

## YO højloftslampe med rekordstor effektivitet



Armaturlampe med 120 graders skærm til venstre og 70 graders skærm til højre.

LEDpartners nye high power YO højloftslamper har rekordhøj effektivitet på hele 160 lumen pr. watt. Samtidig er de relativt kompakte og lette. Driverne er fra verdens førende producent, MeanWell. Dette er absolut topklasse med hensyn til både ydelse og holdbarhed.

Lysdioderne er nyeste og mest effektive type Kingbrighter SMD5730. De belastes kun med 40 mA forsyningsspænding svarende til 75 % af den normerede spænding, hvilket sænker driftstemperaturen og forøger både levetiden og den relative effektivitet. Derved opnås den rekordhøje effektivitet på 160 lm/W.

High power YO lamperne leveres med to lysvinkler: 70 grader til høj placering og 120 grader til lavere placering. Den "smalle" model er også uhyre velegnet til f.eks. højlagre, hvor den primært skal belyse de snævre færdselsarealer i mellem hyldeerne.

### Spar op til 80 % strømforbrug!

En lampe på 75 W kan erstatte en 250 W lampe med kviksløvl-, natrium- eller metalhalogenpære. En gaslampe vil have et systemforbrug på typisk 290-320 W p.gr.a. den indbyggede forkobling. En 400 W lampe med samlet systemforbrug på typisk 500 W kan erstattes med en 135 W lampe.

I forhold til standard LED lamper er der også meget at spare med de nye YO high power lamper. Et typisk LED højloftsarmatur har en effektivitet på omkring 90 lm/W, hvor LEDpartners nye lamper ligger 75 % højere med hele 160 lm/W.

### Tænder straks med fuld lysstyrke - uanset temperatur

Ud over de store økonomiske fordele ved LED er der også store praktiske fordele: LED tænder straks med fuld lysstyrke i modsætning til gaspærer, der kræver lang opvarmningstid. Det gør også LED ideelt til lokaliteter med sensorstyring.

Gaspærer lyser mindre i takt med at temperaturen falder. Men jo koldere det bliver, desto stærkere lyser LED pærer.

- SPAR op til 80 % strøm i forhold til gas-pærer
- Kingbrighter SMD5730 high power lysdioder
- MEAN WELL Long Life strømforsyning/driver, der er anerkendt som Verdens bedste
- Rekordhøj effektivitet: 160 lumen pr. watt
- >50.000 timers levetid for LED (70 % restlys)
- >500.000 timers levetid (MTBF) for driver
- 70° eller 120° lysspredning
- Lysfarve 3000/4000/6000K
- TÜV, VDE, GS, CE og RoHS certificeret
- FEM ÅRS GARANTI

Det skyldes ganske enkelt, at den interne impedans (elektriske modstand) i de elektroniske kredsløb reduceres, når temperaturen falder. Så stiger effektiviteten.

Allerede ved temperaturer omkring frysepunktet giver LED markant mere lys end gaspærer. Og i frysehuse med -20-40 °C er LED fremragende, da lysstyrken stiger 20-30 % i forhold til stuetemperatur. Og uanset temperatur tænder LED omgående og med fuld styrke, hvilket er perfekt for både komfort og sikkerhed.

### Strømforsyning fra MEAN WELL - Verdens bedste!

Som regel er strømforsyningen LED-belysningens svageste punkt, men ikke her! Ganske som lysdioderne er fra Verdens bedste producent CREE, så er den eksterne strømforsyning fra verdens mest anerkendte producent af LED "drivere": MEAN WELL fra Taiwan. MW har patenter, som giver strømforsyningen næsten evigt liv. Driverne til YO serien har således en MTBF på 520.000 timer! Det svarer til 45 års uafbrudt drift.

## Produkt-specifikationer for UFO højloftslamper

Model	LPHP-YO75	LPHB-YO135	LPHB-YO200
Mål højde x diameter (70° skærm)	H479 x Ø410 mm	H479 x Ø410 mm	H520 x Ø410 mm
Forbrug W inkl. intern driver	75 W	135 W	200 W
LED type	Kingbrighter SMD5730 High Power		
System-effektivitet ±10 %	150-160 lm/W		
Lysstrøm (lumen) 3000K	11.250 lm	20.250 lm	30.000 lm
Lysstrøm (lumen) 4000K	11.625 lm	20.925 lm	31.000 lm
Lysstrøm (lumen) 6000K	2400 lm	4320 lm	4000 lm
Lysfarve standard varm hvid	2800-3200 grader Kelvin		
Lysfarve standard neutral hvid	4000-4500 grader Kelvin		
Lysvinkel (spredning)	70° eller 120° grader		
Lyskvalitet (CRI)	Ra >80		
Lysdegradation 5.000 timer	2-4 % lystab i forhold til oprindelig lysstyrke (varmeafhængigt)		
Lysdegradation 50.000 timer	25-30 % lystab i forhold til oprindelig lysstyrke (varmeafhængigt)		
Levetid LED	>100.000 timer (varmeafhængigt)		
Levetid strømforsyning	MTBF = 520.000 timer (varmeafhængigt)		
Indgangsspænding	100-240 V/50 Hz		
Strømforsyning (driver)	MEAN WELL CEN Series Constant Current med IC styring		
Rumtemperatur	-40~+80° Celsius		
Vægt (uden emballage)	3,8 kg	3,9 kg	4,2 kg
Godkendelser (certificering)	CE-LVD, CE-EMC, RoHS		



# IES LM-80-2008

MEASURING LUMEN MAINTENANCE OF LED LIGHT SOURCES

## MEASUREMENT AND TEST REPORT

For

**Shenzhen Kingbrighter Optoelectronics Co.,Ltd**

B Bid,Haoye Logistics Park,Gushu Shugang Channel,Xixiang,Baoan District,Shenzhen,China

**Model: KT57-23NYSG/HO-AT2**

<b>Report Type:</b> 6000 Hours Test Report		<b>Product Type:</b> LED Package	
<b>Test Engineer:</b>	Jack Zhou	<i>Jack Zhou</i>	
<b>Report Number:</b>	RSZ14042705-10		
<b>Test Date:</b>	2014-04-12 to 2014-12-18		
<b>Report Date:</b>	2014-12-22		
<b>Reviewed By:</b>	Jeanne Han /Safety Manager	<i>Jeanne Han</i>	
<b>Prepared By:</b>	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:+86-0769-86858588		

**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: KT57-23NYSG/HO-AT2  
 Part Name: /  
 Part Type: LED Package  
 Nominal CCT: 6130K

Family Declaration:

Manufacturer declare that the KT57-23NYSG/HO-AT2 serial models have different nominal CCTs and can be covered by this report under *ENERGY STAR® Program Guidance Regarding LED Package, LED Array and LED Module Lumen Maintenance Performance Data Supporting Qualification of Lighting Products*. The nominal CCT will be represented by suffix.

### 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	2014-02-19	2015-02-18
Programmable Test Power for LEDs	EVERFINE	LED300E	1008002	15V/2000mA	2014-02-15	2015-02-14
Standard Light Source	EVERFINE	D062	1011064	N/A	2014-02-23	2015-02-22
High accuracy array spectroradiometer	EVERFINE	HAAS-2000	1012016T	380-780nm	2014-02-15	2015-02-14

### 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 5 mm above the reliability test board. The relative humidity within chamber was less than 65%.

For photometry measurement, temperature was set to  $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ , 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  $U=21\text{K}$  ( $K=2$ ), at the 95% confidence level. This calibration results traceable to the NATIONAL INSTITUTE OF METROLOGY (NIM).

## 1.8 Sample Set

### Data Set 1: 55°C, 120mA

Part Number:	KT57-23NYSG/HO-AT2
Number of Units:	25
Actual Case Temperature( $T_S$ ):	$T_S = 54.5^{\circ}\text{C}$
Actual Ambient Temperature( $T_A$ ):	$T_A = 51.2^{\circ}\text{C}$
Life Test Drive Current:	$I_F = 50\text{mA}$
Measurement Current:	$I_F = 50\text{mA}$

### Data Set 2: 85°C, 120mA

Part Number:	KT57-23NYSG/HO-AT2
Number of Units:	25
Actual Case Temperature( $T_S$ ):	$T_S = 84.2^{\circ}\text{C}$
Actual Ambient Temperature( $T_A$ ):	$T_A = 81.2^{\circ}\text{C}$
Life Test Drive Current:	$I_F = 50\text{mA}$
Measurement Current:	$I_F = 50\text{mA}$

### Data Set 3: 100°C, 120mA

Part Number:	KT57-23NYSG/HO-AT2
Number of Units:	25
Actual Case Temperature( $T_S$ ):	$T_S = 99.1^{\circ}\text{C}$
Actual Ambient Temperature( $T_A$ ):	$T_A = 97.5^{\circ}\text{C}$
Life Test Drive Current:	$I_F = 50\text{mA}$
Measurement Current:	$I_F = 50\text{mA}$

## 2 - SUMMARY OF TEST RESULT

<b>Data Set:</b>	<b>Data Set 1, 55°C, 50mA</b>
Number of Units:	25
Failures Observed:	0
Average. Lumen Maintenance at 6000 hours:	95.79%
Average Chromaticity Shift at 6000 hours ( $\Delta u'v'$ ):	0.0012
Reported TM-21 L <sub>70</sub> Lifetime:	>36,000 hours

<b>Data Set:</b>	<b>Data Set 2, 85°C, 50mA</b>
Number of Units:	25
Failures Observed:	0
Average. Lumen Maintenance at 6000 hours:	95.00%
Average Chromaticity Shift at 6000 hours ( $\Delta u'v'$ ):	0.0011
Reported TM-21 L <sub>70</sub> Lifetime	>36,000 hours

<b>Data Set:</b>	<b>Data Set 2, 100°C, 50mA</b>
Number of Units:	25
Failures Observed:	0
Average. Lumen Maintenance at 6000 hours:	94.04%
Average Chromaticity Shift at 6000 hours ( $\Delta u'v'$ ):	0.0013
Reported TM-21 L <sub>70</sub> Lifetime	30,000 hours

### 3 - Test Data

#### 3.1 Data Set 1, 55°C, 50mA (Lumen Maintenance)

No.	V <sub>F</sub> (V)	Φ (lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	8.469	68.67	99.49	99.22	98.57	97.63	96.63	95.94
2	8.453	68.46	99.48	99.23	98.42	97.38	96.50	95.64
3	8.442	68.54	99.66	99.30	98.47	97.59	96.59	95.78
4	8.561	72.67	99.49	99.17	98.44	97.50	96.54	95.73
5	8.455	69.25	99.40	99.16	98.45	97.47	96.63	95.89
6	8.451	68.59	99.82	99.44	98.72	97.73	96.90	96.03
7	8.453	67.99	99.44	99.12	98.47	97.41	96.56	95.84
8	8.452	68.33	99.33	99.11	98.33	97.32	96.47	95.56
9	8.455	68.71	99.82	99.37	98.56	97.62	96.74	95.88
10	8.460	67.64	99.68	99.35	98.62	97.57	96.84	96.06
11	8.461	68.12	99.30	99.14	98.60	97.58	96.75	95.91
12	8.466	68.80	99.31	99.13	98.53	97.44	96.57	95.59
13	8.463	68.89	99.75	99.30	98.61	97.62	96.72	95.93
14	8.467	69.11	99.35	99.13	98.34	97.35	96.48	95.56
15	8.469	69.25	99.78	99.30	98.59	97.58	96.73	95.96
16	8.462	67.68	99.59	99.30	98.54	97.45	96.58	95.79
17	8.466	65.95	99.80	99.33	98.56	97.60	96.74	95.96
18	8.462	74.33	99.73	99.41	98.67	97.54	96.70	95.79
19	8.461	70.87	99.75	99.32	98.58	97.50	96.64	95.67
20	8.465	71.40	99.55	99.15	98.55	97.50	96.50	95.56
21	8.467	68.57	99.39	99.12	98.45	97.35	96.40	95.66
22	8.462	69.43	99.49	99.18	98.44	97.46	96.55	95.73
23	8.463	67.39	99.75	99.33	98.48	97.36	96.42	95.70
24	8.465	74.58	99.71	99.30	98.61	97.51	96.67	95.84
25	8.456	67.32	99.42	99.13	98.34	97.40	96.55	95.63
Ave.	8.464	69.22	99.57	99.24	98.52	97.50	96.62	95.79
Med.	8.462	68.67	99.55	99.23	98.54	97.50	96.59	95.79
st dev	0.0212	2.0598	0.0018	0.0010	0.0010	0.0011	0.0013	0.0015
Min.	8.442	65.98	99.30	99.11	98.33	97.32	96.40	95.56
Max.	8.561	74.48	99.82	99.44	98.72	97.73	96.90	96.06

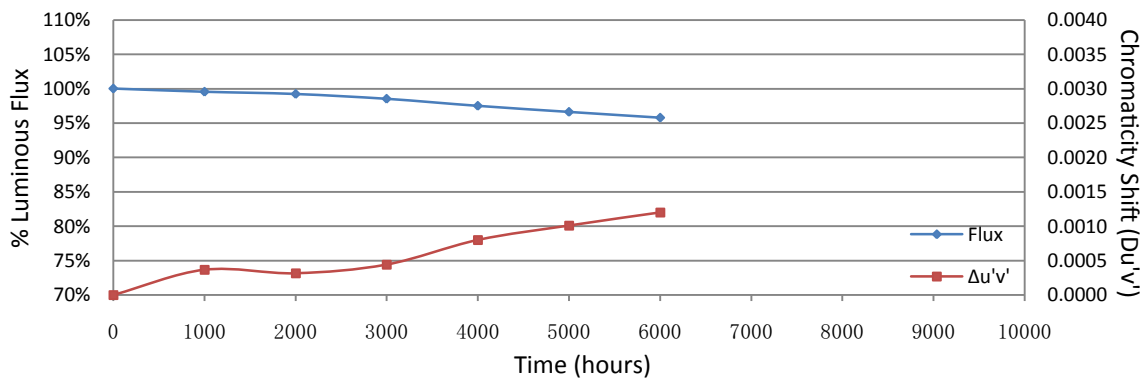
TM-21 Projection:

**Test Duration:** 6000 hours  
**Failures Observed:** 0  
 $\alpha$ : 8.120E-06  
 $\beta$ : 1.007  
**Calculated L<sub>70</sub>:** 45,000 hours  
**Reported L<sub>70</sub>:** >36,000 hours



### 3.2 Data Set 1, 55°C, 50mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift ( $\Delta u'v'$ )					
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2348	0.5176	0.0007	0.0006	0.0009	0.0010	0.0013	0.0014
2	0.2343	0.5179	0.0006	0.0006	0.0004	0.0010	0.0011	0.0013
3	0.2340	0.5181	0.0007	0.0004	0.0001	0.0009	0.0010	0.0013
4	0.2340	0.5185	0.0011	0.0003	0.0006	0.0006	0.0011	0.0013
5	0.2336	0.5177	0.0001	0.0004	0.0004	0.0005	0.0008	0.0011
6	0.2342	0.5184	0.0004	0.0006	0.0005	0.0009	0.0011	0.0013
7	0.2346	0.5172	0.0005	0.0005	0.0007	0.0010	0.0011	0.0012
8	0.2340	0.5177	0.0007	0.0001	0.0002	0.0006	0.0009	0.0009
9	0.2335	0.5168	0.0006	0.0007	0.0007	0.0010	0.0011	0.0014
10	0.2345	0.5161	0.0003	0.0004	0.0002	0.0008	0.0011	0.0013
11	0.2345	0.5162	0.0001	0.0002	0.0005	0.0009	0.0011	0.0013
12	0.2337	0.5189	0.0002	0.0002	0.0005	0.0007	0.0010	0.0010
13	0.2337	0.5175	0.0001	0.0003	0.0001	0.0003	0.0006	0.0007
14	0.2340	0.5169	0.0000	0.0003	0.0002	0.0004	0.0007	0.0009
15	0.2342	0.5183	0.0000	0.0002	0.0005	0.0006	0.0009	0.0012
16	0.2342	0.5179	0.0001	0.0002	0.0005	0.0006	0.0009	0.0010
17	0.2340	0.5166	0.0001	0.0004	0.0004	0.0010	0.0011	0.0013
18	0.2339	0.5173	0.0000	0.0001	0.0002	0.0009	0.0010	0.0013
19	0.2342	0.5157	0.0001	0.0003	0.0006	0.0011	0.0013	0.0014
20	0.2342	0.5193	0.0005	0.0003	0.0005	0.0008	0.0010	0.0014
21	0.2343	0.5168	0.0001	0.0000	0.0008	0.0008	0.0009	0.0012
22	0.2342	0.5180	0.0001	0.0000	0.0007	0.0008	0.0009	0.0010
23	0.2331	0.5179	0.0003	0.0001	0.0003	0.0005	0.0008	0.0010
24	0.2336	0.5159	0.0008	0.0003	0.0003	0.0012	0.0015	0.0016
25	0.2334	0.5174	0.0007	0.0003	0.0001	0.0009	0.0011	0.0012
Ave.	0.2340	0.5175	0.0004	0.0003	0.0004	0.0008	0.0010	0.0012
Med.	0.2340	0.5176	0.0003	0.0003	0.0005	0.0008	0.0010	0.0013
st dev	0.0004	0.0009	0.0003	0.0002	0.0002	0.0002	0.0002	0.0002
Min.	0.2348	0.5193	0.0000	0.0000	0.0001	0.0003	0.0006	0.0007
Max.	0.2331	0.5157	0.0011	0.0007	0.0009	0.0012	0.0015	0.0016



**3.3 Data Set 2, 85°C, 50mA (Lumen Maintenance)**

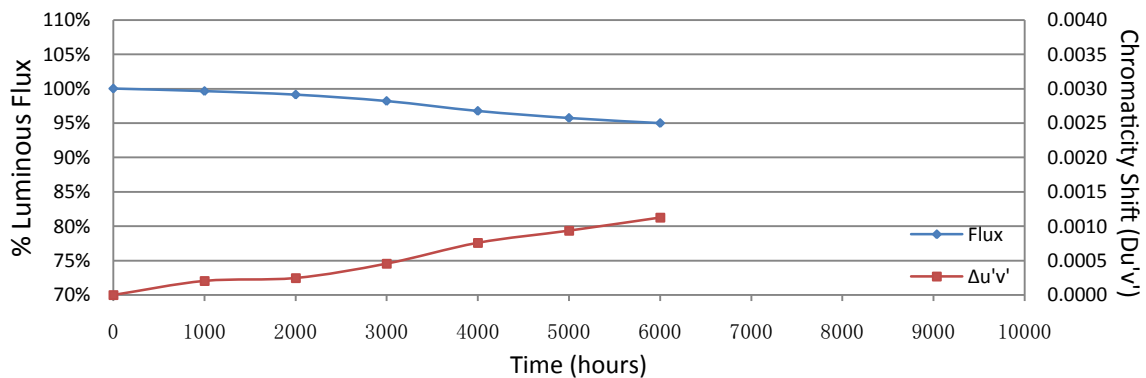
No.	V <sub>F</sub> (V)	Φ (lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	8.435	66.18	99.55	98.92	98.05	96.68	95.83	94.94
2	8.436	68.18	99.60	98.94	98.00	96.52	95.50	94.85
3	8.421	66.21	99.57	99.10	98.11	96.65	95.46	94.79
4	8.475	61.17	99.78	99.22	98.38	96.95	95.91	95.24
5	8.432	74.36	99.84	99.35	98.34	96.84	96.01	95.16
6	8.412	65.22	99.64	99.15	98.27	96.70	95.81	95.20
7	8.356	62.60	99.58	98.93	98.13	96.75	95.71	95.00
8	8.325	64.70	99.87	99.29	98.19	96.67	95.69	95.06
9	8.314	66.44	99.87	99.26	98.25	96.79	95.76	95.15
10	8.426	66.68	99.87	99.33	98.23	96.86	95.76	95.07
11	8.413	63.32	99.58	98.94	98.10	96.66	95.51	94.76
12	8.463	64.50	99.64	99.13	98.21	96.72	95.80	95.04
13	8.472	65.79	99.69	99.15	98.09	96.67	95.66	94.94
14	8.471	62.95	99.53	99.17	98.36	96.82	95.72	94.91
15	8.461	65.80	99.64	99.19	98.26	96.92	95.97	95.20
16	8.361	61.37	99.82	99.26	98.33	96.73	95.58	94.77
17	8.473	65.17	99.64	99.12	98.13	96.79	95.64	94.83
18	8.498	62.76	99.53	99.02	98.05	96.51	95.45	94.78
19	8.368	64.65	99.53	99.00	98.17	96.84	95.79	95.10
20	8.485	66.24	99.44	98.93	98.11	96.78	95.74	94.91
21	8.427	65.30	99.44	99.02	98.15	96.72	95.83	95.25
22	8.435	57.28	99.84	99.26	98.13	96.86	95.81	95.26
23	8.457	66.10	99.62	99.12	98.25	96.67	95.75	94.96
24	8.368	62.96	99.51	99.02	98.05	96.56	95.52	94.78
25	8.421	66.23	99.60	99.13	98.28	96.89	95.84	95.01
Ave.	8.424	64.89	99.65	99.12	98.19	96.74	95.72	95.00
Med.	8.432	65.22	99.62	99.13	98.17	96.73	95.75	95.00
st dev	0.0501	3.0328	0.0014	0.0013	0.0011	0.0012	0.0015	0.0017
Min.	8.314	57.28	99.44	98.92	98.00	96.51	95.45	94.76
Max.	8.498	74.36	99.87	99.35	98.38	96.95	96.01	95.26

**TM-21 Projection:**

**Test Duration:** 6000 hours  
**Failures Observed:** 0  
**α:** 1.024E-05  
**β:** 1.009  
**Calculated L<sub>70</sub>:** 36,000 hours  
**Reported L<sub>70</sub>:** >36,000 hours

**3.4 Data Set 2, 85°C, 50mA (Chromaticity Shift)**

No.	u'	v'	Chromaticity Shift ( $\Delta u'v'$ )					
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2348	0.5179	0.0002	0.0004	0.0005	0.0007	0.0009	0.0010
2	0.2341	0.5170	0.0002	0.0004	0.0007	0.0005	0.0007	0.0008
3	0.2346	0.5155	0.0004	0.0001	0.0005	0.0006	0.0007	0.0009
4	0.2345	0.5190	0.0001	0.0002	0.0003	0.0009	0.0009	0.0010
5	0.2341	0.5164	0.0002	0.0003	0.0006	0.0010	0.0010	0.0012
6	0.2341	0.5198	0.0001	0.0001	0.0002	0.0008	0.0009	0.0012
7	0.2341	0.5181	0.0002	0.0004	0.0006	0.0006	0.0009	0.0011
8	0.2338	0.5176	0.0001	0.0001	0.0004	0.0008	0.0008	0.0010
9	0.2339	0.5183	0.0001	0.0001	0.0006	0.0008	0.0009	0.0009
10	0.2343	0.5167	0.0001	0.0001	0.0003	0.0007	0.0009	0.0011
11	0.2332	0.5167	0.0001	0.0003	0.0007	0.0009	0.0011	0.0014
12	0.2339	0.5175	0.0004	0.0002	0.0002	0.0008	0.0009	0.0012
13	0.2338	0.5175	0.0001	0.0001	0.0004	0.0005	0.0008	0.0010
14	0.2343	0.5185	0.0003	0.0002	0.0001	0.0009	0.0013	0.0015
15	0.2349	0.5156	0.0002	0.0001	0.0004	0.0009	0.0012	0.0014
16	0.2336	0.5167	0.0001	0.0001	0.0008	0.0008	0.0012	0.0014
17	0.2341	0.5190	0.0002	0.0003	0.0007	0.0009	0.0010	0.0011
18	0.2333	0.5171	0.0003	0.0004	0.0004	0.0007	0.0008	0.0009
19	0.2336	0.5181	0.0003	0.0004	0.0001	0.0006	0.0010	0.0011
20	0.2338	0.5176	0.0002	0.0004	0.0005	0.0011	0.0012	0.0012
21	0.2350	0.5166	0.0002	0.0001	0.0006	0.0010	0.0012	0.0014
22	0.2337	0.5191	0.0001	0.0002	0.0008	0.0010	0.0012	0.0015
23	0.2340	0.5166	0.0002	0.0003	0.0004	0.0004	0.0004	0.0007
24	0.2337	0.5195	0.0002	0.0006	0.0000	0.0005	0.0009	0.0009
25	0.2336	0.5164	0.0002	0.0003	0.0005	0.0006	0.0008	0.0011
Ave.	0.2340	0.5176	0.0002	0.0002	0.0005	0.0008	0.0009	0.0011
Med.	0.2340	0.5175	0.0002	0.0002	0.0005	0.0008	0.0009	0.0011
st dev	0.0005	0.0012	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
Min.	0.2350	0.5198	0.0001	0.0001	0.0000	0.0004	0.0004	0.0007
Max.	0.2332	0.5155	0.0004	0.0006	0.0008	0.0011	0.0013	0.0015



**3.5 Data Set 3, 100°C, 50mA (Lumen Maintenance)**

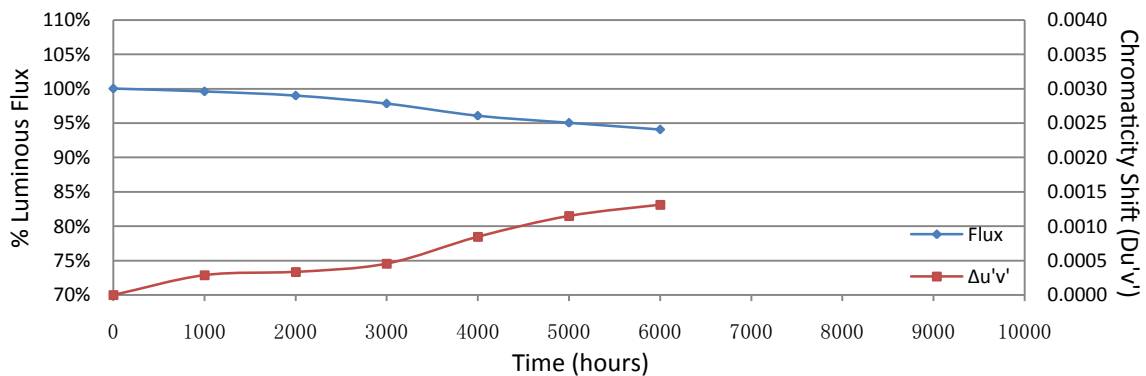
No.	V <sub>F</sub> (V)	Φ (lm)	Lumen Maintenance (%)					
	0hr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	8.421	66.07	99.80	99.15	98.01	96.17	95.07	94.09
2	8.428	68.12	99.68	98.94	97.94	96.09	95.19	94.12
3	8.435	66.74	99.62	99.02	97.70	95.82	94.71	93.86
4	8.434	60.88	99.71	98.92	97.92	96.09	95.08	94.22
5	8.447	74.49	99.51	98.93	97.86	96.03	94.94	93.78
6	8.415	65.65	99.53	99.08	98.03	96.22	95.25	94.31
7	8.446	62.88	99.55	98.94	97.79	96.01	95.09	94.19
8	8.421	65.45	99.59	99.01	97.75	96.11	94.98	94.01
9	8.443	67.47	99.58	99.06	97.88	96.15	94.99	93.85
10	8.413	66.58	99.57	98.94	97.88	96.28	95.23	94.35
11	8.425	63.41	99.37	98.88	97.83	96.06	94.92	93.91
12	8.434	65.92	99.55	98.97	97.78	96.19	95.13	94.22
13	8.418	65.37	99.60	99.00	97.97	96.22	95.05	93.81
14	8.431	62.65	99.64	98.95	97.79	96.05	95.16	94.16
15	8.409	65.40	99.49	98.95	97.90	96.20	95.28	94.23
16	8.406	63.28	99.62	99.06	97.79	95.89	94.78	93.75
17	8.415	64.72	99.64	99.00	97.88	96.16	94.82	93.86
18	8.423	63.39	99.50	99.05	97.82	95.90	94.91	94.05
19	8.414	65.00	99.49	98.95	97.90	96.20	95.31	94.25
20	8.425	67.02	99.57	99.06	97.70	95.95	95.17	94.16
21	8.417	65.22	99.62	99.11	97.78	95.89	94.82	93.80
22	8.424	58.67	99.53	99.01	97.81	96.04	95.01	94.13
23	8.411	66.16	99.51	98.86	97.78	96.13	95.08	93.91
24	8.411	63.28	99.58	99.03	97.72	95.95	94.73	93.80
25	8.495	66.40	99.64	99.04	97.86	96.19	95.23	94.26
Ave.	8.426	65.21	99.58	99.00	97.84	96.08	95.04	94.04
Med.	8.423	65.40	99.58	99.00	97.83	96.09	95.07	94.09
st dev	0.0183	2.8788	0.0009	0.0007	0.0009	0.0012	0.0018	0.0019
Min.	8.406	58.67	99.37	98.86	97.70	95.82	94.71	93.75
Max.	8.495	74.49	99.80	99.15	98.03	96.28	95.31	94.35

**TM-21 Projection:**

**Test Duration:** 6000 hours  
**Failures Observed:** 0  
 $\alpha$ : 1.219E-05  
 $\beta$ : 1.011  
**Calculated L<sub>70</sub>:** 30,000 hours  
**Reported L<sub>70</sub>:** 30,000 hours

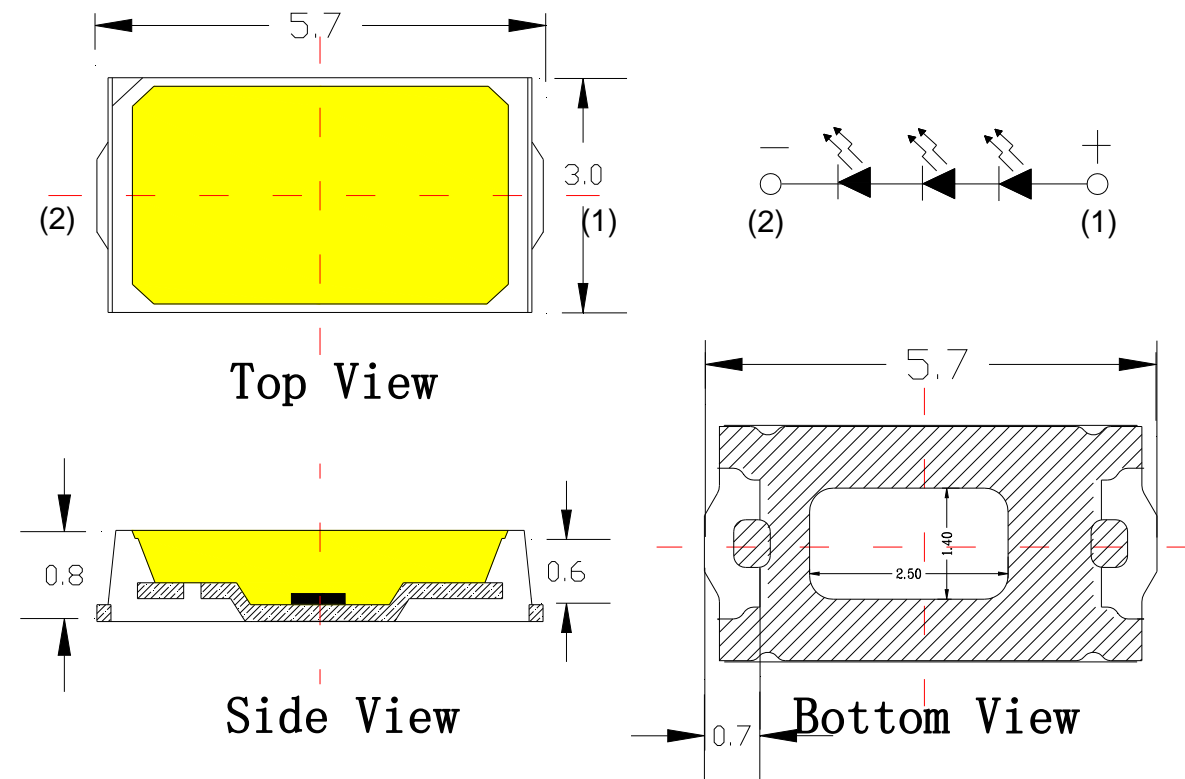
### 3.6 Data Set 3, 100°C, 50mA (Chromaticity Shift)

No.	u'	v'	Chromaticity Shift ( $\Delta u'v'$ )					
	Ohr(Initial)		1000hrs	2000hrs	3000hrs	4000hrs	5000hrs	6000hrs
1	0.2347	0.5171	0.0002	0.0003	0.0007	0.0008	0.0012	0.0015
2	0.2342	0.5171	0.0004	0.0004	0.0010	0.0010	0.0013	0.0014
3	0.2347	0.5165	0.0002	0.0003	0.0012	0.0007	0.0014	0.0015
4	0.2340	0.5174	0.0005	0.0003	0.0004	0.0009	0.0014	0.0016
5	0.2339	0.5172	0.0003	0.0004	0.0006	0.0007	0.0013	0.0014
6	0.2339	0.5170	0.0002	0.0002	0.0003	0.0006	0.0011	0.0012
7	0.2341	0.5161	0.0002	0.0004	0.0005	0.0008	0.0009	0.0011
8	0.2336	0.5172	0.0002	0.0007	0.0004	0.0006	0.0007	0.0011
9	0.2334	0.5173	0.0004	0.0004	0.0001	0.0006	0.0010	0.0011
10	0.2334	0.5177	0.0001	0.0005	0.0006	0.0008	0.0013	0.0015
11	0.2344	0.5165	0.0003	0.0004	0.0004	0.0007	0.0012	0.0014
12	0.2340	0.5161	0.0003	0.0004	0.0004	0.0007	0.0008	0.0009
13	0.2341	0.5180	0.0004	0.0001	0.0005	0.0011	0.0012	0.0015
14	0.2350	0.5176	0.0004	0.0006	0.0007	0.0009	0.0012	0.0014
15	0.2335	0.5182	0.0002	0.0003	0.0004	0.0009	0.0010	0.0012
16	0.2339	0.5166	0.0002	0.0000	0.0002	0.0009	0.0013	0.0013
17	0.2344	0.5185	0.0003	0.0002	0.0001	0.0008	0.0011	0.0011
18	0.2339	0.5170	0.0002	0.0005	0.0001	0.0010	0.0013	0.0014
19	0.2340	0.5178	0.0002	0.0004	0.0005	0.0010	0.0011	0.0015
20	0.2333	0.5171	0.0004	0.0002	0.0004	0.0008	0.0009	0.0009
21	0.2339	0.5182	0.0003	0.0002	0.0001	0.0009	0.0011	0.0013
22	0.2343	0.5174	0.0004	0.0002	0.0004	0.0006	0.0009	0.0011
23	0.2345	0.5162	0.0003	0.0002	0.0005	0.0011	0.0014	0.0016
24	0.2337	0.5184	0.0002	0.0003	0.0002	0.0009	0.0013	0.0014
25	0.2329	0.5164	0.0003	0.0004	0.0007	0.0011	0.0013	0.0015
Ave.	0.2340	0.5172	0.0003	0.0003	0.0005	0.0008	0.0012	0.0013
Med.	0.2340	0.5172	0.0003	0.0003	0.0004	0.0008	0.0012	0.0014
st dev	0.0005	0.0007	0.0001	0.0002	0.0003	0.0002	0.0002	0.0002
Min.	0.2350	0.5185	0.0001	0.0000	0.0001	0.0006	0.0007	0.0009
Max.	0.2329	0.5161	0.0005	0.0007	0.0012	0.0011	0.0014	0.0016

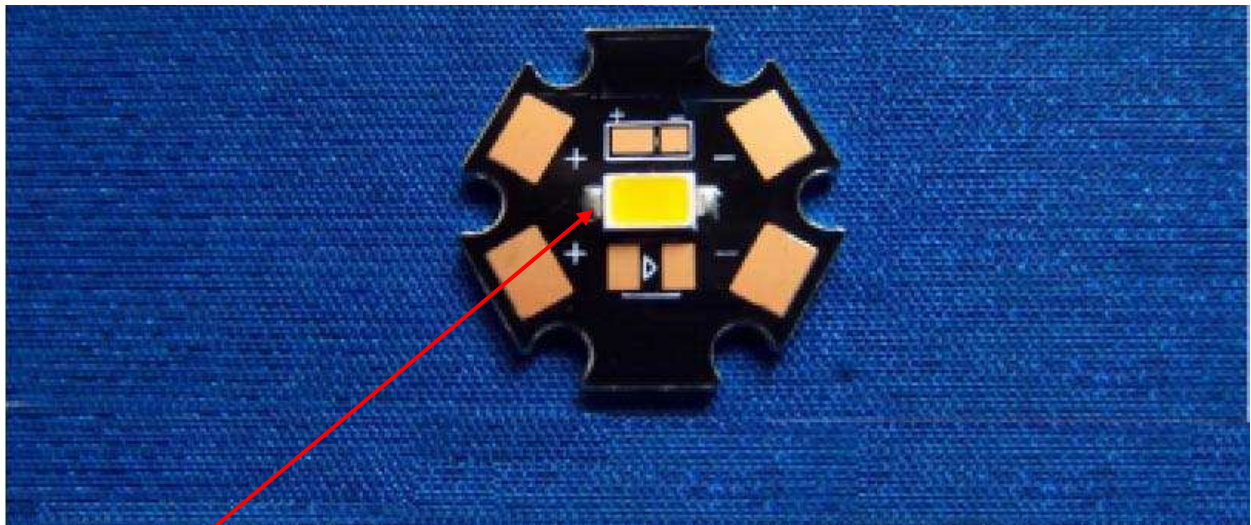


## Appendix A -EUT PHOTO

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



### A.2 EUT Photo



TMP<sub>LED</sub>

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