



IES LM-80-2008

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES

MEASUREMENT AND TEST REPORT

For

G.H. Opto-Electronic Co Ltd & Kwality Photonics P Ltd.

Model: KLSL 2835W

Report Type: 6000 Hours Test Report		Product Type: LED Package	
Test Engineer:	Jack Zhou	<i>Jack Zhou</i>	
Report Number:	RSZ120424502-10-M2		
Test Date:	2012-04-26 to 2013-01-04		
Report Date:	2013-05-27		
Revision Note:	The previous report RSZ120424502-10-M1 is replaced by this report. The product photo is updated in this report.		
Reviewed By:	Jeanne Han /Safety Manager	<i>Jeanne Han</i>	
Prepared By:	Bay Area Compliance Laboratories Corp. (Dongguan). Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China. Tel: +86-0769-86858888 Fax: +86-0769-86858888		



Note: The test data was only valid for the test sample(s). This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Dongguan).
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1 - GENERAL INFORMATION

1.1 Description of LED Light Sources

Devices tested

Part Number: KLSL2835W
Part Type: LED Package
Nominal CCT: 6000K-6500K

1.2 Standards Used:

- IESNA LM-80-08: IES Approved Method for Measuring Lumen Maintenance of LED Light Sources.

1.3 Test Facility

The testing facility used by Bay Area Compliance Laboratories Corp. (Dongguan), is located at Pu Long Cun 69, Puxinghu Industrial Area, Tangxia Town, Dongguan, Guangdong, P.R.China.

1.4 Description of Auxiliary Equipment

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Integral Sphere	EVERFINE	Diameter 0.3M	1011119	380-780nm, length:0.3M ,0- 1999LUMEN	2012-02-19	2013-02-18
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	15V/2000mA	2012-02-15	2013-02-14
Standard Light Source	EVERFINE	D062	1011064	N/A	2012-02-23	2013-02-22
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2012-02-15	2013-02-14

1.5 Operating Cycle

Samples are driven with a constant direct current (DC)

1.6 Ambient Conditions

For lumen maintenance test, samples were operated in thermal chambers with minimal ambient airflow. For long term reliability test, the case temperature was controlled by mounting several thermocouples on a sample reliability stress board at the designated thermal measurement point, as shown in APPENDIX. The ambient temperature T_A was measured by several thermocouples at a distance of 1.5 mm above the reliability test board. The relative humidity within chamber was less than 65%.

For photometry measurement, temperature was set to $25\text{ }^\circ\text{C} \pm 2\text{ }^\circ\text{C}$, RH <65%.

1.7 Photometry 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. This calibration results traceable to the NATIONAL INSTITUTE OF METROLOGY (NIM).

1.8 Sample Set

Data Set 1: 85 °C, 150mA

Part Number:	KLSL 2835W
Number of Units:	25
Actual Case Temperature(T_S):	$T_S = 84.2\text{ °C}$
Actual Ambient Temperature(T_A):	$T_A = 82.3\text{ °C}$
Life Test Drive Current:	$I_F = 150\text{mA}$
Measurement Current:	$I_F = 150\text{mA}$

2 - SUMMARY OF TEST RESULT

Data Set:	Data Set 1, 85 °C, 150mA
Number of Units:	25
Failures Observed:	0
Average. Lumen Maintenance at 6000 hours:	95.19%
Average Chromaticity Shift at 6000 hours ($\Delta u'v'$):	0.0011
Reported TM-21 L ₇₀ Lifetime:	35,000 hours

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3 - Test Data

3.1 Data Set 1, 85 °C, 150mA (Lumen Maintenance)

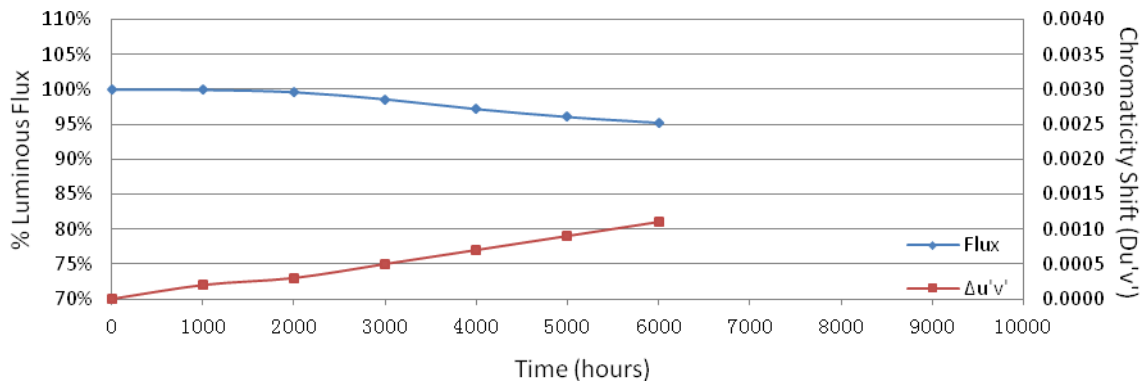
No.	VF(V)	Φ(lm)	Lumen Maintenance (%)					
			0hr(Initial)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs
1	3.212	37.94	99.95	99.68	98.55	97.21	95.91	94.99
2	3.242	37.06	99.87	99.51	98.54	97.14	96.06	95.33
3	3.214	37.77	99.81	99.52	98.54	97.17	95.82	95.02
4	3.227	37.06	100.13	99.76	98.62	97.14	96.17	95.47
5	3.217	37.60	99.87	99.63	98.46	97.07	95.98	95.13
6	3.220	37.81	99.92	99.66	98.55	97.25	96.24	95.45
7	3.230	38.23	99.90	99.63	98.56	97.04	96.05	95.21
8	3.234	37.18	99.95	99.57	98.74	97.36	96.26	95.37
9	3.248	37.40	99.87	99.55	98.61	97.27	96.02	95.16
10	3.221	37.67	99.92	99.63	98.59	97.05	95.91	95.27
11	3.223	37.13	99.87	99.60	98.73	97.25	96.18	95.18
12	3.220	37.22	100.05	99.73	98.52	97.07	95.94	95.19
13	3.224	37.62	99.97	99.57	98.72	97.26	96.09	95.16
14	3.227	37.37	99.87	99.52	98.53	97.03	95.83	95.10
15	3.237	37.19	100.13	99.68	98.41	97.12	96.29	95.40
16	3.220	37.55	99.97	99.60	98.64	97.23	96.17	95.23
17	3.234	38.22	99.97	99.69	98.67	97.20	95.76	95.03
18	3.229	37.88	99.92	99.68	98.60	97.15	96.12	95.22
19	3.212	36.99	99.97	99.59	98.51	97.08	96.08	95.35
20	3.215	37.55	99.84	99.52	98.62	97.26	96.19	95.10
21	3.227	37.87	100.03	99.71	98.57	97.10	96.09	95.17
22	3.230	37.35	100.00	99.57	98.61	97.11	96.01	95.07
23	3.242	36.60	99.95	99.51	98.63	97.19	95.90	94.95
24	3.211	37.72	99.95	99.63	98.73	97.32	96.05	95.02
25	3.217	38.40	99.90	99.51	98.54	97.21	95.96	95.26
Ave.	3.225	37.54	99.94	99.61	98.59	97.17	96.04	95.19
Med.	3.224	37.55	99.95	99.60	98.59	97.17	96.05	95.18
st dev	0.0101	0.4331	0.0823	0.0749	0.0832	0.0909	0.1421	0.1447
Min.	3.211	36.60	99.81	99.51	98.41	97.03	95.76	94.95
Max.	3.248	38.40	100.13	99.76	98.74	97.36	96.29	95.47

TM-21 Projection:

Test Duration: 6000 hours
Failures Observed: 0
 α : 1.050E-05
 β : 1.014
Calculated L₇₀: 35,000
Reported L₇₀: 35,000

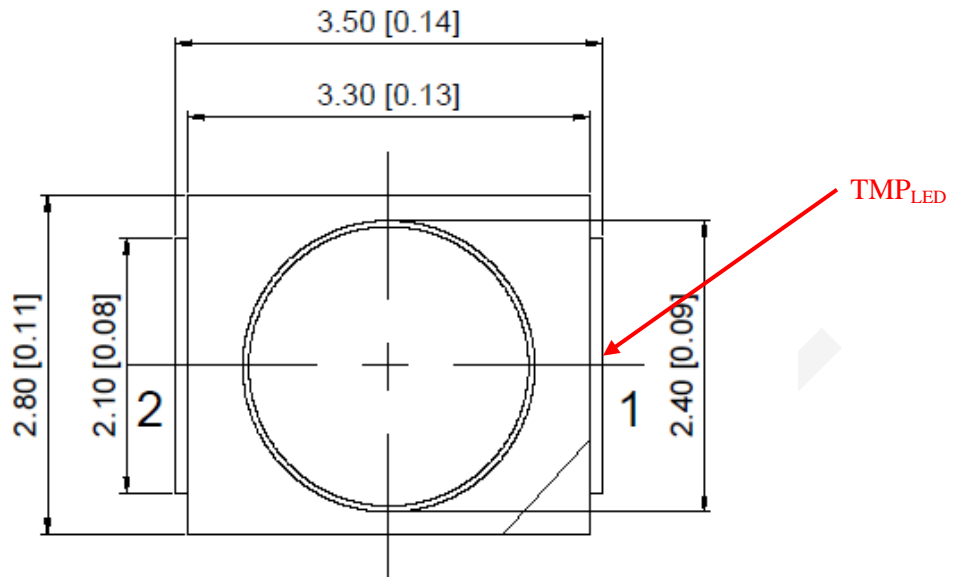
3.2 Data Set 1, 85 °C, 150mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift ($\Delta u'v'$)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2593	0.5269	0.0002	0.0003	0.0003	0.0009	0.0011	0.0013
2	0.2582	0.5269	0.0003	0.0003	0.0008	0.0009	0.0011	0.0012
3	0.2577	0.5272	0.0001	0.0004	0.0005	0.0004	0.0006	0.0007
4	0.2588	0.5265	0.0001	0.0006	0.0005	0.0005	0.0007	0.0009
5	0.2575	0.5263	0.0004	0.0001	0.0005	0.0007	0.0008	0.0009
6	0.2573	0.5247	0.0002	0.0003	0.0002	0.0009	0.0011	0.0011
7	0.2593	0.5284	0.0003	0.0002	0.0007	0.0004	0.0009	0.0013
8	0.2582	0.5273	0.0002	0.0004	0.0006	0.0005	0.0009	0.0014
9	0.2599	0.5278	0.0002	0.0004	0.0007	0.0004	0.0009	0.0010
10	0.2587	0.5261	0.0002	0.0002	0.0008	0.0006	0.0007	0.0010
11	0.2588	0.5284	0.0002	0.0005	0.0003	0.0002	0.0006	0.0008
12	0.2606	0.5282	0.0003	0.0001	0.0008	0.0008	0.0009	0.0010
13	0.2589	0.5274	0.0004	0.0000	0.0004	0.0006	0.0010	0.0011
14	0.2588	0.5283	0.0002	0.0004	0.0001	0.0005	0.0009	0.0012
15	0.2586	0.5275	0.0001	0.0000	0.0005	0.0009	0.0010	0.0011
16	0.2585	0.5269	0.0002	0.0001	0.0004	0.0008	0.0010	0.0010
17	0.2566	0.5262	0.0003	0.0003	0.0008	0.0010	0.0011	0.0011
18	0.2590	0.5285	0.0003	0.0006	0.0006	0.0006	0.0009	0.0010
19	0.2596	0.5276	0.0004	0.0003	0.0008	0.0004	0.0010	0.0011
20	0.2596	0.5288	0.0002	0.0003	0.0002	0.0003	0.0009	0.0012
21	0.2590	0.5278	0.0002	0.0003	0.0007	0.0010	0.0013	0.0015
22	0.2590	0.5267	0.0003	0.0000	0.0005	0.0006	0.0011	0.0013
23	0.2581	0.5267	0.0001	0.0002	0.0002	0.0004	0.0007	0.0010
24	0.2576	0.5270	0.0002	0.0002	0.0004	0.0006	0.0006	0.0009
25	0.2592	0.5269	0.0004	0.0004	0.0006	0.0010	0.0012	0.0014
Ave.	0.2587	0.5272	0.0002	0.0003	0.0005	0.0007	0.0009	0.0011
Med.	0.2588	0.5272	0.0002	0.0003	0.0005	0.0006	0.0009	0.0011
st dev	0.0009	0.0009	0.0001	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2606	0.5288	0.0001	0.0000	0.0001	0.0002	0.0006	0.0007
Max.	0.2566	0.5247	0.0004	0.0006	0.0008	0.0010	0.0013	0.0015

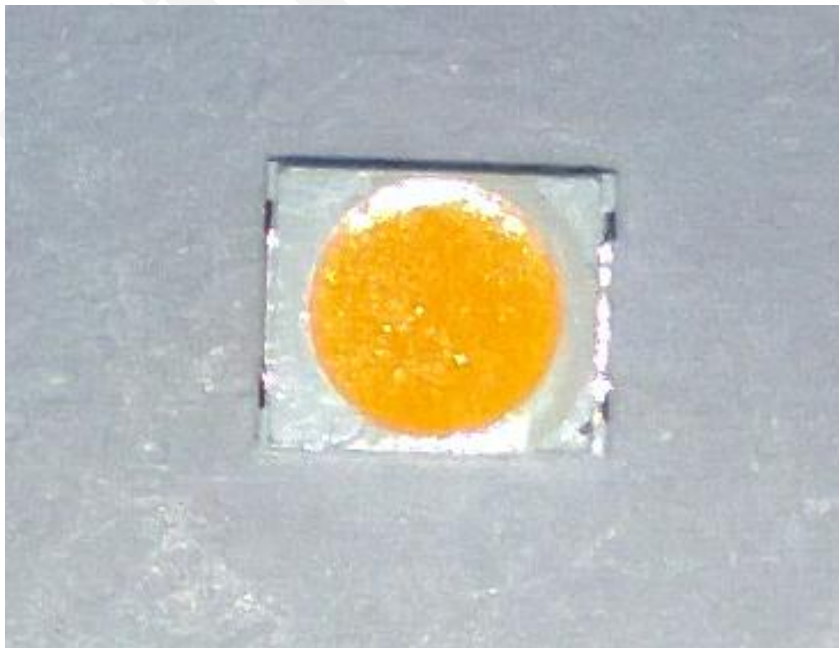


Appendix A – EUT PHOTO

A.1 Mechanical Dimensions (Ta = 25 °C)



A.2 EUT Photo



Appendix B – REVISION HISTORY

Report Number	Report Date	Contents
RSZ120424502-10	2013/01/23	Original report.
RSZ120424502-10-M1	2013/04/03	Update the product photo in page 8.
RSZ120424502-10-M2	2013/05/27	A footnote is added in the first page.

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

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