



# TEST REPORT

According to ANSI/IES LM-80-15  
For

## Lumileds Holding B.V.

370 W. Trimble Road, San Jose, CA 95131, USA

**Model: L140-2780RA14000K1**

<b>Report Type:</b> 9000 Hours Test Report	<b>Product Type:</b> LED Package
<b>Reviewed By:</b> Pote Wang	
<b>Report Number:</b> R2DG200325050-10-M1	
<b>Test Date:</b> 2017-12-04 to 2018-12-25	
<b>Report Date:</b> 2021-07-08	
<b>Approved by:</b> Blake Zhang / EE Engineer	
<b>Revised Note:</b> The previous report R2DG200325050-10 is replaced by this report on 2021-07-08	
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## 1 - General Information

### 1.1 Description of LED Light Sources

#### Sample Size:

50 PCS test samples were in good condition and received on 2017-12-04. The samples were numbered from 1 to 25 and 26 to 50.

#Manufacturer:	Lumileds Holding B.V.
#Part Number:	L140-2780RA14000K1
#Part Type:	LED Package
#Drive Level:	DC 60mA
#Nominal CCT:	2700K
#Power:	0.2W
#Average Current Density per LED die:	645.8346mA/mm <sup>2</sup>
#Average Power Density per LED die:	2.152782083W/mm <sup>2</sup>
#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<sup>®</sup> 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<sup>®</sup> Requirements for the Use of LM-80 Data* (September 28, 2017)

This report covers the following models:

Tested model	Multiple model	Total Input Current (mA)	Power (W)	Number of dies	Driver current per die (mA)	Current Density per Die (mA/mm <sup>2</sup> )	Power Density per PCB (W/mm <sup>2</sup> )	Die Spacing (mm)
L140-2780RA14000K1	L140-****RA1400***	60	0.2	1	60	645.8346	0.032143	N/A

#### Note1:

- The first and second \* denote designates nominal CCT (27=2700K, 30=3000K, 35=3500K, 40=4000K, 45=4500K, 50=5000K, 57=5700K, 60=6000K, 65=6500K),
- The third and fourth \* represents internal company code.
- The last three \* denote specifying= internal code of Lumileds (0A1, 0B1, 0C1, etc.=shares the same base part).

#### Note 2:

- The applicant Lumileds Holding B.V. declare that their products with model L140-2780RA14000K1 are the same to the products in report # R2DG171204056-10-M1 and is authorized by original applicant to use their test data.
- All the data in previous report (R2DG171204056-10-M1) is shared in this report.

### 1.2 Standards and Reference Documentations

- ANSI/IES LM-80-15: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.
- CIE 127:2007: Measurement of LEDs
- ENERGY STAR<sup>®</sup> 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
0.3m integrating sphere	EVERFINE	Diameter 0.3m	1011119	2018-03-18	2019-03-18
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	2018-03-26	2019-03-26
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	2018-03-18	2019-03-18
Standard Light Source	EVERFINE	D062	G100278CJ7351206	2018-12-24	2019-12-24
Precision digital stabilized DC power supply	EVERFINE	WY605-V110	G115987CJ7321114	2018-03-26	2019-03-26
Multilayer aging machine	BACL	B2-270	20024	2018-03-13	2019-03-13
DC Power Supply	BACL	B12001-12	90023	2018-12-18	2019-12-18

### 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  $\pm 3\%$  of the specified value of the manufacturer during maintenance test, and was within  $\pm 0.5\%$  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<sub>LED</sub>) location, while the other is mounted at a distance of 5 mm above the TMP location.

During life testing, TMP<sub>LED</sub> 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  $\pm 3\%$  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  $\pm$  2°C, RH <65%.

### 1.6 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate u'v'. 2 $\pi$  measurement was used and sample was driven by DC power supply. The forward current was regulated to within  $\pm 0.5\%$  of the nominal value. The test system was calibrated by halogen reference lamp. The ambient temperature during test was set to 25°C  $\pm$  2°C, RH <65%. The temperature measurement point was located in the sphere and the temperature was detected by a temperature probe.

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: 85°C, 60mA

Part Number: L140-2780RA14000K1

Number of Units: 25

Case Temperature: >83°C

Ambient Temperature: >80°C

Life Test Drive Current: 60mA

Measurement Current: 60mA

### Data Set 2: 105°C, 60mA

Part Number: L140-2780RA14000K1

Number of Units: 25

Case Temperature: >103°C

Ambient Temperature: >100°C

Life Test Drive Current: 60mA

Measurement Current: 60mA

FEMNAL

## 2 - Summary of Test Result

Data Set:	Sample Size	Failures Observed:	Test Interval	Test Duration	$\alpha$	$\beta$	Reported TM-21 L <sub>70</sub> Lifetime
1	25	0	1000hrs	9000hrs	2.122E-06	1.003	>54000hrs
2	25	0	1000hrs	9000hrs	2.585E-06	1.003	>54000hrs

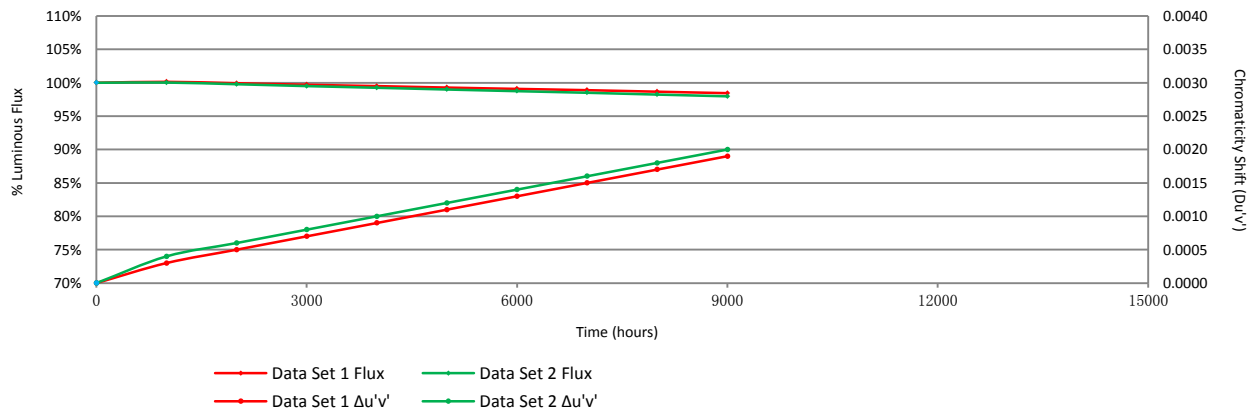
Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	100.14%	99.93%	99.70%	99.50%	99.28%	99.08%	98.89%	98.66%	98.44%
2	100.03%	99.78%	99.50%	99.25%	98.99%	98.74%	98.50%	98.23%	97.97%

Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019
2	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020

Average Lumen Maintenance and Chromaticity Shift VS. Time



### 3 - Test Data

#### 3.1 Data Set 1, 85°C, 60mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	34.31	100.12	99.83	99.71	99.50	99.30	99.13	98.92	98.63	98.57
2	33.98	100.09	99.85	99.56	99.18	99.03	98.79	98.71	98.50	98.23
3	33.92	100.29	100.12	99.85	99.62	99.38	99.12	98.79	98.53	98.29
4	34.50	100.26	99.88	99.71	99.51	99.36	99.22	99.07	98.84	98.61
5	34.09	100.15	99.82	99.62	99.47	99.27	99.09	98.86	98.59	98.36
6	34.66	100.20	99.97	99.74	99.60	99.45	99.31	99.19	98.87	98.62
7	34.00	100.15	100.06	99.82	99.71	99.35	99.12	99.00	98.82	98.65
8	34.13	100.23	99.97	99.65	99.50	99.24	99.00	98.83	98.59	98.36
9	34.35	100.17	99.94	99.80	99.59	99.36	99.16	98.84	98.69	98.54
10	34.28	100.06	99.91	99.62	99.42	99.15	98.95	98.72	98.34	98.19
11	33.91	100.12	99.97	99.68	99.47	99.29	99.09	98.85	98.47	98.32
12	34.13	100.12	99.85	99.68	99.47	99.27	99.12	98.83	98.59	98.42
13	34.56	100.06	99.80	99.68	99.45	99.19	99.02	98.87	98.70	98.52
14	34.36	100.15	99.94	99.80	99.62	99.51	99.33	99.19	99.13	98.89
15	34.66	100.20	99.91	99.71	99.65	99.51	99.31	99.22	99.13	98.90
16	34.34	100.03	99.88	99.68	99.50	99.27	99.10	98.92	98.60	98.43
17	34.36	100.12	99.91	99.71	99.51	99.33	99.10	98.95	98.78	98.43
18	33.76	100.18	100.09	99.79	99.64	99.53	99.32	98.99	98.87	98.55
19	34.65	100.09	99.88	99.60	99.45	99.25	99.11	98.93	98.70	98.44
20	34.37	100.17	99.94	99.71	99.56	99.33	99.13	98.89	98.72	98.55
21	34.06	100.09	99.91	99.62	99.35	99.06	98.83	98.68	98.44	98.24
22	33.95	100.09	99.91	99.73	99.47	99.15	98.91	98.62	98.44	98.14
23	34.06	100.18	100.06	99.79	99.53	99.21	98.91	98.85	98.62	98.44
24	34.06	100.09	99.97	99.68	99.38	99.21	98.94	98.85	98.62	98.44
25	34.35	100.17	99.91	99.65	99.30	99.10	98.86	98.66	98.25	97.96
Avg.	34.23	100.14	99.93	99.70	99.50	99.28	99.08	98.89	98.66	98.44
Med.	34.28	100.15	99.91	99.71	99.50	99.27	99.10	98.86	98.62	98.44
st dev	0.26	0.07	0.08	0.08	0.12	0.13	0.15	0.16	0.21	0.21
Min.	33.76	100.03	99.80	99.56	99.18	99.03	98.79	98.62	98.25	97.96
Max.	34.66	100.29	100.12	99.85	99.71	99.53	99.33	99.22	99.13	98.90

**3.2 Data Set 1, 85°C, 60mA (Forward Voltage)**

No.	Forward Voltage (V)									
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	2.829	2.827	2.861	2.812	2.822	2.825	2.820	2.822	2.842	2.840
2	2.832	2.829	2.881	2.806	2.818	2.816	2.814	2.815	2.835	2.830
3	2.846	2.843	2.862	2.821	2.853	2.830	2.835	2.834	2.852	2.844
4	2.806	2.827	2.808	2.803	2.815	2.814	2.819	2.815	2.833	2.827
5	2.865	2.850	2.862	2.818	2.835	2.830	2.836	2.830	2.849	2.843
6	2.867	2.851	2.838	2.819	2.833	2.832	2.838	2.830	2.848	2.845
7	2.863	2.854	2.887	2.817	2.831	2.831	2.835	2.829	2.849	2.843
8	2.927	2.837	2.837	2.807	2.820	2.821	2.823	2.818	2.838	2.826
9	2.892	2.841	2.824	2.813	2.826	2.827	2.826	2.825	2.851	2.835
10	2.857	2.831	2.876	2.806	2.817	2.819	2.816	2.814	2.834	2.826
11	2.858	2.840	2.883	2.808	2.819	2.819	2.819	2.815	2.836	2.829
12	2.869	2.843	2.897	2.813	2.824	2.826	2.823	2.821	2.839	2.834
13	2.875	2.841	2.822	2.813	2.824	2.825	2.825	2.820	2.838	2.836
14	2.889	2.851	2.829	2.826	2.834	2.838	2.836	2.834	2.850	2.849
15	2.880	2.854	2.825	2.827	2.837	2.839	2.838	2.834	2.853	2.855
16	2.814	2.841	2.811	2.818	2.828	2.833	2.828	2.826	2.841	2.844
17	2.851	2.838	2.818	2.812	2.824	2.825	2.825	2.820	2.837	2.841
18	2.859	2.849	2.822	2.822	2.837	2.837	2.834	2.832	2.844	2.853
19	2.849	2.842	2.821	2.815	2.830	2.827	2.825	2.822	2.834	2.846
20	2.858	2.849	2.880	2.825	2.841	2.836	2.835	2.834	2.840	2.853
21	2.842	2.831	2.858	2.802	2.812	2.814	2.812	2.814	2.820	2.835
22	2.840	2.836	2.867	2.806	2.814	2.817	2.816	2.818	2.823	2.833
23	2.834	2.838	2.864	2.808	2.817	2.819	2.817	2.814	2.826	2.836
24	2.837	2.834	2.852	2.805	2.816	2.819	2.815	2.813	2.826	2.832
25	2.840	2.844	2.859	2.811	2.821	2.825	2.824	2.820	2.827	2.843
Avg.	2.855	2.841	2.850	2.813	2.826	2.826	2.825	2.823	2.839	2.839
Med.	2.857	2.841	2.858	2.813	2.824	2.825	2.825	2.821	2.838	2.840
st dev	0.026	0.008	0.027	0.007	0.010	0.008	0.008	0.007	0.009	0.009
Min.	2.806	2.827	2.808	2.802	2.812	2.814	2.812	2.813	2.820	2.826
Max.	2.927	2.854	2.897	2.827	2.853	2.839	2.838	2.834	2.853	2.855



**3.3 Data Set 1, 85°C, 60mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )								
				0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs
1	0.2611	0.5275	2729	0.0002	0.0004	0.0006	0.0009	0.0011	0.0013	0.0016	0.0018	0.0021
2	0.2610	0.5256	2739	0.0002	0.0003	0.0004	0.0007	0.0009	0.0011	0.0012	0.0013	0.0015
3	0.2635	0.5288	2673	0.0001	0.0004	0.0006	0.0008	0.0009	0.0011	0.0014	0.0016	0.0017
4	0.2603	0.5292	2737	0.0003	0.0004	0.0006	0.0008	0.0009	0.0010	0.0011	0.0013	0.0016
5	0.2614	0.5276	2721	0.0003	0.0005	0.0006	0.0008	0.0011	0.0014	0.0015	0.0016	0.0018
6	0.2595	0.5299	2752	0.0002	0.0005	0.0007	0.0010	0.0011	0.0013	0.0014	0.0016	0.0018
7	0.2621	0.5297	2699	0.0004	0.0006	0.0009	0.0012	0.0015	0.0016	0.0018	0.0019	0.0020
8	0.2579	0.5281	2794	0.0003	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0019	0.0021
9	0.2598	0.5285	2751	0.0002	0.0005	0.0007	0.0009	0.0011	0.0013	0.0016	0.0018	0.0021
10	0.2604	0.5277	2742	0.0002	0.0005	0.0007	0.0009	0.0011	0.0012	0.0015	0.0018	0.0021
11	0.2601	0.5268	2752	0.0002	0.0004	0.0006	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018
12	0.2620	0.5291	2703	0.0003	0.0005	0.0008	0.0011	0.0013	0.0014	0.0015	0.0018	0.0018
13	0.2579	0.5295	2788	0.0003	0.0004	0.0006	0.0009	0.0012	0.0014	0.0017	0.0018	0.0020
14	0.2596	0.5300	2749	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0012	0.0014	0.0016
15	0.2604	0.5295	2734	0.0002	0.0005	0.0007	0.0008	0.0009	0.0011	0.0014	0.0017	0.0019
16	0.2614	0.5268	2725	0.0001	0.0004	0.0007	0.0010	0.0011	0.0014	0.0016	0.0018	0.0020
17	0.2606	0.5279	2738	0.0003	0.0005	0.0007	0.0009	0.0012	0.0015	0.0017	0.0020	0.0022
18	0.2612	0.5283	2723	0.0002	0.0004	0.0006	0.0009	0.0012	0.0013	0.0016	0.0019	0.0021
19	0.2586	0.5284	2777	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0017	0.0021	0.0023
20	0.2586	0.5278	2780	0.0004	0.0006	0.0009	0.0011	0.0012	0.0014	0.0015	0.0017	0.0019
21	0.2613	0.5287	2719	0.0001	0.0004	0.0006	0.0008	0.0011	0.0013	0.0016	0.0016	0.0019
22	0.2617	0.5299	2707	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011	0.0014	0.0017	0.0019
23	0.2634	0.5290	2676	0.0004	0.0005	0.0006	0.0009	0.0011	0.0013	0.0014	0.0017	0.0019
24	0.2604	0.5300	2732	0.0002	0.0004	0.0005	0.0007	0.0009	0.0011	0.0012	0.0015	0.0018
25	0.2584	0.5271	2787	0.0002	0.0005	0.0008	0.0011	0.0014	0.0015	0.0016	0.0018	0.0019
Avg.	0.2605	0.5285	2737	0.0003	0.0005	0.0007	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019
Med.	0.2604	0.5285	2737	0.0002	0.0005	0.0006	0.0009	0.0011	0.0013	0.0015	0.0017	0.0019
st dev	0.0015	0.0012	32	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2579	0.5256	2673	0.0001	0.0003	0.0004	0.0007	0.0009	0.0010	0.0011	0.0013	0.0015
Max.	0.2635	0.5300	2794	0.0004	0.0006	0.0009	0.0012	0.0015	0.0016	0.0018	0.0021	0.0023

**3.4 Data Set 2, 105°C, 60mA (Lumen Maintenance)**

No.	Φ(lm)	Lumen Maintenance (%)								
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	34.25	100.12	99.91	99.53	99.39	99.07	98.80	98.60	98.28	97.99
27	34.57	100.17	99.88	99.71	99.42	99.16	98.99	98.73	98.44	98.15
28	34.35	99.97	99.68	99.48	99.16	98.84	98.52	98.31	98.05	97.87
29	34.26	100.06	99.91	99.77	99.59	99.39	99.18	99.01	98.69	98.42
30	34.12	99.97	99.62	99.41	99.24	98.94	98.65	98.42	98.01	97.66
31	34.53	99.97	99.77	99.51	99.22	99.04	98.87	98.67	98.38	98.15
32	33.50	100.18	99.91	99.70	99.49	99.19	98.96	98.75	98.48	98.24
33	33.23	99.94	99.61	99.40	99.13	98.92	98.68	98.53	98.31	98.22
34	33.29	100.09	99.85	99.58	99.28	99.07	98.86	98.62	98.41	98.08
35	34.16	99.94	99.74	99.36	99.09	98.86	98.62	98.30	98.16	97.95
36	34.21	100.09	99.91	99.65	99.44	99.21	98.98	98.80	98.54	98.28
37	34.41	99.97	99.71	99.39	99.13	98.78	98.49	98.31	98.02	97.79
38	33.96	99.94	99.68	99.32	99.00	98.73	98.50	98.26	98.00	97.76
39	34.12	99.97	99.68	99.41	99.12	98.92	98.77	98.45	98.24	97.95
40	34.11	100.12	99.82	99.47	99.12	98.92	98.59	98.42	98.09	97.77
41	34.15	100.12	99.91	99.71	99.53	99.30	99.06	98.68	98.45	98.21
42	34.18	100.15	99.80	99.53	99.24	99.03	98.68	98.30	98.16	98.01
43	33.95	99.91	99.62	99.29	99.09	98.82	98.56	98.41	98.17	97.91
44	33.77	99.97	99.67	99.38	99.17	98.82	98.52	98.31	98.16	97.90
45	34.27	99.97	99.77	99.53	99.21	98.98	98.72	98.45	98.13	97.69
46	34.13	100.21	99.97	99.56	99.33	98.95	98.62	98.24	97.89	97.66
47	34.26	100.03	99.77	99.45	99.21	98.98	98.72	98.42	98.07	97.84
48	33.60	99.94	99.70	99.43	99.17	98.96	98.72	98.57	98.36	98.13
49	34.27	99.91	99.65	99.33	99.10	98.86	98.57	98.31	97.96	97.78
50	34.38	100.15	99.85	99.48	99.33	99.07	98.81	98.63	98.28	97.93
Avg.	34.08	100.03	99.78	99.50	99.25	98.99	98.74	98.50	98.23	97.97
Med.	34.16	99.97	99.77	99.48	99.21	98.96	98.72	98.45	98.17	97.95
st dev	0.35	0.09	0.11	0.13	0.16	0.16	0.19	0.20	0.20	0.21
Min.	33.23	99.91	99.61	99.29	99.00	98.73	98.49	98.24	97.89	97.66
Max.	34.57	100.21	99.97	99.77	99.59	99.39	99.18	99.01	98.69	98.42

**3.5 Data Set 2, 105°C, 60mA (Forward Voltage)**

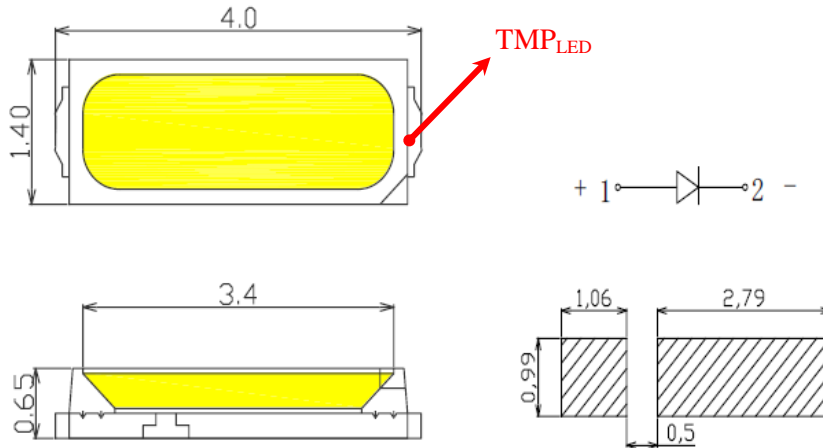
No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	2.822	2.849	2.849	2.807	2.818	2.816	2.818	2.813	2.820	2.836
27	2.844	2.848	2.870	2.825	2.833	2.838	2.822	2.834	2.842	2.850
28	2.847	2.835	2.866	2.826	2.832	2.835	2.822	2.831	2.841	2.853
29	2.832	2.847	2.860	2.810	2.813	2.818	2.807	2.813	2.822	2.837
30	2.825	2.854	2.884	2.809	2.812	2.822	2.808	2.813	2.822	2.808
31	2.830	2.839	2.837	2.812	2.816	2.821	2.813	2.815	2.828	2.815
32	2.843	2.856	2.913	2.817	2.819	2.825	2.818	2.818	2.831	2.815
33	2.847	2.857	2.823	2.821	2.825	2.834	2.827	2.827	2.836	2.829
34	2.828	2.834	2.888	2.804	2.808	2.815	2.813	2.811	2.829	2.804
35	2.838	2.844	2.802	2.813	2.819	2.825	2.819	2.819	2.838	2.813
36	2.844	2.851	2.813	2.815	2.823	2.830	2.823	2.822	2.834	2.822
37	2.838	2.844	2.829	2.816	2.821	2.826	2.839	2.821	2.837	2.826
38	2.839	2.849	2.884	2.817	2.827	2.829	2.837	2.823	2.836	2.827
39	2.838	2.839	2.882	2.818	2.833	2.828	2.845	2.825	2.835	2.834
40	2.840	2.846	2.870	2.809	2.825	2.821	2.833	2.816	2.824	2.827
41	2.849	2.849	2.881	2.813	2.824	2.826	2.838	2.820	2.834	2.832
42	2.868	2.841	2.874	2.825	2.835	2.832	2.850	2.832	2.840	2.822
43	2.842	2.847	2.869	2.802	2.814	2.811	2.824	2.811	2.815	2.805
44	2.856	2.848	2.876	2.821	2.832	2.832	2.842	2.827	2.832	2.824
45	2.849	2.834	2.887	2.809	2.822	2.817	2.832	2.817	2.826	2.819
46	2.870	2.844	2.815	2.811	2.822	2.821	2.839	2.818	2.826	2.822
47	2.862	2.852	2.875	2.804	2.817	2.814	2.831	2.812	2.818	2.816
48	2.840	2.831	2.882	2.801	2.815	2.818	2.832	2.810	2.817	2.815
49	2.861	2.849	2.829	2.820	2.833	2.837	2.846	2.828	2.833	2.838
50	2.854	2.838	2.815	2.815	2.828	2.833	2.844	2.822	2.830	2.833
Avg.	2.844	2.845	2.859	2.814	2.823	2.825	2.829	2.820	2.830	2.825
Med.	2.843	2.847	2.870	2.813	2.822	2.825	2.831	2.819	2.831	2.824
st dev	0.013	0.007	0.030	0.007	0.008	0.008	0.012	0.007	0.008	0.013
Min.	2.822	2.831	2.802	2.801	2.808	2.811	2.807	2.810	2.815	2.804
Max.	2.870	2.857	2.913	2.826	2.835	2.838	2.850	2.834	2.842	2.853

**3.6 Data Set 2, 105°C, 60mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )								
	Ohr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.2607	0.5285	2732	0.0001	0.0004	0.0005	0.0008	0.0011	0.0013	0.0016	0.0018	0.0021
27	0.2617	0.5289	2710	0.0004	0.0006	0.0009	0.0011	0.0012	0.0014	0.0015	0.0017	0.0018
28	0.2592	0.5260	2777	0.0003	0.0005	0.0006	0.0007	0.0009	0.0010	0.0011	0.0014	0.0017
29	0.2588	0.5294	2769	0.0005	0.0006	0.0009	0.0011	0.0013	0.0015	0.0016	0.0018	0.0021
30	0.2601	0.5291	2744	0.0004	0.0005	0.0007	0.0009	0.0012	0.0015	0.0018	0.0021	0.0024
31	0.2587	0.5278	2778	0.0002	0.0004	0.0005	0.0007	0.0008	0.0009	0.0011	0.0014	0.0016
32	0.2611	0.5270	2731	0.0003	0.0004	0.0006	0.0008	0.0009	0.0011	0.0013	0.0014	0.0015
33	0.2610	0.5300	2720	0.0004	0.0007	0.0010	0.0013	0.0015	0.0017	0.0020	0.0022	0.0024
34	0.2605	0.5270	2743	0.0004	0.0006	0.0008	0.0009	0.0012	0.0015	0.0017	0.0018	0.0019
35	0.2614	0.5268	2725	0.0004	0.0006	0.0008	0.0009	0.0011	0.0012	0.0014	0.0016	0.0019
36	0.2590	0.5278	2773	0.0006	0.0008	0.0010	0.0012	0.0015	0.0016	0.0018	0.0021	0.0023
37	0.2596	0.5259	2767	0.0004	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0019	0.0020
38	0.2613	0.5276	2723	0.0003	0.0004	0.0006	0.0007	0.0009	0.0011	0.0012	0.0013	0.0014
39	0.2607	0.5282	2733	0.0002	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0014	0.0016
40	0.2600	0.5284	2749	0.0006	0.0008	0.0011	0.0013	0.0016	0.0018	0.0020	0.0021	0.0024
41	0.2623	0.5278	2702	0.0002	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0019	0.0020
42	0.2596	0.5276	2760	0.0005	0.0008	0.0011	0.0013	0.0015	0.0018	0.0021	0.0023	0.0026
43	0.2598	0.5281	2754	0.0004	0.0006	0.0007	0.0010	0.0013	0.0016	0.0019	0.0021	0.0022
44	0.2635	0.5282	2676	0.0006	0.0007	0.0009	0.0012	0.0014	0.0015	0.0016	0.0019	0.0021
45	0.2614	0.5296	2713	0.0005	0.0006	0.0007	0.0009	0.0011	0.0013	0.0016	0.0017	0.0018
46	0.2584	0.5271	2788	0.0005	0.0008	0.0009	0.0010	0.0013	0.0015	0.0016	0.0019	0.0021
47	0.2582	0.5285	2786	0.0004	0.0007	0.0009	0.0011	0.0013	0.0014	0.0017	0.0019	0.0021
48	0.2596	0.5270	2763	0.0003	0.0004	0.0007	0.0010	0.0012	0.0014	0.0016	0.0019	0.0020
49	0.2611	0.5289	2723	0.0005	0.0007	0.0009	0.0010	0.0011	0.0013	0.0014	0.0016	0.0017
50	0.2592	0.5292	2761	0.0002	0.0006	0.0009	0.0013	0.0016	0.0019	0.0021	0.0024	0.0027
Avg.	0.2603	0.5280	2744	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0018	0.0020
Med.	0.2601	0.5281	2744	0.0004	0.0006	0.0008	0.0010	0.0012	0.0014	0.0016	0.0019	0.0020
st dev	0.0013	0.0011	29	0.0001	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003	0.0003	0.0003
Min.	0.2582	0.5259	2676	0.0001	0.0003	0.0004	0.0005	0.0007	0.0008	0.0011	0.0013	0.0014
Max.	0.2635	0.5300	2788	0.0006	0.0008	0.0011	0.0013	0.0016	0.0019	0.0021	0.0024	0.0027

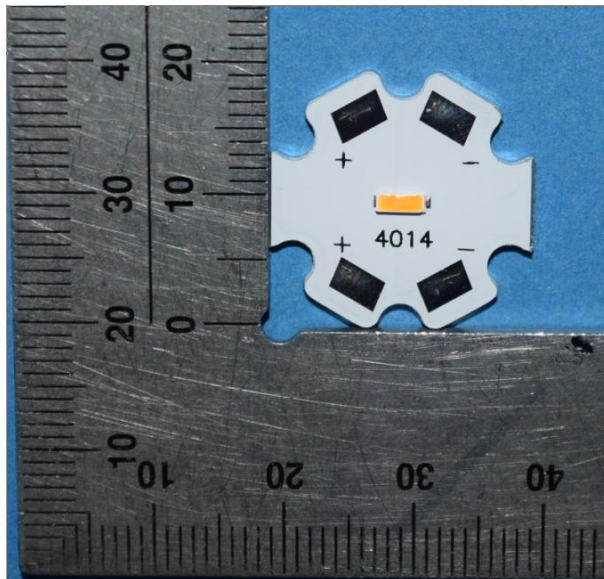
#### 4 - DUT Photo

##### 4.1 #Mechanical Dimensions



All dimensions are in millimeter

##### 4.2 DUT Photo



## 5 - Report Revision

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Report Number	Report Date	Contents
R2DG200325050-10	2020-03-25	Original report.
R2DG200325050-10-M1	2021-07-08	Update the Family products covered.

FINAL

## Directions

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1. The information marked “superscript #” is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report.
2. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*