

**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:** R011603984L**Model No:** LY-D300500**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**Prepared By:** Shenzhen Anbotek Compliance Laboratory Limited, 1/F., Building 1, SEC Industrial Park, No.0409 Qianhai Road, Nanshan District, Shenzhen, Guangdong, China  
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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-D300500

**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 :**  $\pm 1.5$  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°C~50°C, 10% to 90%RH	2016-03-14	2017-03-13
0.3m Integral Sphere	LINKCOLOR	LCB-03	-	380nm-780nm,0.011m~6.00×10 <sup>5</sup> lm	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°C~50°C, 10% to 90%RH	2016-03-14	2017-03-13
LM-80aging measurement system	KEYI	KY-3X-LH60	-	55, 85, 105°C	2016-04-06	2017-04-05

## 2-Summary of Test Result

Data Set	Case Temperature(Ts) °C	Ambient Temperature(Ta)°C	Drive Current (mA)	Average Lumen Maintenance at 6000 hours	Average Chromaticity Shift ( $\Delta u'v'$ ) at 6000 hours
1	54.4	53.5	4500	/	/
2	84.5	83.2	4500	/	/
3	104.7	103.8	4500	/	/

## 3-Test Method

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### 3.1 Photometric and Electrical Measurement

Total light output (luminous flux) for the  $25^{\circ}\text{C}\pm 1^{\circ}\text{C}$  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  $\pm 1.6\%$  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  $55^{\circ}\text{C}$ ,  $85^{\circ}\text{C}$ ,  $105^{\circ}\text{C}$  ( 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°C ; 4500mA**

<b>Description of Light Sources tested :</b>	LY-D300500
<b>Case Temperature :</b>	54.4°C
<b>Ambient Temperature :</b>	53.5°C
<b>Drive Current :</b>	4500mA
<b>Measure Current :</b>	4500mA
<b>Failures Observed :</b>	None

**Lumen Maintenance (%)**

Sample No.	V <sub>F</sub> (V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L1	44.83	19950.067	99.71%	99.33%	98.73%	/	/	/
L2	43.31	19579.592	99.71%	99.12%	98.77%	/	/	/
L3	43.77	18135.678	99.71%	99.29%	98.81%	/	/	/
L4	44.38	18043.541	99.68%	99.04%	98.70%	/	/	/
L5	44.42	19850.949	99.71%	99.31%	98.74%	/	/	/
L6	42.08	19365.882	99.68%	99.23%	98.65%	/	/	/
L7	44.50	19563.079	99.69%	99.13%	98.82%	/	/	/
L8	42.17	19253.450	99.68%	99.09%	98.68%	/	/	/
L9	43.48	18166.691	99.74%	99.35%	98.84%	/	/	/
L10	42.27	18954.932	99.69%	99.10%	98.92%	/	/	/
L11	42.20	18815.192	99.67%	99.30%	98.89%	/	/	/
L12	43.80	19774.718	99.69%	99.32%	98.88%	/	/	/
L13	42.58	19371.881	99.69%	99.08%	98.70%	/	/	/
L14	44.75	18077.780	99.73%	99.25%	98.66%	/	/	/
L15	44.05	18838.538	99.72%	99.14%	98.82%	/	/	/
Avg.	43.51	19049.465	99.70%	99.21%	98.78%	/	/	/
MIN	42.08	18043.541	99.67%	99.04%	98.65%	/	/	/
MAX	44.83	19950.067	99.74%	99.35%	98.92%	/	/	/
STDEV	1.0102	678.6873	0.0202	0.0011	0.0009	/	/	/
N	15	15	15	15	15	/	/	/

<b>Description of Light Sources tested :</b>	LY-D300500
<b>Case Temperature :</b>	54.4°C
<b>Ambient Temperature :</b>	53.5°C
<b>Drive Current :</b>	4500mA
<b>Measure Current :</b>	4500mA
<b>Failures Observed :</b>	None

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

Sample No.	u'	v'	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L1	0.2500	0.5285	2970	0.0008	0.0010	0.0015	/	/	/
L2	0.2526	0.5248	2931	0.0009	0.0012	0.0013	/	/	/
L3	0.2524	0.5247	2937	0.0008	0.0012	0.0015	/	/	/
L4	0.2524	0.5247	2938	0.0007	0.0013	0.0013	/	/	/
L5	0.2523	0.5249	2937	0.0006	0.0013	0.0013	/	/	/
L6	0.2521	0.5252	2942	0.0007	0.0012	0.0013	/	/	/
L7	0.2521	0.5248	2943	0.0008	0.0012	0.0015	/	/	/
L8	0.2519	0.5246	2949	0.0006	0.0010	0.0014	/	/	/
L9	0.2519	0.5238	2953	0.0007	0.0012	0.0015	/	/	/
L10	0.2518	0.5237	2956	0.0006	0.0010	0.0015	/	/	/
L11	0.2518	0.5237	2957	0.0009	0.0013	0.0014	/	/	/
L12	0.2523	0.5244	2941	0.0009	0.0011	0.0014	/	/	/
L13	0.2520	0.5241	2949	0.0008	0.0012	0.0014	/	/	/
L14	0.2519	0.5241	2952	0.0008	0.0012	0.0013	/	/	/
L15	0.2523	0.5246	2940	0.0008	0.0011	0.0014	/	/	/
AV	0.2520	0.5247	2946	0.0008	0.0012	0.0014	/	/	/
MIN	0.2500	0.5237	2931	0.0006	0.0010	0.0013	/	/	/
MAX	0.2526	0.5285	2970	0.0009	0.0013	0.0015	/	/	/
STDEV	0.0006	0.0011	10	0.0001	0.0001	0.0001	/	/	/
N	15	15	15	15	15	15	/	/	/



**5-Data Set 2: 85°C; 4500mA**

<b>Description of Light Sources tested :</b>	LY-D300500
<b>Case Temperature :</b>	84.5°C
<b>Ambient Temperature :</b>	83.2°C
<b>Drive Current :</b>	4500mA
<b>Measure Current :</b>	4500mA
<b>Failures Observed :</b>	None

**Lumen Maintenance (%)**

Sample No.	V <sub>F</sub> (V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L16	42.46	18493.709	99.67%	98.74%	98.33%	/	/	/
L17	44.88	18914.763	99.57%	98.85%	98.37%	/	/	/
L18	42.22	19365.801	99.46%	99.03%	98.41%	/	/	/
L19	42.48	19077.464	99.47%	98.86%	98.33%	/	/	/
L20	44.07	19592.900	99.43%	98.75%	98.43%	/	/	/
L21	43.96	18985.984	99.45%	98.95%	98.39%	/	/	/
L22	44.69	19480.565	99.49%	98.97%	98.44%	/	/	/
L23	42.22	18987.827	99.42%	98.98%	98.46%	/	/	/
L24	43.41	19717.693	99.41%	98.80%	98.36%	/	/	/
L25	44.05	18901.091	99.49%	99.04%	98.39%	/	/	/
L26	42.29	18965.597	99.54%	99.09%	98.58%	/	/	/
L27	44.48	19337.241	99.54%	99.10%	98.39%	/	/	/
L28	43.19	18110.767	99.60%	98.96%	98.34%	/	/	/
L29	44.45	19348.689	99.48%	99.03%	98.30%	/	/	/
L30	43.71	19740.868	99.45%	98.98%	98.41%	/	/	/
Avg.	43.50	19134.731	99.50%	98.94%	98.39%	/	/	/
MIN	42.22	18110.767	99.41%	98.74%	98.30%	/	/	/
MAX	44.88	19740.868	99.67%	99.10%	98.58%	/	/	/
STDEV	0.9649	448.4040	0.0720	0.0012	0.0007	/	/	/
N	15	15	15	15	15	/	/	/

<b>Description of Light Sources tested :</b>	LY-D300500
<b>Case Temperature :</b>	84.5°C
<b>Ambient Temperature :</b>	83.2°C
<b>Drive Current :</b>	4500mA
<b>Measure Current :</b>	4500mA
<b>Failures Observed :</b>	None

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

Sample No.	$u'$	$v'$	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L16	0.2522	0.5246	2942	0.0011	0.0016	0.0020	/	/	/
L17	0.2522	0.5246	2942	0.0011	0.0017	0.0020	/	/	/
L18	0.2521	0.5246	2943	0.0010	0.0015	0.0019	/	/	/
L19	0.2518	0.5239	2955	0.0009	0.0015	0.0019	/	/	/
L20	0.2514	0.5235	2968	0.0010	0.0016	0.0018	/	/	/
L21	0.2513	0.5235	2970	0.0011	0.0016	0.0019	/	/	/
L22	0.2512	0.5233	2973	0.0012	0.0016	0.0020	/	/	/
L23	0.2511	0.5234	2974	0.0011	0.0016	0.0017	/	/	/
L24	0.2525	0.5254	2929	0.0010	0.0014	0.0021	/	/	/
L25	0.2525	0.5253	2930	0.0010	0.0016	0.0021	/	/	/
L26	0.2525	0.5253	2931	0.0009	0.0015	0.0020	/	/	/
L27	0.2524	0.5253	2932	0.0010	0.0017	0.0020	/	/	/
L28	0.2522	0.5242	2943	0.0008	0.0015	0.0018	/	/	/
L29	0.2521	0.5242	2946	0.0009	0.0015	0.0018	/	/	/
L30	0.2521	0.5242	2948	0.0012	0.0017	0.0020	/	/	/
AV	0.2520	0.5244	2948	0.0010	0.0016	0.0019	/	/	/
MIN	0.2511	0.5233	2929	0.0008	0.0014	0.0017	/	/	/
MAX	0.2525	0.5254	2974	0.0012	0.0017	0.0021	/	/	/
STDEV	0.0005	0.0007	16	0.0001	0.0001	0.0001	/	/	/
N	15	15	15	15	15	15	/	/	/

**6-Data Set 3: 105°C; 4500mA**

<b>Description of Light Sources tested :</b>	LY-D300500
<b>Case Temperature :</b>	104.7°C
<b>Ambient Temperature :</b>	103.8°C
<b>Drive Current :</b>	4500mA
<b>Measure Current :</b>	4500mA
<b>Failures Observed :</b>	None

**Lumen Maintenance (%)**

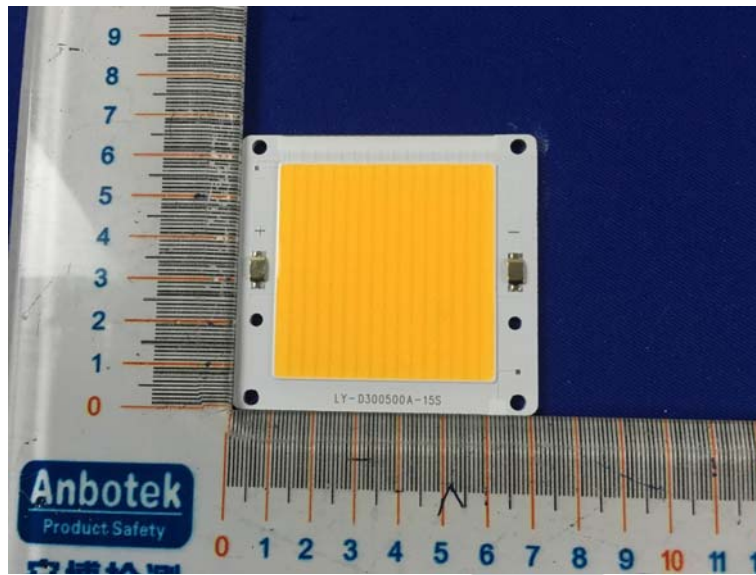
Sample No.	V <sub>F</sub> (V)	Φ(lm)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L31	42.99	19445.845	99.24%	98.55%	98.19%	/	/	/
L32	42.80	19899.405	99.22%	98.77%	98.15%	/	/	/
L33	42.76	19387.665	99.18%	98.69%	98.02%	/	/	/
L34	43.60	18200.835	99.22%	98.53%	97.95%	/	/	/
L35	42.05	18130.695	99.17%	98.64%	98.19%	/	/	/
L36	42.51	18291.357	99.22%	98.73%	98.24%	/	/	/
L37	42.93	18797.613	99.19%	98.68%	97.91%	/	/	/
L38	44.85	18113.318	99.19%	98.70%	98.07%	/	/	/
L39	42.12	18900.181	99.18%	98.64%	97.91%	/	/	/
L40	44.84	19566.184	99.23%	98.61%	98.10%	/	/	/
L41	42.79	18836.734	99.18%	98.52%	98.04%	/	/	/
L42	44.27	18952.821	99.22%	98.52%	98.24%	/	/	/
L43	43.08	19776.377	99.19%	98.61%	98.22%	/	/	/
L44	44.02	19940.957	99.21%	98.70%	98.23%	/	/	/
L45	42.48	19221.295	99.19%	98.48%	98.24%	/	/	/
Avg.	43.21	19030.752	99.20%	98.62%	98.11%	/	/	/
MIN	42.05	18113.318	99.17%	98.48%	97.91%	/	/	/
MAX	44.85	19940.957	99.24%	98.77%	98.24%	/	/	/
STDEV	0.9073	641.6521	0.0216	0.0009	0.0012	/	/	/
N	15	15	15	15	15	/	/	/

<b>Description of Light Sources tested :</b>	LY-D300500
<b>Case Temperature :</b>	104.7°C
<b>Ambient Temperature :</b>	103.8°C
<b>Drive Current :</b>	4500mA
<b>Measure Current :</b>	4500mA
<b>Failures Observed :</b>	None

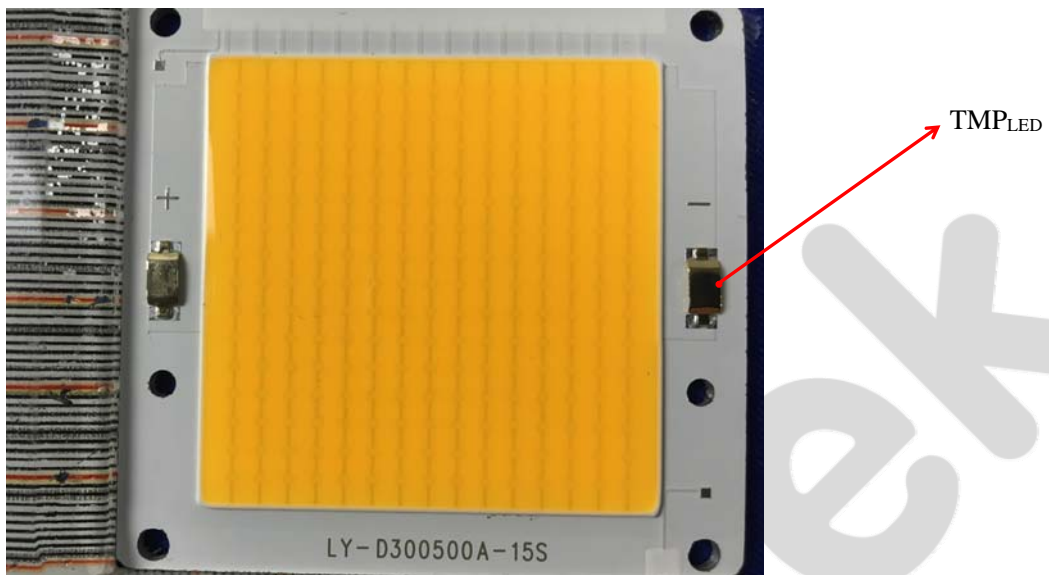
### Chromaticity Shift ( $\Delta u'v'$ )

Sample No.	$u'$	$v'$	CCT(K)	1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
L31	0.2520	0.5241	2948	0.0013	0.0016	0.0023	/	/	/
L32	0.2503	0.5302	2955	0.0012	0.0018	0.0022	/	/	/
L33	0.2500	0.5298	2964	0.0011	0.0015	0.0023	/	/	/
L34	0.2491	0.5267	3003	0.0011	0.0015	0.0022	/	/	/
L35	0.2490	0.5266	3005	0.0012	0.0017	0.0023	/	/	/
L36	0.2490	0.5266	3007	0.0014	0.0017	0.0024	/	/	/
L37	0.2489	0.5265	3008	0.0012	0.0017	0.0023	/	/	/
L38	0.2504	0.5290	2958	0.0011	0.0018	0.0022	/	/	/
L39	0.2504	0.5290	2958	0.0013	0.0015	0.0023	/	/	/
L40	0.2504	0.5289	2960	0.0012	0.0017	0.0023	/	/	/
L41	0.2503	0.5289	2961	0.0011	0.0015	0.0022	/	/	/
L42	0.2503	0.5289	2961	0.0012	0.0018	0.0023	/	/	/
L43	0.2497	0.5264	2990	0.0011	0.0018	0.0024	/	/	/
L44	0.2494	0.5260	3001	0.0012	0.0017	0.0022	/	/	/
L45	0.2494	0.5260	3001	0.0013	0.0018	0.0023	/	/	/
AV	0.2499	0.5276	2979	0.0012	0.0017	0.0023	/	/	/
MIN	0.2489	0.5241	2948	0.0011	0.0015	0.0022	/	/	/
MAX	0.2520	0.5302	3008	0.0014	0.0018	0.0024	/	/	/
STDEV	0.0008	0.0018	23	0.0001	0.0001	0.0001	/	/	/
N	15	15	15	15	15	15	/	/	/

## 7-EUT Photos



## 8-TMP



---End of report---