# TEST REPORT

ACCORDING TO IES LM-80-15
For

## Hongli Zhihui Group Co.,Ltd. Guangzhou Branch

Room 316, Building 2, No.1, Xianke Yi Road, Huadong Town, Huadu District, Guangzhou, China

## Model: A2835W1H3-D01-8D2AA1

| | |
|---|---|
| **Report Type:** 6000 Hours Test Report | **Product Type:** LED Package |
| **Test Engineer:** | Pote Wang |
| **Report Number:** | RSZ160930505-10-M5 |
| **Test Date:** | 2016-10-09 to 2017-06-18 |
| **Report Date:** | 2019-04-15 |
| **Reviewed By:** | Daniel Duan / EE Manager |
| **Revised Note:** | The previous report RSZ160930505-10-M4 is replaced by this report on 2019-04-15 |
| **Test Facility:** | Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. |
| **Prepared By:** | Bay Area Compliance Laboratories Corp. (Dongguan).<br>No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia ,<br>Dongguan, Guangdong, China.<br>Tel: +86-0769-86858888<br>Fax:+86-0769-86858588 |

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# 1 - General Information

## 1.1 Description of LED Light Sources

**Sample Size:**

90 PCS samples were received on 2016-09-30. The samples were numbered from 1 to 30, 31 to 60 and 61 to 90.

| | |
|---|---|
| Manufacturer: | Hongli Zhihui Group Co.,Ltd. Guangzhou Branch |
| Part Number: | A2835W1H3-D01-8D2AA1 |
| Part Type: | LED Package |
| Drive Level: | DC 90mA |
| Nominal CCT: | 2700K |
| Power: | 0.36 W |
| Average Current Density per LED die: | 1038.78mA/mm$^2$ |
| Average Power Density per LED die: | 4.16 W/mm$^2$ |
| CRI: | 80 |
| Die Spacing: | N/A |

**Sampling Method:**

LED samples for IESNA LM-80 testing consist of units built from a minimum of three manufacturing lots with each manufacturing lot built from different wafer lots built on non-consecutive days.
These manufacturing lots are picked to represent a wide parametric distribution.

**Family products covered by this report:**

According to *ENERGY STAR® Requirements for the Use of LM-80 Data*, the following products can be covered by this report base on the information and declaration provided by manufacturer. The information of these models shows that the covered products meet all section 4 requirements of *ENERGY STAR® Requirements for the Use of LM-80 Data* (September 28, 2017)

| Test Model Number | Multiple Models | Details |
|---|---|---|
| A2835W1H3-D01-8D2AA1 | A2835W*H3-D01-8D2AA2 | 1. Different Model name for different market<br>2. "*" is a number from 1 to 9 which stand for CCT.<br>1 means 2600-2800K,<br>2 means 2800-3100K,<br>3 means 3800-4250K,<br>4 means 4750-5300K,<br>5 means 5700-6500K,<br>6 means 6000-7000K,<br>8 means 3200-3800K,<br>9 means 5050-5650K. |
| | A2835W*H3-D01-8D2AA3 | |
| | A2835W*H3-D01-8D2AA4 | |
| | A2835W*H3-D01-8D2AA5 | |
| | A2835W*H5-D01-8D2AA4 | |
| | A2835W*H6-D01-8D2AA4 | |
| | P2835W*H5-D01-8D3A01 | |
| | P2835W*H6-D01-8D3A01 | |

| Test Model Number | Multiple Models | Details |
|---|---|---|
| A2835W1H3-D01-8D2AA1 | HL-A-2835HW-S1-08HL-HR3 | Only different Model name for different market |
| | HL-AM-2835HW-S1-08HL-HR3 | |
| | HL-A-2835HW-S1-08HL-HR3(R9) | |
| | HL-AM-2835HW-S1-08HL-HR3(R9) | |
| | HL-AM-2835HW-S1-08-HR3 | |
| | HL-AM-2835HW-S1-08-HR3(R9) | |
| | P*2835W*H6-D01-8D2A* | 1. Different Model name for different market<br>2. First "*" is a letter which stand for special code which do not affect product performance.<br>3. Second "*" is a number from 1 to 9 which stand for CCT.<br>1 means 2600-2800K,<br>2 means 2800-3100K,<br>3 means 3800-4250K,<br>4 means 4750-5300K,<br>5 means 5700-6500K,<br>6 means 6000-7000K,<br>8 means 3200-3800K,<br>9 means 5050-5650K.<br>4. Third "*" is a serial number from 1 to 9. |

## 1.2 Standards Used:

- IESNA LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs
- ENERGY STAR® Requirements for the Use of LM-80 Data (This standard was not accredited by IAS)

## 1.3 Testing Equipment

| Device | Manufacture | Model No | Serial No | Calibration date | Calibration due date |
|---|---|---|---|---|---|
| Integral Sphere | EVERFINE | Diameter 0.3m | 1011119 | 2017-03-09 | 2018-03-08 |
| Programmable Test Power for LEDs | EVERFINE | LED300E | 1008002 | 2017-03-03 | 2018-03-02 |

| Device | Manufacture | Model No | Serial No | Calibration date | Calibration due date |
|---|---|---|---|---|---|
| High accuracy array spectroradiometer | EVERFINE | HAAS-2000 | 1012016T | 2017-03-09 | 2018-03-08 |
| Standard Light Source | EVERFINE | D062 | 1011093 | 2016-09-13 | 2017-09-12 |
| Precision digital stabilized DC power supply | EVERFINE | WY605-V110 | G115987CJ7321114 | 2017-03-03 | 2018-03-02 |
| Multilayer aging machine | BACL | B2-270 | 20005 | 2016-09-01 | 2017-09-01 |
| Digital CC&CV DC Power Supply | EVERFINE | WY5015 | 11090009 | 2016-12-15 | 2017-12-14 |
| Digital CC&CV DC Power Supply | EVERFINE | WY5015 | 11090004 | 2017-03-03 | 2018-03-02 |

## 1.4 Drive Level

Samples are driven with a constant direct current (DC) during maintenance test, photometric and electrical measurement. The current value was regulated to within ±3% of the specified value of the manufacturer during maintenance test, and was within ±0.5% during photometric and electrical measurement test.

## 1.5 Ambient Conditions for Maintenance Test

For lumen maintenance test, samples within one data set, were installed on cooling boards in thermal chambers with minimal ambient airflow. The case temperature and ambient temperature was monitored by thermocouples which one was soldered to the coldest DUTs' case ($TMP_{LED}$) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing, $TMP_{LED}$ of the coldest LEDs were maintained at a temperature that was greater than or equal to 2°C below the corresponding nominal case temperature. Surrounding air was maintained at a temperature that was greater than or equal to 5°C below the corresponding nominal case temperature. Thermocouples were shielded from direct DUT optical radiation and comply with ASTM E230 Table 1 "Special Limits".

Samples were connected to DC power supply in series circuits with a constant current. The forward current was regulated to within ±3% of the specified value of the manufacturer.

The relative humidity within chamber was kept less than 65% during test.

For photometry measurement, the ambient temperature during test was set to 25°C ± 2°C, RH <65%.

## 1.6 Measurement Uncertainty

The uncertainty of the light output measurements is U=1.59% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=21K (K=2), at the 95% confidence level.

The uncertainty of the temperature is U=0.8671°C (K=2), at the 95% confidence level.

## 1.7 Statement of Traceability

Bay Area Compliance Laboratories Corp. (Dongguan) attested that all calibration has been performed using suitable standards traceable to National Primary Standards and International System of Units (SI).

## 1.8 Sample Set

**Data Set 1: 55°C, 90mA**

| | |
|---|---|
| Part Number: | A2835W1H3-D01-8D2AA1 |
| Number of Units: | 30 |
| Case Temperature: | >53°C |
| Ambient Temperature: | >50°C |
| Life Test Drive Current: | 90mA |
| Measurement Current: | 90mA |

**Data Set 2: 85°C, 90mA**

| | |
|---|---|
| Part Number: | A2835W1H3-D01-8D2AA1 |
| Number of Units: | 30 |
| Case Temperature: | >83°C |
| Ambient Temperature: | >80°C |
| Life Test Drive Current: | 90mA |
| Measurement Current: | 90mA |

**Data Set 3: 105°C, 90mA**

| | |
|---|---|
| Part Number: | A2835W1H3-D01-8D2AA1 |
| Number of Units: | 30 |
| Case Temperature: | >103°C |
| Ambient Temperature: | >100°C |
| Life Test Drive Current: | 90mA |
| Measurement Current: | 90mA |

## 2 - Summary of Test Result

| Data Set: | Sample Size | Failures Observed: | Test Interval | Test Duration | Reported TM-21 $L_{70}$ Lifetime |
|---|---|---|---|---|---|
| 1 | 30 | 0 | 1000 | 6000 | >36000 hours |
| 2 | 30 | 0 | 1000 | 6000 | >36000 hours |
| 3 | 30 | 0 | 1000 | 6000 | >36000 hours |

Average Lumen Maintenance (Percentage of Initial Luminous Flux)

| Data Set: | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 |
|---|---|---|---|---|---|---|
| 1 | 100.31% | 100.14% | 99.98% | 99.83% | 99.62% | 99.42% |
| 2 | 100.20% | 99.98% | 99.77% | 99.60% | 99.34% | 99.09% |
| 3 | 100.13% | 99.83% | 99.56% | 99.36% | 99.02% | 98.72% |

Average Color Maintenance

| Data Set: | 1000 | 2000 | 3000 | 4000 | 5000 | 6000 |
|---|---|---|---|---|---|---|
| 1 | 0.0004 | 0.0007 | 0.0010 | 0.0011 | 0.0014 | 0.0017 |
| 2 | 0.0006 | 0.0008 | 0.0012 | 0.0013 | 0.0016 | 0.0019 |
| 3 | 0.0007 | 0.0010 | 0.0014 | 0.0015 | 0.0018 | 0.0021 |

# 3 - Test Data

## 3.1 Data Set 1, 55°C, 90mA (Lumen Maintenance)

| No. | Φ(lm) | Lumen Maintenance (%) | | | | | |
|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 1 | 42.33 | 100.33 | 100.12 | 99.86 | 99.74 | 99.50 | 99.29 |
| 2 | 42.11 | 100.36 | 100.19 | 100.07 | 99.98 | 99.79 | 99.62 |
| 3 | 41.99 | 100.33 | 100.17 | 99.95 | 99.81 | 99.69 | 99.45 |
| 4 | 42.38 | 100.24 | 100.19 | 100.09 | 99.74 | 99.62 | 99.46 |
| 5 | 41.75 | 100.19 | 100.02 | 99.95 | 99.76 | 99.50 | 99.26 |
| 6 | 42.17 | 100.43 | 100.38 | 100.14 | 99.95 | 99.60 | 99.26 |
| 7 | 42.38 | 100.24 | 100.17 | 99.81 | 99.72 | 99.48 | 99.17 |
| 8 | 41.71 | 100.41 | 100.31 | 100.05 | 99.98 | 99.83 | 99.57 |
| 9 | 42.12 | 100.33 | 100.05 | 99.98 | 99.79 | 99.72 | 99.57 |
| 10 | 41.96 | 100.31 | 100.14 | 99.88 | 99.79 | 99.52 | 99.31 |
| 11 | 41.54 | 100.39 | 100.22 | 100.14 | 99.93 | 99.66 | 99.52 |
| 12 | 42.57 | 100.31 | 100.21 | 99.93 | 99.84 | 99.69 | 99.44 |
| 13 | 41.82 | 100.36 | 100.29 | 100.12 | 99.78 | 99.76 | 99.62 |
| 14 | 41.99 | 100.29 | 100.14 | 100.10 | 99.98 | 99.67 | 99.43 |
| 15 | 42.05 | 100.40 | 100.17 | 99.95 | 99.86 | 99.67 | 99.41 |
| 16 | 41.83 | 100.24 | 100.10 | 99.83 | 99.78 | 99.62 | 99.43 |
| 17 | 42.61 | 100.38 | 100.12 | 99.95 | 99.74 | 99.58 | 99.48 |
| 18 | 41.37 | 100.34 | 100.15 | 99.93 | 99.85 | 99.56 | 99.49 |
| 19 | 42.03 | 100.43 | 100.21 | 100.02 | 99.81 | 99.60 | 99.50 |
| 20 | 41.81 | 100.38 | 100.17 | 99.90 | 99.71 | 99.38 | 99.16 |
| 21 | 42.68 | 100.37 | 100.19 | 100.02 | 99.93 | 99.88 | 99.70 |
| 22 | 41.62 | 100.19 | 100.07 | 100.05 | 99.90 | 99.74 | 99.59 |
| 23 | 41.56 | 100.26 | 100.14 | 100.10 | 99.98 | 99.59 | 99.40 |
| 24 | 42.42 | 100.09 | 99.95 | 99.88 | 99.72 | 99.41 | 99.08 |
| 25 | 42.35 | 100.21 | 99.91 | 99.79 | 99.67 | 99.50 | 99.29 |
| 26 | 42.44 | 100.33 | 100.07 | 99.95 | 99.84 | 99.51 | 99.34 |
| 27 | 42.31 | 100.26 | 99.95 | 99.79 | 99.67 | 99.36 | 99.10 |
| 28 | 41.87 | 100.36 | 100.19 | 100.17 | 99.95 | 99.74 | 99.57 |
| 29 | 41.67 | 100.24 | 100.12 | 100.02 | 99.88 | 99.78 | 99.62 |
| 30 | 42.35 | 100.38 | 100.17 | 99.93 | 99.81 | 99.67 | 99.36 |
| Ave. | 42.06 | 100.31 | 100.14 | 99.98 | 99.83 | 99.62 | 99.42 |
| Med. | 42.04 | 100.33 | 100.16 | 99.95 | 99.81 | 99.62 | 99.43 |
| st dev | 0.35 | 0.0808 | 0.1013 | 0.1094 | 0.0970 | 0.1318 | 0.1627 |
| Min. | 41.37 | 100.09 | 99.91 | 99.79 | 99.67 | 99.36 | 99.08 |
| Max. | 42.68 | 100.43 | 100.38 | 100.17 | 99.98 | 99.88 | 99.70 |

TM-21 Projection:

**Test Duration:** 6000 hours

**Failures Observed:** 0

**α:** 1.762E-06

**β:** 1.005

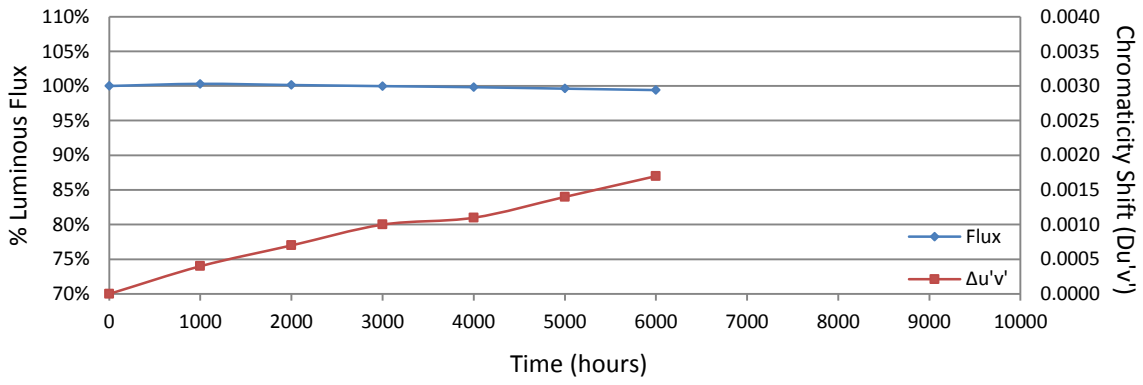
**Reported $L_{70}$:** >36000 hours

## 3.2 Data Set 1, 55°C, 90mA (Forward Voltage)

| No. | Forward Voltage (V) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 1 | 2.981 | 2.983 | 2.988 | 2.999 | 2.984 | 2.990 | 2.984 |
| 2 | 2.987 | 2.953 | 2.957 | 2.989 | 2.957 | 2.959 | 2.953 |
| 3 | 2.985 | 2.982 | 2.986 | 3.009 | 2.987 | 2.992 | 2.984 |
| 4 | 2.980 | 2.978 | 2.981 | 2.989 | 2.995 | 2.987 | 2.982 |
| 5 | 2.981 | 2.981 | 2.984 | 3.009 | 2.987 | 2.989 | 2.982 |
| 6 | 2.952 | 2.990 | 2.993 | 3.001 | 2.993 | 2.999 | 2.990 |
| 7 | 2.975 | 2.975 | 2.978 | 2.979 | 2.983 | 2.983 | 2.978 |
| 8 | 2.976 | 2.975 | 2.977 | 2.980 | 2.999 | 2.984 | 2.975 |
| 9 | 2.972 | 2.970 | 2.975 | 2.974 | 2.976 | 2.981 | 2.971 |
| 10 | 2.975 | 2.974 | 2.978 | 2.979 | 2.975 | 2.982 | 2.977 |
| 11 | 2.978 | 2.977 | 2.980 | 2.982 | 2.982 | 2.986 | 2.975 |
| 12 | 2.994 | 2.993 | 2.998 | 3.004 | 2.995 | 3.001 | 2.990 |
| 13 | 2.981 | 2.978 | 2.984 | 2.986 | 2.981 | 2.987 | 2.980 |
| 14 | 2.994 | 2.992 | 2.996 | 3.002 | 2.995 | 2.999 | 2.993 |
| 15 | 2.980 | 2.976 | 2.981 | 2.987 | 2.986 | 2.987 | 2.979 |
| 16 | 2.987 | 2.987 | 2.992 | 2.993 | 2.995 | 2.996 | 2.989 |
| 17 | 2.969 | 2.967 | 2.972 | 2.974 | 2.970 | 2.974 | 2.968 |
| 18 | 2.988 | 2.986 | 2.989 | 2.992 | 2.993 | 2.994 | 2.987 |
| 19 | 2.992 | 2.989 | 2.993 | 2.994 | 2.989 | 2.998 | 2.992 |
| 20 | 2.991 | 2.986 | 2.992 | 2.990 | 2.994 | 2.995 | 2.987 |
| 21 | 2.979 | 2.976 | 2.981 | 2.983 | 2.980 | 2.985 | 2.979 |
| 22 | 2.991 | 2.985 | 2.990 | 2.991 | 2.989 | 2.993 | 2.987 |
| 23 | 2.980 | 2.978 | 2.983 | 2.985 | 2.980 | 2.987 | 2.981 |
| 24 | 2.954 | 2.949 | 2.953 | 2.956 | 2.954 | 2.955 | 2.950 |
| 25 | 2.987 | 2.984 | 2.990 | 2.990 | 2.987 | 2.993 | 2.987 |
| 26 | 2.992 | 2.987 | 2.993 | 2.994 | 2.993 | 2.997 | 2.995 |
| 27 | 2.996 | 2.991 | 2.998 | 2.999 | 2.996 | 3.002 | 2.996 |
| 28 | 2.982 | 2.983 | 2.987 | 3.001 | 2.985 | 2.993 | 2.985 |
| 29 | 2.975 | 2.972 | 2.979 | 2.982 | 2.974 | 2.984 | 2.975 |
| 30 | 2.977 | 2.978 | 2.982 | 2.988 | 2.981 | 2.985 | 2.980 |
| Ave. | 2.981 | 2.979 | 2.984 | 2.989 | 2.985 | 2.988 | 2.981 |
| Med. | 2.981 | 2.980 | 2.984 | 2.990 | 2.987 | 2.988 | 2.982 |
| st dev | 0.010 | 0.010 | 0.010 | 0.011 | 0.011 | 0.011 | 0.011 |
| Min. | 2.952 | 2.949 | 2.953 | 2.956 | 2.954 | 2.955 | 2.950 |
| Max. | 2.996 | 2.993 | 2.998 | 3.009 | 2.999 | 3.002 | 2.996 |

## 3.3 Data Set 1, 55°C, 90mA (Chromaticity Shift)

| No. | u' | v' | CCT(K) | Chromaticity Shift (Δu'v') | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | | | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 1 | 0.2625 | 0.5250 | 2709 | 0.0004 | 0.0005 | 0.0006 | 0.0010 | 0.0013 | 0.0016 |
| 2 | 0.2627 | 0.5255 | 2703 | 0.0003 | 0.0004 | 0.0007 | 0.0008 | 0.0009 | 0.0011 |
| 3 | 0.2616 | 0.5254 | 2728 | 0.0004 | 0.0009 | 0.0009 | 0.0010 | 0.0014 | 0.0016 |
| 4 | 0.2615 | 0.5254 | 2729 | 0.0004 | 0.0008 | 0.0009 | 0.0010 | 0.0014 | 0.0016 |
| 5 | 0.2619 | 0.5242 | 2726 | 0.0004 | 0.0009 | 0.0011 | 0.0012 | 0.0014 | 0.0016 |
| 6 | 0.2615 | 0.5254 | 2728 | 0.0009 | 0.0011 | 0.0017 | 0.0019 | 0.0024 | 0.0025 |
| 7 | 0.2615 | 0.5245 | 2733 | 0.0004 | 0.0005 | 0.0011 | 0.0012 | 0.0015 | 0.0017 |
| 8 | 0.2610 | 0.5237 | 2746 | 0.0004 | 0.0006 | 0.0010 | 0.0011 | 0.0014 | 0.0016 |
| 9 | 0.2623 | 0.5253 | 2713 | 0.0004 | 0.0006 | 0.0010 | 0.0011 | 0.0014 | 0.0016 |
| 10 | 0.2619 | 0.5254 | 2720 | 0.0004 | 0.0006 | 0.0010 | 0.0011 | 0.0014 | 0.0016 |
| 11 | 0.2634 | 0.5241 | 2694 | 0.0004 | 0.0005 | 0.0009 | 0.0011 | 0.0013 | 0.0016 |
| 12 | 0.2611 | 0.5256 | 2736 | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0014 | 0.0017 |
| 13 | 0.2608 | 0.5246 | 2748 | 0.0004 | 0.0006 | 0.0011 | 0.0011 | 0.0013 | 0.0016 |
| 14 | 0.2625 | 0.5245 | 2711 | 0.0004 | 0.0006 | 0.0009 | 0.0012 | 0.0013 | 0.0016 |
| 15 | 0.2613 | 0.5246 | 2737 | 0.0004 | 0.0007 | 0.0010 | 0.0012 | 0.0014 | 0.0015 |
| 16 | 0.2619 | 0.5223 | 2734 | 0.0004 | 0.0006 | 0.0010 | 0.0012 | 0.0014 | 0.0016 |
| 17 | 0.2613 | 0.5242 | 2738 | 0.0004 | 0.0006 | 0.0011 | 0.0013 | 0.0014 | 0.0017 |
| 18 | 0.2607 | 0.5240 | 2752 | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0014 | 0.0017 |
| 19 | 0.2610 | 0.5235 | 2747 | 0.0004 | 0.0006 | 0.0010 | 0.0011 | 0.0013 | 0.0015 |
| 20 | 0.2627 | 0.5253 | 2704 | 0.0004 | 0.0006 | 0.0010 | 0.0013 | 0.0015 | 0.0017 |
| 21 | 0.2607 | 0.5243 | 2752 | 0.0004 | 0.0007 | 0.0010 | 0.0013 | 0.0013 | 0.0016 |
| 22 | 0.2621 | 0.5256 | 2715 | 0.0004 | 0.0006 | 0.0010 | 0.0011 | 0.0014 | 0.0016 |
| 23 | 0.2638 | 0.5238 | 2687 | 0.0004 | 0.0006 | 0.0010 | 0.0010 | 0.0013 | 0.0016 |
| 24 | 0.2615 | 0.5260 | 2726 | 0.0004 | 0.0006 | 0.0010 | 0.0011 | 0.0014 | 0.0016 |
| 25 | 0.2615 | 0.5251 | 2731 | 0.0004 | 0.0006 | 0.0011 | 0.0011 | 0.0014 | 0.0016 |
| 26 | 0.2631 | 0.5252 | 2697 | 0.0004 | 0.0006 | 0.0010 | 0.0011 | 0.0014 | 0.0016 |
| 27 | 0.2605 | 0.5252 | 2751 | 0.0005 | 0.0007 | 0.0010 | 0.0012 | 0.0015 | 0.0016 |
| 28 | 0.2632 | 0.5249 | 2696 | 0.0005 | 0.0007 | 0.0012 | 0.0012 | 0.0016 | 0.0017 |
| 29 | 0.2610 | 0.5243 | 2745 | 0.0004 | 0.0006 | 0.0010 | 0.0012 | 0.0014 | 0.0016 |
| 30 | 0.2631 | 0.5239 | 2703 | 0.0005 | 0.0007 | 0.0011 | 0.0013 | 0.0014 | 0.0016 |
| Ave. | 0.2619 | 0.5247 | 2725 | 0.0004 | 0.0007 | 0.0010 | 0.0011 | 0.0014 | 0.0017 |
| Med. | 0.2616 | 0.5248 | 2728 | 0.0004 | 0.0006 | 0.0010 | 0.0011 | 0.0014 | 0.0016 |
| st dev | 0.0009 | 0.0008 | 19 | 0.0001 | 0.0001 | 0.0002 | 0.0002 | 0.0002 | 0.0002 |
| Min. | 0.2605 | 0.5223 | 2687 | 0.0003 | 0.0004 | 0.0006 | 0.0008 | 0.0009 | 0.0011 |
| Max. | 0.2638 | 0.5260 | 2752 | 0.0009 | 0.0011 | 0.0017 | 0.0019 | 0.0024 | 0.0025 |



## 3.4 Data Set 2, 85°C, 90mA (Lumen Maintenance)

| No. | Φ(lm) | Lumen Maintenance (%) | | | | | |
|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 31 | 41.25 | 100.36 | 100.24 | 100.07 | 99.83 | 99.64 | 99.42 |
| 32 | 42.54 | 100.26 | 100.12 | 99.95 | 99.76 | 99.44 | 99.27 |
| 33 | 41.95 | 100.17 | 100.02 | 99.83 | 99.71 | 99.64 | 99.38 |
| 34 | 41.48 | 100.34 | 100.12 | 99.93 | 99.86 | 99.59 | 99.40 |
| 35 | 42.13 | 100.07 | 99.76 | 99.43 | 99.26 | 99.10 | 98.74 |
| 36 | 42.09 | 100.10 | 99.88 | 99.71 | 99.55 | 99.22 | 99.03 |
| 37 | 42.07 | 100.24 | 99.90 | 99.64 | 99.57 | 99.26 | 98.84 |
| 38 | 41.83 | 100.17 | 99.98 | 99.81 | 99.57 | 99.21 | 98.83 |
| 39 | 42.44 | 100.21 | 99.95 | 99.74 | 99.55 | 99.29 | 99.08 |
| 40 | 42.70 | 100.16 | 99.93 | 99.81 | 99.65 | 99.48 | 99.25 |
| 41 | 41.72 | 100.24 | 100.12 | 99.78 | 99.47 | 99.14 | 98.92 |
| 42 | 42.29 | 100.21 | 100.02 | 99.79 | 99.62 | 99.46 | 99.13 |
| 43 | 42.31 | 100.26 | 100.07 | 99.76 | 99.69 | 99.46 | 99.36 |
| 44 | 42.17 | 100.36 | 100.05 | 99.86 | 99.72 | 99.41 | 99.10 |
| 45 | 42.42 | 100.21 | 99.95 | 99.69 | 99.53 | 99.13 | 98.75 |
| 46 | 42.35 | 100.24 | 99.93 | 99.86 | 99.62 | 99.24 | 98.96 |
| 47 | 41.59 | 100.12 | 99.78 | 99.59 | 99.42 | 99.09 | 98.82 |
| 48 | 41.83 | 100.02 | 99.69 | 99.50 | 99.12 | 99.00 | 98.73 |
| 49 | 41.74 | 100.36 | 100.22 | 100.07 | 99.95 | 99.57 | 99.35 |
| 50 | 42.28 | 100.14 | 100.02 | 99.91 | 99.79 | 99.48 | 99.24 |
| 51 | 42.49 | 100.02 | 99.81 | 99.60 | 99.41 | 99.20 | 98.92 |
| 52 | 42.15 | 100.12 | 99.88 | 99.67 | 99.48 | 99.31 | 99.05 |
| 53 | 42.04 | 100.05 | 99.76 | 99.50 | 99.17 | 98.98 | 98.88 |
| 54 | 42.17 | 100.07 | 99.98 | 99.88 | 99.64 | 99.29 | 99.12 |
| 55 | 42.29 | 100.14 | 99.91 | 99.76 | 99.62 | 99.34 | 99.01 |
| 56 | 42.28 | 100.26 | 100.09 | 99.74 | 99.62 | 99.34 | 99.20 |
| 57 | 41.75 | 100.29 | 99.95 | 99.64 | 99.57 | 99.33 | 99.11 |
| 58 | 42.77 | 100.33 | 100.07 | 99.84 | 99.67 | 99.49 | 99.37 |
| 59 | 42.43 | 100.28 | 100.12 | 99.86 | 99.69 | 99.39 | 99.22 |
| 60 | 41.37 | 100.27 | 100.07 | 99.90 | 99.73 | 99.56 | 99.35 |
| Ave. | 42.10 | 100.20 | 99.98 | 99.77 | 99.60 | 99.34 | 99.09 |
| Med. | 42.16 | 100.21 | 99.98 | 99.79 | 99.62 | 99.33 | 99.11 |
| st dev | 0.38 | 0.1014 | 0.1357 | 0.1556 | 0.1877 | 0.1839 | 0.2186 |
| Min. | 41.25 | 100.02 | 99.69 | 99.43 | 99.12 | 98.98 | 98.73 |
| Max. | 42.77 | 100.36 | 100.24 | 100.07 | 99.95 | 99.64 | 99.42 |

TM-21 Projection:

**Test Duration:** 6000 hours

**Failures Observed:** 0

**α:** 2.191E-06

**β:** 1.004

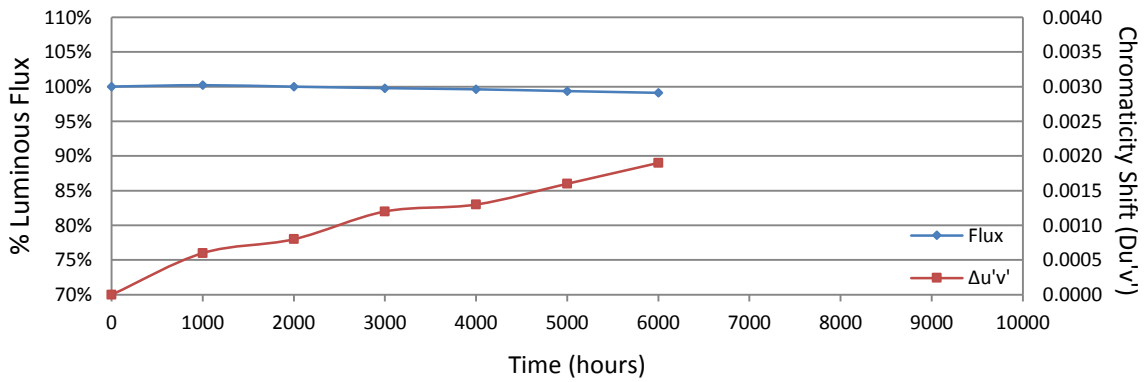
**Reported $L_{70}$:** >36000 hours

## 3.5 Data Set 2, 85°C, 90mA (Forward Voltage)

| No. | Forward Voltage (V) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 31 | 2.983 | 2.982 | 2.987 | 2.995 | 2.984 | 2.992 | 2.982 |
| 32 | 2.978 | 2.978 | 2.982 | 3.006 | 2.979 | 2.985 | 2.982 |
| 33 | 2.972 | 2.972 | 2.978 | 2.983 | 2.974 | 2.980 | 2.975 |
| 34 | 2.986 | 2.981 | 2.987 | 2.989 | 2.985 | 2.990 | 2.984 |
| 35 | 2.995 | 2.993 | 3.000 | 3.033 | 3.001 | 3.002 | 2.994 |
| 36 | 2.950 | 2.949 | 2.955 | 2.960 | 2.956 | 2.957 | 2.950 |
| 37 | 2.980 | 2.979 | 2.985 | 2.985 | 2.985 | 2.986 | 2.981 |
| 38 | 2.989 | 2.988 | 2.994 | 2.997 | 2.993 | 2.996 | 2.987 |
| 39 | 2.989 | 2.987 | 2.992 | 2.991 | 2.990 | 2.993 | 2.986 |
| 40 | 2.975 | 2.974 | 2.980 | 2.996 | 2.987 | 2.981 | 2.977 |
| 41 | 2.979 | 2.977 | 2.983 | 2.992 | 2.981 | 2.984 | 2.978 |
| 42 | 2.982 | 2.983 | 2.987 | 2.990 | 2.990 | 2.990 | 2.980 |
| 43 | 2.988 | 2.987 | 2.992 | 2.992 | 2.989 | 2.993 | 2.986 |
| 44 | 2.991 | 2.989 | 2.996 | 2.997 | 2.998 | 2.998 | 2.992 |
| 45 | 2.989 | 2.988 | 2.994 | 3.017 | 2.989 | 2.995 | 2.989 |
| 46 | 2.979 | 2.978 | 2.984 | 2.995 | 2.980 | 2.987 | 2.981 |
| 47 | 2.977 | 2.974 | 2.982 | 2.993 | 2.977 | 2.983 | 2.978 |
| 48 | 2.952 | 2.950 | 2.957 | 2.958 | 2.953 | 2.956 | 2.957 |
| 49 | 2.972 | 2.971 | 2.976 | 2.981 | 2.971 | 2.976 | 2.980 |
| 50 | 2.978 | 2.977 | 2.982 | 2.987 | 2.980 | 2.983 | 2.983 |
| 51 | 2.982 | 2.981 | 2.987 | 2.991 | 2.984 | 2.988 | 2.983 |
| 52 | 2.976 | 2.973 | 2.980 | 2.983 | 2.979 | 2.981 | 2.994 |
| 53 | 2.980 | 2.977 | 2.982 | 2.984 | 2.985 | 2.983 | 2.982 |
| 54 | 2.983 | 2.982 | 2.989 | 2.991 | 2.981 | 2.985 | 2.986 |
| 55 | 2.964 | 2.962 | 2.970 | 2.970 | 2.963 | 2.967 | 2.976 |
| 56 | 2.985 | 2.983 | 2.992 | 2.993 | 2.989 | 2.987 | 2.992 |
| 57 | 2.993 | 2.992 | 2.997 | 2.998 | 2.994 | 2.998 | 3.014 |
| 58 | 2.981 | 2.978 | 2.985 | 2.989 | 2.981 | 2.985 | 2.987 |
| 59 | 2.987 | 2.989 | 2.993 | 2.996 | 2.988 | 2.993 | 2.993 |
| 60 | 2.986 | 2.987 | 2.993 | 2.993 | 2.989 | 2.992 | 2.994 |
| Ave. | 2.980 | 2.979 | 2.985 | 2.991 | 2.983 | 2.986 | 2.983 |
| Med. | 2.982 | 2.980 | 2.986 | 2.992 | 2.985 | 2.987 | 2.983 |
| st dev | 0.010 | 0.011 | 0.010 | 0.014 | 0.011 | 0.011 | 0.011 |
| Min. | 2.950 | 2.949 | 2.955 | 2.958 | 2.953 | 2.956 | 2.950 |
| Max. | 2.995 | 2.993 | 3.000 | 3.033 | 3.001 | 3.002 | 3.014 |

## 3.6 Data Set 2, 85°C, 90mA (Chromaticity Shift)

| No. | u' | v' | CCT(K) | Chromaticity Shift (Δu'v') | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | | | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 31 | 0.2618 | 0.5216 | 2739 | 0.0006 | 0.0009 | 0.0013 | 0.0012 | 0.0016 | 0.0018 |
| 32 | 0.2625 | 0.5246 | 2711 | 0.0006 | 0.0008 | 0.0011 | 0.0012 | 0.0016 | 0.0018 |
| 33 | 0.2614 | 0.5247 | 2733 | 0.0006 | 0.0008 | 0.0011 | 0.0011 | 0.0016 | 0.0018 |
| 34 | 0.2617 | 0.5233 | 2734 | 0.0005 | 0.0007 | 0.0010 | 0.0011 | 0.0015 | 0.0017 |
| 35 | 0.2633 | 0.5245 | 2694 | 0.0006 | 0.0008 | 0.0012 | 0.0012 | 0.0016 | 0.0018 |
| 36 | 0.2614 | 0.5242 | 2735 | 0.0007 | 0.0008 | 0.0013 | 0.0012 | 0.0016 | 0.0018 |
| 37 | 0.2629 | 0.5249 | 2701 | 0.0005 | 0.0008 | 0.0012 | 0.0011 | 0.0014 | 0.0017 |
| 38 | 0.2619 | 0.5242 | 2725 | 0.0006 | 0.0008 | 0.0013 | 0.0012 | 0.0016 | 0.0019 |
| 39 | 0.2616 | 0.5245 | 2731 | 0.0007 | 0.0008 | 0.0013 | 0.0014 | 0.0017 | 0.0019 |
| 40 | 0.2606 | 0.5248 | 2750 | 0.0006 | 0.0009 | 0.0013 | 0.0013 | 0.0017 | 0.0019 |
| 41 | 0.2611 | 0.5240 | 2744 | 0.0005 | 0.0008 | 0.0012 | 0.0013 | 0.0015 | 0.0018 |
| 42 | 0.2612 | 0.5236 | 2744 | 0.0006 | 0.0008 | 0.0013 | 0.0013 | 0.0016 | 0.0019 |
| 43 | 0.2614 | 0.5255 | 2732 | 0.0006 | 0.0008 | 0.0012 | 0.0015 | 0.0016 | 0.0018 |
| 44 | 0.2619 | 0.5248 | 2724 | 0.0007 | 0.0009 | 0.0014 | 0.0015 | 0.0017 | 0.0019 |
| 45 | 0.2622 | 0.5240 | 2720 | 0.0005 | 0.0008 | 0.0011 | 0.0013 | 0.0015 | 0.0018 |
| 46 | 0.2604 | 0.5247 | 2755 | 0.0006 | 0.0008 | 0.0012 | 0.0014 | 0.0016 | 0.0019 |
| 47 | 0.2629 | 0.5267 | 2695 | 0.0007 | 0.0009 | 0.0013 | 0.0014 | 0.0017 | 0.0019 |
| 48 | 0.2620 | 0.5245 | 2723 | 0.0006 | 0.0009 | 0.0013 | 0.0015 | 0.0017 | 0.0019 |
| 49 | 0.2619 | 0.5239 | 2728 | 0.0006 | 0.0009 | 0.0013 | 0.0016 | 0.0017 | 0.0019 |
| 50 | 0.2619 | 0.5238 | 2726 | 0.0006 | 0.0008 | 0.0011 | 0.0013 | 0.0015 | 0.0017 |
| 51 | 0.2611 | 0.5249 | 2738 | 0.0006 | 0.0008 | 0.0012 | 0.0014 | 0.0016 | 0.0019 |
| 52 | 0.2615 | 0.5258 | 2727 | 0.0007 | 0.0009 | 0.0013 | 0.0015 | 0.0016 | 0.0019 |
| 53 | 0.2614 | 0.5238 | 2737 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0016 | 0.0018 |
| 54 | 0.2606 | 0.5251 | 2750 | 0.0006 | 0.0008 | 0.0012 | 0.0014 | 0.0016 | 0.0018 |
| 55 | 0.2614 | 0.5257 | 2731 | 0.0005 | 0.0007 | 0.0011 | 0.0013 | 0.0016 | 0.0018 |
| 56 | 0.2613 | 0.5228 | 2744 | 0.0006 | 0.0008 | 0.0012 | 0.0014 | 0.0016 | 0.0019 |
| 57 | 0.2608 | 0.5247 | 2747 | 0.0006 | 0.0009 | 0.0013 | 0.0015 | 0.0016 | 0.0019 |
| 58 | 0.2613 | 0.5256 | 2733 | 0.0006 | 0.0009 | 0.0013 | 0.0015 | 0.0016 | 0.0019 |
| 59 | 0.2620 | 0.5251 | 2720 | 0.0006 | 0.0008 | 0.0012 | 0.0014 | 0.0015 | 0.0017 |
| 60 | 0.2631 | 0.5247 | 2698 | 0.0006 | 0.0008 | 0.0011 | 0.0014 | 0.0015 | 0.0018 |
| Ave. | 0.2617 | 0.5245 | 2729 | 0.0006 | 0.0008 | 0.0012 | 0.0013 | 0.0016 | 0.0019 |
| Med. | 0.2616 | 0.5247 | 2732 | 0.0006 | 0.0008 | 0.0012 | 0.0014 | 0.0016 | 0.0018 |
| st dev | 0.0007 | 0.0010 | 16 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.2604 | 0.5216 | 2694 | 0.0005 | 0.0007 | 0.0010 | 0.0011 | 0.0014 | 0.0017 |
| Max. | 0.2633 | 0.5267 | 2755 | 0.0007 | 0.0009 | 0.0014 | 0.0016 | 0.0017 | 0.0019 |



## 3.7 Data Set 3, 105°C, 90mA (Lumen Maintenance)

| No. | Φ(lm) | Lumen Maintenance (%) | | | | | |
|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 61 | 42.03 | 100.17 | 99.95 | 99.81 | 99.60 | 99.26 | 98.95 |
| 62 | 42.12 | 100.26 | 99.86 | 99.60 | 99.50 | 99.12 | 98.96 |
| 63 | 41.75 | 100.14 | 99.88 | 99.62 | 99.38 | 99.16 | 98.97 |
| 64 | 41.38 | 100.24 | 100.02 | 99.86 | 99.59 | 99.37 | 99.11 |
| 65 | 42.01 | 99.98 | 99.76 | 99.52 | 99.33 | 99.10 | 98.64 |
| 66 | 42.21 | 100.07 | 99.81 | 99.64 | 99.53 | 99.15 | 98.91 |
| 67 | 41.26 | 100.05 | 99.59 | 99.35 | 99.25 | 98.96 | 98.69 |
| 68 | 41.30 | 100.15 | 99.76 | 99.39 | 99.30 | 99.18 | 98.86 |
| 69 | 41.42 | 99.98 | 99.73 | 99.40 | 99.35 | 98.89 | 98.43 |
| 70 | 42.47 | 100.14 | 99.84 | 99.41 | 99.27 | 99.03 | 98.75 |
| 71 | 42.05 | 100.05 | 99.69 | 99.45 | 99.17 | 98.91 | 98.69 |
| 72 | 41.65 | 100.07 | 99.64 | 99.30 | 99.18 | 98.73 | 98.39 |
| 73 | 41.80 | 100.14 | 99.81 | 99.50 | 99.28 | 99.02 | 98.71 |
| 74 | 41.73 | 100.22 | 99.93 | 99.54 | 99.35 | 98.85 | 98.66 |
| 75 | 42.57 | 100.07 | 99.77 | 99.53 | 99.27 | 98.75 | 98.33 |
| 76 | 42.48 | 100.14 | 99.79 | 99.46 | 99.13 | 98.82 | 98.59 |
| 77 | 41.79 | 100.07 | 99.76 | 99.62 | 99.52 | 99.07 | 98.73 |
| 78 | 42.14 | 100.19 | 99.91 | 99.81 | 99.69 | 99.26 | 98.84 |
| 79 | 41.63 | 100.02 | 99.78 | 99.71 | 99.54 | 99.14 | 98.85 |
| 80 | 42.00 | 100.12 | 99.76 | 99.50 | 99.17 | 98.86 | 98.55 |
| 81 | 41.94 | 100.07 | 99.71 | 99.36 | 99.09 | 98.78 | 98.43 |
| 82 | 41.79 | 100.02 | 99.86 | 99.52 | 99.28 | 99.02 | 98.73 |
| 83 | 42.11 | 100.26 | 99.93 | 99.62 | 99.34 | 99.03 | 98.81 |
| 84 | 41.35 | 100.27 | 99.90 | 99.83 | 99.61 | 99.40 | 98.98 |
| 85 | 42.19 | 100.19 | 99.88 | 99.50 | 99.36 | 98.91 | 98.60 |
| 86 | 41.84 | 100.24 | 99.83 | 99.43 | 99.14 | 98.83 | 98.47 |
| 87 | 41.66 | 100.22 | 99.88 | 99.57 | 99.26 | 98.80 | 98.46 |
| 88 | 41.51 | 100.24 | 100.02 | 99.74 | 99.61 | 99.16 | 98.84 |
| 89 | 42.07 | 100.17 | 100.07 | 99.81 | 99.60 | 99.36 | 99.03 |
| 90 | 41.89 | 100.07 | 99.74 | 99.45 | 99.21 | 98.83 | 98.62 |
| Ave. | 41.87 | 100.13 | 99.83 | 99.56 | 99.36 | 99.02 | 98.72 |
| Med. | 41.87 | 100.14 | 99.82 | 99.53 | 99.33 | 99.02 | 98.72 |
| st dev | 0.35 | 0.0868 | 0.1117 | 0.1571 | 0.1728 | 0.1931 | 0.2064 |
| Min. | 41.26 | 99.98 | 99.59 | 99.30 | 99.09 | 98.73 | 98.33 |
| Max. | 42.57 | 100.27 | 100.07 | 99.86 | 99.69 | 99.40 | 99.11 |

TM-21 Projection:

**Test Duration:** 6000 hours

**Failures Observed:** 0

**α:** 2.782E-06

**β:** 1.004

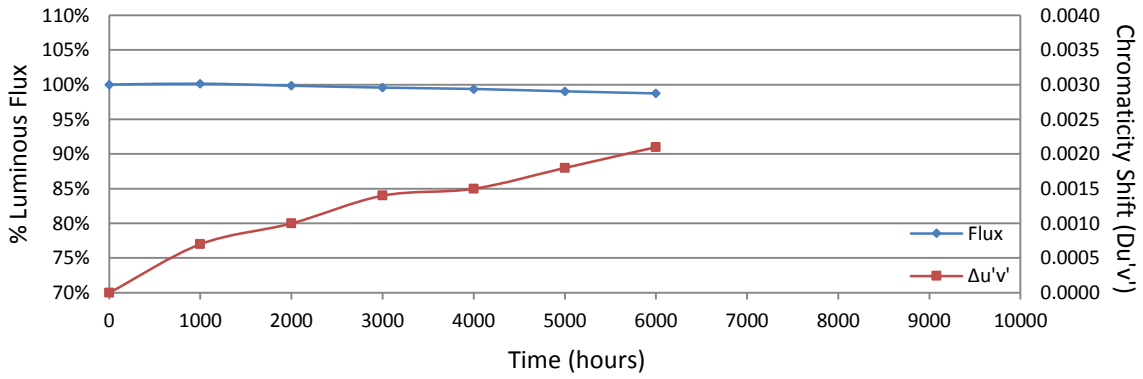
**Reported $L_{70}$:** >36000 hours

## 3.8 Data Set 3, 105°C, 90mA (Forward Voltage)

| No. | Forward Voltage (V) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 61 | 2.981 | 2.984 | 2.986 | 2.988 | 2.983 | 2.990 | 2.986 |
| 62 | 2.970 | 2.973 | 2.975 | 2.981 | 2.970 | 2.976 | 2.975 |
| 63 | 2.973 | 2.971 | 2.978 | 2.982 | 2.974 | 2.980 | 2.980 |
| 64 | 2.974 | 2.973 | 2.980 | 2.981 | 2.975 | 2.981 | 2.977 |
| 65 | 2.975 | 2.976 | 2.983 | 2.983 | 2.979 | 2.982 | 2.977 |
| 66 | 2.981 | 2.981 | 2.986 | 2.992 | 2.983 | 2.987 | 2.982 |
| 67 | 2.947 | 2.945 | 2.949 | 2.953 | 2.947 | 2.951 | 2.956 |
| 68 | 2.953 | 2.951 | 2.956 | 2.958 | 2.951 | 2.956 | 2.952 |
| 69 | 2.991 | 2.989 | 2.995 | 2.996 | 2.991 | 2.995 | 2.992 |
| 70 | 2.978 | 2.976 | 2.982 | 2.992 | 2.979 | 2.982 | 2.978 |
| 71 | 2.960 | 2.957 | 2.962 | 2.966 | 2.958 | 2.964 | 2.960 |
| 72 | 2.980 | 2.977 | 2.983 | 2.984 | 2.978 | 2.981 | 2.981 |
| 73 | 2.977 | 2.975 | 2.981 | 2.987 | 2.977 | 2.982 | 2.977 |
| 74 | 2.981 | 2.977 | 2.986 | 2.987 | 2.984 | 2.986 | 2.981 |
| 75 | 2.980 | 2.977 | 2.983 | 2.986 | 2.989 | 2.987 | 2.980 |
| 76 | 2.987 | 2.986 | 2.994 | 2.992 | 2.993 | 2.993 | 2.990 |
| 77 | 2.952 | 2.948 | 2.955 | 2.956 | 2.954 | 2.956 | 2.952 |
| 78 | 2.982 | 2.981 | 2.986 | 2.993 | 2.989 | 2.988 | 2.983 |
| 79 | 2.983 | 2.980 | 2.987 | 2.989 | 2.986 | 2.989 | 2.983 |
| 80 | 2.984 | 2.983 | 2.991 | 2.990 | 2.989 | 2.991 | 2.984 |
| 81 | 2.991 | 2.987 | 2.994 | 2.994 | 2.988 | 2.996 | 2.989 |
| 82 | 2.992 | 2.988 | 2.997 | 2.997 | 2.992 | 2.997 | 2.994 |
| 83 | 2.991 | 2.989 | 2.997 | 2.999 | 2.993 | 2.999 | 2.996 |
| 84 | 2.989 | 2.989 | 2.999 | 3.000 | 2.992 | 2.997 | 2.993 |
| 85 | 2.985 | 2.983 | 2.991 | 2.993 | 2.984 | 2.990 | 2.989 |
| 86 | 2.979 | 2.976 | 2.987 | 2.990 | 2.980 | 2.986 | 2.981 |
| 87 | 2.984 | 2.982 | 2.990 | 2.992 | 2.987 | 2.992 | 2.991 |
| 88 | 2.983 | 2.980 | 2.987 | 2.995 | 2.985 | 2.989 | 2.988 |
| 89 | 3.001 | 2.998 | 3.005 | 3.013 | 3.002 | 3.007 | 3.006 |
| 90 | 2.974 | 2.974 | 2.980 | 2.983 | 2.975 | 2.980 | 2.978 |
| Ave. | 2.979 | 2.977 | 2.984 | 2.986 | 2.980 | 2.984 | 2.981 |
| Med. | 2.981 | 2.979 | 2.986 | 2.990 | 2.984 | 2.987 | 2.982 |
| st dev | 0.012 | 0.012 | 0.013 | 0.013 | 0.013 | 0.013 | 0.013 |
| Min. | 2.947 | 2.945 | 2.949 | 2.953 | 2.947 | 2.951 | 2.952 |
| Max. | 3.001 | 2.998 | 3.005 | 3.013 | 3.002 | 3.007 | 3.006 |

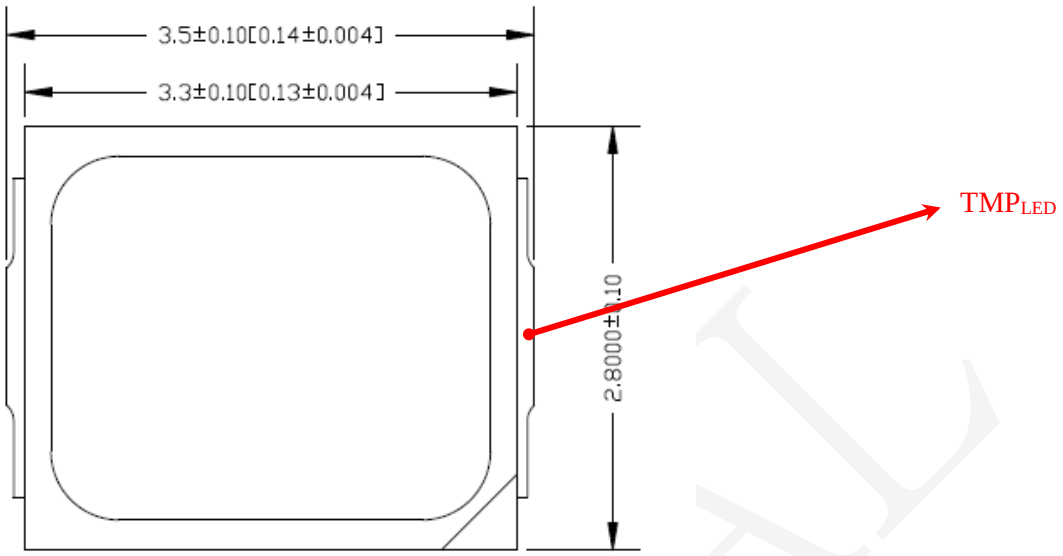
## 3.9 Data Set 3, 105°C, 90mA (Chromaticity Shift)

| No. | u' | v' | CCT(K) | Chromaticity Shift (Δu'v') | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 0hr(Initial) | | | 1000hrs | 2000hrs | 3000hrs | 4000hrs | 5000hrs | 6000hrs |
| 61 | 0.2604 | 0.5247 | 2755 | 0.0008 | 0.0010 | 0.0015 | 0.0014 | 0.0019 | 0.0020 |
| 62 | 0.2612 | 0.5250 | 2737 | 0.0008 | 0.0010 | 0.0015 | 0.0015 | 0.0019 | 0.0022 |
| 63 | 0.2616 | 0.5257 | 2726 | 0.0007 | 0.0009 | 0.0015 | 0.0017 | 0.0018 | 0.0021 |
| 64 | 0.2626 | 0.5239 | 2713 | 0.0007 | 0.0009 | 0.0013 | 0.0014 | 0.0017 | 0.0019 |
| 65 | 0.2606 | 0.5238 | 2756 | 0.0007 | 0.0009 | 0.0014 | 0.0015 | 0.0018 | 0.0020 |
| 66 | 0.2604 | 0.5241 | 2759 | 0.0007 | 0.0009 | 0.0013 | 0.0015 | 0.0017 | 0.0019 |
| 67 | 0.2623 | 0.5240 | 2717 | 0.0007 | 0.0009 | 0.0012 | 0.0015 | 0.0017 | 0.0019 |
| 68 | 0.2607 | 0.5240 | 2752 | 0.0007 | 0.0010 | 0.0013 | 0.0015 | 0.0018 | 0.0021 |
| 69 | 0.2618 | 0.5261 | 2719 | 0.0008 | 0.0011 | 0.0013 | 0.0015 | 0.0016 | 0.0019 |
| 70 | 0.2608 | 0.5253 | 2744 | 0.0007 | 0.0010 | 0.0013 | 0.0015 | 0.0018 | 0.0020 |
| 71 | 0.2611 | 0.5237 | 2744 | 0.0007 | 0.0010 | 0.0013 | 0.0016 | 0.0017 | 0.0022 |
| 72 | 0.2611 | 0.5236 | 2745 | 0.0008 | 0.0010 | 0.0014 | 0.0015 | 0.0018 | 0.0022 |
| 73 | 0.2609 | 0.5252 | 2743 | 0.0007 | 0.0010 | 0.0013 | 0.0016 | 0.0017 | 0.0020 |
| 74 | 0.2609 | 0.5242 | 2746 | 0.0007 | 0.0009 | 0.0012 | 0.0015 | 0.0017 | 0.0019 |
| 75 | 0.2616 | 0.5245 | 2731 | 0.0007 | 0.0010 | 0.0014 | 0.0016 | 0.0018 | 0.0021 |
| 76 | 0.2602 | 0.5248 | 2758 | 0.0007 | 0.0010 | 0.0013 | 0.0015 | 0.0017 | 0.0020 |
| 77 | 0.2600 | 0.5241 | 2767 | 0.0007 | 0.0010 | 0.0013 | 0.0015 | 0.0017 | 0.0020 |
| 78 | 0.2610 | 0.5243 | 2745 | 0.0008 | 0.0010 | 0.0014 | 0.0016 | 0.0018 | 0.0022 |
| 79 | 0.2623 | 0.5228 | 2722 | 0.0007 | 0.0009 | 0.0012 | 0.0015 | 0.0017 | 0.0020 |
| 80 | 0.2606 | 0.5245 | 2752 | 0.0007 | 0.0010 | 0.0013 | 0.0015 | 0.0016 | 0.0021 |
| 81 | 0.2606 | 0.5242 | 2753 | 0.0007 | 0.0010 | 0.0014 | 0.0015 | 0.0013 | 0.0021 |
| 82 | 0.2612 | 0.5233 | 2745 | 0.0007 | 0.0011 | 0.0015 | 0.0016 | 0.0018 | 0.0022 |
| 83 | 0.2608 | 0.5239 | 2750 | 0.0007 | 0.0010 | 0.0013 | 0.0016 | 0.0017 | 0.0020 |
| 84 | 0.2609 | 0.5249 | 2744 | 0.0008 | 0.0010 | 0.0013 | 0.0015 | 0.0015 | 0.0018 |
| 85 | 0.2603 | 0.5250 | 2757 | 0.0008 | 0.0011 | 0.0015 | 0.0016 | 0.0018 | 0.0022 |
| 86 | 0.2623 | 0.5250 | 2713 | 0.0008 | 0.0010 | 0.0014 | 0.0016 | 0.0018 | 0.0021 |
| 87 | 0.2618 | 0.5245 | 2726 | 0.0008 | 0.0011 | 0.0015 | 0.0017 | 0.0018 | 0.0022 |
| 88 | 0.2605 | 0.5243 | 2755 | 0.0008 | 0.0011 | 0.0014 | 0.0016 | 0.0018 | 0.0021 |
| 89 | 0.2606 | 0.5238 | 2755 | 0.0007 | 0.0010 | 0.0013 | 0.0016 | 0.0018 | 0.0021 |
| 90 | 0.2605 | 0.5250 | 2753 | 0.0008 | 0.0010 | 0.0013 | 0.0016 | 0.0017 | 0.0020 |
| Ave. | 0.2611 | 0.5244 | 2743 | 0.0007 | 0.0010 | 0.0014 | 0.0015 | 0.0018 | 0.0021 |
| Med. | 0.2609 | 0.5243 | 2745 | 0.0007 | 0.0010 | 0.0013 | 0.0015 | 0.0018 | 0.0021 |
| st dev | 0.0007 | 0.0007 | 15 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Min. | 0.2600 | 0.5228 | 2713 | 0.0007 | 0.0009 | 0.0012 | 0.0014 | 0.0013 | 0.0018 |
| Max. | 0.2626 | 0.5261 | 2767 | 0.0008 | 0.0011 | 0.0015 | 0.0017 | 0.0019 | 0.0022 |



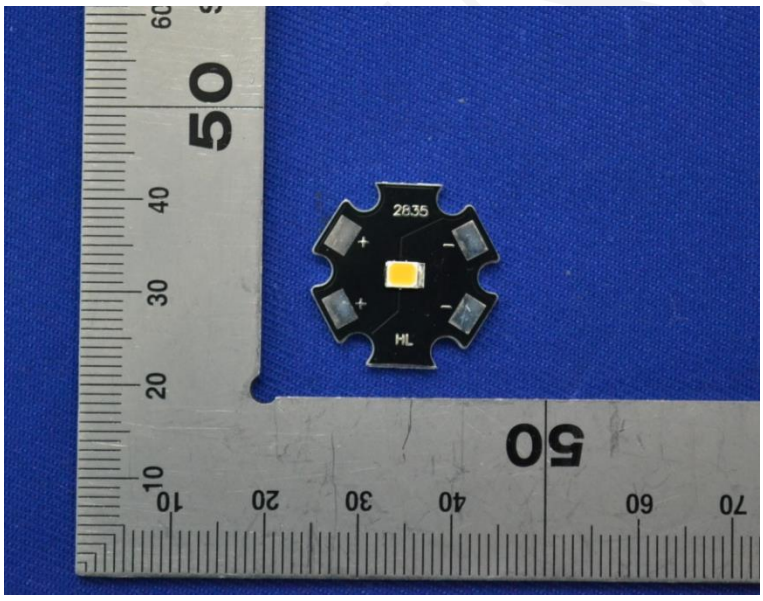
# 4 - EUT Photo

## 4.1 Mechanical Dimensions




All dimensions are in millimeter

## 4.2 EUT Photo



# 5 - Report Revision

| Report Number | Report Date | Contents |
|---|---|---|
| RSZ160930505-10 | 2017-06-26 | Original report. |
| RSZ160930505-10-M1 | 2017-07-05 | Revise the case and ambient temperature of 85°C in page 6. |
| RSZ160930505-10-M2 | 2017-08-16 | Update the Family Declaration in page3. |
| RSZ160930505-10-M3 | 2017-10-27 | Add family products in page3. |
| RSZ160930505-10-M4 | 2019-01-14 | Update the Logo of lab on the Page1<br>Update Company name and address on page 1.<br>Add DUT Characteristics on page 3 according to ENERGY STAR requirements. |
| RSZ160930505-10-M5 | 2019-04-15 | Update the Family cover model and information required by ENERGY STAR. |

**********END OF REPORT**********