

SMD ■ MID POWER LED

62-217D/XK2C-HXXXXXXXXXXXXZ15/2T



Features

- LM-80 Certified
- PLCC-2 Package
- Top view white LED
- High luminous flux output
- High current capability
- Wide viewing angle
- Pb-free
- RoHS compliant
- ANSI Binning

Description

The Everlight 0.5W 62-217D package has high efficacy, high CRI, low power consumption, wide viewing angle and a compact form factor. These features make this package an ideal LED for all lighting application.

Applications

- Decorative and Entertainment Lighting
- Light pipe application
- Indicator and backlight in office and family equipment
- General use

Product Number Explanation

62-217D / X K 2 C – H XX XX XX XX XX / 2T

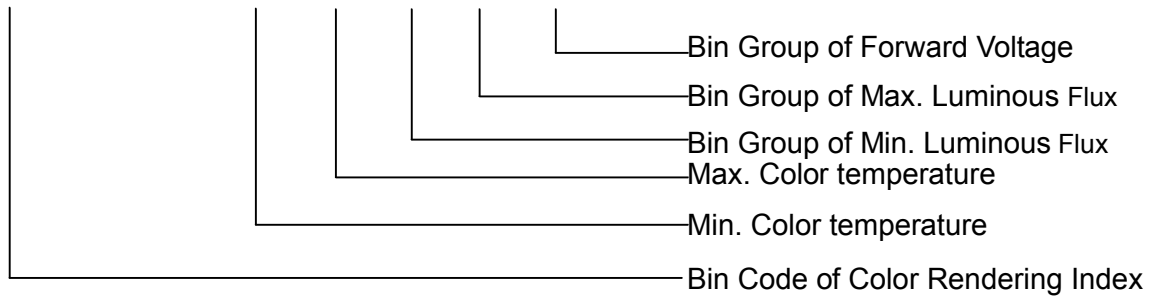


Table of Color Rendering Index

Symbol	Description
M	CRI(Min.) : 60
N	CRI(Min.) : 65
L	CRI(Min.) : 70
Q	CRI(Min.) : 75
K	CRI(Min.) : 80
H	CRI(Min.) : 90

Note:
 Tolerance of Color Rendering Index: ±2

Example:

62-217D/KK2C-H4040QAR3B42Z15/2T

CRI	80(Min.)
CCT	4000K
Flux	45~65lm
V _F	2.8~3.5V
I _F	150mA

Mass Production List for CRI>80

Product	CRI Min. (1)	CCT(K)	Φ(lm) Min. (2)	Φ(lm) Max. (2)
62-217D/KK2C-H2727PBR2B42Z15/2T	80	2700K	40	60
62-217D/KK2C-H3030QAR3B42Z15/2T	80	3000K	45	65
62-217D/KK2C-H4040QAR3B42Z15/2T	80	4000K	45	65
62-217D/KK2C-H5050R1R4B42Z15/2T	80	5000K	50	70
62-217D/KK2C-H5353R1R4B42Z15/2T	80	5300K	50	70
62-217D/KK2C-H5757R1R4B42Z15/2T	80	5700K	50	70
62-217D/KK2C-H6565R1R4B42Z15/2T	80	6500K	50	70

Note:

1. Tolerance of Color Rendering Index: ± 2
2. Tolerance of Luminous flux: $\pm 11\%$.

EVERLIGHT

Device Selection Guide

Chip Materials	Emitted Color	Resin Color
InGaN	Cool White	Water Clear
	Neutral White	
	Warm White	

Absolute Maximum Ratings (T_{Soldering}=25)

Parameter	Symbol	Rating	Unit
Forward Current	I _F	180	mA
Peak Forward Current (Duty 1/10 @10ms)	I _{FP}	300	mA
Power Dissipation	P _d	630	mW
Operating Temperature	T _{opr}	-40 ~ +85	
Storage Temperature	T _{stg}	-40 ~ +100	
Thermal Resistance (Junction / Soldering point)	R _{th J-S}	21	/W
Junction Temperature	T _j	115	
Soldering Temperature	T _{sol}	Reflow Soldering : 260 Hand Soldering : 350	for 10 sec. for 3 sec.

Electro-Optical Characteristics (T_{Soldering}=25)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous Flux ₍₁₎	Φ	40	-----	70	lm	I _F =150mA
Forward Voltage ₍₂₎	V _F	2.8	-----	3.5	V	I _F =150mA
Color Rendering Index ₍₃₎	R _a	80	-----	-----	-----	I _F =150mA
Viewing Angle	2θ _{1/2}	-----	120	-----	deg	I _F =150mA
Reverse Current	I _R	-----	-----	50	μA	V _R =5V

Notes:

1. Tolerance of Luminous flux: ±11%.
2. Tolerance of Forward Voltage : ±0.1V.
3. Tolerance of Color Rendering Index: ±2

Bin Range of Luminous Flux

Bin Code	Min.	Max.	Unit	Condition
PB	40	45	lm	I _F =150mA
QA	45	50		
R1	50	55		
R2	55	60		
R3	60	65		
R4	65	70		

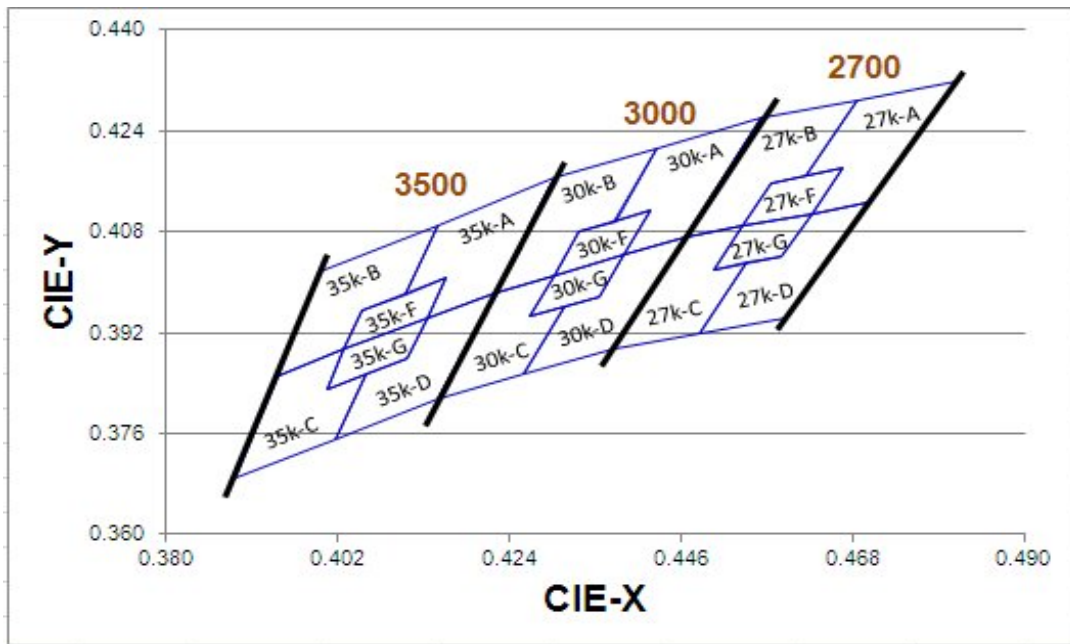
Notes:
 Tolerance of Luminous flux: ±11%

Bin Range of Forward Voltage

Group	Bin Code	Min.	Max.	Unit	Condition
B42	35	2.8	2.9	V	I _F =150mA
	36	2.9	3.0		
	37	3.0	3.1		
	38	3.1	3.2		
	39	3.2	3.3		
	40	3.3	3.4		
	41	3.4	3.5		

Notes:
 Tolerance of Forward Voltage : ±0.1V.

The C.I.E. 1931 Chromaticity Diagram

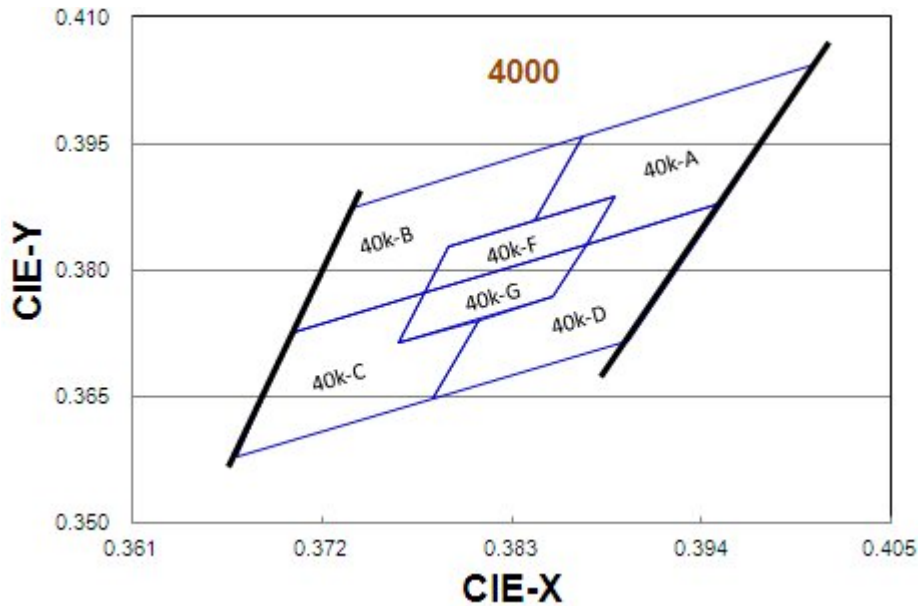


Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
2700K	27K-A	0.4813	0.4319	27K-D	0.4700	0.4126	
		0.4687	0.4289		0.4627	0.4109	
		0.4621	0.4169		0.4588	0.4041	
		0.4667	0.4180		0.4544	0.4030	
		0.4627	0.4109		0.4483	0.3919	
		0.4700	0.4126		0.4593	0.3944	
	Reference Range:2580K~2700K						
	27K-B	0.4687	0.4289	27K-C	0.4465	0.4071	
		0.4562	0.4260		0.4373	0.3893	
		0.4465	0.4071		0.4483	0.3919	
		0.4539	0.4088		0.4544	0.4030	
		0.4576	0.4158		0.4502	0.4020	
		0.4621	0.4169		0.4539	0.4088	
	Reference Range:2700K~2870K						
	27K-F	0.4667	0.4180	27K-G	0.4627	0.4109	
		0.4576	0.4158		0.4539	0.4088	
		0.4539	0.4088		0.4502	0.4020	
		0.4627	0.4109		0.4588	0.4041	
Reference Range: 2665K~2770K							

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
3000K	30K-A	0.4562	0.4260	30K-D	0.4465	0.4071	
		0.4430	0.4212		0.4388	0.4043	
		0.4375	0.4096		0.4355	0.3977	
		0.4422	0.4113		0.4311	0.3962	
		0.4388	0.4043		0.4259	0.3853	
		0.4465	0.4071		0.4373	0.3893	
	Reference Range:2870K~3000K						
	30K-B	0.4430	0.4212	30K-C	0.4221	0.3984	
		0.4299	0.4165		0.4147	0.3814	
		0.4221	0.3984		0.4259	0.3853	
		0.4297	0.4011		0.4311	0.3962	
		0.4328	0.4079		0.4267	0.3946	
		0.4375	0.4096		0.4297	0.4011	
	Reference Range:3000K~3220K						
	30K-F	0.4422	0.4113	30K-G	0.4388	0.4043	
		0.4328	0.4079		0.4297	0.4011	
		0.4297	0.4011		0.4267	0.3946	
		0.4388	0.4043		0.4355	0.3977	
	Reference Range:2960K~3080K						

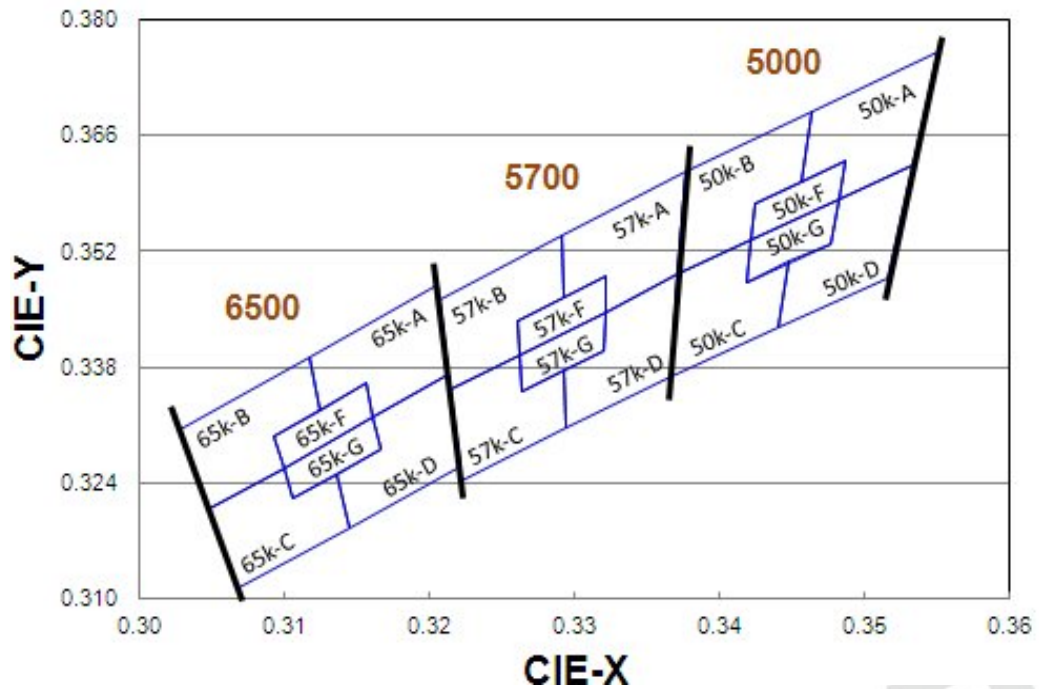
The C.I.E. 1931 Chromaticity Diagram



Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
4000K	40K-A	0.4006	0.4044	40K-D	0.3952	0.3880	
		0.3871	0.3959		0.3873	0.3831	
		0.3843	0.3858		0.3854	0.3768	
		0.3890	0.3887		0.3810	0.3741	
		0.3873	0.3831		0.3784	0.3647	
		0.3952	0.3880		0.3898	0.3716	
	Reference Range:3700K~3970K						
	40K-B	0.3871	0.3959	40K-C	0.3703	0.3726	
		0.3736	0.3874		0.3670	0.3578	
		0.3703	0.3726		0.3784	0.3647	
		0.3779	0.3773		0.3810	0.3741	
		0.3793	0.3828		0.3764	0.3713	
		0.3843	0.3858		0.3779	0.3773	
	Reference Range:3970K~4270K						
	40K-F	0.3890	0.3887	40K-G	0.3873	0.3831	
		0.3793	0.3828		0.3779	0.3773	
		0.3779	0.3773		0.3764	0.3713	
		0.3873	0.3831		0.3854	0.3768	
	Reference Range:3870K~4080K						

The C.I.E. 1931 Chromaticity Diagram



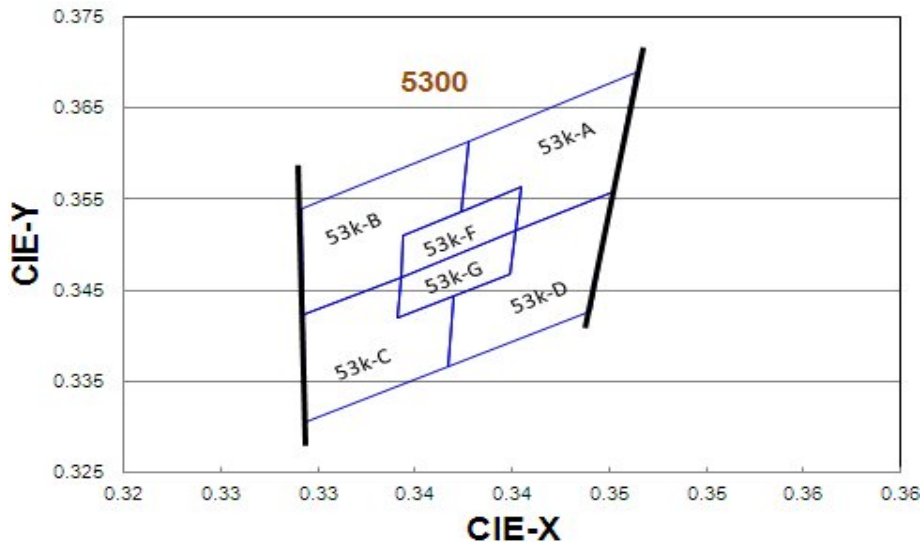
Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
5000K	50K-A	0.3551	0.3760	50K-D	0.3533	0.3624	
		0.3464	0.3688		0.3482	0.3583	
		0.3456	0.3604		0.3477	0.3530	
		0.3487	0.3629		0.3448	0.3507	
		0.3482	0.3583		0.3441	0.3428	
		0.3533	0.3624		0.3515	0.3487	
	Reference Range:4745K~5000K						
	50K-B	0.3464	0.3688	50K-C	0.3371	0.3493	
		0.3376	0.3616		0.3366	0.3369	
		0.3371	0.3493		0.3441	0.3428	
		0.3422	0.3533		0.3448	0.3507	
		0.3425	0.3579		0.3418	0.3483	
		0.3456	0.3604		0.3422	0.3533	
	Reference Range:5000K~5310K						
	50K-F	0.3487	0.3629	50K-G	0.3482	0.3583	
		0.3425	0.3579		0.3422	0.3533	
		0.3422	0.3533		0.3418	0.3483	
		0.3482	0.3583		0.3477	0.3530	
	Reference Range:4910K~5120K						

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
5700K	57K-A	0.3376	0.3616	57K-D	0.3371	0.3493	
		0.3292	0.3539		0.3321	0.3447	
		0.3292	0.3464		0.3320	0.3401	
		0.3321	0.3490		0.3293	0.3377	
		0.3321	0.3447		0.3294	0.3306	
		0.3371	0.3493		0.3366	0.3369	
	Reference Range:5310K~5700K						
	57K-B	0.3292	0.3539	57K-C	0.3215	0.3353	
		0.3207	0.3462		0.3222	0.3243	
		0.3215	0.3353		0.3294	0.3306	
		0.3262	0.3395		0.3293	0.3377	
		0.3261	0.3436		0.3263	0.335	
		0.3292	0.3464		0.3262	0.3395	
	Reference Range:5700K~6020K						
	57K-F	0.3321	0.3490	57K-G	0.3321	0.3447	
		0.3261	0.3436		0.3262	0.3395	
		0.3262	0.3395		0.3263	0.3350	
		0.3321	0.3447		0.3320	0.3401	
	Reference Range:5520K~5780K						

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
6500K	65K-A	0.3205	0.3481	65K-D	0.3213	0.3371	
		0.3117	0.3393		0.3161	0.3320	
		0.3125	0.3328		0.3166	0.3281	
		0.3157	0.3360		0.3136	0.3251	
		0.3161	0.3320		0.3145	0.3187	
		0.3213	0.3371		0.3221	0.3261	
	Reference Range:6020K~6500K						
	65K-B	0.3117	0.3393	65K-C	0.3048	0.3209	
		0.3028	0.3304		0.3068	0.3113	
		0.3048	0.3209		0.3145	0.3187	
		0.3100	0.3259		0.3136	0.3251	
		0.3093	0.3297		0.3106	0.3222	
		0.3125	0.3328		0.31	0.3259	
	Reference Range:6500K~7050K						
	65K-F	0.3157	0.3360	65K-G	0.3161	0.3320	
		0.3093	0.3297		0.3100	0.3259	
		0.3100	0.3259		0.3106	0.3222	
		0.3161	0.3320		0.3166	0.3281	
	Reference Range:6300K~6690K						

The C.I.E. 1931 Chromaticity Diagram



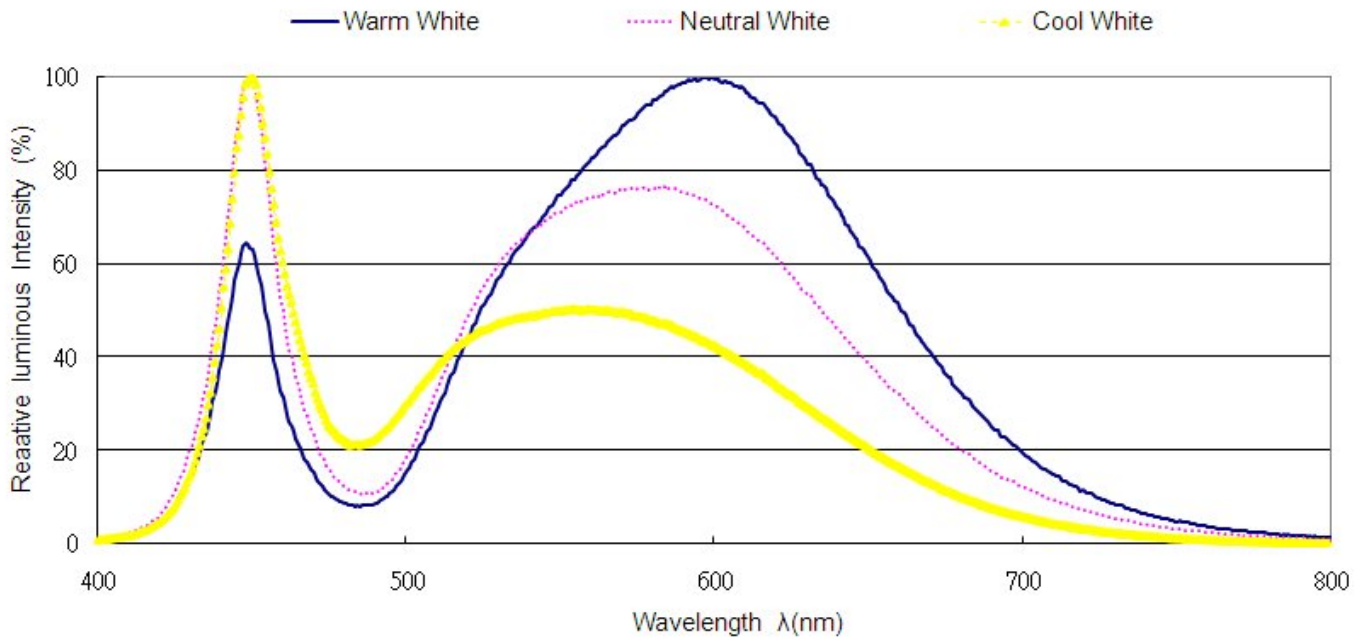
Bin Range of Chromaticity Coordinate

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
5300K	53K-A	0.3464	0.3688	53K-D	0.3452	0.3558	
		0.3378	0.3614		0.3402	0.3516	
		0.3374	0.3536		0.3399	0.3468	
		0.3405	0.3563		0.3370	0.3444	
		0.3402	0.3516		0.3367	0.3367	
		0.3452	0.3558		0.3440	0.3428	
	Reference Range:5000K~5300K						
	53K-B	0.3378	0.3614	53K-C	0.3293	0.3423	
		0.3292	0.3539		0.3294	0.3306	
		0.3293	0.3423		0.3367	0.3367	
		0.3343	0.3465		0.3370	0.3444	
		0.3344	0.3510		0.3341	0.3420	
0.3374		0.3536	0.3343		0.3465		
Reference Range:5300~5640K							
53K-F	0.3405	0.3563	53K-G	0.3402	0.3516		
	0.3344	0.3510		0.3343	0.3465		
	0.3343	0.3465		0.3341	0.3420		
	0.3402	0.3516		0.3399	0.3468		
Reference Range: 5190K~5420K							

Note:

1. The value is based on driving current by 150mA.
2. Tolerance of Chromaticity Coordinates: ±0.01.

Spectrum Distribution



Typical Electro-Optical Characteristics Curves

Fig.1 – Forward Voltage Shift vs. Junction Temperature

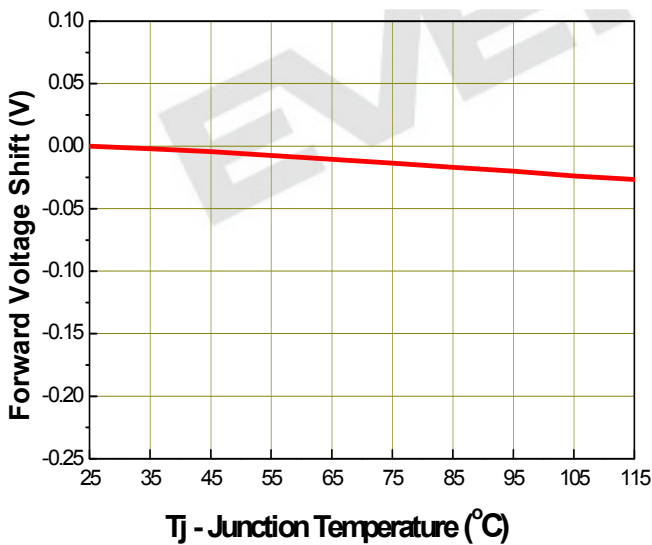
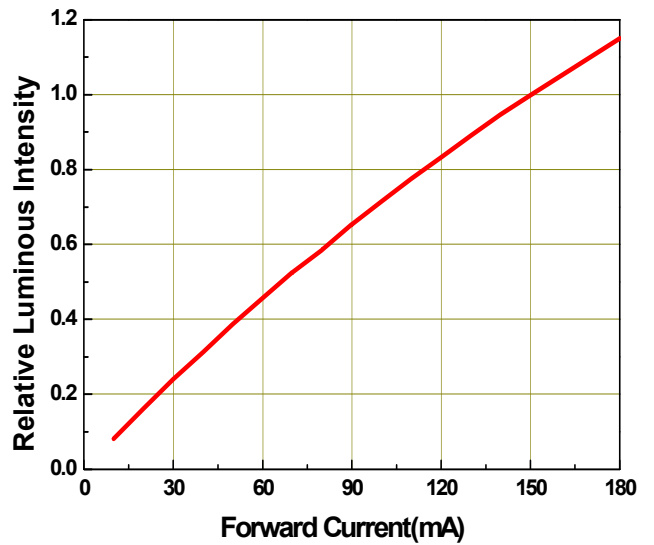


Fig.2 - Relative Luminous Intensity vs. Forward Current



Typical Electro-Optical Characteristics Curves

Fig.3 - Relative Luminous Intensity vs. Junction Temperature

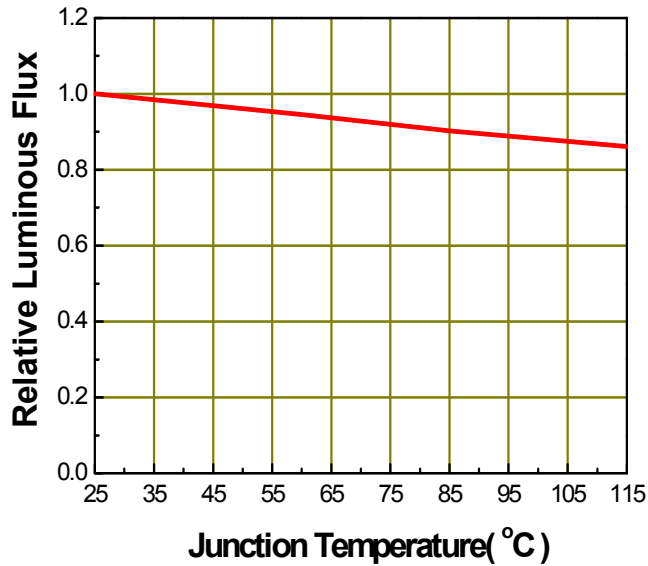


Fig.4 - Forward Current vs. Forward Voltage

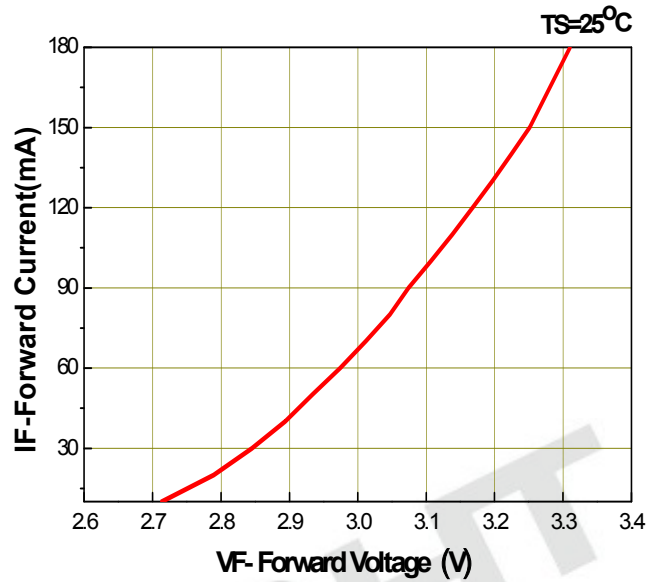


Fig.5 – Max. Driving Forward Current vs. Soldering Temperature

Rth j-s=21° C/W

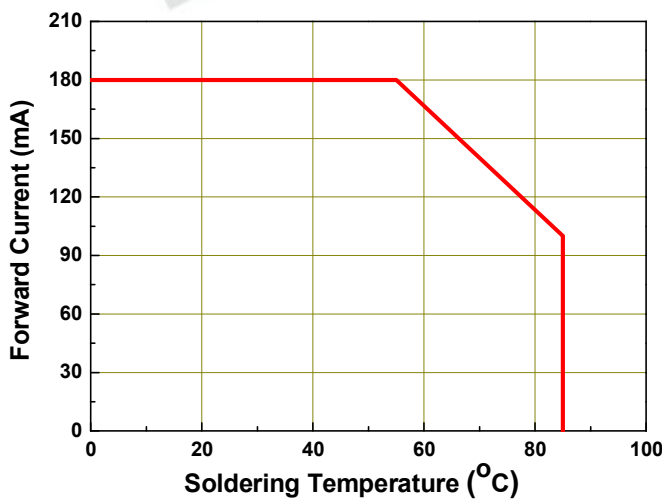
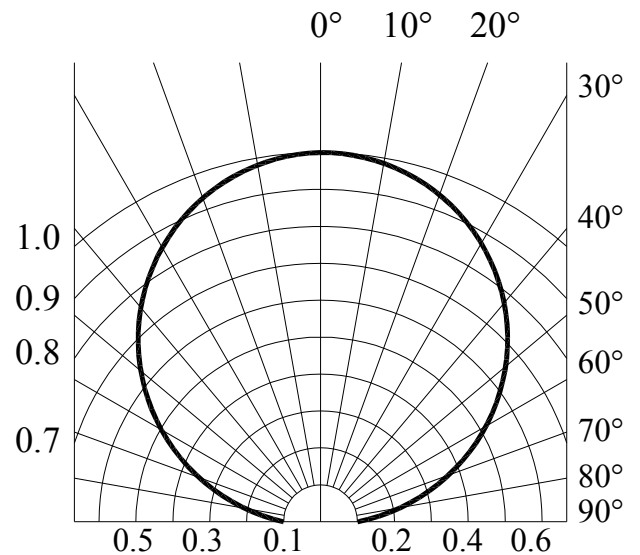
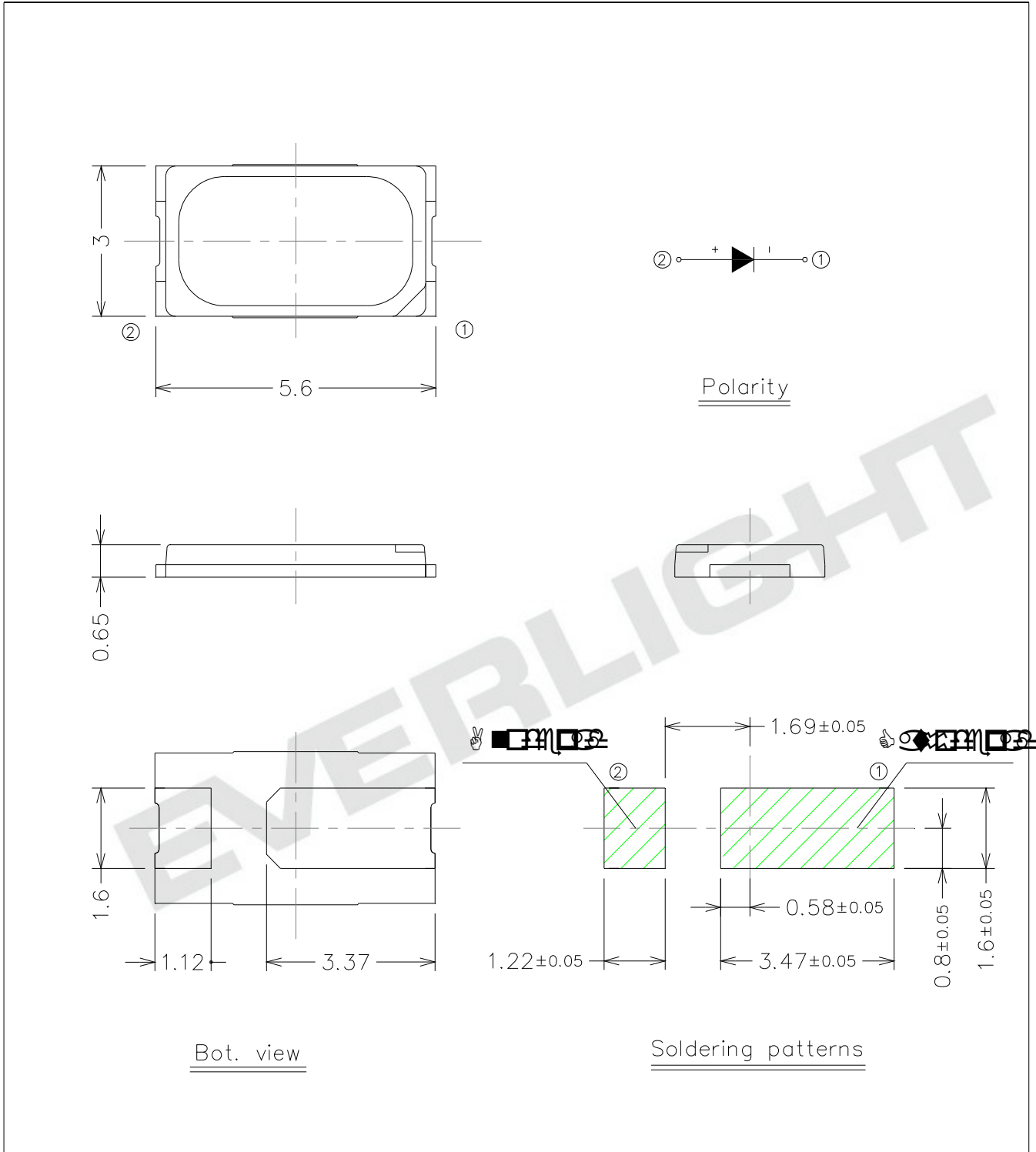


Fig.6 – Radiation Diagram



Package Dimension



Note:
 Tolerance unless mentioned is ±0.1mm; Unit = mm

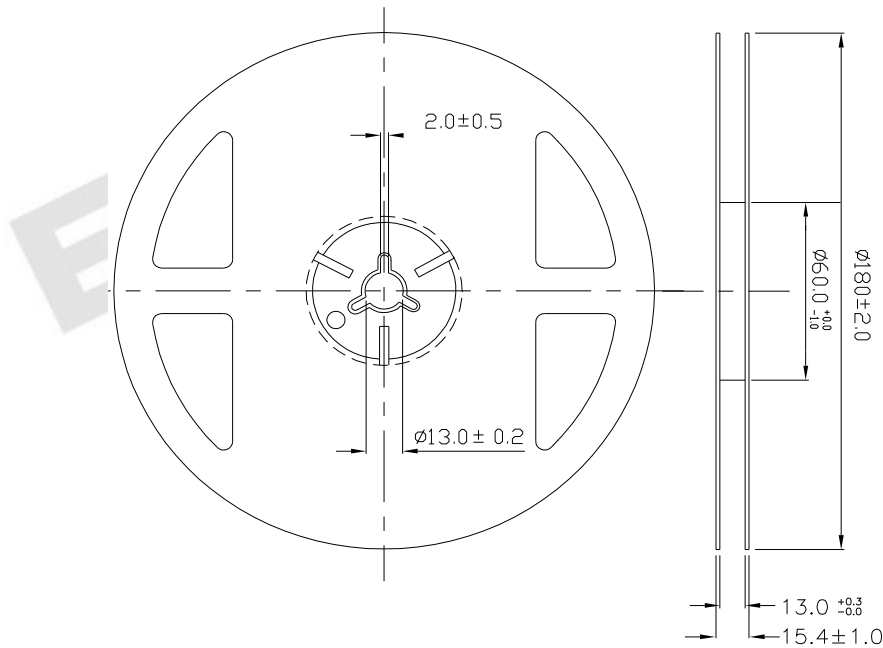
Moisture Resistant Packing Materials

Label Explanation



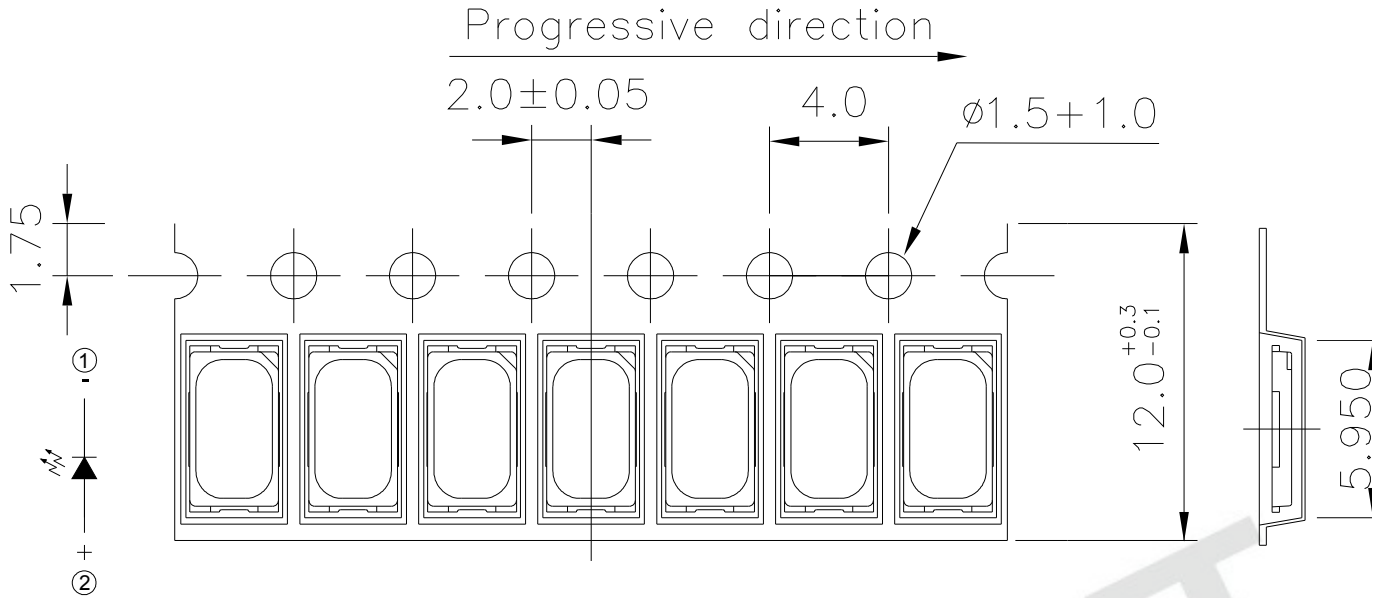
- CPN: Customer's Product Number
- P/N: Product Number
- QTY: Packing Quantity
- CAT: Luminous Intensity Rank
- HUE: Dom. Wavelength Rank
- REF: Forward Voltage Rank
- LOT No: Lot Number

Reel Dimensions



Note:
 Tolerances unless mentioned ± 0.1 mm. Unit = mm

Carrier Tape Dimensions: Loaded Quantity 250/500/1000/2000 pcs. Per Reel

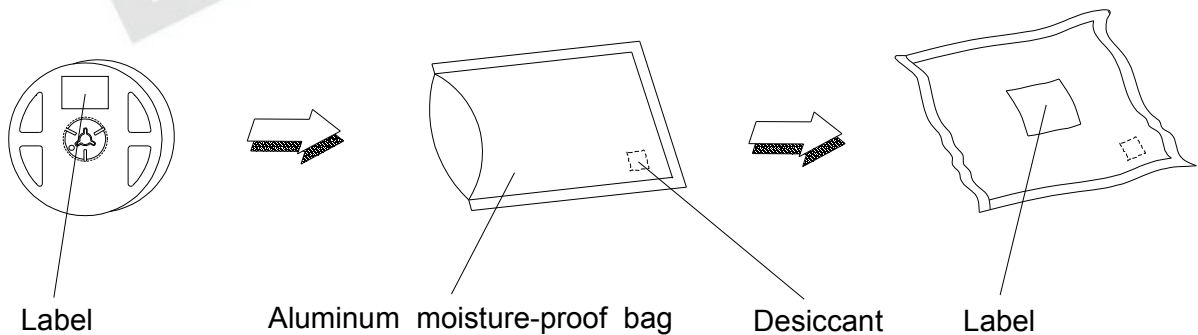


Polarity

Note:

Tolerance unless mentioned is ± 0.1 mm; Unit = mm

Moisture Resistant Packing Process



Reliability Test Items and Conditions

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10%

No.	Items	Test Condition	Test Hours/Cycles	Sample Size	Ac/Re
1	Reflow Soldering	Temp. : 260 /10sec.	6 Min.	22 PCS.	0/1
2	Thermal Shock	H : +100 20min 10 sec L : -10 20min	500 Cycles	22 PCS.	0/1
3	Temperature Cycle	H : +100 30min 5 min L : -40 30min	500 Cycles	22 PCS.	0/1
4	High Temperature/Humidity Storage	Ta=85 ,85%RH	1000 Hrs.	22 PCS.	0/1
5	High Temperature/Humidity Operation	Ta=85 ,85%RH, I _F = 100 mA	1000 Hrs.	22 PCS.	0/1
6	Low Temperature Storage	Ta=-40	1000 Hrs.	22 PCS.	0/1
7	High Temperature Storage	Ta=85	1000 Hrs.	22 PCS.	0/1
8	Low Temperature Operation Life	Ta=-40 , I _F = 150 mA	1000 Hrs.	22 PCS.	0/1
9	High Temperature Operation/ Life#1	Ta=25 , I _F = 150 mA	1000 Hrs.	22 PCS.	0/1
10	High Temperature Operation/ Life#2	Ta=55 , I _F =150 mA	1000 Hrs.	22 PCS.	0/1
11	High Temperature Operation/ Life#3	Ta=85 , I _F = 100 mA	1000 Hrs.	22 PCS.	0/1

Precautions for Use

1. Over-current-proof

Customer must apply resistors for protection; otherwise slight voltage shift will cause big current change (Burn out will happen).

2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

2.2 Before opening the package: The LEDs should be kept at 30 °C or less and 90%RH or less.

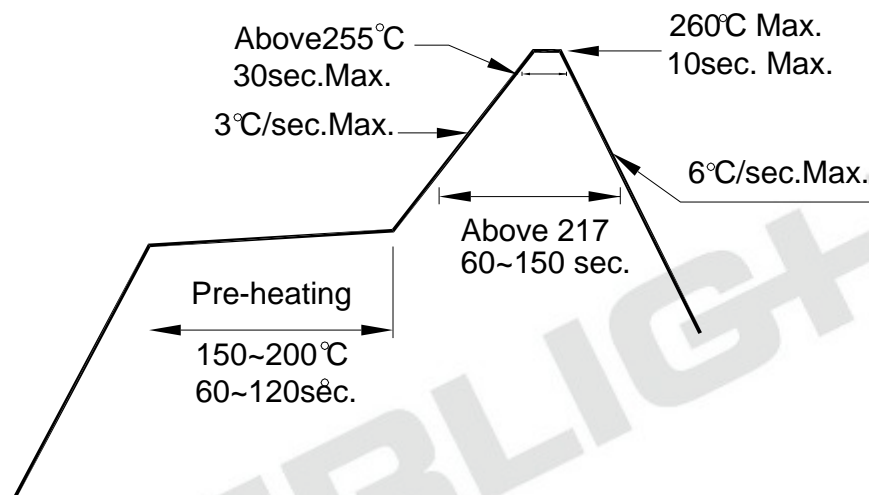
2.3 After opening the package: The LED's floor life is 168 Hrs under 30 °C or less and 60% RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

2.4 If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.

Baking treatment: 60±5 °C for 24 hours.

3. Soldering Condition

3.1 Pb-free solder temperature profile



3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the LEDs during heating.

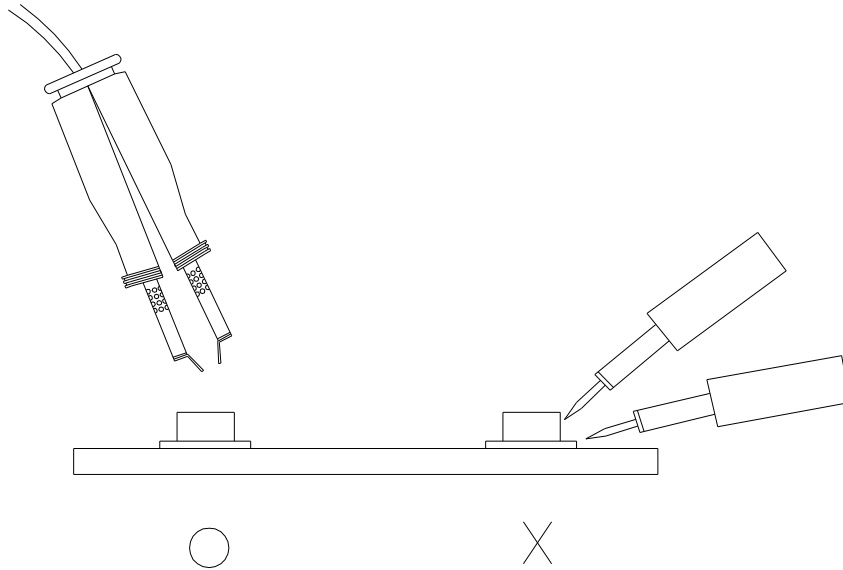
3.4 After soldering, do not warp the circuit board.

4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350 for 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

5. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.





Report No.: OA-2012-B0007

Page 1 of 25

Issued: Aug. 30, 2013

TEST REPORT

The following tested product(s) were submitted and identified by the vendor as:

Applicant : EVERLIGHT ELECTRONICS CO., LTD.
Address of Applicant : No.6-8, Zhonghua Rd., Shulin Dist, New Taipei City
23860, Taiwan, R.O.C.
Testing Laboratory : SGS Taiwan Ltd., Optics Laboratory
Laboratory Address : 33, Wu Chyuan Rd., New Taipei Industrial Park, New
Taipei City, Taiwan 24888
Product Name : SMD MID Power LED 62-217D series
Model / Serial Number : 62-217D (3000 K)
Manufacturer : EVERLIGHT ELECTRONICS CO., LTD.
Rating : DC 150 mA, 0.5 W
Tested Condition : DC 150 mA (Constant Current)
Test Standard/Method : IES LM-80-08 Approved Method: Measuring Lumen
Maintenance of LED Light Sources
Date of Issue : Aug. 30, 2013

The submitted products have been tested as requested and the following results were obtained, and the report, not applicable for lawsuit, refers only to the unit(s) submitted for test.

Test Results : -PLEASE SEE ATTACHED SHEETS-

Signed for and on behalf of
SGS TAIWAN Ltd.

Calvin Tzou
Technical Manager

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1 SAMPLING DESCRIPTION

No sampling action and method employed

2 DATE OF RECEIPT OF SAMPLES

Nov. 12, 2012

3 DATE(S) OF PERFORMANCE OF THE TEST

Nov. 12, 2012 ~ Aug. 21, 2013

4 IDENTITY OF SAMPLES

Quantity	Model	Serial Number
25	62-217D (3000 K)	# A01 - # A25 (55 °C)
25	62-217D (3000 K)	# B01 - # B25 (65 °C)
25	62-217D (3000 K)	# C01 - # C25 (95 °C)

5 TEST ITEMS

5.1 Data Summary of Lumen and Color Maintenance

Test results were concluded by different Case Temperatures (Ts).

5.2 Lumen Maintenance and Color Maintenance Test

Testing specifications by different case temperatures according to IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources and client's requirements were implemented per the following items.

5.2.1 Total Luminous Flux (Φ_v)

The test results of total luminous flux were implemented referring to Clause 2 PROPERTIES OF LEDS & Clause 6 MEASUREMENT OF LUMINOUS FLUX of CIE 127: 2007 2nd edition MEASUREMENT OF LEDS and IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources, when the UUTs were powered with constant current of I_f .

5.2.2 Correlated Color Temperature (CCT), CIE Color Coordinate (CIE_x, CIE_y) & Chromaticity Shift ($\Delta u'v'$)

The test results of correlated color temperature were implemented referring to CIE 127:2007 2nd edition MEASUREMENT OF LEDS, CIE 15: 2004 COLORIMETRY.

The test results of color coordinate were implemented referring to CIE 127: 2007 2nd edition MEASUREMENT OF LEDS, CIE 15:2004 COLORIMETRY.

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6 TEST CONDITIONS

Main Test Equipment:

Name	Brand	Model	S/N	Traceability
Standard Light Source / Spectroradiometer	Labsphere	SCL-600 / CDS 2100	D112 / 0811118355	NIST
Source Meter	Kethley	2400	1321218	NMI
Handheld Digital Multimeter	Agilent	U1242A	MY48490144	NMI

Environmental Conditions:

Temperature: (25 ± 1) °C
Relative Humidity: < 65 % RH

UUT Conditions:

LED Light source: LED Package
Drive Current: DC 150 mA (Typical)
Forward Voltage: DC 2.8 V to 3.5 V
Power Consumption: 0.5 W
CCT: 3000 K
Package Dimension: L 5.6 mm x W 3.0 mm x H 0.65 mm
Prior operation: 0 hour
Total Operation Duration: 6000 hours
Target CCT: 3000 K
Sample Size: 75 pcs (25 pcs for each temperature)
Failed Quantity: 0 pcs

Measurement Conditions:

Interval Time: 0, 1000, 2000, 3000, 4000, 5000, 6000 hours
Warm up Time: < 1 minute (Initial)
Relative measurement uncertainty: 2.8 % (95 % Confidence Level)

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7 TEST RESULTS

7.1 Data Summary of Lumen and Color Maintenance

Temp.	Initial (0 hr)		Luminous Maintenance (%)					
	TLF(lm)	V _f (V)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs
55°C Avg.	47.04	3.16	100.4 %	100.6 %	99.4 %	98.7 %	97.5 %	96.8 %
85°C Avg.	46.92	3.15	100.3 %	100.6 %	99.3 %	98.3 %	96.8 %	95.2 %
95°C Avg.	46.86	3.16	100.1 %	99.9 %	98.6 %	97.8 %	96.1 %	94.7 %

Temp.	Initial (0 hr)			Chromaticity Shift ($\Delta u'v'$)					
	CIEx	CIEy	CCT	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs
55°C Avg.	0.4382	0.4095	3020.2	0.0006	0.0009	0.0007	0.0009	0.0015	0.0018
85°C Avg.	0.4385	0.4099	3018.5	0.0007	0.0011	0.0009	0.0010	0.0016	0.0021
95°C Avg.	0.4385	0.4102	3020.9	0.0010	0.0014	0.0015	0.0014	0.0015	0.0019

Lumen maintenance life projection

Table 1: Report at each LM-80 Test Condition					
Description of LED Light Source Tested (manufacturer, model, catalog number)					
Test Condition 1 - 55°C Case Temp		Test Condition 2 - 85°C Case Temp		Test Condition 3 - 95°C Case Temp	
Sample size	25	Sample size	25	Sample size	25
Number of failures	0	Number of failures	0	Number of failures	0
DUT drive current used in the test (mA)	150	DUT drive current used in the test (mA)	150	DUT drive current used in the test (mA)	150
Test duration (hours)	6,000	Test duration (hours)	6,000	Test duration (hours)	6,000
Test duration used for projection (hour to hour)	1,000 - 6,000	Test duration used for projection (hour to hour)	1,000 - 6,000	Test duration used for projection (hour to hour)	1,000 - 6,000
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	95
α	8.101E-06	α	1.104E-05	α	1.148E-05
B	1.017	B	1.023	B	1.019
Calculated L70(6k) (hours)	46,000	Calculated L70(6k) (hours)	34,000	Calculated L70(6k) (hours)	33,000
Reported L70(6k) (hours)	>36000	Reported L70(6k) (hours)	34,000	Reported L70(6k) (hours)	33,000



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TEST REPORT

The following tested product(s) were submitted and identified by the vendor as:

Applicant : EVERLIGHT ELECTRONICS CO., LTD.
Address of Applicant : No.6-8, Zhonghua Rd., Shulin Dist, New Taipei City
23860, Taiwan, R.O.C.
Testing Laboratory : SGS Taiwan Ltd., Optics Laboratory
Laboratory Address : 33, Wu Chyuan Rd., New Taipei Industrial Park, New
Taipei City, Taiwan 24886
Product Name : SMD MID Power LED 62-217D series
Model / Serial Number : 62-217D (5700 K)
Manufacturer : EVERLIGHT ELECTRONICS CO., LTD.
Rating : DC 150 mA, 0.5 W
Tested Condition : DC 150 mA (Constant Current)
Test Standard/Method : IES LM-80-08 Approved Method: Measuring Lumen
Maintenance of LED Light Sources
Date of Issue : Aug. 30, 2013

The submitted products have been tested as requested and the following results were obtained, and the report, not applicable for lawsuit, refers only to the unit(s) submitted for test.

Test Results : -PLEASE SEE ATTACHED SHEETS-

Signed for and on behalf of
SGS TAIWAN Ltd.

Calvin Tzou
Technical Manager

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1 SAMPLING DESCRIPTION

No sampling action and method employed

2 DATE OF RECEIPT OF SAMPLES

Nov. 12, 2012

3 DATE(S) OF PERFORMANCE OF THE TEST

Nov. 12, 2012 ~ Aug. 26, 2013

4 IDENTITY OF SAMPLES

Quantity	Model	Serial Number
25	62-217D (5700 K)	# A01 - # A25 (55 °C)
25	62-217D (5700 K)	# B01 - # B25 (85 °C)
25	62-217D (5700 K)	# C01 - # C25 (95 °C)

5 TEST ITEMS

5.1 Data Summary of Lumen and Color Maintenance

Test results were concluded by different Case Temperatures (Ts).

5.2 Lumen Maintenance and Color Maintenance Test

Testing specifications by different case temperatures according to IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources and client's requirements were implemented per the following items.

5.2.1 Total Luminous Flux (Φ_v)

The test results of total luminous flux were implemented referring to Clause 2 PROPERTIES OF LEDS & Clause 6 MEASUREMENT OF LUMINOUS FLUX of CIE 127: 2007 2nd edition MEASUREMENT OF LEDS and IES LM-80-08 Approved Method: Measuring Lumen Maintenance of LED Light Sources, when the UUTs were powered with constant current of I_f .

5.2.2 Correlated Color Temperature (CCT), CIE Color Coordinate (CIE_x, CIE_y) & Chromaticity Shift ($\Delta u'v'$)

The test results of correlated color temperature were implemented referring to CIE 127:2007 2nd edition MEASUREMENT OF LEDS, CIE 15: 2004 COLORIMETRY.

The test results of color coordinate were implemented referring to CIE 127: 2007 2nd edition MEASUREMENT OF LEDS, CIE 15:2004 COLORIMETRY.

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6 TEST CONDITIONS

Main Test Equipment:

Name	Brand	Model	S/N	Traceability
Standard Light Source / Spectroradiometer	Labsphere	SCL-600 / CDS 2100	D112 / 08111118355	NIST
Source Meter	Kelthley	2400	1321218	NMI
Handheld Digital Multimeter	Aglient	U1242A	MY48490144	NMI

Environmental Conditions:

Temperature: (25 ± 1) °C
 Relative Humidity: < 65 % RH

LUU Conditions:

LED Light source: LED Package
 Drive Current: DC 150 mA (Typical)
 Forward Voltage: DC 2.8 V to 3.5 V
 Power Consumption: 0.5 W
 CCT: 5700 K
 Package Dimension: L 5.6 mm x W 3.0 mm x H 0.65 mm
 Prior operation: 0 hour
 Total Operation Duration: 6000 hours
 Target CCT: 5700 K
 Sample Size: 75 pcs (25 pcs for each temperature)
 Failed Quantity: 0 pcs

Measurement Conditions:

Interval Time: 0, 1000, 2000, 3000, 4000, 5000, 6000 hours
 Warm up Time: < 1 minute (Initial)
 Relative measurement uncertainty: 2.8 % (95 % Confidence Level)

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7 TEST RESULTS

7.1 Data Summary of Lumen and Color Maintenance

Temp.	Initial (0 hr)		Luminous Maintenance (%)					
	TLF(lm)	V _p (V)	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs
55°C Avg.	54.62	3.20	99.8%	99.9%	100.0%	99.2%	97.8%	96.3%
85°C Avg.	54.12	3.19	99.7%	99.6%	99.6%	98.5%	97.0%	95.2%
95°C Avg.	54.09	3.19	98.7%	98.5%	98.4%	97.1%	95.4%	93.4%

Temp.	Initial (0 hr)			Chromaticity Shift ($\Delta u'v'$)					
	CIE _x	CIE _y	CCT	1000 hrs	2000 hrs	3000 hrs	4000 hrs	5000 hrs	6000 hrs
55°C Avg.	0.3295	0.3363	5632.1	0.0009	0.0011	0.0011	0.0015	0.0018	0.0013
85°C Avg.	0.3292	0.3372	5642.6	0.0011	0.0012	0.0013	0.0017	0.0022	0.0017
95°C Avg.	0.3289	0.3381	5657.4	0.0009	0.0012	0.0013	0.0019	0.0022	0.0016

Lumen maintenance life projection

Table 1: Report at each LM-80 Test Condition							
Description of LED Light Source Tested (manufacturer, model, catalog number)		Test Condition 1 - 55°C Case Temp		Test Condition 2 - 85°C Case Temp		Test Condition 3 - 95°C Case Temp	
Sample size	25	Sample size	25	Sample size	25	Sample size	25
Number of failures	0	Number of failures	0	Number of failures	0	Number of failures	0
DUT drive current used in the test (mA)	150	DUT drive current used in the test (mA)	150	DUT drive current used in the test (mA)	150	DUT drive current used in the test (mA)	150
Test duration (hours)	6,000	Test duration (hours)	6,000	Test duration (hours)	6,000	Test duration (hours)	6,000
Test duration used for projection (hour to hour)	1,000 - 6,000	Test duration used for projection (hour to hour)	1,000 - 6,000	Test duration used for projection (hour to hour)	1,000 - 6,000	Test duration used for projection (hour to hour)	1,000 - 6,000
Tested case temperature (°C)	55	Tested case temperature (°C)	85	Tested case temperature (°C)	95	Tested case temperature (°C)	95
α	7.150E-06	α	9.183E-06	α	1.101E-05	α	1.101E-05
B	1.013	B	1.015	B	1.007	B	1.007
Calculated L70(6k) (hours)	52,000	Calculated L70(6k) (hours)	40,000	Calculated L70(6k) (hours)	33,000	Calculated L70(6k) (hours)	33,000
Reported L70(6k) (hours)	>36000	Reported L70(6k) (hours)	>36000	Reported L70(6k) (hours)	33,000	Reported L70(6k) (hours)	33,000