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:	R011603986L
Model No:	LY-D062
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
Tested By:	Alcander Lou
Reviewed By:	Vic Zhou
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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-D062
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	54.2	53.5	3500	/	/
2	84.4	83.2	3500	/	/
3	104.2	103.6	3500	/	/

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℃; 3500mA

Description of Light Sources tested :	LY-D062
Case Temperature :	54.2℃
Ambient Temperature :	53.5℃
Drive Current :	3500mA
Measure Current :	3500mA
Failures Observed :	None

Lumen Maintenance (%)

Sample No.	V_F(V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L1	42.57	13860.608	99.71%	99.16%	98.81%	/	/	/
L2	43.03	13276.677	99.72%	99.20%	98.84%	/	/	/
L3	43.75	13583.651	99.68%	99.19%	98.90%	/	/	/
L4	42.93	13491.542	99.70%	99.36%	98.82%	/	/	/
L5	44.78	13540.913	99.75%	99.21%	98.83%	/	/	/
L6	43.31	14079.319	99.66%	99.15%	98.99%	/	/	/
L7	44.82	13599.401	99.67%	99.39%	98.81%	/	/	/
L8	44.03	14085.116	99.68%	99.27%	98.97%	/	/	/
L9	42.41	13179.773	99.68%	99.36%	98.94%	/	/	/
L10	44.41	13281.763	99.69%	99.32%	98.97%	/	/	/
L11	44.20	13263.702	99.71%	99.48%	98.86%	/	/	/
L12	43.65	14032.193	99.71%	99.37%	98.85%	/	/	/
L13	44.02	13987.401	99.66%	99.10%	98.85%	/	/	/
L14	43.17	14230.812	99.66%	99.15%	98.83%	/	/	/
L15	42.16	14421.147	99.67%	99.39%	98.91%	/	/	/
Avg.	43.55	13727.601	99.69%	99.27%	98.88%	/	/	/
MIN	42.16	13179.773	99.66%	99.10%	98.81%	/	/	/
MAX	44.82	14421.147	99.75%	99.48%	98.99%	/	/	/
STDEV	0.8383	397.2106	0.0267	0.0011	0.0006	/	/	/
N	15	15	15	15	15	/	/	/

Description of Light Sources tested :	LY-D062
Case Temperature :	54.2℃
Ambient Temperature :	53.5℃
Drive Current :	3500mA
Measure Current :	3500mA
Failures Observed :	None

Chromaticity Shift (△u'v')

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L1	0.2534	0.5250	2911	0.0006	0.0008	0.0013	/	/	/
L2	0.2533	0.5250	2913	0.0005	0.0009	0.0012	/	/	/
L3	0.2533	0.5250	2913	0.0005	0.0009	0.0012	/	/	/
L4	0.4411	0.5246	2985	0.0004	0.0009	0.0015	/	/	/
L5	0.2522	0.5243	2942	0.0006	0.0008	0.0015	/	/	/
L6	0.2520	0.5242	2948	0.0005	0.0009	0.0015	/	/	/
L7	0.2518	0.5248	2950	0.0004	0.0009	0.0013	/	/	/
L8	0.2511	0.5244	2970	0.0007	0.0008	0.0014	/	/	/
L9	0.2498	0.5234	3007	0.0006	0.0008	0.0014	/	/	/
L10	0.2497	0.5233	3010	0.0004	0.0008	0.0014	/	/	/
L11	0.2496	0.5232	3013	0.0006	0.0009	0.0012	/	/	/
L12	0.2495	0.5232	3015	0.0004	0.0009	0.0014	/	/	/
L13	0.2532	0.5252	2916	0.0005	0.0010	0.0012	/	/	/
L14	0.2520	0.5244	2947	0.0006	0.0009	0.0013	/	/	/
L15	0.2519	0.5243	2950	0.0006	0.0008	0.0013	/	/	/
AV	0.2643	0.5243	2959	0.0005	0.0009	0.0013	/	/	/
MIN	0.2495	0.5232	2911	0.0004	0.0008	0.0012	/	/	/
MAX	0.4411	0.5252	3015	0.0007	0.0010	0.0015	/	/	/
STDEV	0.0489	0.0007	38	0.0001	0.0001	0.0001	/	/	/
N	15	15	15	15	15	15	/	/	/

5-Data Set 2: 85℃; 3500mA

Description of Light Sources tested :	LY-D062
Case Temperature :	84.4℃
Ambient Temperature :	83.2℃
Drive Current :	3500mA
Measure Current :	3500mA
Failures Observed :	None

Lumen Maintenance (%)

Sample No.	V_F(V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L16	44.41	14169.007	99.46%	98.94%	98.29%	/	/	/
L17	44.22	13930.112	99.51%	98.81%	98.39%	/	/	/
L18	42.50	13650.531	99.53%	98.76%	98.40%	/	/	/
L19	42.76	13017.530	99.54%	98.80%	98.31%	/	/	/
L20	43.07	13180.088	99.48%	98.97%	98.25%	/	/	/
L21	43.35	14387.158	99.51%	99.06%	98.29%	/	/	/
L22	42.77	13328.812	99.49%	98.91%	98.48%	/	/	/
L23	42.77	13023.776	99.46%	98.75%	98.36%	/	/	/
L24	43.40	14408.550	99.48%	99.03%	98.53%	/	/	/
L25	42.40	14366.734	99.50%	98.99%	98.48%	/	/	/
L26	42.80	13549.431	99.53%	98.91%	98.39%	/	/	/
L27	42.43	13968.483	99.49%	98.85%	98.26%	/	/	/
L28	43.33	13889.483	99.54%	99.01%	98.41%	/	/	/
L29	42.85	14718.521	99.47%	99.00%	98.53%	/	/	/
L30	44.95	13466.276	99.46%	98.97%	98.39%	/	/	/
Avg.	43.20	13803.633	99.50%	98.92%	98.38%	/	/	/
MIN	42.40	13017.530	99.46%	98.75%	98.25%	/	/	/
MAX	44.95	14718.521	99.54%	99.06%	98.53%	/	/	/
STDEV	0.7668	540.2933	0.0281	0.0010	0.0009	/	/	/
N	15	15	15	15	15	/	/	/

Description of Light Sources tested :	LY-D062
Case Temperature :	84.4℃
Ambient Temperature :	83.2℃
Drive Current :	3500mA
Measure Current :	3500mA
Failures Observed :	None

Chromaticity Shift (△u'v')

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L16	0.2511	0.5238	2972	0.0008	0.0013	0.0017	/	/	/
L17	0.2532	0.5252	2915	0.0007	0.0012	0.0018	/	/	/
L18	0.2530	0.5247	2923	0.0008	0.0011	0.0017	/	/	/
L19	0.2530	0.5247	2923	0.0007	0.0013	0.0018	/	/	/
L20	0.2527	0.5245	2929	0.0006	0.0011	0.0018	/	/	/
L21	0.2528	0.5248	2926	0.0008	0.0011	0.0016	/	/	/
L22	0.2538	0.5243	2905	0.0007	0.0010	0.0015	/	/	/
L23	0.2543	0.5257	2885	0.0005	0.0014	0.0017	/	/	/
L24	0.2543	0.5257	2887	0.0008	0.0014	0.0015	/	/	/
L25	0.2542	0.5256	2890	0.0009	0.0010	0.0017	/	/	/
L26	0.2541	0.5256	2891	0.0008	0.0013	0.0016	/	/	/
L27	0.2527	0.5234	2936	0.0009	0.0011	0.0015	/	/	/
L28	0.2525	0.5232	2943	0.0007	0.0013	0.0018	/	/	/
L29	0.2523	0.5231	2948	0.0007	0.0012	0.0018	/	/	/
L30	0.2521	0.5230	2952	0.0008	0.0011	0.0016	/	/	/
AV	0.2531	0.5245	2922	0.0007	0.0012	0.0017	/	/	/
MIN	0.2511	0.5230	2885	0.0005	0.0010	0.0015	/	/	/
MAX	0.2543	0.5257	2972	0.0009	0.0014	0.0018	/	/	/
STDEV	0.0009	0.0010	26	0.0001	0.0001	0.0001	/	/	/
N	15	15	15	15	15	15	/	/	/

6-Data Set 3: 105℃; 3500mA

Description of Light Sources tested :	LY-D062
Case Temperature :	104.2℃
Ambient Temperature :	103.6℃
Drive Current :	3500mA
Measure Current :	3500mA
Failures Observed :	None

Lumen Maintenance (%)

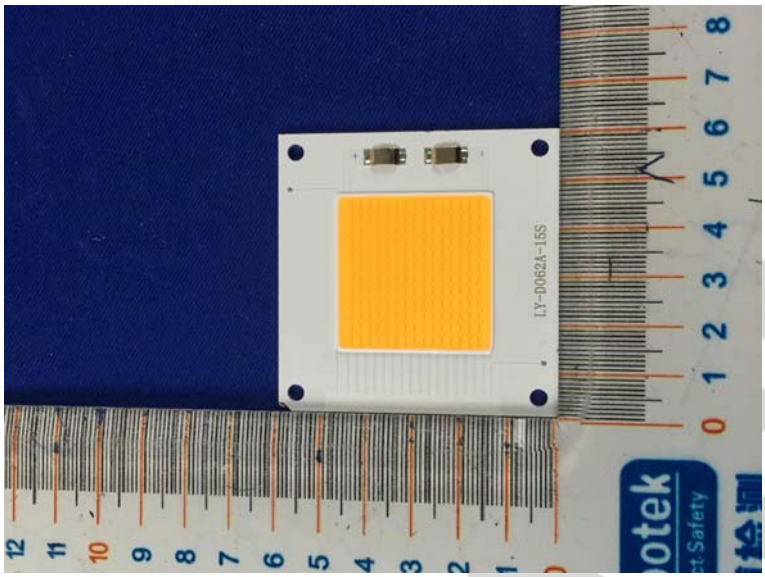
Sample No.	V_F(V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L31	44.49	14038.944	99.30%	98.70%	98.02%	/	/	/
L32	42.85	14319.118	99.29%	98.58%	98.17%	/	/	/
L33	44.77	13455.549	99.32%	98.47%	98.03%	/	/	/
L34	42.14	14292.486	99.30%	98.71%	98.26%	/	/	/
L35	43.40	13583.305	99.28%	98.63%	98.24%	/	/	/
L36	43.68	14173.922	99.29%	98.64%	98.27%	/	/	/
L37	42.18	13157.007	99.32%	98.64%	98.11%	/	/	/
L38	44.83	13741.561	99.28%	98.48%	98.24%	/	/	/
L39	44.70	13565.319	99.36%	98.69%	98.04%	/	/	/
L40	44.54	13023.589	99.33%	98.64%	98.12%	/	/	/
L41	43.48	14570.820	99.25%	98.46%	98.16%	/	/	/
L42	43.74	14250.540	99.32%	98.70%	98.16%	/	/	/
L43	43.63	14776.485	99.33%	98.74%	98.21%	/	/	/
L44	43.37	13712.946	99.26%	98.54%	98.04%	/	/	/
L45	43.19	14558.909	99.28%	98.63%	98.29%	/	/	/
Avg.	43.67	13948.033	99.30%	98.62%	98.16%	/	/	/
MIN	42.14	13023.589	99.25%	98.46%	98.02%	/	/	/
MAX	44.83	14776.485	99.36%	98.74%	98.29%	/	/	/
STDEV	0.8748	531.4919	0.0303	0.0009	0.0009	/	/	/
N	15	15	15	15	15	/	/	/

Description of Light Sources tested :	LY-D062
Case Temperature :	104.2℃
Ambient Temperature :	103.6℃
Drive Current :	3500mA
Measure Current :	3500mA
Failures Observed :	None

Chromaticity Shift (△u'v')

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L31	0.2528	0.5240	2931	0.0010	0.0015	0.0021	/	/	/
L32	0.2525	0.5238	2938	0.0011	0.0013	0.0018	/	/	/
L33	0.2524	0.5238	2941	0.0009	0.0014	0.0019	/	/	/
L34	0.2529	0.5240	2929	0.0008	0.0015	0.0020	/	/	/
L35	0.2524	0.5236	2941	0.0010	0.0015	0.0019	/	/	/
L36	0.2524	0.5236	2944	0.0010	0.0015	0.0020	/	/	/
L37	0.2522	0.5235	2947	0.0009	0.0014	0.0021	/	/	/
L38	0.2520	0.5233	2954	0.0009	0.0015	0.0018	/	/	/
L39	0.2519	0.5233	2956	0.0110	0.0015	0.0020	/	/	/
L40	0.2530	0.5239	2927	0.0008	0.0015	0.0019	/	/	/
L41	0.2524	0.5235	2943	0.0009	0.0015	0.0020	/	/	/
L42	0.2521	0.5233	2952	0.0010	0.0015	0.0021	/	/	/
L43	0.2520	0.5232	2954	0.0011	0.0016	0.0019	/	/	/
L44	0.2517	0.5231	2963	0.0009	0.0013	0.0020	/	/	/
L45	0.2514	0.5229	2969	0.0010	0.0016	0.0018	/	/	/
AV	0.2523	0.5235	2946	0.0016	0.0015	0.0020	/	/	/
MIN	0.2514	0.5229	2927	0.0008	0.0013	0.0018	/	/	/
MAX	0.2530	0.5240	2969	0.0110	0.0016	0.0021	/	/	/
STDEV	0.0004	0.0003	12	0.0026	0.0001	0.0001	/	/	/
N	15	15	15	15	15	15	/	/	/

7-EUT Photos



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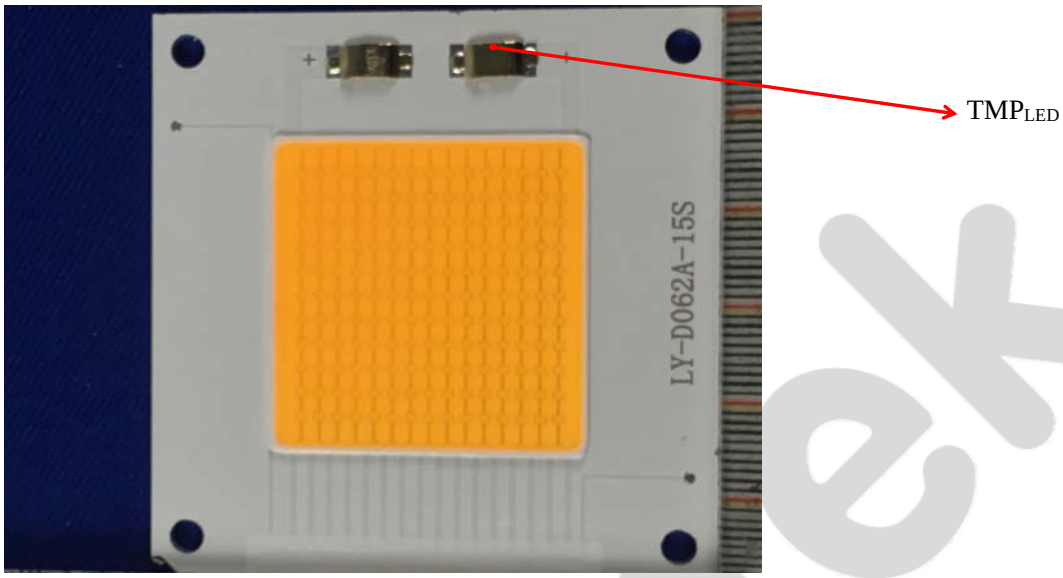

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