



# TEST REPORT

According to ANSI/IES LM-80-15  
For

## Xiamen Dacol Photoelectronics Technology Co., Ltd.

No. 8021 Xiang'an West Road(Xiang'an) industrial zone, Torch Hi-Tech Industrial Development Zone ,Xiamen City,Fujian,China

**#Model: 2835**

<b>Report Type:</b> 9000 Hours Test Report		<b>Product Type:</b> LED Package	
<b>Test Engineer:</b>	Pote Wang	<i>Pote Wang</i>	
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<b>Reviewed By:</b>	Blake Zhang / EE Engineer	<i>Blake Zhang</i>	
<b>Test Facility:</b>	Test facility was located at No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China.		
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Dongguan). No.69,Pulongcun ,Puxinhu Industrial Area, Tangxia , Dongguan, Guangdong, China. Tel: +86-0769-86858888 Fax:+86-0769-86858588		
<b>Accreditation:</b>	The IAS Accreditation Number TL-460.		

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## 1 - General Information

### 1.1 Description of LED Light Sources

#### Sample Size:

75 PCS test samples were in good condition and received on 2018-09-14. The samples were numbered from 1 to 25, 26 to 50 and 51 to 75.

#Manufacturer:	Xiamen Dacol Photoelectronics Technology Co., Ltd.
#Part Number:	2835
#Part Type:	LED Package
#Drive Level:	DC 30mA
#Nominal CCT:	2700K
#Power:	1.08W
#Average Current Density per LED die:	78.9 mA/mm <sup>2</sup>
#Average Power Density per LED die:	1.421W/mm <sup>2</sup>
#CRI:	80
#Die Spacing:	0.084mm

#### 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.

### 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® 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
0.5m integrating sphere	EVERFINE	AIS-2	G185304TA1381172	2019-06-28	2020-06-27
LED Test Source	EVERFINE	LTS-300	P185616CD1371113	2019-07-23	2020-07-22
High Accuracy Array Spectroradiometer	EVERFINE	HAAS-2000	P600674CM1381123	2019-06-28	2020-06-27
Standard Light Source	EVERFINE	D062	G100278CJ7351206	2018-12-24	2019-12-24
Multilayer aging machine	BACL	B2-270	20023	2019-03-10	2020-03-09
Digital CC&CV DC Power Supply	EVERFINE	WY5015	11090003	2019-07-23	2020-07-22

### 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<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 ±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 Photometric Measurement Method and Uncertainty

Integrating sphere and spectroradiometer is used to measure luminous flux and chromaticity coordinate u'v'. 2π measurement was used and sample was driven by DC power supply. The forward current was regulated to within ±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 ± 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 (luminous flux) measurements is U=1.8% (K=2), at the 95% confidence level. The uncertainty of the correlated color temperature measurements is U=20K (K=2), at the 95% confidence level. The uncertainty of the CRI is U=1.5 (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, 30mA

Part Number: 2835  
Number of Units: 25  
Case Temperature: >53°C  
Ambient Temperature: >50°C  
Life Test Drive Current: 30mA  
Measurement Current: 30mA

### Data Set 2: 85°C, 30mA

Part Number: 2835  
Number of Units: 25  
Case Temperature: >83°C  
Ambient Temperature: >80°C  
Life Test Drive Current: 30mA  
Measurement Current: 30mA

### Data Set 3: 115° C, 30mA

Part Number: 2835  
Number of Units: 25  
Case Temperature: >113°C  
Ambient Temperature: >110°C  
Life Test Drive Current: 30mA  
Measurement Current: 30mA

## 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	2.869E-06	1.005	>54000 hours
2	25	0	1000hrs	9000hrs	3.509E-06	1.006	>54000 hours
3	25	0	1000hrs	9000hrs	3.930E-06	1.005	>54000 hours

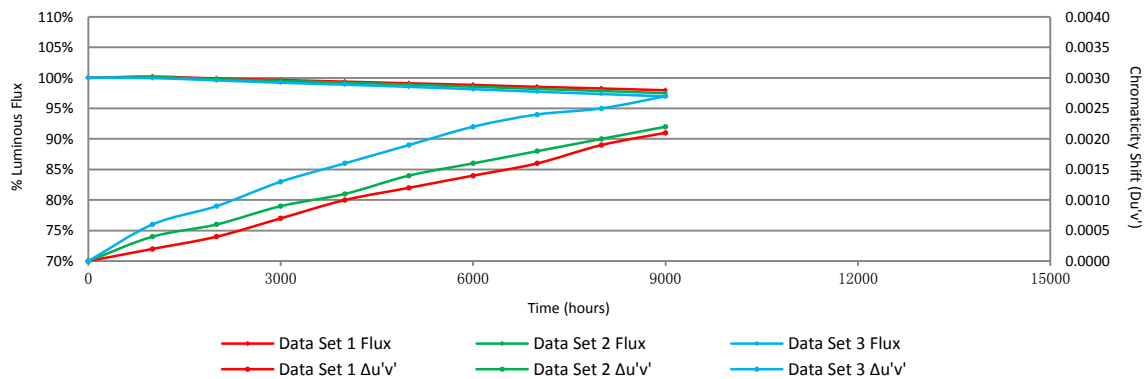
### Average Lumen Maintenance (Percentage of Initial Luminous Flux)

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	100.20%	99.90%	99.65%	99.38%	99.11%	98.84%	98.53%	98.26%	97.97%
2	100.13%	99.79%	99.51%	99.21%	98.89%	98.55%	98.19%	97.85%	97.49%
3	99.96%	99.58%	99.21%	98.88%	98.53%	98.14%	97.73%	97.36%	96.97%

### Average Chromaticity Shift

Data Set:	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.0002	0.0004	0.0007	0.001	0.0012	0.0014	0.0016	0.0019	0.0021
2	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0018	0.002	0.0022
3	0.0006	0.0009	0.0013	0.0016	0.0019	0.0022	0.0024	0.0025	0.0027

### Average Lumen Maintenance and Chromaticity Shift VS. Time



### 3 - Test Data

#### 3.1 Data Set 1, 55°C, 30mA (Lumen Maintenance)

No.	Φ(lm)	Lumen Maintenance (%)								
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	153.8	100.26	99.93	99.67	99.48	99.28	99.09	98.83	98.50	98.24
2	152.5	100.46	100.07	99.87	99.61	99.21	99.02	98.69	98.43	98.23
3	154.6	100.26	99.94	99.68	99.29	99.03	98.77	98.58	98.38	98.12
4	154.2	99.94	99.61	99.48	99.16	98.90	98.44	98.05	97.67	97.34
5	153.6	99.87	99.61	99.22	99.02	98.70	98.44	98.11	97.85	97.53
6	153.9	99.87	99.61	99.42	99.22	98.96	98.64	98.38	98.12	97.86
7	152.4	100.13	99.87	99.67	99.48	99.21	98.69	98.36	98.03	97.70
8	152.4	100.13	99.67	99.41	98.95	98.62	98.49	98.23	97.83	97.51
9	154.9	100.06	99.74	99.35	98.97	98.84	98.39	98.00	97.74	97.48
10	152.0	100.20	99.80	99.41	99.14	98.95	98.88	98.62	98.29	97.96
11	153.9	100.26	100.13	99.94	99.55	99.22	99.09	98.77	98.51	98.18
12	152.9	100.26	100.13	99.87	99.41	99.08	99.02	98.63	98.36	98.04
13	153.9	100.26	99.81	99.42	99.22	99.03	98.96	98.70	98.31	98.05
14	154.4	100.39	100.13	99.94	99.55	99.29	99.09	98.83	98.58	98.32
15	153.1	100.33	100.13	99.93	99.67	99.28	99.02	98.63	98.30	97.98
16	152.7	100.13	99.93	99.87	99.54	99.35	99.08	98.76	98.49	98.17
17	151.9	100.53	99.93	99.54	99.28	98.95	98.82	98.55	98.35	98.03
18	153.8	100.33	99.93	99.74	99.54	99.41	99.28	98.83	98.50	98.24
19	154.6	100.65	100.45	100.32	100.00	99.68	99.29	98.97	98.90	98.58
20	152.5	99.93	99.54	99.41	99.28	98.89	98.56	98.30	97.84	97.51
21	154.4	100.19	99.94	99.55	99.29	99.16	98.70	98.38	98.25	97.86
22	153.4	100.13	99.80	99.61	99.48	99.22	98.83	98.44	98.37	98.11
23	152.6	99.93	99.80	99.61	99.34	99.21	98.75	98.43	98.03	97.90
24	152.1	100.20	99.87	99.74	99.47	99.08	98.88	98.62	98.49	98.29
25	153.1	100.20	100.07	99.67	99.54	99.22	98.89	98.63	98.30	97.98
Avg.	153.3	100.20	99.90	99.65	99.38	99.11	98.84	98.53	98.26	97.97
Med.	153.4	100.20	99.93	99.67	99.41	99.16	98.88	98.62	98.31	98.03
st dev	0.9	0.20	0.21	0.25	0.24	0.23	0.26	0.26	0.30	0.31
Min.	151.9	99.87	99.54	99.22	98.95	98.62	98.39	98.00	97.67	97.34
Max.	154.9	100.65	100.45	100.32	100.00	99.68	99.29	98.97	98.90	98.58

**3.2 Data Set 1, 55°C, 30mA (Forward Voltage)**

No.	Forward Voltage (V)									
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	37.11	37.21	37.28	37.33	37.31	37.20	37.23	37.21	37.21	37.20
2	37.31	37.40	37.52	37.56	37.54	37.44	37.49	37.45	37.45	37.44
3	37.76	37.34	37.48	37.50	37.49	37.39	37.59	37.39	37.37	37.37
4	37.24	37.27	37.39	37.45	37.43	37.30	37.36	37.29	37.31	37.33
5	37.23	37.25	37.38	37.42	37.42	37.29	37.71	37.28	37.30	37.29
6	37.26	37.31	37.42	37.43	37.60	37.34	37.55	37.31	37.34	37.32
7	37.01	37.08	37.17	37.21	37.20	37.10	37.10	37.10	37.11	37.10
8	37.05	37.11	37.23	37.27	37.23	37.14	37.16	37.12	37.13	37.13
9	37.25	37.25	37.36	37.40	37.55	37.32	37.37	37.26	37.29	37.28
10	37.19	37.24	37.37	37.41	37.38	37.29	37.34	37.27	37.29	37.29
11	37.07	37.13	37.24	37.27	37.29	37.16	37.16	37.14	37.16	37.15
12	37.04	37.09	37.20	37.24	37.23	37.13	37.12	37.09	37.12	37.11
13	37.07	37.26	37.28	37.53	37.35	37.27	37.19	37.16	37.18	37.18
14	37.22	37.26	37.32	37.37	37.37	37.24	37.24	37.20	37.24	37.24
15	37.13	37.19	37.30	37.33	37.33	37.23	37.21	37.18	37.21	37.20
16	37.24	37.29	37.42	37.44	37.44	37.31	37.34	37.31	37.32	37.32
17	37.15	37.22	37.32	37.39	37.37	37.25	37.25	37.22	37.26	37.27
18	37.26	37.31	37.44	37.47	37.47	37.34	37.42	37.32	37.33	37.34
19	37.31	37.41	37.49	37.55	37.35	37.41	37.43	37.37	37.43	37.43
20	37.20	37.32	37.41	37.44	37.42	37.42	37.31	37.29	37.40	37.50
21	37.21	37.26	37.38	37.43	37.42	37.30	37.28	37.25	37.30	37.28
22	37.09	37.19	37.29	37.33	37.32	37.26	37.20	37.16	37.20	37.19
23	37.15	37.24	37.34	37.38	37.35	37.29	37.25	37.21	37.24	37.26
24	37.22	37.18	37.29	37.34	37.30	37.21	37.19	37.17	37.20	37.20
25	37.08	37.16	37.25	37.28	37.29	37.19	37.16	37.13	37.19	37.15
Avg.	37.19	37.24	37.34	37.39	37.38	37.27	37.31	37.24	37.26	37.26
Med.	37.20	37.25	37.34	37.40	37.37	37.29	37.25	37.22	37.26	37.27
st dev	0.15	0.09	0.09	0.09	0.10	0.09	0.16	0.09	0.09	0.10
Min.	37.01	37.08	37.17	37.21	37.20	37.10	37.10	37.09	37.11	37.10
Max.	37.76	37.41	37.52	37.56	37.60	37.44	37.71	37.45	37.45	37.50



**3.3 Data Set 1, 55°C, 30mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )								
	0hr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
1	0.2640	0.5278	2668	0.0004	0.0006	0.0010	0.0014	0.0017	0.0017	0.0019	0.0021	0.0022
2	0.2652	0.5281	2642	0.0002	0.0003	0.0006	0.0008	0.0013	0.0016	0.0019	0.0021	0.0024
3	0.2638	0.5285	2669	0.0002	0.0003	0.0004	0.0006	0.0007	0.0008	0.0009	0.0012	0.0014
4	0.2639	0.5286	2666	0.0002	0.0003	0.0007	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014
5	0.2654	0.5278	2640	0.0004	0.0006	0.0007	0.0008	0.0010	0.0011	0.0013	0.0014	0.0016
6	0.2649	0.5306	2640	0.0002	0.0004	0.0008	0.0009	0.0011	0.0012	0.0014	0.0016	0.0018
7	0.2657	0.5280	2632	0.0004	0.0006	0.0008	0.0011	0.0014	0.0017	0.0018	0.0020	0.0022
8	0.2659	0.5302	2621	0.0002	0.0004	0.0006	0.0010	0.0016	0.0018	0.0021	0.0026	0.0028
9	0.2627	0.5278	2694	0.0002	0.0004	0.0008	0.0011	0.0014	0.0017	0.0019	0.0024	0.0027
10	0.2625	0.5268	2703	0.0001	0.0002	0.0007	0.0011	0.0014	0.0016	0.0018	0.0020	0.0023
11	0.2650	0.5284	2644	0.0001	0.0002	0.0005	0.0009	0.0012	0.0015	0.0018	0.0018	0.0020
12	0.2654	0.5280	2639	0.0001	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0017	0.0019
13	0.2646	0.5291	2650	0.0001	0.0004	0.0006	0.0010	0.0013	0.0014	0.0014	0.0017	0.0019
14	0.2639	0.5284	2668	0.0002	0.0005	0.0006	0.0009	0.0012	0.0014	0.0016	0.0017	0.0019
15	0.2652	0.5294	2637	0.0002	0.0004	0.0008	0.0010	0.0012	0.0014	0.0016	0.0017	0.0020
16	0.2666	0.5273	2617	0.0001	0.0002	0.0006	0.0010	0.0013	0.0014	0.0016	0.0018	0.0020
17	0.2645	0.5294	2651	0.0001	0.0003	0.0006	0.0009	0.0011	0.0013	0.0016	0.0017	0.0018
18	0.2638	0.5282	2670	0.0001	0.0002	0.0006	0.0009	0.0011	0.0014	0.0015	0.0017	0.0018
19	0.2642	0.5285	2661	0.0001	0.0003	0.0007	0.0012	0.0015	0.0015	0.0017	0.0018	0.0020
20	0.2662	0.5280	2623	0.0003	0.0005	0.0008	0.0010	0.0014	0.0016	0.0018	0.0021	0.0025
21	0.2632	0.5269	2687	0.0001	0.0004	0.0006	0.0009	0.0013	0.0016	0.0018	0.0021	0.0023
22	0.2647	0.5275	2655	0.0002	0.0003	0.0006	0.0007	0.0011	0.0014	0.0017	0.0020	0.0022
23	0.2637	0.5280	2673	0.0001	0.0004	0.0007	0.0009	0.0011	0.0014	0.0017	0.0021	0.0023
24	0.2651	0.5293	2640	0.0002	0.0003	0.0005	0.0006	0.0009	0.0012	0.0016	0.0019	0.0023
25	0.2662	0.5289	2620	0.0002	0.0004	0.0006	0.0009	0.0010	0.0012	0.0013	0.0016	0.0020
Avg.	0.2647	0.5284	2652	0.0002	0.0004	0.0007	0.0010	0.0012	0.0014	0.0016	0.0019	0.0021
Med.	0.2647	0.5282	2650	0.0002	0.0004	0.0006	0.0009	0.0012	0.0014	0.0016	0.0018	0.0020
st dev	0.0011	0.0009	23	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0003	0.0003	0.0004
Min.	0.2625	0.5268	2617	0.0001	0.0002	0.0004	0.0006	0.0007	0.0008	0.0009	0.0012	0.0014
Max.	0.2666	0.5306	2703	0.0004	0.0006	0.0010	0.0014	0.0017	0.0018	0.0021	0.0026	0.0028

**3.4 Data Set 2, 85°C, 30mA (Lumen Maintenance)**

No.	Φ(lm)	Lumen Maintenance (%)								
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	154.1	99.68	99.48	99.16	99.03	98.83	98.51	98.12	97.92	97.66
27	152.1	100.13	99.67	99.34	98.88	98.55	98.36	97.96	97.57	97.30
28	153.2	100.07	99.67	99.28	98.96	98.63	98.37	97.91	97.58	97.13
29	152.6	100.20	99.87	99.67	99.54	99.28	99.02	98.82	98.49	98.17
30	153.5	99.80	99.48	99.15	99.02	98.70	98.63	98.31	98.11	97.72
31	153.4	99.93	99.74	99.41	99.15	98.76	98.50	98.17	97.78	97.46
32	153.1	100.07	99.80	99.74	99.22	98.95	98.69	98.37	98.11	97.71
33	151.4	99.80	99.41	99.01	98.61	98.15	97.95	97.56	97.16	96.83
34	152.6	99.93	99.67	99.41	99.15	98.75	98.36	97.90	97.64	97.31
35	154.0	99.94	99.68	99.55	99.22	99.09	98.90	98.51	97.92	97.66
36	152.3	100.07	99.67	99.34	99.28	99.21	98.82	98.49	98.10	97.70
37	152.9	100.26	99.80	99.54	99.15	98.69	98.43	98.23	97.71	97.38
38	151.1	100.13	99.93	99.54	99.27	98.94	98.87	98.48	98.15	97.75
39	152.8	100.20	99.87	99.67	99.41	99.02	98.69	98.36	98.23	97.84
40	152.3	100.07	99.54	99.15	98.88	98.62	98.16	97.77	97.44	97.05
41	152.6	100.20	99.93	99.67	99.34	99.08	98.95	98.62	98.17	97.97
42	153.9	100.19	99.94	99.74	99.42	99.22	99.09	98.64	98.38	98.05
43	152.8	100.13	99.87	99.54	99.35	99.28	98.76	98.43	98.17	97.77
44	153.1	100.33	100.07	99.80	99.54	99.09	98.69	98.50	98.17	97.84
45	153.7	100.33	100.13	99.93	99.67	99.35	98.50	98.05	97.66	97.20
46	152.2	100.26	100.07	99.93	99.87	99.34	98.95	98.62	98.36	97.96
47	154.2	100.52	100.19	99.87	99.22	98.83	98.18	97.80	97.28	96.89
48	153.4	100.20	99.61	99.35	98.89	98.57	98.04	97.78	97.52	97.26
49	154.1	100.39	99.81	99.55	99.16	98.51	97.92	97.40	96.89	96.50
50	152.1	100.39	99.87	99.41	99.01	98.69	98.29	97.96	97.70	97.24
Avg.	152.9	100.13	99.79	99.51	99.21	98.89	98.55	98.19	97.85	97.49
Med.	152.9	100.13	99.80	99.54	99.22	98.83	98.51	98.23	97.92	97.66
st dev	0.8	0.20	0.21	0.26	0.28	0.31	0.34	0.37	0.41	0.42
Min.	151.1	99.68	99.41	99.01	98.61	98.15	97.92	97.40	96.89	96.50
Max.	154.2	100.52	100.19	99.93	99.87	99.35	99.09	98.82	98.49	98.17

**3.5 Data Set 2, 85°C, 30mA (Forward Voltage)**

No.	Forward Voltage (V)									
	Ohr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	37.17	37.26	37.38	37.41	37.39	37.34	37.29	37.23	37.28	37.28
27	37.04	37.15	37.25	37.31	37.26	37.19	37.22	37.13	37.18	37.17
28	37.26	37.34	37.44	37.49	37.46	37.35	37.37	37.28	37.38	37.34
29	37.07	37.17	37.28	37.29	37.29	37.19	37.40	37.14	37.20	37.19
30	37.04	37.12	37.23	37.24	37.24	37.16	37.17	37.10	37.15	37.17
31	37.24	37.35	37.49	37.61	37.47	37.38	37.41	37.37	37.39	37.36
32	37.10	37.20	37.28	37.32	37.29	37.20	37.31	37.18	37.23	37.21
33	37.25	37.35	37.45	37.51	37.46	37.37	37.58	37.33	37.38	37.45
34	37.09	37.13	37.20	37.27	37.23	37.14	37.17	37.12	37.16	37.20
35	37.21	37.34	37.42	37.45	37.44	37.35	37.61	37.39	37.35	37.34
36	37.21	37.31	37.42	37.46	37.44	37.35	37.36	37.29	37.35	37.32
37	37.23	37.35	37.44	37.49	37.45	37.34	37.41	37.34	37.36	37.37
38	37.16	37.27	37.37	37.41	37.37	37.29	37.32	37.23	37.26	37.26
39	37.22	37.54	37.44	37.48	37.45	37.43	37.39	37.30	37.35	37.47
40	37.23	37.37	37.44	37.47	37.48	37.43	37.42	37.32	37.35	37.34
41	37.05	37.20	37.31	37.30	37.27	37.28	37.27	37.13	37.18	37.22
42	37.19	37.17	37.41	37.47	37.55	37.31	37.31	37.23	37.28	37.29
43	37.08	37.21	37.30	37.32	37.29	37.21	37.20	37.16	37.21	37.20
44	37.22	37.33	37.54	37.49	37.48	37.38	37.33	37.30	37.33	37.33
45	37.23	37.36	37.40	37.43	37.40	37.32	37.31	37.29	37.32	37.30
46	37.00	37.12	37.20	37.23	37.18	37.08	37.11	37.07	37.09	37.11
47	37.23	37.17	37.23	37.27	37.23	37.16	37.13	37.11	37.15	37.14
48	37.05	37.20	37.23	37.28	37.25	37.18	37.29	37.13	37.16	37.17
49	37.29	37.37	37.43	37.48	37.46	37.40	37.34	37.32	37.35	37.36
50	37.13	37.25	37.30	37.35	37.34	37.24	37.20	37.19	37.23	37.21
Avg.	37.16	37.27	37.36	37.39	37.37	37.28	37.32	37.23	37.27	37.27
Med.	37.19	37.26	37.38	37.41	37.39	37.31	37.31	37.23	37.28	37.28
st dev	0.09	0.10	0.10	0.10	0.10	0.10	0.12	0.10	0.09	0.10
Min.	37.00	37.12	37.20	37.23	37.18	37.08	37.11	37.07	37.09	37.11
Max.	37.29	37.54	37.54	37.61	37.55	37.43	37.61	37.39	37.39	37.47

**3.6 Data Set 2, 85°C, 30mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )								
	Ohr(Initial)			1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
26	0.2648	0.5292	2647	0.0002	0.0005	0.0008	0.0010	0.0013	0.0013	0.0014	0.0016	0.0017
27	0.2655	0.5279	2637	0.0002	0.0004	0.0007	0.0009	0.0012	0.0013	0.0015	0.0017	0.0019
28	0.2639	0.5284	2667	0.0002	0.0003	0.0006	0.0009	0.0012	0.0014	0.0015	0.0017	0.0019
29	0.2631	0.5259	2692	0.0002	0.0004	0.0006	0.0007	0.0010	0.0013	0.0014	0.0017	0.0019
30	0.2631	0.5266	2690	0.0001	0.0003	0.0007	0.0009	0.0010	0.0013	0.0015	0.0017	0.0020
31	0.2647	0.5283	2651	0.0001	0.0004	0.0007	0.0009	0.0011	0.0013	0.0015	0.0016	0.0018
32	0.2652	0.5292	2638	0.0002	0.0004	0.0007	0.0011	0.0013	0.0015	0.0016	0.0018	0.0019
33	0.2648	0.5283	2649	0.0002	0.0006	0.0007	0.0011	0.0014	0.0017	0.0021	0.0023	0.0025
34	0.2641	0.5274	2668	0.0004	0.0005	0.0010	0.0012	0.0014	0.0016	0.0018	0.0021	0.0023
35	0.2635	0.5283	2675	0.0003	0.0004	0.0008	0.0011	0.0013	0.0015	0.0016	0.0018	0.0021
36	0.2662	0.5296	2618	0.0005	0.0007	0.0009	0.0013	0.0016	0.0017	0.0020	0.0022	0.0023
37	0.2664	0.5299	2612	0.0005	0.0008	0.0010	0.0012	0.0019	0.0019	0.0021	0.0022	0.0024
38	0.2653	0.5291	2637	0.0005	0.0006	0.0009	0.0011	0.0012	0.0013	0.0016	0.0018	0.0020
39	0.2634	0.5280	2679	0.0004	0.0006	0.0008	0.0010	0.0014	0.0015	0.0017	0.0021	0.0023
40	0.2644	0.5276	2661	0.0005	0.0008	0.0010	0.0013	0.0016	0.0018	0.0019	0.0021	0.0025
41	0.2656	0.5283	2635	0.0005	0.0008	0.0011	0.0013	0.0017	0.0018	0.0020	0.0022	0.0024
42	0.2652	0.5301	2636	0.0004	0.0009	0.0011	0.0013	0.0015	0.0018	0.0021	0.0021	0.0022
43	0.2638	0.5271	2675	0.0004	0.0009	0.0011	0.0014	0.0016	0.0017	0.0018	0.0023	0.0025
44	0.2661	0.5292	2620	0.0005	0.0007	0.0009	0.0012	0.0014	0.0016	0.0018	0.0021	0.0025
45	0.2659	0.5297	2622	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0018	0.0021	0.0024
46	0.2658	0.5287	2628	0.0005	0.0007	0.0010	0.0012	0.0014	0.0016	0.0017	0.0019	0.0021
47	0.2634	0.5283	2678	0.0004	0.0007	0.0011	0.0014	0.0015	0.0019	0.0021	0.0022	0.0023
48	0.2643	0.5288	2659	0.0005	0.0007	0.0010	0.0013	0.0015	0.0017	0.0019	0.0024	0.0025
49	0.2641	0.5273	2668	0.0005	0.0007	0.0011	0.0014	0.0016	0.0018	0.0020	0.0023	0.0026
50	0.2661	0.5294	2619	0.0005	0.0008	0.0011	0.0014	0.0014	0.0016	0.0018	0.0022	0.0024
Avg.	0.2647	0.5284	2650	0.0004	0.0006	0.0009	0.0011	0.0014	0.0016	0.0018	0.0020	0.0022
Med.	0.2648	0.5283	2649	0.0004	0.0007	0.0009	0.0012	0.0014	0.0016	0.0018	0.0021	0.0023
st dev	0.0010	0.0010	24	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0003	0.0003
Min.	0.2631	0.5259	2612	0.0001	0.0003	0.0006	0.0007	0.0010	0.0013	0.0014	0.0016	0.0017
Max.	0.2664	0.5301	2692	0.0005	0.0009	0.0011	0.0014	0.0019	0.0019	0.0021	0.0024	0.0026

**3.7 Data Set 3, 115° C, 30mA (Lumen Maintenance)**

No.	Φ(m)	Lumen Maintenance (%)								
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	151.2	100.20	99.93	99.54	99.21	98.94	98.35	98.15	97.95	97.55
52	153.1	99.87	99.28	98.76	98.63	98.17	97.84	97.39	96.86	96.54
53	153.8	99.93	99.54	99.28	98.70	98.31	98.11	97.72	97.33	97.01
54	152.0	99.93	99.67	99.47	99.14	98.75	98.49	98.03	97.76	97.30
55	154.8	99.94	99.48	99.22	98.84	98.51	98.26	97.80	97.29	96.90
56	153.6	99.87	99.67	99.35	99.09	98.70	98.50	98.11	97.79	97.40
57	152.3	100.26	99.93	99.67	99.47	99.08	98.56	98.10	97.64	97.24
58	152.6	100.07	99.54	99.28	98.89	98.49	98.30	97.90	97.58	97.25
59	154.3	100.06	99.74	99.35	99.09	98.83	98.19	97.73	97.21	96.76
60	155.6	100.06	99.55	99.04	98.84	98.46	98.01	97.49	97.04	96.66
61	152.9	100.20	99.87	99.41	98.95	98.63	97.84	97.38	97.19	96.73
62	152.0	99.80	99.54	99.21	98.75	98.49	98.16	97.76	97.43	96.97
63	154.7	99.61	99.42	99.10	98.77	98.58	98.32	97.93	97.41	96.96
64	154.4	100.06	99.74	99.16	98.90	98.45	97.99	97.60	97.28	96.89
65	153.5	99.93	99.67	99.22	98.70	98.37	97.92	97.46	96.74	96.42
66	152.6	100.07	99.67	99.34	99.15	98.56	98.17	97.77	97.38	96.92
67	152.9	99.67	99.15	98.56	98.17	97.84	97.51	97.06	96.80	96.53
68	154.7	100.13	99.61	99.42	99.03	98.58	98.19	97.80	97.35	96.90
69	155.1	100.26	99.94	99.55	99.36	98.97	98.19	97.87	97.49	97.10
70	153.0	99.80	99.28	98.89	98.30	98.04	97.91	97.45	97.25	96.86
71	154.1	99.81	99.42	99.03	98.83	98.51	97.99	97.47	97.21	96.89
72	153.8	99.41	98.96	98.57	98.37	98.18	97.66	97.27	97.01	96.55
73	153.8	99.61	99.22	98.96	98.76	98.50	98.18	97.79	97.46	97.14
74	153.8	100.07	99.80	99.48	99.09	98.83	98.70	98.24	98.11	97.66
75	153.7	100.33	99.87	99.35	99.02	98.50	98.24	98.05	97.46	97.14
Avg.	153.5	99.96	99.58	99.21	98.88	98.53	98.14	97.73	97.36	96.97
Med.	153.7	99.94	99.61	99.28	98.89	98.51	98.18	97.77	97.35	96.92
st dev	1.1	0.23	0.26	0.29	0.31	0.29	0.28	0.30	0.34	0.32
Min.	151.2	99.41	98.96	98.56	98.17	97.84	97.51	97.06	96.74	96.42
Max.	155.6	100.33	99.94	99.67	99.47	99.08	98.70	98.24	98.11	97.66

**3.8 Data Set 3, 115° C, 30mA (Forward Voltage)**

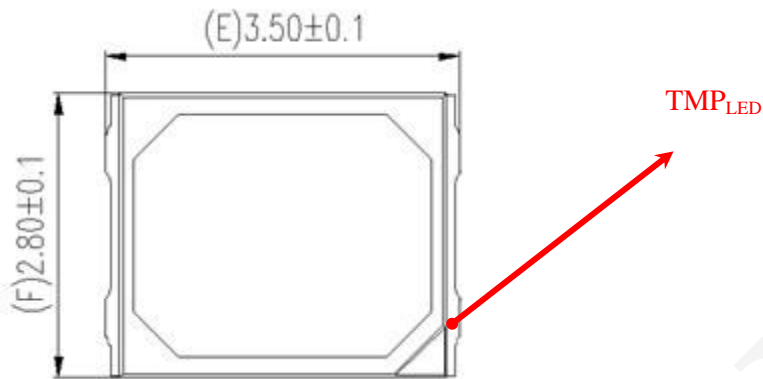
No.	Forward Voltage (V)									
	0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
51	37.21	37.38	37.43	37.45	37.46	37.39	37.32	37.31	37.34	37.34
52	37.48	37.33	37.38	37.41	37.41	37.33	37.27	37.25	37.29	37.30
53	37.08	37.23	37.29	37.32	37.30	37.23	37.17	37.16	37.20	37.20
54	37.17	37.31	37.39	37.40	37.39	37.34	37.25	37.24	37.30	37.45
55	37.13	37.28	37.35	37.38	37.36	37.33	37.25	37.23	37.25	37.25
56	37.11	37.25	37.32	37.34	37.39	37.28	37.25	37.18	37.22	37.24
57	37.13	37.25	37.32	37.34	37.35	37.25	37.27	37.21	37.24	37.20
58	37.11	37.24	37.31	37.32	37.35	37.25	37.27	37.18	37.22	37.23
59	37.21	37.38	37.48	37.45	37.45	37.38	37.33	37.32	37.33	37.34
60	37.24	37.39	37.44	37.46	37.46	37.38	37.34	37.33	37.36	37.35
61	37.18	37.32	37.38	37.42	37.39	37.32	37.29	37.26	37.29	37.29
62	37.21	37.51	37.48	37.47	37.61	37.34	37.52	37.28	37.37	37.43
63	37.19	37.29	37.35	37.37	37.34	37.24	37.25	37.23	37.26	37.25
64	37.12	37.31	37.60	37.36	37.34	37.24	37.48	37.21	37.23	37.26
65	37.19	37.40	37.68	37.35	37.37	37.34	37.32	37.21	37.24	37.44
66	37.06	37.51	37.20	37.26	37.24	37.16	37.14	37.12	37.15	37.15
67	37.26	37.60	37.35	37.29	37.28	37.18	37.19	37.15	37.18	37.19
68	37.15	37.62	37.34	37.36	37.35	37.27	37.24	37.21	37.25	37.24
69	37.30	37.72	37.48	37.47	37.54	37.33	37.39	37.32	37.34	37.35
70	37.21	37.69	37.46	37.44	37.48	37.30	37.31	37.28	37.30	37.31
71	37.18	37.64	37.42	37.41	37.42	37.26	37.37	37.24	37.28	37.28
72	37.05	37.53	37.26	37.26	37.27	37.13	37.22	37.12	37.14	37.17
73	37.23	37.72	37.80	37.48	37.45	37.33	37.35	37.32	37.34	37.49
74	37.09	37.54	37.27	37.30	37.26	37.16	37.21	37.16	37.17	37.16
75	37.15	37.63	37.36	37.38	37.35	37.24	37.36	37.23	37.25	37.32
Avg.	37.18	37.44	37.41	37.38	37.38	37.28	37.29	37.23	37.26	37.29
Med.	37.18	37.39	37.38	37.38	37.37	37.28	37.27	37.23	37.25	37.28
st dev	0.09	0.17	0.13	0.07	0.09	0.07	0.09	0.06	0.06	0.09
Min.	37.05	37.23	37.20	37.26	37.24	37.13	37.14	37.12	37.14	37.15
Max.	37.48	37.72	37.80	37.48	37.61	37.39	37.52	37.33	37.37	37.49

**3.9 Data Set 3, 115° C, 30mA (Chromaticity Shift)**

No.	u'	v'	CCT(K)	Chromaticity Shift ( $\Delta u'v'$ )								
				1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs	7000hrs	8000hrs	9000hrs
	0hr(Initial)											
51	0.2642	0.5288	2661	0.0004	0.0005	0.0008	0.0009	0.0014	0.0016	0.0019	0.0021	0.0025
52	0.2659	0.5291	2624	0.0004	0.0007	0.0010	0.0011	0.0014	0.0016	0.0018	0.0021	0.0023
53	0.2636	0.5284	2672	0.0005	0.0007	0.0011	0.0013	0.0014	0.0017	0.0019	0.0021	0.0024
54	0.2654	0.5290	2635	0.0004	0.0006	0.0011	0.0013	0.0014	0.0016	0.0020	0.0023	0.0024
55	0.2647	0.5271	2655	0.0006	0.0009	0.0010	0.0014	0.0016	0.0016	0.0017	0.0020	0.0023
56	0.2634	0.5271	2683	0.0005	0.0010	0.0012	0.0013	0.0016	0.0017	0.0018	0.0019	0.0020
57	0.2657	0.5288	2630	0.0007	0.0009	0.0013	0.0016	0.0017	0.0018	0.0020	0.0021	0.0023
58	0.2648	0.5283	2650	0.0004	0.0009	0.0013	0.0015	0.0018	0.0019	0.0022	0.0023	0.0025
59	0.2634	0.5284	2677	0.0007	0.0009	0.0013	0.0015	0.0019	0.0022	0.0023	0.0025	0.0026
60	0.2637	0.5304	2664	0.0006	0.0009	0.0013	0.0016	0.0019	0.0020	0.0023	0.0026	0.0027
61	0.2651	0.5284	2643	0.0006	0.0011	0.0013	0.0018	0.0021	0.0023	0.0024	0.0026	0.0028
62	0.2646	0.5277	2657	0.0006	0.0009	0.0014	0.0018	0.0022	0.0024	0.0026	0.0028	0.0030
63	0.2633	0.5291	2676	0.0005	0.0008	0.0012	0.0016	0.0021	0.0023	0.0025	0.0025	0.0027
64	0.2640	0.5290	2663	0.0004	0.0007	0.0013	0.0016	0.0021	0.0024	0.0025	0.0025	0.0028
65	0.2633	0.5291	2677	0.0006	0.0010	0.0014	0.0016	0.0021	0.0026	0.0030	0.0029	0.0031
66	0.2664	0.5288	2617	0.0005	0.0008	0.0013	0.0016	0.0019	0.0021	0.0024	0.0026	0.0028
67	0.2655	0.5282	2635	0.0006	0.0008	0.0013	0.0016	0.0018	0.0021	0.0023	0.0026	0.0028
68	0.2641	0.5286	2662	0.0008	0.0012	0.0015	0.0018	0.0020	0.0020	0.0023	0.0026	0.0027
69	0.2628	0.5288	2688	0.0008	0.0012	0.0016	0.0019	0.0020	0.0021	0.0024	0.0028	0.0029
70	0.2636	0.5260	2683	0.0007	0.0012	0.0017	0.0020	0.0023	0.0026	0.0027	0.0028	0.0031
71	0.2658	0.5291	2627	0.0009	0.0012	0.0017	0.0022	0.0024	0.0027	0.0029	0.0028	0.0031
72	0.2644	0.5300	2651	0.0007	0.0012	0.0016	0.0019	0.0024	0.0027	0.0029	0.0027	0.0031
73	0.2649	0.5284	2647	0.0008	0.0012	0.0017	0.0019	0.0025	0.0029	0.0030	0.0026	0.0029
74	0.2635	0.5282	2677	0.0008	0.0012	0.0018	0.0020	0.0023	0.0025	0.0028	0.0025	0.0028
75	0.2649	0.5281	2648	0.0009	0.0012	0.0013	0.0016	0.0022	0.0025	0.0026	0.0033	0.0034
Avg.	0.2644	0.5285	2656	0.0006	0.0009	0.0013	0.0016	0.0019	0.0022	0.0024	0.0025	0.0027
Med.	0.2644	0.5286	2657	0.0006	0.0009	0.0013	0.0016	0.0020	0.0021	0.0024	0.0026	0.0028
st dev	0.0010	0.0009	20	0.0001	0.0002	0.0003	0.0003	0.0003	0.0004	0.0004	0.0003	0.0003
Min.	0.2628	0.5260	2617	0.0004	0.0005	0.0008	0.0009	0.0014	0.0016	0.0017	0.0019	0.0020
Max.	0.2664	0.5304	2688	0.0009	0.0012	0.0018	0.0022	0.0025	0.0029	0.0030	0.0033	0.0034

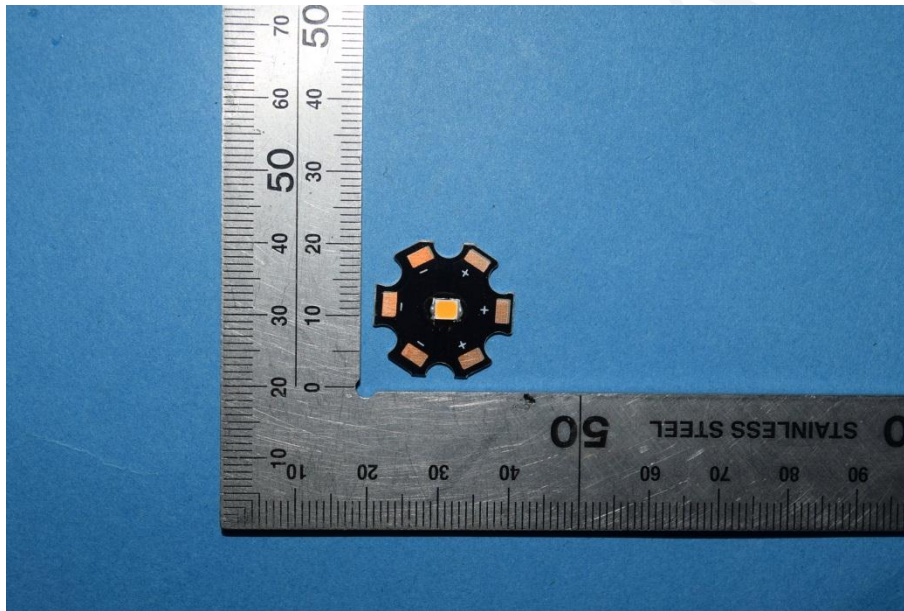
#### 4 - DUT Photo

##### 4.1 #Mechanical Dimensions



All dimensions are in millimeter

##### 4.2 DUT Photo





### 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.
3. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.
4. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.
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\*\*\*\*\*END OF REPORT\*\*\*\*\*