | | | | | | | | |
| 9 | 0.5282 | 0.5282 | 0.5281 | | | | | | | | | | | | | |
| 10 | 0.5269 | 0.5270 | 0.5270 | | | | | | | | | | | | | |
| 11 | 0.5280 | 0.5280 | 0.5280 | | | | | | | | | | | | | |
| 12 | 0.5269 | 0.5269 | 0.5268 | | | | | | | | | | | | | |
| 13 | 0.5249 | 0.5250 | 0.5249 | | | | | | | | | | | | | |
| 14 | 0.5283 | 0.5283 | 0.5284 | | | | | | | | | | | | | |
| 15 | 0.5283 | 0.5283 | 0.5283 | | | | | | | | | | | | | |
| 16 | 0.5286 | 0.5285 | 0.5285 | | | | | | | | | | | | | |
| 17 | 0.5263 | 0.5264 | 0.5264 | | | | | | | | | | | | | |
| 18 | 0.5278 | 0.5278 | 0.5278 | | | | | | | | | | | | | |
| 19 | 0.5262 | 0.5263 | 0.5262 | | | | | | | | | | | | | |
| 20 | 0.5256 | 0.5256 | 0.5257 | | | | | | | | | | | | | |
| 21 | 0.5268 | 0.5268 | 0.5268 | | | | | | | | | | | | | |
| 22 | 0.5266 | 0.5267 | 0.5266 | | | | | | | | | | | | | |
| 23 | 0.5302 | 0.5302 | 0.5302 | | | | | | | | | | | | | |
| 24 | 0.5258 | 0.5258 | 0.5258 | | | | | | | | | | | | | |
| 25 | 0.5268 | 0.5267 | 0.5268 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.5271 | 0.5271 | 0.5271 | | | | | | | | | | | | | |
| Med. | 0.5268 | 0.5268 | 0.5268 | | | | | | | | | | | | | |
| σ | 0.0015 | 0.0014 | 0.0014 | | | | | | | | | | | | | |
| Min. | 0.5247 | 0.5247 | 0.5247 | | | | | | | | | | | | | |
| Max. | 0.5302 | 0.5302 | 0.5302 | | | | | | | | | | | | | |



Data Set 3 : 55 °C, 200 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 55.5 °C |
| Actual Ambient Temperature [T_A] | 53.0 °C |
| Drive Current [I_F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0



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Data Set 3 : 55 °C, 200 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 55.5 °C |
| Actual Ambient Temperature [T_A] | 53.0 °C |
| Drive Current [I_F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-1
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | | | |
|----------|---------------|-----------------|--------------|-------------|---------|--------|---------|--------|--|--|--|--|--|--|
| | Φ_V [lm] | V_F [V] | T_{CP} [K] | P [W] | x | y | u' | v' | | | | | | |
| 1 | 173.2 | 6.53 | 2717 | 1.31 | 0.457 | 0.408 | 0.262 | 0.526 | | | | | | |
| 2 | 172.7 | 6.52 | 2727 | 1.30 | 0.456 | 0.408 | 0.261 | 0.526 | | | | | | |
| 3 | 174.4 | 6.52 | 2786 | 1.30 | 0.453 | 0.409 | 0.259 | 0.525 | | | | | | |
| 4 | 172.8 | 6.55 | 2675 | 1.31 | 0.460 | 0.408 | 0.264 | 0.527 | | | | | | |
| 5 | 173.8 | 6.54 | 2722 | 1.31 | 0.458 | 0.410 | 0.262 | 0.527 | | | | | | |
| 6 | 174.6 | 6.52 | 2765 | 1.30 | 0.455 | 0.409 | 0.260 | 0.526 | | | | | | |
| 7 | 174.7 | 6.53 | 2751 | 1.31 | 0.455 | 0.409 | 0.260 | 0.526 | | | | | | |
| 8 | 172.9 | 6.54 | 2692 | 1.31 | 0.461 | 0.412 | 0.263 | 0.528 | | | | | | |
| 9 | 175.5 | 6.54 | 2782 | 1.31 | 0.453 | 0.409 | 0.259 | 0.526 | | | | | | |
| 10 | 175.5 | 6.53 | 2730 | 1.31 | 0.460 | 0.415 | 0.261 | 0.529 | | | | | | |
| 11 | 174.5 | 6.53 | 2760 | 1.31 | 0.454 | 0.408 | 0.260 | 0.525 | | | | | | |
| 12 | 174.7 | 6.54 | 2764 | 1.31 | 0.454 | 0.409 | 0.260 | 0.526 | | | | | | |
| 13 | 174.8 | 6.53 | 2763 | 1.31 | 0.455 | 0.411 | 0.260 | 0.527 | | | | | | |
| 14 | 175.0 | 6.52 | 2835 | 1.30 | 0.449 | 0.407 | 0.257 | 0.524 | | | | | | |
| 15 | 173.8 | 6.53 | 2705 | 1.31 | 0.459 | 0.410 | 0.262 | 0.527 | | | | | | |
| 16 | 173.3 | 6.53 | 2714 | 1.31 | 0.458 | 0.409 | 0.262 | 0.527 | | | | | | |
| 17 | 174.7 | 6.54 | 2770 | 1.31 | 0.455 | 0.410 | 0.259 | 0.526 | | | | | | |
| 18 | 173.4 | 6.53 | 2693 | 1.31 | 0.461 | 0.412 | 0.263 | 0.528 | | | | | | |
| 19 | 175.8 | 6.52 | 2855 | 1.30 | 0.449 | 0.410 | 0.256 | 0.526 | | | | | | |
| 20 | 173.7 | 6.54 | 2727 | 1.31 | 0.458 | 0.411 | 0.261 | 0.527 | | | | | | |
| 21 | 174.0 | 6.54 | 2785 | 1.31 | 0.450 | 0.404 | 0.259 | 0.523 | | | | | | |
| 22 | 173.8 | 6.53 | 2734 | 1.31 | 0.455 | 0.407 | 0.261 | 0.525 | | | | | | |
| 23 | 174.6 | 6.53 | 2783 | 1.31 | 0.453 | 0.409 | 0.259 | 0.526 | | | | | | |
| 24 | 174.6 | 6.53 | 2754 | 1.31 | 0.457 | 0.413 | 0.260 | 0.528 | | | | | | |
| 25 | 173 | 6.53 | 2754 | 1.31 | 0.454 | 0.407 | 0.260 | 0.525 | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | | | |
| Avg. | 174.2 | 6.53 | 2750 | 1.31 | 0.456 | 0.409 | 0.260 | 0.526 | | | | | | |
| Med. | 174.4 | 6.53 | 2754 | 1.31 | 0.455 | 0.409 | 0.260 | 0.526 | | | | | | |
| σ | 0.87 | 0.007 | 42.4 | 0.001 | 0.0035 | 0.0023 | 0.0018 | 0.0012 | | | | | | |
| Min. | 172.7 | 6.52 | 2675 | 1.30 | 0.449 | 0.404 | 0.256 | 0.523 | | | | | | |
| Max. | 175.8 | 6.55 | 2855 | 1.31 | 0.461 | 0.415 | 0.264 | 0.529 | | | | | | |



Data Set 3 : 55 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 55.5 °C |
| Actual Ambient Temperature [T _A] | 53.0 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-2
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.0 | 98.9 | 98.6 | 98.9 | 98.8 | 98.6 | 98.3 | 98.3 | 98.3 | 98.1 | 98.1 | 97.9 | 98.1 | 97.9 | 98.0 | 97.9 | 97.9 |
| 2 | 100.0 | 99.4 | 99.4 | 99.3 | 99.0 | 99.0 | 98.7 | 98.5 | 98.4 | 98.5 | 98.4 | 98.2 | 98.1 | 98.4 | 98.1 | 98.3 | 98.2 | 98.3 |
| 3 | 100.0 | 99.0 | 99.0 | 98.6 | 98.8 | 98.7 | 98.4 | 98.1 | 98.1 | 98.0 | 97.8 | 97.5 | 97.3 | 97.5 | 97.2 | 97.7 | 97.7 | 97.6 |
| 4 | 100.0 | 99.0 | 99.0 | 98.9 | 99.1 | 99.0 | 98.6 | 98.4 | 98.3 | 98.3 | 98.2 | 97.9 | 97.8 | 97.9 | 97.7 | 97.7 | 97.6 | 97.6 |
| 5 | 100.0 | 99.1 | 99.2 | 98.9 | 99.0 | 98.8 | 98.6 | 98.2 | 98.3 | 98.2 | 98.1 | 97.8 | 97.7 | 97.8 | 97.4 | 97.6 | 97.6 | 97.5 |
| 6 | 100.0 | 99.4 | 99.5 | 99.4 | 99.1 | 99.1 | 98.8 | 98.6 | 98.5 | 98.6 | 98.4 | 98.2 | 98.1 | 98.2 | 97.9 | 98.0 | 98.0 | 98.1 |
| 7 | 100.0 | 99.1 | 99.1 | 99.1 | 99.2 | 99.1 | 98.7 | 98.4 | 98.5 | 98.4 | 98.3 | 98.0 | 97.9 | 98.0 | 97.8 | 97.9 | 97.9 | 97.8 |
| 8 | 100.0 | 99.2 | 99.1 | 98.8 | 98.5 | 98.5 | 98.2 | 97.8 | 98.0 | 97.9 | 97.7 | 97.4 | 97.4 | 97.6 | 97.3 | 97.4 | 97.4 | 97.3 |
| 9 | 100.0 | 99.2 | 99.3 | 99.4 | 99.4 | 99.4 | 99.0 | 98.7 | 98.6 | 98.6 | 98.4 | 98.1 | 98.0 | 98.1 | 97.9 | 97.9 | 97.9 | 97.8 |
| 10 | 100.0 | 99.6 | 99.4 | 99.4 | 99.1 | 99.1 | 98.7 | 98.2 | 98.4 | 98.3 | 98.2 | 97.9 | 97.8 | 98.0 | 97.7 | 97.7 | 97.7 | 97.6 |
| 11 | 100.0 | 99.5 | 99.5 | 99.1 | 98.8 | 98.9 | 98.5 | 98.0 | 98.1 | 98.2 | 98.3 | 97.7 | 97.6 | 97.8 | 97.4 | 97.5 | 97.4 | 97.3 |
| 12 | 100.0 | 99.5 | 99.3 | 99.1 | 99.2 | 99.2 | 98.9 | 98.5 | 98.5 | 98.5 | 98.3 | 97.9 | 97.9 | 98.0 | 97.8 | 97.8 | 97.9 | 97.7 |
| 13 | 100.0 | 99.6 | 99.4 | 99.4 | 99.2 | 99.1 | 98.7 | 98.4 | 98.6 | 98.4 | 98.3 | 98.1 | 97.9 | 98.0 | 97.7 | 97.9 | 97.8 | 97.7 |
| 14 | 100.0 | 99.1 | 98.9 | 98.7 | 99.0 | 98.9 | 98.5 | 98.2 | 98.3 | 98.1 | 97.9 | 97.7 | 97.6 | 97.6 | 97.3 | 97.5 | 97.4 | 97.3 |
| 15 | 100.0 | 99.2 | 99.0 | 99.0 | 99.2 | 99.2 | 98.8 | 98.4 | 98.4 | 98.4 | 98.2 | 97.9 | 97.7 | 97.8 | 97.4 | 98.3 | 98.2 | 98.2 |
| 16 | 100.0 | 99.2 | 99.0 | 98.9 | 99.1 | 99.0 | 98.6 | 98.3 | 98.4 | 98.4 | 98.1 | 97.9 | 97.8 | 98.0 | 97.7 | 97.9 | 97.8 | 97.8 |
| 17 | 100.0 | 99.8 | 99.5 | 99.2 | 99.1 | 99.0 | 98.6 | 98.3 | 98.4 | 98.3 | 98.3 | 97.9 | 97.7 | 98.0 | 97.5 | 97.7 | 97.5 | 97.6 |
| 18 | 100.0 | 99.5 | 99.3 | 99.1 | 98.9 | 98.9 | 98.6 | 98.2 | 98.3 | 98.2 | 98.1 | 97.9 | 97.8 | 98.0 | 97.8 | 98.0 | 98.0 | 97.9 |
| 19 | 100.0 | 98.8 | 98.7 | 98.3 | 98.4 | 98.3 | 98.0 | 97.8 | 98.0 | 98.0 | 97.7 | 97.6 | 97.4 | 97.6 | 97.5 | 97.7 | 97.7 | 97.6 |
| 20 | 100.0 | 98.0 | 97.9 | 97.7 | 97.6 | 97.5 | 97.3 | 97.1 | 97.4 | 97.3 | 97.2 | 97.0 | 96.9 | 97.0 | 96.9 | 97.2 | 97.2 | 97.0 |
| 21 | 100.0 | 99.5 | 99.4 | 99.1 | 98.9 | 98.7 | 98.5 | 98.2 | 98.1 | 98.1 | 97.9 | 97.8 | 97.6 | 97.7 | 97.5 | 97.6 | 97.6 | 97.5 |
| 22 | 100.0 | 99.4 | 99.4 | 99.1 | 98.8 | 98.8 | 98.5 | 98.3 | 98.2 | 98.4 | 98.2 | 98.0 | 97.9 | 98.0 | 97.8 | 97.8 | 97.8 | 97.7 |
| 23 | 100.0 | 99.2 | 99.0 | 98.4 | 98.5 | 98.6 | 98.4 | 98.2 | 98.0 | 98.1 | 98.0 | 97.5 | 97.3 | 97.5 | 97.3 | 97.2 | 97.3 | 97.1 |
| 24 | 100.0 | 99.6 | 99.4 | 99.2 | 99.0 | 99.0 | 98.7 | 98.5 | 98.4 | 98.5 | 98.3 | 98.2 | 98.0 | 98.1 | 97.9 | 97.9 | 98.0 | 97.8 |
| 25 | 100.0 | 99.5 | 99.6 | 99.7 | 99.3 | 99.2 | 99.0 | 98.7 | 98.7 | 98.6 | 98.5 | 98.2 | 98.1 | 98.2 | 98.1 | 98.1 | 97.9 | 97.9 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.3 | 99.2 | 99.0 | 98.9 | 98.9 | 98.6 | 98.3 | 98.3 | 98.3 | 98.1 | 97.9 | 97.7 | 97.9 | 97.6 | 97.8 | 97.7 | 97.7 |
| Med. | 100.0 | 99.2 | 99.3 | 99.1 | 99.0 | 99.0 | 98.6 | 98.3 | 98.3 | 98.3 | 98.2 | 97.9 | 97.8 | 98.0 | 97.7 | 97.8 | 97.8 | 97.7 |
| σ | 0.00 | 0.36 | 0.35 | 0.43 | 0.37 | 0.38 | 0.34 | 0.33 | 0.27 | 0.28 | 0.29 | 0.29 | 0.29 | 0.29 | 0.30 | 0.28 | 0.27 | 0.31 |
| Min. | 100.0 | 98.0 | 97.9 | 97.7 | 97.6 | 97.5 | 97.3 | 97.1 | 97.4 | 97.3 | 97.2 | 97.0 | 96.9 | 97.0 | 96.9 | 97.2 | 97.2 | 97.0 |
| Max. | 100.0 | 99.8 | 99.6 | 99.7 | 99.4 | 99.4 | 99.0 | 98.7 | 98.7 | 98.6 | 98.5 | 98.2 | 98.1 | 98.4 | 98.1 | 98.3 | 98.2 | 98.3 |

TM-21 Projection

| Test duration used | 5000 h | to | 10000 h |
|----------------------------------|-----------|-------|---------|
| B | 0.9830 | | |
| α | 7.435E-07 | | |
| R ² | 0.5883 | | |
| Calculated L ₇₀ (10K) | 457000 | hours | |
| Reported L ₇₀ (10K) | > 60000 | hours | |
| Calculated L ₈₀ (10K) | 277000 | hours | |
| Reported L ₈₀ (10K) | > 60000 | hours | |
| Calculated L ₉₀ (10K) | 119000 | hours | |
| Reported L ₉₀ (10K) | > 60000 | hours | |

Curve-fit equation:

$$\Phi(t) = B \exp(-\alpha t)$$

Luminous flux maintenance life equation:

$$L_{70} = \ln(B/0.7)/\alpha$$

$$L_{80} = \ln(B/0.8)/\alpha$$

$$L_{90} = \ln(B/0.9)/\alpha$$

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Data Set 3 : 55 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 55.5 °C |
| Actual Ambient Temperature [T _A] | 53.0 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-2 (Continued)
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|--|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 98.0 | 97.8 | 97.6 | | | | | | | | | | | | | |
| 2 | 98.3 | 98.2 | 98.1 | | | | | | | | | | | | | |
| 3 | 97.7 | 97.6 | 97.6 | | | | | | | | | | | | | |
| 4 | 97.6 | 97.5 | 97.4 | | | | | | | | | | | | | |
| 5 | 97.5 | 97.2 | 97.3 | | | | | | | | | | | | | |
| 6 | 98.2 | 98.0 | 97.9 | | | | | | | | | | | | | |
| 7 | 97.8 | 97.8 | 97.6 | | | | | | | | | | | | | |
| 8 | 97.3 | 97.2 | 97.6 | | | | | | | | | | | | | |
| 9 | 97.9 | 97.8 | 97.7 | | | | | | | | | | | | | |
| 10 | 97.6 | 97.5 | 97.5 | | | | | | | | | | | | | |
| 11 | 97.5 | 97.3 | 97.1 | | | | | | | | | | | | | |
| 12 | 97.8 | 97.7 | 97.6 | | | | | | | | | | | | | |
| 13 | 97.8 | 97.6 | 97.6 | | | | | | | | | | | | | |
| 14 | 97.4 | 97.2 | 97.2 | | | | | | | | | | | | | |
| 15 | 98.2 | 98.1 | 98.0 | | | | | | | | | | | | | |
| 16 | 97.8 | 97.7 | 97.7 | | | | | | | | | | | | | |
| 17 | 97.5 | 97.3 | 97.5 | | | | | | | | | | | | | |
| 18 | 97.9 | 97.9 | 97.9 | | | | | | | | | | | | | |
| 19 | 97.7 | 97.5 | 97.7 | | | | | | | | | | | | | |
| 20 | 97.1 | 97.0 | 97.2 | | | | | | | | | | | | | |
| 21 | 97.6 | 97.5 | 97.4 | | | | | | | | | | | | | |
| 22 | 97.8 | 97.6 | 97.5 | | | | | | | | | | | | | |
| 23 | 97.3 | 97.2 | 97.1 | | | | | | | | | | | | | |
| 24 | 97.9 | 97.7 | 97.7 | | | | | | | | | | | | | |
| 25 | 98.0 | 97.9 | 97.7 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 97.7 | 97.6 | 97.6 | | | | | | | | | | | | | |
| Med. | 97.8 | 97.6 | 97.6 | | | | | | | | | | | | | |
| σ | 0.30 | 0.31 | 0.26 | | | | | | | | | | | | | |
| Min. | 97.1 | 97.0 | 97.1 | | | | | | | | | | | | | |
| Max. | 98.3 | 98.2 | 98.1 | | | | | | | | | | | | | |



Data Set 3 : 55 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 55.5 °C |
| Actual Ambient Temperature [T _A] | 53.0 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-3
Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 |
| 2 | 100.0 | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 |
| 3 | 100.0 | 99.4 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.7 | 99.5 | 99.6 | 99.6 | 99.5 | 99.7 | 99.6 |
| 4 | 100.0 | 99.5 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 |
| 5 | 100.0 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.4 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 |
| 6 | 100.0 | 99.5 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 |
| 7 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 8 | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 |
| 9 | 100.0 | 99.4 | 99.5 | 99.5 | 99.5 | 99.6 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 |
| 10 | 100.0 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 |
| 11 | 100.0 | 99.5 | 99.5 | 99.6 | 99.5 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 12 | 100.0 | 99.4 | 99.5 | 99.5 | 99.4 | 99.6 | 99.5 | 99.5 | 99.4 | 99.6 | 99.6 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 |
| 13 | 100.0 | 99.4 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 14 | 100.0 | 99.4 | 99.5 | 99.6 | 99.5 | 99.7 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.5 | 99.7 | 99.7 |
| 15 | 100.0 | 99.4 | 99.5 | 99.6 | 99.4 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 |
| 16 | 100.0 | 99.5 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 17 | 100.0 | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | 99.5 | 99.5 | 99.4 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 |
| 18 | 100.0 | 99.5 | 99.6 | 99.6 | 99.4 | 99.6 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 19 | 100.0 | 99.5 | 99.5 | 99.6 | 99.6 | 99.7 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 |
| 20 | 100.0 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |
| 21 | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 22 | 100.0 | 99.5 | 99.6 | 99.7 | 99.6 | 99.7 | 99.6 | 99.6 | 99.5 | 99.7 | 99.7 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.8 | 99.7 |
| 23 | 100.0 | 99.4 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.4 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.6 |
| 24 | 100.0 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.5 | 99.4 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 |
| 25 | 100.0 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.6 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.5 | 99.6 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 |
| Med. | 100.0 | 99.5 | 99.5 | 99.6 | 99.5 | 99.6 | 99.6 | 99.6 | 99.5 | 99.6 | 99.7 | 99.6 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 |
| σ | 0.00 | 0.05 | 0.05 | 0.05 | 0.07 | 0.04 | 0.04 | 0.04 | 0.04 | 0.05 | 0.04 | 0.05 | 0.05 | 0.05 | 0.05 | 0.06 | 0.06 | 0.05 |
| Min. | 100.0 | 99.4 | 99.5 | 99.5 | 99.4 | 99.6 | 99.5 | 99.5 | 99.4 | 99.6 | 99.6 | 99.5 | 99.5 | 99.5 | 99.5 | 99.5 | 99.6 | 99.6 |
| Max. | 100.0 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 |



Data Set 3 : 55 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 55.5 °C |
| Actual Ambient Temperature [T _A] | 53.0 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 3-3 (Continued)
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|---|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 2 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 3 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 4 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 5 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 6 | 99.7 | 99.7 | 99.8 | | | | | | | | | | | | | |
| 7 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 8 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 9 | 99.6 | 99.7 | 99.6 | | | | | | | | | | | | | |
| 10 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 11 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 12 | 99.5 | 99.6 | 99.7 | | | | | | | | | | | | | |
| 13 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 14 | 99.6 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 15 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 16 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 17 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 18 | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 19 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 20 | 99.7 | 99.8 | 99.7 | | | | | | | | | | | | | |
| 21 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 22 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 23 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 24 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| 25 | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 99.6 | 99.7 | 99.7 | | | | | | | | | | | | | |
| Med. | 99.7 | 99.7 | 99.7 | | | | | | | | | | | | | |
| σ | 0.05 | 0.05 | 0.04 | | | | | | | | | | | | | |
| Min. | 99.5 | 99.6 | 99.6 | | | | | | | | | | | | | |
| Max. | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |

Data Set 3 : 55 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 55.5 °C |
| Actual Ambient Temperature [T _A] | 53.0 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-4
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.0000 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0025 | 0.0026 | 0.0028 | 0.0031 | 0.0032 | 0.0035 |
| 2 | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0013 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0024 | 0.0025 | 0.0027 | 0.0028 | 0.0029 | 0.0035 |
| 3 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0014 | 0.0015 | 0.0017 | 0.0016 | 0.0018 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0026 |
| 4 | 0.0000 | 0.0010 | 0.0008 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0019 | 0.0020 | 0.0022 | 0.0021 | 0.0022 | 0.0023 | 0.0022 | 0.0024 |
| 5 | 0.0000 | 0.0009 | 0.0007 | 0.0009 | 0.0010 | 0.0012 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0017 | 0.0017 | 0.0019 | 0.0018 | 0.0019 |
| 6 | 0.0000 | 0.0008 | 0.0008 | 0.0008 | 0.0012 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0019 | 0.0021 | 0.0022 | 0.0022 | 0.0025 |
| 7 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0014 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0025 | 0.0025 | 0.0024 | 0.0026 |
| 8 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0018 | 0.0018 | 0.0020 | 0.0021 | 0.0020 | 0.0023 | 0.0023 | 0.0025 | 0.0026 | 0.0025 | 0.0026 | 0.0027 | 0.0027 | 0.0028 |
| 9 | 0.0000 | 0.0008 | 0.0009 | 0.0008 | 0.0013 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0021 | 0.0023 |
| 10 | 0.0000 | 0.0008 | 0.0007 | 0.0007 | 0.0011 | 0.0011 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0017 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0018 | 0.0019 |
| 11 | 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0018 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 |
| 12 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0012 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0018 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0022 | 0.0023 |
| 13 | 0.0000 | 0.0007 | 0.0008 | 0.0009 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0021 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0023 |
| 14 | 0.0000 | 0.0011 | 0.0011 | 0.0013 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0020 | 0.0022 | 0.0023 | 0.0024 | 0.0025 | 0.0026 | 0.0027 | 0.0028 | 0.0029 |
| 15 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0020 | 0.0019 | 0.0022 |
| 16 | 0.0000 | 0.0010 | 0.0010 | 0.0011 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0021 | 0.0023 |
| 17 | 0.0000 | 0.0007 | 0.0009 | 0.0010 | 0.0012 | 0.0013 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0021 | 0.0019 | 0.0022 |
| 18 | 0.0000 | 0.0008 | 0.0008 | 0.0009 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0015 | 0.0017 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0018 | 0.0019 | 0.0018 | 0.0020 |
| 19 | 0.0000 | 0.0011 | 0.0011 | 0.0014 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0019 | 0.0021 | 0.0024 | 0.0025 | 0.0027 | 0.0026 | 0.0025 | 0.0027 | 0.0026 | 0.0027 |
| 20 | 0.0000 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0024 | 0.0026 | 0.0026 | 0.0024 | 0.0026 | 0.0028 | 0.0029 | 0.0028 | 0.0029 | 0.0029 | 0.0029 | 0.0029 | 0.0031 |
| 21 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0015 | 0.0016 | 0.0018 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0022 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0023 | 0.0024 |
| 22 | 0.0000 | 0.0007 | 0.0009 | 0.0009 | 0.0013 | 0.0014 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0020 | 0.0019 | 0.0020 |
| 23 | 0.0000 | 0.0008 | 0.0008 | 0.0008 | 0.0011 | 0.0011 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0020 |
| 24 | 0.0000 | 0.0008 | 0.0008 | 0.0008 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0014 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0020 |
| 25 | 0.0000 | 0.0006 | 0.0009 | 0.0009 | 0.0012 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0021 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0009 | 0.0009 | 0.0010 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0022 | 0.0024 |
| Med. | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0023 |
| σ | 0.0000 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0004 | 0.0004 | 0.0004 |
| Min. | 0.0000 | 0.0006 | 0.0007 | 0.0007 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0015 | 0.0017 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0018 | 0.0019 |
| Max. | 0.0000 | 0.0015 | 0.0017 | 0.0019 | 0.0023 | 0.0024 | 0.0026 | 0.0026 | 0.0024 | 0.0026 | 0.0028 | 0.0029 | 0.0028 | 0.0029 | 0.0029 | 0.0031 | 0.0032 | 0.0035 |

Data Set 3 : 55 °C, 200 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 55.5 °C |
| Actual Ambient Temperature [T_A] | 53.0 °C |
| Drive Current [I_F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-4 (Continued)
Chromaticity Shift

| LED No. | Chromaticity Shift $\Delta u'v'$ | | | | | | | | | | | | | | | |
|----------|----------------------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.0036 | 0.0037 | 0.0038 | | | | | | | | | | | | | |
| 2 | 0.0034 | 0.0035 | 0.0036 | | | | | | | | | | | | | |
| 3 | 0.0029 | 0.0029 | 0.0031 | | | | | | | | | | | | | |
| 4 | 0.0024 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| 5 | 0.0021 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 6 | 0.0028 | 0.0028 | 0.0029 | | | | | | | | | | | | | |
| 7 | 0.0027 | 0.0028 | 0.0029 | | | | | | | | | | | | | |
| 8 | 0.0031 | 0.0030 | 0.0031 | | | | | | | | | | | | | |
| 9 | 0.0024 | 0.0024 | 0.0025 | | | | | | | | | | | | | |
| 10 | 0.0021 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| 11 | 0.0023 | 0.0022 | 0.0022 | | | | | | | | | | | | | |
| 12 | 0.0025 | 0.0024 | 0.0026 | | | | | | | | | | | | | |
| 13 | 0.0025 | 0.0024 | 0.0024 | | | | | | | | | | | | | |
| 14 | 0.0031 | 0.0031 | 0.0031 | | | | | | | | | | | | | |
| 15 | 0.0023 | 0.0024 | 0.0026 | | | | | | | | | | | | | |
| 16 | 0.0024 | 0.0024 | 0.0025 | | | | | | | | | | | | | |
| 17 | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 18 | 0.0022 | 0.0022 | 0.0024 | | | | | | | | | | | | | |
| 19 | 0.0029 | 0.0029 | 0.0031 | | | | | | | | | | | | | |
| 20 | 0.0032 | 0.0032 | 0.0034 | | | | | | | | | | | | | |
| 21 | 0.0026 | 0.0025 | 0.0027 | | | | | | | | | | | | | |
| 22 | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 23 | 0.0023 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 24 | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 25 | 0.0023 | 0.0023 | 0.0024 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.0026 | 0.0026 | 0.0027 | | | | | | | | | | | | | |
| Med. | 0.0024 | 0.0024 | 0.0026 | | | | | | | | | | | | | |
| σ | 0.0004 | 0.0004 | 0.0005 | | | | | | | | | | | | | |
| Min. | 0.0021 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| Max. | 0.0036 | 0.0037 | 0.0038 | | | | | | | | | | | | | |

Data Set 3 : 55 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 55.5 °C |
| Actual Ambient Temperature [T _A] | 53.0 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-5
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.2623 | 0.2611 | 0.2612 | 0.2610 | 0.2609 | 0.2607 | 0.2605 | 0.2604 | 0.2604 | 0.2603 | 0.2601 | 0.2600 | 0.2598 | 0.2597 | 0.2595 | 0.2593 | 0.2592 | 0.2589 |
| 2 | 0.2617 | 0.2609 | 0.2609 | 0.2608 | 0.2604 | 0.2603 | 0.2602 | 0.2601 | 0.2601 | 0.2598 | 0.2597 | 0.2596 | 0.2594 | 0.2593 | 0.2591 | 0.2589 | 0.2588 | 0.2583 |
| 3 | 0.2591 | 0.2581 | 0.2581 | 0.2579 | 0.2577 | 0.2576 | 0.2574 | 0.2575 | 0.2573 | 0.2571 | 0.2571 | 0.2571 | 0.2570 | 0.2568 | 0.2567 | 0.2567 | 0.2567 | 0.2565 |
| 4 | 0.2646 | 0.2636 | 0.2638 | 0.2635 | 0.2634 | 0.2633 | 0.2632 | 0.2631 | 0.2630 | 0.2629 | 0.2628 | 0.2626 | 0.2625 | 0.2625 | 0.2625 | 0.2623 | 0.2625 | 0.2623 |
| 5 | 0.2640 | 0.2630 | 0.2633 | 0.2631 | 0.2630 | 0.2628 | 0.2627 | 0.2627 | 0.2626 | 0.2625 | 0.2624 | 0.2623 | 0.2622 | 0.2623 | 0.2623 | 0.2621 | 0.2622 | 0.2621 |
| 6 | 0.2605 | 0.2597 | 0.2598 | 0.2597 | 0.2593 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2589 | 0.2588 | 0.2588 | 0.2586 | 0.2586 | 0.2585 | 0.2583 | 0.2584 | 0.2580 |
| 7 | 0.2607 | 0.2596 | 0.2596 | 0.2596 | 0.2592 | 0.2591 | 0.2589 | 0.2589 | 0.2588 | 0.2586 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2581 |
| 8 | 0.2632 | 0.2622 | 0.2621 | 0.2620 | 0.2614 | 0.2614 | 0.2612 | 0.2612 | 0.2612 | 0.2609 | 0.2610 | 0.2608 | 0.2607 | 0.2608 | 0.2607 | 0.2605 | 0.2606 | 0.2605 |
| 9 | 0.2591 | 0.2583 | 0.2582 | 0.2583 | 0.2578 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2573 | 0.2574 | 0.2572 | 0.2571 | 0.2571 | 0.2570 | 0.2570 | 0.2570 | 0.2569 |
| 10 | 0.2614 | 0.2607 | 0.2607 | 0.2607 | 0.2603 | 0.2603 | 0.2601 | 0.2602 | 0.2601 | 0.2599 | 0.2599 | 0.2598 | 0.2598 | 0.2597 | 0.2597 | 0.2596 | 0.2597 | 0.2595 |
| 11 | 0.2626 | 0.2619 | 0.2618 | 0.2617 | 0.2614 | 0.2613 | 0.2612 | 0.2612 | 0.2612 | 0.2610 | 0.2609 | 0.2609 | 0.2609 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2606 |
| 12 | 0.2604 | 0.2596 | 0.2595 | 0.2594 | 0.2593 | 0.2591 | 0.2590 | 0.2590 | 0.2589 | 0.2587 | 0.2586 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | 0.2582 |
| 13 | 0.2600 | 0.2593 | 0.2592 | 0.2591 | 0.2588 | 0.2587 | 0.2586 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2581 | 0.2579 | 0.2580 | 0.2580 | 0.2578 | 0.2579 | 0.2577 |
| 14 | 0.2571 | 0.2561 | 0.2560 | 0.2558 | 0.2556 | 0.2556 | 0.2554 | 0.2554 | 0.2554 | 0.2552 | 0.2550 | 0.2549 | 0.2549 | 0.2547 | 0.2546 | 0.2545 | 0.2545 | 0.2544 |
| 15 | 0.2626 | 0.2616 | 0.2616 | 0.2616 | 0.2614 | 0.2613 | 0.2612 | 0.2611 | 0.2611 | 0.2608 | 0.2607 | 0.2606 | 0.2605 | 0.2606 | 0.2605 | 0.2606 | 0.2607 | 0.2605 |
| 16 | 0.2626 | 0.2616 | 0.2616 | 0.2615 | 0.2612 | 0.2611 | 0.2611 | 0.2611 | 0.2611 | 0.2609 | 0.2608 | 0.2607 | 0.2606 | 0.2606 | 0.2604 | 0.2604 | 0.2605 | 0.2603 |
| 17 | 0.2619 | 0.2611 | 0.2610 | 0.2609 | 0.2607 | 0.2606 | 0.2605 | 0.2604 | 0.2604 | 0.2603 | 0.2602 | 0.2601 | 0.2600 | 0.2600 | 0.2600 | 0.2598 | 0.2600 | 0.2598 |
| 18 | 0.2635 | 0.2627 | 0.2627 | 0.2626 | 0.2622 | 0.2621 | 0.2619 | 0.2619 | 0.2621 | 0.2618 | 0.2618 | 0.2617 | 0.2616 | 0.2617 | 0.2617 | 0.2616 | 0.2617 | 0.2615 |
| 19 | 0.2561 | 0.2550 | 0.2550 | 0.2548 | 0.2545 | 0.2543 | 0.2542 | 0.2541 | 0.2543 | 0.2541 | 0.2538 | 0.2537 | 0.2536 | 0.2536 | 0.2537 | 0.2535 | 0.2536 | 0.2535 |
| 20 | 0.2614 | 0.2599 | 0.2597 | 0.2596 | 0.2592 | 0.2590 | 0.2589 | 0.2589 | 0.2591 | 0.2589 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2584 |
| 21 | 0.2596 | 0.2588 | 0.2586 | 0.2586 | 0.2581 | 0.2581 | 0.2579 | 0.2579 | 0.2579 | 0.2578 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2574 | 0.2573 | 0.2574 | 0.2573 |
| 22 | 0.2618 | 0.2611 | 0.2610 | 0.2609 | 0.2606 | 0.2604 | 0.2603 | 0.2603 | 0.2604 | 0.2603 | 0.2602 | 0.2601 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2600 | 0.2599 |
| 23 | 0.2614 | 0.2606 | 0.2606 | 0.2605 | 0.2603 | 0.2603 | 0.2601 | 0.2600 | 0.2599 | 0.2599 | 0.2597 | 0.2597 | 0.2596 | 0.2596 | 0.2595 | 0.2595 | 0.2595 | 0.2594 |
| 24 | 0.2605 | 0.2597 | 0.2597 | 0.2596 | 0.2593 | 0.2592 | 0.2591 | 0.2590 | 0.2591 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 |
| 25 | 0.2606 | 0.2599 | 0.2597 | 0.2597 | 0.2594 | 0.2593 | 0.2592 | 0.2591 | 0.2591 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2586 | 0.2585 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2612 | 0.2603 | 0.2602 | 0.2601 | 0.2598 | 0.2597 | 0.2596 | 0.2596 | 0.2595 | 0.2594 | 0.2593 | 0.2592 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | 0.2589 | 0.2588 |
| Med. | 0.2614 | 0.2606 | 0.2606 | 0.2605 | 0.2603 | 0.2603 | 0.2601 | 0.2600 | 0.2599 | 0.2598 | 0.2597 | 0.2596 | 0.2594 | 0.2593 | 0.2591 | 0.2589 | 0.2588 | 0.2585 |
| σ | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 |
| Min. | 0.2561 | 0.2550 | 0.2550 | 0.2548 | 0.2545 | 0.2543 | 0.2542 | 0.2541 | 0.2543 | 0.2541 | 0.2538 | 0.2537 | 0.2536 | 0.2536 | 0.2537 | 0.2535 | 0.2536 | 0.2535 |
| Max. | 0.2646 | 0.2636 | 0.2638 | 0.2635 | 0.2634 | 0.2633 | 0.2632 | 0.2631 | 0.2630 | 0.2629 | 0.2628 | 0.2626 | 0.2625 | 0.2625 | 0.2625 | 0.2623 | 0.2625 | 0.2623 |

Data Set 3 : 55 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 55.5 °C |
| Actual Ambient Temperature [T _A] | 53.0 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-5 (Continued)
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.2587 | 0.2587 | 0.2586 | | | | | | | | | | | | | |
| 2 | 0.2584 | 0.2583 | 0.2581 | | | | | | | | | | | | | |
| 3 | 0.2563 | 0.2562 | 0.2561 | | | | | | | | | | | | | |
| 4 | 0.2622 | 0.2622 | 0.2620 | | | | | | | | | | | | | |
| 5 | 0.2619 | 0.2619 | 0.2617 | | | | | | | | | | | | | |
| 6 | 0.2578 | 0.2578 | 0.2577 | | | | | | | | | | | | | |
| 7 | 0.2580 | 0.2579 | 0.2578 | | | | | | | | | | | | | |
| 8 | 0.2602 | 0.2603 | 0.2601 | | | | | | | | | | | | | |
| 9 | 0.2568 | 0.2567 | 0.2566 | | | | | | | | | | | | | |
| 10 | 0.2593 | 0.2593 | 0.2592 | | | | | | | | | | | | | |
| 11 | 0.2604 | 0.2605 | 0.2604 | | | | | | | | | | | | | |
| 12 | 0.2580 | 0.2580 | 0.2579 | | | | | | | | | | | | | |
| 13 | 0.2576 | 0.2576 | 0.2577 | | | | | | | | | | | | | |
| 14 | 0.2542 | 0.2542 | 0.2541 | | | | | | | | | | | | | |
| 15 | 0.2603 | 0.2602 | 0.2601 | | | | | | | | | | | | | |
| 16 | 0.2602 | 0.2602 | 0.2601 | | | | | | | | | | | | | |
| 17 | 0.2597 | 0.2597 | 0.2597 | | | | | | | | | | | | | |
| 18 | 0.2613 | 0.2613 | 0.2612 | | | | | | | | | | | | | |
| 19 | 0.2533 | 0.2534 | 0.2531 | | | | | | | | | | | | | |
| 20 | 0.2583 | 0.2583 | 0.2581 | | | | | | | | | | | | | |
| 21 | 0.2571 | 0.2571 | 0.2570 | | | | | | | | | | | | | |
| 22 | 0.2597 | 0.2597 | 0.2595 | | | | | | | | | | | | | |
| 23 | 0.2591 | 0.2592 | 0.2591 | | | | | | | | | | | | | |
| 24 | 0.2583 | 0.2583 | 0.2582 | | | | | | | | | | | | | |
| 25 | 0.2583 | 0.2583 | 0.2582 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.2586 | 0.2586 | 0.2585 | | | | | | | | | | | | | |
| Med. | 0.2584 | 0.2583 | 0.2582 | | | | | | | | | | | | | |
| σ | 0.0021 | 0.0021 | 0.0021 | | | | | | | | | | | | | |
| Min. | 0.2533 | 0.2534 | 0.2531 | | | | | | | | | | | | | |
| Max. | 0.2622 | 0.2622 | 0.2620 | | | | | | | | | | | | | |

Data Set 3 : 55 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 55.5 °C |
| Actual Ambient Temperature [T _A] | 53.0 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-6
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.5261 | 0.5259 | 0.5260 | 0.5259 | 0.5257 | 0.5258 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5254 | 0.5254 | 0.5254 | 0.5252 |
| 2 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5255 | 0.5255 | 0.5255 | 0.5254 | 0.5254 | 0.5254 | 0.5254 | 0.5254 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5251 |
| 3 | 0.5256 | 0.5255 | 0.5255 | 0.5255 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5251 | 0.5252 | 0.5251 | 0.5252 | 0.5250 | 0.5251 | 0.5250 | 0.5251 | 0.5251 | 0.5250 |
| 4 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5264 |
| 5 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5275 |
| 6 | 0.5261 | 0.5261 | 0.5261 | 0.5262 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5257 |
| 7 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5257 | 0.5258 | 0.5257 | 0.5257 | 0.5258 | 0.5258 |
| 8 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | 0.5276 | 0.5275 |
| 9 | 0.5259 | 0.5258 | 0.5258 | 0.5259 | 0.5257 | 0.5257 | 0.5256 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5256 | 0.5255 |
| 10 | 0.5294 | 0.5294 | 0.5294 | 0.5295 | 0.5293 | 0.5293 | 0.5292 | 0.5292 | 0.5293 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5293 | 0.5292 | 0.5292 | 0.5293 | 0.5292 |
| 11 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 |
| 12 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5259 | 0.5258 | 0.5258 | 0.5259 | 0.5259 |
| 13 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | 0.5264 |
| 14 | 0.5242 | 0.5240 | 0.5240 | 0.5240 | 0.5238 | 0.5237 | 0.5237 | 0.5237 | 0.5237 | 0.5237 | 0.5236 | 0.5236 | 0.5235 | 0.5236 | 0.5235 | 0.5235 | 0.5235 | 0.5235 |
| 15 | 0.5272 | 0.5271 | 0.5271 | 0.5272 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5269 | 0.5269 | 0.5269 |
| 16 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5265 | 0.5266 | 0.5265 |
| 17 | 0.5275 | 0.5274 | 0.5274 | 0.5275 | 0.5273 | 0.5272 | 0.5271 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5272 | 0.5271 |
| 18 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5279 | 0.5278 | 0.5278 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 |
| 19 | 0.5255 | 0.5253 | 0.5254 | 0.5253 | 0.5252 | 0.5251 | 0.5251 | 0.5250 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5250 | 0.5249 |
| 20 | 0.5274 | 0.5272 | 0.5272 | 0.5271 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5269 | 0.5268 |
| 21 | 0.5232 | 0.5231 | 0.5231 | 0.5231 | 0.5229 | 0.5228 | 0.5228 | 0.5228 | 0.5228 | 0.5228 | 0.5228 | 0.5227 | 0.5227 | 0.5227 | 0.5227 | 0.5227 | 0.5227 | 0.5227 |
| 22 | 0.5253 | 0.5252 | 0.5253 | 0.5253 | 0.5250 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5250 | 0.5250 | 0.5249 | 0.5250 | 0.5250 |
| 23 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5269 | 0.5268 |
| 24 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5278 | 0.5279 | 0.5278 | 0.5279 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 |
| 25 | 0.5252 | 0.5251 | 0.5251 | 0.5252 | 0.5249 | 0.5249 | 0.5248 | 0.5249 | 0.5249 | 0.5248 | 0.5248 | 0.5248 | 0.5247 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 |
| Med. | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 |
| σ | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0014 |
| Min. | 0.5232 | 0.5231 | 0.5231 | 0.5231 | 0.5229 | 0.5228 | 0.5228 | 0.5228 | 0.5228 | 0.5228 | 0.5228 | 0.5227 | 0.5227 | 0.5227 | 0.5227 | 0.5227 | 0.5227 | 0.5227 |
| Max. | 0.5294 | 0.5294 | 0.5294 | 0.5295 | 0.5293 | 0.5293 | 0.5292 | 0.5292 | 0.5293 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5293 | 0.5292 | 0.5292 | 0.5293 | 0.5292 |

Data Set 3 : 55 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 55.5 °C |
| Actual Ambient Temperature [T _A] | 53.0 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 3-6 (Continued)
Chromaticity

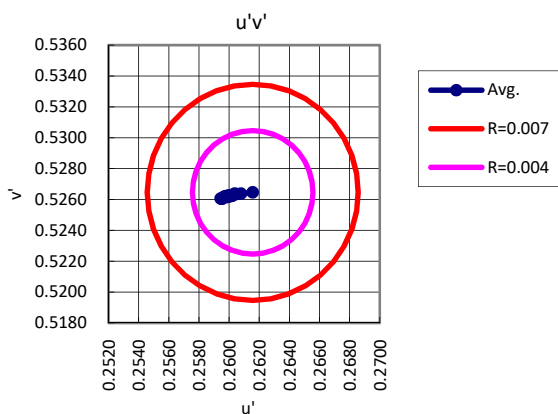
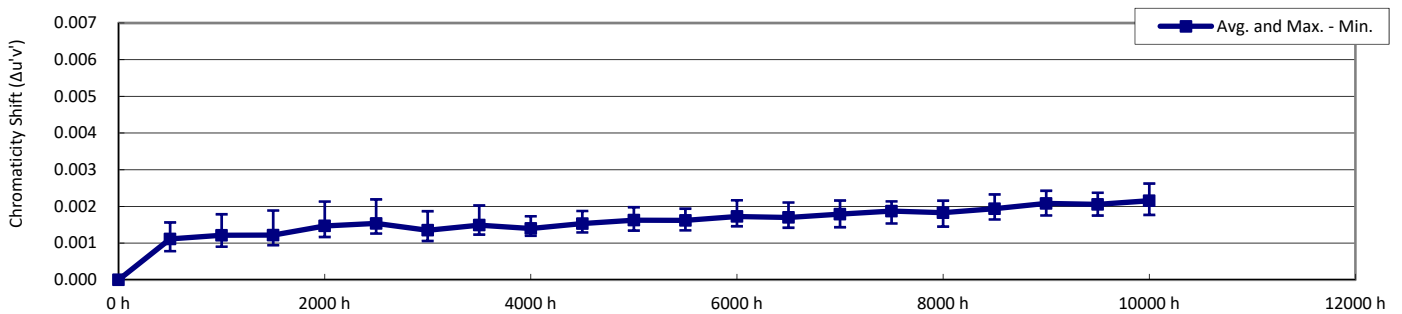
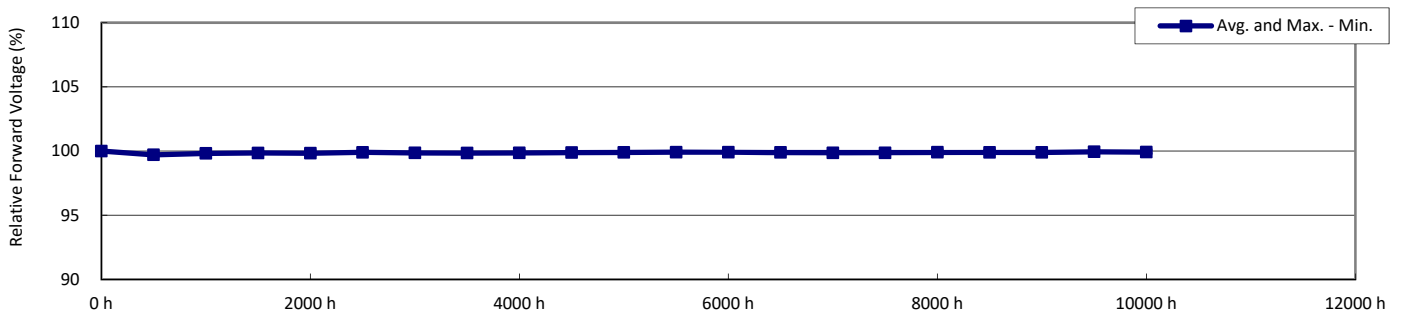
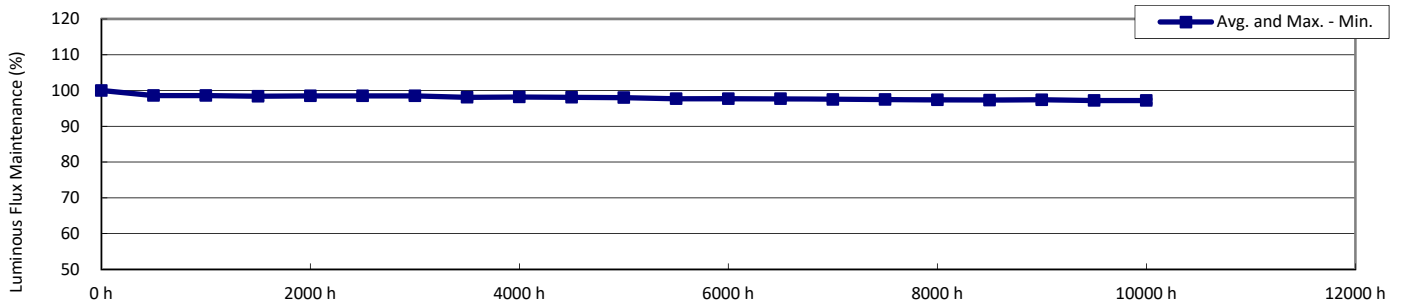
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.5252 | 0.5253 | 0.5251 | | | | | | | | | | | | | |
| 2 | 0.5250 | 0.5251 | 0.5250 | | | | | | | | | | | | | |
| 3 | 0.5249 | 0.5249 | 0.5249 | | | | | | | | | | | | | |
| 4 | 0.5263 | 0.5264 | 0.5264 | | | | | | | | | | | | | |
| 5 | 0.5274 | 0.5275 | 0.5275 | | | | | | | | | | | | | |
| 6 | 0.5256 | 0.5256 | 0.5256 | | | | | | | | | | | | | |
| 7 | 0.5256 | 0.5256 | 0.5256 | | | | | | | | | | | | | |
| 8 | 0.5274 | 0.5273 | 0.5274 | | | | | | | | | | | | | |
| 9 | 0.5254 | 0.5254 | 0.5254 | | | | | | | | | | | | | |
| 10 | 0.5291 | 0.5291 | 0.5291 | | | | | | | | | | | | | |
| 11 | 0.5262 | 0.5262 | 0.5262 | | | | | | | | | | | | | |
| 12 | 0.5257 | 0.5257 | 0.5258 | | | | | | | | | | | | | |
| 13 | 0.5263 | 0.5263 | 0.5263 | | | | | | | | | | | | | |
| 14 | 0.5234 | 0.5233 | 0.5234 | | | | | | | | | | | | | |
| 15 | 0.5267 | 0.5268 | 0.5267 | | | | | | | | | | | | | |
| 16 | 0.5263 | 0.5264 | 0.5264 | | | | | | | | | | | | | |
| 17 | 0.5270 | 0.5272 | 0.5271 | | | | | | | | | | | | | |
| 18 | 0.5277 | 0.5278 | 0.5278 | | | | | | | | | | | | | |
| 19 | 0.5248 | 0.5248 | 0.5249 | | | | | | | | | | | | | |
| 20 | 0.5267 | 0.5267 | 0.5267 | | | | | | | | | | | | | |
| 21 | 0.5225 | 0.5226 | 0.5226 | | | | | | | | | | | | | |
| 22 | 0.5249 | 0.5249 | 0.5248 | | | | | | | | | | | | | |
| 23 | 0.5266 | 0.5267 | 0.5267 | | | | | | | | | | | | | |
| 24 | 0.5277 | 0.5277 | 0.5277 | | | | | | | | | | | | | |
| 25 | 0.5247 | 0.5247 | 0.5247 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.5260 | 0.5260 | 0.5260 | | | | | | | | | | | | | |
| Med. | 0.5262 | 0.5262 | 0.5262 | | | | | | | | | | | | | |
| σ | 0.0014 | 0.0014 | 0.0014 | | | | | | | | | | | | | |
| Min. | 0.5225 | 0.5226 | 0.5226 | | | | | | | | | | | | | |
| Max. | 0.5291 | 0.5291 | 0.5291 | | | | | | | | | | | | | |



Data Set 4 : 85 °C, 100 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 87.2 °C |
| Actual Ambient Temperature [T_A] | 85.0 °C |
| Drive Current [I_F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0



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Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 4-1
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | | | |
|---------|---------------------|--------------------|---------------------|-------------|---------|--------|---------|--------|--|--|--|--|--|--|
| | Φ _v [lm] | V _F [V] | T _{CP} [K] | P [W] | x | y | u' | v' | | | | | | |
| 1 | 93.4 | 5.94 | 2723 | 0.59 | 0.457 | 0.409 | 0.262 | 0.526 | | | | | | |
| 2 | 93.2 | 5.94 | 2686 | 0.59 | 0.461 | 0.410 | 0.263 | 0.527 | | | | | | |
| 3 | 93.9 | 5.94 | 2758 | 0.59 | 0.454 | 0.407 | 0.260 | 0.525 | | | | | | |
| 4 | 94.5 | 5.95 | 2738 | 0.59 | 0.460 | 0.416 | 0.260 | 0.529 | | | | | | |
| 5 | 93.4 | 5.94 | 2763 | 0.59 | 0.452 | 0.404 | 0.260 | 0.524 | | | | | | |
| 6 | 93.1 | 5.95 | 2692 | 0.59 | 0.459 | 0.408 | 0.263 | 0.526 | | | | | | |
| 7 | 94.4 | 5.94 | 2760 | 0.59 | 0.455 | 0.410 | 0.260 | 0.527 | | | | | | |
| 8 | 93.2 | 5.95 | 2706 | 0.59 | 0.458 | 0.408 | 0.262 | 0.526 | | | | | | |
| 9 | 94.0 | 5.95 | 2737 | 0.60 | 0.458 | 0.411 | 0.261 | 0.527 | | | | | | |
| 10 | 93.3 | 5.95 | 2712 | 0.59 | 0.459 | 0.410 | 0.262 | 0.527 | | | | | | |
| 11 | 93.7 | 5.94 | 2701 | 0.59 | 0.459 | 0.410 | 0.262 | 0.527 | | | | | | |
| 12 | 94.1 | 5.94 | 2741 | 0.59 | 0.457 | 0.410 | 0.261 | 0.527 | | | | | | |
| 13 | 94.3 | 5.95 | 2754 | 0.60 | 0.457 | 0.412 | 0.260 | 0.528 | | | | | | |
| 14 | 94.5 | 5.95 | 2737 | 0.60 | 0.459 | 0.413 | 0.261 | 0.528 | | | | | | |
| 15 | 92.6 | 5.95 | 2679 | 0.59 | 0.458 | 0.405 | 0.264 | 0.525 | | | | | | |
| 16 | 93.4 | 5.95 | 2713 | 0.59 | 0.458 | 0.409 | 0.262 | 0.527 | | | | | | |
| 17 | 94.0 | 5.95 | 2741 | 0.60 | 0.455 | 0.408 | 0.261 | 0.526 | | | | | | |
| 18 | 94.5 | 5.94 | 2813 | 0.59 | 0.450 | 0.408 | 0.258 | 0.525 | | | | | | |
| 19 | 93.5 | 5.95 | 2757 | 0.60 | 0.453 | 0.406 | 0.260 | 0.524 | | | | | | |
| 20 | 93.8 | 5.96 | 2714 | 0.60 | 0.458 | 0.409 | 0.262 | 0.526 | | | | | | |
| 21 | 93.4 | 5.94 | 2697 | 0.59 | 0.459 | 0.409 | 0.263 | 0.527 | | | | | | |
| 22 | 92.9 | 5.94 | 2699 | 0.59 | 0.459 | 0.408 | 0.263 | 0.526 | | | | | | |
| 23 | 93.2 | 5.96 | 2692 | 0.60 | 0.459 | 0.409 | 0.263 | 0.527 | | | | | | |
| 24 | 93.8 | 5.95 | 2708 | 0.60 | 0.460 | 0.412 | 0.262 | 0.528 | | | | | | |
| 25 | 93 | 5.94 | 2700 | 0.59 | 0.458 | 0.406 | 0.263 | 0.525 | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | | | |
| Avg. | 93.6 | 5.95 | 2725 | 0.59 | 0.457 | 0.409 | 0.262 | 0.526 | | | | | | |
| Med. | 93.5 | 5.95 | 2714 | 0.59 | 0.458 | 0.409 | 0.262 | 0.527 | | | | | | |
| σ | 0.55 | 0.006 | 31.7 | 0.001 | 0.0026 | 0.0026 | 0.0014 | 0.0012 | | | | | | |
| Min. | 92.6 | 5.94 | 2679 | 0.59 | 0.450 | 0.404 | 0.258 | 0.524 | | | | | | |
| Max. | 94.5 | 5.96 | 2813 | 0.60 | 0.461 | 0.416 | 0.264 | 0.529 | | | | | | |



Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 4-2
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 98.3 | 98.5 | 98.8 | 98.8 | 98.8 | 98.8 | 98.3 | 98.3 | 98.3 | 98.0 | 97.8 | 97.8 | 97.8 | 97.6 | 97.5 | 97.4 | 97.3 |
| 2 | 100.0 | 98.7 | 98.8 | 98.7 | 98.7 | 98.7 | 98.8 | 98.4 | 98.4 | 98.4 | 98.2 | 98.0 | 97.9 | 98.0 | 97.7 | 97.7 | 97.7 | 97.6 |
| 3 | 100.0 | 98.5 | 98.5 | 98.4 | 98.8 | 98.9 | 98.9 | 98.4 | 98.4 | 98.3 | 98.1 | 97.8 | 97.8 | 97.8 | 97.6 | 97.6 | 97.5 | 97.4 |
| 4 | 100.0 | 98.5 | 98.6 | 98.5 | 98.7 | 98.7 | 98.8 | 98.3 | 98.4 | 98.3 | 98.2 | 97.9 | 97.9 | 97.9 | 97.6 | 97.7 | 97.7 | 97.6 |
| 5 | 100.0 | 97.8 | 97.7 | 97.7 | 97.8 | 98.1 | 98.3 | 97.9 | 97.9 | 97.9 | 97.7 | 97.4 | 97.3 | 97.3 | 97.1 | 97.1 | 97.0 | 96.9 |
| 6 | 100.0 | 98.4 | 98.5 | 98.5 | 98.6 | 98.7 | 98.7 | 98.2 | 98.3 | 98.2 | 97.9 | 97.8 | 97.7 | 97.7 | 97.5 | 97.5 | 97.5 | 97.3 |
| 7 | 100.0 | 98.6 | 98.6 | 98.4 | 98.5 | 98.3 | 98.5 | 98.1 | 98.4 | 98.2 | 98.1 | 97.7 | 97.7 | 97.7 | 97.5 | 97.5 | 97.4 | 97.4 |
| 8 | 100.0 | 98.7 | 98.7 | 98.5 | 98.6 | 98.6 | 98.6 | 98.1 | 98.2 | 98.1 | 98.0 | 97.6 | 97.6 | 97.6 | 97.3 | 97.4 | 97.3 | 97.2 |
| 9 | 100.0 | 99.0 | 99.0 | 98.8 | 98.8 | 98.8 | 98.8 | 98.4 | 98.5 | 98.4 | 98.3 | 97.9 | 97.9 | 98.0 | 97.7 | 97.7 | 97.7 | 97.6 |
| 10 | 100.0 | 98.4 | 98.4 | 98.1 | 98.3 | 98.1 | 98.2 | 97.8 | 98.0 | 97.9 | 97.8 | 97.6 | 97.6 | 97.7 | 97.4 | 97.5 | 97.4 | 97.3 |
| 11 | 100.0 | 98.8 | 98.8 | 98.3 | 98.4 | 98.3 | 98.2 | 97.8 | 97.8 | 97.6 | 97.7 | 97.2 | 97.2 | 97.1 | 96.8 | 96.8 | 96.8 | 96.7 |
| 12 | 100.0 | 98.9 | 98.8 | 98.6 | 98.6 | 98.5 | 98.5 | 98.1 | 98.2 | 98.0 | 98.0 | 97.6 | 97.6 | 97.7 | 97.4 | 97.4 | 97.3 | 97.3 |
| 13 | 100.0 | 98.7 | 98.7 | 98.5 | 98.5 | 98.3 | 98.6 | 98.0 | 98.2 | 98.1 | 98.0 | 97.8 | 97.8 | 97.9 | 97.6 | 97.7 | 97.7 | 97.6 |
| 14 | 100.0 | 99.0 | 99.0 | 98.8 | 98.8 | 98.9 | 98.8 | 98.5 | 98.5 | 98.5 | 98.3 | 98.0 | 98.0 | 98.1 | 97.7 | 97.8 | 97.7 | 97.6 |
| 15 | 100.0 | 98.6 | 98.6 | 98.3 | 98.4 | 98.5 | 98.6 | 98.1 | 98.2 | 98.1 | 97.9 | 97.7 | 97.6 | 97.6 | 97.3 | 97.4 | 97.3 | 97.3 |
| 16 | 100.0 | 98.0 | 97.7 | 97.3 | 97.4 | 97.3 | 97.6 | 97.3 | 97.8 | 97.8 | 97.7 | 97.4 | 97.4 | 97.5 | 97.2 | 97.4 | 97.3 | 97.3 |
| 17 | 100.0 | 98.4 | 98.5 | 98.1 | 98.3 | 98.2 | 98.2 | 97.8 | 98.1 | 97.8 | 97.9 | 97.4 | 97.4 | 97.5 | 97.1 | 97.0 | 97.1 | 97.0 |
| 18 | 100.0 | 98.9 | 98.9 | 98.6 | 98.5 | 98.6 | 98.6 | 98.2 | 98.2 | 98.1 | 98.0 | 97.7 | 97.7 | 97.7 | 97.4 | 97.4 | 97.3 | 97.3 |
| 19 | 100.0 | 99.0 | 99.0 | 98.9 | 98.7 | 98.7 | 98.8 | 98.4 | 98.4 | 98.3 | 98.1 | 97.8 | 97.8 | 98.0 | 97.7 | 97.6 | 97.6 | 97.5 |
| 20 | 100.0 | 98.6 | 98.7 | 98.7 | 98.9 | 98.8 | 98.9 | 98.5 | 98.6 | 98.4 | 98.3 | 98.0 | 98.0 | 98.1 | 97.8 | 97.9 | 97.7 | 97.7 |
| 21 | 100.0 | 98.5 | 98.5 | 98.3 | 98.3 | 98.1 | 98.3 | 97.9 | 98.0 | 98.0 | 97.8 | 97.6 | 97.6 | 97.7 | 97.4 | 97.4 | 97.4 | 97.3 |
| 22 | 100.0 | 97.6 | 97.5 | 97.4 | 97.8 | 97.7 | 98.1 | 97.7 | 98.0 | 97.8 | 97.8 | 97.6 | 97.6 | 97.8 | 97.5 | 97.4 | 97.4 | 97.3 |
| 23 | 100.0 | 98.8 | 98.7 | 98.5 | 98.6 | 98.5 | 98.6 | 98.1 | 98.2 | 98.1 | 98.2 | 97.8 | 97.6 | 97.8 | 97.4 | 97.4 | 97.2 | 97.3 |
| 24 | 100.0 | 98.8 | 98.9 | 98.6 | 98.7 | 98.7 | 98.8 | 98.3 | 98.4 | 98.2 | 98.0 | 97.8 | 97.8 | 97.9 | 97.6 | 97.6 | 97.5 | 97.4 |
| 25 | 100.0 | 98.6 | 98.7 | 98.6 | 98.6 | 98.5 | 98.6 | 98.2 | 98.3 | 98.0 | 97.9 | 97.8 | 97.7 | 97.7 | 97.5 | 97.4 | 97.4 | 97.3 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 98.6 | 98.6 | 98.4 | 98.5 | 98.5 | 98.5 | 98.1 | 98.2 | 98.1 | 98.0 | 97.7 | 97.7 | 97.7 | 97.5 | 97.5 | 97.4 | 97.3 |
| Med. | 100.0 | 98.6 | 98.7 | 98.5 | 98.6 | 98.5 | 98.6 | 98.1 | 98.2 | 98.1 | 98.0 | 97.8 | 97.7 | 97.7 | 97.5 | 97.5 | 97.4 | 97.3 |
| σ | 0.00 | 0.35 | 0.39 | 0.41 | 0.36 | 0.38 | 0.31 | 0.29 | 0.22 | 0.23 | 0.19 | 0.20 | 0.20 | 0.23 | 0.23 | 0.24 | 0.23 | 0.23 |
| Min. | 100.0 | 97.6 | 97.5 | 97.3 | 97.4 | 97.3 | 97.6 | 97.3 | 97.8 | 97.6 | 97.7 | 97.2 | 97.2 | 97.1 | 96.8 | 96.8 | 96.8 | 96.7 |
| Max. | 100.0 | 99.0 | 99.0 | 98.9 | 98.9 | 98.9 | 98.9 | 98.5 | 98.6 | 98.5 | 98.3 | 98.0 | 98.0 | 98.1 | 97.8 | 97.9 | 97.7 | 97.7 |

TM-21 Projection

| Test duration used | 5000 h to 10000 h |
|----------------------------------|-------------------|
| B | 0.9858 |
| α | 1.454E-06 |
| R ² | 0.9085 |
| Calculated L ₇₀ (10K) | 235000 hours |
| Reported L ₇₀ (10K) | > 60000 hours |
| Calculated L ₈₀ (10K) | 144000 hours |
| Reported L ₈₀ (10K) | > 60000 hours |
| Calculated L ₉₀ (10K) | 62600 hours |
| Reported L ₉₀ (10K) | > 60000 hours |

Curve-fit equation:

$$\Phi(t) = B \exp(-\alpha t)$$

Luminous flux maintenance life equation:

$$L_{70} = \ln(B/0.7) / \alpha$$

$$L_{80} = \ln(B/0.8) / \alpha$$

$$L_{90} = \ln(B/0.9) / \alpha$$

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Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 4-2 (Continued)
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|--|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 97.6 | 97.3 | 97.3 | | | | | | | | | | | | | |
| 2 | 97.7 | 97.4 | 97.4 | | | | | | | | | | | | | |
| 3 | 97.6 | 97.3 | 97.3 | | | | | | | | | | | | | |
| 4 | 97.7 | 97.6 | 97.5 | | | | | | | | | | | | | |
| 5 | 97.0 | 96.8 | 96.7 | | | | | | | | | | | | | |
| 6 | 97.5 | 97.4 | 97.3 | | | | | | | | | | | | | |
| 7 | 97.4 | 97.3 | 97.2 | | | | | | | | | | | | | |
| 8 | 97.2 | 97.0 | 97.0 | | | | | | | | | | | | | |
| 9 | 97.6 | 97.4 | 97.3 | | | | | | | | | | | | | |
| 10 | 97.3 | 97.2 | 97.2 | | | | | | | | | | | | | |
| 11 | 96.5 | 96.3 | 96.4 | | | | | | | | | | | | | |
| 12 | 97.3 | 97.1 | 97.2 | | | | | | | | | | | | | |
| 13 | 97.7 | 97.5 | 97.4 | | | | | | | | | | | | | |
| 14 | 97.7 | 97.5 | 97.5 | | | | | | | | | | | | | |
| 15 | 97.3 | 97.2 | 97.1 | | | | | | | | | | | | | |
| 16 | 97.2 | 97.1 | 97.1 | | | | | | | | | | | | | |
| 17 | 97.0 | 96.8 | 96.7 | | | | | | | | | | | | | |
| 18 | 97.2 | 97.1 | 97.1 | | | | | | | | | | | | | |
| 19 | 97.7 | 97.5 | 97.4 | | | | | | | | | | | | | |
| 20 | 97.9 | 97.7 | 97.6 | | | | | | | | | | | | | |
| 21 | 97.4 | 97.2 | 97.1 | | | | | | | | | | | | | |
| 22 | 97.5 | 97.2 | 97.3 | | | | | | | | | | | | | |
| 23 | 97.3 | 97.2 | 97.1 | | | | | | | | | | | | | |
| 24 | 97.6 | 97.4 | 97.3 | | | | | | | | | | | | | |
| 25 | 97.3 | 97.2 | 97.1 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 97.4 | 97.2 | 97.2 | | | | | | | | | | | | | |
| Med. | 97.4 | 97.2 | 97.2 | | | | | | | | | | | | | |
| σ | 0.30 | 0.29 | 0.27 | | | | | | | | | | | | | |
| Min. | 96.5 | 96.3 | 96.4 | | | | | | | | | | | | | |
| Max. | 97.9 | 97.7 | 97.6 | | | | | | | | | | | | | |



Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 4-3
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.7 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 |
| 2 | 100.0 | 99.7 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 |
| 3 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 |
| 4 | 100.0 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 |
| 5 | 100.0 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.8 |
| 6 | 100.0 | 99.8 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.1 | 100.0 |
| 7 | 100.0 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| 8 | 100.0 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 |
| 9 | 100.0 | 99.6 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| 10 | 100.0 | 99.6 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 |
| 11 | 100.0 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 |
| 12 | 100.0 | 99.7 | 99.9 | 99.9 | 99.8 | 100.0 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 |
| 13 | 100.0 | 99.7 | 99.9 | 99.9 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| 14 | 100.0 | 99.7 | 99.7 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 |
| 15 | 100.0 | 99.7 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 99.9 | 100.0 | 99.9 |
| 16 | 100.0 | 99.7 | 99.8 | 99.9 | 99.8 | 99.9 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 |
| 17 | 100.0 | 99.7 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.9 | 99.9 |
| 18 | 100.0 | 99.7 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 |
| 19 | 100.0 | 99.6 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 |
| 20 | 100.0 | 99.6 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.7 | 99.8 |
| 21 | 100.0 | 99.7 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.1 | 100.0 |
| 22 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 |
| 23 | 100.0 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 |
| 24 | 100.0 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| 25 | 100.0 | 99.7 | 99.8 | 99.8 | 99.7 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.7 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 |
| Med. | 100.0 | 99.7 | 99.8 | 99.9 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 |
| σ | 0.00 | 0.06 | 0.07 | 0.06 | 0.09 | 0.06 | 0.07 | 0.06 | 0.07 | 0.06 | 0.07 | 0.07 | 0.07 | 0.06 | 0.07 | 0.06 | 0.09 | 0.07 |
| Min. | 100.0 | 99.6 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.7 | 99.8 |
| Max. | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 |

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Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 4-3 (Continued)
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|---|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 2 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 3 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 4 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 5 | 99.8 | 99.9 | 99.8 | | | | | | | | | | | | | |
| 6 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 7 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 8 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 9 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 10 | 99.9 | 99.9 | 99.8 | | | | | | | | | | | | | |
| 11 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 12 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 13 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 14 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 15 | 100.0 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 16 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 17 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 18 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 19 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 20 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 21 | 100.0 | 100.1 | 100.0 | | | | | | | | | | | | | |
| 22 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | | | |
| 23 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 24 | 99.8 | 99.9 | 99.8 | | | | | | | | | | | | | |
| 25 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| Med. | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| σ | 0.06 | 0.07 | 0.06 | | | | | | | | | | | | | |
| Min. | 99.8 | 99.8 | 99.8 | | | | | | | | | | | | | |
| Max. | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |



Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 4-4
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.0000 | 0.0014 | 0.0013 | 0.0011 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0021 |
| 2 | 0.0000 | 0.0010 | 0.0012 | 0.0011 | 0.0014 | 0.0014 | 0.0013 | 0.0015 | 0.0013 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0019 |
| 3 | 0.0000 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0015 | 0.0013 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0020 | 0.0019 | 0.0020 |
| 4 | 0.0000 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0015 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0016 | 0.0018 | 0.0018 | 0.0017 | 0.0018 |
| 5 | 0.0000 | 0.0015 | 0.0016 | 0.0014 | 0.0016 | 0.0017 | 0.0015 | 0.0018 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | 0.0022 |
| 6 | 0.0000 | 0.0012 | 0.0012 | 0.0012 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0020 |
| 7 | 0.0000 | 0.0012 | 0.0013 | 0.0013 | 0.0015 | 0.0016 | 0.0014 | 0.0015 | 0.0014 | 0.0016 | 0.0017 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0020 | 0.0019 | 0.0021 |
| 8 | 0.0000 | 0.0011 | 0.0012 | 0.0012 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0021 |
| 9 | 0.0000 | 0.0010 | 0.0011 | 0.0011 | 0.0014 | 0.0014 | 0.0013 | 0.0014 | 0.0014 | 0.0014 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0018 | 0.0017 | 0.0019 |
| 10 | 0.0000 | 0.0011 | 0.0011 | 0.0012 | 0.0015 | 0.0015 | 0.0013 | 0.0015 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0018 |
| 11 | 0.0000 | 0.0009 | 0.0011 | 0.0011 | 0.0013 | 0.0015 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0021 |
| 12 | 0.0000 | 0.0009 | 0.0010 | 0.0010 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0013 | 0.0014 | 0.0015 | 0.0015 | 0.0017 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 |
| 13 | 0.0000 | 0.0011 | 0.0013 | 0.0013 | 0.0016 | 0.0017 | 0.0015 | 0.0016 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0019 |
| 14 | 0.0000 | 0.0010 | 0.0010 | 0.0010 | 0.0013 | 0.0013 | 0.0011 | 0.0013 | 0.0012 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0017 |
| 15 | 0.0000 | 0.0009 | 0.0012 | 0.0012 | 0.0015 | 0.0015 | 0.0013 | 0.0014 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0016 | 0.0018 | 0.0019 | 0.0018 | 0.0020 |
| 16 | 0.0000 | 0.0016 | 0.0018 | 0.0019 | 0.0021 | 0.0022 | 0.0019 | 0.0020 | 0.0017 | 0.0019 | 0.0020 | 0.0019 | 0.0022 | 0.0021 | 0.0022 | 0.0021 | 0.0022 | 0.0023 |
| 17 | 0.0000 | 0.0012 | 0.0013 | 0.0012 | 0.0015 | 0.0016 | 0.0014 | 0.0016 | 0.0015 | 0.0016 | 0.0017 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0019 |
| 18 | 0.0000 | 0.0010 | 0.0011 | 0.0012 | 0.0014 | 0.0014 | 0.0013 | 0.0014 | 0.0013 | 0.0015 | 0.0017 | 0.0015 | 0.0018 | 0.0016 | 0.0017 | 0.0019 | 0.0018 | 0.0020 |
| 19 | 0.0000 | 0.0008 | 0.0009 | 0.0010 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0014 | 0.0014 | 0.0016 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0017 |
| 20 | 0.0000 | 0.0009 | 0.0010 | 0.0009 | 0.0012 | 0.0013 | 0.0011 | 0.0012 | 0.0013 | 0.0013 | 0.0015 | 0.0014 | 0.0015 | 0.0014 | 0.0015 | 0.0016 | 0.0015 | 0.0017 |
| 21 | 0.0000 | 0.0011 | 0.0012 | 0.0014 | 0.0015 | 0.0015 | 0.0013 | 0.0014 | 0.0013 | 0.0015 | 0.0015 | 0.0015 | 0.0017 | 0.0017 | 0.0016 | 0.0018 | 0.0017 | 0.0019 |
| 22 | 0.0000 | 0.0015 | 0.0017 | 0.0017 | 0.0019 | 0.0020 | 0.0016 | 0.0017 | 0.0015 | 0.0017 | 0.0018 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0019 |
| 23 | 0.0000 | 0.0009 | 0.0010 | 0.0011 | 0.0013 | 0.0013 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 |
| 24 | 0.0000 | 0.0010 | 0.0012 | 0.0012 | 0.0014 | 0.0015 | 0.0012 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 | 0.0017 | 0.0016 | 0.0017 | 0.0019 | 0.0018 | 0.0018 |
| 25 | 0.0000 | 0.0012 | 0.0012 | 0.0014 | 0.0015 | 0.0016 | 0.0014 | 0.0016 | 0.0015 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0021 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0011 | 0.0012 | 0.0012 | 0.0015 | 0.0015 | 0.0013 | 0.0015 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0019 |
| Med. | 0.0000 | 0.0011 | 0.0012 | 0.0012 | 0.0015 | 0.0015 | 0.0013 | 0.0015 | 0.0014 | 0.0015 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0019 |
| σ | 0.0000 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0001 | 0.0002 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| Min. | 0.0000 | 0.0008 | 0.0009 | 0.0009 | 0.0012 | 0.0013 | 0.0011 | 0.0012 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0015 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0016 |
| Max. | 0.0000 | 0.0016 | 0.0018 | 0.0019 | 0.0021 | 0.0022 | 0.0019 | 0.0020 | 0.0017 | 0.0019 | 0.0020 | 0.0019 | 0.0022 | 0.0021 | 0.0022 | 0.0021 | 0.0022 | 0.0023 |



Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 4-4 (Continued)
 Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 2 | 0.0020 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| 3 | 0.0021 | 0.0022 | 0.0022 | | | | | | | | | | | | | |
| 4 | 0.0019 | 0.0020 | 0.0020 | | | | | | | | | | | | | |
| 5 | 0.0023 | 0.0023 | 0.0024 | | | | | | | | | | | | | |
| 6 | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 7 | 0.0022 | 0.0022 | 0.0022 | | | | | | | | | | | | | |
| 8 | 0.0024 | 0.0023 | 0.0024 | | | | | | | | | | | | | |
| 9 | 0.0020 | 0.0021 | 0.0021 | | | | | | | | | | | | | |
| 10 | 0.0020 | 0.0020 | 0.0020 | | | | | | | | | | | | | |
| 11 | 0.0022 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 12 | 0.0021 | 0.0020 | 0.0022 | | | | | | | | | | | | | |
| 13 | 0.0020 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| 14 | 0.0018 | 0.0018 | 0.0019 | | | | | | | | | | | | | |
| 15 | 0.0022 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| 16 | 0.0024 | 0.0024 | 0.0026 | | | | | | | | | | | | | |
| 17 | 0.0022 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| 18 | 0.0019 | 0.0019 | 0.0019 | | | | | | | | | | | | | |
| 19 | 0.0019 | 0.0018 | 0.0020 | | | | | | | | | | | | | |
| 20 | 0.0018 | 0.0018 | 0.0019 | | | | | | | | | | | | | |
| 21 | 0.0020 | 0.0019 | 0.0020 | | | | | | | | | | | | | |
| 22 | 0.0021 | 0.0021 | 0.0021 | | | | | | | | | | | | | |
| 23 | 0.0018 | 0.0018 | 0.0018 | | | | | | | | | | | | | |
| 24 | 0.0020 | 0.0020 | 0.0021 | | | | | | | | | | | | | |
| 25 | 0.0023 | 0.0022 | 0.0024 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.0021 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| Med. | 0.0021 | 0.0021 | 0.0022 | | | | | | | | | | | | | |
| σ | 0.0002 | 0.0002 | 0.0002 | | | | | | | | | | | | | |
| Min. | 0.0018 | 0.0018 | 0.0018 | | | | | | | | | | | | | |
| Max. | 0.0024 | 0.0024 | 0.0026 | | | | | | | | | | | | | |



Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 4-5
 Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.2619 | 0.2606 | 0.2607 | 0.2608 | 0.2605 | 0.2603 | 0.2605 | 0.2604 | 0.2605 | 0.2603 | 0.2602 | 0.2602 | 0.2600 | 0.2602 | 0.2600 | 0.2600 | 0.2600 | 0.2598 |
| 2 | 0.2635 | 0.2625 | 0.2623 | 0.2624 | 0.2621 | 0.2621 | 0.2622 | 0.2620 | 0.2622 | 0.2620 | 0.2619 | 0.2619 | 0.2618 | 0.2618 | 0.2617 | 0.2616 | 0.2616 | 0.2616 |
| 3 | 0.2606 | 0.2594 | 0.2592 | 0.2594 | 0.2592 | 0.2591 | 0.2593 | 0.2591 | 0.2592 | 0.2591 | 0.2589 | 0.2590 | 0.2589 | 0.2589 | 0.2587 | 0.2586 | 0.2587 | 0.2586 |
| 4 | 0.2611 | 0.2600 | 0.2599 | 0.2599 | 0.2598 | 0.2596 | 0.2598 | 0.2598 | 0.2598 | 0.2596 | 0.2595 | 0.2595 | 0.2594 | 0.2595 | 0.2593 | 0.2594 | 0.2594 | 0.2593 |
| 5 | 0.2627 | 0.2612 | 0.2611 | 0.2613 | 0.2611 | 0.2610 | 0.2612 | 0.2609 | 0.2612 | 0.2611 | 0.2609 | 0.2609 | 0.2608 | 0.2608 | 0.2608 | 0.2606 | 0.2607 | 0.2606 |
| 6 | 0.2639 | 0.2627 | 0.2627 | 0.2628 | 0.2624 | 0.2623 | 0.2624 | 0.2623 | 0.2624 | 0.2622 | 0.2621 | 0.2621 | 0.2621 | 0.2621 | 0.2620 | 0.2619 | 0.2620 | 0.2619 |
| 7 | 0.2602 | 0.2590 | 0.2589 | 0.2589 | 0.2587 | 0.2587 | 0.2588 | 0.2588 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2582 | 0.2583 | 0.2582 |
| 8 | 0.2627 | 0.2616 | 0.2615 | 0.2615 | 0.2612 | 0.2611 | 0.2612 | 0.2612 | 0.2611 | 0.2611 | 0.2610 | 0.2609 | 0.2608 | 0.2609 | 0.2607 | 0.2606 | 0.2606 | 0.2606 |
| 9 | 0.2612 | 0.2602 | 0.2601 | 0.2600 | 0.2598 | 0.2597 | 0.2599 | 0.2597 | 0.2598 | 0.2598 | 0.2596 | 0.2596 | 0.2596 | 0.2596 | 0.2594 | 0.2594 | 0.2594 | 0.2593 |
| 10 | 0.2626 | 0.2616 | 0.2615 | 0.2614 | 0.2612 | 0.2611 | 0.2614 | 0.2611 | 0.2613 | 0.2612 | 0.2611 | 0.2612 | 0.2611 | 0.2610 | 0.2609 | 0.2609 | 0.2608 | 0.2608 |
| 11 | 0.2650 | 0.2641 | 0.2640 | 0.2639 | 0.2637 | 0.2635 | 0.2637 | 0.2635 | 0.2636 | 0.2634 | 0.2633 | 0.2633 | 0.2631 | 0.2632 | 0.2631 | 0.2630 | 0.2630 | 0.2630 |
| 12 | 0.2614 | 0.2605 | 0.2604 | 0.2604 | 0.2601 | 0.2600 | 0.2601 | 0.2600 | 0.2601 | 0.2600 | 0.2599 | 0.2599 | 0.2597 | 0.2598 | 0.2597 | 0.2596 | 0.2596 | 0.2595 |
| 13 | 0.2604 | 0.2592 | 0.2591 | 0.2591 | 0.2588 | 0.2586 | 0.2589 | 0.2588 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2585 | 0.2586 | 0.2585 |
| 14 | 0.2608 | 0.2599 | 0.2599 | 0.2598 | 0.2596 | 0.2595 | 0.2598 | 0.2595 | 0.2596 | 0.2595 | 0.2595 | 0.2595 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2592 |
| 15 | 0.2641 | 0.2632 | 0.2630 | 0.2630 | 0.2627 | 0.2627 | 0.2629 | 0.2628 | 0.2628 | 0.2626 | 0.2626 | 0.2626 | 0.2625 | 0.2625 | 0.2624 | 0.2623 | 0.2624 | 0.2622 |
| 16 | 0.2628 | 0.2613 | 0.2611 | 0.2609 | 0.2607 | 0.2606 | 0.2610 | 0.2608 | 0.2611 | 0.2610 | 0.2609 | 0.2609 | 0.2607 | 0.2607 | 0.2607 | 0.2607 | 0.2607 | 0.2605 |
| 17 | 0.2637 | 0.2625 | 0.2624 | 0.2625 | 0.2622 | 0.2621 | 0.2623 | 0.2621 | 0.2622 | 0.2621 | 0.2620 | 0.2621 | 0.2619 | 0.2619 | 0.2618 | 0.2618 | 0.2618 | 0.2618 |
| 18 | 0.2585 | 0.2575 | 0.2574 | 0.2573 | 0.2571 | 0.2571 | 0.2572 | 0.2571 | 0.2572 | 0.2570 | 0.2569 | 0.2570 | 0.2568 | 0.2569 | 0.2568 | 0.2566 | 0.2567 | 0.2566 |
| 19 | 0.2607 | 0.2599 | 0.2598 | 0.2597 | 0.2595 | 0.2594 | 0.2595 | 0.2595 | 0.2595 | 0.2594 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2590 |
| 20 | 0.2621 | 0.2612 | 0.2611 | 0.2612 | 0.2610 | 0.2609 | 0.2610 | 0.2609 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2606 | 0.2604 |
| 21 | 0.2630 | 0.2619 | 0.2618 | 0.2617 | 0.2615 | 0.2616 | 0.2618 | 0.2616 | 0.2617 | 0.2616 | 0.2615 | 0.2615 | 0.2614 | 0.2614 | 0.2614 | 0.2613 | 0.2613 | 0.2612 |
| 22 | 0.2635 | 0.2619 | 0.2617 | 0.2618 | 0.2616 | 0.2615 | 0.2619 | 0.2617 | 0.2619 | 0.2618 | 0.2617 | 0.2618 | 0.2618 | 0.2617 | 0.2617 | 0.2616 | 0.2616 | 0.2616 |
| 23 | 0.2656 | 0.2646 | 0.2645 | 0.2645 | 0.2643 | 0.2643 | 0.2645 | 0.2643 | 0.2644 | 0.2643 | 0.2643 | 0.2642 | 0.2641 | 0.2642 | 0.2642 | 0.2641 | 0.2641 | 0.2639 |
| 24 | 0.2629 | 0.2619 | 0.2617 | 0.2617 | 0.2615 | 0.2614 | 0.2617 | 0.2615 | 0.2616 | 0.2615 | 0.2614 | 0.2613 | 0.2613 | 0.2613 | 0.2612 | 0.2611 | 0.2612 | 0.2612 |
| 25 | 0.2633 | 0.2621 | 0.2621 | 0.2619 | 0.2618 | 0.2617 | 0.2619 | 0.2617 | 0.2618 | 0.2617 | 0.2616 | 0.2615 | 0.2615 | 0.2615 | 0.2614 | 0.2614 | 0.2614 | 0.2613 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2623 | 0.2612 | 0.2611 | 0.2611 | 0.2609 | 0.2608 | 0.2610 | 0.2609 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2606 | 0.2606 | 0.2606 | 0.2605 | 0.2605 | 0.2604 |
| Med. | 0.2627 | 0.2613 | 0.2611 | 0.2613 | 0.2611 | 0.2610 | 0.2612 | 0.2609 | 0.2611 | 0.2611 | 0.2609 | 0.2609 | 0.2608 | 0.2608 | 0.2607 | 0.2606 | 0.2607 | 0.2606 |
| σ | 0.0017 | 0.0017 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 | 0.0016 |
| Min. | 0.2585 | 0.2575 | 0.2574 | 0.2573 | 0.2571 | 0.2571 | 0.2572 | 0.2571 | 0.2572 | 0.2570 | 0.2569 | 0.2570 | 0.2568 | 0.2569 | 0.2568 | 0.2566 | 0.2567 | 0.2566 |
| Max. | 0.2656 | 0.2646 | 0.2645 | 0.2645 | 0.2643 | 0.2643 | 0.2645 | 0.2643 | 0.2644 | 0.2643 | 0.2643 | 0.2642 | 0.2641 | 0.2642 | 0.2642 | 0.2641 | 0.2641 | 0.2639 |

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Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 4-5 (Continued)
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.2598 | 0.2598 | 0.2597 | | | | | | | | | | | | | |
| 2 | 0.2615 | 0.2614 | 0.2613 | | | | | | | | | | | | | |
| 3 | 0.2585 | 0.2585 | 0.2584 | | | | | | | | | | | | | |
| 4 | 0.2592 | 0.2592 | 0.2592 | | | | | | | | | | | | | |
| 5 | 0.2604 | 0.2605 | 0.2604 | | | | | | | | | | | | | |
| 6 | 0.2618 | 0.2618 | 0.2617 | | | | | | | | | | | | | |
| 7 | 0.2581 | 0.2580 | 0.2580 | | | | | | | | | | | | | |
| 8 | 0.2603 | 0.2604 | 0.2603 | | | | | | | | | | | | | |
| 9 | 0.2592 | 0.2591 | 0.2591 | | | | | | | | | | | | | |
| 10 | 0.2607 | 0.2607 | 0.2606 | | | | | | | | | | | | | |
| 11 | 0.2628 | 0.2629 | 0.2627 | | | | | | | | | | | | | |
| 12 | 0.2593 | 0.2594 | 0.2592 | | | | | | | | | | | | | |
| 13 | 0.2584 | 0.2584 | 0.2582 | | | | | | | | | | | | | |
| 14 | 0.2591 | 0.2591 | 0.2590 | | | | | | | | | | | | | |
| 15 | 0.2621 | 0.2621 | 0.2621 | | | | | | | | | | | | | |
| 16 | 0.2605 | 0.2605 | 0.2602 | | | | | | | | | | | | | |
| 17 | 0.2616 | 0.2616 | 0.2615 | | | | | | | | | | | | | |
| 18 | 0.2566 | 0.2567 | 0.2566 | | | | | | | | | | | | | |
| 19 | 0.2588 | 0.2589 | 0.2587 | | | | | | | | | | | | | |
| 20 | 0.2603 | 0.2604 | 0.2603 | | | | | | | | | | | | | |
| 21 | 0.2610 | 0.2611 | 0.2610 | | | | | | | | | | | | | |
| 22 | 0.2614 | 0.2614 | 0.2614 | | | | | | | | | | | | | |
| 23 | 0.2638 | 0.2638 | 0.2638 | | | | | | | | | | | | | |
| 24 | 0.2609 | 0.2610 | 0.2609 | | | | | | | | | | | | | |
| 25 | 0.2610 | 0.2612 | 0.2610 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.2603 | 0.2603 | 0.2602 | | | | | | | | | | | | | |
| Med. | 0.2604 | 0.2605 | 0.2603 | | | | | | | | | | | | | |
| σ | 0.0016 | 0.0016 | 0.0016 | | | | | | | | | | | | | |
| Min. | 0.2566 | 0.2567 | 0.2566 | | | | | | | | | | | | | |
| Max. | 0.2638 | 0.2638 | 0.2638 | | | | | | | | | | | | | |



Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 4-6
 Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.5263 | 0.5261 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5260 |
| 2 | 0.5273 | 0.5272 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 |
| 3 | 0.5252 | 0.5251 | 0.5251 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5250 | 0.5249 | 0.5248 | 0.5248 | 0.5249 |
| 4 | 0.5296 | 0.5295 | 0.5295 | 0.5296 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | 0.5294 | 0.5293 | 0.5293 | 0.5293 |
| 5 | 0.5251 | 0.5249 | 0.5249 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5247 | 0.5248 | 0.5248 | 0.5247 | 0.5248 | 0.5247 |
| 6 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 |
| 7 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5263 |
| 8 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5259 | 0.5258 | 0.5257 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5256 | 0.5257 | 0.5256 | 0.5256 | 0.5257 | 0.5256 |
| 9 | 0.5273 | 0.5272 | 0.5272 | 0.5273 | 0.5271 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5270 |
| 10 | 0.5273 | 0.5271 | 0.5271 | 0.5272 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 |
| 11 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 |
| 12 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5269 |
| 13 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5276 | 0.5274 | 0.5274 | 0.5275 | 0.5274 |
| 14 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5279 |
| 15 | 0.5249 | 0.5247 | 0.5248 | 0.5248 | 0.5246 | 0.5247 | 0.5247 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5245 | 0.5245 | 0.5246 | 0.5245 |
| 16 | 0.5270 | 0.5269 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 |
| 17 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5267 |
| 18 | 0.5251 | 0.5250 | 0.5251 | 0.5250 | 0.5248 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5248 | 0.5248 | 0.5249 | 0.5248 | 0.5248 | 0.5248 | 0.5248 |
| 19 | 0.5245 | 0.5245 | 0.5244 | 0.5244 | 0.5243 | 0.5244 | 0.5243 | 0.5243 | 0.5243 | 0.5243 | 0.5242 | 0.5242 | 0.5242 | 0.5243 | 0.5242 | 0.5242 | 0.5242 | 0.5242 |
| 20 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5263 |
| 21 | 0.5268 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5265 |
| 22 | 0.5267 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5264 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 |
| 23 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5276 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | 0.5276 | 0.5276 |
| 24 | 0.5281 | 0.5280 | 0.5281 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 |
| 25 | 0.5255 | 0.5253 | 0.5253 | 0.5253 | 0.5252 | 0.5251 | 0.5252 | 0.5252 | 0.5251 | 0.5251 | 0.5251 | 0.5252 | 0.5251 | 0.5252 | 0.5251 | 0.5251 | 0.5252 | 0.5251 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5264 |
| Med. | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 |
| σ | 0.0012 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0012 | 0.0012 | 0.0013 | 0.0012 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 | 0.0013 |
| Min. | 0.5245 | 0.5245 | 0.5244 | 0.5244 | 0.5243 | 0.5244 | 0.5243 | 0.5243 | 0.5243 | 0.5243 | 0.5242 | 0.5242 | 0.5242 | 0.5243 | 0.5242 | 0.5242 | 0.5242 | 0.5242 |
| Max. | 0.5296 | 0.5295 | 0.5295 | 0.5296 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | 0.5294 | 0.5293 | 0.5293 | 0.5293 |

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Data Set 4 : 85 °C, 100 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 87.2 °C |
| Actual Ambient Temperature [T _A] | 85.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 4-6 (Continued)
Chromaticity

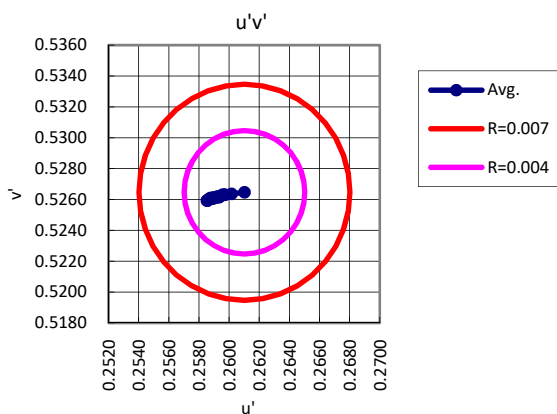
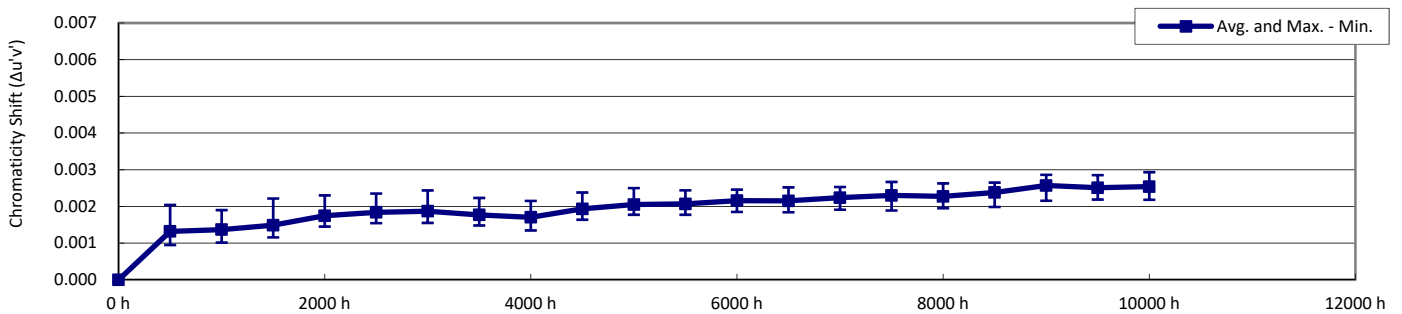
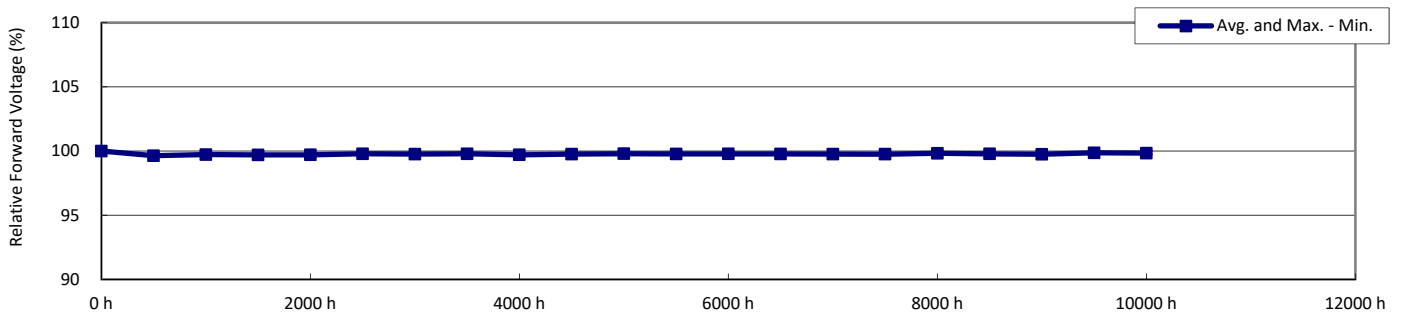
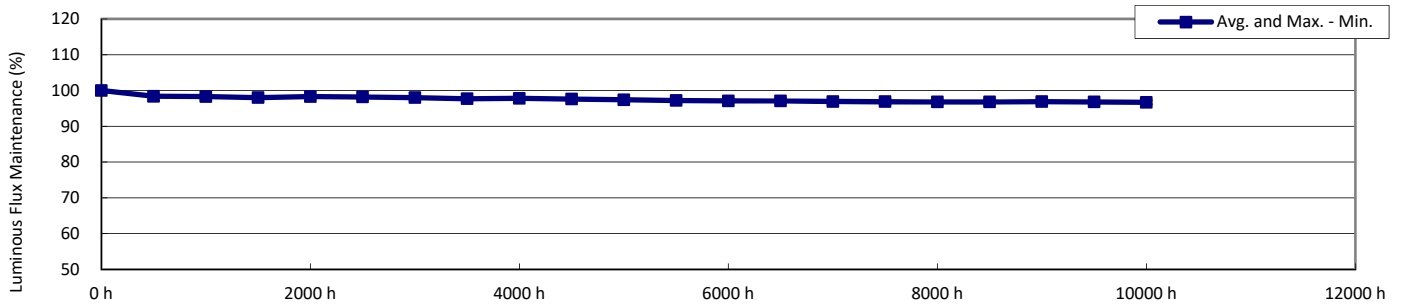
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.5258 | 0.5258 | 0.5258 | | | | | | | | | | | | | |
| 2 | 0.5269 | 0.5269 | 0.5269 | | | | | | | | | | | | | |
| 3 | 0.5247 | 0.5247 | 0.5247 | | | | | | | | | | | | | |
| 4 | 0.5292 | 0.5293 | 0.5292 | | | | | | | | | | | | | |
| 5 | 0.5246 | 0.5246 | 0.5246 | | | | | | | | | | | | | |
| 6 | 0.5264 | 0.5264 | 0.5264 | | | | | | | | | | | | | |
| 7 | 0.5263 | 0.5263 | 0.5262 | | | | | | | | | | | | | |
| 8 | 0.5255 | 0.5255 | 0.5255 | | | | | | | | | | | | | |
| 9 | 0.5269 | 0.5269 | 0.5269 | | | | | | | | | | | | | |
| 10 | 0.5268 | 0.5268 | 0.5269 | | | | | | | | | | | | | |
| 11 | 0.5278 | 0.5278 | 0.5277 | | | | | | | | | | | | | |
| 12 | 0.5268 | 0.5268 | 0.5268 | | | | | | | | | | | | | |
| 13 | 0.5274 | 0.5273 | 0.5274 | | | | | | | | | | | | | |
| 14 | 0.5278 | 0.5278 | 0.5278 | | | | | | | | | | | | | |
| 15 | 0.5243 | 0.5244 | 0.5244 | | | | | | | | | | | | | |
| 16 | 0.5266 | 0.5266 | 0.5266 | | | | | | | | | | | | | |
| 17 | 0.5266 | 0.5266 | 0.5266 | | | | | | | | | | | | | |
| 18 | 0.5247 | 0.5247 | 0.5247 | | | | | | | | | | | | | |
| 19 | 0.5241 | 0.5242 | 0.5241 | | | | | | | | | | | | | |
| 20 | 0.5262 | 0.5263 | 0.5262 | | | | | | | | | | | | | |
| 21 | 0.5263 | 0.5263 | 0.5263 | | | | | | | | | | | | | |
| 22 | 0.5263 | 0.5263 | 0.5263 | | | | | | | | | | | | | |
| 23 | 0.5274 | 0.5274 | 0.5275 | | | | | | | | | | | | | |
| 24 | 0.5278 | 0.5278 | 0.5278 | | | | | | | | | | | | | |
| 25 | 0.5249 | 0.5250 | 0.5250 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.5263 | 0.5263 | 0.5263 | | | | | | | | | | | | | |
| Med. | 0.5264 | 0.5264 | 0.5264 | | | | | | | | | | | | | |
| σ | 0.0013 | 0.0013 | 0.0013 | | | | | | | | | | | | | |
| Min. | 0.5241 | 0.5242 | 0.5241 | | | | | | | | | | | | | |
| Max. | 0.5292 | 0.5293 | 0.5292 | | | | | | | | | | | | | |



Data Set 5 : 85 °C, 150 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 85.6 °C |
| Actual Ambient Temperature [T_A] | 82.3 °C |
| Drive Current [I_F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0



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Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 5-1
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | | | |
|---------|---------------------|--------------------|---------------------|-------------|---------|--------|---------|--------|--|--|--|--|--|--|
| | Φ _V [lm] | V _F [V] | T _{CP} [K] | P [W] | x | y | u' | v' | | | | | | |
| 1 | 136.1 | 6.25 | 2735 | 0.94 | 0.461 | 0.417 | 0.260 | 0.530 | | | | | | |
| 2 | 135.6 | 6.25 | 2747 | 0.94 | 0.456 | 0.410 | 0.260 | 0.527 | | | | | | |
| 3 | 134.0 | 6.26 | 2664 | 0.94 | 0.463 | 0.411 | 0.264 | 0.528 | | | | | | |
| 4 | 137.2 | 6.26 | 2709 | 0.94 | 0.464 | 0.420 | 0.261 | 0.531 | | | | | | |
| 5 | 135.3 | 6.26 | 2732 | 0.94 | 0.457 | 0.410 | 0.261 | 0.527 | | | | | | |
| 6 | 135.5 | 6.25 | 2764 | 0.94 | 0.455 | 0.410 | 0.260 | 0.526 | | | | | | |
| 7 | 134.3 | 6.27 | 2691 | 0.94 | 0.459 | 0.407 | 0.263 | 0.526 | | | | | | |
| 8 | 133.7 | 6.24 | 2725 | 0.94 | 0.454 | 0.403 | 0.262 | 0.523 | | | | | | |
| 9 | 136.3 | 6.26 | 2786 | 0.94 | 0.453 | 0.409 | 0.259 | 0.526 | | | | | | |
| 10 | 134.1 | 6.26 | 2690 | 0.94 | 0.458 | 0.406 | 0.263 | 0.525 | | | | | | |
| 11 | 135.7 | 6.25 | 2736 | 0.94 | 0.459 | 0.414 | 0.261 | 0.528 | | | | | | |
| 12 | 135.1 | 6.25 | 2710 | 0.94 | 0.460 | 0.413 | 0.262 | 0.528 | | | | | | |
| 13 | 136.7 | 6.25 | 2751 | 0.94 | 0.459 | 0.415 | 0.260 | 0.529 | | | | | | |
| 14 | 136.1 | 6.26 | 2727 | 0.94 | 0.459 | 0.412 | 0.261 | 0.528 | | | | | | |
| 15 | 134.9 | 6.25 | 2778 | 0.94 | 0.451 | 0.404 | 0.260 | 0.524 | | | | | | |
| 16 | 134.5 | 6.25 | 2761 | 0.94 | 0.452 | 0.405 | 0.260 | 0.524 | | | | | | |
| 17 | 134.6 | 6.25 | 2698 | 0.94 | 0.460 | 0.411 | 0.263 | 0.528 | | | | | | |
| 18 | 135.1 | 6.26 | 2736 | 0.94 | 0.458 | 0.412 | 0.261 | 0.527 | | | | | | |
| 19 | 135.4 | 6.26 | 2752 | 0.94 | 0.456 | 0.411 | 0.260 | 0.527 | | | | | | |
| 20 | 135.3 | 6.26 | 2755 | 0.94 | 0.454 | 0.408 | 0.260 | 0.525 | | | | | | |
| 21 | 135.0 | 6.24 | 2768 | 0.94 | 0.452 | 0.406 | 0.260 | 0.524 | | | | | | |
| 22 | 134.2 | 6.24 | 2738 | 0.94 | 0.456 | 0.408 | 0.261 | 0.526 | | | | | | |
| 23 | 134.3 | 6.25 | 2693 | 0.94 | 0.459 | 0.408 | 0.263 | 0.526 | | | | | | |
| 24 | 135.9 | 6.25 | 2765 | 0.94 | 0.454 | 0.409 | 0.260 | 0.526 | | | | | | |
| 25 | 136 | 6.24 | 2744 | 0.94 | 0.457 | 0.411 | 0.260 | 0.527 | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | | | |
| Avg. | 135.2 | 6.25 | 2734 | 0.94 | 0.457 | 0.410 | 0.261 | 0.527 | | | | | | |
| Med. | 135.3 | 6.25 | 2736 | 0.94 | 0.457 | 0.410 | 0.261 | 0.527 | | | | | | |
| σ | 0.88 | 0.007 | 30.8 | 0.001 | 0.0033 | 0.0039 | 0.0014 | 0.0019 | | | | | | |
| Min. | 133.7 | 6.24 | 2664 | 0.94 | 0.451 | 0.403 | 0.259 | 0.523 | | | | | | |
| Max. | 137.2 | 6.27 | 2786 | 0.94 | 0.464 | 0.420 | 0.264 | 0.531 | | | | | | |



Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 5-2
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 97.5 | 97.4 | 96.9 | 97.8 | 97.6 | 97.4 | 97.1 | 97.4 | 97.3 | 96.9 | 97.0 | 97.0 | 97.1 | 97.0 | 96.9 | 96.7 | 96.8 |
| 2 | 100.0 | 97.1 | 97.4 | 97.3 | 97.7 | 97.7 | 97.7 | 97.5 | 97.7 | 97.7 | 97.3 | 97.2 | 97.2 | 97.2 | 97.1 | 97.0 | 97.0 | 97.0 |
| 3 | 100.0 | 99.0 | 99.0 | 98.6 | 98.6 | 98.5 | 98.4 | 98.0 | 98.0 | 97.9 | 97.5 | 97.4 | 97.3 | 97.4 | 97.2 | 97.1 | 97.0 | 97.1 |
| 4 | 100.0 | 98.6 | 98.7 | 98.1 | 98.4 | 98.4 | 98.3 | 98.0 | 98.1 | 98.0 | 97.7 | 97.7 | 97.6 | 97.7 | 97.6 | 97.5 | 97.4 | 97.5 |
| 5 | 100.0 | 98.5 | 98.6 | 97.9 | 98.1 | 98.0 | 97.8 | 97.3 | 97.5 | 97.3 | 96.9 | 96.8 | 96.6 | 96.6 | 96.4 | 96.3 | 96.2 | 96.3 |
| 6 | 100.0 | 98.3 | 98.3 | 98.1 | 98.2 | 98.1 | 98.0 | 97.6 | 97.5 | 97.4 | 97.0 | 96.9 | 96.7 | 96.7 | 96.5 | 96.6 | 96.4 | 96.4 |
| 7 | 100.0 | 98.2 | 98.3 | 98.1 | 98.3 | 98.2 | 98.0 | 97.7 | 97.9 | 97.6 | 97.4 | 97.2 | 97.0 | 97.1 | 96.9 | 97.0 | 96.8 | 96.8 |
| 8 | 100.0 | 98.0 | 97.7 | 97.7 | 98.4 | 98.3 | 98.1 | 97.7 | 97.8 | 97.4 | 97.3 | 97.2 | 96.9 | 97.0 | 96.8 | 96.8 | 96.7 | 96.7 |
| 9 | 100.0 | 98.8 | 98.7 | 98.4 | 98.4 | 98.4 | 98.2 | 97.8 | 98.0 | 97.6 | 97.5 | 97.3 | 97.2 | 97.2 | 96.9 | 97.1 | 96.9 | 96.9 |
| 10 | 100.0 | 98.8 | 98.6 | 98.3 | 98.4 | 98.3 | 98.1 | 97.8 | 97.9 | 97.6 | 97.5 | 97.3 | 97.2 | 97.2 | 96.9 | 97.0 | 96.9 | 96.7 |
| 11 | 100.0 | 99.0 | 98.6 | 98.1 | 98.2 | 98.2 | 97.9 | 97.6 | 97.9 | 97.3 | 97.5 | 97.1 | 97.0 | 97.0 | 96.7 | 96.7 | 96.4 | 96.4 |
| 12 | 100.0 | 98.7 | 98.4 | 98.3 | 98.3 | 98.3 | 98.2 | 97.8 | 97.9 | 97.6 | 97.5 | 97.3 | 97.2 | 97.2 | 96.9 | 97.1 | 96.8 | 96.7 |
| 13 | 100.0 | 98.9 | 98.8 | 98.5 | 98.5 | 98.4 | 98.2 | 97.9 | 97.9 | 97.6 | 97.4 | 97.3 | 97.1 | 97.1 | 96.9 | 96.9 | 96.8 | 96.7 |
| 14 | 100.0 | 98.7 | 98.5 | 98.2 | 98.4 | 98.4 | 98.2 | 98.1 | 98.1 | 97.9 | 97.7 | 97.6 | 97.4 | 97.5 | 97.3 | 97.4 | 97.3 | 97.3 |
| 15 | 100.0 | 98.2 | 98.1 | 98.2 | 98.4 | 98.4 | 98.2 | 97.9 | 98.0 | 97.7 | 97.5 | 97.3 | 97.2 | 97.2 | 97.0 | 97.1 | 97.0 | 97.0 |
| 16 | 100.0 | 98.6 | 98.5 | 98.2 | 98.5 | 98.4 | 98.2 | 98.0 | 98.0 | 97.7 | 97.5 | 97.4 | 97.1 | 97.2 | 96.9 | 97.0 | 96.9 | 96.9 |
| 17 | 100.0 | 99.0 | 98.7 | 98.3 | 98.4 | 98.5 | 98.3 | 97.9 | 97.9 | 97.6 | 97.8 | 97.3 | 97.0 | 97.2 | 96.9 | 96.8 | 96.6 | 96.6 |
| 18 | 100.0 | 98.4 | 98.3 | 97.9 | 98.3 | 98.2 | 98.0 | 98.0 | 98.0 | 97.7 | 97.7 | 97.5 | 97.4 | 97.4 | 97.2 | 97.3 | 97.1 | 97.0 |
| 19 | 100.0 | 98.1 | 98.4 | 98.1 | 98.2 | 98.1 | 97.8 | 97.6 | 97.7 | 97.5 | 97.3 | 97.1 | 97.0 | 97.1 | 97.0 | 97.0 | 97.0 | 96.9 |
| 20 | 100.0 | 98.8 | 98.7 | 98.3 | 98.4 | 98.5 | 98.2 | 98.0 | 98.0 | 97.7 | 97.5 | 97.4 | 97.3 | 97.3 | 97.2 | 97.1 | 97.0 | 97.0 |
| 21 | 100.0 | 97.9 | 97.9 | 97.7 | 98.2 | 98.2 | 97.8 | 97.7 | 97.8 | 97.4 | 97.3 | 97.1 | 96.9 | 97.1 | 96.9 | 96.9 | 96.8 | 96.9 |
| 22 | 100.0 | 98.0 | 98.0 | 97.7 | 97.9 | 97.8 | 97.3 | 97.2 | 97.5 | 97.2 | 97.0 | 96.9 | 96.8 | 96.8 | 96.6 | 96.7 | 96.6 | 96.6 |
| 23 | 100.0 | 98.6 | 98.4 | 97.9 | 98.1 | 98.3 | 97.8 | 97.6 | 97.6 | 97.2 | 97.2 | 96.7 | 96.7 | 96.7 | 96.4 | 96.4 | 96.4 | 96.2 |
| 24 | 100.0 | 98.2 | 98.2 | 98.1 | 98.3 | 98.4 | 98.0 | 97.8 | 97.8 | 97.5 | 97.3 | 97.0 | 96.9 | 97.0 | 96.7 | 96.7 | 96.7 | 96.7 |
| 25 | 100.0 | 98.1 | 98.5 | 98.3 | 98.4 | 98.3 | 98.1 | 97.9 | 97.9 | 97.6 | 97.4 | 97.2 | 97.0 | 97.1 | 96.9 | 96.9 | 96.8 | 96.7 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 98.4 | 98.3 | 98.0 | 98.3 | 98.2 | 98.0 | 97.7 | 97.8 | 97.6 | 97.4 | 97.2 | 97.1 | 97.1 | 96.9 | 96.9 | 96.8 | 96.8 |
| Med. | 100.0 | 98.5 | 98.4 | 98.1 | 98.3 | 98.3 | 98.1 | 97.8 | 97.9 | 97.6 | 97.4 | 97.2 | 97.0 | 97.1 | 96.9 | 97.0 | 96.8 | 96.8 |
| σ | 0.00 | 0.48 | 0.41 | 0.37 | 0.22 | 0.24 | 0.27 | 0.26 | 0.20 | 0.21 | 0.24 | 0.24 | 0.24 | 0.25 | 0.28 | 0.28 | 0.28 | 0.30 |
| Min. | 100.0 | 97.1 | 97.4 | 96.9 | 97.7 | 97.6 | 97.3 | 97.1 | 97.4 | 97.2 | 96.9 | 96.7 | 96.6 | 96.6 | 96.4 | 96.3 | 96.2 | 96.2 |
| Max. | 100.0 | 99.0 | 99.0 | 98.6 | 98.6 | 98.5 | 98.4 | 98.1 | 98.1 | 98.0 | 97.8 | 97.7 | 97.6 | 97.7 | 97.6 | 97.5 | 97.4 | 97.5 |

TM-21 Projection

| Test duration used | 5000 h to 10000 h |
|----------------------------------|-------------------|
| B | 0.9784 |
| α | 1.199E-06 |
| R ² | 0.8363 |
| Calculated L ₇₀ (10K) | 279000 hours |
| Reported L ₇₀ (10K) | > 60000 hours |
| Calculated L ₈₀ (10K) | 168000 hours |
| Reported L ₈₀ (10K) | > 60000 hours |
| Calculated L ₉₀ (10K) | 69700 hours |
| Reported L ₉₀ (10K) | > 60000 hours |

Curve-fit equation:

$$\Phi(t) = B \exp(-\alpha t)$$

Luminous flux maintenance life equation:

$$L_{70} = \ln(B/0.7)/\alpha$$

$$L_{80} = \ln(B/0.8)/\alpha$$

$$L_{90} = \ln(B/0.9)/\alpha$$

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The laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.



Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 5-2 (Continued)
 Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|--|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 96.9 | 96.6 | 96.5 | | | | | | | | | | | | | |
| 2 | 97.2 | 97.0 | 97.0 | | | | | | | | | | | | | |
| 3 | 97.2 | 97.0 | 97.0 | | | | | | | | | | | | | |
| 4 | 97.5 | 97.3 | 97.3 | | | | | | | | | | | | | |
| 5 | 96.3 | 96.1 | 96.1 | | | | | | | | | | | | | |
| 6 | 96.5 | 96.3 | 96.2 | | | | | | | | | | | | | |
| 7 | 97.1 | 96.9 | 96.7 | | | | | | | | | | | | | |
| 8 | 96.9 | 96.9 | 96.8 | | | | | | | | | | | | | |
| 9 | 97.1 | 97.0 | 96.9 | | | | | | | | | | | | | |
| 10 | 97.0 | 96.8 | 96.8 | | | | | | | | | | | | | |
| 11 | 96.4 | 96.2 | 96.3 | | | | | | | | | | | | | |
| 12 | 96.9 | 96.8 | 96.8 | | | | | | | | | | | | | |
| 13 | 96.9 | 96.8 | 96.6 | | | | | | | | | | | | | |
| 14 | 97.4 | 97.4 | 97.1 | | | | | | | | | | | | | |
| 15 | 97.1 | 97.1 | 96.9 | | | | | | | | | | | | | |
| 16 | 97.1 | 97.0 | 96.9 | | | | | | | | | | | | | |
| 17 | 96.7 | 96.7 | 96.4 | | | | | | | | | | | | | |
| 18 | 97.2 | 97.0 | 96.8 | | | | | | | | | | | | | |
| 19 | 97.0 | 96.9 | 96.7 | | | | | | | | | | | | | |
| 20 | 97.0 | 97.0 | 96.8 | | | | | | | | | | | | | |
| 21 | 96.9 | 97.0 | 96.8 | | | | | | | | | | | | | |
| 22 | 96.7 | 96.6 | 96.5 | | | | | | | | | | | | | |
| 23 | 96.3 | 96.4 | 96.3 | | | | | | | | | | | | | |
| 24 | 96.9 | 96.8 | 96.6 | | | | | | | | | | | | | |
| 25 | 96.9 | 96.9 | 96.8 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 96.9 | 96.8 | 96.7 | | | | | | | | | | | | | |
| Med. | 96.9 | 96.9 | 96.8 | | | | | | | | | | | | | |
| σ | 0.31 | 0.31 | 0.29 | | | | | | | | | | | | | |
| Min. | 96.3 | 96.1 | 96.1 | | | | | | | | | | | | | |
| Max. | 97.5 | 97.4 | 97.3 | | | | | | | | | | | | | |



Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 5-3
Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 |
| 2 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 |
| 3 | 100.0 | 99.6 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |
| 4 | 100.0 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 |
| 5 | 100.0 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |
| 6 | 100.0 | 99.7 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 |
| 7 | 100.0 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| 8 | 100.0 | 99.7 | 99.7 | 99.7 | 99.6 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 |
| 9 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 |
| 10 | 100.0 | 99.6 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| 11 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 |
| 12 | 100.0 | 99.6 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 |
| 13 | 100.0 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.9 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| 14 | 100.0 | 99.6 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 |
| 15 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 |
| 16 | 100.0 | 99.5 | 99.7 | 99.6 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |
| 17 | 100.0 | 99.6 | 99.7 | 99.6 | 99.6 | 99.8 | 99.7 | 99.8 | 99.6 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |
| 18 | 100.0 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |
| 19 | 100.0 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.7 | 99.8 | 99.8 |
| 20 | 100.0 | 99.6 | 99.7 | 99.7 | 99.6 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 |
| 21 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 |
| 22 | 100.0 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.6 | 99.7 | 99.8 | 99.7 |
| 23 | 100.0 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.9 | 99.9 |
| 24 | 100.0 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.8 |
| 25 | 100.0 | 99.6 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| Med. | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 |
| σ | 0.00 | 0.07 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.08 | 0.07 | 0.06 | 0.06 | 0.06 |
| Min. | 100.0 | 99.5 | 99.6 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 |
| Max. | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 100.0 | 99.9 |



Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 5-3 (Continued)
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|---|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 2 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 3 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 4 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 5 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 6 | 99.8 | 99.9 | 99.8 | | | | | | | | | | | | | |
| 7 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 8 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 9 | 99.7 | 99.9 | 99.8 | | | | | | | | | | | | | |
| 10 | 99.7 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 11 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 12 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 13 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 14 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 15 | 99.8 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 16 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 17 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 18 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 19 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 20 | 99.7 | 99.9 | 99.8 | | | | | | | | | | | | | |
| 21 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 22 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 23 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 24 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 25 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 99.7 | 99.9 | 99.8 | | | | | | | | | | | | | |
| Med. | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| σ | 0.07 | 0.07 | 0.07 | | | | | | | | | | | | | |
| Min. | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| Max. | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |



Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 5-4
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.0000 | 0.0019 | 0.0019 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0022 | 0.0021 | 0.0024 | 0.0025 | 0.0024 | 0.0025 | 0.0024 | 0.0024 | 0.0025 | 0.0026 | 0.0026 |
| 2 | 0.0000 | 0.0020 | 0.0018 | 0.0020 | 0.0023 | 0.0023 | 0.0023 | 0.0021 | 0.0020 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 |
| 3 | 0.0000 | 0.0009 | 0.0010 | 0.0012 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0023 |
| 4 | 0.0000 | 0.0013 | 0.0011 | 0.0014 | 0.0016 | 0.0018 | 0.0017 | 0.0016 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 |
| 5 | 0.0000 | 0.0011 | 0.0011 | 0.0013 | 0.0016 | 0.0017 | 0.0017 | 0.0016 | 0.0015 | 0.0017 | 0.0018 | 0.0020 | 0.0021 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0024 |
| 6 | 0.0000 | 0.0013 | 0.0013 | 0.0014 | 0.0018 | 0.0019 | 0.0020 | 0.0019 | 0.0019 | 0.0022 | 0.0023 | 0.0023 | 0.0025 | 0.0024 | 0.0025 | 0.0027 | 0.0026 | 0.0027 |
| 7 | 0.0000 | 0.0014 | 0.0014 | 0.0015 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0018 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0021 | 0.0022 | 0.0024 | 0.0023 | 0.0024 |
| 8 | 0.0000 | 0.0014 | 0.0016 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0026 | 0.0025 | 0.0026 |
| 9 | 0.0000 | 0.0012 | 0.0012 | 0.0013 | 0.0016 | 0.0017 | 0.0017 | 0.0016 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0023 |
| 10 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0015 | 0.0017 | 0.0016 | 0.0015 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0021 |
| 11 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0015 | 0.0014 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0022 |
| 12 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0015 | 0.0016 | 0.0016 | 0.0015 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0022 |
| 13 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0015 | 0.0017 | 0.0018 | 0.0017 | 0.0016 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0025 |
| 14 | 0.0000 | 0.0012 | 0.0013 | 0.0015 | 0.0017 | 0.0018 | 0.0017 | 0.0016 | 0.0016 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0021 |
| 15 | 0.0000 | 0.0015 | 0.0016 | 0.0016 | 0.0019 | 0.0020 | 0.0021 | 0.0019 | 0.0019 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0023 | 0.0025 | 0.0025 | 0.0024 | 0.0026 |
| 16 | 0.0000 | 0.0012 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0017 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0024 |
| 17 | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0014 | 0.0016 | 0.0015 | 0.0015 | 0.0013 | 0.0017 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0020 | 0.0022 |
| 18 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0019 | 0.0018 | 0.0017 | 0.0018 | 0.0021 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0021 | 0.0023 |
| 19 | 0.0000 | 0.0014 | 0.0014 | 0.0014 | 0.0019 | 0.0019 | 0.0020 | 0.0019 | 0.0018 | 0.0020 | 0.0022 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0023 | 0.0022 | 0.0024 |
| 20 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0016 | 0.0017 | 0.0018 | 0.0016 | 0.0016 | 0.0018 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0022 | 0.0023 |
| 21 | 0.0000 | 0.0015 | 0.0015 | 0.0015 | 0.0019 | 0.0019 | 0.0020 | 0.0018 | 0.0018 | 0.0020 | 0.0022 | 0.0021 | 0.0023 | 0.0022 | 0.0024 | 0.0024 | 0.0024 | 0.0025 |
| 22 | 0.0000 | 0.0015 | 0.0015 | 0.0016 | 0.0019 | 0.0020 | 0.0021 | 0.0019 | 0.0018 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0022 | 0.0023 | 0.0024 | 0.0023 | 0.0025 |
| 23 | 0.0000 | 0.0013 | 0.0014 | 0.0014 | 0.0017 | 0.0019 | 0.0019 | 0.0018 | 0.0017 | 0.0021 | 0.0021 | 0.0021 | 0.0023 | 0.0021 | 0.0024 | 0.0024 | 0.0024 | 0.0024 |
| 24 | 0.0000 | 0.0014 | 0.0016 | 0.0016 | 0.0019 | 0.0019 | 0.0020 | 0.0019 | 0.0018 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0025 | 0.0024 | 0.0025 |
| 25 | 0.0000 | 0.0014 | 0.0015 | 0.0015 | 0.0019 | 0.0019 | 0.0020 | 0.0020 | 0.0019 | 0.0021 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0026 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0013 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0017 | 0.0019 | 0.0021 | 0.0021 | 0.0022 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0024 |
| Med. | 0.0000 | 0.0013 | 0.0014 | 0.0014 | 0.0017 | 0.0018 | 0.0019 | 0.0018 | 0.0017 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0024 |
| σ | 0.0000 | 0.0003 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| Min. | 0.0000 | 0.0009 | 0.0010 | 0.0012 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0013 | 0.0016 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0020 | 0.0020 |
| Max. | 0.0000 | 0.0020 | 0.0019 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0022 | 0.0021 | 0.0024 | 0.0025 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0027 | 0.0026 | 0.0027 |



Data Set 5 : 85 °C, 150 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 85.6 °C |
| Actual Ambient Temperature [T_A] | 82.3 °C |
| Drive Current [I_F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 5-4 (Continued)
Chromaticity Shift

| LED No. | Chromaticity Shift $\Delta u'v'$ | | | | | | | | | | | | | | | |
|----------|----------------------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.0029 | 0.0029 | 0.0029 | | | | | | | | | | | | | |
| 2 | 0.0027 | 0.0026 | 0.0026 | | | | | | | | | | | | | |
| 3 | 0.0025 | 0.0024 | 0.0025 | | | | | | | | | | | | | |
| 4 | 0.0022 | 0.0022 | 0.0022 | | | | | | | | | | | | | |
| 5 | 0.0024 | 0.0024 | 0.0025 | | | | | | | | | | | | | |
| 6 | 0.0029 | 0.0028 | 0.0029 | | | | | | | | | | | | | |
| 7 | 0.0026 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| 8 | 0.0028 | 0.0028 | 0.0028 | | | | | | | | | | | | | |
| 9 | 0.0026 | 0.0024 | 0.0025 | | | | | | | | | | | | | |
| 10 | 0.0023 | 0.0023 | 0.0023 | | | | | | | | | | | | | |
| 11 | 0.0023 | 0.0022 | 0.0022 | | | | | | | | | | | | | |
| 12 | 0.0023 | 0.0023 | 0.0024 | | | | | | | | | | | | | |
| 13 | 0.0027 | 0.0026 | 0.0026 | | | | | | | | | | | | | |
| 14 | 0.0023 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| 15 | 0.0028 | 0.0027 | 0.0027 | | | | | | | | | | | | | |
| 16 | 0.0025 | 0.0025 | 0.0025 | | | | | | | | | | | | | |
| 17 | 0.0023 | 0.0023 | 0.0022 | | | | | | | | | | | | | |
| 18 | 0.0026 | 0.0024 | 0.0024 | | | | | | | | | | | | | |
| 19 | 0.0026 | 0.0025 | 0.0025 | | | | | | | | | | | | | |
| 20 | 0.0025 | 0.0025 | 0.0024 | | | | | | | | | | | | | |
| 21 | 0.0026 | 0.0026 | 0.0026 | | | | | | | | | | | | | |
| 22 | 0.0027 | 0.0026 | 0.0027 | | | | | | | | | | | | | |
| 23 | 0.0026 | 0.0026 | 0.0027 | | | | | | | | | | | | | |
| 24 | 0.0028 | 0.0027 | 0.0027 | | | | | | | | | | | | | |
| 25 | 0.0028 | 0.0027 | 0.0028 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.0026 | 0.0025 | 0.0025 | | | | | | | | | | | | | |
| Med. | 0.0026 | 0.0025 | 0.0025 | | | | | | | | | | | | | |
| σ | 0.0002 | 0.0002 | 0.0002 | | | | | | | | | | | | | |
| Min. | 0.0022 | 0.0022 | 0.0022 | | | | | | | | | | | | | |
| Max. | 0.0029 | 0.0029 | 0.0029 | | | | | | | | | | | | | |



Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 5-5
 Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.2608 | 0.2589 | 0.2589 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2586 | 0.2587 | 0.2584 | 0.2583 | 0.2584 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2582 | 0.2582 |
| 2 | 0.2607 | 0.2587 | 0.2589 | 0.2587 | 0.2584 | 0.2584 | 0.2584 | 0.2586 | 0.2588 | 0.2586 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2583 |
| 3 | 0.2644 | 0.2635 | 0.2634 | 0.2633 | 0.2630 | 0.2629 | 0.2629 | 0.2629 | 0.2629 | 0.2626 | 0.2625 | 0.2625 | 0.2624 | 0.2623 | 0.2623 | 0.2622 | 0.2623 | 0.2621 |
| 4 | 0.2620 | 0.2608 | 0.2609 | 0.2606 | 0.2605 | 0.2603 | 0.2603 | 0.2605 | 0.2606 | 0.2604 | 0.2602 | 0.2602 | 0.2602 | 0.2602 | 0.2601 | 0.2601 | 0.2601 | 0.2601 |
| 5 | 0.2633 | 0.2623 | 0.2623 | 0.2620 | 0.2618 | 0.2617 | 0.2616 | 0.2618 | 0.2618 | 0.2617 | 0.2615 | 0.2614 | 0.2613 | 0.2614 | 0.2613 | 0.2612 | 0.2612 | 0.2610 |
| 6 | 0.2604 | 0.2591 | 0.2590 | 0.2590 | 0.2585 | 0.2584 | 0.2584 | 0.2585 | 0.2585 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2580 | 0.2579 | 0.2577 | 0.2578 | 0.2578 |
| 7 | 0.2635 | 0.2622 | 0.2621 | 0.2620 | 0.2617 | 0.2617 | 0.2616 | 0.2617 | 0.2617 | 0.2615 | 0.2615 | 0.2614 | 0.2613 | 0.2614 | 0.2613 | 0.2612 | 0.2613 | 0.2611 |
| 8 | 0.2622 | 0.2608 | 0.2607 | 0.2606 | 0.2603 | 0.2602 | 0.2602 | 0.2603 | 0.2603 | 0.2601 | 0.2599 | 0.2599 | 0.2599 | 0.2598 | 0.2598 | 0.2597 | 0.2598 | 0.2597 |
| 9 | 0.2591 | 0.2579 | 0.2579 | 0.2578 | 0.2575 | 0.2575 | 0.2574 | 0.2576 | 0.2576 | 0.2574 | 0.2573 | 0.2572 | 0.2571 | 0.2570 | 0.2570 | 0.2569 | 0.2569 | 0.2569 |
| 10 | 0.2640 | 0.2629 | 0.2628 | 0.2627 | 0.2624 | 0.2623 | 0.2624 | 0.2624 | 0.2625 | 0.2623 | 0.2622 | 0.2622 | 0.2620 | 0.2621 | 0.2620 | 0.2620 | 0.2620 | 0.2619 |
| 11 | 0.2632 | 0.2621 | 0.2620 | 0.2618 | 0.2617 | 0.2616 | 0.2616 | 0.2617 | 0.2618 | 0.2616 | 0.2614 | 0.2614 | 0.2613 | 0.2613 | 0.2612 | 0.2612 | 0.2612 | 0.2610 |
| 12 | 0.2625 | 0.2614 | 0.2613 | 0.2612 | 0.2610 | 0.2609 | 0.2610 | 0.2610 | 0.2610 | 0.2609 | 0.2607 | 0.2607 | 0.2606 | 0.2606 | 0.2605 | 0.2605 | 0.2604 | 0.2603 |
| 13 | 0.2600 | 0.2589 | 0.2589 | 0.2588 | 0.2586 | 0.2584 | 0.2583 | 0.2584 | 0.2584 | 0.2582 | 0.2581 | 0.2580 | 0.2579 | 0.2579 | 0.2577 | 0.2577 | 0.2577 | 0.2576 |
| 14 | 0.2614 | 0.2601 | 0.2600 | 0.2599 | 0.2597 | 0.2596 | 0.2597 | 0.2598 | 0.2598 | 0.2597 | 0.2596 | 0.2595 | 0.2595 | 0.2595 | 0.2594 | 0.2594 | 0.2594 | 0.2593 |
| 15 | 0.2598 | 0.2584 | 0.2582 | 0.2583 | 0.2580 | 0.2579 | 0.2578 | 0.2580 | 0.2580 | 0.2577 | 0.2576 | 0.2576 | 0.2575 | 0.2576 | 0.2574 | 0.2574 | 0.2575 | 0.2573 |
| 16 | 0.2609 | 0.2598 | 0.2596 | 0.2594 | 0.2592 | 0.2592 | 0.2592 | 0.2592 | 0.2593 | 0.2590 | 0.2589 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2587 | 0.2586 | 0.2586 |
| 17 | 0.2652 | 0.2641 | 0.2640 | 0.2639 | 0.2638 | 0.2637 | 0.2637 | 0.2637 | 0.2639 | 0.2635 | 0.2635 | 0.2635 | 0.2633 | 0.2633 | 0.2632 | 0.2632 | 0.2633 | 0.2631 |
| 18 | 0.2615 | 0.2603 | 0.2601 | 0.2600 | 0.2597 | 0.2596 | 0.2596 | 0.2597 | 0.2599 | 0.2597 | 0.2595 | 0.2595 | 0.2595 | 0.2594 | 0.2594 | 0.2593 | 0.2594 | 0.2592 |
| 19 | 0.2606 | 0.2592 | 0.2592 | 0.2591 | 0.2587 | 0.2586 | 0.2586 | 0.2587 | 0.2589 | 0.2586 | 0.2584 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2583 | 0.2584 | 0.2583 |
| 20 | 0.2605 | 0.2594 | 0.2593 | 0.2592 | 0.2590 | 0.2589 | 0.2588 | 0.2589 | 0.2590 | 0.2588 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2584 | 0.2584 | 0.2583 |
| 21 | 0.2601 | 0.2586 | 0.2586 | 0.2586 | 0.2583 | 0.2582 | 0.2582 | 0.2583 | 0.2584 | 0.2582 | 0.2580 | 0.2580 | 0.2579 | 0.2580 | 0.2578 | 0.2578 | 0.2578 | 0.2577 |
| 22 | 0.2617 | 0.2602 | 0.2602 | 0.2601 | 0.2598 | 0.2597 | 0.2597 | 0.2598 | 0.2599 | 0.2597 | 0.2596 | 0.2596 | 0.2595 | 0.2596 | 0.2594 | 0.2593 | 0.2594 | 0.2593 |
| 23 | 0.2658 | 0.2645 | 0.2645 | 0.2644 | 0.2642 | 0.2640 | 0.2640 | 0.2640 | 0.2641 | 0.2638 | 0.2637 | 0.2637 | 0.2636 | 0.2637 | 0.2635 | 0.2635 | 0.2635 | 0.2634 |
| 24 | 0.2604 | 0.2591 | 0.2589 | 0.2589 | 0.2586 | 0.2585 | 0.2585 | 0.2586 | 0.2587 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2580 | 0.2580 | 0.2580 | 0.2580 |
| 25 | 0.2608 | 0.2594 | 0.2593 | 0.2593 | 0.2589 | 0.2589 | 0.2588 | 0.2588 | 0.2589 | 0.2587 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2582 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2618 | 0.2605 | 0.2604 | 0.2603 | 0.2601 | 0.2600 | 0.2600 | 0.2601 | 0.2601 | 0.2599 | 0.2598 | 0.2598 | 0.2597 | 0.2597 | 0.2596 | 0.2595 | 0.2596 | 0.2595 |
| Med. | 0.2614 | 0.2601 | 0.2600 | 0.2599 | 0.2597 | 0.2596 | 0.2596 | 0.2597 | 0.2598 | 0.2597 | 0.2595 | 0.2595 | 0.2595 | 0.2594 | 0.2594 | 0.2593 | 0.2594 | 0.2592 |
| σ | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0018 |
| Min. | 0.2591 | 0.2579 | 0.2579 | 0.2578 | 0.2575 | 0.2575 | 0.2574 | 0.2576 | 0.2576 | 0.2574 | 0.2573 | 0.2572 | 0.2571 | 0.2570 | 0.2570 | 0.2569 | 0.2569 | 0.2569 |
| Max. | 0.2658 | 0.2645 | 0.2645 | 0.2644 | 0.2642 | 0.2640 | 0.2640 | 0.2640 | 0.2641 | 0.2638 | 0.2637 | 0.2637 | 0.2636 | 0.2637 | 0.2635 | 0.2635 | 0.2635 | 0.2634 |

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Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 5-5 (Continued)
 Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.2580 | 0.2580 | 0.2579 | | | | | | | | | | | | | |
| 2 | 0.2581 | 0.2582 | 0.2581 | | | | | | | | | | | | | |
| 3 | 0.2620 | 0.2620 | 0.2620 | | | | | | | | | | | | | |
| 4 | 0.2599 | 0.2599 | 0.2598 | | | | | | | | | | | | | |
| 5 | 0.2610 | 0.2609 | 0.2609 | | | | | | | | | | | | | |
| 6 | 0.2576 | 0.2576 | 0.2575 | | | | | | | | | | | | | |
| 7 | 0.2610 | 0.2610 | 0.2610 | | | | | | | | | | | | | |
| 8 | 0.2595 | 0.2596 | 0.2596 | | | | | | | | | | | | | |
| 9 | 0.2566 | 0.2567 | 0.2567 | | | | | | | | | | | | | |
| 10 | 0.2617 | 0.2617 | 0.2617 | | | | | | | | | | | | | |
| 11 | 0.2609 | 0.2610 | 0.2610 | | | | | | | | | | | | | |
| 12 | 0.2602 | 0.2603 | 0.2602 | | | | | | | | | | | | | |
| 13 | 0.2574 | 0.2575 | 0.2575 | | | | | | | | | | | | | |
| 14 | 0.2591 | 0.2592 | 0.2591 | | | | | | | | | | | | | |
| 15 | 0.2572 | 0.2572 | 0.2572 | | | | | | | | | | | | | |
| 16 | 0.2585 | 0.2585 | 0.2585 | | | | | | | | | | | | | |
| 17 | 0.2630 | 0.2630 | 0.2630 | | | | | | | | | | | | | |
| 18 | 0.2590 | 0.2592 | 0.2591 | | | | | | | | | | | | | |
| 19 | 0.2580 | 0.2581 | 0.2581 | | | | | | | | | | | | | |
| 20 | 0.2581 | 0.2581 | 0.2582 | | | | | | | | | | | | | |
| 21 | 0.2576 | 0.2576 | 0.2577 | | | | | | | | | | | | | |
| 22 | 0.2590 | 0.2591 | 0.2591 | | | | | | | | | | | | | |
| 23 | 0.2632 | 0.2633 | 0.2632 | | | | | | | | | | | | | |
| 24 | 0.2577 | 0.2578 | 0.2578 | | | | | | | | | | | | | |
| 25 | 0.2580 | 0.2581 | 0.2580 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.2593 | 0.2594 | 0.2593 | | | | | | | | | | | | | |
| Med. | 0.2590 | 0.2591 | 0.2591 | | | | | | | | | | | | | |
| σ | 0.0019 | 0.0019 | 0.0019 | | | | | | | | | | | | | |
| Min. | 0.2566 | 0.2567 | 0.2567 | | | | | | | | | | | | | |
| Max. | 0.2632 | 0.2633 | 0.2632 | | | | | | | | | | | | | |



Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 5-6
 Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.5301 | 0.5299 | 0.5299 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5298 | 0.5298 | 0.5297 | 0.5298 | 0.5297 |
| 2 | 0.5266 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 |
| 3 | 0.5278 | 0.5277 | 0.5278 | 0.5278 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 |
| 4 | 0.5316 | 0.5315 | 0.5315 | 0.5315 | 0.5314 | 0.5315 | 0.5314 | 0.5315 | 0.5315 | 0.5315 | 0.5314 | 0.5314 | 0.5314 | 0.5315 | 0.5314 | 0.5315 | 0.5315 | 0.5314 |
| 5 | 0.5279 | 0.5277 | 0.5278 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5274 |
| 6 | 0.5267 | 0.5265 | 0.5265 | 0.5266 | 0.5264 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 |
| 7 | 0.5260 | 0.5257 | 0.5258 | 0.5257 | 0.5256 | 0.5256 | 0.5255 | 0.5256 | 0.5256 | 0.5256 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5255 |
| 8 | 0.5235 | 0.5232 | 0.5231 | 0.5232 | 0.5230 | 0.5230 | 0.5229 | 0.5229 | 0.5230 | 0.5229 | 0.5230 | 0.5230 | 0.5228 | 0.5229 | 0.5229 | 0.5228 | 0.5229 | 0.5229 |
| 9 | 0.5258 | 0.5257 | 0.5257 | 0.5257 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5253 | 0.5254 | 0.5254 | 0.5253 | 0.5254 | 0.5254 |
| 10 | 0.5253 | 0.5251 | 0.5251 | 0.5252 | 0.5250 | 0.5251 | 0.5250 | 0.5250 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5249 | 0.5249 |
| 11 | 0.5294 | 0.5293 | 0.5294 | 0.5293 | 0.5292 | 0.5293 | 0.5292 | 0.5292 | 0.5291 | 0.5292 | 0.5291 | 0.5291 | 0.5292 | 0.5291 | 0.5291 | 0.5291 | 0.5292 | 0.5292 |
| 12 | 0.5283 | 0.5282 | 0.5283 | 0.5282 | 0.5281 | 0.5282 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 |
| 13 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5285 | 0.5286 | 0.5285 | 0.5285 | 0.5284 | 0.5285 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5283 |
| 14 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 |
| 15 | 0.5235 | 0.5232 | 0.5233 | 0.5233 | 0.5230 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5230 | 0.5231 | 0.5230 | 0.5230 | 0.5230 | 0.5230 | 0.5230 | 0.5229 |
| 16 | 0.5241 | 0.5239 | 0.5240 | 0.5240 | 0.5238 | 0.5238 | 0.5238 | 0.5238 | 0.5238 | 0.5238 | 0.5237 | 0.5237 | 0.5237 | 0.5237 | 0.5236 | 0.5236 | 0.5237 | 0.5236 |
| 17 | 0.5287 | 0.5287 | 0.5287 | 0.5287 | 0.5285 | 0.5285 | 0.5285 | 0.5286 | 0.5284 | 0.5285 | 0.5285 | 0.5285 | 0.5284 | 0.5285 | 0.5284 | 0.5285 | 0.5285 | 0.5284 |
| 18 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5274 | 0.5274 | 0.5274 | 0.5276 | 0.5274 | 0.5275 | 0.5274 | 0.5275 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5275 | 0.5274 |
| 19 | 0.5270 | 0.5268 | 0.5269 | 0.5268 | 0.5266 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 |
| 20 | 0.5254 | 0.5253 | 0.5253 | 0.5252 | 0.5251 | 0.5251 | 0.5251 | 0.5251 | 0.5251 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5250 |
| 21 | 0.5245 | 0.5242 | 0.5242 | 0.5243 | 0.5241 | 0.5241 | 0.5241 | 0.5242 | 0.5241 | 0.5241 | 0.5240 | 0.5240 | 0.5240 | 0.5240 | 0.5240 | 0.5239 | 0.5240 | 0.5240 |
| 22 | 0.5262 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5258 | 0.5258 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5259 | 0.5257 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5258 |
| 23 | 0.5274 | 0.5272 | 0.5272 | 0.5272 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5269 |
| 24 | 0.5260 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5255 | 0.5256 | 0.5255 |
| 25 | 0.5268 | 0.5266 | 0.5267 | 0.5267 | 0.5265 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5263 | 0.5265 | 0.5264 | 0.5263 | 0.5264 | 0.5264 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5269 | 0.5268 | 0.5268 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5266 | 0.5265 |
| Med. | 0.5268 | 0.5266 | 0.5267 | 0.5267 | 0.5265 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5263 | 0.5265 | 0.5264 | 0.5263 | 0.5264 | 0.5264 |
| σ | 0.0020 | 0.0021 | 0.0021 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 | 0.0021 |
| Min. | 0.5235 | 0.5232 | 0.5231 | 0.5232 | 0.5230 | 0.5230 | 0.5229 | 0.5229 | 0.5230 | 0.5229 | 0.5230 | 0.5230 | 0.5228 | 0.5229 | 0.5229 | 0.5228 | 0.5229 | 0.5229 |
| Max. | 0.5316 | 0.5315 | 0.5315 | 0.5315 | 0.5314 | 0.5315 | 0.5314 | 0.5315 | 0.5315 | 0.5315 | 0.5314 | 0.5314 | 0.5314 | 0.5315 | 0.5314 | 0.5315 | 0.5315 | 0.5314 |

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Data Set 5 : 85 °C, 150 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 85.6 °C |
| Actual Ambient Temperature [T _A] | 82.3 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 5-6 (Continued)
 Chromaticity

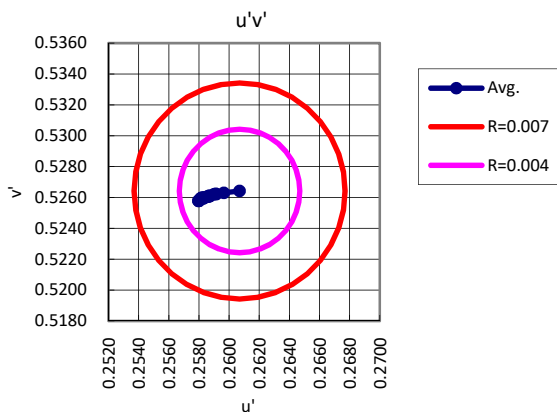
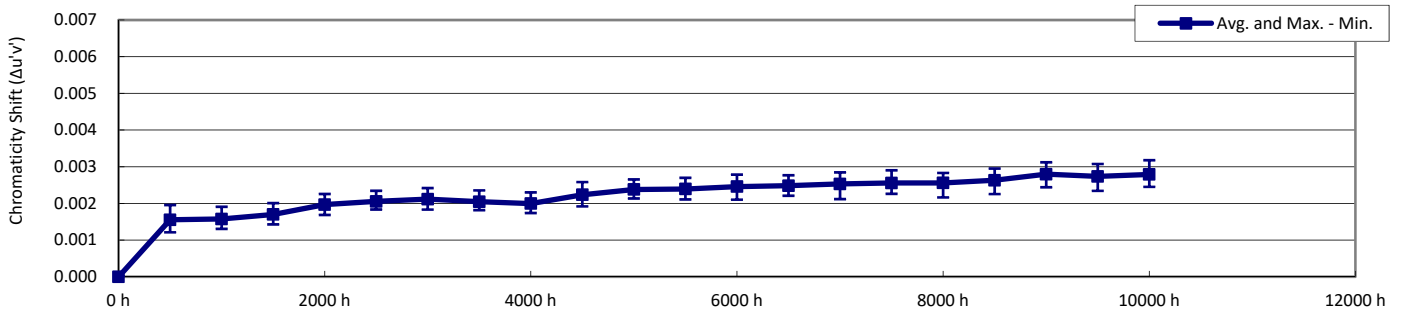
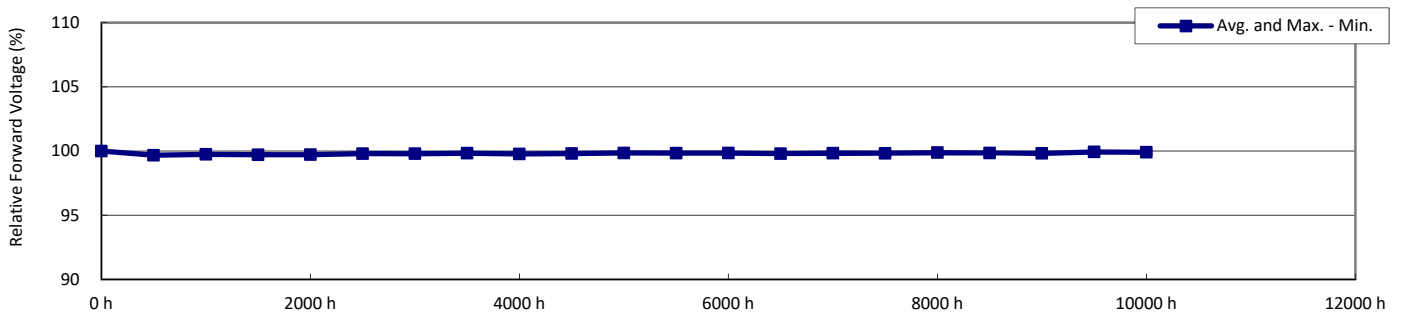
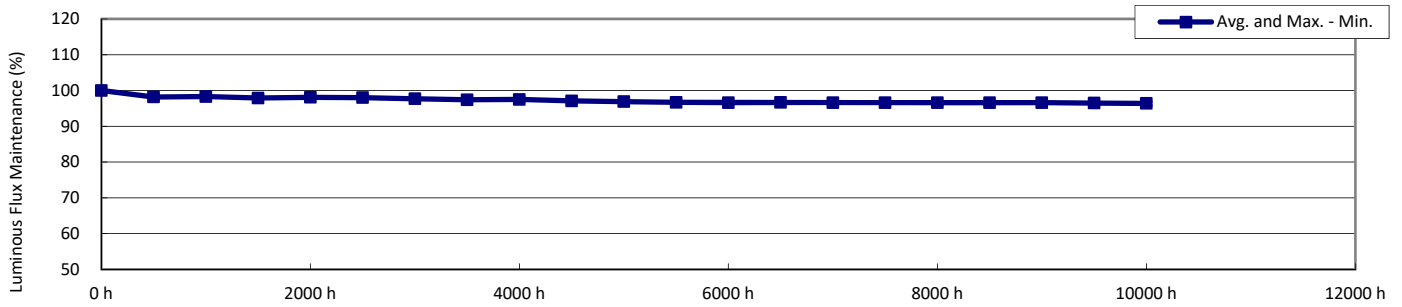
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.5296 | 0.5297 | 0.5296 | | | | | | | | | | | | | |
| 2 | 0.5261 | 0.5261 | 0.5261 | | | | | | | | | | | | | |
| 3 | 0.5273 | 0.5273 | 0.5273 | | | | | | | | | | | | | |
| 4 | 0.5313 | 0.5313 | 0.5313 | | | | | | | | | | | | | |
| 5 | 0.5273 | 0.5274 | 0.5273 | | | | | | | | | | | | | |
| 6 | 0.5261 | 0.5261 | 0.5261 | | | | | | | | | | | | | |
| 7 | 0.5254 | 0.5254 | 0.5253 | | | | | | | | | | | | | |
| 8 | 0.5227 | 0.5227 | 0.5227 | | | | | | | | | | | | | |
| 9 | 0.5252 | 0.5252 | 0.5252 | | | | | | | | | | | | | |
| 10 | 0.5247 | 0.5247 | 0.5247 | | | | | | | | | | | | | |
| 11 | 0.5290 | 0.5290 | 0.5290 | | | | | | | | | | | | | |
| 12 | 0.5280 | 0.5279 | 0.5280 | | | | | | | | | | | | | |
| 13 | 0.5282 | 0.5283 | 0.5282 | | | | | | | | | | | | | |
| 14 | 0.5273 | 0.5274 | 0.5274 | | | | | | | | | | | | | |
| 15 | 0.5227 | 0.5228 | 0.5229 | | | | | | | | | | | | | |
| 16 | 0.5235 | 0.5234 | 0.5235 | | | | | | | | | | | | | |
| 17 | 0.5283 | 0.5282 | 0.5283 | | | | | | | | | | | | | |
| 18 | 0.5273 | 0.5272 | 0.5273 | | | | | | | | | | | | | |
| 19 | 0.5264 | 0.5264 | 0.5264 | | | | | | | | | | | | | |
| 20 | 0.5249 | 0.5248 | 0.5249 | | | | | | | | | | | | | |
| 21 | 0.5238 | 0.5239 | 0.5238 | | | | | | | | | | | | | |
| 22 | 0.5256 | 0.5257 | 0.5257 | | | | | | | | | | | | | |
| 23 | 0.5268 | 0.5268 | 0.5269 | | | | | | | | | | | | | |
| 24 | 0.5254 | 0.5254 | 0.5254 | | | | | | | | | | | | | |
| 25 | 0.5262 | 0.5262 | 0.5262 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.5264 | 0.5264 | 0.5264 | | | | | | | | | | | | | |
| Med. | 0.5262 | 0.5262 | 0.5262 | | | | | | | | | | | | | |
| σ | 0.0021 | 0.0021 | 0.0021 | | | | | | | | | | | | | |
| Min. | 0.5227 | 0.5227 | 0.5227 | | | | | | | | | | | | | |
| Max. | 0.5313 | 0.5313 | 0.5313 | | | | | | | | | | | | | |



Data Set 6 : 85 °C, 200 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 86.4 °C |
| Actual Ambient Temperature [T_A] | 82.8 °C |
| Drive Current [I_F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0



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Data Set 6 : 85 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 86.4 °C |
| Actual Ambient Temperature [T _A] | 82.8 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 6-1
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | | | |
|---------|---------------------|--------------------|---------------------|-------------|---------|--------|---------|--------|--|--|--|--|--|--|
| | Φ _v [lm] | V _F [V] | T _{CP} [K] | P [W] | x | y | u' | v' | | | | | | |
| 1 | 174.8 | 6.53 | 2765 | 1.31 | 0.456 | 0.412 | 0.259 | 0.527 | | | | | | |
| 2 | 175.0 | 6.53 | 2796 | 1.31 | 0.452 | 0.409 | 0.258 | 0.526 | | | | | | |
| 3 | 173.2 | 6.53 | 2712 | 1.31 | 0.457 | 0.408 | 0.262 | 0.526 | | | | | | |
| 4 | 175.2 | 6.55 | 2778 | 1.31 | 0.453 | 0.409 | 0.259 | 0.526 | | | | | | |
| 5 | 175.7 | 6.54 | 2743 | 1.31 | 0.458 | 0.413 | 0.260 | 0.528 | | | | | | |
| 6 | 174.2 | 6.54 | 2746 | 1.31 | 0.455 | 0.409 | 0.261 | 0.526 | | | | | | |
| 7 | 174.8 | 6.53 | 2779 | 1.31 | 0.453 | 0.408 | 0.259 | 0.525 | | | | | | |
| 8 | 173.2 | 6.53 | 2680 | 1.31 | 0.462 | 0.411 | 0.263 | 0.528 | | | | | | |
| 9 | 173.1 | 6.52 | 2707 | 1.30 | 0.459 | 0.410 | 0.262 | 0.527 | | | | | | |
| 10 | 173.6 | 6.52 | 2714 | 1.30 | 0.459 | 0.411 | 0.262 | 0.527 | | | | | | |
| 11 | 173.9 | 6.53 | 2734 | 1.31 | 0.455 | 0.406 | 0.261 | 0.525 | | | | | | |
| 12 | 173.6 | 6.54 | 2701 | 1.31 | 0.460 | 0.411 | 0.262 | 0.528 | | | | | | |
| 13 | 173.2 | 6.53 | 2727 | 1.31 | 0.456 | 0.407 | 0.262 | 0.525 | | | | | | |
| 14 | 175.2 | 6.54 | 2738 | 1.31 | 0.459 | 0.413 | 0.261 | 0.528 | | | | | | |
| 15 | 174.1 | 6.52 | 2836 | 1.30 | 0.446 | 0.402 | 0.257 | 0.522 | | | | | | |
| 16 | 174.5 | 6.52 | 2770 | 1.30 | 0.453 | 0.407 | 0.260 | 0.525 | | | | | | |
| 17 | 174.1 | 6.53 | 2742 | 1.31 | 0.456 | 0.409 | 0.261 | 0.526 | | | | | | |
| 18 | 175.3 | 6.53 | 2719 | 1.31 | 0.461 | 0.415 | 0.261 | 0.529 | | | | | | |
| 19 | 173.8 | 6.53 | 2716 | 1.31 | 0.460 | 0.412 | 0.262 | 0.528 | | | | | | |
| 20 | 176.3 | 6.55 | 2842 | 1.31 | 0.449 | 0.408 | 0.256 | 0.525 | | | | | | |
| 21 | 173.7 | 6.53 | 2706 | 1.31 | 0.459 | 0.410 | 0.262 | 0.527 | | | | | | |
| 22 | 173.6 | 6.53 | 2750 | 1.31 | 0.455 | 0.408 | 0.260 | 0.525 | | | | | | |
| 23 | 173.8 | 6.52 | 2755 | 1.30 | 0.454 | 0.407 | 0.260 | 0.525 | | | | | | |
| 24 | 173.8 | 6.53 | 2717 | 1.31 | 0.459 | 0.412 | 0.262 | 0.528 | | | | | | |
| 25 | 176 | 6.54 | 2799 | 1.31 | 0.455 | 0.414 | 0.258 | 0.528 | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | | | |
| Avg. | 174.3 | 6.53 | 2747 | 1.31 | 0.456 | 0.410 | 0.260 | 0.526 | | | | | | |
| Med. | 174.1 | 6.53 | 2742 | 1.31 | 0.456 | 0.409 | 0.261 | 0.526 | | | | | | |
| σ | 0.95 | 0.007 | 41.1 | 0.001 | 0.0038 | 0.0029 | 0.0017 | 0.0016 | | | | | | |
| Min. | 173.1 | 6.52 | 2680 | 1.30 | 0.446 | 0.402 | 0.256 | 0.522 | | | | | | |
| Max. | 176.3 | 6.55 | 2842 | 1.31 | 0.462 | 0.415 | 0.263 | 0.529 | | | | | | |



Data Set 6 : 85 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 86.4 °C |
| Actual Ambient Temperature [T _A] | 82.8 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 6-2
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 98.3 | 98.3 | 98.0 | 98.2 | 98.0 | 97.8 | 97.5 | 97.5 | 97.2 | 97.0 | 96.8 | 96.7 | 96.8 | 96.5 | 96.6 | 96.6 | 96.6 |
| 2 | 100.0 | 98.2 | 98.4 | 98.1 | 98.2 | 98.0 | 97.8 | 97.5 | 97.5 | 97.2 | 96.9 | 96.8 | 96.8 | 96.9 | 96.7 | 96.9 | 96.8 | 96.9 |
| 3 | 100.0 | 98.0 | 98.2 | 97.6 | 98.2 | 98.0 | 97.8 | 97.5 | 97.5 | 97.2 | 97.0 | 96.7 | 96.6 | 96.8 | 96.6 | 96.8 | 96.8 | 96.9 |
| 4 | 100.0 | 97.2 | 97.7 | 97.4 | 97.7 | 97.8 | 97.6 | 97.4 | 97.6 | 97.1 | 96.9 | 96.8 | 96.7 | 96.8 | 96.5 | 96.6 | 96.7 | 96.7 |
| 5 | 100.0 | 97.9 | 98.0 | 97.6 | 98.0 | 97.9 | 97.7 | 97.3 | 97.4 | 97.1 | 96.8 | 96.7 | 96.6 | 96.7 | 96.5 | 96.6 | 96.5 | 96.7 |
| 6 | 100.0 | 98.1 | 98.5 | 98.0 | 98.1 | 97.9 | 97.7 | 97.3 | 97.3 | 96.9 | 96.7 | 96.6 | 96.5 | 96.7 | 96.6 | 96.7 | 96.7 | 96.8 |
| 7 | 100.0 | 97.7 | 98.4 | 98.0 | 98.1 | 98.0 | 97.7 | 97.4 | 97.4 | 97.0 | 96.8 | 96.7 | 96.6 | 96.7 | 96.7 | 96.7 | 96.7 | 96.6 |
| 8 | 100.0 | 98.4 | 98.4 | 98.0 | 98.2 | 98.1 | 97.7 | 97.4 | 97.5 | 97.1 | 96.8 | 96.6 | 96.5 | 96.5 | 96.4 | 96.4 | 96.3 | 96.2 |
| 9 | 100.0 | 98.4 | 98.5 | 98.1 | 98.2 | 98.2 | 97.8 | 97.4 | 97.5 | 97.1 | 96.9 | 96.7 | 96.5 | 96.6 | 96.5 | 96.5 | 96.5 | 96.4 |
| 10 | 100.0 | 98.6 | 98.7 | 98.3 | 98.4 | 98.4 | 98.0 | 97.7 | 97.8 | 97.3 | 97.1 | 96.9 | 96.9 | 96.9 | 96.9 | 97.0 | 96.9 | 96.9 |
| 11 | 100.0 | 97.8 | 98.3 | 97.6 | 97.9 | 98.1 | 97.7 | 97.2 | 97.2 | 96.8 | 96.7 | 96.4 | 96.4 | 96.6 | 96.5 | 96.4 | 96.7 | 96.3 |
| 12 | 100.0 | 98.2 | 98.3 | 97.8 | 97.9 | 97.9 | 97.6 | 97.3 | 97.4 | 97.1 | 96.9 | 96.6 | 96.6 | 96.7 | 96.6 | 96.6 | 96.6 | 96.5 |
| 13 | 100.0 | 98.0 | 97.9 | 97.7 | 97.8 | 97.7 | 97.5 | 97.1 | 97.2 | 96.8 | 96.6 | 96.4 | 96.2 | 96.3 | 96.3 | 96.4 | 96.3 | 96.3 |
| 14 | 100.0 | 98.8 | 98.6 | 98.1 | 98.1 | 98.0 | 97.7 | 97.3 | 97.4 | 97.0 | 96.8 | 96.5 | 96.4 | 96.5 | 96.3 | 96.4 | 96.3 | 96.2 |
| 15 | 100.0 | 98.1 | 98.2 | 97.9 | 98.1 | 97.9 | 97.6 | 97.3 | 97.4 | 96.9 | 96.7 | 96.5 | 96.4 | 96.5 | 96.5 | 96.6 | 96.5 | 96.6 |
| 16 | 100.0 | 97.8 | 97.9 | 97.8 | 98.0 | 98.0 | 97.7 | 97.4 | 97.6 | 97.1 | 97.0 | 96.8 | 96.6 | 96.8 | 96.7 | 96.9 | 96.7 | 96.8 |
| 17 | 100.0 | 98.4 | 98.6 | 97.9 | 97.9 | 97.9 | 97.7 | 97.3 | 97.5 | 96.9 | 96.8 | 96.6 | 96.4 | 96.7 | 96.4 | 96.6 | 96.5 | 96.4 |
| 18 | 100.0 | 98.2 | 98.3 | 98.0 | 98.2 | 98.1 | 97.9 | 97.7 | 97.7 | 97.3 | 97.1 | 96.9 | 96.7 | 96.8 | 96.7 | 96.7 | 96.6 | 96.5 |
| 19 | 100.0 | 97.8 | 97.9 | 97.7 | 98.1 | 98.0 | 97.8 | 97.6 | 97.6 | 97.4 | 97.1 | 96.9 | 96.7 | 96.8 | 96.6 | 96.7 | 96.7 | 96.7 |
| 20 | 100.0 | 98.3 | 98.2 | 97.8 | 97.8 | 97.6 | 97.3 | 97.0 | 97.1 | 96.8 | 96.5 | 96.3 | 96.1 | 96.3 | 96.1 | 96.2 | 96.3 | 96.3 |
| 21 | 100.0 | 98.2 | 98.3 | 98.1 | 98.1 | 98.0 | 97.8 | 97.6 | 97.6 | 97.3 | 97.0 | 96.8 | 96.7 | 96.8 | 96.6 | 96.6 | 96.5 | 96.5 |
| 22 | 100.0 | 99.1 | 99.0 | 98.7 | 98.7 | 98.6 | 98.4 | 98.1 | 98.1 | 97.8 | 97.5 | 97.3 | 97.0 | 97.0 | 96.8 | 96.9 | 96.9 | 96.8 |
| 23 | 100.0 | 98.3 | 98.1 | 97.8 | 97.8 | 97.9 | 97.6 | 97.3 | 97.3 | 96.9 | 96.8 | 96.3 | 96.2 | 96.4 | 96.1 | 96.2 | 96.0 | 96.0 |
| 24 | 100.0 | 98.6 | 98.4 | 98.1 | 98.2 | 98.2 | 97.9 | 97.7 | 97.7 | 97.4 | 97.1 | 96.9 | 96.7 | 96.9 | 96.8 | 96.7 | 96.8 | 96.8 |
| 25 | 100.0 | 98.2 | 98.4 | 98.2 | 98.2 | 98.1 | 97.9 | 97.7 | 97.7 | 97.3 | 97.1 | 97.0 | 96.8 | 97.0 | 96.9 | 97.0 | 96.9 | 96.8 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 98.2 | 98.3 | 97.9 | 98.1 | 98.0 | 97.7 | 97.4 | 97.5 | 97.1 | 96.9 | 96.7 | 96.6 | 96.7 | 96.6 | 96.6 | 96.6 | 96.6 |
| Med. | 100.0 | 98.2 | 98.3 | 98.0 | 98.1 | 98.0 | 97.7 | 97.4 | 97.5 | 97.1 | 96.9 | 96.7 | 96.6 | 96.7 | 96.6 | 96.6 | 96.6 | 96.6 |
| σ | 0.00 | 0.38 | 0.29 | 0.27 | 0.21 | 0.20 | 0.20 | 0.23 | 0.21 | 0.23 | 0.21 | 0.23 | 0.22 | 0.20 | 0.21 | 0.22 | 0.23 | 0.25 |
| Min. | 100.0 | 97.2 | 97.7 | 97.4 | 97.7 | 97.6 | 97.3 | 97.0 | 97.1 | 96.8 | 96.5 | 96.3 | 96.1 | 96.3 | 96.1 | 96.2 | 96.0 | 96.0 |
| Max. | 100.0 | 99.1 | 99.0 | 98.7 | 98.7 | 98.6 | 98.4 | 98.1 | 98.1 | 97.8 | 97.5 | 97.3 | 97.0 | 97.0 | 96.9 | 97.0 | 96.9 | 96.9 |

TM-21 Projection

| Test duration used | 5000 h | to | 10000 h |
|----------------------------------|-----------|-------|---------|
| B | 0.9710 | | |
| α | 6.585E-07 | | |
| R ² | 0.7124 | | |
| Calculated L ₇₀ (10K) | 497000 | hours | |
| Reported L ₇₀ (10K) | > 60000 | hours | |
| Calculated L ₈₀ (10K) | 294000 | hours | |
| Reported L ₈₀ (10K) | > 60000 | hours | |
| Calculated L ₉₀ (10K) | 115000 | hours | |
| Reported L ₉₀ (10K) | > 60000 | hours | |

Curve-fit equation:

$$\Phi(t) = B \exp(-\alpha t)$$

Luminous flux maintenance life equation:

$$L_{70} = \ln(B/0.7)/\alpha$$

$$L_{80} = \ln(B/0.8)/\alpha$$

$$L_{90} = \ln(B/0.9)/\alpha$$

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Data Set 6 : 85 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 86.4 °C |
| Actual Ambient Temperature [T _A] | 82.8 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 6-2 (Continued)
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|--|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 96.5 | 96.4 | 96.3 | | | | | | | | | | | | | |
| 2 | 96.9 | 96.8 | 96.8 | | | | | | | | | | | | | |
| 3 | 96.9 | 96.9 | 96.9 | | | | | | | | | | | | | |
| 4 | 96.6 | 96.3 | 96.5 | | | | | | | | | | | | | |
| 5 | 96.6 | 96.6 | 96.7 | | | | | | | | | | | | | |
| 6 | 96.7 | 96.7 | 96.6 | | | | | | | | | | | | | |
| 7 | 96.7 | 96.5 | 96.3 | | | | | | | | | | | | | |
| 8 | 96.3 | 96.2 | 96.1 | | | | | | | | | | | | | |
| 9 | 96.5 | 96.4 | 96.2 | | | | | | | | | | | | | |
| 10 | 97.0 | 97.0 | 96.8 | | | | | | | | | | | | | |
| 11 | 96.4 | 96.4 | 96.2 | | | | | | | | | | | | | |
| 12 | 96.6 | 96.6 | 96.4 | | | | | | | | | | | | | |
| 13 | 96.5 | 96.4 | 96.3 | | | | | | | | | | | | | |
| 14 | 96.4 | 96.3 | 96.1 | | | | | | | | | | | | | |
| 15 | 96.7 | 96.6 | 96.4 | | | | | | | | | | | | | |
| 16 | 96.9 | 96.8 | 96.7 | | | | | | | | | | | | | |
| 17 | 96.5 | 96.1 | 96.0 | | | | | | | | | | | | | |
| 18 | 96.7 | 96.6 | 96.3 | | | | | | | | | | | | | |
| 19 | 96.9 | 96.7 | 96.6 | | | | | | | | | | | | | |
| 20 | 96.4 | 96.2 | 96.1 | | | | | | | | | | | | | |
| 21 | 96.6 | 96.5 | 96.3 | | | | | | | | | | | | | |
| 22 | 96.9 | 96.8 | 96.7 | | | | | | | | | | | | | |
| 23 | 96.1 | 95.9 | 95.8 | | | | | | | | | | | | | |
| 24 | 96.8 | 96.8 | 96.6 | | | | | | | | | | | | | |
| 25 | 97.0 | 96.8 | 96.7 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 96.6 | 96.5 | 96.4 | | | | | | | | | | | | | |
| Med. | 96.6 | 96.6 | 96.4 | | | | | | | | | | | | | |
| σ | 0.23 | 0.27 | 0.29 | | | | | | | | | | | | | |
| Min. | 96.1 | 95.9 | 95.8 | | | | | | | | | | | | | |
| Max. | 97.0 | 97.0 | 96.9 | | | | | | | | | | | | | |



Data Set 6 : 85 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 86.4 °C |
| Actual Ambient Temperature [T _A] | 82.8 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 6-3
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.6 | 99.7 | 99.7 | 99.6 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 |
| 2 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.9 | 99.8 |
| 3 | 100.0 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 |
| 4 | 100.0 | 99.7 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 100.0 | 99.9 |
| 5 | 100.0 | 99.6 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 |
| 6 | 100.0 | 99.6 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.7 | 99.8 | 99.8 | 99.9 | 99.9 |
| 7 | 100.0 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 |
| 8 | 100.0 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 |
| 9 | 100.0 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.9 | 99.8 |
| 10 | 100.0 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 |
| 11 | 100.0 | 99.8 | 99.8 | 99.8 | 99.7 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 |
| 12 | 100.0 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 |
| 13 | 100.0 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.8 |
| 14 | 100.0 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 99.8 | 99.9 | 99.8 |
| 15 | 100.0 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 |
| 16 | 100.0 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 |
| 17 | 100.0 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.7 | 99.8 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 |
| 18 | 100.0 | 99.6 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 |
| 19 | 100.0 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.7 | 99.8 | 99.7 | 99.8 | 99.8 |
| 20 | 100.0 | 99.8 | 99.9 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 99.9 | 100.0 | 100.0 |
| 21 | 100.0 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 |
| 22 | 100.0 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.9 | 99.9 |
| 23 | 100.0 | 99.7 | 99.8 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 |
| 24 | 100.0 | 99.6 | 99.7 | 99.6 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |
| 25 | 100.0 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 |
| Med. | 100.0 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 | 99.8 | 99.8 | 99.8 | 99.8 | 99.9 | 99.8 |
| σ | 0.00 | 0.06 | 0.07 | 0.06 | 0.08 | 0.07 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 | 0.07 | 0.07 | 0.06 | 0.07 | 0.06 | 0.06 | 0.06 |
| Min. | 100.0 | 99.6 | 99.6 | 99.5 | 99.5 | 99.6 | 99.6 | 99.7 | 99.6 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.7 |
| Max. | 100.0 | 99.8 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 |

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Data Set 6 : 85 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 86.4 °C |
| Actual Ambient Temperature [T _A] | 82.8 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 6-3 (Continued)
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|---|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 2 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 3 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 4 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 5 | 99.8 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 6 | 99.9 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 7 | 99.8 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 8 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 9 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 10 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 11 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 12 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 13 | 99.8 | 100.0 | 99.9 | | | | | | | | | | | | | |
| 14 | 99.9 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 15 | 99.7 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 16 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 17 | 99.7 | 99.9 | 99.8 | | | | | | | | | | | | | |
| 18 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 19 | 99.7 | 99.9 | 99.8 | | | | | | | | | | | | | |
| 20 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 21 | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 22 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 23 | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| 24 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| 25 | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| Med. | 99.8 | 99.9 | 99.9 | | | | | | | | | | | | | |
| σ | 0.07 | 0.07 | 0.06 | | | | | | | | | | | | | |
| Min. | 99.7 | 99.8 | 99.8 | | | | | | | | | | | | | |
| Max. | 99.9 | 100.0 | 100.0 | | | | | | | | | | | | | |



Data Set 6 : 85 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _S] | 86.4 °C |
| Actual Ambient Temperature [T _A] | 82.8 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 6-4
 Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.0000 | 0.0015 | 0.0014 | 0.0016 | 0.0019 | 0.0020 | 0.0020 | 0.0019 | 0.0019 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0024 | 0.0026 |
| 2 | 0.0000 | 0.0014 | 0.0014 | 0.0015 | 0.0019 | 0.0019 | 0.0019 | 0.0019 | 0.0018 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 |
| 3 | 0.0000 | 0.0017 | 0.0015 | 0.0018 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0020 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0025 | 0.0025 | 0.0025 |
| 4 | 0.0000 | 0.0020 | 0.0017 | 0.0020 | 0.0022 | 0.0022 | 0.0022 | 0.0019 | 0.0019 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0026 |
| 5 | 0.0000 | 0.0017 | 0.0015 | 0.0017 | 0.0021 | 0.0021 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0025 |
| 6 | 0.0000 | 0.0015 | 0.0013 | 0.0016 | 0.0019 | 0.0021 | 0.0021 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0026 |
| 7 | 0.0000 | 0.0019 | 0.0017 | 0.0018 | 0.0020 | 0.0021 | 0.0022 | 0.0021 | 0.0021 | 0.0024 | 0.0024 | 0.0026 | 0.0027 | 0.0026 | 0.0027 | 0.0028 | 0.0027 | 0.0028 |
| 8 | 0.0000 | 0.0015 | 0.0016 | 0.0018 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0024 | 0.0027 | 0.0026 | 0.0028 | 0.0027 | 0.0028 | 0.0029 | 0.0028 | 0.0030 |
| 9 | 0.0000 | 0.0015 | 0.0016 | 0.0017 | 0.0020 | 0.0020 | 0.0022 | 0.0021 | 0.0021 | 0.0023 | 0.0025 | 0.0026 | 0.0026 | 0.0027 | 0.0028 | 0.0028 | 0.0028 | 0.0029 |
| 10 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0017 | 0.0019 | 0.0018 | 0.0018 | 0.0019 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0024 | 0.0025 |
| 11 | 0.0000 | 0.0017 | 0.0016 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | 0.0019 | 0.0021 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0024 | 0.0025 |
| 12 | 0.0000 | 0.0015 | 0.0016 | 0.0016 | 0.0020 | 0.0020 | 0.0022 | 0.0020 | 0.0019 | 0.0022 | 0.0024 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0024 | 0.0024 | 0.0026 |
| 13 | 0.0000 | 0.0018 | 0.0019 | 0.0019 | 0.0021 | 0.0022 | 0.0024 | 0.0023 | 0.0022 | 0.0025 | 0.0026 | 0.0027 | 0.0028 | 0.0028 | 0.0028 | 0.0029 | 0.0028 | 0.0029 |
| 14 | 0.0000 | 0.0012 | 0.0014 | 0.0016 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0020 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0027 | 0.0027 | 0.0027 | 0.0028 |
| 15 | 0.0000 | 0.0016 | 0.0017 | 0.0018 | 0.0021 | 0.0022 | 0.0023 | 0.0022 | 0.0022 | 0.0024 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0028 | 0.0028 | 0.0028 |
| 16 | 0.0000 | 0.0017 | 0.0018 | 0.0018 | 0.0022 | 0.0023 | 0.0024 | 0.0023 | 0.0022 | 0.0024 | 0.0026 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0029 |
| 17 | 0.0000 | 0.0014 | 0.0014 | 0.0016 | 0.0018 | 0.0018 | 0.0019 | 0.0019 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0021 | 0.0023 | 0.0022 | 0.0023 |
| 18 | 0.0000 | 0.0015 | 0.0016 | 0.0015 | 0.0019 | 0.0018 | 0.0019 | 0.0019 | 0.0018 | 0.0020 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 |
| 19 | 0.0000 | 0.0018 | 0.0018 | 0.0019 | 0.0022 | 0.0023 | 0.0022 | 0.0022 | 0.0022 | 0.0024 | 0.0026 | 0.0025 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0027 |
| 20 | 0.0000 | 0.0014 | 0.0015 | 0.0017 | 0.0021 | 0.0021 | 0.0023 | 0.0021 | 0.0022 | 0.0023 | 0.0025 | 0.0025 | 0.0025 | 0.0027 | 0.0026 | 0.0027 | 0.0026 | 0.0027 |
| 21 | 0.0000 | 0.0014 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0019 | 0.0018 | 0.0018 | 0.0020 | 0.0022 | 0.0021 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0025 |
| 22 | 0.0000 | 0.0017 | 0.0018 | 0.0020 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0023 | 0.0026 | 0.0026 | 0.0027 | 0.0026 | 0.0027 | 0.0026 | 0.0028 | 0.0028 | 0.0028 |
| 23 | 0.0000 | 0.0015 | 0.0017 | 0.0016 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | 0.0020 | 0.0022 | 0.0024 | 0.0024 | 0.0025 | 0.0026 | 0.0027 | 0.0026 | 0.0026 | 0.0028 |
| 24 | 0.0000 | 0.0013 | 0.0015 | 0.0016 | 0.0018 | 0.0019 | 0.0019 | 0.0019 | 0.0017 | 0.0019 | 0.0022 | 0.0021 | 0.0023 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 |
| 25 | 0.0000 | 0.0015 | 0.0015 | 0.0015 | 0.0019 | 0.0019 | 0.0020 | 0.0019 | 0.0018 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0023 | 0.0023 | 0.0023 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0016 | 0.0016 | 0.0017 | 0.0020 | 0.0021 | 0.0021 | 0.0020 | 0.0020 | 0.0022 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0026 |
| Med. | 0.0000 | 0.0015 | 0.0016 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0020 | 0.0020 | 0.0022 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0025 | 0.0026 |
| σ | 0.0000 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| Min. | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0017 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0021 | 0.0023 | 0.0022 | 0.0023 |
| Max. | 0.0000 | 0.0020 | 0.0019 | 0.0020 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0023 | 0.0026 | 0.0027 | 0.0027 | 0.0028 | 0.0028 | 0.0028 | 0.0029 | 0.0028 | 0.0030 |



Data Set 6 : 85 °C, 200 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 86.4 °C |
| Actual Ambient Temperature [T_A] | 82.8 °C |
| Drive Current [I_F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 6-4 (Continued)
Chromaticity Shift

| LED No. | Chromaticity Shift $\Delta u'v'$ | | | | | | | | | | | | | | | |
|----------|----------------------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.0028 | 0.0027 | 0.0027 | | | | | | | | | | | | | |
| 2 | 0.0026 | 0.0025 | 0.0025 | | | | | | | | | | | | | |
| 3 | 0.0027 | 0.0026 | 0.0026 | | | | | | | | | | | | | |
| 4 | 0.0028 | 0.0026 | 0.0027 | | | | | | | | | | | | | |
| 5 | 0.0026 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| 6 | 0.0027 | 0.0026 | 0.0026 | | | | | | | | | | | | | |
| 7 | 0.0031 | 0.0030 | 0.0031 | | | | | | | | | | | | | |
| 8 | 0.0031 | 0.0031 | 0.0031 | | | | | | | | | | | | | |
| 9 | 0.0031 | 0.0030 | 0.0030 | | | | | | | | | | | | | |
| 10 | 0.0026 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| 11 | 0.0026 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| 12 | 0.0027 | 0.0027 | 0.0027 | | | | | | | | | | | | | |
| 13 | 0.0031 | 0.0030 | 0.0031 | | | | | | | | | | | | | |
| 14 | 0.0029 | 0.0029 | 0.0030 | | | | | | | | | | | | | |
| 15 | 0.0030 | 0.0030 | 0.0030 | | | | | | | | | | | | | |
| 16 | 0.0029 | 0.0029 | 0.0029 | | | | | | | | | | | | | |
| 17 | 0.0024 | 0.0023 | 0.0025 | | | | | | | | | | | | | |
| 18 | 0.0027 | 0.0026 | 0.0028 | | | | | | | | | | | | | |
| 19 | 0.0030 | 0.0029 | 0.0029 | | | | | | | | | | | | | |
| 20 | 0.0029 | 0.0029 | 0.0028 | | | | | | | | | | | | | |
| 21 | 0.0027 | 0.0027 | 0.0027 | | | | | | | | | | | | | |
| 22 | 0.0031 | 0.0030 | 0.0032 | | | | | | | | | | | | | |
| 23 | 0.0029 | 0.0028 | 0.0030 | | | | | | | | | | | | | |
| 24 | 0.0025 | 0.0025 | 0.0025 | | | | | | | | | | | | | |
| 25 | 0.0025 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.0028 | 0.0027 | 0.0028 | | | | | | | | | | | | | |
| Med. | 0.0028 | 0.0027 | 0.0027 | | | | | | | | | | | | | |
| σ | 0.0002 | 0.0002 | 0.0002 | | | | | | | | | | | | | |
| Min. | 0.0024 | 0.0023 | 0.0025 | | | | | | | | | | | | | |
| Max. | 0.0031 | 0.0031 | 0.0032 | | | | | | | | | | | | | |

Data Set 6 : 85 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 86.4 °C |
| Actual Ambient Temperature [T _A] | 82.8 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 6-5
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.2598 | 0.2583 | 0.2584 | 0.2582 | 0.2579 | 0.2578 | 0.2578 | 0.2579 | 0.2580 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | 0.2573 | 0.2574 | 0.2572 |
| 2 | 0.2585 | 0.2571 | 0.2571 | 0.2570 | 0.2567 | 0.2567 | 0.2566 | 0.2566 | 0.2568 | 0.2565 | 0.2564 | 0.2563 | 0.2563 | 0.2563 | 0.2563 | 0.2562 | 0.2562 | 0.2562 |
| 3 | 0.2625 | 0.2608 | 0.2610 | 0.2607 | 0.2606 | 0.2604 | 0.2604 | 0.2605 | 0.2605 | 0.2603 | 0.2601 | 0.2602 | 0.2601 | 0.2600 | 0.2600 | 0.2600 | 0.2600 | 0.2600 |
| 4 | 0.2597 | 0.2578 | 0.2581 | 0.2578 | 0.2576 | 0.2576 | 0.2576 | 0.2578 | 0.2578 | 0.2576 | 0.2575 | 0.2575 | 0.2574 | 0.2574 | 0.2574 | 0.2573 | 0.2573 | 0.2572 |
| 5 | 0.2628 | 0.2611 | 0.2614 | 0.2611 | 0.2608 | 0.2607 | 0.2608 | 0.2608 | 0.2609 | 0.2606 | 0.2606 | 0.2606 | 0.2605 | 0.2605 | 0.2605 | 0.2604 | 0.2604 | 0.2604 |
| 6 | 0.2613 | 0.2598 | 0.2600 | 0.2597 | 0.2595 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2591 | 0.2591 | 0.2589 | 0.2590 | 0.2590 | 0.2589 | 0.2589 | 0.2589 | 0.2588 |
| 7 | 0.2594 | 0.2575 | 0.2577 | 0.2576 | 0.2574 | 0.2573 | 0.2572 | 0.2573 | 0.2573 | 0.2570 | 0.2570 | 0.2569 | 0.2568 | 0.2568 | 0.2567 | 0.2567 | 0.2567 | 0.2566 |
| 8 | 0.2636 | 0.2621 | 0.2621 | 0.2619 | 0.2616 | 0.2615 | 0.2615 | 0.2615 | 0.2615 | 0.2612 | 0.2610 | 0.2611 | 0.2609 | 0.2609 | 0.2608 | 0.2608 | 0.2608 | 0.2607 |
| 9 | 0.2626 | 0.2611 | 0.2610 | 0.2609 | 0.2606 | 0.2605 | 0.2604 | 0.2605 | 0.2605 | 0.2603 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2598 | 0.2598 | 0.2598 | 0.2597 |
| 10 | 0.2625 | 0.2612 | 0.2611 | 0.2610 | 0.2608 | 0.2606 | 0.2606 | 0.2606 | 0.2606 | 0.2603 | 0.2602 | 0.2602 | 0.2602 | 0.2601 | 0.2600 | 0.2601 | 0.2600 | 0.2600 |
| 11 | 0.2639 | 0.2622 | 0.2623 | 0.2622 | 0.2620 | 0.2618 | 0.2617 | 0.2619 | 0.2620 | 0.2617 | 0.2616 | 0.2616 | 0.2616 | 0.2615 | 0.2615 | 0.2615 | 0.2615 | 0.2614 |
| 12 | 0.2632 | 0.2617 | 0.2616 | 0.2616 | 0.2612 | 0.2612 | 0.2611 | 0.2612 | 0.2613 | 0.2610 | 0.2609 | 0.2609 | 0.2608 | 0.2608 | 0.2608 | 0.2608 | 0.2608 | 0.2607 |
| 13 | 0.2617 | 0.2599 | 0.2599 | 0.2598 | 0.2596 | 0.2595 | 0.2594 | 0.2594 | 0.2595 | 0.2593 | 0.2592 | 0.2591 | 0.2590 | 0.2590 | 0.2590 | 0.2589 | 0.2590 | 0.2589 |
| 14 | 0.2607 | 0.2595 | 0.2593 | 0.2592 | 0.2588 | 0.2587 | 0.2586 | 0.2586 | 0.2587 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2581 | 0.2580 | 0.2580 | 0.2579 |
| 15 | 0.2576 | 0.2560 | 0.2559 | 0.2558 | 0.2556 | 0.2555 | 0.2553 | 0.2554 | 0.2554 | 0.2552 | 0.2551 | 0.2550 | 0.2550 | 0.2549 | 0.2549 | 0.2549 | 0.2548 | 0.2549 |
| 16 | 0.2602 | 0.2585 | 0.2584 | 0.2583 | 0.2580 | 0.2579 | 0.2578 | 0.2579 | 0.2580 | 0.2578 | 0.2576 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2575 | 0.2575 | 0.2573 |
| 17 | 0.2633 | 0.2619 | 0.2619 | 0.2618 | 0.2616 | 0.2615 | 0.2614 | 0.2615 | 0.2616 | 0.2614 | 0.2612 | 0.2613 | 0.2613 | 0.2612 | 0.2612 | 0.2611 | 0.2612 | 0.2611 |
| 18 | 0.2619 | 0.2604 | 0.2603 | 0.2603 | 0.2600 | 0.2600 | 0.2600 | 0.2600 | 0.2601 | 0.2599 | 0.2597 | 0.2596 | 0.2596 | 0.2596 | 0.2595 | 0.2595 | 0.2594 | 0.2594 |
| 19 | 0.2619 | 0.2601 | 0.2602 | 0.2600 | 0.2598 | 0.2597 | 0.2598 | 0.2597 | 0.2598 | 0.2596 | 0.2594 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2592 |
| 20 | 0.2567 | 0.2553 | 0.2552 | 0.2550 | 0.2547 | 0.2547 | 0.2545 | 0.2546 | 0.2546 | 0.2545 | 0.2543 | 0.2543 | 0.2543 | 0.2541 | 0.2542 | 0.2541 | 0.2542 | 0.2541 |
| 21 | 0.2624 | 0.2610 | 0.2610 | 0.2608 | 0.2606 | 0.2605 | 0.2605 | 0.2606 | 0.2606 | 0.2604 | 0.2602 | 0.2603 | 0.2602 | 0.2601 | 0.2600 | 0.2601 | 0.2600 | 0.2599 |
| 22 | 0.2614 | 0.2598 | 0.2596 | 0.2595 | 0.2592 | 0.2591 | 0.2591 | 0.2591 | 0.2592 | 0.2589 | 0.2589 | 0.2588 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2587 |
| 23 | 0.2627 | 0.2612 | 0.2610 | 0.2611 | 0.2608 | 0.2607 | 0.2606 | 0.2607 | 0.2607 | 0.2605 | 0.2603 | 0.2603 | 0.2602 | 0.2602 | 0.2601 | 0.2601 | 0.2601 | 0.2600 |
| 24 | 0.2622 | 0.2609 | 0.2607 | 0.2607 | 0.2605 | 0.2604 | 0.2603 | 0.2604 | 0.2605 | 0.2603 | 0.2601 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2600 | 0.2599 | 0.2599 |
| 25 | 0.2580 | 0.2565 | 0.2565 | 0.2565 | 0.2561 | 0.2561 | 0.2560 | 0.2561 | 0.2562 | 0.2559 | 0.2558 | 0.2558 | 0.2557 | 0.2557 | 0.2556 | 0.2558 | 0.2557 | 0.2557 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2612 | 0.2597 | 0.2597 | 0.2595 | 0.2593 | 0.2592 | 0.2591 | 0.2592 | 0.2593 | 0.2590 | 0.2589 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2587 | 0.2586 |
| Med. | 0.2619 | 0.2601 | 0.2602 | 0.2600 | 0.2598 | 0.2597 | 0.2598 | 0.2597 | 0.2598 | 0.2596 | 0.2594 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2592 |
| σ | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 | 0.0020 |
| Min. | 0.2567 | 0.2553 | 0.2552 | 0.2550 | 0.2547 | 0.2547 | 0.2545 | 0.2546 | 0.2546 | 0.2545 | 0.2543 | 0.2543 | 0.2543 | 0.2541 | 0.2542 | 0.2541 | 0.2542 | 0.2541 |
| Max. | 0.2639 | 0.2622 | 0.2623 | 0.2622 | 0.2620 | 0.2618 | 0.2617 | 0.2619 | 0.2620 | 0.2617 | 0.2616 | 0.2616 | 0.2616 | 0.2615 | 0.2615 | 0.2615 | 0.2615 | 0.2614 |



Data Set 6 : 85 °C, 200 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 86.4 °C |
| Actual Ambient Temperature [T_A] | 82.8 °C |
| Drive Current [I_F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 6-5 (Continued)
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | |
|----------|-------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | |
| 1 | 0.2571 | 0.2572 | 0.2572 | | | | | | | | | | |
| 2 | 0.2560 | 0.2561 | 0.2561 | | | | | | | | | | |
| 3 | 0.2599 | 0.2599 | 0.2599 | | | | | | | | | | |
| 4 | 0.2571 | 0.2572 | 0.2571 | | | | | | | | | | |
| 5 | 0.2603 | 0.2603 | 0.2602 | | | | | | | | | | |
| 6 | 0.2587 | 0.2588 | 0.2588 | | | | | | | | | | |
| 7 | 0.2564 | 0.2565 | 0.2564 | | | | | | | | | | |
| 8 | 0.2606 | 0.2606 | 0.2606 | | | | | | | | | | |
| 9 | 0.2596 | 0.2596 | 0.2596 | | | | | | | | | | |
| 10 | 0.2599 | 0.2600 | 0.2599 | | | | | | | | | | |
| 11 | 0.2613 | 0.2614 | 0.2613 | | | | | | | | | | |
| 12 | 0.2606 | 0.2606 | 0.2606 | | | | | | | | | | |
| 13 | 0.2587 | 0.2589 | 0.2588 | | | | | | | | | | |
| 14 | 0.2579 | 0.2579 | 0.2578 | | | | | | | | | | |
| 15 | 0.2547 | 0.2547 | 0.2547 | | | | | | | | | | |
| 16 | 0.2574 | 0.2573 | 0.2573 | | | | | | | | | | |
| 17 | 0.2609 | 0.2610 | 0.2609 | | | | | | | | | | |
| 18 | 0.2592 | 0.2593 | 0.2592 | | | | | | | | | | |
| 19 | 0.2590 | 0.2591 | 0.2590 | | | | | | | | | | |
| 20 | 0.2540 | 0.2540 | 0.2541 | | | | | | | | | | |
| 21 | 0.2597 | 0.2598 | 0.2598 | | | | | | | | | | |
| 22 | 0.2585 | 0.2586 | 0.2584 | | | | | | | | | | |
| 23 | 0.2599 | 0.2600 | 0.2598 | | | | | | | | | | |
| 24 | 0.2598 | 0.2598 | 0.2598 | | | | | | | | | | |
| 25 | 0.2555 | 0.2556 | 0.2555 | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | |
| Avg. | 0.2585 | 0.2586 | 0.2585 | | | | | | | | | | |
| Med. | 0.2590 | 0.2591 | 0.2590 | | | | | | | | | | |
| σ | 0.0020 | 0.0020 | 0.0020 | | | | | | | | | | |
| Min. | 0.2540 | 0.2540 | 0.2541 | | | | | | | | | | |
| Max. | 0.2613 | 0.2614 | 0.2613 | | | | | | | | | | |



Data Set 6 : 85 °C, 200 mA

| | |
|--|---------|
| Actual Case Temperature [T _s] | 86.4 °C |
| Actual Ambient Temperature [T _A] | 82.8 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 6-6
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.5272 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 |
| 2 | 0.5256 | 0.5254 | 0.5254 | 0.5254 | 0.5253 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5251 | 0.5252 | 0.5251 | 0.5251 | 0.5251 | 0.5251 | 0.5252 | 0.5251 |
| 3 | 0.5259 | 0.5257 | 0.5258 | 0.5257 | 0.5256 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5255 | 0.5255 | 0.5254 | 0.5254 | 0.5255 | 0.5255 | 0.5254 | 0.5255 | 0.5255 |
| 4 | 0.5259 | 0.5256 | 0.5257 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5256 | 0.5257 | 0.5256 | 0.5255 | 0.5255 | 0.5254 | 0.5255 | 0.5255 | 0.5255 | 0.5255 | 0.5255 |
| 5 | 0.5288 | 0.5287 | 0.5287 | 0.5287 | 0.5286 | 0.5286 | 0.5285 | 0.5286 | 0.5286 | 0.5285 | 0.5285 | 0.5285 | 0.5285 | 0.5286 | 0.5286 | 0.5285 | 0.5286 | 0.5286 |
| 6 | 0.5262 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5258 | 0.5259 | 0.5259 | 0.5257 | 0.5258 | 0.5258 | 0.5257 | 0.5257 | 0.5258 | 0.5257 | 0.5257 | 0.5257 |
| 7 | 0.5253 | 0.5249 | 0.5250 | 0.5250 | 0.5248 | 0.5249 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5247 |
| 8 | 0.5277 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5273 | 0.5272 | 0.5272 | 0.5272 | 0.5271 |
| 9 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 |
| 10 | 0.5273 | 0.5273 | 0.5272 | 0.5273 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5269 |
| 11 | 0.5262 | 0.5259 | 0.5260 | 0.5260 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5259 | 0.5258 | 0.5258 | 0.5257 | 0.5257 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5257 |
| 12 | 0.5281 | 0.5278 | 0.5279 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 |
| 13 | 0.5252 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5248 | 0.5248 | 0.5249 | 0.5248 | 0.5248 | 0.5247 | 0.5247 | 0.5246 | 0.5247 | 0.5246 | 0.5246 | 0.5247 | 0.5246 |
| 14 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | 0.5277 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 |
| 15 | 0.5218 | 0.5216 | 0.5215 | 0.5215 | 0.5213 | 0.5213 | 0.5213 | 0.5213 | 0.5212 | 0.5212 | 0.5212 | 0.5211 | 0.5211 | 0.5211 | 0.5211 | 0.5211 | 0.5211 | 0.5211 |
| 16 | 0.5252 | 0.5249 | 0.5249 | 0.5250 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5247 |
| 17 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5272 | 0.5272 | 0.5271 | 0.5272 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 |
| 18 | 0.5296 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | 0.5294 | 0.5293 | 0.5293 | 0.5293 | 0.5292 | 0.5292 | 0.5293 | 0.5292 | 0.5293 | 0.5292 |
| 19 | 0.5280 | 0.5278 | 0.5279 | 0.5279 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5275 |
| 20 | 0.5247 | 0.5245 | 0.5244 | 0.5244 | 0.5243 | 0.5243 | 0.5241 | 0.5242 | 0.5242 | 0.5241 | 0.5241 | 0.5241 | 0.5240 | 0.5241 | 0.5240 | 0.5240 | 0.5240 | 0.5240 |
| 21 | 0.5272 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5269 | 0.5268 | 0.5269 | 0.5269 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5268 | 0.5267 |
| 22 | 0.5257 | 0.5254 | 0.5255 | 0.5254 | 0.5253 | 0.5253 | 0.5252 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5251 | 0.5252 | 0.5251 |
| 23 | 0.5265 | 0.5263 | 0.5263 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 | 0.5260 |
| 24 | 0.5279 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5276 | 0.5276 |
| 25 | 0.5281 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5279 | 0.5277 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5277 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5267 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 |
| Med. | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5268 | 0.5268 | 0.5269 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 |
| σ | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 |
| Min. | 0.5218 | 0.5216 | 0.5215 | 0.5215 | 0.5213 | 0.5213 | 0.5213 | 0.5213 | 0.5212 | 0.5212 | 0.5212 | 0.5211 | 0.5211 | 0.5211 | 0.5211 | 0.5211 | 0.5211 | 0.5211 |
| Max. | 0.5296 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5294 | 0.5293 | 0.5294 | 0.5294 | 0.5293 | 0.5293 | 0.5293 | 0.5292 | 0.5292 | 0.5293 | 0.5292 | 0.5293 | 0.5292 |

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Data Set 6 : 85 °C, 200 mA

| | |
|--------------------------------------|---------|
| Actual Case Temperature [T_S] | 86.4 °C |
| Actual Ambient Temperature [T_A] | 82.8 °C |
| Drive Current [I_F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 6-6 (Continued)
Chromaticity

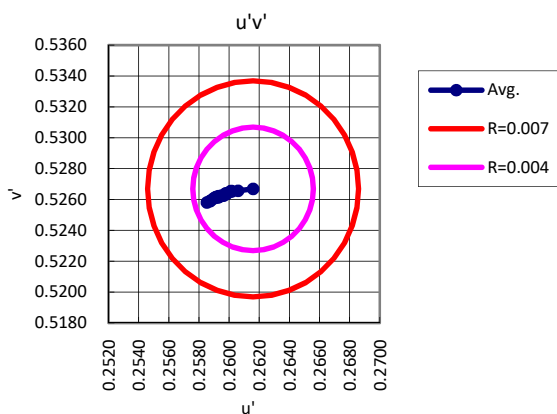
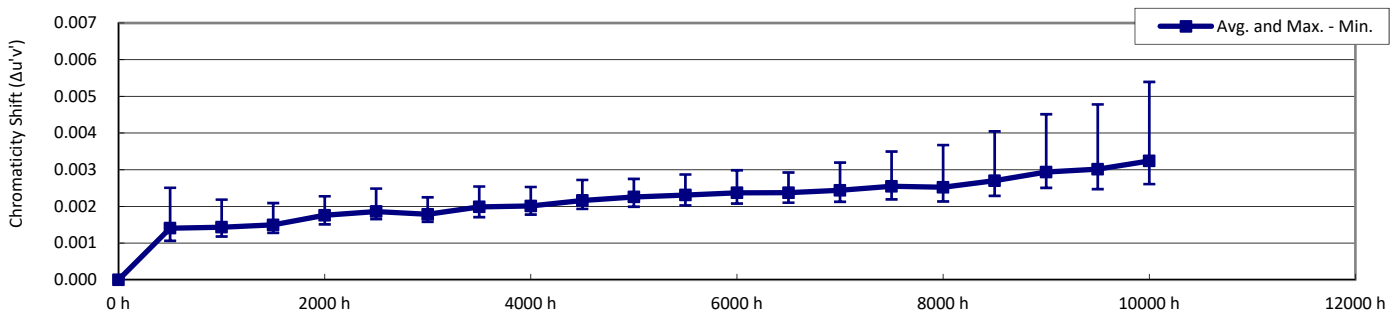
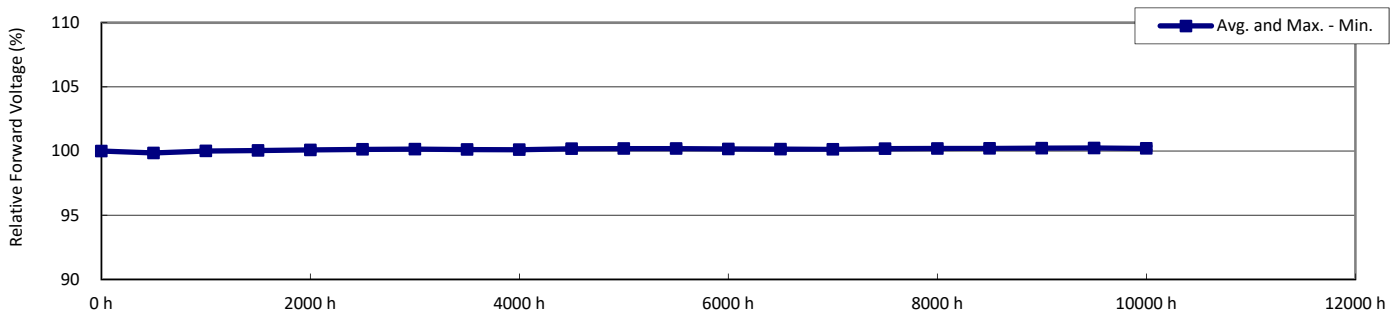
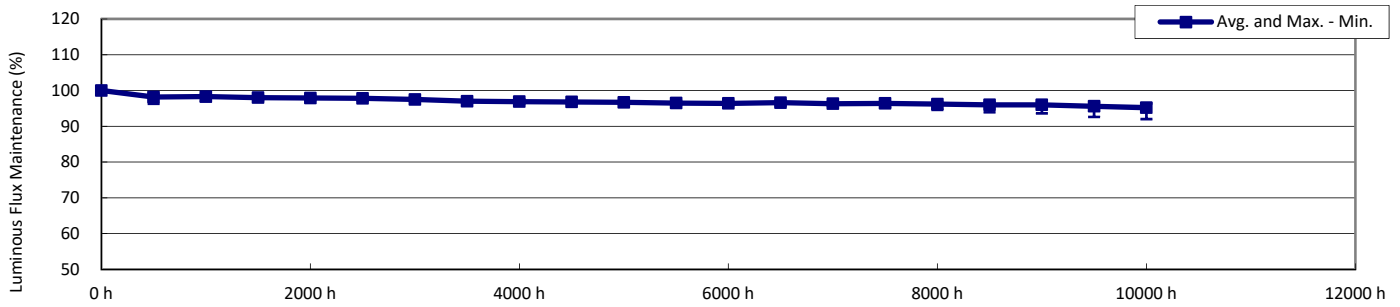
| LED No. | Chromaticity v' | | | | | | | | | | | |
|----------|-------------------|--------|---------|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | |
| 1 | 0.5265 | 0.5265 | 0.5264 | | | | | | | | | |
| 2 | 0.5250 | 0.5250 | 0.5249 | | | | | | | | | |
| 3 | 0.5254 | 0.5254 | 0.5254 | | | | | | | | | |
| 4 | 0.5253 | 0.5253 | 0.5254 | | | | | | | | | |
| 5 | 0.5285 | 0.5285 | 0.5285 | | | | | | | | | |
| 6 | 0.5255 | 0.5256 | 0.5255 | | | | | | | | | |
| 7 | 0.5245 | 0.5245 | 0.5244 | | | | | | | | | |
| 8 | 0.5270 | 0.5270 | 0.5269 | | | | | | | | | |
| 9 | 0.5266 | 0.5265 | 0.5265 | | | | | | | | | |
| 10 | 0.5268 | 0.5268 | 0.5268 | | | | | | | | | |
| 11 | 0.5256 | 0.5256 | 0.5256 | | | | | | | | | |
| 12 | 0.5275 | 0.5274 | 0.5275 | | | | | | | | | |
| 13 | 0.5245 | 0.5245 | 0.5244 | | | | | | | | | |
| 14 | 0.5276 | 0.5275 | 0.5275 | | | | | | | | | |
| 15 | 0.5210 | 0.5209 | 0.5208 | | | | | | | | | |
| 16 | 0.5245 | 0.5245 | 0.5245 | | | | | | | | | |
| 17 | 0.5269 | 0.5269 | 0.5269 | | | | | | | | | |
| 18 | 0.5291 | 0.5291 | 0.5291 | | | | | | | | | |
| 19 | 0.5274 | 0.5274 | 0.5274 | | | | | | | | | |
| 20 | 0.5239 | 0.5238 | 0.5237 | | | | | | | | | |
| 21 | 0.5265 | 0.5265 | 0.5265 | | | | | | | | | |
| 22 | 0.5249 | 0.5250 | 0.5250 | | | | | | | | | |
| 23 | 0.5258 | 0.5258 | 0.5258 | | | | | | | | | |
| 24 | 0.5274 | 0.5274 | 0.5274 | | | | | | | | | |
| 25 | 0.5275 | 0.5275 | 0.5275 | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | |
| Avg. | 0.5260 | 0.5260 | 0.5260 | | | | | | | | | |
| Med. | 0.5265 | 0.5265 | 0.5264 | | | | | | | | | |
| σ | 0.0017 | 0.0017 | 0.0017 | | | | | | | | | |
| Min. | 0.5210 | 0.5209 | 0.5208 | | | | | | | | | |
| Max. | 0.5291 | 0.5291 | 0.5291 | | | | | | | | | |



Data Set 7 : 105 °C, 100 mA

| | |
|--------------------------------------|----------|
| Actual Case Temperature [T_S] | 106.8 °C |
| Actual Ambient Temperature [T_A] | 104.0 °C |
| Drive Current [I_F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0



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Data Set 7 : 105 °C, 100 mA

| | |
|--------------------------------------|----------|
| Actual Case Temperature [T_S] | 106.8 °C |
| Actual Ambient Temperature [T_A] | 104.0 °C |
| Drive Current [I_F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 7-1
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | | | |
|----------|---------------|-----------------|--------------|-------------|---------|--------|---------|--------|--|--|--|--|--|--|
| | Φ_V [lm] | V_F [V] | T_{CP} [K] | P [W] | x | y | u' | v' | | | | | | |
| 1 | 94.1 | 5.96 | 2752 | 0.60 | 0.455 | 0.409 | 0.260 | 0.526 | | | | | | |
| 2 | 93.7 | 5.95 | 2713 | 0.59 | 0.458 | 0.409 | 0.262 | 0.526 | | | | | | |
| 3 | 93.4 | 5.96 | 2651 | 0.60 | 0.465 | 0.414 | 0.265 | 0.529 | | | | | | |
| 4 | 93.2 | 5.96 | 2703 | 0.60 | 0.457 | 0.405 | 0.263 | 0.525 | | | | | | |
| 5 | 94.2 | 5.96 | 2696 | 0.60 | 0.463 | 0.415 | 0.262 | 0.530 | | | | | | |
| 6 | 93.9 | 5.96 | 2721 | 0.60 | 0.458 | 0.410 | 0.262 | 0.527 | | | | | | |
| 7 | 93.9 | 5.96 | 2740 | 0.60 | 0.456 | 0.408 | 0.261 | 0.526 | | | | | | |
| 8 | 93.8 | 5.94 | 2709 | 0.59 | 0.459 | 0.410 | 0.262 | 0.527 | | | | | | |
| 9 | 94.2 | 5.95 | 2771 | 0.59 | 0.453 | 0.408 | 0.260 | 0.525 | | | | | | |
| 10 | 94.1 | 5.95 | 2756 | 0.60 | 0.456 | 0.410 | 0.260 | 0.527 | | | | | | |
| 11 | 92.5 | 5.95 | 2667 | 0.60 | 0.460 | 0.407 | 0.264 | 0.526 | | | | | | |
| 12 | 94.4 | 5.96 | 2719 | 0.60 | 0.461 | 0.415 | 0.261 | 0.529 | | | | | | |
| 13 | 93.4 | 5.95 | 2722 | 0.60 | 0.457 | 0.408 | 0.262 | 0.526 | | | | | | |
| 14 | 93.9 | 5.95 | 2723 | 0.60 | 0.458 | 0.411 | 0.261 | 0.527 | | | | | | |
| 15 | 93.0 | 5.96 | 2699 | 0.60 | 0.457 | 0.406 | 0.263 | 0.525 | | | | | | |
| 16 | 94.6 | 5.96 | 2771 | 0.60 | 0.456 | 0.412 | 0.259 | 0.527 | | | | | | |
| 17 | 92.7 | 5.96 | 2649 | 0.60 | 0.465 | 0.413 | 0.265 | 0.529 | | | | | | |
| 18 | 93.9 | 5.96 | 2779 | 0.60 | 0.452 | 0.405 | 0.259 | 0.524 | | | | | | |
| 19 | 93.5 | 5.95 | 2669 | 0.59 | 0.463 | 0.412 | 0.264 | 0.528 | | | | | | |
| 20 | 94.5 | 5.96 | 2757 | 0.60 | 0.456 | 0.410 | 0.260 | 0.527 | | | | | | |
| 21 | 93.7 | 5.96 | 2696 | 0.60 | 0.459 | 0.409 | 0.263 | 0.527 | | | | | | |
| 22 | 93.5 | 5.96 | 2695 | 0.60 | 0.461 | 0.411 | 0.263 | 0.528 | | | | | | |
| 23 | 93.7 | 5.95 | 2747 | 0.60 | 0.454 | 0.406 | 0.261 | 0.525 | | | | | | |
| 24 | 93.8 | 5.95 | 2730 | 0.59 | 0.457 | 0.409 | 0.261 | 0.526 | | | | | | |
| 25 | 94 | 5.96 | 2761 | 0.60 | 0.454 | 0.407 | 0.260 | 0.525 | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | | | |
| Avg. | 93.7 | 5.96 | 2720 | 0.60 | 0.458 | 0.410 | 0.262 | 0.527 | | | | | | |
| Med. | 93.8 | 5.96 | 2721 | 0.60 | 0.457 | 0.409 | 0.262 | 0.527 | | | | | | |
| σ | 0.52 | 0.006 | 37.0 | 0.001 | 0.0035 | 0.0029 | 0.0016 | 0.0015 | | | | | | |
| Min. | 92.5 | 5.94 | 2649 | 0.59 | 0.452 | 0.405 | 0.259 | 0.524 | | | | | | |
| Max. | 94.6 | 5.96 | 2779 | 0.60 | 0.465 | 0.415 | 0.265 | 0.530 | | | | | | |



Data Set 7 : 105 °C, 100 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.8 °C |
| Actual Ambient Temperature [T _A] | 104.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 7-2
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 97.8 | 98.1 | 97.7 | 97.6 | 97.5 | 97.4 | 97.0 | 96.9 | 96.7 | 96.6 | 96.5 | 96.4 | 96.6 | 96.4 | 96.3 | 96.0 | 95.8 |
| 2 | 100.0 | 97.9 | 98.0 | 97.8 | 97.7 | 97.6 | 97.4 | 96.9 | 96.9 | 96.7 | 96.5 | 96.4 | 96.3 | 96.6 | 96.4 | 96.4 | 96.2 | 96.0 |
| 3 | 100.0 | 98.7 | 98.7 | 98.2 | 98.1 | 97.9 | 97.6 | 97.2 | 97.0 | 96.9 | 96.8 | 96.6 | 96.7 | 96.8 | 96.6 | 96.6 | 96.5 | 96.4 |
| 4 | 100.0 | 98.0 | 98.3 | 97.8 | 97.7 | 97.5 | 97.3 | 96.8 | 96.7 | 96.6 | 96.5 | 96.4 | 96.4 | 96.5 | 96.4 | 96.5 | 96.4 | 96.4 |
| 5 | 100.0 | 98.6 | 98.5 | 97.8 | 97.9 | 97.6 | 97.4 | 96.9 | 96.8 | 96.6 | 96.7 | 96.2 | 96.2 | 96.2 | 96.1 | 96.1 | 96.1 | 96.1 |
| 6 | 100.0 | 97.8 | 98.1 | 97.6 | 97.5 | 97.6 | 97.4 | 96.8 | 96.7 | 96.6 | 96.5 | 96.3 | 96.3 | 96.5 | 96.4 | 96.4 | 96.3 | 96.3 |
| 7 | 100.0 | 98.4 | 98.3 | 98.0 | 97.8 | 97.8 | 97.6 | 97.0 | 96.9 | 96.9 | 96.8 | 96.6 | 96.5 | 96.6 | 96.3 | 96.2 | 95.7 | 95.3 |
| 8 | 100.0 | 98.4 | 98.5 | 98.3 | 98.3 | 98.1 | 97.9 | 97.3 | 97.3 | 97.2 | 97.1 | 96.9 | 96.8 | 96.9 | 96.5 | 96.3 | 95.5 | 94.9 |
| 9 | 100.0 | 96.3 | 97.0 | 97.1 | 97.5 | 97.4 | 97.3 | 96.7 | 96.6 | 96.5 | 96.4 | 96.1 | 96.0 | 96.1 | 95.7 | 95.4 | 94.6 | 93.9 |
| 10 | 100.0 | 99.1 | 99.0 | 98.6 | 98.6 | 98.4 | 98.2 | 97.6 | 97.5 | 97.3 | 97.3 | 97.1 | 97.0 | 97.2 | 96.9 | 96.8 | 96.4 | 96.1 |
| 11 | 100.0 | 98.1 | 98.0 | 97.4 | 97.5 | 97.6 | 97.5 | 96.9 | 96.9 | 96.8 | 96.8 | 96.4 | 96.3 | 96.3 | 95.9 | 95.9 | 95.4 | 95.2 |
| 12 | 100.0 | 98.7 | 98.7 | 98.3 | 98.2 | 98.0 | 97.8 | 97.2 | 97.1 | 97.1 | 97.0 | 96.8 | 96.7 | 96.8 | 96.6 | 96.5 | 96.2 | 95.8 |
| 13 | 100.0 | 97.8 | 98.1 | 97.8 | 97.8 | 97.7 | 97.5 | 97.0 | 96.8 | 96.7 | 96.6 | 96.4 | 96.3 | 96.4 | 96.4 | 96.5 | 96.4 | 96.4 |
| 14 | 100.0 | 98.5 | 98.6 | 98.3 | 98.0 | 97.8 | 97.6 | 97.1 | 96.8 | 96.8 | 96.5 | 96.3 | 96.2 | 96.4 | 96.2 | 96.3 | 96.1 | 96.1 |
| 15 | 100.0 | 98.5 | 98.5 | 98.1 | 97.9 | 97.8 | 97.6 | 97.1 | 96.9 | 96.9 | 96.8 | 96.6 | 96.4 | 96.6 | 96.6 | 96.8 | 96.7 | 96.7 |
| 16 | 100.0 | 98.6 | 98.5 | 98.2 | 98.0 | 97.9 | 97.6 | 97.2 | 96.9 | 96.9 | 96.8 | 96.5 | 96.5 | 96.6 | 96.5 | 96.7 | 96.7 | 96.7 |
| 17 | 100.0 | 98.9 | 98.9 | 98.4 | 98.3 | 98.2 | 97.8 | 97.2 | 97.0 | 97.0 | 96.9 | 96.6 | 96.3 | 96.6 | 96.3 | 96.5 | 96.5 | 96.4 |
| 18 | 100.0 | 98.0 | 97.8 | 97.5 | 97.3 | 97.2 | 97.0 | 96.5 | 96.3 | 96.3 | 96.1 | 95.9 | 95.7 | 95.8 | 95.6 | 95.5 | 95.4 | 95.1 |
| 19 | 100.0 | 98.5 | 98.6 | 98.3 | 98.1 | 98.0 | 97.6 | 97.1 | 96.9 | 96.9 | 96.7 | 96.6 | 96.6 | 96.7 | 96.5 | 96.7 | 96.6 | 96.5 |
| 20 | 100.0 | 98.5 | 98.5 | 98.2 | 98.1 | 98.0 | 97.8 | 97.2 | 97.1 | 96.9 | 96.9 | 96.7 | 96.6 | 96.8 | 96.6 | 96.8 | 96.7 | 96.6 |
| 21 | 100.0 | 98.2 | 98.2 | 97.9 | 97.9 | 97.8 | 97.6 | 97.1 | 96.9 | 96.9 | 96.7 | 96.5 | 96.5 | 96.7 | 96.5 | 96.7 | 96.6 | 96.6 |
| 22 | 100.0 | 97.9 | 98.0 | 97.7 | 97.8 | 97.7 | 97.5 | 96.9 | 96.8 | 96.7 | 96.5 | 96.3 | 96.3 | 96.5 | 96.2 | 96.3 | 96.3 | 96.2 |
| 23 | 100.0 | 98.1 | 98.3 | 97.8 | 97.8 | 97.7 | 97.5 | 96.9 | 96.8 | 96.7 | 96.7 | 96.3 | 96.3 | 96.5 | 96.1 | 96.4 | 96.1 | 96.2 |
| 24 | 100.0 | 98.1 | 98.4 | 98.1 | 97.9 | 97.8 | 97.4 | 96.9 | 96.8 | 96.6 | 96.5 | 96.3 | 96.3 | 96.5 | 96.2 | 96.4 | 96.3 | 96.2 |
| 25 | 100.0 | 98.4 | 98.4 | 97.9 | 97.9 | 97.6 | 97.4 | 97.0 | 96.9 | 96.8 | 96.8 | 96.6 | 96.5 | 96.7 | 96.5 | 96.6 | 96.5 | 96.5 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 98.2 | 98.3 | 98.0 | 97.9 | 97.8 | 97.5 | 97.0 | 96.9 | 96.8 | 96.7 | 96.5 | 96.4 | 96.6 | 96.3 | 96.4 | 96.2 | 96.0 |
| Med. | 100.0 | 98.4 | 98.4 | 97.9 | 97.9 | 97.8 | 97.5 | 97.0 | 96.9 | 96.8 | 96.7 | 96.5 | 96.4 | 96.6 | 96.4 | 96.4 | 96.3 | 96.2 |
| σ | 0.00 | 0.54 | 0.40 | 0.35 | 0.29 | 0.26 | 0.23 | 0.22 | 0.22 | 0.22 | 0.25 | 0.25 | 0.26 | 0.28 | 0.29 | 0.36 | 0.50 | 0.67 |
| Min. | 100.0 | 96.3 | 97.0 | 97.1 | 97.3 | 97.2 | 97.0 | 96.5 | 96.3 | 96.3 | 96.1 | 95.9 | 95.7 | 95.8 | 95.6 | 95.4 | 94.6 | 93.9 |
| Max. | 100.0 | 99.1 | 99.0 | 98.6 | 98.6 | 98.4 | 98.2 | 97.6 | 97.5 | 97.3 | 97.3 | 97.1 | 97.0 | 97.2 | 96.9 | 96.8 | 96.7 | 96.7 |

TM-21 Projection

| Test duration used | 5000 h | to | 10000 h |
|----------------------------------|-----------|-------|---------|
| B | 0.9805 | | |
| α | 2.575E-06 | | |
| R ² | 0.8305 | | |
| Calculated L ₇₀ (10K) | 131000 | hours | |
| Reported L ₇₀ (10K) | > 60000 | hours | |
| Calculated L ₈₀ (10K) | 79000 | hours | |
| Reported L ₈₀ (10K) | > 60000 | hours | |
| Calculated L ₉₀ (10K) | 33300 | hours | |
| Reported L ₉₀ (10K) | 33300 | hours | |

Curve-fit equation:

$$\Phi(t) = B \exp(-\alpha t)$$

Luminous flux maintenance life equation:

$$L_{70} = \ln(B/0.7)/\alpha$$

$$L_{80} = \ln(B/0.8)/\alpha$$

$$L_{90} = \ln(B/0.9)/\alpha$$

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Data Set 7 : 105 °C, 100 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 106.8 °C |
| Actual Ambient Temperature [T _A] | 104.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 7-2 (Continued)
 Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|--|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 95.6 | 95.0 | 94.5 | | | | | | | | | | | | | |
| 2 | 96.0 | 95.3 | 94.8 | | | | | | | | | | | | | |
| 3 | 96.5 | 96.1 | 95.7 | | | | | | | | | | | | | |
| 4 | 96.5 | 96.2 | 96.0 | | | | | | | | | | | | | |
| 5 | 96.2 | 95.8 | 95.6 | | | | | | | | | | | | | |
| 6 | 96.3 | 96.0 | 95.7 | | | | | | | | | | | | | |
| 7 | 95.1 | 94.3 | 93.6 | | | | | | | | | | | | | |
| 8 | 94.3 | 93.3 | 92.5 | | | | | | | | | | | | | |
| 9 | 93.6 | 92.6 | 92.0 | | | | | | | | | | | | | |
| 10 | 96.0 | 95.5 | 95.0 | | | | | | | | | | | | | |
| 11 | 94.8 | 94.1 | 93.6 | | | | | | | | | | | | | |
| 12 | 95.5 | 94.7 | 94.0 | | | | | | | | | | | | | |
| 13 | 96.6 | 96.3 | 96.1 | | | | | | | | | | | | | |
| 14 | 96.2 | 95.9 | 95.6 | | | | | | | | | | | | | |
| 15 | 96.8 | 96.6 | 96.4 | | | | | | | | | | | | | |
| 16 | 96.7 | 96.6 | 96.3 | | | | | | | | | | | | | |
| 17 | 96.4 | 96.2 | 95.8 | | | | | | | | | | | | | |
| 18 | 95.2 | 95.0 | 94.6 | | | | | | | | | | | | | |
| 19 | 96.7 | 96.5 | 96.3 | | | | | | | | | | | | | |
| 20 | 96.8 | 96.6 | 96.4 | | | | | | | | | | | | | |
| 21 | 96.8 | 96.6 | 96.4 | | | | | | | | | | | | | |
| 22 | 96.2 | 96.0 | 95.8 | | | | | | | | | | | | | |
| 23 | 96.0 | 95.9 | 95.7 | | | | | | | | | | | | | |
| 24 | 96.3 | 96.1 | 95.7 | | | | | | | | | | | | | |
| 25 | 96.5 | 96.4 | 96.1 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 96.0 | 95.6 | 95.2 | | | | | | | | | | | | | |
| Med. | 96.2 | 96.0 | 95.7 | | | | | | | | | | | | | |
| σ | 0.83 | 1.07 | 1.23 | | | | | | | | | | | | | |
| Min. | 93.6 | 92.6 | 92.0 | | | | | | | | | | | | | |
| Max. | 96.8 | 96.6 | 96.4 | | | | | | | | | | | | | |



Data Set 7 : 105 °C, 100 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.8 °C |
| Actual Ambient Temperature [T _A] | 104.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 7-3
Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.3 | 100.1 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.2 | 100.2 | 100.3 | 100.3 | 100.4 |
| 2 | 100.0 | 99.9 | 100.1 | 100.0 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 |
| 3 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 |
| 4 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.3 | 100.2 | 100.2 | 100.2 | 100.3 | 100.3 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.3 | 100.3 |
| 5 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.0 | 100.2 | 100.2 | 100.2 |
| 6 | 100.0 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.3 |
| 7 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.2 | 100.1 | 100.0 | 100.1 | 100.1 | 100.0 | 100.1 |
| 8 | 100.0 | 99.9 | 100.1 | 100.0 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 |
| 9 | 100.0 | 99.9 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 |
| 10 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.0 | 100.1 | 100.2 | 100.2 | 100.2 | 100.1 | 100.1 | 100.0 | 100.2 | 100.2 | 100.2 |
| 11 | 100.0 | 99.9 | 100.0 | 100.0 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 |
| 12 | 100.0 | 99.7 | 99.9 | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 |
| 13 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 |
| 14 | 100.0 | 99.8 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.3 | 100.2 |
| 15 | 100.0 | 99.8 | 100.0 | 100.0 | 100.2 | 100.2 | 100.2 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.1 | 100.2 | 100.3 | 100.2 |
| 16 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.2 | 100.1 |
| 17 | 100.0 | 99.7 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 |
| 18 | 100.0 | 99.7 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.1 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.0 |
| 19 | 100.0 | 99.8 | 100.0 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 |
| 20 | 100.0 | 99.7 | 100.0 | 99.9 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.2 | 100.1 | 100.0 |
| 21 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 |
| 22 | 100.0 | 99.9 | 100.1 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.3 | 100.4 | 100.4 | 100.4 | 100.3 | 100.3 | 100.3 | 100.3 | 100.4 | 100.3 |
| 23 | 100.0 | 99.8 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.3 | 100.3 | 100.2 | 100.2 | 100.1 | 100.3 | 100.2 | 100.2 |
| 24 | 100.0 | 99.9 | 100.0 | 100.0 | 100.2 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.1 |
| 25 | 100.0 | 99.9 | 100.1 | 100.1 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.3 | 100.3 | 100.3 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.8 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 |
| Med. | 100.0 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 |
| σ | 0.00 | 0.08 | 0.08 | 0.07 | 0.10 | 0.08 | 0.07 | 0.08 | 0.08 | 0.09 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.07 | 0.08 | 0.09 |
| Min. | 100.0 | 99.7 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 |
| Max. | 100.0 | 100.0 | 100.1 | 100.2 | 100.3 | 100.3 | 100.3 | 100.3 | 100.3 | 100.4 | 100.4 | 100.4 | 100.3 | 100.3 | 100.3 | 100.3 | 100.4 | 100.4 |

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Data Set 7 : 105 °C, 100 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 106.8 °C |
| Actual Ambient Temperature [T _A] | 104.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 7-3 (Continued)
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|---|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 100.4 | 100.3 | 100.4 | | | | | | | | | | | | | |
| 2 | 100.3 | 100.3 | 100.3 | | | | | | | | | | | | | |
| 3 | 100.3 | 100.3 | 100.3 | | | | | | | | | | | | | |
| 4 | 100.4 | 100.4 | 100.3 | | | | | | | | | | | | | |
| 5 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 6 | 100.3 | 100.3 | 100.3 | | | | | | | | | | | | | |
| 7 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 8 | 100.3 | 100.3 | 100.2 | | | | | | | | | | | | | |
| 9 | 100.2 | 100.3 | 100.2 | | | | | | | | | | | | | |
| 10 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 11 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 12 | 100.2 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 13 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 14 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 15 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 16 | 100.1 | 100.1 | 100.2 | | | | | | | | | | | | | |
| 17 | 100.1 | 100.2 | 100.1 | | | | | | | | | | | | | |
| 18 | 100.1 | 100.2 | 100.1 | | | | | | | | | | | | | |
| 19 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 20 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 21 | 100.1 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 22 | 100.3 | 100.4 | 100.3 | | | | | | | | | | | | | |
| 23 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 24 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 25 | 100.3 | 100.3 | 100.2 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| Med. | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| σ | 0.08 | 0.07 | 0.08 | | | | | | | | | | | | | |
| Min. | 100.1 | 100.1 | 100.1 | | | | | | | | | | | | | |
| Max. | 100.4 | 100.4 | 100.4 | | | | | | | | | | | | | |



Data Set 7 : 105 °C, 100 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.8 °C |
| Actual Ambient Temperature [T _A] | 104.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 7-4
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.0000 | 0.0014 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0018 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0028 |
| 2 | 0.0000 | 0.0014 | 0.0014 | 0.0015 | 0.0018 | 0.0019 | 0.0018 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0024 | 0.0026 | 0.0025 | 0.0027 |
| 3 | 0.0000 | 0.0012 | 0.0012 | 0.0014 | 0.0018 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0024 | 0.0025 |
| 4 | 0.0000 | 0.0014 | 0.0014 | 0.0015 | 0.0018 | 0.0019 | 0.0019 | 0.0021 | 0.0022 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0027 | 0.0026 | 0.0027 |
| 5 | 0.0000 | 0.0012 | 0.0012 | 0.0013 | 0.0015 | 0.0017 | 0.0016 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0022 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0021 | 0.0023 |
| 6 | 0.0000 | 0.0015 | 0.0014 | 0.0016 | 0.0019 | 0.0019 | 0.0019 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0024 | 0.0025 |
| 7 | 0.0000 | 0.0013 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0017 | 0.0019 | 0.0019 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0022 | 0.0023 | 0.0025 | 0.0026 | 0.0029 |
| 8 | 0.0000 | 0.0013 | 0.0014 | 0.0013 | 0.0015 | 0.0017 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0022 | 0.0024 | 0.0026 | 0.0030 |
| 9 | 0.0000 | 0.0025 | 0.0022 | 0.0021 | 0.0023 | 0.0025 | 0.0022 | 0.0025 | 0.0025 | 0.0027 | 0.0027 | 0.0029 | 0.0030 | 0.0029 | 0.0032 | 0.0035 | 0.0037 | 0.0040 |
| 10 | 0.0000 | 0.0014 | 0.0014 | 0.0015 | 0.0016 | 0.0018 | 0.0017 | 0.0018 | 0.0019 | 0.0021 | 0.0023 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0026 | 0.0026 | 0.0029 |
| 11 | 0.0000 | 0.0018 | 0.0017 | 0.0016 | 0.0018 | 0.0019 | 0.0017 | 0.0020 | 0.0020 | 0.0020 | 0.0022 | 0.0022 | 0.0024 | 0.0023 | 0.0025 | 0.0025 | 0.0025 | 0.0029 |
| 12 | 0.0000 | 0.0013 | 0.0014 | 0.0014 | 0.0016 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0024 | 0.0024 | 0.0027 |
| 13 | 0.0000 | 0.0015 | 0.0015 | 0.0016 | 0.0018 | 0.0020 | 0.0019 | 0.0021 | 0.0020 | 0.0022 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 |
| 14 | 0.0000 | 0.0013 | 0.0014 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0021 | 0.0020 | 0.0022 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0028 | 0.0029 |
| 15 | 0.0000 | 0.0013 | 0.0014 | 0.0014 | 0.0018 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0024 | 0.0025 |
| 16 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0016 | 0.0017 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0022 | 0.0023 | 0.0024 | 0.0023 | 0.0025 |
| 17 | 0.0000 | 0.0012 | 0.0013 | 0.0013 | 0.0015 | 0.0018 | 0.0016 | 0.0018 | 0.0019 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 |
| 18 | 0.0000 | 0.0016 | 0.0019 | 0.0020 | 0.0023 | 0.0023 | 0.0022 | 0.0024 | 0.0025 | 0.0026 | 0.0027 | 0.0028 | 0.0029 | 0.0029 | 0.0029 | 0.0031 | 0.0031 | 0.0033 |
| 19 | 0.0000 | 0.0011 | 0.0012 | 0.0014 | 0.0017 | 0.0017 | 0.0017 | 0.0019 | 0.0019 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0023 | 0.0025 |
| 20 | 0.0000 | 0.0012 | 0.0013 | 0.0013 | 0.0016 | 0.0017 | 0.0016 | 0.0017 | 0.0019 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0022 | 0.0023 |
| 21 | 0.0000 | 0.0014 | 0.0014 | 0.0014 | 0.0017 | 0.0018 | 0.0017 | 0.0019 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0023 | 0.0023 | 0.0024 |
| 22 | 0.0000 | 0.0014 | 0.0016 | 0.0015 | 0.0018 | 0.0020 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | 0.0026 |
| 23 | 0.0000 | 0.0016 | 0.0014 | 0.0015 | 0.0017 | 0.0019 | 0.0018 | 0.0019 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0022 | 0.0023 | 0.0024 | 0.0023 | 0.0024 |
| 24 | 0.0000 | 0.0014 | 0.0014 | 0.0015 | 0.0019 | 0.0019 | 0.0018 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 |
| 25 | 0.0000 | 0.0012 | 0.0013 | 0.0014 | 0.0017 | 0.0018 | 0.0017 | 0.0020 | 0.0019 | 0.0021 | 0.0022 | 0.0022 | 0.0022 | 0.0022 | 0.0023 | 0.0024 | 0.0023 | 0.0024 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0014 | 0.0014 | 0.0015 | 0.0018 | 0.0019 | 0.0018 | 0.0020 | 0.0020 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0027 |
| Med. | 0.0000 | 0.0014 | 0.0014 | 0.0015 | 0.0017 | 0.0018 | 0.0018 | 0.0020 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0024 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0027 |
| σ | 0.0000 | 0.0003 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0004 |
| Min. | 0.0000 | 0.0011 | 0.0012 | 0.0013 | 0.0015 | 0.0017 | 0.0016 | 0.0017 | 0.0018 | 0.0019 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0021 | 0.0023 |
| Max. | 0.0000 | 0.0025 | 0.0022 | 0.0021 | 0.0023 | 0.0025 | 0.0022 | 0.0025 | 0.0025 | 0.0027 | 0.0027 | 0.0029 | 0.0030 | 0.0029 | 0.0032 | 0.0035 | 0.0037 | 0.0040 |

Data Set 7 : 105 °C, 100 mA

| | |
|--------------------------------------|----------|
| Actual Case Temperature [T_S] | 106.8 °C |
| Actual Ambient Temperature [T_A] | 104.0 °C |
| Drive Current [I_F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 7-4 (Continued)
Chromaticity Shift

| LED No. | Chromaticity Shift $\Delta u'v'$ | | | | | | | | | | | | | | | |
|----------|----------------------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.0031 | 0.0033 | 0.0035 | | | | | | | | | | | | | |
| 2 | 0.0029 | 0.0031 | 0.0035 | | | | | | | | | | | | | |
| 3 | 0.0028 | 0.0029 | 0.0030 | | | | | | | | | | | | | |
| 4 | 0.0029 | 0.0030 | 0.0030 | | | | | | | | | | | | | |
| 5 | 0.0026 | 0.0025 | 0.0027 | | | | | | | | | | | | | |
| 6 | 0.0027 | 0.0029 | 0.0029 | | | | | | | | | | | | | |
| 7 | 0.0033 | 0.0035 | 0.0040 | | | | | | | | | | | | | |
| 8 | 0.0035 | 0.0038 | 0.0045 | | | | | | | | | | | | | |
| 9 | 0.0045 | 0.0048 | 0.0054 | | | | | | | | | | | | | |
| 10 | 0.0031 | 0.0032 | 0.0036 | | | | | | | | | | | | | |
| 11 | 0.0031 | 0.0034 | 0.0036 | | | | | | | | | | | | | |
| 12 | 0.0030 | 0.0032 | 0.0036 | | | | | | | | | | | | | |
| 13 | 0.0028 | 0.0028 | 0.0029 | | | | | | | | | | | | | |
| 14 | 0.0031 | 0.0031 | 0.0033 | | | | | | | | | | | | | |
| 15 | 0.0027 | 0.0026 | 0.0028 | | | | | | | | | | | | | |
| 16 | 0.0025 | 0.0027 | 0.0027 | | | | | | | | | | | | | |
| 17 | 0.0026 | 0.0025 | 0.0027 | | | | | | | | | | | | | |
| 18 | 0.0036 | 0.0036 | 0.0037 | | | | | | | | | | | | | |
| 19 | 0.0027 | 0.0027 | 0.0027 | | | | | | | | | | | | | |
| 20 | 0.0025 | 0.0025 | 0.0027 | | | | | | | | | | | | | |
| 21 | 0.0025 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| 22 | 0.0028 | 0.0028 | 0.0029 | | | | | | | | | | | | | |
| 23 | 0.0026 | 0.0026 | 0.0027 | | | | | | | | | | | | | |
| 24 | 0.0029 | 0.0029 | 0.0032 | | | | | | | | | | | | | |
| 25 | 0.0026 | 0.0026 | 0.0028 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.0029 | 0.0030 | 0.0032 | | | | | | | | | | | | | |
| Med. | 0.0028 | 0.0029 | 0.0030 | | | | | | | | | | | | | |
| σ | 0.0004 | 0.0005 | 0.0007 | | | | | | | | | | | | | |
| Min. | 0.0025 | 0.0025 | 0.0026 | | | | | | | | | | | | | |
| Max. | 0.0045 | 0.0048 | 0.0054 | | | | | | | | | | | | | |

Data Set 7 : 105 °C, 100 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 106.8 °C |
| Actual Ambient Temperature [T _A] | 104.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 7-5
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.2606 | 0.2592 | 0.2593 | 0.2591 | 0.2588 | 0.2588 | 0.2589 | 0.2587 | 0.2587 | 0.2585 | 0.2584 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | 0.2581 | 0.2581 | 0.2580 |
| 2 | 0.2623 | 0.2609 | 0.2610 | 0.2608 | 0.2605 | 0.2604 | 0.2605 | 0.2603 | 0.2603 | 0.2602 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2600 | 0.2598 | 0.2599 | 0.2597 |
| 3 | 0.2649 | 0.2637 | 0.2637 | 0.2635 | 0.2632 | 0.2631 | 0.2631 | 0.2629 | 0.2629 | 0.2628 | 0.2627 | 0.2626 | 0.2626 | 0.2625 | 0.2625 | 0.2624 | 0.2626 | 0.2624 |
| 4 | 0.2635 | 0.2621 | 0.2622 | 0.2621 | 0.2617 | 0.2617 | 0.2617 | 0.2615 | 0.2614 | 0.2612 | 0.2612 | 0.2611 | 0.2611 | 0.2611 | 0.2611 | 0.2609 | 0.2610 | 0.2609 |
| 5 | 0.2647 | 0.2635 | 0.2635 | 0.2633 | 0.2632 | 0.2630 | 0.2631 | 0.2629 | 0.2629 | 0.2627 | 0.2627 | 0.2625 | 0.2626 | 0.2626 | 0.2626 | 0.2625 | 0.2626 | 0.2624 |
| 6 | 0.2624 | 0.2610 | 0.2611 | 0.2609 | 0.2606 | 0.2605 | 0.2606 | 0.2604 | 0.2605 | 0.2603 | 0.2602 | 0.2602 | 0.2602 | 0.2601 | 0.2600 | 0.2600 | 0.2602 | 0.2600 |
| 7 | 0.2613 | 0.2600 | 0.2600 | 0.2599 | 0.2597 | 0.2595 | 0.2597 | 0.2595 | 0.2596 | 0.2593 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2591 | 0.2589 | 0.2588 | 0.2585 |
| 8 | 0.2624 | 0.2611 | 0.2610 | 0.2610 | 0.2609 | 0.2607 | 0.2608 | 0.2607 | 0.2606 | 0.2605 | 0.2604 | 0.2604 | 0.2603 | 0.2602 | 0.2602 | 0.2601 | 0.2599 | 0.2595 |
| 9 | 0.2600 | 0.2575 | 0.2579 | 0.2579 | 0.2578 | 0.2576 | 0.2578 | 0.2575 | 0.2576 | 0.2574 | 0.2573 | 0.2572 | 0.2571 | 0.2572 | 0.2569 | 0.2566 | 0.2565 | 0.2562 |
| 10 | 0.2607 | 0.2593 | 0.2592 | 0.2592 | 0.2591 | 0.2589 | 0.2590 | 0.2589 | 0.2588 | 0.2586 | 0.2584 | 0.2585 | 0.2585 | 0.2584 | 0.2583 | 0.2581 | 0.2581 | 0.2579 |
| 11 | 0.2669 | 0.2651 | 0.2652 | 0.2653 | 0.2651 | 0.2651 | 0.2652 | 0.2650 | 0.2650 | 0.2650 | 0.2648 | 0.2647 | 0.2646 | 0.2646 | 0.2645 | 0.2645 | 0.2645 | 0.2641 |
| 12 | 0.2620 | 0.2607 | 0.2606 | 0.2607 | 0.2604 | 0.2603 | 0.2604 | 0.2602 | 0.2602 | 0.2601 | 0.2599 | 0.2599 | 0.2599 | 0.2598 | 0.2598 | 0.2597 | 0.2596 | 0.2594 |
| 13 | 0.2621 | 0.2606 | 0.2606 | 0.2605 | 0.2603 | 0.2601 | 0.2602 | 0.2600 | 0.2601 | 0.2599 | 0.2597 | 0.2597 | 0.2596 | 0.2597 | 0.2596 | 0.2595 | 0.2595 | 0.2595 |
| 14 | 0.2617 | 0.2604 | 0.2603 | 0.2603 | 0.2601 | 0.2599 | 0.2599 | 0.2597 | 0.2597 | 0.2596 | 0.2593 | 0.2593 | 0.2592 | 0.2592 | 0.2591 | 0.2590 | 0.2590 | 0.2589 |
| 15 | 0.2633 | 0.2620 | 0.2619 | 0.2619 | 0.2615 | 0.2616 | 0.2616 | 0.2614 | 0.2614 | 0.2612 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2610 | 0.2609 | 0.2610 | 0.2609 |
| 16 | 0.2599 | 0.2587 | 0.2586 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2581 | 0.2581 | 0.2580 | 0.2578 | 0.2578 | 0.2577 | 0.2578 | 0.2577 | 0.2576 | 0.2576 | 0.2575 |
| 17 | 0.2672 | 0.2660 | 0.2659 | 0.2659 | 0.2657 | 0.2654 | 0.2656 | 0.2654 | 0.2653 | 0.2651 | 0.2650 | 0.2650 | 0.2650 | 0.2650 | 0.2650 | 0.2648 | 0.2648 | 0.2648 |
| 18 | 0.2604 | 0.2588 | 0.2585 | 0.2584 | 0.2582 | 0.2581 | 0.2582 | 0.2580 | 0.2580 | 0.2578 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2576 | 0.2574 | 0.2574 | 0.2572 |
| 19 | 0.2641 | 0.2630 | 0.2628 | 0.2627 | 0.2624 | 0.2624 | 0.2624 | 0.2622 | 0.2622 | 0.2620 | 0.2619 | 0.2618 | 0.2618 | 0.2618 | 0.2618 | 0.2617 | 0.2618 | 0.2616 |
| 20 | 0.2603 | 0.2591 | 0.2590 | 0.2590 | 0.2587 | 0.2586 | 0.2587 | 0.2586 | 0.2584 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2580 | 0.2582 | 0.2580 |
| 21 | 0.2632 | 0.2618 | 0.2619 | 0.2618 | 0.2615 | 0.2615 | 0.2615 | 0.2614 | 0.2613 | 0.2612 | 0.2612 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2610 | 0.2610 | 0.2609 |
| 22 | 0.2635 | 0.2621 | 0.2620 | 0.2620 | 0.2617 | 0.2616 | 0.2618 | 0.2616 | 0.2615 | 0.2614 | 0.2614 | 0.2613 | 0.2612 | 0.2611 | 0.2611 | 0.2610 | 0.2610 | 0.2609 |
| 23 | 0.2637 | 0.2621 | 0.2623 | 0.2621 | 0.2620 | 0.2618 | 0.2619 | 0.2618 | 0.2617 | 0.2616 | 0.2616 | 0.2615 | 0.2615 | 0.2614 | 0.2614 | 0.2613 | 0.2614 | 0.2613 |
| 24 | 0.2620 | 0.2605 | 0.2606 | 0.2605 | 0.2601 | 0.2601 | 0.2602 | 0.2599 | 0.2599 | 0.2598 | 0.2597 | 0.2596 | 0.2596 | 0.2596 | 0.2595 | 0.2594 | 0.2594 | 0.2593 |
| 25 | 0.2604 | 0.2592 | 0.2591 | 0.2590 | 0.2587 | 0.2587 | 0.2587 | 0.2585 | 0.2586 | 0.2584 | 0.2583 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2581 | 0.2581 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2625 | 0.2611 | 0.2611 | 0.2611 | 0.2608 | 0.2607 | 0.2608 | 0.2606 | 0.2606 | 0.2604 | 0.2603 | 0.2603 | 0.2602 | 0.2602 | 0.2602 | 0.2601 | 0.2601 | 0.2599 |
| Med. | 0.2623 | 0.2609 | 0.2610 | 0.2608 | 0.2605 | 0.2604 | 0.2605 | 0.2603 | 0.2603 | 0.2602 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2600 | 0.2598 | 0.2599 | 0.2595 |
| σ | 0.0020 | 0.0021 | 0.0021 | 0.0020 | 0.0020 | 0.0021 | 0.0020 | 0.0020 | 0.0020 | 0.0021 | 0.0021 | 0.0020 | 0.0021 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0021 |
| Min. | 0.2599 | 0.2575 | 0.2579 | 0.2579 | 0.2578 | 0.2576 | 0.2578 | 0.2575 | 0.2576 | 0.2574 | 0.2573 | 0.2572 | 0.2571 | 0.2572 | 0.2569 | 0.2566 | 0.2565 | 0.2562 |
| Max. | 0.2672 | 0.2660 | 0.2659 | 0.2659 | 0.2657 | 0.2654 | 0.2656 | 0.2654 | 0.2653 | 0.2651 | 0.2650 | 0.2650 | 0.2650 | 0.2650 | 0.2650 | 0.2648 | 0.2648 | 0.2648 |



Data Set 7 : 105 °C, 100 mA

| | |
|--------------------------------------|----------|
| Actual Case Temperature [T_S] | 106.8 °C |
| Actual Ambient Temperature [T_A] | 104.0 °C |
| Drive Current [I_F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 7-5 (Continued)
Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|----------|-------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.2577 | 0.2575 | 0.2573 | | | | | | | | | | | | | |
| 2 | 0.2595 | 0.2594 | 0.2590 | | | | | | | | | | | | | |
| 3 | 0.2622 | 0.2620 | 0.2620 | | | | | | | | | | | | | |
| 4 | 0.2607 | 0.2606 | 0.2606 | | | | | | | | | | | | | |
| 5 | 0.2621 | 0.2623 | 0.2621 | | | | | | | | | | | | | |
| 6 | 0.2598 | 0.2597 | 0.2596 | | | | | | | | | | | | | |
| 7 | 0.2582 | 0.2580 | 0.2576 | | | | | | | | | | | | | |
| 8 | 0.2591 | 0.2588 | 0.2582 | | | | | | | | | | | | | |
| 9 | 0.2558 | 0.2556 | 0.2550 | | | | | | | | | | | | | |
| 10 | 0.2577 | 0.2576 | 0.2572 | | | | | | | | | | | | | |
| 11 | 0.2639 | 0.2637 | 0.2635 | | | | | | | | | | | | | |
| 12 | 0.2591 | 0.2589 | 0.2586 | | | | | | | | | | | | | |
| 13 | 0.2594 | 0.2594 | 0.2592 | | | | | | | | | | | | | |
| 14 | 0.2587 | 0.2587 | 0.2586 | | | | | | | | | | | | | |
| 15 | 0.2607 | 0.2609 | 0.2606 | | | | | | | | | | | | | |
| 16 | 0.2575 | 0.2573 | 0.2573 | | | | | | | | | | | | | |
| 17 | 0.2646 | 0.2647 | 0.2645 | | | | | | | | | | | | | |
| 18 | 0.2569 | 0.2570 | 0.2569 | | | | | | | | | | | | | |
| 19 | 0.2615 | 0.2615 | 0.2614 | | | | | | | | | | | | | |
| 20 | 0.2578 | 0.2579 | 0.2577 | | | | | | | | | | | | | |
| 21 | 0.2608 | 0.2608 | 0.2607 | | | | | | | | | | | | | |
| 22 | 0.2608 | 0.2608 | 0.2607 | | | | | | | | | | | | | |
| 23 | 0.2611 | 0.2611 | 0.2610 | | | | | | | | | | | | | |
| 24 | 0.2592 | 0.2592 | 0.2589 | | | | | | | | | | | | | |
| 25 | 0.2579 | 0.2579 | 0.2577 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.2597 | 0.2596 | 0.2594 | | | | | | | | | | | | | |
| Med. | 0.2594 | 0.2594 | 0.2590 | | | | | | | | | | | | | |
| σ | 0.0021 | 0.0022 | 0.0023 | | | | | | | | | | | | | |
| Min. | 0.2558 | 0.2556 | 0.2550 | | | | | | | | | | | | | |
| Max. | 0.2646 | 0.2647 | 0.2645 | | | | | | | | | | | | | |



Data Set 7 : 105 °C, 100 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 106.8 °C |
| Actual Ambient Temperature [T _A] | 104.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 7-6
 Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.5262 | 0.5261 | 0.5261 | 0.5260 | 0.5258 | 0.5258 | 0.5259 | 0.5257 | 0.5257 | 0.5257 | 0.5256 | 0.5257 | 0.5256 | 0.5257 | 0.5256 | 0.5256 | 0.5256 | 0.5255 |
| 2 | 0.5264 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5258 | 0.5259 | 0.5258 | 0.5258 | 0.5258 | 0.5257 |
| 3 | 0.5293 | 0.5294 | 0.5293 | 0.5293 | 0.5292 | 0.5291 | 0.5291 | 0.5290 | 0.5291 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5290 | 0.5289 |
| 4 | 0.5250 | 0.5248 | 0.5248 | 0.5248 | 0.5246 | 0.5246 | 0.5246 | 0.5245 | 0.5245 | 0.5245 | 0.5244 | 0.5244 | 0.5244 | 0.5244 | 0.5244 | 0.5245 | 0.5244 | 0.5244 |
| 5 | 0.5305 | 0.5306 | 0.5305 | 0.5305 | 0.5305 | 0.5304 | 0.5304 | 0.5303 | 0.5303 | 0.5302 | 0.5302 | 0.5302 | 0.5302 | 0.5302 | 0.5303 | 0.5302 | 0.5302 | 0.5302 |
| 6 | 0.5271 | 0.5269 | 0.5269 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5266 | 0.5265 | 0.5265 | 0.5266 | 0.5266 |
| 7 | 0.5257 | 0.5255 | 0.5254 | 0.5255 | 0.5253 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5252 | 0.5251 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5248 |
| 8 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5266 | 0.5265 | 0.5264 | 0.5263 | 0.5261 |
| 9 | 0.5256 | 0.5250 | 0.5251 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5246 | 0.5247 | 0.5246 | 0.5245 | 0.5244 | 0.5242 |
| 10 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | 0.5263 | 0.5262 | 0.5262 | 0.5261 | 0.5261 |
| 11 | 0.5271 | 0.5269 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5264 |
| 12 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5293 | 0.5293 | 0.5293 | 0.5292 | 0.5292 | 0.5292 | 0.5292 | 0.5291 | 0.5292 | 0.5292 | 0.5292 | 0.5291 | 0.5290 |
| 13 | 0.5263 | 0.5261 | 0.5262 | 0.5262 | 0.5261 | 0.5260 | 0.5260 | 0.5259 | 0.5258 | 0.5258 | 0.5258 | 0.5258 | 0.5257 | 0.5258 | 0.5257 | 0.5258 | 0.5257 | 0.5257 |
| 14 | 0.5270 | 0.5269 | 0.5269 | 0.5269 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 |
| 15 | 0.5253 | 0.5251 | 0.5251 | 0.5251 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5248 | 0.5247 |
| 16 | 0.5275 | 0.5273 | 0.5273 | 0.5273 | 0.5271 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5270 | 0.5270 | 0.5270 | 0.5271 | 0.5270 |
| 17 | 0.5300 | 0.5299 | 0.5299 | 0.5299 | 0.5298 | 0.5297 | 0.5297 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5296 | 0.5295 | 0.5296 | 0.5296 | 0.5296 |
| 18 | 0.5243 | 0.5241 | 0.5241 | 0.5241 | 0.5239 | 0.5239 | 0.5238 | 0.5238 | 0.5237 | 0.5237 | 0.5236 | 0.5236 | 0.5235 | 0.5236 | 0.5235 | 0.5235 | 0.5235 | 0.5233 |
| 19 | 0.5281 | 0.5280 | 0.5280 | 0.5281 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5277 | 0.5276 |
| 20 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5261 |
| 21 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5263 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5264 | 0.5263 | 0.5263 |
| 22 | 0.5280 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 |
| 23 | 0.5259 | 0.5257 | 0.5257 | 0.5257 | 0.5256 | 0.5255 | 0.5255 | 0.5255 | 0.5254 | 0.5255 | 0.5254 | 0.5254 | 0.5254 | 0.5255 | 0.5254 | 0.5254 | 0.5255 | 0.5253 |
| 24 | 0.5267 | 0.5264 | 0.5265 | 0.5264 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5261 | 0.5261 |
| 25 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5248 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5246 | 0.5247 | 0.5246 | 0.5246 | 0.5246 | 0.5245 | 0.5246 | 0.5245 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5263 |
| Med. | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5263 | 0.5263 | 0.5262 | 0.5263 | 0.5262 | 0.5262 | 0.5261 | 0.5261 |
| σ | 0.0016 | 0.0017 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 |
| Min. | 0.5243 | 0.5241 | 0.5241 | 0.5241 | 0.5239 | 0.5239 | 0.5238 | 0.5238 | 0.5237 | 0.5237 | 0.5236 | 0.5236 | 0.5235 | 0.5236 | 0.5235 | 0.5235 | 0.5235 | 0.5233 |
| Max. | 0.5305 | 0.5306 | 0.5305 | 0.5305 | 0.5305 | 0.5304 | 0.5304 | 0.5303 | 0.5303 | 0.5302 | 0.5302 | 0.5302 | 0.5302 | 0.5302 | 0.5303 | 0.5302 | 0.5302 | 0.5302 |

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Data Set 7 : 105 °C, 100 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.8 °C |
| Actual Ambient Temperature [T _A] | 104.0 °C |
| Drive Current [I _F] | 100 mA |
| Measurement Current | 100 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 7-6 (Continued)
Chromaticity

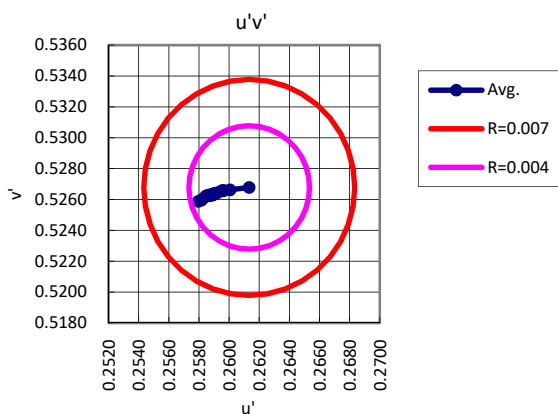
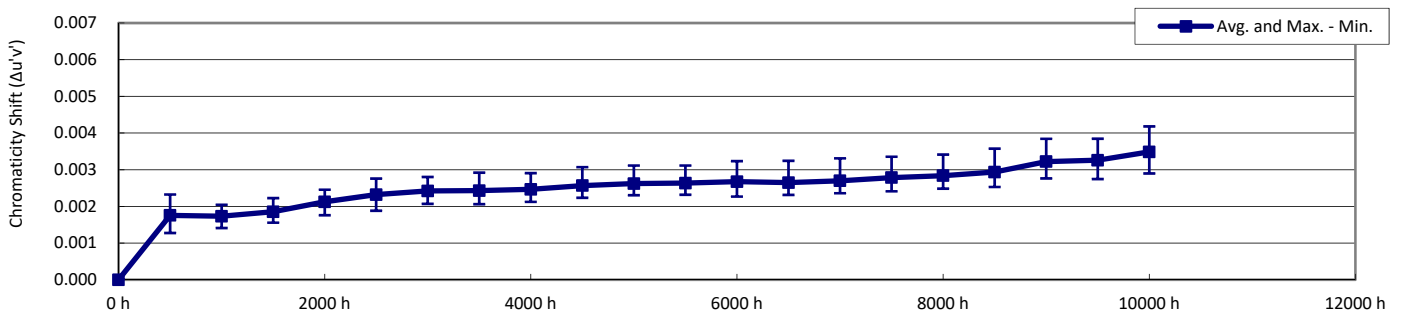
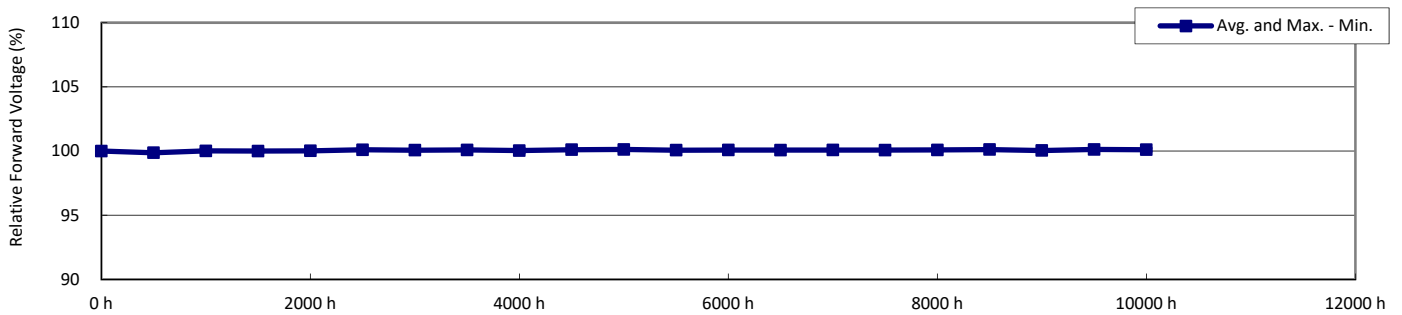
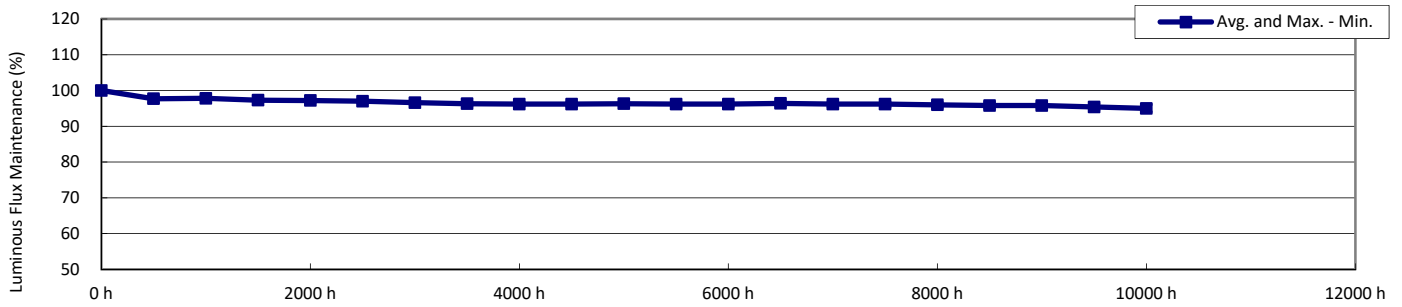
| LED No. | Chromaticity v' | | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.5253 | 0.5252 | 0.5251 | | | | | | | | | | | | | |
| 2 | 0.5256 | 0.5254 | 0.5253 | | | | | | | | | | | | | |
| 3 | 0.5288 | 0.5287 | 0.5287 | | | | | | | | | | | | | |
| 4 | 0.5242 | 0.5242 | 0.5241 | | | | | | | | | | | | | |
| 5 | 0.5302 | 0.5301 | 0.5301 | | | | | | | | | | | | | |
| 6 | 0.5264 | 0.5264 | 0.5263 | | | | | | | | | | | | | |
| 7 | 0.5246 | 0.5244 | 0.5242 | | | | | | | | | | | | | |
| 8 | 0.5258 | 0.5257 | 0.5254 | | | | | | | | | | | | | |
| 9 | 0.5239 | 0.5237 | 0.5235 | | | | | | | | | | | | | |
| 10 | 0.5259 | 0.5258 | 0.5257 | | | | | | | | | | | | | |
| 11 | 0.5263 | 0.5261 | 0.5261 | | | | | | | | | | | | | |
| 12 | 0.5288 | 0.5287 | 0.5286 | | | | | | | | | | | | | |
| 13 | 0.5256 | 0.5256 | 0.5255 | | | | | | | | | | | | | |
| 14 | 0.5263 | 0.5262 | 0.5262 | | | | | | | | | | | | | |
| 15 | 0.5245 | 0.5246 | 0.5246 | | | | | | | | | | | | | |
| 16 | 0.5268 | 0.5269 | 0.5268 | | | | | | | | | | | | | |
| 17 | 0.5294 | 0.5295 | 0.5294 | | | | | | | | | | | | | |
| 18 | 0.5232 | 0.5232 | 0.5230 | | | | | | | | | | | | | |
| 19 | 0.5275 | 0.5275 | 0.5275 | | | | | | | | | | | | | |
| 20 | 0.5260 | 0.5260 | 0.5260 | | | | | | | | | | | | | |
| 21 | 0.5262 | 0.5262 | 0.5261 | | | | | | | | | | | | | |
| 22 | 0.5274 | 0.5273 | 0.5273 | | | | | | | | | | | | | |
| 23 | 0.5253 | 0.5252 | 0.5252 | | | | | | | | | | | | | |
| 24 | 0.5259 | 0.5259 | 0.5258 | | | | | | | | | | | | | |
| 25 | 0.5244 | 0.5244 | 0.5243 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.5262 | 0.5261 | 0.5260 | | | | | | | | | | | | | |
| Med. | 0.5259 | 0.5259 | 0.5258 | | | | | | | | | | | | | |
| σ | 0.0017 | 0.0018 | 0.0018 | | | | | | | | | | | | | |
| Min. | 0.5232 | 0.5232 | 0.5230 | | | | | | | | | | | | | |
| Max. | 0.5302 | 0.5301 | 0.5301 | | | | | | | | | | | | | |



Data Set 8 : 105 °C, 150 mA

| | |
|--------------------------------------|----------|
| Actual Case Temperature [T_S] | 106.4 °C |
| Actual Ambient Temperature [T_A] | 103.8 °C |
| Drive Current [I_F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0



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Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 8-1
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | | | |
|---------|---------------------|--------------------|---------------------|-------------|---------|--------|---------|--------|--|--|--|--|--|--|
| | Φ _V [lm] | V _F [V] | T _{CP} [K] | P [W] | x | y | u' | v' | | | | | | |
| 1 | 135.2 | 6.25 | 2746 | 0.94 | 0.455 | 0.408 | 0.261 | 0.526 | | | | | | |
| 2 | 136.3 | 6.25 | 2793 | 0.94 | 0.452 | 0.408 | 0.259 | 0.525 | | | | | | |
| 3 | 134.2 | 6.25 | 2678 | 0.94 | 0.460 | 0.408 | 0.264 | 0.526 | | | | | | |
| 4 | 136.6 | 6.26 | 2735 | 0.94 | 0.459 | 0.414 | 0.261 | 0.528 | | | | | | |
| 5 | 135.0 | 6.26 | 2700 | 0.94 | 0.461 | 0.413 | 0.262 | 0.528 | | | | | | |
| 6 | 135.5 | 6.26 | 2701 | 0.94 | 0.459 | 0.409 | 0.263 | 0.527 | | | | | | |
| 7 | 134.6 | 6.27 | 2710 | 0.94 | 0.458 | 0.409 | 0.262 | 0.526 | | | | | | |
| 8 | 134.0 | 6.25 | 2715 | 0.94 | 0.455 | 0.404 | 0.262 | 0.524 | | | | | | |
| 9 | 135.8 | 6.26 | 2772 | 0.94 | 0.453 | 0.407 | 0.260 | 0.525 | | | | | | |
| 10 | 134.7 | 6.26 | 2705 | 0.94 | 0.459 | 0.409 | 0.262 | 0.527 | | | | | | |
| 11 | 135.4 | 6.26 | 2719 | 0.94 | 0.459 | 0.411 | 0.262 | 0.528 | | | | | | |
| 12 | 135.7 | 6.26 | 2734 | 0.94 | 0.459 | 0.413 | 0.261 | 0.528 | | | | | | |
| 13 | 135.1 | 6.26 | 2673 | 0.94 | 0.463 | 0.413 | 0.264 | 0.529 | | | | | | |
| 14 | 135.7 | 6.26 | 2718 | 0.94 | 0.459 | 0.412 | 0.262 | 0.528 | | | | | | |
| 15 | 136.2 | 6.26 | 2779 | 0.94 | 0.453 | 0.408 | 0.259 | 0.525 | | | | | | |
| 16 | 136.8 | 6.25 | 2726 | 0.94 | 0.461 | 0.416 | 0.261 | 0.530 | | | | | | |
| 17 | 133.6 | 6.26 | 2732 | 0.94 | 0.452 | 0.401 | 0.262 | 0.522 | | | | | | |
| 18 | 136.7 | 6.26 | 2785 | 0.94 | 0.454 | 0.410 | 0.259 | 0.526 | | | | | | |
| 19 | 134.3 | 6.25 | 2698 | 0.94 | 0.458 | 0.408 | 0.263 | 0.526 | | | | | | |
| 20 | 136.2 | 6.25 | 2742 | 0.94 | 0.458 | 0.413 | 0.260 | 0.528 | | | | | | |
| 21 | 134.9 | 6.26 | 2703 | 0.94 | 0.458 | 0.408 | 0.263 | 0.526 | | | | | | |
| 22 | 136.9 | 6.26 | 2767 | 0.94 | 0.456 | 0.412 | 0.259 | 0.527 | | | | | | |
| 23 | 135.7 | 6.25 | 2724 | 0.94 | 0.460 | 0.413 | 0.261 | 0.528 | | | | | | |
| 24 | 135.6 | 6.26 | 2749 | 0.94 | 0.456 | 0.411 | 0.260 | 0.527 | | | | | | |
| 25 | 136 | 6.26 | 2768 | 0.94 | 0.455 | 0.411 | 0.259 | 0.527 | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | | | |
| Avg. | 135.5 | 6.26 | 2731 | 0.94 | 0.457 | 0.410 | 0.261 | 0.527 | | | | | | |
| Med. | 135.6 | 6.26 | 2726 | 0.94 | 0.458 | 0.410 | 0.261 | 0.527 | | | | | | |
| σ | 0.89 | 0.006 | 32.8 | 0.001 | 0.0030 | 0.0033 | 0.0015 | 0.0016 | | | | | | |
| Min. | 133.6 | 6.25 | 2673 | 0.94 | 0.452 | 0.401 | 0.259 | 0.522 | | | | | | |
| Max. | 136.9 | 6.27 | 2793 | 0.94 | 0.463 | 0.416 | 0.264 | 0.530 | | | | | | |



Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 8-2
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 98.1 | 98.0 | 97.6 | 97.4 | 97.1 | 96.7 | 96.4 | 96.2 | 96.2 | 96.3 | 96.1 | 96.2 | 96.4 | 96.2 | 96.1 | 95.7 | 95.4 |
| 2 | 100.0 | 98.0 | 98.0 | 97.5 | 97.4 | 97.1 | 96.7 | 96.6 | 96.4 | 96.4 | 96.5 | 96.4 | 96.4 | 96.6 | 96.4 | 96.5 | 96.2 | 96.0 |
| 3 | 100.0 | 97.9 | 97.8 | 97.4 | 97.2 | 96.9 | 96.5 | 96.3 | 96.2 | 96.2 | 96.3 | 96.2 | 96.2 | 96.5 | 96.3 | 96.3 | 96.1 | 95.9 |
| 4 | 100.0 | 98.0 | 98.0 | 97.6 | 97.3 | 97.2 | 96.8 | 96.5 | 96.4 | 96.3 | 96.3 | 96.1 | 96.3 | 96.6 | 96.4 | 96.5 | 96.3 | 96.1 |
| 5 | 100.0 | 97.4 | 97.4 | 97.1 | 97.2 | 97.3 | 96.7 | 96.5 | 96.4 | 96.2 | 96.5 | 96.0 | 96.1 | 96.4 | 96.2 | 96.2 | 96.0 | 95.8 |
| 6 | 100.0 | 97.3 | 97.5 | 97.0 | 96.9 | 96.6 | 96.2 | 95.8 | 95.7 | 95.7 | 95.7 | 95.4 | 95.5 | 95.7 | 95.4 | 95.4 | 95.1 | 95.0 |
| 7 | 100.0 | 97.3 | 97.5 | 96.9 | 97.1 | 96.8 | 96.4 | 96.1 | 96.0 | 96.0 | 95.9 | 96.0 | 96.0 | 96.2 | 96.0 | 96.0 | 95.9 | 95.8 |
| 8 | 100.0 | 97.9 | 98.0 | 97.6 | 97.4 | 97.1 | 96.7 | 96.4 | 96.3 | 96.2 | 96.3 | 96.3 | 96.3 | 96.4 | 96.2 | 96.1 | 96.0 | 95.8 |
| 9 | 100.0 | 97.4 | 97.6 | 97.3 | 97.2 | 97.0 | 96.5 | 96.3 | 96.2 | 96.2 | 96.3 | 96.3 | 96.3 | 96.4 | 96.3 | 96.3 | 96.2 | 96.0 |
| 10 | 100.0 | 96.9 | 97.3 | 97.1 | 97.1 | 97.0 | 96.6 | 96.3 | 96.3 | 96.3 | 96.3 | 96.2 | 96.3 | 96.4 | 96.2 | 96.3 | 96.1 | 96.1 |
| 11 | 100.0 | 98.5 | 98.0 | 97.5 | 97.1 | 97.2 | 96.7 | 96.3 | 96.1 | 96.1 | 96.3 | 96.0 | 96.1 | 96.1 | 96.1 | 95.9 | 95.5 | 95.5 |
| 12 | 100.0 | 96.6 | 97.3 | 97.0 | 97.1 | 96.8 | 96.4 | 96.2 | 96.1 | 96.1 | 96.2 | 96.0 | 96.1 | 96.2 | 96.0 | 95.8 | 95.6 | 95.4 |
| 13 | 100.0 | 97.8 | 97.7 | 97.1 | 97.0 | 96.6 | 96.1 | 95.9 | 95.7 | 95.7 | 95.8 | 95.7 | 95.8 | 95.8 | 95.7 | 95.6 | 95.4 | 95.2 |
| 14 | 100.0 | 97.4 | 97.6 | 97.2 | 97.3 | 96.8 | 96.5 | 96.2 | 96.2 | 96.2 | 96.3 | 96.2 | 96.3 | 96.3 | 96.2 | 96.0 | 95.7 | 95.3 |
| 15 | 100.0 | 98.2 | 98.1 | 97.5 | 97.4 | 97.1 | 96.7 | 96.5 | 96.4 | 96.4 | 96.5 | 96.4 | 96.4 | 96.6 | 96.6 | 96.6 | 96.4 | 96.2 |
| 16 | 100.0 | 98.6 | 98.2 | 97.7 | 97.6 | 97.4 | 97.1 | 96.8 | 96.7 | 96.7 | 96.7 | 96.6 | 96.6 | 96.7 | 96.6 | 96.6 | 96.5 | 96.3 |
| 17 | 100.0 | 98.1 | 98.0 | 97.1 | 97.0 | 96.6 | 96.3 | 96.2 | 96.1 | 96.1 | 96.4 | 96.1 | 96.1 | 96.2 | 95.9 | 96.0 | 95.9 | 95.8 |
| 18 | 100.0 | 97.5 | 97.8 | 97.3 | 97.3 | 97.0 | 96.6 | 96.4 | 96.2 | 96.2 | 96.4 | 96.3 | 96.4 | 96.5 | 96.3 | 96.4 | 96.2 | 96.0 |
| 19 | 100.0 | 97.9 | 97.9 | 97.4 | 97.3 | 97.0 | 96.6 | 96.3 | 96.2 | 96.4 | 96.5 | 96.4 | 96.4 | 96.5 | 96.4 | 96.4 | 96.3 | 96.2 |
| 20 | 100.0 | 98.3 | 98.1 | 97.7 | 97.6 | 97.3 | 96.9 | 96.6 | 96.5 | 96.5 | 96.6 | 96.5 | 96.5 | 96.7 | 96.4 | 96.2 | 96.0 | 95.9 |
| 21 | 100.0 | 98.0 | 98.1 | 97.6 | 97.5 | 97.2 | 96.8 | 96.5 | 96.4 | 96.4 | 96.5 | 96.4 | 96.4 | 96.6 | 96.4 | 96.4 | 96.2 | 96.1 |
| 22 | 100.0 | 97.6 | 97.9 | 97.4 | 97.3 | 97.0 | 96.6 | 96.3 | 96.2 | 96.3 | 96.4 | 96.3 | 96.3 | 96.5 | 96.4 | 96.4 | 96.3 | 96.2 |
| 23 | 100.0 | 96.9 | 97.3 | 96.9 | 96.7 | 96.5 | 96.1 | 95.6 | 95.7 | 95.6 | 95.9 | 95.6 | 95.7 | 95.9 | 95.7 | 95.7 | 95.5 | 95.2 |
| 24 | 100.0 | 97.8 | 97.7 | 97.2 | 97.1 | 96.8 | 96.5 | 96.2 | 96.1 | 96.2 | 96.3 | 96.1 | 96.2 | 96.3 | 96.1 | 96.1 | 95.8 | 95.7 |
| 25 | 100.0 | 98.1 | 98.3 | 97.6 | 97.5 | 97.2 | 96.8 | 96.5 | 96.7 | 96.5 | 96.7 | 96.6 | 96.6 | 96.7 | 96.7 | 96.8 | 96.7 | 96.7 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 97.7 | 97.8 | 97.3 | 97.2 | 97.0 | 96.6 | 96.3 | 96.2 | 96.2 | 96.3 | 96.2 | 96.2 | 96.4 | 96.2 | 96.2 | 96.0 | 95.8 |
| Med. | 100.0 | 97.9 | 97.9 | 97.4 | 97.3 | 97.0 | 96.6 | 96.3 | 96.2 | 96.2 | 96.3 | 96.2 | 96.3 | 96.4 | 96.2 | 96.2 | 96.0 | 95.9 |
| σ | 0.00 | 0.50 | 0.30 | 0.26 | 0.22 | 0.24 | 0.24 | 0.26 | 0.26 | 0.25 | 0.26 | 0.29 | 0.26 | 0.27 | 0.30 | 0.34 | 0.38 | 0.41 |
| Min. | 100.0 | 96.6 | 97.3 | 96.9 | 96.7 | 96.5 | 96.1 | 95.6 | 95.7 | 95.6 | 95.7 | 95.4 | 95.5 | 95.7 | 95.4 | 95.4 | 95.1 | 95.0 |
| Max. | 100.0 | 98.6 | 98.3 | 97.7 | 97.6 | 97.4 | 97.1 | 96.8 | 96.7 | 96.7 | 96.7 | 96.6 | 96.6 | 96.7 | 96.7 | 96.8 | 96.7 | 96.7 |

TM-21 Projection

| Test duration used | 5000 h | to | 10000 h |
|----------------------------------|-----------|-------|---------|
| B | 0.9765 | | |
| α | 2.335E-06 | | |
| R ² | 0.7518 | | |
| Calculated L ₇₀ (10K) | 143000 | hours | |
| Reported L ₇₀ (10K) | > 60000 | hours | |
| Calculated L ₈₀ (10K) | 85400 | hours | |
| Reported L ₈₀ (10K) | > 60000 | hours | |
| Calculated L ₉₀ (10K) | 34900 | hours | |
| Reported L ₉₀ (10K) | 34900 | hours | |

Curve-fit equation:

$$\Phi(t)=Bexp(-\alpha t)$$

Luminous flux maintenance life equation:

$$L_{70}=\ln(B/0.7)/\alpha$$

$$L_{80}=\ln(B/0.8)/\alpha$$

$$L_{90}=\ln(B/0.9)/\alpha$$

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The laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.



Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 8-2 (Continued)
 Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|--|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 95.4 | 94.9 | 94.5 | | | | | | | | | | | | | |
| 2 | 96.0 | 95.6 | 95.3 | | | | | | | | | | | | | |
| 3 | 95.9 | 95.5 | 95.3 | | | | | | | | | | | | | |
| 4 | 96.2 | 95.8 | 95.5 | | | | | | | | | | | | | |
| 5 | 96.1 | 95.6 | 95.4 | | | | | | | | | | | | | |
| 6 | 95.0 | 94.6 | 94.3 | | | | | | | | | | | | | |
| 7 | 95.7 | 95.4 | 95.1 | | | | | | | | | | | | | |
| 8 | 95.7 | 95.3 | 94.7 | | | | | | | | | | | | | |
| 9 | 96.0 | 95.6 | 95.2 | | | | | | | | | | | | | |
| 10 | 96.0 | 95.7 | 95.3 | | | | | | | | | | | | | |
| 11 | 95.4 | 95.0 | 94.5 | | | | | | | | | | | | | |
| 12 | 95.2 | 94.8 | 94.4 | | | | | | | | | | | | | |
| 13 | 95.1 | 94.7 | 94.3 | | | | | | | | | | | | | |
| 14 | 95.1 | 94.5 | 94.0 | | | | | | | | | | | | | |
| 15 | 96.3 | 95.9 | 95.6 | | | | | | | | | | | | | |
| 16 | 96.4 | 96.0 | 95.8 | | | | | | | | | | | | | |
| 17 | 95.6 | 95.3 | 95.0 | | | | | | | | | | | | | |
| 18 | 96.0 | 95.6 | 95.2 | | | | | | | | | | | | | |
| 19 | 96.1 | 95.7 | 95.1 | | | | | | | | | | | | | |
| 20 | 95.8 | 95.5 | 95.0 | | | | | | | | | | | | | |
| 21 | 96.1 | 95.8 | 95.2 | | | | | | | | | | | | | |
| 22 | 96.2 | 95.8 | 95.2 | | | | | | | | | | | | | |
| 23 | 95.1 | 94.9 | 94.1 | | | | | | | | | | | | | |
| 24 | 95.6 | 95.3 | 94.9 | | | | | | | | | | | | | |
| 25 | 96.7 | 96.4 | 96.1 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 95.8 | 95.4 | 95.0 | | | | | | | | | | | | | |
| Med. | 95.9 | 95.5 | 95.1 | | | | | | | | | | | | | |
| σ | 0.46 | 0.48 | 0.53 | | | | | | | | | | | | | |
| Min. | 95.0 | 94.5 | 94.0 | | | | | | | | | | | | | |
| Max. | 96.7 | 96.4 | 96.1 | | | | | | | | | | | | | |



Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 8-3
Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.8 | 100.0 | 99.9 | 99.9 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 |
| 2 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 |
| 3 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 |
| 4 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.2 | 100.1 | 100.2 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 |
| 5 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 |
| 6 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 |
| 7 | 100.0 | 100.0 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 |
| 8 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 |
| 9 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 |
| 10 | 100.0 | 99.8 | 100.0 | 100.0 | 99.9 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 |
| 11 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 |
| 12 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 |
| 13 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 |
| 14 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.8 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 |
| 15 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 |
| 16 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 |
| 17 | 100.0 | 99.8 | 100.0 | 100.0 | 99.9 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 |
| 18 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 |
| 19 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.2 | 100.1 | 100.0 | 100.1 | 100.1 |
| 20 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 |
| 21 | 100.0 | 99.8 | 100.0 | 100.0 | 100.1 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 |
| 22 | 100.0 | 99.9 | 100.1 | 100.1 | 100.0 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.2 | 100.2 |
| 23 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.0 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 |
| 24 | 100.0 | 100.0 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 |
| 25 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 |
| Med. | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 |
| σ | 0.00 | 0.06 | 0.07 | 0.07 | 0.08 | 0.06 | 0.07 | 0.07 | 0.07 | 0.06 | 0.08 | 0.07 | 0.07 | 0.07 | 0.07 | 0.06 | 0.07 | 0.05 |
| Min. | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.8 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 99.9 | 99.9 | 100.0 |
| Max. | 100.0 | 100.0 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.2 | 100.3 |



Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 8-3 (Continued)
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|---|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 2 | 100.0 | 100.2 | 100.1 | | | | | | | | | | | | | |
| 3 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 4 | 100.1 | 100.2 | 100.1 | | | | | | | | | | | | | |
| 5 | 100.0 | 100.1 | 100.0 | | | | | | | | | | | | | |
| 6 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 7 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 8 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 9 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 10 | 100.0 | 100.1 | 100.0 | | | | | | | | | | | | | |
| 11 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 12 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 13 | 100.1 | 100.2 | 100.1 | | | | | | | | | | | | | |
| 14 | 100.0 | 100.0 | 100.0 | | | | | | | | | | | | | |
| 15 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 16 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 17 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 18 | 100.1 | 100.2 | 100.1 | | | | | | | | | | | | | |
| 19 | 100.0 | 100.1 | 100.0 | | | | | | | | | | | | | |
| 20 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 21 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 22 | 100.1 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 23 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 24 | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 25 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| Med. | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| σ | 0.06 | 0.06 | 0.05 | | | | | | | | | | | | | |
| Min. | 100.0 | 100.0 | 100.0 | | | | | | | | | | | | | |
| Max. | 100.2 | 100.2 | 100.2 | | | | | | | | | | | | | |



Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 8-4
 Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.0000 | 0.0017 | 0.0016 | 0.0018 | 0.0021 | 0.0022 | 0.0025 | 0.0025 | 0.0025 | 0.0027 | 0.0028 | 0.0028 | 0.0029 | 0.0028 | 0.0028 | 0.0030 | 0.0031 | 0.0033 |
| 2 | 0.0000 | 0.0017 | 0.0018 | 0.0019 | 0.0022 | 0.0024 | 0.0025 | 0.0026 | 0.0025 | 0.0026 | 0.0027 | 0.0028 | 0.0029 | 0.0028 | 0.0029 | 0.0030 | 0.0030 | 0.0032 |
| 3 | 0.0000 | 0.0017 | 0.0017 | 0.0018 | 0.0021 | 0.0023 | 0.0024 | 0.0023 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0028 | 0.0029 |
| 4 | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0018 | 0.0019 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0026 |
| 5 | 0.0000 | 0.0020 | 0.0019 | 0.0018 | 0.0020 | 0.0023 | 0.0023 | 0.0022 | 0.0023 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 |
| 6 | 0.0000 | 0.0020 | 0.0020 | 0.0021 | 0.0024 | 0.0025 | 0.0027 | 0.0026 | 0.0028 | 0.0029 | 0.0030 | 0.0029 | 0.0030 | 0.0030 | 0.0030 | 0.0032 | 0.0031 | 0.0033 |
| 7 | 0.0000 | 0.0021 | 0.0020 | 0.0022 | 0.0024 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0030 | 0.0030 | 0.0030 | 0.0030 | 0.0030 | 0.0031 | 0.0031 | 0.0032 | 0.0033 |
| 8 | 0.0000 | 0.0018 | 0.0017 | 0.0018 | 0.0023 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0028 | 0.0028 | 0.0029 | 0.0029 | 0.0028 | 0.0030 | 0.0030 | 0.0031 | 0.0032 |
| 9 | 0.0000 | 0.0018 | 0.0018 | 0.0019 | 0.0021 | 0.0023 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0028 |
| 10 | 0.0000 | 0.0021 | 0.0020 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0023 | 0.0025 | 0.0026 | 0.0026 | 0.0027 | 0.0026 | 0.0026 | 0.0028 | 0.0028 | 0.0029 |
| 11 | 0.0000 | 0.0015 | 0.0016 | 0.0017 | 0.0019 | 0.0021 | 0.0022 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0027 |
| 12 | 0.0000 | 0.0023 | 0.0020 | 0.0022 | 0.0023 | 0.0024 | 0.0026 | 0.0025 | 0.0025 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0029 | 0.0030 |
| 13 | 0.0000 | 0.0019 | 0.0020 | 0.0022 | 0.0025 | 0.0028 | 0.0028 | 0.0029 | 0.0029 | 0.0031 | 0.0031 | 0.0031 | 0.0032 | 0.0032 | 0.0033 | 0.0034 | 0.0034 | 0.0036 |
| 14 | 0.0000 | 0.0017 | 0.0017 | 0.0018 | 0.0021 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0025 | 0.0024 | 0.0026 | 0.0025 | 0.0025 | 0.0027 | 0.0028 | 0.0030 |
| 15 | 0.0000 | 0.0014 | 0.0015 | 0.0016 | 0.0019 | 0.0021 | 0.0023 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0026 |
| 16 | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0018 | 0.0020 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 |
| 17 | 0.0000 | 0.0016 | 0.0017 | 0.0018 | 0.0021 | 0.0024 | 0.0024 | 0.0025 | 0.0024 | 0.0025 | 0.0026 | 0.0025 | 0.0026 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0027 |
| 18 | 0.0000 | 0.0018 | 0.0017 | 0.0019 | 0.0022 | 0.0024 | 0.0024 | 0.0025 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0025 | 0.0026 | 0.0027 | 0.0028 | 0.0029 |
| 19 | 0.0000 | 0.0017 | 0.0018 | 0.0018 | 0.0022 | 0.0023 | 0.0025 | 0.0024 | 0.0024 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0026 | 0.0028 | 0.0028 | 0.0028 |
| 20 | 0.0000 | 0.0017 | 0.0017 | 0.0017 | 0.0021 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0029 | 0.0029 | 0.0031 | 0.0031 |
| 21 | 0.0000 | 0.0016 | 0.0015 | 0.0017 | 0.0020 | 0.0022 | 0.0023 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0028 | 0.0029 |
| 22 | 0.0000 | 0.0017 | 0.0017 | 0.0018 | 0.0021 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | 0.0025 | 0.0026 | 0.0025 | 0.0026 | 0.0027 | 0.0027 | 0.0028 |
| 23 | 0.0000 | 0.0019 | 0.0017 | 0.0019 | 0.0021 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0027 | 0.0026 | 0.0025 | 0.0026 | 0.0026 | 0.0028 | 0.0029 | 0.0029 |
| 24 | 0.0000 | 0.0017 | 0.0017 | 0.0019 | 0.0022 | 0.0024 | 0.0025 | 0.0024 | 0.0025 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0029 | 0.0030 | 0.0031 |
| 25 | 0.0000 | 0.0017 | 0.0015 | 0.0018 | 0.0021 | 0.0023 | 0.0023 | 0.0024 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0026 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0018 | 0.0017 | 0.0019 | 0.0021 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0026 | 0.0027 | 0.0028 | 0.0028 | 0.0029 |
| Med. | 0.0000 | 0.0017 | 0.0017 | 0.0018 | 0.0021 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0028 | 0.0028 | 0.0029 |
| σ | 0.0000 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0003 |
| Min. | 0.0000 | 0.0013 | 0.0014 | 0.0016 | 0.0018 | 0.0019 | 0.0021 | 0.0021 | 0.0021 | 0.0022 | 0.0023 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0024 | 0.0025 | 0.0025 |
| Max. | 0.0000 | 0.0023 | 0.0020 | 0.0022 | 0.0025 | 0.0028 | 0.0028 | 0.0029 | 0.0029 | 0.0031 | 0.0031 | 0.0031 | 0.0032 | 0.0032 | 0.0033 | 0.0034 | 0.0034 | 0.0036 |

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Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 8-4 (Continued)
Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.0036 | 0.0037 | 0.0040 | | | | | | | | | | | | | |
| 2 | 0.0034 | 0.0034 | 0.0037 | | | | | | | | | | | | | |
| 3 | 0.0032 | 0.0032 | 0.0034 | | | | | | | | | | | | | |
| 4 | 0.0029 | 0.0029 | 0.0031 | | | | | | | | | | | | | |
| 5 | 0.0029 | 0.0029 | 0.0031 | | | | | | | | | | | | | |
| 6 | 0.0036 | 0.0037 | 0.0038 | | | | | | | | | | | | | |
| 7 | 0.0036 | 0.0037 | 0.0037 | | | | | | | | | | | | | |
| 8 | 0.0036 | 0.0037 | 0.0039 | | | | | | | | | | | | | |
| 9 | 0.0032 | 0.0032 | 0.0035 | | | | | | | | | | | | | |
| 10 | 0.0031 | 0.0032 | 0.0034 | | | | | | | | | | | | | |
| 11 | 0.0030 | 0.0031 | 0.0033 | | | | | | | | | | | | | |
| 12 | 0.0033 | 0.0034 | 0.0035 | | | | | | | | | | | | | |
| 13 | 0.0038 | 0.0038 | 0.0042 | | | | | | | | | | | | | |
| 14 | 0.0033 | 0.0034 | 0.0037 | | | | | | | | | | | | | |
| 15 | 0.0029 | 0.0029 | 0.0031 | | | | | | | | | | | | | |
| 16 | 0.0028 | 0.0027 | 0.0029 | | | | | | | | | | | | | |
| 17 | 0.0030 | 0.0029 | 0.0032 | | | | | | | | | | | | | |
| 18 | 0.0031 | 0.0031 | 0.0035 | | | | | | | | | | | | | |
| 19 | 0.0031 | 0.0032 | 0.0034 | | | | | | | | | | | | | |
| 20 | 0.0034 | 0.0035 | 0.0037 | | | | | | | | | | | | | |
| 21 | 0.0032 | 0.0033 | 0.0034 | | | | | | | | | | | | | |
| 22 | 0.0030 | 0.0030 | 0.0033 | | | | | | | | | | | | | |
| 23 | 0.0032 | 0.0033 | 0.0035 | | | | | | | | | | | | | |
| 24 | 0.0033 | 0.0034 | 0.0036 | | | | | | | | | | | | | |
| 25 | 0.0028 | 0.0029 | 0.0031 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.0032 | 0.0033 | 0.0035 | | | | | | | | | | | | | |
| Med. | 0.0032 | 0.0032 | 0.0035 | | | | | | | | | | | | | |
| σ | 0.0003 | 0.0003 | 0.0003 | | | | | | | | | | | | | |
| Min. | 0.0028 | 0.0027 | 0.0029 | | | | | | | | | | | | | |
| Max. | 0.0038 | 0.0038 | 0.0042 | | | | | | | | | | | | | |



Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 8-5
 Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.2609 | 0.2593 | 0.2593 | 0.2591 | 0.2588 | 0.2587 | 0.2585 | 0.2585 | 0.2584 | 0.2583 | 0.2582 | 0.2582 | 0.2581 | 0.2582 | 0.2582 | 0.2580 | 0.2579 | 0.2578 |
| 2 | 0.2587 | 0.2570 | 0.2570 | 0.2569 | 0.2566 | 0.2564 | 0.2563 | 0.2562 | 0.2563 | 0.2561 | 0.2560 | 0.2560 | 0.2559 | 0.2560 | 0.2559 | 0.2558 | 0.2558 | 0.2556 |
| 3 | 0.2641 | 0.2624 | 0.2624 | 0.2623 | 0.2620 | 0.2618 | 0.2617 | 0.2618 | 0.2616 | 0.2616 | 0.2616 | 0.2616 | 0.2615 | 0.2615 | 0.2615 | 0.2614 | 0.2613 | 0.2613 |
| 4 | 0.2611 | 0.2597 | 0.2596 | 0.2595 | 0.2594 | 0.2593 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | 0.2589 | 0.2588 | 0.2587 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2585 |
| 5 | 0.2648 | 0.2629 | 0.2629 | 0.2630 | 0.2628 | 0.2625 | 0.2626 | 0.2626 | 0.2625 | 0.2624 | 0.2624 | 0.2623 | 0.2622 | 0.2623 | 0.2623 | 0.2623 | 0.2622 | 0.2621 |
| 6 | 0.2634 | 0.2614 | 0.2614 | 0.2614 | 0.2610 | 0.2609 | 0.2607 | 0.2608 | 0.2607 | 0.2606 | 0.2605 | 0.2605 | 0.2605 | 0.2605 | 0.2605 | 0.2603 | 0.2603 | 0.2602 |
| 7 | 0.2627 | 0.2607 | 0.2607 | 0.2605 | 0.2603 | 0.2601 | 0.2601 | 0.2600 | 0.2600 | 0.2598 | 0.2598 | 0.2598 | 0.2598 | 0.2598 | 0.2597 | 0.2597 | 0.2596 | 0.2595 |
| 8 | 0.2627 | 0.2609 | 0.2610 | 0.2609 | 0.2605 | 0.2602 | 0.2602 | 0.2602 | 0.2601 | 0.2600 | 0.2600 | 0.2599 | 0.2599 | 0.2599 | 0.2598 | 0.2597 | 0.2596 | 0.2596 |
| 9 | 0.2599 | 0.2580 | 0.2581 | 0.2580 | 0.2578 | 0.2576 | 0.2575 | 0.2574 | 0.2574 | 0.2573 | 0.2573 | 0.2572 | 0.2573 | 0.2573 | 0.2572 | 0.2572 | 0.2571 | 0.2571 |
| 10 | 0.2630 | 0.2609 | 0.2610 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2607 | 0.2607 | 0.2605 | 0.2604 | 0.2604 | 0.2604 | 0.2604 | 0.2604 | 0.2602 | 0.2602 | 0.2601 |
| 11 | 0.2640 | 0.2625 | 0.2625 | 0.2623 | 0.2621 | 0.2619 | 0.2618 | 0.2619 | 0.2617 | 0.2617 | 0.2617 | 0.2616 | 0.2616 | 0.2615 | 0.2616 | 0.2614 | 0.2615 | 0.2614 |
| 12 | 0.2617 | 0.2594 | 0.2597 | 0.2594 | 0.2594 | 0.2592 | 0.2591 | 0.2592 | 0.2592 | 0.2590 | 0.2590 | 0.2590 | 0.2590 | 0.2590 | 0.2590 | 0.2589 | 0.2588 | 0.2588 |
| 13 | 0.2636 | 0.2617 | 0.2616 | 0.2614 | 0.2612 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2606 | 0.2605 | 0.2605 | 0.2604 | 0.2604 | 0.2603 | 0.2603 | 0.2602 | 0.2601 |
| 14 | 0.2618 | 0.2601 | 0.2601 | 0.2600 | 0.2597 | 0.2596 | 0.2594 | 0.2594 | 0.2593 | 0.2594 | 0.2594 | 0.2594 | 0.2592 | 0.2594 | 0.2593 | 0.2592 | 0.2591 | 0.2589 |
| 15 | 0.2595 | 0.2581 | 0.2580 | 0.2580 | 0.2576 | 0.2574 | 0.2573 | 0.2573 | 0.2573 | 0.2573 | 0.2572 | 0.2572 | 0.2572 | 0.2571 | 0.2572 | 0.2571 | 0.2571 | 0.2570 |
| 16 | 0.2614 | 0.2601 | 0.2600 | 0.2598 | 0.2596 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2591 | 0.2591 | 0.2592 | 0.2591 | 0.2591 | 0.2590 | 0.2589 | 0.2589 |
| 17 | 0.2647 | 0.2631 | 0.2630 | 0.2629 | 0.2627 | 0.2623 | 0.2624 | 0.2623 | 0.2623 | 0.2623 | 0.2622 | 0.2623 | 0.2622 | 0.2622 | 0.2622 | 0.2621 | 0.2622 | 0.2620 |
| 18 | 0.2595 | 0.2577 | 0.2578 | 0.2577 | 0.2574 | 0.2572 | 0.2571 | 0.2571 | 0.2571 | 0.2570 | 0.2569 | 0.2569 | 0.2570 | 0.2570 | 0.2569 | 0.2568 | 0.2568 | 0.2567 |
| 19 | 0.2633 | 0.2616 | 0.2615 | 0.2614 | 0.2611 | 0.2610 | 0.2609 | 0.2610 | 0.2609 | 0.2608 | 0.2607 | 0.2607 | 0.2606 | 0.2606 | 0.2607 | 0.2606 | 0.2605 | 0.2605 |
| 20 | 0.2606 | 0.2589 | 0.2589 | 0.2588 | 0.2585 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2580 | 0.2579 | 0.2579 | 0.2579 | 0.2579 | 0.2577 | 0.2577 | 0.2575 | 0.2575 |
| 21 | 0.2628 | 0.2612 | 0.2613 | 0.2611 | 0.2608 | 0.2606 | 0.2605 | 0.2605 | 0.2605 | 0.2603 | 0.2604 | 0.2603 | 0.2602 | 0.2603 | 0.2602 | 0.2601 | 0.2601 | 0.2600 |
| 22 | 0.2601 | 0.2584 | 0.2584 | 0.2583 | 0.2580 | 0.2578 | 0.2577 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2577 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | 0.2574 | 0.2574 |
| 23 | 0.2637 | 0.2618 | 0.2620 | 0.2619 | 0.2616 | 0.2614 | 0.2612 | 0.2613 | 0.2613 | 0.2612 | 0.2611 | 0.2612 | 0.2613 | 0.2612 | 0.2612 | 0.2610 | 0.2609 | 0.2609 |
| 24 | 0.2611 | 0.2594 | 0.2593 | 0.2592 | 0.2589 | 0.2587 | 0.2587 | 0.2587 | 0.2586 | 0.2584 | 0.2584 | 0.2584 | 0.2584 | 0.2584 | 0.2584 | 0.2582 | 0.2582 | 0.2581 |
| 25 | 0.2599 | 0.2582 | 0.2584 | 0.2582 | 0.2579 | 0.2577 | 0.2576 | 0.2576 | 0.2576 | 0.2576 | 0.2575 | 0.2574 | 0.2574 | 0.2575 | 0.2575 | 0.2573 | 0.2574 | 0.2573 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2620 | 0.2602 | 0.2602 | 0.2601 | 0.2599 | 0.2597 | 0.2596 | 0.2596 | 0.2595 | 0.2594 | 0.2594 | 0.2594 | 0.2593 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2591 |
| Med. | 0.2618 | 0.2601 | 0.2601 | 0.2600 | 0.2597 | 0.2596 | 0.2594 | 0.2594 | 0.2593 | 0.2594 | 0.2594 | 0.2594 | 0.2592 | 0.2594 | 0.2593 | 0.2592 | 0.2591 | 0.2589 |
| σ | 0.0018 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0017 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 | 0.0018 |
| Min. | 0.2587 | 0.2570 | 0.2570 | 0.2569 | 0.2566 | 0.2564 | 0.2563 | 0.2562 | 0.2563 | 0.2561 | 0.2560 | 0.2560 | 0.2559 | 0.2560 | 0.2559 | 0.2558 | 0.2558 | 0.2556 |
| Max. | 0.2648 | 0.2631 | 0.2630 | 0.2630 | 0.2628 | 0.2625 | 0.2626 | 0.2626 | 0.2625 | 0.2624 | 0.2624 | 0.2623 | 0.2622 | 0.2623 | 0.2623 | 0.2623 | 0.2622 | 0.2621 |

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Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 8-5 (Continued)
 Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.2575 | 0.2574 | 0.2571 | | | | | | | | | | | | | |
| 2 | 0.2554 | 0.2555 | 0.2552 | | | | | | | | | | | | | |
| 3 | 0.2610 | 0.2610 | 0.2608 | | | | | | | | | | | | | |
| 4 | 0.2583 | 0.2583 | 0.2581 | | | | | | | | | | | | | |
| 5 | 0.2619 | 0.2620 | 0.2617 | | | | | | | | | | | | | |
| 6 | 0.2599 | 0.2599 | 0.2598 | | | | | | | | | | | | | |
| 7 | 0.2592 | 0.2592 | 0.2592 | | | | | | | | | | | | | |
| 8 | 0.2592 | 0.2592 | 0.2590 | | | | | | | | | | | | | |
| 9 | 0.2568 | 0.2568 | 0.2566 | | | | | | | | | | | | | |
| 10 | 0.2599 | 0.2598 | 0.2597 | | | | | | | | | | | | | |
| 11 | 0.2611 | 0.2611 | 0.2608 | | | | | | | | | | | | | |
| 12 | 0.2584 | 0.2584 | 0.2582 | | | | | | | | | | | | | |
| 13 | 0.2599 | 0.2599 | 0.2595 | | | | | | | | | | | | | |
| 14 | 0.2586 | 0.2586 | 0.2582 | | | | | | | | | | | | | |
| 15 | 0.2567 | 0.2567 | 0.2566 | | | | | | | | | | | | | |
| 16 | 0.2587 | 0.2587 | 0.2586 | | | | | | | | | | | | | |
| 17 | 0.2618 | 0.2619 | 0.2616 | | | | | | | | | | | | | |
| 18 | 0.2565 | 0.2565 | 0.2561 | | | | | | | | | | | | | |
| 19 | 0.2602 | 0.2602 | 0.2600 | | | | | | | | | | | | | |
| 20 | 0.2573 | 0.2571 | 0.2569 | | | | | | | | | | | | | |
| 21 | 0.2597 | 0.2596 | 0.2595 | | | | | | | | | | | | | |
| 22 | 0.2571 | 0.2571 | 0.2569 | | | | | | | | | | | | | |
| 23 | 0.2606 | 0.2605 | 0.2603 | | | | | | | | | | | | | |
| 24 | 0.2578 | 0.2578 | 0.2576 | | | | | | | | | | | | | |
| 25 | 0.2572 | 0.2571 | 0.2569 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.2588 | 0.2588 | 0.2586 | | | | | | | | | | | | | |
| Med. | 0.2587 | 0.2587 | 0.2586 | | | | | | | | | | | | | |
| σ | 0.0018 | 0.0018 | 0.0018 | | | | | | | | | | | | | |
| Min. | 0.2554 | 0.2555 | 0.2552 | | | | | | | | | | | | | |
| Max. | 0.2619 | 0.2620 | 0.2617 | | | | | | | | | | | | | |



Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 8-6
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.5257 | 0.5255 | 0.5255 | 0.5255 | 0.5253 | 0.5253 | 0.5252 | 0.5252 | 0.5251 | 0.5252 | 0.5251 | 0.5251 | 0.5251 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5249 |
| 2 | 0.5252 | 0.5251 | 0.5250 | 0.5250 | 0.5249 | 0.5248 | 0.5247 | 0.5247 | 0.5246 | 0.5247 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5246 | 0.5245 | 0.5245 | 0.5244 |
| 3 | 0.5264 | 0.5262 | 0.5263 | 0.5262 | 0.5261 | 0.5262 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5259 | 0.5259 | 0.5258 | 0.5259 | 0.5258 |
| 4 | 0.5286 | 0.5284 | 0.5285 | 0.5284 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 |
| 5 | 0.5293 | 0.5290 | 0.5290 | 0.5290 | 0.5289 | 0.5290 | 0.5289 | 0.5288 | 0.5288 | 0.5289 | 0.5288 | 0.5289 | 0.5288 | 0.5288 | 0.5288 | 0.5289 | 0.5289 | 0.5289 |
| 6 | 0.5269 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5262 | 0.5261 |
| 7 | 0.5263 | 0.5262 | 0.5263 | 0.5261 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5259 | 0.5258 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5258 |
| 8 | 0.5240 | 0.5238 | 0.5239 | 0.5238 | 0.5237 | 0.5236 | 0.5235 | 0.5235 | 0.5235 | 0.5235 | 0.5234 | 0.5234 | 0.5234 | 0.5234 | 0.5234 | 0.5234 | 0.5234 | 0.5233 |
| 9 | 0.5252 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5247 | 0.5246 | 0.5246 | 0.5246 | 0.5247 | 0.5246 | 0.5246 | 0.5245 | 0.5246 | 0.5245 | 0.5246 | 0.5246 | 0.5245 |
| 10 | 0.5267 | 0.5263 | 0.5264 | 0.5264 | 0.5262 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5262 | 0.5262 | 0.5262 | 0.5261 |
| 11 | 0.5285 | 0.5284 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5280 |
| 12 | 0.5285 | 0.5282 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5279 |
| 13 | 0.5286 | 0.5284 | 0.5284 | 0.5284 | 0.5283 | 0.5282 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5280 | 0.5280 | 0.5279 |
| 14 | 0.5278 | 0.5276 | 0.5277 | 0.5276 | 0.5275 | 0.5275 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5274 | 0.5274 | 0.5274 | 0.5274 | 0.5273 | 0.5273 | 0.5273 |
| 15 | 0.5253 | 0.5251 | 0.5251 | 0.5250 | 0.5249 | 0.5249 | 0.5248 | 0.5248 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5247 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5247 |
| 16 | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5296 | 0.5296 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5295 | 0.5294 | 0.5294 | 0.5295 | 0.5295 |
| 17 | 0.5237 | 0.5235 | 0.5235 | 0.5234 | 0.5233 | 0.5231 | 0.5232 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5232 | 0.5232 | 0.5231 |
| 18 | 0.5265 | 0.5262 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5260 | 0.5260 | 0.5260 | 0.5261 | 0.5260 | 0.5262 | 0.5261 | 0.5261 | 0.5260 | 0.5260 |
| 19 | 0.5260 | 0.5257 | 0.5258 | 0.5258 | 0.5257 | 0.5256 | 0.5255 | 0.5255 | 0.5255 | 0.5256 | 0.5256 | 0.5255 | 0.5255 | 0.5256 | 0.5256 | 0.5255 | 0.5256 | 0.5255 |
| 20 | 0.5279 | 0.5278 | 0.5279 | 0.5278 | 0.5277 | 0.5277 | 0.5276 | 0.5275 | 0.5275 | 0.5276 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5274 |
| 21 | 0.5263 | 0.5261 | 0.5261 | 0.5262 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5258 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5259 | 0.5258 | 0.5258 | 0.5258 | 0.5258 |
| 22 | 0.5274 | 0.5273 | 0.5273 | 0.5273 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 | 0.5270 |
| 23 | 0.5294 | 0.5291 | 0.5291 | 0.5291 | 0.5290 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5289 | 0.5288 | 0.5289 | 0.5289 | 0.5288 | 0.5288 | 0.5288 |
| 24 | 0.5272 | 0.5270 | 0.5270 | 0.5270 | 0.5269 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5268 | 0.5267 | 0.5267 | 0.5266 | 0.5267 | 0.5266 | 0.5267 | 0.5266 | 0.5266 |
| 25 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5270 | 0.5267 | 0.5268 | 0.5267 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5265 | 0.5264 | 0.5264 | 0.5264 | 0.5264 |
| Med. | 0.5267 | 0.5265 | 0.5265 | 0.5265 | 0.5263 | 0.5263 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 |
| σ | 0.0016 | 0.0016 | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 |
| Min. | 0.5237 | 0.5235 | 0.5235 | 0.5234 | 0.5233 | 0.5231 | 0.5232 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5231 | 0.5232 | 0.5232 | 0.5231 |
| Max. | 0.5298 | 0.5298 | 0.5298 | 0.5297 | 0.5296 | 0.5296 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5295 | 0.5294 | 0.5295 | 0.5294 | 0.5294 | 0.5295 | 0.5295 |



Data Set 8 : 105 °C, 150 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 106.4 °C |
| Actual Ambient Temperature [T _A] | 103.8 °C |
| Drive Current [I _F] | 150 mA |
| Measurement Current | 150 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 8-6 (Continued)
 Chromaticity

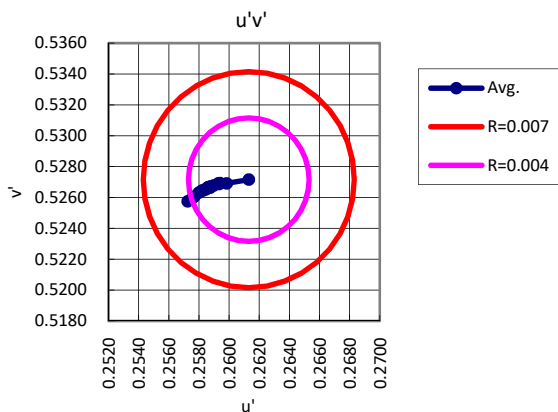
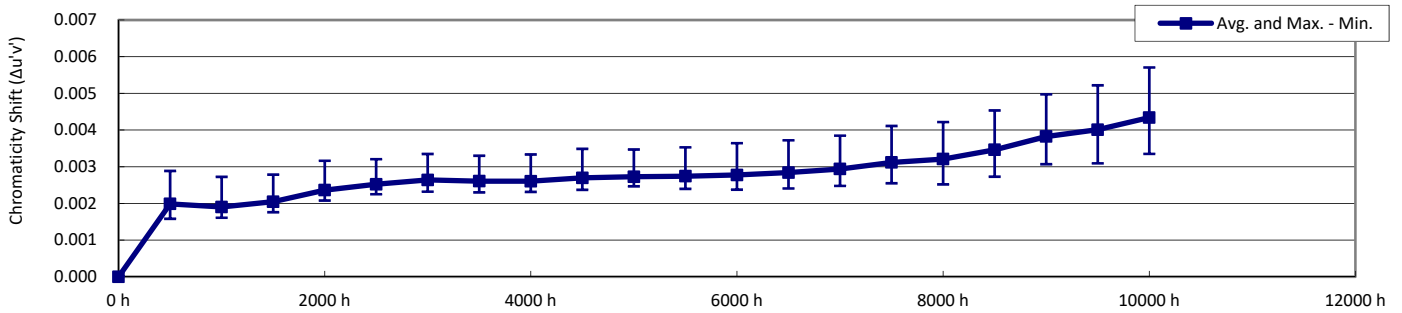
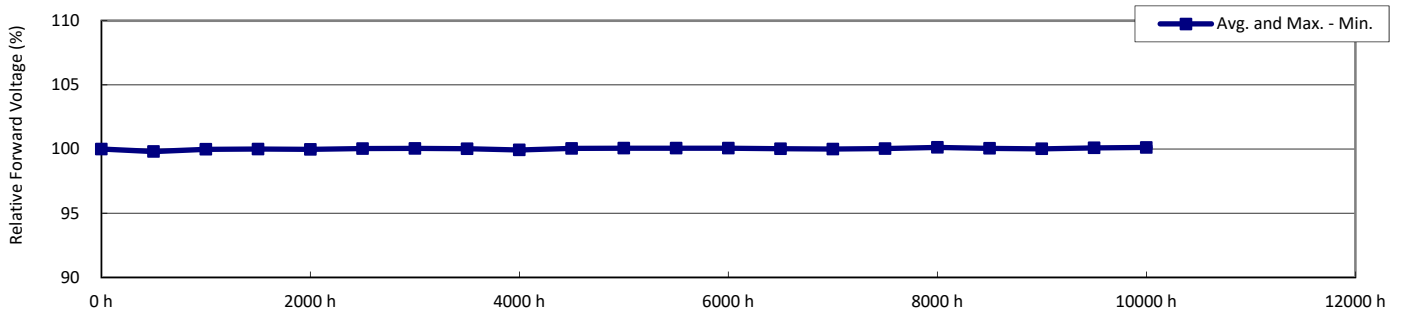
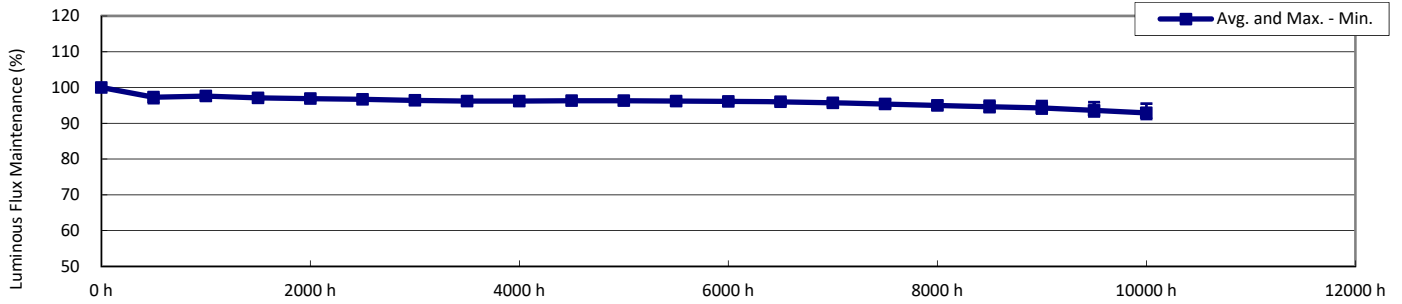
| LED No. | Chromaticity v' | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | |
| 1 | 0.5246 | 0.5245 | 0.5244 | | | | | | | | | | | | |
| 2 | 0.5242 | 0.5242 | 0.5241 | | | | | | | | | | | | |
| 3 | 0.5256 | 0.5256 | 0.5256 | | | | | | | | | | | | |
| 4 | 0.5280 | 0.5279 | 0.5279 | | | | | | | | | | | | |
| 5 | 0.5287 | 0.5287 | 0.5287 | | | | | | | | | | | | |
| 6 | 0.5259 | 0.5259 | 0.5259 | | | | | | | | | | | | |
| 7 | 0.5255 | 0.5255 | 0.5254 | | | | | | | | | | | | |
| 8 | 0.5231 | 0.5230 | 0.5229 | | | | | | | | | | | | |
| 9 | 0.5244 | 0.5243 | 0.5241 | | | | | | | | | | | | |
| 10 | 0.5260 | 0.5260 | 0.5258 | | | | | | | | | | | | |
| 11 | 0.5278 | 0.5278 | 0.5277 | | | | | | | | | | | | |
| 12 | 0.5277 | 0.5276 | 0.5276 | | | | | | | | | | | | |
| 13 | 0.5278 | 0.5277 | 0.5276 | | | | | | | | | | | | |
| 14 | 0.5270 | 0.5269 | 0.5269 | | | | | | | | | | | | |
| 15 | 0.5245 | 0.5245 | 0.5243 | | | | | | | | | | | | |
| 16 | 0.5293 | 0.5292 | 0.5292 | | | | | | | | | | | | |
| 17 | 0.5228 | 0.5229 | 0.5227 | | | | | | | | | | | | |
| 18 | 0.5258 | 0.5258 | 0.5257 | | | | | | | | | | | | |
| 19 | 0.5253 | 0.5252 | 0.5251 | | | | | | | | | | | | |
| 20 | 0.5272 | 0.5272 | 0.5271 | | | | | | | | | | | | |
| 21 | 0.5256 | 0.5256 | 0.5255 | | | | | | | | | | | | |
| 22 | 0.5268 | 0.5268 | 0.5267 | | | | | | | | | | | | |
| 23 | 0.5286 | 0.5286 | 0.5284 | | | | | | | | | | | | |
| 24 | 0.5264 | 0.5263 | 0.5263 | | | | | | | | | | | | |
| 25 | 0.5260 | 0.5259 | 0.5259 | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | |
| Avg. | 0.5262 | 0.5261 | 0.5261 | | | | | | | | | | | | |
| Med. | 0.5260 | 0.5259 | 0.5259 | | | | | | | | | | | | |
| σ | 0.0017 | 0.0017 | 0.0017 | | | | | | | | | | | | |
| Min. | 0.5228 | 0.5229 | 0.5227 | | | | | | | | | | | | |
| Max. | 0.5293 | 0.5292 | 0.5292 | | | | | | | | | | | | |



Data Set 9 : 105 °C, 200 mA

| | |
|--------------------------------------|----------|
| Actual Case Temperature [T_S] | 105.9 °C |
| Actual Ambient Temperature [T_A] | 101.5 °C |
| Drive Current [I_F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_S and T_A were measured during initial setup.
 Number of LED failures: 0



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Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 9-1
Initial Characteristics

| LED No. | Luminous flux | Forward voltage | CCT | Input Power | CIE1931 | | CIE1976 | | | | | | | |
|---------|---------------------|--------------------|---------------------|-------------|---------|--------|---------|--------|--|--|--|--|--|--|
| | Φ _v [lm] | V _F [V] | T _{CP} [K] | P [W] | x | y | u' | v' | | | | | | |
| 1 | 174.3 | 6.55 | 2707 | 1.31 | 0.459 | 0.410 | 0.262 | 0.527 | | | | | | |
| 2 | 174.9 | 6.52 | 2732 | 1.30 | 0.459 | 0.413 | 0.261 | 0.528 | | | | | | |
| 3 | 173.7 | 6.53 | 2714 | 1.31 | 0.458 | 0.409 | 0.262 | 0.527 | | | | | | |
| 4 | 173.0 | 6.54 | 2695 | 1.31 | 0.458 | 0.407 | 0.263 | 0.526 | | | | | | |
| 5 | 175.3 | 6.55 | 2706 | 1.31 | 0.463 | 0.417 | 0.262 | 0.530 | | | | | | |
| 6 | 173.0 | 6.53 | 2730 | 1.31 | 0.457 | 0.409 | 0.261 | 0.526 | | | | | | |
| 7 | 175.6 | 6.55 | 2811 | 1.31 | 0.452 | 0.410 | 0.258 | 0.526 | | | | | | |
| 8 | 175.2 | 6.52 | 2737 | 1.30 | 0.459 | 0.413 | 0.261 | 0.528 | | | | | | |
| 9 | 173.3 | 6.54 | 2695 | 1.31 | 0.460 | 0.410 | 0.263 | 0.527 | | | | | | |
| 10 | 175.0 | 6.55 | 2805 | 1.31 | 0.452 | 0.409 | 0.258 | 0.525 | | | | | | |
| 11 | 173.8 | 6.53 | 2737 | 1.31 | 0.457 | 0.411 | 0.261 | 0.527 | | | | | | |
| 12 | 174.3 | 6.54 | 2706 | 1.31 | 0.461 | 0.414 | 0.262 | 0.529 | | | | | | |
| 13 | 173.8 | 6.54 | 2713 | 1.31 | 0.460 | 0.413 | 0.262 | 0.528 | | | | | | |
| 14 | 174.2 | 6.53 | 2741 | 1.31 | 0.456 | 0.409 | 0.261 | 0.526 | | | | | | |
| 15 | 174.7 | 6.54 | 2739 | 1.31 | 0.457 | 0.410 | 0.261 | 0.527 | | | | | | |
| 16 | 175.3 | 6.53 | 2742 | 1.31 | 0.458 | 0.413 | 0.260 | 0.528 | | | | | | |
| 17 | 174.6 | 6.53 | 2710 | 1.31 | 0.460 | 0.413 | 0.262 | 0.528 | | | | | | |
| 18 | 174.5 | 6.53 | 2740 | 1.31 | 0.457 | 0.411 | 0.261 | 0.527 | | | | | | |
| 19 | 171.8 | 6.54 | 2659 | 1.31 | 0.461 | 0.407 | 0.265 | 0.526 | | | | | | |
| 20 | 173.9 | 6.54 | 2721 | 1.31 | 0.459 | 0.412 | 0.261 | 0.528 | | | | | | |
| 21 | 173.8 | 6.54 | 2737 | 1.31 | 0.455 | 0.407 | 0.261 | 0.525 | | | | | | |
| 22 | 173.9 | 6.53 | 2722 | 1.31 | 0.458 | 0.410 | 0.262 | 0.527 | | | | | | |
| 23 | 173.9 | 6.54 | 2739 | 1.31 | 0.457 | 0.410 | 0.261 | 0.526 | | | | | | |
| 24 | 174.6 | 6.54 | 2723 | 1.31 | 0.460 | 0.414 | 0.261 | 0.529 | | | | | | |
| 25 | 174 | 6.54 | 2732 | 1.31 | 0.456 | 0.408 | 0.261 | 0.526 | | | | | | |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | | | | | | |
| Avg. | 174.2 | 6.54 | 2728 | 1.31 | 0.458 | 0.411 | 0.261 | 0.527 | | | | | | |
| Med. | 174.3 | 6.54 | 2730 | 1.31 | 0.458 | 0.410 | 0.261 | 0.527 | | | | | | |
| σ | 0.85 | 0.007 | 30.9 | 0.001 | 0.0026 | 0.0025 | 0.0014 | 0.0012 | | | | | | |
| Min. | 171.8 | 6.52 | 2659 | 1.30 | 0.452 | 0.407 | 0.258 | 0.525 | | | | | | |
| Max. | 175.6 | 6.55 | 2811 | 1.31 | 0.463 | 0.417 | 0.265 | 0.530 | | | | | | |



Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 9-2
Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|--|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 96.9 | 97.5 | 97.2 | 97.0 | 96.6 | 96.3 | 96.1 | 96.1 | 96.3 | 96.2 | 96.2 | 96.0 | 96.1 | 95.7 | 95.7 | 95.2 | 95.0 |
| 2 | 100.0 | 98.1 | 98.0 | 97.6 | 97.3 | 97.0 | 96.6 | 96.5 | 96.5 | 96.6 | 96.6 | 96.7 | 96.6 | 96.7 | 96.6 | 96.6 | 96.3 | 96.3 |
| 3 | 100.0 | 97.3 | 97.3 | 97.0 | 96.9 | 96.6 | 96.3 | 96.2 | 96.1 | 96.3 | 96.3 | 96.3 | 96.1 | 96.1 | 95.8 | 95.7 | 95.2 | 95.0 |
| 4 | 100.0 | 96.8 | 97.7 | 97.1 | 96.8 | 96.5 | 96.2 | 96.1 | 96.1 | 96.2 | 96.3 | 96.3 | 96.1 | 96.1 | 95.9 | 95.7 | 95.3 | 95.0 |
| 5 | 100.0 | 97.6 | 97.9 | 97.4 | 97.0 | 97.0 | 96.6 | 96.4 | 96.2 | 96.3 | 96.4 | 96.2 | 96.2 | 96.2 | 95.8 | 95.8 | 95.2 | 95.0 |
| 6 | 100.0 | 97.6 | 97.8 | 97.2 | 97.0 | 96.7 | 96.3 | 96.2 | 96.1 | 96.2 | 96.1 | 96.0 | 95.8 | 95.7 | 95.2 | 95.0 | 94.4 | 94.1 |
| 7 | 100.0 | 95.6 | 96.6 | 96.4 | 96.3 | 96.3 | 96.1 | 95.8 | 95.8 | 96.0 | 96.0 | 95.9 | 95.8 | 95.6 | 95.2 | 94.9 | 94.4 | 93.9 |
| 8 | 100.0 | 96.9 | 97.3 | 97.0 | 96.9 | 96.6 | 96.4 | 96.2 | 96.1 | 96.4 | 96.4 | 96.3 | 96.2 | 96.2 | 95.9 | 95.7 | 95.4 | 94.8 |
| 9 | 100.0 | 98.0 | 97.9 | 97.4 | 97.0 | 96.7 | 96.4 | 96.2 | 96.1 | 96.3 | 96.4 | 96.3 | 96.3 | 96.2 | 95.8 | 95.5 | 95.0 | 94.6 |
| 10 | 100.0 | 98.0 | 97.9 | 97.4 | 97.1 | 96.9 | 96.7 | 96.5 | 96.5 | 96.7 | 96.7 | 96.6 | 96.5 | 96.4 | 96.1 | 96.0 | 95.6 | 95.2 |
| 11 | 100.0 | 97.6 | 97.5 | 96.9 | 96.6 | 96.3 | 96.0 | 95.6 | 95.8 | 96.0 | 96.2 | 95.8 | 95.9 | 95.8 | 95.4 | 95.4 | 95.2 | 94.7 |
| 12 | 100.0 | 96.7 | 97.2 | 97.0 | 96.8 | 96.6 | 96.4 | 96.0 | 96.0 | 96.1 | 96.1 | 96.1 | 96.1 | 95.9 | 95.6 | 95.4 | 95.0 | 94.4 |
| 13 | 100.0 | 97.6 | 97.9 | 97.4 | 97.2 | 96.9 | 96.6 | 96.2 | 96.3 | 96.4 | 96.5 | 96.4 | 96.3 | 96.4 | 96.1 | 95.8 | 95.6 | 95.3 |
| 14 | 100.0 | 97.4 | 97.8 | 97.3 | 97.1 | 96.8 | 96.6 | 96.3 | 96.4 | 96.6 | 96.6 | 96.5 | 96.4 | 96.6 | 96.4 | 96.3 | 96.0 | 95.8 |
| 15 | 100.0 | 97.7 | 97.8 | 97.2 | 96.9 | 96.5 | 96.3 | 96.0 | 96.0 | 96.1 | 96.1 | 95.9 | 95.7 | 95.6 | 95.1 | 94.6 | 94.1 | 93.4 |
| 16 | 100.0 | 97.4 | 97.5 | 97.0 | 96.9 | 96.7 | 96.4 | 96.2 | 96.2 | 96.3 | 96.4 | 96.1 | 95.8 | 95.7 | 95.2 | 95.0 | 94.5 | 94.1 |
| 17 | 100.0 | 97.6 | 97.8 | 97.0 | 96.9 | 96.7 | 96.5 | 96.0 | 96.2 | 96.2 | 96.5 | 96.2 | 96.0 | 96.1 | 95.8 | 95.6 | 95.5 | 95.0 |
| 18 | 100.0 | 97.0 | 97.7 | 97.2 | 97.0 | 96.8 | 96.4 | 96.2 | 96.1 | 96.3 | 96.4 | 96.3 | 96.1 | 96.1 | 95.6 | 95.2 | 94.8 | 94.2 |
| 19 | 100.0 | 97.8 | 97.7 | 97.2 | 96.9 | 96.7 | 96.5 | 96.2 | 96.1 | 96.2 | 96.2 | 95.9 | 95.7 | 95.5 | 95.0 | 94.5 | 94.0 | 93.4 |
| 20 | 100.0 | 98.0 | 98.0 | 97.4 | 97.2 | 96.9 | 96.6 | 96.5 | 96.4 | 96.6 | 96.6 | 96.6 | 96.4 | 96.4 | 96.0 | 95.6 | 95.0 | 94.6 |
| 21 | 100.0 | 97.3 | 97.5 | 97.0 | 96.7 | 96.4 | 96.3 | 96.2 | 96.2 | 96.4 | 96.2 | 95.9 | 95.7 | 95.4 | 95.0 | 94.5 | 93.8 | 93.1 |
| 22 | 100.0 | 97.4 | 97.8 | 97.1 | 96.9 | 96.6 | 96.4 | 96.3 | 96.3 | 96.4 | 96.5 | 96.4 | 96.2 | 96.1 | 95.8 | 95.3 | 94.7 | 94.3 |
| 23 | 100.0 | 96.8 | 97.4 | 96.8 | 96.8 | 96.7 | 96.4 | 96.1 | 96.1 | 96.0 | 96.4 | 96.1 | 96.1 | 96.0 | 95.8 | 95.7 | 95.5 | 95.3 |
| 24 | 100.0 | 96.2 | 97.0 | 96.9 | 96.8 | 96.6 | 96.3 | 96.0 | 95.9 | 96.0 | 95.9 | 95.7 | 95.5 | 95.2 | 94.8 | 94.3 | 93.8 | 93.2 |
| 25 | 100.0 | 97.8 | 97.7 | 97.2 | 96.9 | 96.7 | 96.4 | 96.4 | 96.4 | 96.6 | 96.5 | 96.5 | 96.4 | 96.4 | 96.2 | 95.9 | 95.5 | 95.1 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 97.3 | 97.6 | 97.1 | 96.9 | 96.7 | 96.4 | 96.2 | 96.2 | 96.3 | 96.3 | 96.2 | 96.1 | 96.0 | 95.7 | 95.4 | 95.0 | 94.6 |
| Med. | 100.0 | 97.4 | 97.7 | 97.2 | 96.9 | 96.7 | 96.4 | 96.2 | 96.1 | 96.3 | 96.4 | 96.2 | 96.1 | 96.1 | 95.8 | 95.6 | 95.2 | 94.7 |
| σ | 0.00 | 0.60 | 0.34 | 0.25 | 0.20 | 0.19 | 0.17 | 0.21 | 0.19 | 0.21 | 0.21 | 0.27 | 0.28 | 0.38 | 0.46 | 0.57 | 0.66 | 0.79 |
| Min. | 100.0 | 95.6 | 96.6 | 96.4 | 96.3 | 96.3 | 96.0 | 95.6 | 95.8 | 96.0 | 95.9 | 95.7 | 95.5 | 95.2 | 94.8 | 94.3 | 93.8 | 93.1 |
| Max. | 100.0 | 98.1 | 98.0 | 97.6 | 97.3 | 97.0 | 96.7 | 96.5 | 96.5 | 96.7 | 96.7 | 96.7 | 96.6 | 96.7 | 96.6 | 96.6 | 96.3 | 96.3 |

TM-21 Projection

| Test duration used | 5000 h | to | 10000 h |
|----------------------------------|-----------|-------|---------|
| B | 1.0020 | | |
| α | 6.959E-06 | | |
| R ² | 0.9263 | | |
| Calculated L ₇₀ (10K) | 51500 | hours | |
| Reported L ₇₀ (10K) | 51500 | hours | |
| Calculated L ₈₀ (10K) | 32400 | hours | |
| Reported L ₈₀ (10K) | 32400 | hours | |
| Calculated L ₉₀ (10K) | 15400 | hours | |
| Reported L ₉₀ (10K) | 15400 | hours | |

Curve-fit equation:

$$\Phi(t) = B \exp(-\alpha t)$$

Luminous flux maintenance life equation:

$$L_{70} = \ln(B/0.7)/\alpha$$

$$L_{80} = \ln(B/0.8)/\alpha$$

$$L_{90} = \ln(B/0.9)/\alpha$$

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Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 9-2 (Continued)
 Luminous Flux Maintenance

| LED No. | Luminous Flux Maintenance % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|--|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 94.9 | 94.5 | 93.9 | | | | | | | | | | | | | |
| 2 | 96.2 | 95.9 | 95.5 | | | | | | | | | | | | | |
| 3 | 94.6 | 93.9 | 93.2 | | | | | | | | | | | | | |
| 4 | 94.6 | 94.1 | 93.4 | | | | | | | | | | | | | |
| 5 | 94.8 | 94.4 | 93.5 | | | | | | | | | | | | | |
| 6 | 93.7 | 93.1 | 92.4 | | | | | | | | | | | | | |
| 7 | 93.6 | 92.9 | 92.2 | | | | | | | | | | | | | |
| 8 | 94.6 | 94.0 | 93.1 | | | | | | | | | | | | | |
| 9 | 94.4 | 93.6 | 92.7 | | | | | | | | | | | | | |
| 10 | 95.1 | 94.5 | 93.9 | | | | | | | | | | | | | |
| 11 | 94.4 | 93.9 | 93.1 | | | | | | | | | | | | | |
| 12 | 94.0 | 93.3 | 92.4 | | | | | | | | | | | | | |
| 13 | 95.1 | 94.6 | 93.9 | | | | | | | | | | | | | |
| 14 | 95.6 | 95.3 | 94.7 | | | | | | | | | | | | | |
| 15 | 92.9 | 92.1 | 91.3 | | | | | | | | | | | | | |
| 16 | 93.8 | 93.2 | 92.3 | | | | | | | | | | | | | |
| 17 | 94.8 | 94.3 | 93.5 | | | | | | | | | | | | | |
| 18 | 93.8 | 93.0 | 92.1 | | | | | | | | | | | | | |
| 19 | 93.0 | 92.0 | 91.4 | | | | | | | | | | | | | |
| 20 | 94.1 | 93.3 | 92.5 | | | | | | | | | | | | | |
| 21 | 92.7 | 91.9 | 91.3 | | | | | | | | | | | | | |
| 22 | 93.8 | 92.8 | 91.9 | | | | | | | | | | | | | |
| 23 | 95.0 | 94.4 | 93.8 | | | | | | | | | | | | | |
| 24 | 92.8 | 92.0 | 91.2 | | | | | | | | | | | | | |
| 25 | 94.7 | 94.1 | 93.4 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 94.3 | 93.6 | 92.9 | | | | | | | | | | | | | |
| Med. | 94.4 | 93.9 | 93.1 | | | | | | | | | | | | | |
| σ | 0.88 | 1.03 | 1.09 | | | | | | | | | | | | | |
| Min. | 92.7 | 91.9 | 91.2 | | | | | | | | | | | | | |
| Max. | 96.2 | 95.9 | 95.5 | | | | | | | | | | | | | |

Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _S] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 9-3
Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | | | |
|---------|---|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 100.0 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.2 | 100.1 | 100.2 | 100.1 | 100.1 | 100.2 | 100.1 |
| 2 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 |
| 3 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.1 | 100.1 | 100.1 | 100.2 |
| 4 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 |
| 5 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 |
| 6 | 100.0 | 99.7 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.8 | 100.0 | 100.0 | 99.9 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 |
| 7 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.2 | 100.1 |
| 8 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 |
| 9 | 100.0 | 99.8 | 100.0 | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.2 | 100.1 |
| 10 | 100.0 | 99.7 | 99.9 | 99.9 | 99.8 | 99.9 | 100.0 | 99.9 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 |
| 11 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 |
| 12 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 99.9 | 100.0 | 100.1 | 100.0 |
| 13 | 100.0 | 99.7 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 |
| 14 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 |
| 15 | 100.0 | 99.8 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.2 | 100.1 |
| 16 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 |
| 17 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 |
| 18 | 100.0 | 99.9 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 |
| 19 | 100.0 | 99.8 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 |
| 20 | 100.0 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 |
| 21 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 99.9 | 100.1 | 100.2 | 100.1 | 100.1 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 |
| 22 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.1 | 100.0 |
| 23 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.1 |
| 24 | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.2 | 100.0 |
| 25 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.1 | 100.0 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 |
| Med. | 100.0 | 99.8 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 |
| σ | 0.00 | 0.06 | 0.07 | 0.05 | 0.06 | 0.06 | 0.05 | 0.05 | 0.06 | 0.05 | 0.06 | 0.06 | 0.05 | 0.05 | 0.06 | 0.05 | 0.06 | 0.05 |
| Min. | 100.0 | 99.7 | 99.9 | 99.9 | 99.8 | 99.9 | 100.0 | 99.9 | 99.8 | 100.0 | 100.0 | 99.9 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 |
| Max. | 100.0 | 99.9 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.1 | 100.2 | 100.2 | 100.2 | 100.2 | 100.1 | 100.1 | 100.2 | 100.1 |



Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 9-3 (Continued)
 Forward Voltage

| LED No. | Relative Forward Voltage % (Normalized to 100 % at 0 hours) | | | | | | | | | | | | | | | |
|---------|---|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 100.1 | 100.1 | 100.2 | | | | | | | | | | | | | |
| 2 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 3 | 100.1 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 4 | 100.1 | 100.2 | 100.1 | | | | | | | | | | | | | |
| 5 | 100.1 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 6 | 99.9 | 100.0 | 100.1 | | | | | | | | | | | | | |
| 7 | 100.0 | 100.1 | 100.2 | | | | | | | | | | | | | |
| 8 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | | | |
| 9 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 10 | 99.9 | 100.0 | 100.1 | | | | | | | | | | | | | |
| 11 | 100.0 | 100.0 | 100.1 | | | | | | | | | | | | | |
| 12 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 13 | 99.9 | 100.0 | 100.1 | | | | | | | | | | | | | |
| 14 | 100.0 | 100.1 | 100.2 | | | | | | | | | | | | | |
| 15 | 100.1 | 100.1 | 100.2 | | | | | | | | | | | | | |
| 16 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 17 | 99.9 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 18 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 19 | 100.0 | 100.1 | 100.2 | | | | | | | | | | | | | |
| 20 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 21 | 100.0 | 100.1 | 100.2 | | | | | | | | | | | | | |
| 22 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| 23 | 100.0 | 100.2 | 100.2 | | | | | | | | | | | | | |
| 24 | 100.0 | 100.2 | 100.1 | | | | | | | | | | | | | |
| 25 | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| Med. | 100.0 | 100.1 | 100.1 | | | | | | | | | | | | | |
| σ | 0.05 | 0.05 | 0.04 | | | | | | | | | | | | | |
| Min. | 99.9 | 100.0 | 100.1 | | | | | | | | | | | | | |
| Max. | 100.1 | 100.2 | 100.2 | | | | | | | | | | | | | |

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Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 9-4
 Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.0000 | 0.0020 | 0.0018 | 0.0021 | 0.0023 | 0.0025 | 0.0027 | 0.0025 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0028 | 0.0028 | 0.0028 | 0.0031 | 0.0031 | 0.0033 |
| 2 | 0.0000 | 0.0017 | 0.0016 | 0.0020 | 0.0023 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0028 | 0.0027 | 0.0028 | 0.0027 | 0.0028 | 0.0028 | 0.0030 |
| 3 | 0.0000 | 0.0021 | 0.0019 | 0.0021 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0029 | 0.0031 | 0.0032 | 0.0034 |
| 4 | 0.0000 | 0.0022 | 0.0019 | 0.0022 | 0.0026 | 0.0027 | 0.0028 | 0.0029 | 0.0028 | 0.0029 | 0.0029 | 0.0029 | 0.0029 | 0.0030 | 0.0031 | 0.0033 | 0.0034 | 0.0036 |
| 5 | 0.0000 | 0.0018 | 0.0016 | 0.0019 | 0.0021 | 0.0023 | 0.0023 | 0.0023 | 0.0023 | 0.0025 | 0.0025 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0027 | 0.0028 | 0.0030 |
| 6 | 0.0000 | 0.0020 | 0.0017 | 0.0021 | 0.0024 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0028 | 0.0029 | 0.0029 | 0.0030 | 0.0031 | 0.0033 | 0.0034 | 0.0037 |
| 7 | 0.0000 | 0.0029 | 0.0027 | 0.0028 | 0.0032 | 0.0032 | 0.0033 | 0.0033 | 0.0033 | 0.0035 | 0.0035 | 0.0035 | 0.0036 | 0.0037 | 0.0038 | 0.0041 | 0.0042 | 0.0045 |
| 8 | 0.0000 | 0.0022 | 0.0020 | 0.0021 | 0.0024 | 0.0026 | 0.0027 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0026 | 0.0027 | 0.0028 | 0.0028 | 0.0030 | 0.0031 | 0.0033 |
| 9 | 0.0000 | 0.0018 | 0.0018 | 0.0020 | 0.0023 | 0.0025 | 0.0026 | 0.0027 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0028 | 0.0030 | 0.0031 | 0.0033 |
| 10 | 0.0000 | 0.0016 | 0.0017 | 0.0019 | 0.0022 | 0.0023 | 0.0024 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0027 | 0.0029 | 0.0029 | 0.0032 |
| 11 | 0.0000 | 0.0018 | 0.0019 | 0.0019 | 0.0023 | 0.0025 | 0.0025 | 0.0025 | 0.0024 | 0.0027 | 0.0026 | 0.0025 | 0.0025 | 0.0027 | 0.0027 | 0.0028 | 0.0029 | 0.0031 |
| 12 | 0.0000 | 0.0023 | 0.0021 | 0.0020 | 0.0024 | 0.0024 | 0.0027 | 0.0026 | 0.0026 | 0.0028 | 0.0027 | 0.0028 | 0.0028 | 0.0028 | 0.0030 | 0.0031 | 0.0032 | 0.0034 |
| 13 | 0.0000 | 0.0018 | 0.0018 | 0.0020 | 0.0023 | 0.0024 | 0.0026 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0028 | 0.0027 | 0.0028 | 0.0029 | 0.0031 | 0.0031 | 0.0033 |
| 14 | 0.0000 | 0.0019 | 0.0018 | 0.0018 | 0.0022 | 0.0024 | 0.0025 | 0.0023 | 0.0024 | 0.0025 | 0.0025 | 0.0024 | 0.0024 | 0.0024 | 0.0026 | 0.0026 | 0.0025 | 0.0028 |
| 15 | 0.0000 | 0.0018 | 0.0018 | 0.0020 | 0.0024 | 0.0026 | 0.0028 | 0.0027 | 0.0027 | 0.0028 | 0.0030 | 0.0030 | 0.0030 | 0.0031 | 0.0032 | 0.0036 | 0.0037 | 0.0041 |
| 16 | 0.0000 | 0.0019 | 0.0018 | 0.0019 | 0.0022 | 0.0023 | 0.0026 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0027 | 0.0028 | 0.0029 | 0.0031 | 0.0032 | 0.0035 |
| 17 | 0.0000 | 0.0016 | 0.0018 | 0.0018 | 0.0021 | 0.0024 | 0.0024 | 0.0023 | 0.0024 | 0.0024 | 0.0026 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0026 | 0.0027 |
| 18 | 0.0000 | 0.0020 | 0.0018 | 0.0021 | 0.0024 | 0.0026 | 0.0026 | 0.0027 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0028 | 0.0029 | 0.0031 | 0.0033 | 0.0035 |
| 19 | 0.0000 | 0.0016 | 0.0019 | 0.0020 | 0.0022 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0026 | 0.0027 | 0.0026 | 0.0027 | 0.0029 | 0.0030 | 0.0032 | 0.0034 | 0.0037 |
| 20 | 0.0000 | 0.0018 | 0.0018 | 0.0018 | 0.0022 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0026 | 0.0026 | 0.0029 | 0.0030 | 0.0031 | 0.0035 |
| 21 | 0.0000 | 0.0021 | 0.0021 | 0.0022 | 0.0026 | 0.0027 | 0.0028 | 0.0028 | 0.0028 | 0.0029 | 0.0029 | 0.0031 | 0.0032 | 0.0033 | 0.0034 | 0.0037 | 0.0039 | 0.0042 |
| 22 | 0.0000 | 0.0020 | 0.0019 | 0.0020 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | 0.0025 | 0.0027 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0029 | 0.0031 | 0.0031 | 0.0035 |
| 23 | 0.0000 | 0.0024 | 0.0020 | 0.0021 | 0.0024 | 0.0025 | 0.0027 | 0.0027 | 0.0026 | 0.0027 | 0.0027 | 0.0028 | 0.0027 | 0.0028 | 0.0028 | 0.0029 | 0.0030 | 0.0032 |
| 24 | 0.0000 | 0.0027 | 0.0024 | 0.0024 | 0.0026 | 0.0028 | 0.0029 | 0.0029 | 0.0029 | 0.0031 | 0.0032 | 0.0033 | 0.0035 | 0.0035 | 0.0037 | 0.0039 | 0.0042 | 0.0045 |
| 25 | 0.0000 | 0.0018 | 0.0018 | 0.0019 | 0.0023 | 0.0025 | 0.0025 | 0.0025 | 0.0024 | 0.0026 | 0.0026 | 0.0026 | 0.0026 | 0.0026 | 0.0028 | 0.0029 | 0.0030 | 0.0032 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.0000 | 0.0020 | 0.0019 | 0.0020 | 0.0024 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0028 | 0.0029 | 0.0031 | 0.0032 | 0.0035 |
| Med. | 0.0000 | 0.0019 | 0.0018 | 0.0020 | 0.0023 | 0.0025 | 0.0026 | 0.0026 | 0.0026 | 0.0027 | 0.0027 | 0.0027 | 0.0027 | 0.0028 | 0.0029 | 0.0031 | 0.0031 | 0.0034 |
| σ | 0.0000 | 0.0003 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0002 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0004 | 0.0004 | 0.0005 |
| Min. | 0.0000 | 0.0016 | 0.0016 | 0.0018 | 0.0021 | 0.0023 | 0.0023 | 0.0023 | 0.0023 | 0.0024 | 0.0025 | 0.0024 | 0.0024 | 0.0024 | 0.0025 | 0.0025 | 0.0025 | 0.0027 |
| Max. | 0.0000 | 0.0029 | 0.0027 | 0.0028 | 0.0032 | 0.0032 | 0.0033 | 0.0033 | 0.0033 | 0.0035 | 0.0035 | 0.0035 | 0.0036 | 0.0037 | 0.0038 | 0.0041 | 0.0042 | 0.0045 |

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Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 9-4 (Continued)
 Chromaticity Shift

| LED No. | Chromaticity Shift Δu'v' | | | | | | | | | | | | | | | |
|---------|--------------------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.0036 | 0.0038 | 0.0039 | | | | | | | | | | | | | |
| 2 | 0.0032 | 0.0032 | 0.0034 | | | | | | | | | | | | | |
| 3 | 0.0037 | 0.0040 | 0.0043 | | | | | | | | | | | | | |
| 4 | 0.0039 | 0.0042 | 0.0045 | | | | | | | | | | | | | |
| 5 | 0.0033 | 0.0034 | 0.0035 | | | | | | | | | | | | | |
| 6 | 0.0040 | 0.0041 | 0.0044 | | | | | | | | | | | | | |
| 7 | 0.0050 | 0.0052 | 0.0056 | | | | | | | | | | | | | |
| 8 | 0.0037 | 0.0039 | 0.0044 | | | | | | | | | | | | | |
| 9 | 0.0037 | 0.0039 | 0.0043 | | | | | | | | | | | | | |
| 10 | 0.0035 | 0.0037 | 0.0039 | | | | | | | | | | | | | |
| 11 | 0.0035 | 0.0036 | 0.0040 | | | | | | | | | | | | | |
| 12 | 0.0038 | 0.0041 | 0.0045 | | | | | | | | | | | | | |
| 13 | 0.0035 | 0.0037 | 0.0039 | | | | | | | | | | | | | |
| 14 | 0.0031 | 0.0031 | 0.0036 | | | | | | | | | | | | | |
| 15 | 0.0045 | 0.0047 | 0.0051 | | | | | | | | | | | | | |
| 16 | 0.0039 | 0.0041 | 0.0046 | | | | | | | | | | | | | |
| 17 | 0.0031 | 0.0032 | 0.0034 | | | | | | | | | | | | | |
| 18 | 0.0039 | 0.0041 | 0.0044 | | | | | | | | | | | | | |
| 19 | 0.0043 | 0.0045 | 0.0049 | | | | | | | | | | | | | |
| 20 | 0.0038 | 0.0040 | 0.0045 | | | | | | | | | | | | | |
| 21 | 0.0047 | 0.0049 | 0.0053 | | | | | | | | | | | | | |
| 22 | 0.0039 | 0.0041 | 0.0045 | | | | | | | | | | | | | |
| 23 | 0.0034 | 0.0036 | 0.0038 | | | | | | | | | | | | | |
| 24 | 0.0050 | 0.0052 | 0.0057 | | | | | | | | | | | | | |
| 25 | 0.0035 | 0.0037 | 0.0042 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.0038 | 0.0040 | 0.0043 | | | | | | | | | | | | | |
| Med. | 0.0037 | 0.0040 | 0.0044 | | | | | | | | | | | | | |
| σ | 0.0005 | 0.0006 | 0.0006 | | | | | | | | | | | | | |
| Min. | 0.0031 | 0.0031 | 0.0034 | | | | | | | | | | | | | |
| Max. | 0.0050 | 0.0052 | 0.0057 | | | | | | | | | | | | | |



Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 9-5
 Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.2627 | 0.2607 | 0.2609 | 0.2606 | 0.2604 | 0.2602 | 0.2600 | 0.2602 | 0.2601 | 0.2601 | 0.2600 | 0.2600 | 0.2600 | 0.2599 | 0.2599 | 0.2597 | 0.2597 | 0.2594 |
| 2 | 0.2611 | 0.2595 | 0.2595 | 0.2592 | 0.2588 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2585 | 0.2584 | 0.2584 | 0.2582 |
| 3 | 0.2624 | 0.2603 | 0.2604 | 0.2602 | 0.2600 | 0.2598 | 0.2598 | 0.2598 | 0.2598 | 0.2597 | 0.2597 | 0.2597 | 0.2597 | 0.2597 | 0.2595 | 0.2594 | 0.2593 | 0.2590 |
| 4 | 0.2638 | 0.2616 | 0.2620 | 0.2617 | 0.2613 | 0.2611 | 0.2611 | 0.2610 | 0.2611 | 0.2609 | 0.2610 | 0.2609 | 0.2610 | 0.2609 | 0.2608 | 0.2606 | 0.2605 | 0.2604 |
| 5 | 0.2643 | 0.2624 | 0.2626 | 0.2624 | 0.2621 | 0.2620 | 0.2619 | 0.2619 | 0.2620 | 0.2618 | 0.2618 | 0.2619 | 0.2619 | 0.2618 | 0.2617 | 0.2615 | 0.2615 | 0.2613 |
| 6 | 0.2620 | 0.2601 | 0.2603 | 0.2599 | 0.2597 | 0.2595 | 0.2594 | 0.2594 | 0.2594 | 0.2593 | 0.2593 | 0.2592 | 0.2592 | 0.2591 | 0.2590 | 0.2588 | 0.2587 | 0.2585 |
| 7 | 0.2581 | 0.2553 | 0.2554 | 0.2553 | 0.2550 | 0.2550 | 0.2548 | 0.2549 | 0.2549 | 0.2547 | 0.2547 | 0.2547 | 0.2546 | 0.2545 | 0.2544 | 0.2542 | 0.2541 | 0.2538 |
| 8 | 0.2608 | 0.2586 | 0.2588 | 0.2587 | 0.2585 | 0.2583 | 0.2582 | 0.2582 | 0.2583 | 0.2582 | 0.2582 | 0.2582 | 0.2581 | 0.2581 | 0.2580 | 0.2579 | 0.2578 | 0.2576 |
| 9 | 0.2630 | 0.2612 | 0.2612 | 0.2610 | 0.2607 | 0.2605 | 0.2604 | 0.2604 | 0.2604 | 0.2603 | 0.2603 | 0.2603 | 0.2603 | 0.2602 | 0.2602 | 0.2600 | 0.2600 | 0.2598 |
| 10 | 0.2586 | 0.2570 | 0.2569 | 0.2567 | 0.2564 | 0.2564 | 0.2562 | 0.2562 | 0.2562 | 0.2563 | 0.2562 | 0.2562 | 0.2561 | 0.2561 | 0.2560 | 0.2558 | 0.2557 | 0.2555 |
| 11 | 0.2633 | 0.2615 | 0.2614 | 0.2614 | 0.2611 | 0.2609 | 0.2608 | 0.2609 | 0.2609 | 0.2607 | 0.2607 | 0.2608 | 0.2608 | 0.2607 | 0.2607 | 0.2605 | 0.2604 | 0.2603 |
| 12 | 0.2627 | 0.2604 | 0.2606 | 0.2607 | 0.2603 | 0.2603 | 0.2601 | 0.2601 | 0.2601 | 0.2600 | 0.2600 | 0.2600 | 0.2599 | 0.2599 | 0.2598 | 0.2597 | 0.2595 | 0.2594 |
| 13 | 0.2619 | 0.2601 | 0.2601 | 0.2599 | 0.2596 | 0.2595 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2591 | 0.2592 | 0.2591 | 0.2591 | 0.2589 | 0.2588 | 0.2586 |
| 14 | 0.2610 | 0.2592 | 0.2592 | 0.2592 | 0.2588 | 0.2586 | 0.2585 | 0.2587 | 0.2586 | 0.2585 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2584 | 0.2585 | 0.2583 |
| 15 | 0.2610 | 0.2592 | 0.2592 | 0.2590 | 0.2586 | 0.2584 | 0.2583 | 0.2583 | 0.2583 | 0.2582 | 0.2581 | 0.2581 | 0.2581 | 0.2580 | 0.2579 | 0.2576 | 0.2574 | 0.2572 |
| 16 | 0.2611 | 0.2592 | 0.2593 | 0.2591 | 0.2589 | 0.2588 | 0.2586 | 0.2586 | 0.2586 | 0.2586 | 0.2585 | 0.2585 | 0.2585 | 0.2583 | 0.2582 | 0.2581 | 0.2580 | 0.2577 |
| 17 | 0.2644 | 0.2628 | 0.2626 | 0.2627 | 0.2624 | 0.2621 | 0.2621 | 0.2622 | 0.2621 | 0.2620 | 0.2619 | 0.2620 | 0.2620 | 0.2620 | 0.2620 | 0.2619 | 0.2618 | 0.2617 |
| 18 | 0.2615 | 0.2595 | 0.2596 | 0.2594 | 0.2591 | 0.2589 | 0.2589 | 0.2588 | 0.2589 | 0.2588 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2586 | 0.2584 | 0.2582 | 0.2581 |
| 19 | 0.2651 | 0.2635 | 0.2632 | 0.2631 | 0.2629 | 0.2627 | 0.2626 | 0.2626 | 0.2626 | 0.2626 | 0.2624 | 0.2625 | 0.2624 | 0.2623 | 0.2622 | 0.2620 | 0.2618 | 0.2615 |
| 20 | 0.2616 | 0.2599 | 0.2598 | 0.2598 | 0.2594 | 0.2593 | 0.2592 | 0.2592 | 0.2592 | 0.2591 | 0.2591 | 0.2590 | 0.2591 | 0.2590 | 0.2588 | 0.2587 | 0.2586 | 0.2583 |
| 21 | 0.2615 | 0.2594 | 0.2594 | 0.2593 | 0.2589 | 0.2589 | 0.2587 | 0.2588 | 0.2588 | 0.2587 | 0.2587 | 0.2585 | 0.2584 | 0.2583 | 0.2583 | 0.2580 | 0.2578 | 0.2576 |
| 22 | 0.2622 | 0.2602 | 0.2602 | 0.2602 | 0.2598 | 0.2597 | 0.2595 | 0.2596 | 0.2597 | 0.2595 | 0.2596 | 0.2595 | 0.2595 | 0.2595 | 0.2593 | 0.2591 | 0.2591 | 0.2588 |
| 23 | 0.2633 | 0.2610 | 0.2613 | 0.2612 | 0.2610 | 0.2608 | 0.2607 | 0.2607 | 0.2608 | 0.2607 | 0.2606 | 0.2606 | 0.2607 | 0.2606 | 0.2606 | 0.2605 | 0.2604 | 0.2602 |
| 24 | 0.2619 | 0.2593 | 0.2595 | 0.2596 | 0.2594 | 0.2591 | 0.2590 | 0.2591 | 0.2591 | 0.2589 | 0.2588 | 0.2587 | 0.2585 | 0.2585 | 0.2583 | 0.2581 | 0.2579 | 0.2575 |
| 25 | 0.2614 | 0.2596 | 0.2596 | 0.2595 | 0.2592 | 0.2590 | 0.2589 | 0.2589 | 0.2590 | 0.2589 | 0.2589 | 0.2589 | 0.2588 | 0.2588 | 0.2587 | 0.2586 | 0.2585 | 0.2582 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.2620 | 0.2601 | 0.2601 | 0.2600 | 0.2597 | 0.2595 | 0.2594 | 0.2595 | 0.2595 | 0.2594 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2592 | 0.2590 | 0.2589 | 0.2587 |
| Med. | 0.2619 | 0.2601 | 0.2601 | 0.2599 | 0.2596 | 0.2595 | 0.2593 | 0.2593 | 0.2593 | 0.2593 | 0.2592 | 0.2591 | 0.2592 | 0.2591 | 0.2590 | 0.2588 | 0.2587 | 0.2585 |
| σ | 0.0016 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0017 | 0.0018 | 0.0018 | 0.0018 |
| Min. | 0.2581 | 0.2553 | 0.2554 | 0.2553 | 0.2550 | 0.2550 | 0.2548 | 0.2549 | 0.2549 | 0.2547 | 0.2547 | 0.2547 | 0.2546 | 0.2545 | 0.2544 | 0.2542 | 0.2541 | 0.2538 |
| Max. | 0.2651 | 0.2635 | 0.2632 | 0.2631 | 0.2629 | 0.2627 | 0.2626 | 0.2626 | 0.2626 | 0.2626 | 0.2624 | 0.2625 | 0.2624 | 0.2623 | 0.2622 | 0.2620 | 0.2618 | 0.2617 |

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Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:
 T_s and T_A were measured during initial setup.
 Number of LED failures: 0

TABLE 9-5 (Continued)
 Chromaticity

| LED No. | Chromaticity u' | | | | | | | | | | | | | | | |
|---------|-----------------|--------|---------|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | | | | | |
| 1 | 0.2592 | 0.2590 | 0.2589 | | | | | | | | | | | | | |
| 2 | 0.2580 | 0.2580 | 0.2579 | | | | | | | | | | | | | |
| 3 | 0.2588 | 0.2585 | 0.2583 | | | | | | | | | | | | | |
| 4 | 0.2601 | 0.2599 | 0.2596 | | | | | | | | | | | | | |
| 5 | 0.2610 | 0.2609 | 0.2608 | | | | | | | | | | | | | |
| 6 | 0.2582 | 0.2581 | 0.2578 | | | | | | | | | | | | | |
| 7 | 0.2534 | 0.2533 | 0.2530 | | | | | | | | | | | | | |
| 8 | 0.2572 | 0.2571 | 0.2566 | | | | | | | | | | | | | |
| 9 | 0.2595 | 0.2593 | 0.2590 | | | | | | | | | | | | | |
| 10 | 0.2552 | 0.2551 | 0.2549 | | | | | | | | | | | | | |
| 11 | 0.2599 | 0.2598 | 0.2595 | | | | | | | | | | | | | |
| 12 | 0.2590 | 0.2587 | 0.2584 | | | | | | | | | | | | | |
| 13 | 0.2585 | 0.2583 | 0.2582 | | | | | | | | | | | | | |
| 14 | 0.2581 | 0.2580 | 0.2576 | | | | | | | | | | | | | |
| 15 | 0.2568 | 0.2566 | 0.2563 | | | | | | | | | | | | | |
| 16 | 0.2574 | 0.2572 | 0.2567 | | | | | | | | | | | | | |
| 17 | 0.2614 | 0.2613 | 0.2611 | | | | | | | | | | | | | |
| 18 | 0.2577 | 0.2576 | 0.2574 | | | | | | | | | | | | | |
| 19 | 0.2611 | 0.2609 | 0.2605 | | | | | | | | | | | | | |
| 20 | 0.2580 | 0.2578 | 0.2573 | | | | | | | | | | | | | |
| 21 | 0.2572 | 0.2570 | 0.2567 | | | | | | | | | | | | | |
| 22 | 0.2584 | 0.2582 | 0.2579 | | | | | | | | | | | | | |
| 23 | 0.2600 | 0.2599 | 0.2597 | | | | | | | | | | | | | |
| 24 | 0.2572 | 0.2570 | 0.2565 | | | | | | | | | | | | | |
| 25 | 0.2580 | 0.2578 | 0.2574 | | | | | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | | | | | |
| Avg. | 0.2584 | 0.2582 | 0.2579 | | | | | | | | | | | | | |
| Med. | 0.2582 | 0.2581 | 0.2579 | | | | | | | | | | | | | |
| σ | 0.0018 | 0.0018 | 0.0018 | | | | | | | | | | | | | |
| Min. | 0.2534 | 0.2533 | 0.2530 | | | | | | | | | | | | | |
| Max. | 0.2614 | 0.2613 | 0.2611 | | | | | | | | | | | | | |

Data Set 9 : 105 °C, 200 mA

| | |
|--|----------|
| Actual Case Temperature [T _s] | 105.9 °C |
| Actual Ambient Temperature [T _A] | 101.5 °C |
| Drive Current [I _F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_s and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 9-6
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | | | | | | | |
|---------|-----------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0 h | 500 h | 1000 h | 1500 h | 2000 h | 2500 h | 3000 h | 3500 h | 4000 h | 4500 h | 5000 h | 5500 h | 6000 h | 6500 h | 7000 h | 7500 h | 8000 h | 8500 h |
| 1 | 0.5270 | 0.5267 | 0.5268 | 0.5268 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5265 | 0.5265 | 0.5264 | 0.5264 | 0.5263 |
| 2 | 0.5279 | 0.5278 | 0.5278 | 0.5278 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5276 | 0.5276 | 0.5275 | 0.5276 | 0.5275 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5274 |
| 3 | 0.5266 | 0.5264 | 0.5264 | 0.5264 | 0.5262 | 0.5262 | 0.5262 | 0.5262 | 0.5261 | 0.5262 | 0.5261 | 0.5261 | 0.5260 | 0.5261 | 0.5260 | 0.5259 | 0.5259 | 0.5258 |
| 4 | 0.5258 | 0.5255 | 0.5255 | 0.5254 | 0.5254 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5253 | 0.5252 | 0.5253 | 0.5252 | 0.5252 | 0.5252 | 0.5250 | 0.5250 | 0.5249 |
| 5 | 0.5310 | 0.5308 | 0.5309 | 0.5309 | 0.5308 | 0.5308 | 0.5307 | 0.5307 | 0.5307 | 0.5307 | 0.5307 | 0.5308 | 0.5308 | 0.5308 | 0.5307 | 0.5308 | 0.5308 | 0.5307 |
| 6 | 0.5266 | 0.5264 | 0.5264 | 0.5264 | 0.5262 | 0.5262 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5261 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5258 | 0.5257 |
| 7 | 0.5258 | 0.5251 | 0.5253 | 0.5253 | 0.5251 | 0.5250 | 0.5250 | 0.5250 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5248 | 0.5247 | 0.5246 | 0.5245 | 0.5245 | 0.5243 |
| 8 | 0.5281 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5277 | 0.5276 | 0.5276 | 0.5276 | 0.5274 | 0.5274 | 0.5272 |
| 9 | 0.5272 | 0.5270 | 0.5270 | 0.5270 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5265 | 0.5264 | 0.5263 | 0.5262 |
| 10 | 0.5255 | 0.5252 | 0.5253 | 0.5252 | 0.5250 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5249 | 0.5248 | 0.5248 | 0.5247 | 0.5246 | 0.5246 | 0.5245 |
| 11 | 0.5283 | 0.5281 | 0.5281 | 0.5281 | 0.5280 | 0.5279 | 0.5278 | 0.5278 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 |
| 12 | 0.5293 | 0.5289 | 0.5290 | 0.5290 | 0.5288 | 0.5288 | 0.5288 | 0.5288 | 0.5287 | 0.5288 | 0.5288 | 0.5288 | 0.5287 | 0.5288 | 0.5287 | 0.5287 | 0.5286 | 0.5285 |
| 13 | 0.5283 | 0.5281 | 0.5282 | 0.5281 | 0.5280 | 0.5279 | 0.5279 | 0.5278 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5278 | 0.5278 | 0.5278 | 0.5277 |
| 14 | 0.5260 | 0.5256 | 0.5257 | 0.5257 | 0.5256 | 0.5255 | 0.5254 | 0.5255 | 0.5254 | 0.5254 | 0.5254 | 0.5255 | 0.5254 | 0.5254 | 0.5254 | 0.5253 | 0.5254 | 0.5253 |
| 15 | 0.5265 | 0.5263 | 0.5264 | 0.5264 | 0.5262 | 0.5261 | 0.5259 | 0.5260 | 0.5260 | 0.5260 | 0.5259 | 0.5259 | 0.5258 | 0.5258 | 0.5257 | 0.5255 | 0.5254 | 0.5252 |
| 16 | 0.5284 | 0.5281 | 0.5281 | 0.5282 | 0.5280 | 0.5280 | 0.5279 | 0.5280 | 0.5279 | 0.5279 | 0.5279 | 0.5279 | 0.5278 | 0.5279 | 0.5277 | 0.5276 | 0.5276 | 0.5275 |
| 17 | 0.5292 | 0.5290 | 0.5291 | 0.5290 | 0.5289 | 0.5289 | 0.5288 | 0.5287 | 0.5287 | 0.5288 | 0.5288 | 0.5287 | 0.5287 | 0.5288 | 0.5288 | 0.5287 | 0.5287 | 0.5286 |
| 18 | 0.5271 | 0.5268 | 0.5269 | 0.5269 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5267 | 0.5266 | 0.5266 | 0.5265 | 0.5264 | 0.5263 | 0.5262 |
| 19 | 0.5260 | 0.5257 | 0.5257 | 0.5257 | 0.5256 | 0.5254 | 0.5255 | 0.5255 | 0.5254 | 0.5254 | 0.5254 | 0.5254 | 0.5253 | 0.5252 | 0.5252 | 0.5251 | 0.5250 | 0.5249 |
| 20 | 0.5279 | 0.5277 | 0.5277 | 0.5277 | 0.5276 | 0.5276 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5275 | 0.5276 | 0.5274 | 0.5275 | 0.5274 | 0.5273 | 0.5272 | 0.5271 |
| 21 | 0.5253 | 0.5250 | 0.5250 | 0.5250 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5246 | 0.5247 | 0.5246 | 0.5246 | 0.5244 | 0.5244 | 0.5242 | 0.5241 | 0.5240 | 0.5237 |
| 22 | 0.5270 | 0.5268 | 0.5269 | 0.5269 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5266 | 0.5265 | 0.5264 | 0.5263 |
| 23 | 0.5277 | 0.5273 | 0.5274 | 0.5273 | 0.5272 | 0.5272 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5271 | 0.5270 | 0.5271 | 0.5269 |
| 24 | 0.5288 | 0.5285 | 0.5286 | 0.5286 | 0.5284 | 0.5284 | 0.5284 | 0.5284 | 0.5283 | 0.5283 | 0.5283 | 0.5283 | 0.5282 | 0.5282 | 0.5281 | 0.5279 | 0.5278 | 0.5277 |
| 25 | 0.5259 | 0.5256 | 0.5256 | 0.5256 | 0.5254 | 0.5254 | 0.5253 | 0.5254 | 0.5254 | 0.5254 | 0.5253 | 0.5254 | 0.5253 | 0.5253 | 0.5252 | 0.5252 | 0.5251 | 0.5251 |
| n | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| Avg. | 0.5273 | 0.5270 | 0.5271 | 0.5271 | 0.5269 | 0.5269 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5268 | 0.5267 | 0.5266 | 0.5266 | 0.5265 |
| Med. | 0.5271 | 0.5268 | 0.5269 | 0.5269 | 0.5268 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5267 | 0.5267 | 0.5267 | 0.5266 | 0.5266 | 0.5265 | 0.5264 | 0.5264 | 0.5263 |
| σ | 0.0014 | 0.0014 | 0.0014 | 0.0014 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0015 | 0.0016 | 0.0016 | 0.0016 |
| Min. | 0.5253 | 0.5250 | 0.5250 | 0.5250 | 0.5248 | 0.5247 | 0.5247 | 0.5247 | 0.5246 | 0.5247 | 0.5246 | 0.5246 | 0.5244 | 0.5244 | 0.5242 | 0.5241 | 0.5240 | 0.5237 |
| Max. | 0.5310 | 0.5308 | 0.5309 | 0.5309 | 0.5308 | 0.5308 | 0.5307 | 0.5307 | 0.5307 | 0.5307 | 0.5307 | 0.5308 | 0.5308 | 0.5308 | 0.5307 | 0.5308 | 0.5308 | 0.5307 |



Data Set 9 : 105 °C, 200 mA

| | |
|--------------------------------------|----------|
| Actual Case Temperature [T_S] | 105.9 °C |
| Actual Ambient Temperature [T_A] | 101.5 °C |
| Drive Current [I_F] | 200 mA |
| Measurement Current | 200 mA |

NOTES:

T_S and T_A were measured during initial setup.

Number of LED failures: 0

TABLE 9-6 (Continued)
Chromaticity

| LED No. | Chromaticity v' | | | | | | | | | | | |
|----------|-------------------|--------|---------|--|--|--|--|--|--|--|--|--|
| | 9000 h | 9500 h | 10000 h | | | | | | | | | |
| 1 | 0.5261 | 0.5261 | 0.5259 | | | | | | | | | |
| 2 | 0.5272 | 0.5272 | 0.5271 | | | | | | | | | |
| 3 | 0.5255 | 0.5253 | 0.5251 | | | | | | | | | |
| 4 | 0.5246 | 0.5245 | 0.5242 | | | | | | | | | |
| 5 | 0.5305 | 0.5305 | 0.5304 | | | | | | | | | |
| 6 | 0.5254 | 0.5253 | 0.5252 | | | | | | | | | |
| 7 | 0.5240 | 0.5238 | 0.5236 | | | | | | | | | |
| 8 | 0.5270 | 0.5269 | 0.5267 | | | | | | | | | |
| 9 | 0.5260 | 0.5258 | 0.5256 | | | | | | | | | |
| 10 | 0.5243 | 0.5242 | 0.5240 | | | | | | | | | |
| 11 | 0.5276 | 0.5275 | 0.5274 | | | | | | | | | |
| 12 | 0.5282 | 0.5281 | 0.5279 | | | | | | | | | |
| 13 | 0.5275 | 0.5274 | 0.5273 | | | | | | | | | |
| 14 | 0.5250 | 0.5250 | 0.5248 | | | | | | | | | |
| 15 | 0.5249 | 0.5247 | 0.5246 | | | | | | | | | |
| 16 | 0.5272 | 0.5271 | 0.5269 | | | | | | | | | |
| 17 | 0.5284 | 0.5283 | 0.5282 | | | | | | | | | |
| 18 | 0.5259 | 0.5257 | 0.5255 | | | | | | | | | |
| 19 | 0.5246 | 0.5243 | 0.5241 | | | | | | | | | |
| 20 | 0.5268 | 0.5267 | 0.5264 | | | | | | | | | |
| 21 | 0.5234 | 0.5232 | 0.5230 | | | | | | | | | |
| 22 | 0.5261 | 0.5259 | 0.5256 | | | | | | | | | |
| 23 | 0.5267 | 0.5267 | 0.5265 | | | | | | | | | |
| 24 | 0.5274 | 0.5272 | 0.5269 | | | | | | | | | |
| 25 | 0.5248 | 0.5246 | 0.5244 | | | | | | | | | |
| n | 25 | 25 | 25 | | | | | | | | | |
| Avg. | 0.5262 | 0.5261 | 0.5259 | | | | | | | | | |
| Med. | 0.5261 | 0.5259 | 0.5256 | | | | | | | | | |
| σ | 0.0016 | 0.0017 | 0.0017 | | | | | | | | | |
| Min. | 0.5234 | 0.5232 | 0.5230 | | | | | | | | | |
| Max. | 0.5305 | 0.5305 | 0.5304 | | | | | | | | | |