IESNA LM-80-2008

Measurement and Test Report
For

SHENZHEN LEPOWER OPTO ELECTRONICS CORP., LTD

3-5 Floors, Bldg B, Chuangfu Science Technology Park, Shihuan Rd No.202, Shangwu Community, Shiyan St, Bao'an District, Shenzhen

Report No:	R011603985L
Model No:	LY-D3012
Product Name:	Flip chip COB
Test Initiation Date:	03/30/2016 - 08/02/2016
Revision Date:	08/04/2016
Test Completion Date:	08/04/2016
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1-GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

Applicant :	SHENZHEN LEPOWER OPTO ELECTRONICS CORP., LTD
Trade Mark :	LEPOWER
Model Number :	LY-D3012
Part Type:	LED package
Nominal CCT:	3000K
Number of LED Light Source tested :	See tables.
Case temperature (test point temperature) :	See tables.
Drive current of the LED light source during lifetime test :	See tables.
Initial luminous flux and forward voltage at photometric measurement current :	See tables.
Lumen maintenance data for each individual LED light source along with median value, standard deviation, minimum and maximum lumen maintenance value for all of the LED Light sources :	See tables.
Observation of LED light source failure including the failure conditions and time of failure. :	See tables.
LED light source monitoring interval :	The LED light source are inspected at regular interval (24 hours) throughout the 6000 hours test.
Photometric measurement uncertainty :	±1.5 on flux measurements for LM-80 testing.
Chromaticity shift reported over the Measurement time :	See tables.
LED Light Source Test interval :	At regular intervals(1000 hours) throughout the 6000 hours test.
Date of Receiving Sample :	03/29/2016
Test Duration :	03/30/2016 - 08/02/2016

1.2 Standards Used:

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

ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products.

1.3 Test Facility Description

The test facility used by Shenzhen Anbotek Compliance Laboratory Limited is located at 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road,Nanshan District,Shenzhen, Guangdong, China.

1.4 Test Equipment List

Device	Manufacture	Model No	Serial No	Test Range	Calibration date	Calibration due date
Temperature & Humidity meter	XINIXI	CTH-608	-	0℃~50℃, 10% to 90%RH	2016-03-14	2017-03-13
0.3m Integral Sphere	LINKCOLOR	LCB-03	-	380nm-780nm,0.01lm～6.00×10^5lm	2016-04-06	2017-04-05
Digital Power Meter	YOKOGAWA	WT210	-	0-600V/0-10A/0-100Hz	2016-04-06	2017-04-05
DC Power Supply	Linkcolor	Linkcolor	-	DC 30V, 5A	2016-03-28	2017-03-27
Total Luminous Flux Standard Lamp	SENSING	12V/10W	LSD1210111	Refer specification	2016-03-30	2017-03-29
Total Luminous Flux Standard Lamp	SENSING	12V/10W	SL1054	Refer specification	2016-03-30	2017-03-29
Temperature & Humidity meter	XINIXI	CTH-608	-	0℃~50℃, 10% to 90%RH	2016-03-14	2017-03-13
LM-80aging measurement system	KEYI	KY-3X-LH60	-	55, 85, 105℃	2016-04-06	2017-04-05

2-Summary of Test Result

Data Set	Case Temperature(Ts) ℃	Ambient Temperature(Ta)℃	Drive Current (mA)	Average Lumen Maintenance at 6000 hours	Average Chromaticity Shift (△u'v') at 6000 hours
1	54.7	53.4	700	/	/
2	84.3	83.4	700	/	/
3	104.6	103.2	700	/	/

3-Test Method

3.1 Photometric and Electrical Measurement

Total light output (luminous flux) for the 25℃±1℃ ambient temperature conditions is measured using a integrating sphere. Each LED package is operated at rated drive current(CC Mode).

The total uncertainty of the light output measurements is estimated, at the 95% confidence level, not to exceed±1.6% over the wavelength range 380-800nm.

3.2 Season the LED Package from 0 hours to 6000 hours

Three LM-80 aging measurement system Temperature Chambers are using for Seasoning, and the temperature is set to 55 ℃,85 ℃,105 ℃（manufacture defined）,the airflow is minimum to keep the uniformity to temperature. LED package are operated steady state (no cycling) for a period of 6000 hours, checked the lumen flux and Chromaticity Shift every 1000 hours. The samples are inspected at regular intervals (24 hours) throughout the 6000 hours. The time and date of failure of each lamp is recorded. The actual elapsed time for each light package is in hour.

4-Data Set 1: 55℃; 700mA

Description of Light Sources tested :	LY-D3012
Case Temperature :	54.7℃
Ambient Temperature :	53.4℃
Drive Current :	700mA
Measure Current :	700mA
Failures Observed :	None

Lumen Maintenance (%)

Sample No.	V_F(V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L1	28.50	2061.580	100.65%	99.64%	99.48%	/	/	/
L2	29.89	1913.272	100.61%	99.73%	99.41%	/	/	/
L3	29.05	1936.457	100.60%	99.85%	99.36%	/	/	/
L4	28.44	1903.152	100.57%	99.76%	99.42%	/	/	/
L5	28.95	2014.592	100.47%	99.89%	99.39%	/	/	/
L6	29.78	2012.001	100.55%	99.92%	99.55%	/	/	/
L7	28.91	1923.590	100.75%	99.74%	99.30%	/	/	/
L8	29.11	2032.074	100.54%	99.79%	99.37%	/	/	/
L9	28.71	2039.679	100.70%	99.68%	99.28%	/	/	/
L10	28.35	1940.345	100.76%	99.89%	99.41%	/	/	/
L11	29.16	2029.977	100.64%	99.81%	99.37%	/	/	/
L12	28.49	1990.467	100.53%	99.82%	99.26%	/	/	/
L13	29.99	2046.943	100.78%	99.83%	99.31%	/	/	/
L14	29.95	1913.422	100.70%	99.74%	99.40%	/	/	/
L15	28.35	2064.395	100.51%	99.90%	99.45%	/	/	/
Avg.	29.04	1988.130	100.62%	99.80%	99.38%	/	/	/
MIN	28.35	1903.152	100.47%	99.64%	99.26%	/	/	/
MAX	29.99	2064.395	100.78%	99.92%	99.55%	/	/	/
STDEV	0.6012	59.6481	0.0979	0.0008	0.0008	/	/	/
N	15	15	15	15	15	/	/	/

Description of Light Sources tested :	LY-D3012
Case Temperature :	54.7℃
Ambient Temperature :	53.4℃
Drive Current :	700mA
Measure Current :	700mA
Failures Observed :	None

Chromaticity Shift (△u'v')

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L1	0.2510	0.5236	2976	0.0004	0.0008	0.0012	/	/	/
L2	0.2518	0.5242	2953	0.0003	0.0008	0.0013	/	/	/
L3	0.2516	0.5240	2960	0.0004	0.0007	0.0012	/	/	/
L4	0.2515	0.5240	2962	0.0005	0.0008	0.0013	/	/	/
L5	0.2516	0.5240	2960	0.0003	0.0010	0.0011	/	/	/
L6	0.2522	0.5246	2942	0.0003	0.0009	0.0013	/	/	/
L7	0.2518	0.5244	2952	0.0003	0.0008	0.0012	/	/	/
L8	0.2517	0.5244	2954	0.0003	0.0008	0.0013	/	/	/
L9	0.2517	0.5243	2954	0.0005	0.0008	0.0014	/	/	/
L10	0.2529	0.5257	2920	0.0004	0.0007	0.0013	/	/	/
L11	0.2528	0.5256	2921	0.0005	0.0007	0.0013	/	/	/
L12	0.2528	0.5256	2922	0.0004	0.0009	0.0011	/	/	/
L13	0.2523	0.5250	2937	0.0005	0.0008	0.0012	/	/	/
L14	0.2520	0.5248	2945	0.0005	0.0008	0.0013	/	/	/
L15	0.2519	0.5247	2947	0.0004	0.0007	0.0013	/	/	/
AV	0.2520	0.5246	2947	0.0004	0.0008	0.0013	/	/	/
MIN	0.2510	0.5236	2920	0.0003	0.0007	0.0011	/	/	/
MAX	0.2529	0.5257	2976	0.0005	0.0010	0.0014	/	/	/
STDEV	0.0005	0.0006	16	0.0001	0.0001	0.0001	/	/	/
N	15	15	15	15	15	15	/	/	/

5-Data Set 2: 85℃; 700mA

Description of Light Sources tested :	LY-D3012
Case Temperature :	84.3℃
Ambient Temperature :	83.4℃
Drive Current :	700mA
Measure Current :	700mA
Failures Observed :	None

Lumen Maintenance (%)

Sample No.	V_F(V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L16	29.67	2024.060	100.44%	99.52%	98.85%	/	/	/
L17	29.54	1938.119	100.36%	99.39%	98.98%	/	/	/
L18	29.21	2020.398	100.33%	99.58%	98.81%	/	/	/
L19	29.23	1912.357	100.45%	99.63%	98.87%	/	/	/
L20	29.85	1930.312	100.19%	99.56%	98.94%	/	/	/
L21	29.37	1955.177	100.35%	99.36%	99.00%	/	/	/
L22	28.25	1950.424	100.18%	99.32%	98.92%	/	/	/
L23	28.77	1981.172	100.34%	99.58%	98.92%	/	/	/
L24	28.82	1921.005	100.47%	99.65%	98.95%	/	/	/
L25	28.80	2057.899	100.30%	99.42%	98.84%	/	/	/
L26	28.81	2056.739	100.35%	99.67%	99.09%	/	/	/
L27	28.42	2084.337	100.27%	99.51%	99.02%	/	/	/
L28	29.97	2062.181	100.43%	99.60%	99.10%	/	/	/
L29	29.95	1934.543	100.44%	99.67%	98.86%	/	/	/
L30	28.45	1960.412	100.23%	99.42%	99.01%	/	/	/
Avg.	29.14	1985.942	100.34%	99.53%	98.94%	/	/	/
MIN	28.25	1912.357	100.18%	99.32%	98.81%	/	/	/
MAX	29.97	2084.337	100.47%	99.67%	99.10%	/	/	/
STDEV	0.5736	59.0774	0.0932	0.0012	0.0009	/	/	/
N	15	15	15	15	15	/	/	/

Description of Light Sources tested :	LY-D3012
Case Temperature :	84.3℃
Ambient Temperature :	83.4℃
Drive Current :	700mA
Measure Current :	700mA
Failures Observed :	None

Chromaticity Shift (△u'v')

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L16	0.2497	0.5249	2999	0.0007	0.0010	0.0017	/	/	/
L17	0.2496	0.5247	3002	0.0008	0.0011	0.0016	/	/	/
L18	0.2496	0.5247	3004	0.0005	0.0011	0.0016	/	/	/
L19	0.2494	0.5271	2994	0.0008	0.0010	0.0015	/	/	/
L20	0.2492	0.5269	3000	0.0006	0.0012	0.0016	/	/	/
L21	0.2491	0.5269	3001	0.0005	0.0010	0.0016	/	/	/
L22	0.2497	0.5283	2979	0.0007	0.0009	0.0016	/	/	/
L23	0.2497	0.5282	2981	0.0008	0.0013	0.0015	/	/	/
L24	0.2495	0.5281	2986	0.0008	0.0010	0.0015	/	/	/
L25	0.2494	0.5281	2987	0.0005	0.0012	0.0016	/	/	/
L26	0.2490	0.5267	3006	0.0004	0.0012	0.0016	/	/	/
L27	0.2490	0.5266	3007	0.0004	0.0010	0.0016	/	/	/
L28	0.2490	0.5266	3007	0.0006	0.0011	0.0014	/	/	/
L29	0.2489	0.5266	3007	0.0007	0.0010	0.0015	/	/	/
L30	0.2505	0.5302	2949	0.0006	0.0009	0.0016	/	/	/
AV	0.2494	0.5270	2994	0.0006	0.0011	0.0016	/	/	/
MIN	0.2489	0.5247	2949	0.0004	0.0009	0.0014	/	/	/
MAX	0.2505	0.5302	3007	0.0008	0.0013	0.0017	/	/	/
STDEV	0.0004	0.0015	15	0.0001	0.0001	0.0001	/	/	/
N	15	15	15	15	15	15	/	/	/

6-Data Set 3: 105℃; 700mA

Description of Light Sources tested :	LY-D3012
Case Temperature :	104.6℃
Ambient Temperature :	103.2℃
Drive Current :	700mA
Measure Current :	700mA
Failures Observed :	None

Lumen Maintenance (%)

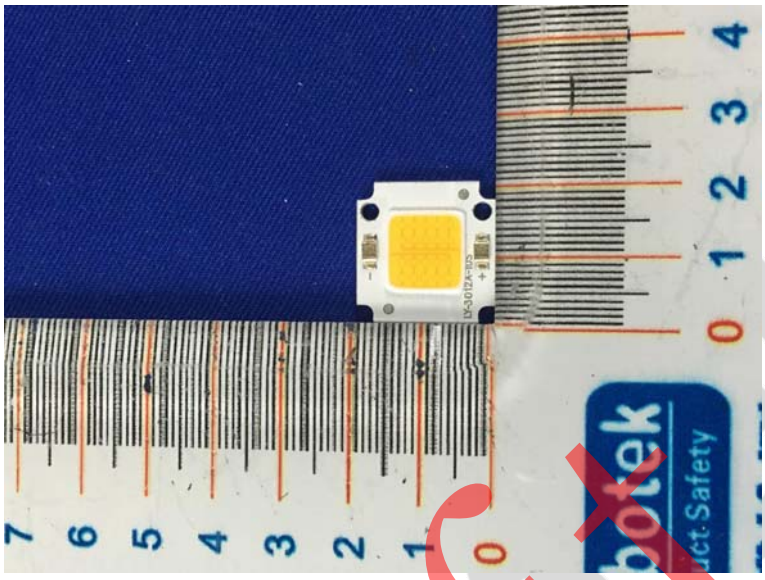
Sample No.	V_F(V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L31	28.03	1932.622	100.12%	99.43%	98.74%	/	/	/
L32	29.06	1968.881	100.21%	99.19%	98.79%	/	/	/
L33	28.13	1948.952	100.21%	99.36%	98.64%	/	/	/
L34	29.11	1966.927	100.21%	99.30%	98.80%	/	/	/
L35	29.60	1935.514	99.92%	99.17%	98.77%	/	/	/
L36	29.53	1956.134	100.20%	99.44%	98.72%	/	/	/
L37	28.83	2096.301	100.08%	99.47%	98.69%	/	/	/
L38	29.26	2084.706	100.11%	99.32%	98.77%	/	/	/
L39	29.10	1937.697	100.12%	99.29%	98.62%	/	/	/
L40	28.31	1975.724	100.12%	99.13%	98.69%	/	/	/
L41	29.45	2002.905	100.20%	99.37%	98.67%	/	/	/
L42	28.75	1970.341	100.08%	99.23%	98.77%	/	/	/
L43	29.72	1937.768	100.22%	99.37%	98.76%	/	/	/
L44	28.98	1944.680	100.22%	99.38%	98.68%	/	/	/
L45	29.46	2071.163	100.09%	99.31%	98.78%	/	/	/
Avg.	29.02	1982.021	100.14%	99.32%	98.73%	/	/	/
MIN	28.03	1932.622	99.92%	99.13%	98.62%	/	/	/
MAX	29.72	2096.301	100.22%	99.47%	98.80%	/	/	/
STDEV	0.5295	56.2185	0.0816	0.0010	0.0006	/	/	/
N	15	15	15	15	15	/	/	/

Description of Light Sources tested :	LY-D3012
Case Temperature :	104.6℃
Ambient Temperature :	103.2℃
Drive Current :	700mA
Measure Current :	700mA
Failures Observed :	None

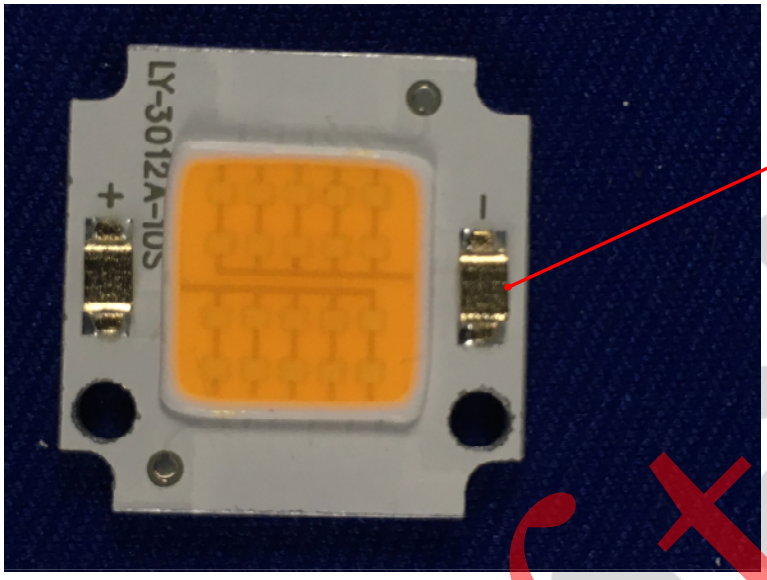
Chromaticity Shift (△u'v')

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L31	0.2505	0.5302	2949	0.0009	0.0015	0.0017	/	/	/
L32	0.2504	0.5301	2951	0.0006	0.0013	0.0018	/	/	/
L33	0.2501	0.5297	2961	0.0007	0.0014	0.0018	/	/	/
L34	0.2499	0.5295	2966	0.0008	0.0015	0.0019	/	/	/
L35	0.2499	0.5295	2966	0.0009	0.0015	0.0019	/	/	/
L36	0.2499	0.5295	2967	0.0009	0.0014	0.0019	/	/	/
L37	0.2501	0.5289	2965	0.0010	0.0014	0.0019	/	/	/
L38	0.2499	0.5288	2973	0.0009	0.0013	0.0018	/	/	/
L39	0.2498	0.5288	2974	0.0008	0.0015	0.0019	/	/	/
L40	0.2508	0.5303	2941	0.0008	0.0013	0.0020	/	/	/
L41	0.2505	0.5300	2949	0.0007	0.0014	0.0017	/	/	/
L42	0.2505	0.5299	2952	0.0006	0.0014	0.0019	/	/	/
L43	0.2504	0.5289	2959	0.0009	0.0015	0.0018	/	/	/
L44	0.2501	0.5286	2967	0.0010	0.0012	0.0018	/	/	/
L45	0.2501	0.5285	2968	0.0009	0.0014	0.0017	/	/	/
AV	0.2502	0.5294	2961	0.0008	0.0014	0.0018	/	/	/
MIN	0.2498	0.5285	2941	0.0006	0.0012	0.0017	/	/	/
MAX	0.2508	0.5303	2974	0.0010	0.0015	0.0020	/	/	/
STDEV	0.0003	0.0006	9	0.0001	0.0001	0.0001	/	/	/
N	15	15	15	15	15	15	/	/	/

7-EUT Photos



8-TMP



TMP_{LED}

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