



**Testing Lab.**  
**Shenzhen LCS Compliance Testing Laboratory Ltd.**



Report No.: LCS160901012BS

## TEST REPORT of IESNA LM-80-15

**Approved Method: Measuring Luminous Flux and Color Maintenance of LED Packages, Arrays and Modules**

**Client**..... : Shenzhen jingrui photoelectric Co., Ltd.  
**Address**..... : 3-4/F, Building A, Mingfengda Industrial Park, Baoshan Road, Yutang Office,  
Guangming New District, Shenzhen  
**Brand Name**..... : Jingrui Optoelectronics  
**Testing laboratory**..... : Shenzhen LCS Compliance Testing Laboratory Ltd.  
**Address**..... : B Area, 2F, Building B, Zhongyu Green High-tech Industrial Park, Wenge  
Road, Heshuikou, Gongming Street, Guangming New District, Shenzhen,  
Guangdong, China  
**Product description** ..... : SMD LED  
**Model**..... : 2835  
**Rating**..... : IF:60mA, VF: 3V, 0.2W  
**Date of Test**..... : February 13, 2018 – February 22, 2019  
**Date of Issue**..... : February 25, 2019

**Test by:**

*Seth Cai*

Seth Cai/ Project Engineer

**Check by:**

*Ian Luo*

Ian Luo/ Director

**Approved by:**



Hart Qiu/ Manager



## Test Summary

Life test condition			Summary of result		
Test condition	Current (mA)	Case temperature (°C)	Test duration (h)	Average lumen maintenance (%)	Average chromaticity shift ( $\Delta u'v'$ )
1	60	55	9000	95.82%	0.0030
2	60	85	9000	95.53%	0.0033
3	60	105	9000	95.15%	0.0037

### 1. Number of LED light sources tested

- 15 Packages tested at actual case temperature 54.6°C
- 15 Packages tested at actual case temperature 84.5°C
- 15 Packages tested at actual case temperature 104.5°C

### 2. Description of LED light sources

- Part Number: 2835
- Part Type: LED Package
- IF =60mA, CCT(Nominal) = 2700-2900 K

### 3. Description of auxiliary equipment

- 1) EVERFINE LT-200A Accelerated Aging-Life Test System for LEDs
- 2) Instrument Integrating sphere 0.5m
- 3) SENSING SPR-3000 Photometric, Colorimetric& Electric System for Light Sources

### 4. Operating time

LED packages are driven with a constant direct current.

- Number of units : 15 at 55°C, 85°C and 105°C
- Drive current : 60 mA
- Typical voltage : 3V

### 5. Ambient conditions including airflow, temperature and relative humidity

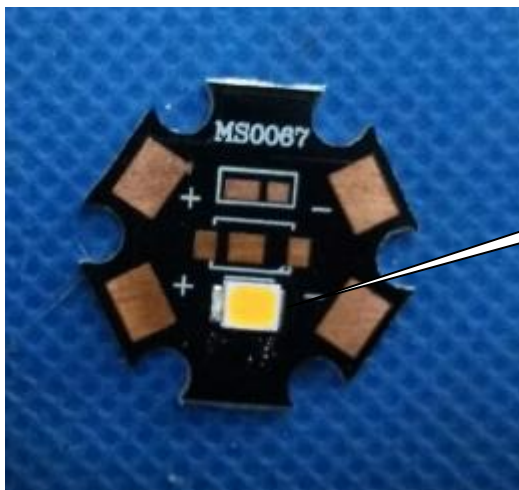
The minimal airflow is maintained in chamber.

The ambient temperature around the LED packages inside chamber is controlled by air flowing and the thermocouple readings are monitored.

- Case temperature : Controlled to -2°C
- Surrounding air temperature : Controlled to -5°C
- Relative humidity : < 65%RH



## 6. Case temperature (Test point temperature)



**T<sub>s</sub> Measurement**

## 7. Drive current of the LED light source during lifetime test

See Sub-clause 9.1, 9.2 and 9.3

## 8. Initial luminous flux and forward voltage

See the table

## 9. Lumen maintenance data for each individual LED light source

See the table

Quantity	Model	Serial Number
15	2835	A01-A15 (55°C)
15	2835	B01-B15 (85°C)
15	2835	C01-C15 (105°C)



**9.1 Test condition 1: 55 °C, Drive Current : 60mA**

Item	V <sub>F</sub> (V)	Flux(lm)	T=55°C Luminous Maintenance (%)								
			0 h	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h
A01	2.859	29.76	101.50	100.46	100.14	99.55	99.25	98.89	98.47	97.81	97.42
A02	2.865	30.05	101.86	100.15	99.30	98.93	98.32	97.99	97.26	96.63	96.21
A03	2.860	29.95	101.35	100.29	99.89	99.34	98.78	98.33	97.64	96.93	96.53
A04	2.866	31.15	101.76	99.84	99.44	99.08	98.56	98.28	97.62	96.93	96.46
A05	2.861	30.64	99.90	99.80	99.03	98.12	97.40	97.01	96.31	95.91	95.28
A06	2.856	30.28	100.47	99.81	99.57	99.01	98.48	97.88	97.02	96.18	95.47
A07	2.861	30.41	100.90	99.64	98.98	98.17	97.72	97.16	96.69	96.19	95.61
A08	2.864	29.85	100.88	99.97	99.05	98.74	97.76	97.45	96.69	96.05	95.66
A09	2.860	31.15	99.74	99.64	99.00	98.24	97.71	97.40	96.60	95.96	95.26
A10	2.856	30.09	101.54	100.42	99.06	98.22	97.61	97.13	96.38	96.07	95.49
A11	2.867	30.33	100.70	99.47	98.83	98.19	97.71	97.44	96.91	96.31	95.67
A12	2.866	30.47	100.54	99.37	99.02	98.52	97.92	97.49	97.00	96.58	95.85
A13	2.867	31.41	100.32	99.72	99.01	98.37	97.57	97.19	96.31	95.88	95.22
A14	2.861	30.36	100.42	99.24	98.65	98.09	97.44	97.05	96.65	96.13	95.83
A15	2.857	29.75	101.30	99.89	99.19	98.36	97.83	97.08	96.33	96.10	95.38
Ave.	2.862	30.38	100.88	99.85	99.21	98.60	98.00	97.58	96.93	96.38	95.82
Med.	2.861	30.33	100.88	99.81	99.05	98.37	97.76	97.44	96.69	96.18	95.66
St dev	0.0039	0.5193	0.0066	0.0036	0.0040	0.0048	0.0055	0.0057	0.0061	0.0052	0.0060
Max.	2.867	31.41	101.86	100.46	100.14	99.55	99.25	98.89	98.47	97.81	97.42
Min.	2.856	29.75	99.74	99.24	98.65	98.09	97.40	97.01	96.31	95.88	95.22



**9.1.1 Test condition 1: 55 °C, Drive Current : 60mA**

No.	T=55°C Chromaticity Shift ( $\Delta u'v'$ )											
	0 h			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
	u'	v'	CCT(K)									
A01	0.2607	0.5253	2745	0.0000	0.0003	0.0006	0.0010	0.0015	0.0019	0.0025	0.0027	0.0030
A02	0.2587	0.5254	2788	0.0003	0.0005	0.0008	0.0012	0.0016	0.0018	0.0023	0.0026	0.0030
A03	0.2579	0.5249	2808	0.0002	0.0002	0.0007	0.0015	0.0016	0.0019	0.0024	0.0028	0.0031
A04	0.2617	0.526	2723	0.0000	0.0004	0.0009	0.0013	0.0017	0.0021	0.0026	0.0029	0.0031
A05	0.2610	0.5262	2737	0.0001	0.0003	0.0006	0.0012	0.0016	0.0019	0.0022	0.0024	0.0027
A06	0.2618	0.5276	2714	0.0003	0.0005	0.0007	0.0012	0.0015	0.0018	0.0023	0.0025	0.0028
A07	0.2592	0.5267	2772	0.0002	0.0006	0.0009	0.0014	0.0018	0.0020	0.0024	0.0028	0.0031
A08	0.2583	0.5263	2793	0.0001	0.0004	0.0006	0.0011	0.0015	0.0019	0.0023	0.0025	0.0027
A09	0.2589	0.5248	2787	0.0004	0.0006	0.0008	0.0014	0.0017	0.0021	0.0024	0.0028	0.0032
A10	0.2582	0.5274	2791	0.0002	0.0003	0.0006	0.0013	0.0016	0.0019	0.0026	0.0029	0.0033
A11	0.2581	0.5248	2806	0.0000	0.0005	0.0009	0.0012	0.0015	0.0018	0.0025	0.0029	0.0029
A12	0.2590	0.5266	2778	0.0003	0.0004	0.0008	0.0013	0.0016	0.0019	0.0024	0.0029	0.0032
A13	0.2604	0.5275	2743	0.0002	0.0003	0.0007	0.0012	0.0017	0.0020	0.0025	0.0028	0.0031
A14	0.2619	0.5261	2717	0.0002	0.0005	0.0008	0.0013	0.0017	0.0024	0.0027	0.0031	0.0034
A15	0.2587	0.5270	2782	0.0001	0.0004	0.0009	0.0010	0.0013	0.0016	0.0021	0.0026	0.0030
Ave.	0.2596	0.5262	2766	0.0002	0.0004	0.0008	0.0012	0.0016	0.0019	0.0024	0.0027	0.0030
Med.	0.2590	0.5262	2778	0.0002	0.0004	0.0008	0.0012	0.0016	0.0019	0.0024	0.0028	0.0031
St dev	0.0015	0.0010	32.5594	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
Max.	0.2619	0.5276	2808	0.0004	0.0006	0.0009	0.0015	0.0018	0.0024	0.0027	0.0031	0.0034
Min.	0.2579	0.5248	2714	0.0000	0.0002	0.0006	0.0010	0.0013	0.0016	0.0021	0.0024	0.0027



**9.2 Test condition 2: 85 °C, Drive Current : 60mA**

Item	V <sub>F</sub> (V)	Flux(lm)	T=85°C Luminous Maintenance (%)								
			0 h	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h
A01	2.845	29.34	100.26	99.74	99.23	98.93	98.65	98.34	97.52	96.95	96.32
A02	2.843	28.95	99.96	99.22	98.71	98.11	97.65	97.18	96.66	96.21	95.60
A03	2.838	30.11	100.02	99.59	99.36	98.78	98.28	97.63	97.04	96.45	95.61
A04	2.841	30.54	99.47	98.95	98.46	97.81	97.46	96.98	96.34	95.82	95.61
A05	2.839	30.27	99.30	98.88	98.74	98.29	97.26	96.97	96.18	95.57	94.83
A06	2.835	29.94	100.56	100.15	99.57	98.97	98.33	97.80	96.92	96.52	95.80
A07	2.839	31.42	99.48	98.84	98.44	97.91	97.38	96.70	96.26	95.41	94.90
A08	2.840	31.62	99.35	99.23	98.55	98.16	97.58	97.07	95.02	94.36	93.77
A09	2.838	30.39	100.05	99.78	99.53	99.31	98.51	98.34	97.97	97.30	96.72
A10	2.838	30.85	100.21	100.11	99.72	99.35	98.69	98.24	97.87	97.15	96.66
A11	2.841	29.75	100.20	99.80	99.61	99.03	98.24	97.65	97.14	96.39	95.63
A12	2.837	29.96	99.68	99.17	99.01	98.40	97.48	96.98	96.40	95.84	95.29
A13	2.839	30.06	99.57	99.03	98.81	98.66	97.62	97.33	96.87	96.20	95.74
A14	2.839	30.14	99.13	98.72	98.35	98.17	97.43	96.86	96.33	95.74	95.09
A15	2.842	30.36	99.20	98.96	98.46	97.85	97.46	97.01	96.37	95.99	95.45
Ave.	2.840	30.25	99.76	99.35	98.97	98.51	97.87	97.41	96.73	96.13	95.53
Med.	2.839	30.14	99.68	99.22	98.81	98.40	97.62	97.18	96.66	96.20	95.61
St dev	0.0025	0.6937	0.0045	0.0048	0.0049	0.0052	0.0051	0.0056	0.0074	0.0074	0.0074
Max.	2.845	31.62	100.56	100.15	99.72	99.35	98.69	98.34	97.97	97.30	96.72
Min.	2.835	28.95	99.13	98.72	98.35	97.81	97.26	96.70	95.02	94.36	93.77



**9.2.1 Test condition 2: 85 °C, Drive Current : 60mA**

No.	T=85°C Chromaticity Shift ( $\Delta u'v'$ )											
	0 h			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
	u'	v'	CCT(K)									
A01	0.2595	0.5234	2781	0.0004	0.0006	0.0008	0.0014	0.0019	0.0026	0.0024	0.0029	0.0031
A02	0.2597	0.5245	2771	0.0004	0.0006	0.0009	0.0016	0.0018	0.0022	0.0026	0.0028	0.0032
A03	0.2577	0.5236	2820	0.0003	0.0005	0.0008	0.0014	0.0016	0.0021	0.0028	0.0032	0.0035
A04	0.2600	0.5238	2768	0.0002	0.0004	0.0008	0.0013	0.0018	0.0023	0.0028	0.0033	0.0035
A05	0.2578	0.5266	2804	0.0000	0.0003	0.0005	0.0010	0.0015	0.0022	0.0025	0.0028	0.0031
A06	0.2595	0.5239	2779	0.0001	0.0004	0.0008	0.0015	0.0020	0.0026	0.0026	0.0029	0.0033
A07	0.2610	0.5239	2745	0.0002	0.0002	0.0006	0.0012	0.0017	0.0023	0.0028	0.0031	0.0032
A08	0.2600	0.5248	2763	0.0002	0.0004	0.0008	0.0014	0.0018	0.0023	0.0027	0.0030	0.0033
A09	0.2589	0.5256	2783	0.0001	0.0003	0.0006	0.0012	0.0018	0.0022	0.0026	0.0031	0.0032
A10	0.2594	0.5253	2774	0.0003	0.0003	0.0007	0.0013	0.0016	0.0021	0.0027	0.0029	0.0030
A11	0.2604	0.5227	2763	0.0003	0.0005	0.0009	0.0015	0.0018	0.0022	0.0026	0.0029	0.0034
A12	0.2585	0.5259	2792	0.0001	0.0004	0.0008	0.0015	0.0019	0.0026	0.0028	0.0031	0.0033
A13	0.2594	0.5268	2768	0.0003	0.0003	0.0006	0.0012	0.0016	0.0022	0.0026	0.0030	0.0034
A14	0.2611	0.5268	2732	0.0001	0.0002	0.0005	0.0016	0.0018	0.0025	0.0028	0.0032	0.0035
A15	0.2596	0.5280	2759	0.0000	0.0002	0.0006	0.0014	0.0019	0.0025	0.0029	0.0032	0.0033
Ave.	0.2595	0.5250	2773	0.0002	0.0004	0.0007	0.0014	0.0018	0.0023	0.0027	0.0030	0.0033
Med.	0.2595	0.5248	2771	0.0002	0.0004	0.0008	0.0014	0.0018	0.0023	0.0027	0.0030	0.0033
St dev	0.0010	0.0015	21.7842	0.0001	0.0001	0.0001	0.0002	0.0001	0.0002	0.0001	0.0002	0.0002
Max.	0.2611	0.5280	2820	0.0004	0.0006	0.0009	0.0016	0.0020	0.0026	0.0029	0.0033	0.0035
Min.	0.2577	0.5227	2732	0.0000	0.0002	0.0005	0.0010	0.0015	0.0021	0.0024	0.0028	0.0030



**9.3 Test condition 3: 105 °C, Drive Current : 60mA**

Item	V <sub>F</sub> (V)	Flux(lm)	T=105°C Luminous Maintenance (%)								
			0 h	1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h
A01	2.834	30.28	99.37	98.54	98.29	97.75	97.43	96.88	96.35	95.73	95.46
A02	2.835	30.12	99.06	98.81	98.17	97.73	97.16	96.97	96.36	96.06	95.50
A03	2.831	29.85	99.20	98.52	98.29	97.89	97.52	97.23	96.67	96.08	95.67
A04	2.836	31.41	99.30	98.84	98.58	98.43	97.38	96.92	96.43	95.94	95.18
A05	2.836	31.95	99.14	98.71	98.27	97.61	97.47	97.15	96.81	96.39	95.78
A06	2.834	30.66	99.41	98.86	98.42	98.14	97.07	96.40	95.39	94.54	93.79
A07	2.832	29.42	99.79	98.88	98.31	97.71	97.45	96.99	96.04	95.34	94.59
A08	2.830	29.85	99.82	98.97	98.49	97.62	96.84	96.36	95.73	95.15	94.35
A09	2.833	29.16	99.19	99.00	98.93	98.34	97.84	97.41	96.77	96.40	95.72
A10	2.834	29.85	99.95	99.16	98.93	98.18	97.17	96.92	96.57	95.88	95.20
A11	2.831	30.03	99.53	98.87	98.83	98.20	97.54	97.10	96.38	95.62	94.82
A12	2.844	29.74	99.11	98.80	98.20	97.43	96.80	96.60	95.85	95.16	94.49
A13	2.832	29.62	99.46	99.12	98.93	98.48	98.21	97.93	97.30	96.78	96.02
A14	2.836	30.12	99.81	99.56	98.99	98.14	97.32	97.00	96.23	95.75	95.22
A15	2.833	30.55	99.39	99.02	98.93	98.56	97.98	97.05	96.55	96.12	95.41
Ave.	2.834	30.17	99.43	98.91	98.57	98.01	97.41	96.99	96.36	95.80	95.15
Med.	2.834	30.03	99.39	98.87	98.49	98.14	97.43	96.99	96.38	95.88	95.22
St dev	0.0033	0.7321	0.0029	0.0026	0.0032	0.0036	0.0039	0.0039	0.0047	0.0057	0.0062
Max.	2.844	31.95	99.95	99.56	98.99	98.56	98.21	97.93	97.30	96.78	96.02
Min.	2.830	29.16	99.06	98.52	98.17	97.43	96.80	96.36	95.39	94.54	93.79





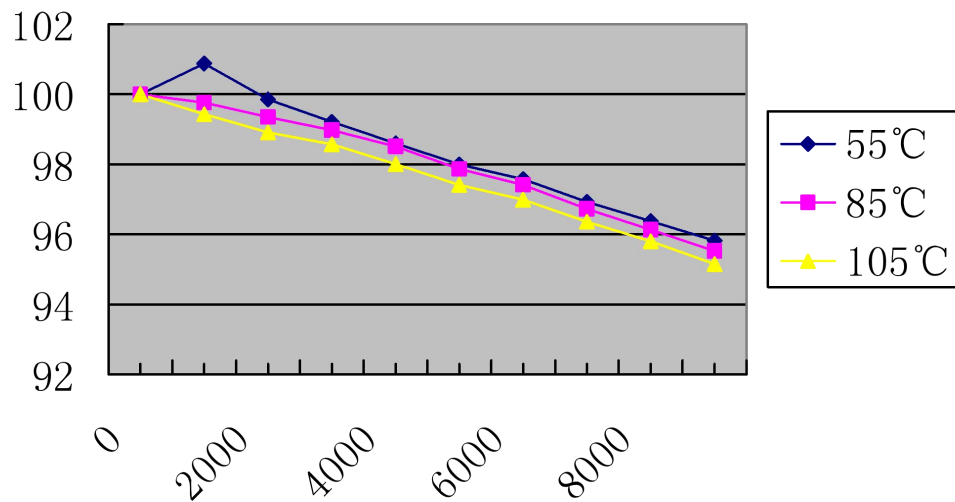
**9.3.1 Test condition 3: 105 °C, Drive Current : 60mA**

No.	T=105°C Chromaticity Shift ( $\Delta u'v'$ )											
	0 h			1000h	2000h	3000h	4000h	5000h	6000h	7000h	8000h	9000h
	u'	v'	CCT(K)									
A01	0.2591	0.5241	2786	0.0003	0.0006	0.0011	0.0018	0.0021	0.0027	0.0031	0.0034	0.0036
A02	0.2600	0.5247	2764	0.0004	0.0005	0.0010	0.0015	0.0019	0.0026	0.0029	0.0033	0.0037
A03	0.2588	0.5256	2787	0.0002	0.0006	0.0009	0.0016	0.0022	0.0028	0.0030	0.0033	0.0036
A04	0.2610	0.5245	2744	0.0003	0.0007	0.0012	0.0017	0.0023	0.0029	0.0031	0.0035	0.0038
A05	0.2600	0.5250	2764	0.0004	0.0006	0.0010	0.0016	0.0019	0.0026	0.0030	0.0034	0.0037
A06	0.2599	0.5282	2752	0.0003	0.0005	0.0009	0.0018	0.0022	0.0025	0.0029	0.0032	0.0036
A07	0.2620	0.5270	2712	0.0004	0.0004	0.0008	0.0015	0.0019	0.0026	0.0031	0.0034	0.0037
A08	0.2587	0.5268	2783	0.0002	0.0006	0.0009	0.0016	0.0019	0.0027	0.0029	0.0033	0.0036
A09	0.2616	0.5262	2724	0.0005	0.0005	0.0008	0.0017	0.0021	0.0026	0.0029	0.0034	0.0038
A10	0.2597	0.5269	2762	0.0001	0.0007	0.0012	0.0016	0.0022	0.0027	0.0033	0.0036	0.0038
A11	0.2591	0.5237	2789	0.0003	0.0006	0.0011	0.0016	0.0019	0.0026	0.0031	0.0032	0.0037
A12	0.2587	0.5263	2786	0.0004	0.0005	0.0010	0.0016	0.0020	0.0028	0.0033	0.0035	0.0039
A13	0.2616	0.5272	2719	0.0002	0.0006	0.0013	0.0018	0.0022	0.0027	0.0029	0.0033	0.0038
A14	0.2600	0.5270	2753	0.0003	0.0004	0.0008	0.0016	0.0019	0.0026	0.0030	0.0034	0.0037
A15	0.2612	0.5287	2720	0.0002	0.0006	0.0012	0.0017	0.0021	0.0027	0.0031	0.0035	0.0038
Ave.	0.2601	0.5261	2756	0.0003	0.0006	0.0010	0.0016	0.0021	0.0027	0.0030	0.0034	0.0037
Med.	0.2600	0.5263	2762	0.0003	0.0006	0.0010	0.0016	0.0021	0.0027	0.0030	0.0034	0.0037
St dev	0.0011	0.0015	27.4322	0.0001	0.0001	0.0002	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001
Max.	0.2620	0.5287	2789	0.0005	0.0007	0.0013	0.0018	0.0023	0.0029	0.0033	0.0036	0.0039
Min.	0.2587	0.5237	2712	0.0001	0.0004	0.0008	0.0015	0.0019	0.0025	0.0029	0.0032	0.0036

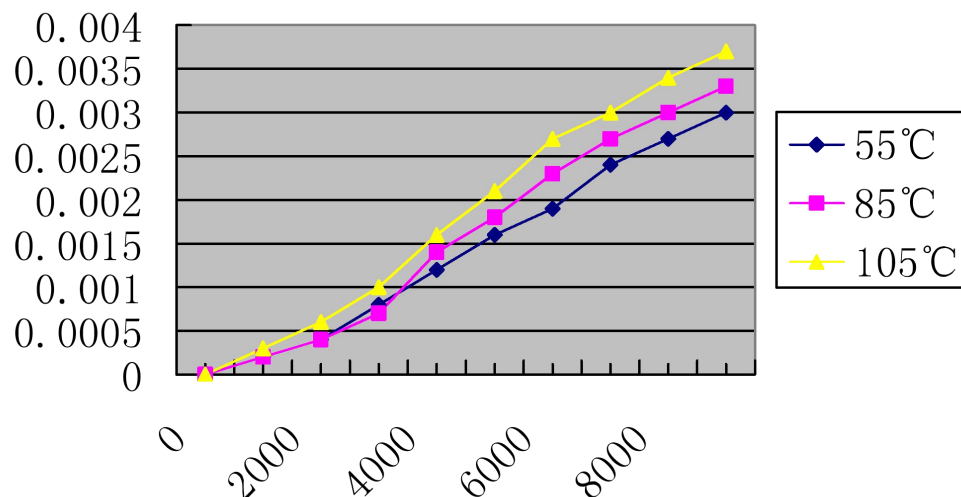


### 9.4 Chart

#### Luminous Maintenance (%)



#### Chromaticity Shift ( $\Delta u'v'$ )





**10. Observation of failures**

No optical, Electrical or mechanical failure of any LED Package was seen during the lifetime testing.

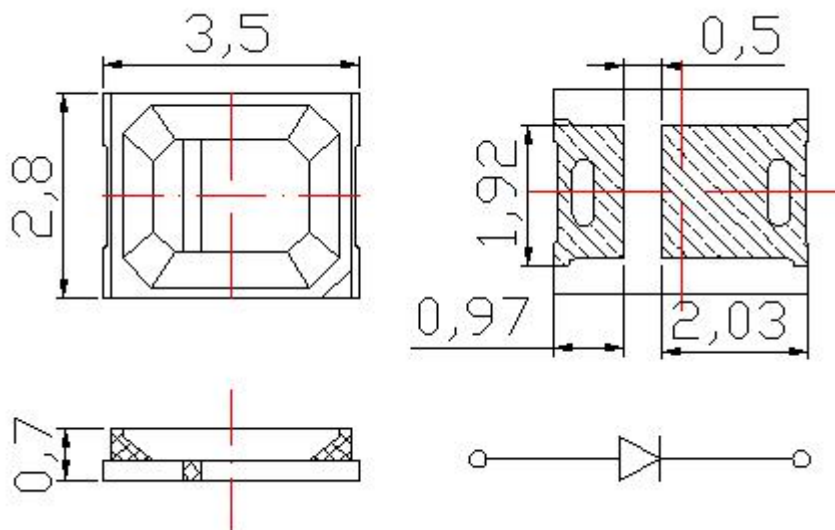
**11. Photometric measurement uncertainty**

2%

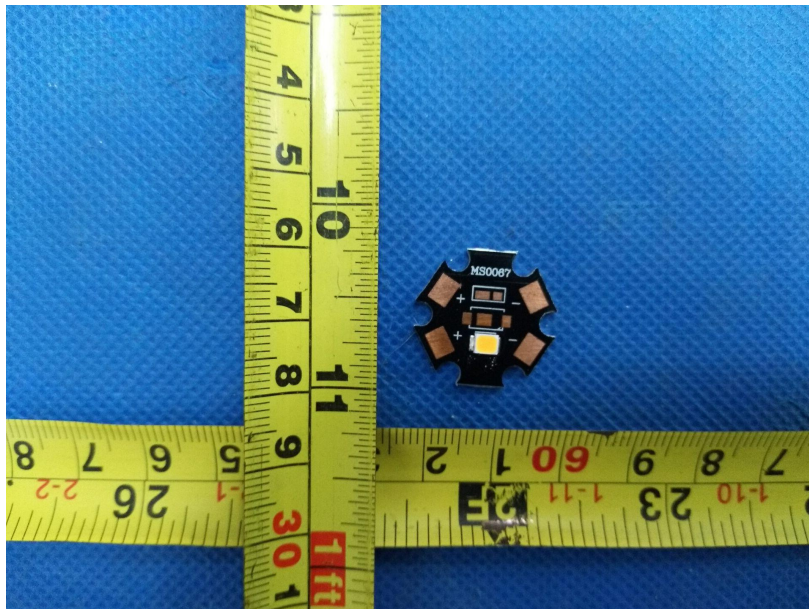
**12. TM-21-11 report: Projecting long term lumen maintenance of LED light source**

Test Condition 1 - 55° C Case Temp		Test Condition 2 - 85° C Case Temp		Test Condition 3 - 105° C Case Temp	
Sample size	15	Sample size	15	Sample size	15
Number of failures	0	Number of failures	0	Number of failures	0
DUT drive current used in the test (mA)	60	DUT drive current used in the test (mA)	60	DUT drive current used in the test (mA)	60
Test duration (hours)	9,000	Test duration (hours)	9,000	Test duration (hours)	9,000
Test duration used for projection (hour to hour)	4,000 - 9,000	Test duration used for projection (hour to hour)	4,000 - 9,000	Test duration used for projection (hour to hour)	4,000 - 9,000
Tested case temperature (° C)	55	Tested case temperature (° C)	85	Tested case temperature (° C)	105
$\alpha$	5.705E-06	$\alpha$	6.126E-06	$\alpha$	5.845E-06
B	1.009	B	1.010	B	1.004
Reported L70(9k) (hours)	>50000	Reported L70(9k) (hours)	>50000	Reported L70(9k) (hours)	>50000

**14. Mechanical Dimensions**



**15. Photo of samples:**



\*\*\*\*\*END OF THIS REPORT\*\*\*\*\*