

### SMD ▪ MID Power LED

67-22ST/KKX-NXXXX30Z15/2T(EMM)



#### Features

- PLCC-2 package
- Top view white LED
- High luminous intensity output
- Wide viewing angle
- Pb-free
- ANSI Binning
- The product itself will remain within RoHS compliant version.
- Compliance with EU REACH.
- Compliance Halogen Free .(Br<900ppm,Cl<900ppm,Br+Cl<1500ppm)

#### Description

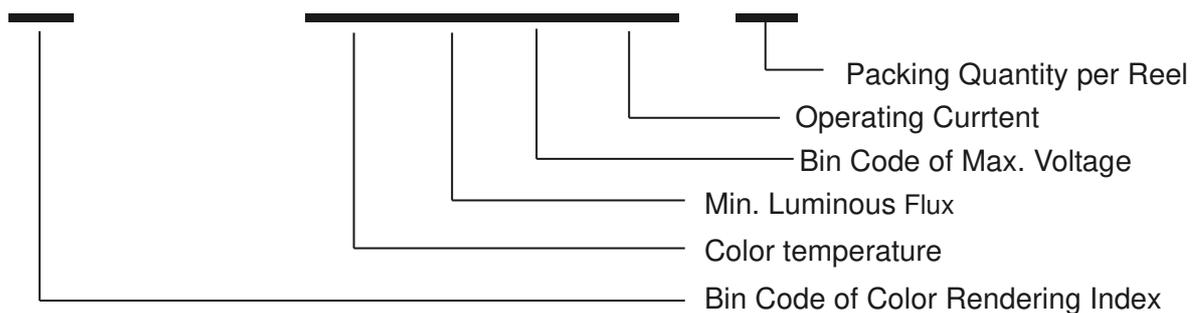
The Everlight 67-22ST package has high efficacy, high CRI, low power consumption, wide viewing angle and a compact form factor. These features make this package an ideal LED for all lighting applications.

#### Applications

- General lighting
- Decorative and Entertainment Lighting
- Indicators
- Illumination
- Switch lights

## Product Number Explanation

**67-22ST/ K KX - N XX XX 30 Z15 / 2 T**



## 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
P	CRI(Min.) : 85
H	CRI(Min.) : 90

Note:

Tolerance of Color Rendering Index:  $\pm 2$

## Table of Forward Current Index

Symbol	Description
Z15	$I_F$ :150mA

## Table of Forward Voltage Index

Symbol	Description
33	3.3V max

Example:

67-22ST/KKX-N658530Z15/2T(EMM)

CRI	80(Min.)
CCT	6500K
Flux	85lm min
$V_F$	3.0V max
$I_F$	150mA

## Mass Production List

CCT(K)	Product	CRI Min. <sup>(1)</sup>	R9 Min. <sup>(2)</sup>	Φ(lm) Min. <sup>(3)</sup>	V <sub>F</sub> Max. <sup>(4)</sup>
2700K	67-22ST/KKX-N277530Z15/2T(EMM)	80	0	75	3.0
3000K	67-22ST/KKX-N308030Z15/2T(EMM)	80	0	80	3.0
3500K	67-22ST/KKX-N358030Z15/2T(EMM)	80	0	80	3.0
4000K	67-22ST/KKX-N408530Z15/2T(EMM)	80	0	85	3.0
5000K	67-22ST/KKX-N508530Z15/2T(EMM)	80	0	85	3.0
5700K	67-22ST/KKX-N578530Z15/2T(EMM)	80	0	85	3.0
6200K	67-22ST/KKX-N628530Z15/2T(EMM)	80	0	85	3.0
6500K	67-22ST/KKX-N658530Z15/2T(EMM)	80	0	85	3.0

### Notes:

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

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## Device Selection Guide

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

## Absolute Maximum Ratings (T<sub>Soldering</sub>=25°C)

Parameter	Symbol	Rating	Unit
Forward Current	I <sub>F</sub>	180	mA
Peak Forward Current (Duty 1/10 @10ms)	I <sub>FP</sub>	300	mA
Power Dissipation	P <sub>d</sub>	594	mW
Operating Temperature	T <sub>opr</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>stg</sub>	-40 ~ +100	°C
Thermal Resistance (Junction / Soldering point)	R <sub>th J-S</sub>	19	°C/W
Junction Temperature	T <sub>j</sub>	115	°C
Soldering Temperature	T <sub>sol</sub>	Reflow Soldering : 260 °C for 10 sec. Hand Soldering : 350 °C for 3 sec.	

### Note:

The products are sensitive to static electricity and must be carefully taken when handling products

## Electro-Optical Characteristics (T<sub>Soldering</sub>=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous Flux <sub>(1)</sub>	Φ	75	---	---	lm	I <sub>F</sub> =150mA
Forward Voltage <sub>(2)</sub>	V <sub>F</sub>	---	---	3.0	V	I <sub>F</sub> =150mA
Color Rendering Index <sub>(3)</sub>	R <sub>a</sub>	80	---	---		I <sub>F</sub> =150mA
	R <sub>9</sub>	0	----	----		I <sub>F</sub> =150mA
Viewing Angle	2θ <sub>1/2</sub>	---	120	---	deg	I <sub>F</sub> =150mA
Reverse Current	I <sub>R</sub>	----	----	50	μA	V <sub>R</sub> =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
75L5	75	80	lm	I <sub>F</sub> =150mA
80L5	80	85		
85L5	85	90		
90L5	90	95		
95L5	95	100		

Note:

Tolerance of Luminous flux:  $\pm 11\%$ .

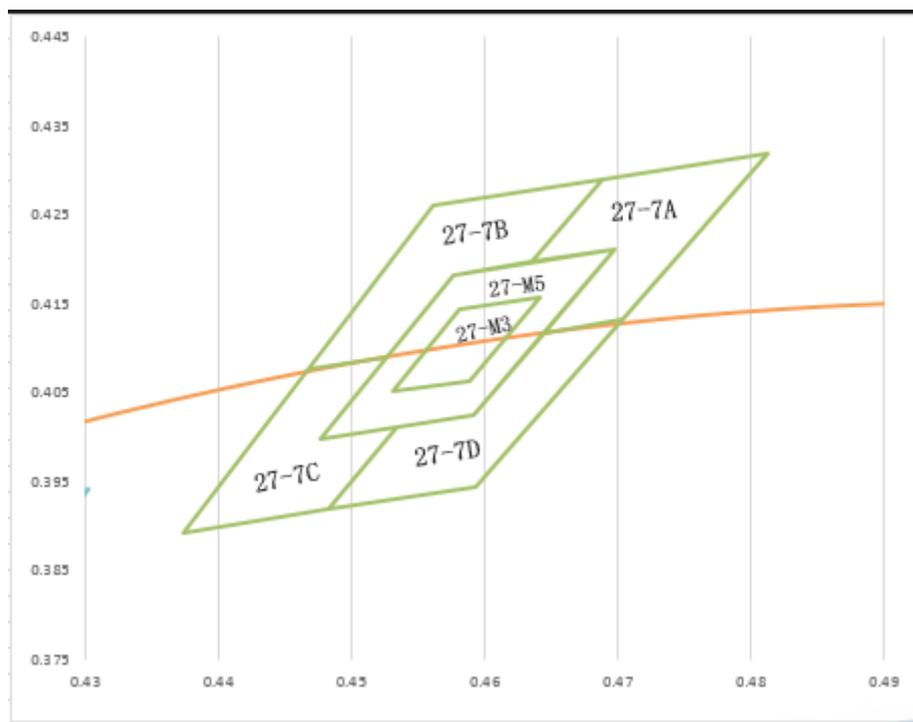
**Bin Range of Forward Voltage**

Group	Bin Code	Min.	Max.	Unit	Condition
2730	27A	2.7	2.8	V	I <sub>F</sub> =150mA
	28A	2.8	2.9		
	29A	2.9	3.0		

Note:

Tolerance of Forward Voltage:  $\pm 0.1V$ .

## The C.I.E. 1931 Chromaticity Diagram



### Bin Range of 3 STEP

CCT	Bin Code	CIE_x	CIE_y
2700K	27-M3	0.4581	0.4143
		0.4641	0.4157
		0.4589	0.4064
		0.4531	0.4051
Reference Range:2681K~2754K			

### Bin Range of 5 STEP

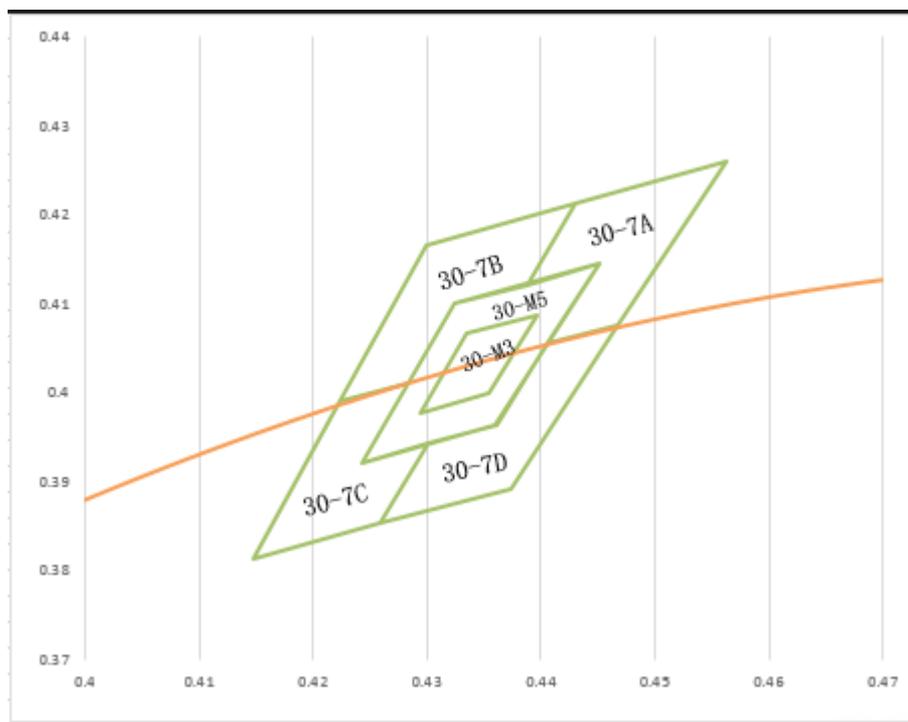
CCT	Bin Code	CIE_x	CIE_y
2700K	27-M5	0.4697	0.4211
		0.4576	0.4183
		0.4477	0.3998
		0.4591	0.4025
Reference Range:2647K~2792K			

## Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
2700K	27-7A	0.4688	0.429	27-7D	0.4644	0.4118	
		0.4813	0.4319		0.4703	0.4132	
		0.4703	0.4132		0.4593	0.3944	
		0.4644	0.4118		0.4483	0.3919	
		0.4697	0.4211		0.4534	0.4011	
		0.4636	0.4197		0.4591	0.4025	
	Reference Range:2580K~2718K						
	27-7B	0.4562	0.426	27-7C	0.4468	0.4077	
		0.4688	0.429		0.4526	0.409	
		0.4636	0.4197		0.4477	0.3998	
		0.4576	0.4183		0.4534	0.4011	
		0.4526	0.409		0.4483	0.3919	
0.4468		0.4077	0.4373		0.3893		
Reference Range:2718K~2868K							

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## The C.I.E. 1931 Chromaticity Diagram



### Bin Range of 3 STEP

CCT	Bin Code	CIE_x	CIE_y
3000K	30-M3	0.4335	0.4067
		0.4294	0.3978
		0.4354	0.3999
		0.4396	0.4088
Reference Range:2979K~3059K			

### Bin Range of 5 STEP

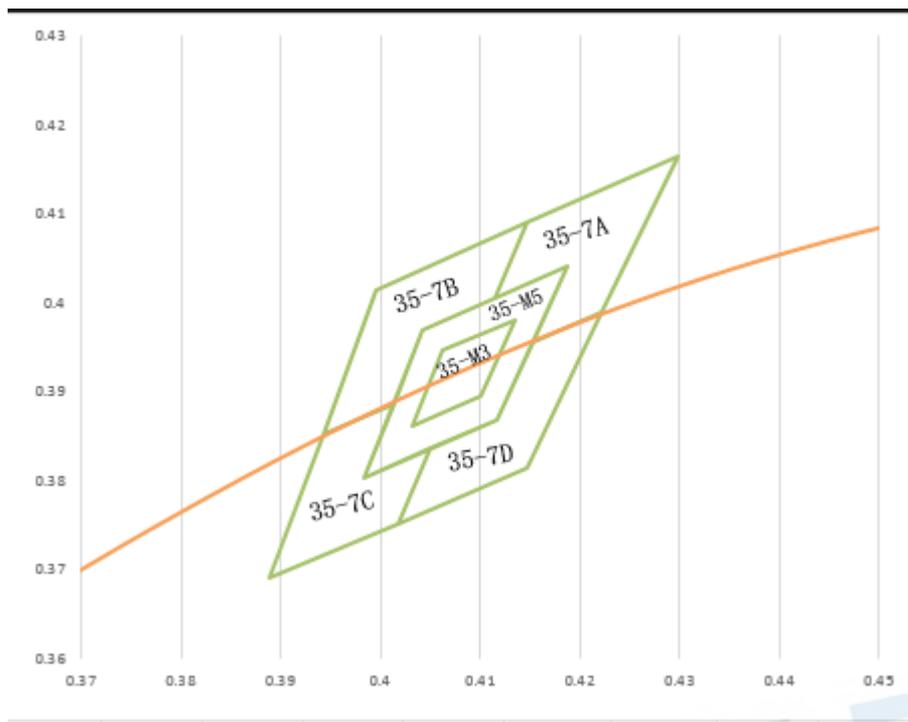
CCT	Bin Code	CIE_x	CIE_y
3000K	30-M5	0.4451	0.4145
		0.4324	0.41
		0.4243	0.3922
		0.436	0.3964
Reference Range:2941K~3105K			

## Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
3000K	30-7A	0.443	0.4212	30-7D	0.4406	0.4055	
		0.4387	0.4122		0.4468	0.4077	
		0.4451	0.4145		0.4373	0.3893	
		0.4406	0.4055		0.4259	0.3853	
		0.4468	0.4077		0.4302	0.3943	
		0.4562	0.426		0.4361	0.3964	
	Reference Range:2868K~3019K						
	30-7B	0.443	0.4212	30-7C	0.4284	0.4011	
		0.4299	0.4165		0.4223	0.399	
		0.4223	0.399		0.4147	0.3814	
		0.4284	0.4011		0.4259	0.3853	
		0.4324	0.41		0.4302	0.3943	
		0.4387	0.4122		0.4243	0.3922	
	Reference Range:3019K~3208K						

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## The C.I.E. 1931 Chromaticity Diagram



### Bin Range of 3 STEP

CCT	Bin Code	CIE_x	CIE_y
3500K	35-M3	0.4063	0.3946
		0.4135	0.3981
		0.4101	0.3896
		0.4032	0.3862
Reference Range:3509K~3387K			

### Bin Range of 5 STEP

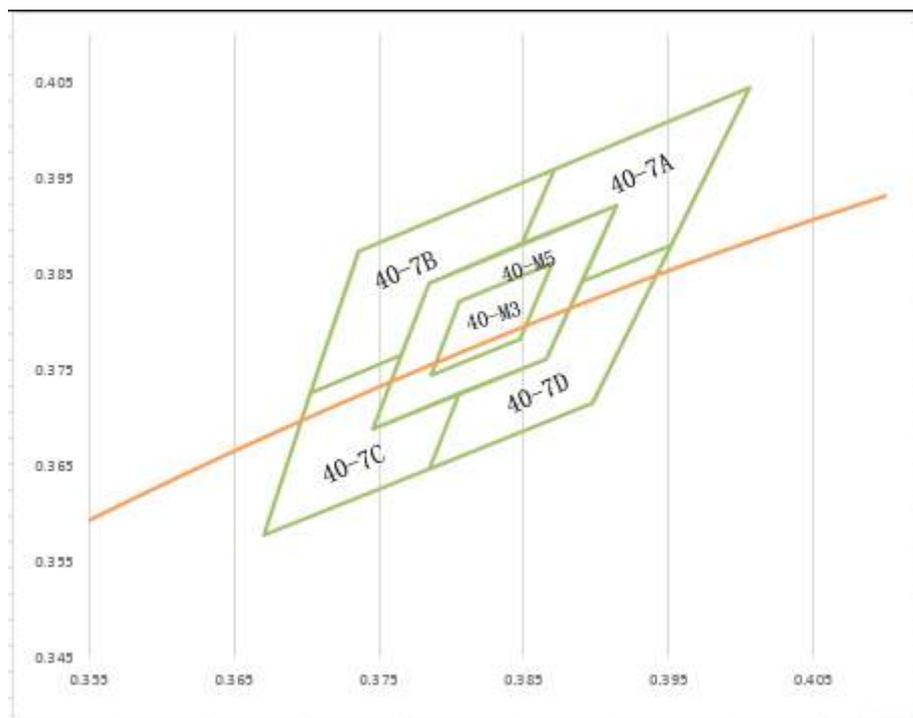
CCT	Bin Code	CIE_x	CIE_y
3500K	35-M5	0.4188	0.4041
		0.4042	0.397
		0.3983	0.3804
		0.4118	0.3869
Reference Range:3328K~3574K			

## Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
3500K	35-7A	0.4148	0.409	35-7D	0.4153	0.3955	
		0.4299	0.4165		0.4223	0.399	
		0.4223	0.399		0.4147	0.3814	
		0.4153	0.3955		0.4018	0.3752	
		0.4188	0.4041		0.405	0.3837	
		0.4115	0.4006		0.4118	0.3869	
	Reference Range:3209K~3447K						
	35-7B	0.3996	0.4015	35-7C	0.3943	0.3853	
		0.4148	0.409		0.4013	0.3887	
		0.4115	0.4006		0.3983	0.3804	
		0.4042	0.397		0.405	0.3837	
		0.4013	0.3887		0.4018	0.3752	
		0.3943	0.3853		0.3889	0.369	
	Reference Range:3446K~3710K						

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## The C.I.E. 1931 Chromaticity Diagram



### Bin Range of 3 STEP

CCT	Bin Code	CIE_x	CIE_y
4000K	40-M3	0.3806	0.3823
		0.3786	0.3746
		0.3847	0.3783
		0.387	0.3862
Reference Range:3897K~4036K			

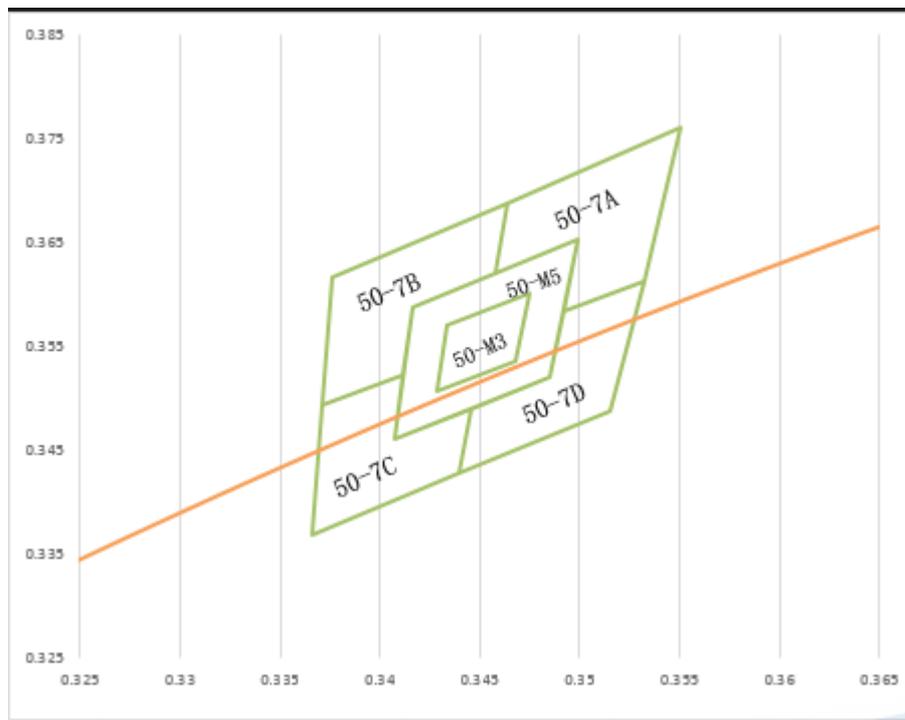
CCT	Bin Code	CIE_x	CIE_y
4000K	40-M5	0.3914	0.3922
		0.3784	0.3841
		0.3746	0.3689
		0.3865	0.3762
Reference Range:3832K~4107K			

## Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
4000K	40-7A	0.3871	0.3959	40-7D	0.389	0.3842	
		0.3849	0.3882		0.3952	0.3881	
		0.3914	0.3922		0.3897	0.3716	
		0.389	0.3842		0.3784	0.3647	
		0.3952	0.3881		0.3806	0.3726	
		0.4006	0.4044		0.3865	0.3762	
	Reference Range:3709K~3965K						
	40-7B	0.3871	0.3959	40-7C	0.3765	0.3765	
		0.3736	0.3874		0.3703	0.3727	
		0.3703	0.3727		0.367	0.3578	
		0.3765	0.3765		0.3784	0.3647	
		0.3784	0.3841		0.3806	0.3726	
0.3849		0.3882	0.3746		0.3689		
Reference Range:3965K~4259K							

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## The C.I.E. 1931 Chromaticity Diagram



### Bin Range of 3 STEP

CCT	Bin Code	CIE_x	CIE_y
5000K	50-M3	0.3434	0.3571
		0.3475	0.3602
		0.3468	0.3536
		0.3429	0.3507
Reference Range:4940K~5082K			

### Bin Range of 5 STEP

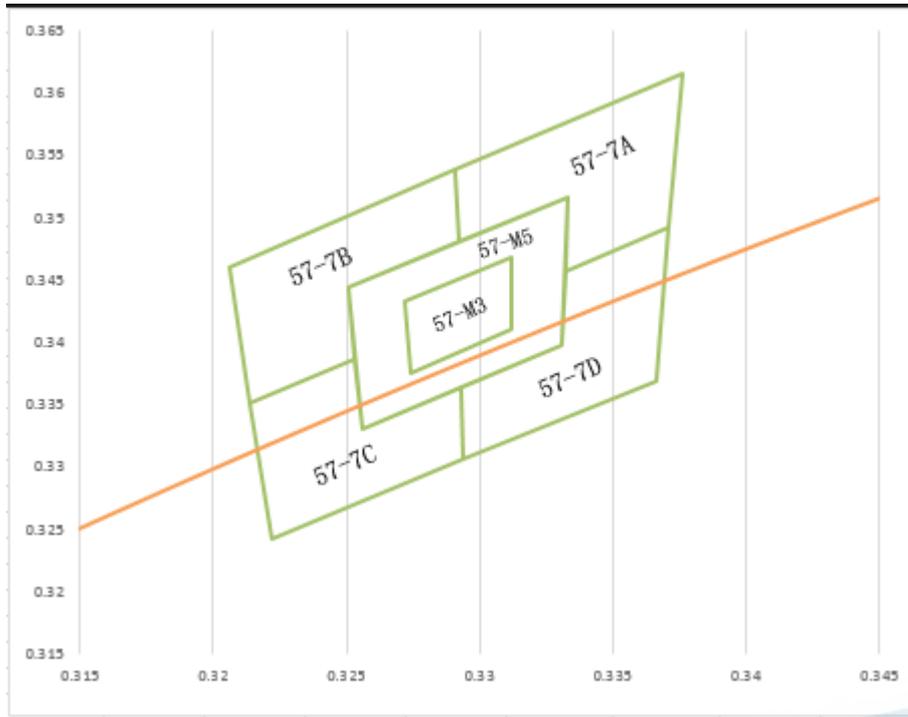
CCT	Bin Code	CIE_x	CIE_y
5000K	50-M5	0.3499	0.3653
		0.3416	0.3587
		0.3407	0.3461
		0.3485	0.352
Reference Range:4872K~5156K			

## Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
5000K	50-7A	0.3464	0.3688	50-7D	0.3492	0.3583	
		0.3551	0.376		0.3532	0.3613	
		0.3532	0.3613		0.3515	0.3487	
		0.3492	0.3583		0.344	0.3428	
		0.3499	0.3653		0.3446	0.349	
		0.3458	0.362		0.3485	0.352	
	Reference Range:4743K~5008K						
	50-7B	0.3376	0.3616	50-7C	0.3371	0.3493	
		0.3464	0.3688		0.3411	0.3523	
		0.3458	0.362		0.3407	0.3461	
		0.3416	0.3587		0.3446	0.349	
		0.3411	0.3523		0.344	0.3428	
		0.3371	0.3493		0.3366	0.3369	
	Reference Range:5008K~5309K						

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## The C.I.E. 1931 Chromaticity Diagram



### Bin Range of 3 STEP

CCT	Bin Code	CIE_x	CIE_y
5700K	57-M3	0.3272	0.3433
		0.3312	0.3469
		0.3312	0.341
		0.3274	0.3376
Reference Range:5553K~5731K			

### Bin Range of 5 STEP

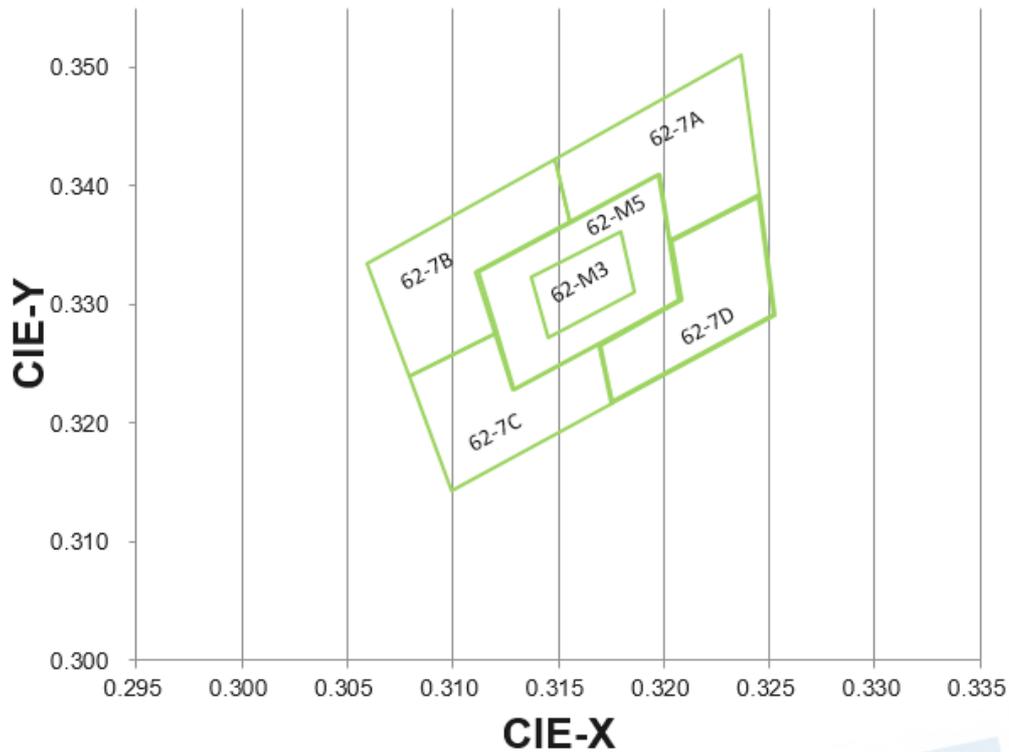
CCT	Bin Code	CIE_x	CIE_y
5700K	57-M5	0.3333	0.3517
		0.3251	0.3444
		0.3256	0.3331
		0.3331	0.3397
Reference Range:5466K~5823K			

## Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
5700K	57-7A	0.3291	0.3539	57-7D	0.3332	0.3457	
		0.3376	0.3616		0.3371	0.3493	
		0.3371	0.3493		0.3366	0.3369	
		0.3332	0.3457		0.3294	0.3306	
		0.3333	0.3517		0.3293	0.3364	
		0.3292	0.3481		0.3331	0.3397	
	Reference Range:5308K~5639K						
	57-7B	0.3206	0.3461	57-7C	0.3214	0.3352	
		0.3291	0.3539		0.3253	0.3387	
		0.3292	0.3481		0.3256	0.3331	
		0.3251	0.3444		0.3293	0.3364	
		0.3253	0.3387		0.3294	0.3306	
		0.3214	0.3352		0.3222	0.3243	
	Reference Range:5639K~6022K						

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## The C.I.E. 1931 Chromaticity Diagram



### Bin Range of 3 STEP

CCT	Bin Code	CIE_x	CIE_y
6200K	62-M3	0.3137	0.3323
		0.3179	0.3362
		0.3186	0.3310
		0.3145	0.3272
Reference Range:6178~6427K			

### Bin Range of 5 STEP

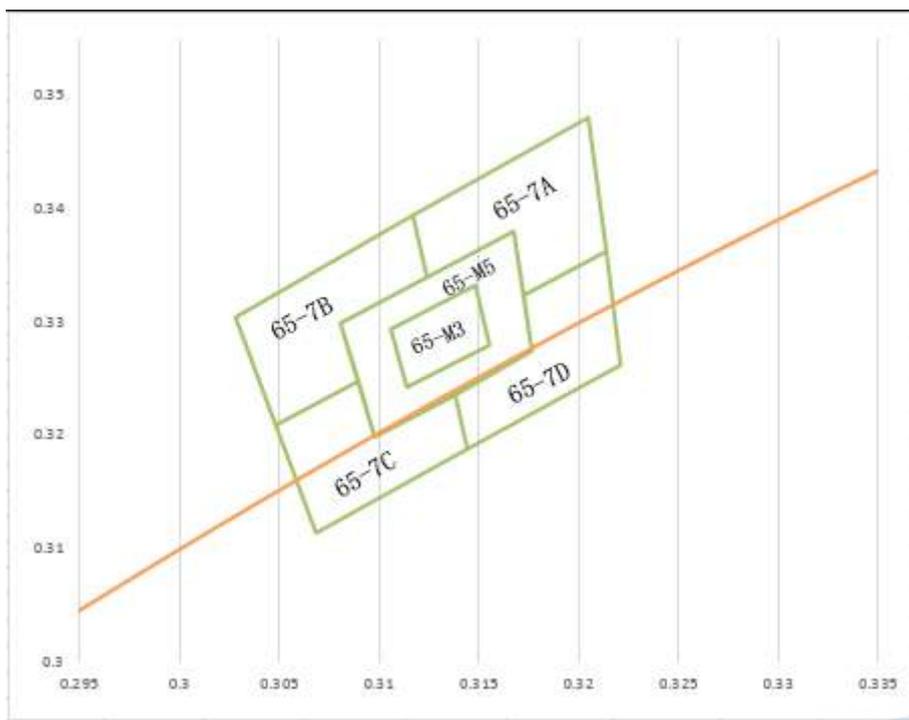
CCT	Bin Code	CIE_x	CIE_y
6200K	62-M5	0.3197	0.3410
		0.3111	0.3328
		0.3128	0.3228
		0.3207	0.3304
Reference Range:6070~6560K			

## Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
6200K	62-7A	0.3148	0.3423	62-7D	0.3203	0.3354	
		0.3236	0.3511		0.3245	0.3392	
		0.3245	0.3392		0.3252	0.3291	
		0.3203	0.3354		0.3175	0.3217	
		0.3198	0.3410		0.3169	0.3266	
		0.3155	0.3369		0.3208	0.3304	
	Reference Range:5850~6310K						
	62-7B	0.3059	0.3334	62-7C	0.3079	0.3239	
		0.3148	0.3423		0.3121	0.3277	
		0.3155	0.3369		0.3129	0.3228	
		0.3112	0.3328		0.3169	0.3266	
		0.3121	0.3277		0.3175	0.3217	
0.3079		0.3239	0.3099		0.3143		
Reference Range:6287~6840K							

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## The C.I.E. 1931 Chromaticity Diagram



### Bin Range of 3 STEP

CCT	Bin Code	CIE_x	CIE_y
6500K	65-M3	0.3106	0.3293
		0.3148	0.3332
		0.3155	0.328
		0.3114	0.3242
Reference Range:6359K~6617K			

### Bin Range of 5 STEP

CCT	Bin Code	CIE_x	CIE_y
6500K	65-M5	0.3167	0.338
		0.3081	0.3298
		0.3098	0.3198
		0.3177	0.3274
Reference Range:6240K~6752K			

## Bin Range of Chromaticity Coordinates

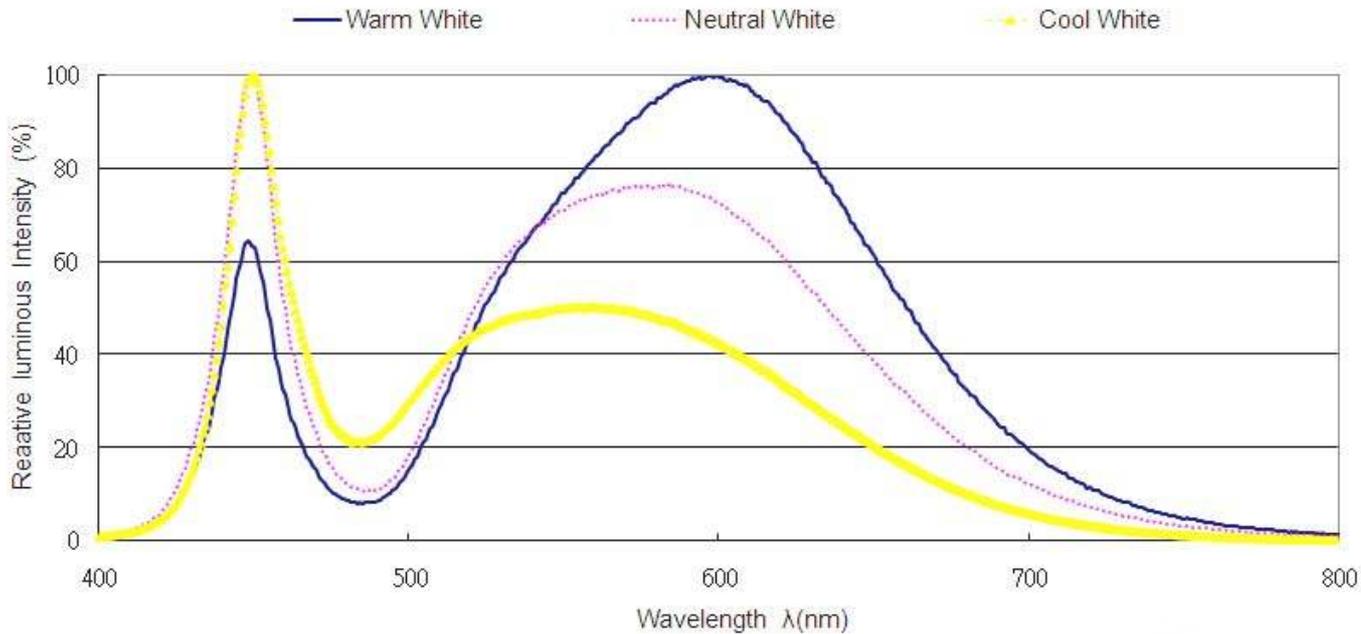
CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
6500K	65-7A	0.3117	0.3393	65-7D	0.3172	0.3324	
		0.3205	0.3481		0.3214	0.3362	
		0.3214	0.3362		0.3221	0.3261	
		0.3172	0.3324		0.3144	0.3187	
		0.3167	0.338		0.3138	0.3236	
		0.3124	0.3339		0.3177	0.3274	
	Reference Range:6017K~6484K						
	65-7B	0.3028	0.3304	65-7C	0.3048	0.3209	
		0.3117	0.3393		0.309	0.3247	
		0.3124	0.3339		0.3098	0.3198	
		0.3081	0.3298		0.3138	0.3236	
		0.309	0.3247		0.3144	0.3187	
0.3048		0.3209	0.3068		0.3113		
Reference Range:6482K~7042K							

### Notes:

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

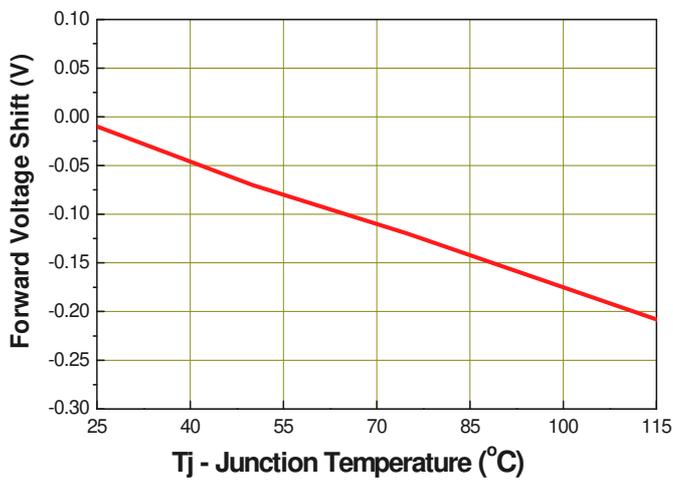
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## Spectrum Distribution

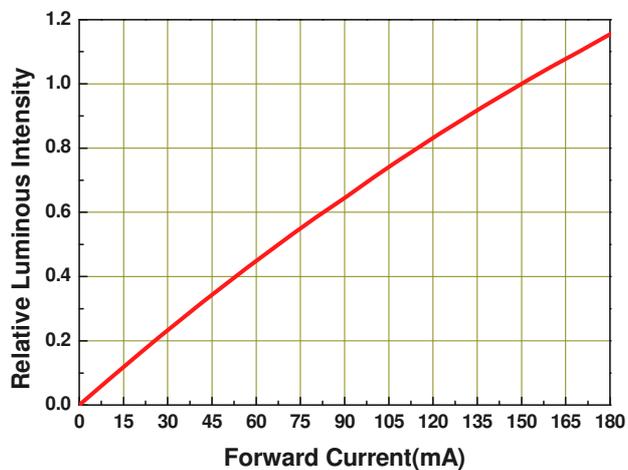


## Typical Electro-Optical Characteristics Curves

**Fig.1 – Forward Voltage Shift vs. Junction Temperature**

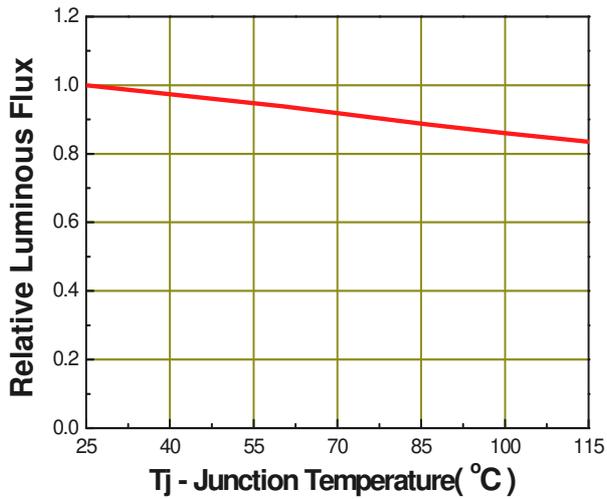


**Fig.2 - Relative Luminous Intensity vs. Forward Current**

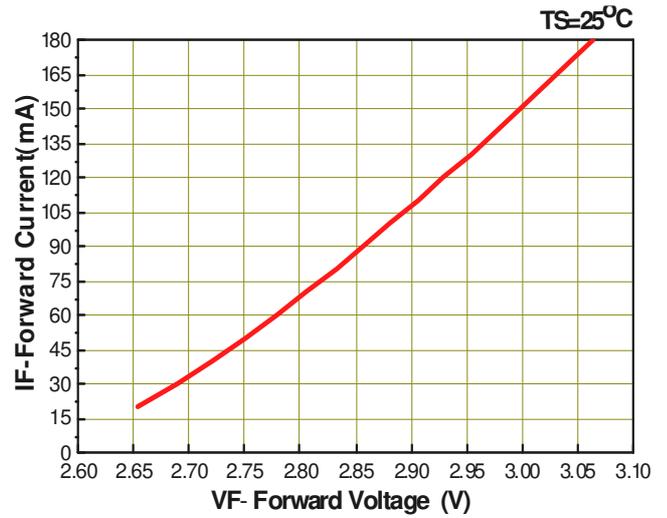


### Typical Electro-Optical Characteristics Curves

**Fig.3 - Relative Luminous Intensity vs. Junction Temperature**

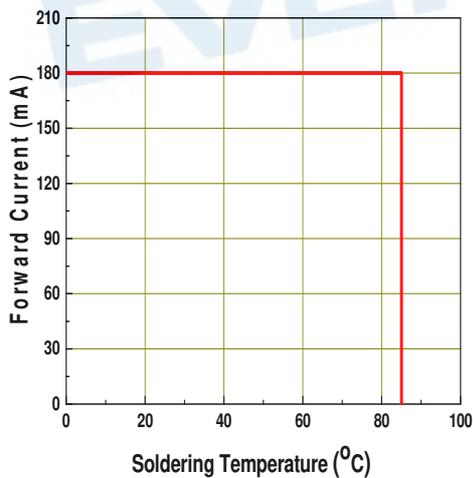


**Fig.4 - Forward Current vs. Forward Voltage**

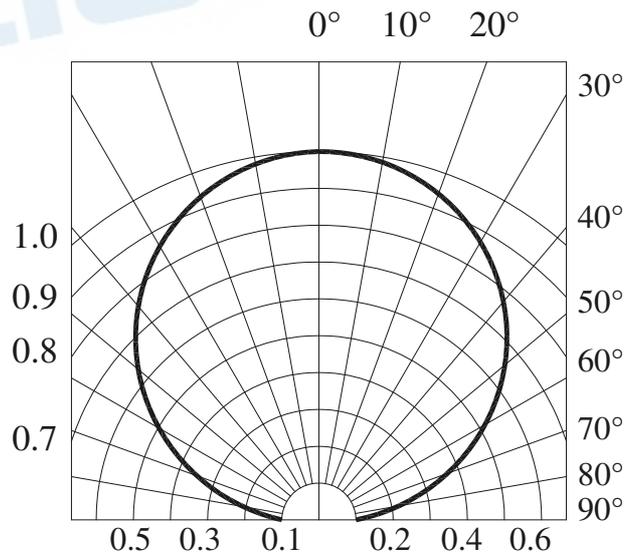


**Fig.5 – Max. Driving Forward Current vs. Soldering Temperature**

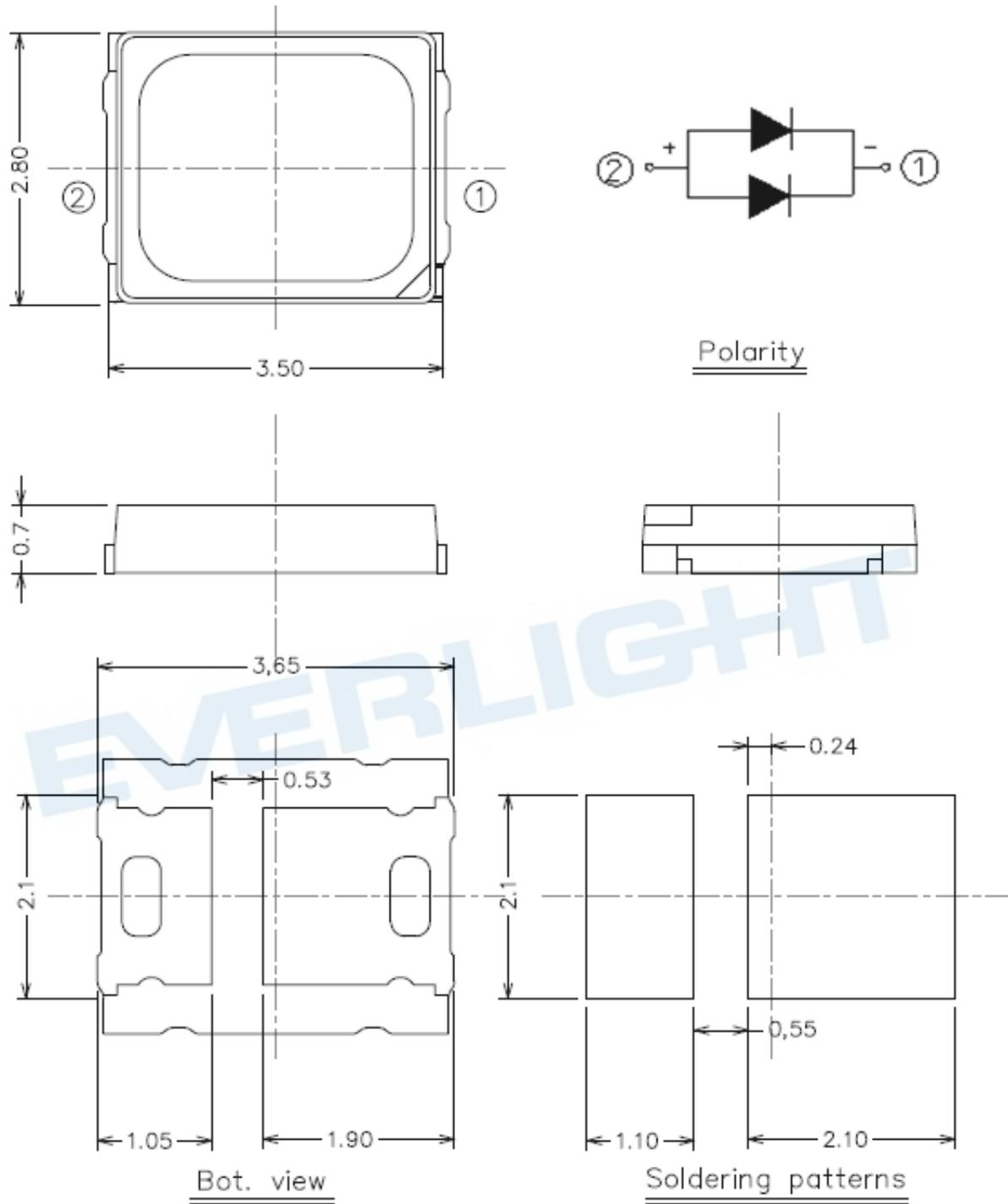
R<sub>th j-s</sub>=19 °C/W



**Fig.6 – Radiation Diagram**



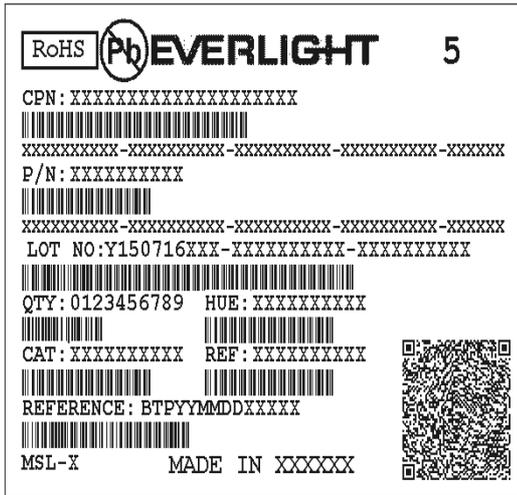
## Package Dimension



Note:  
Tolerance unless mentioned is  $\pm 0.15$  mm; Unit = mm

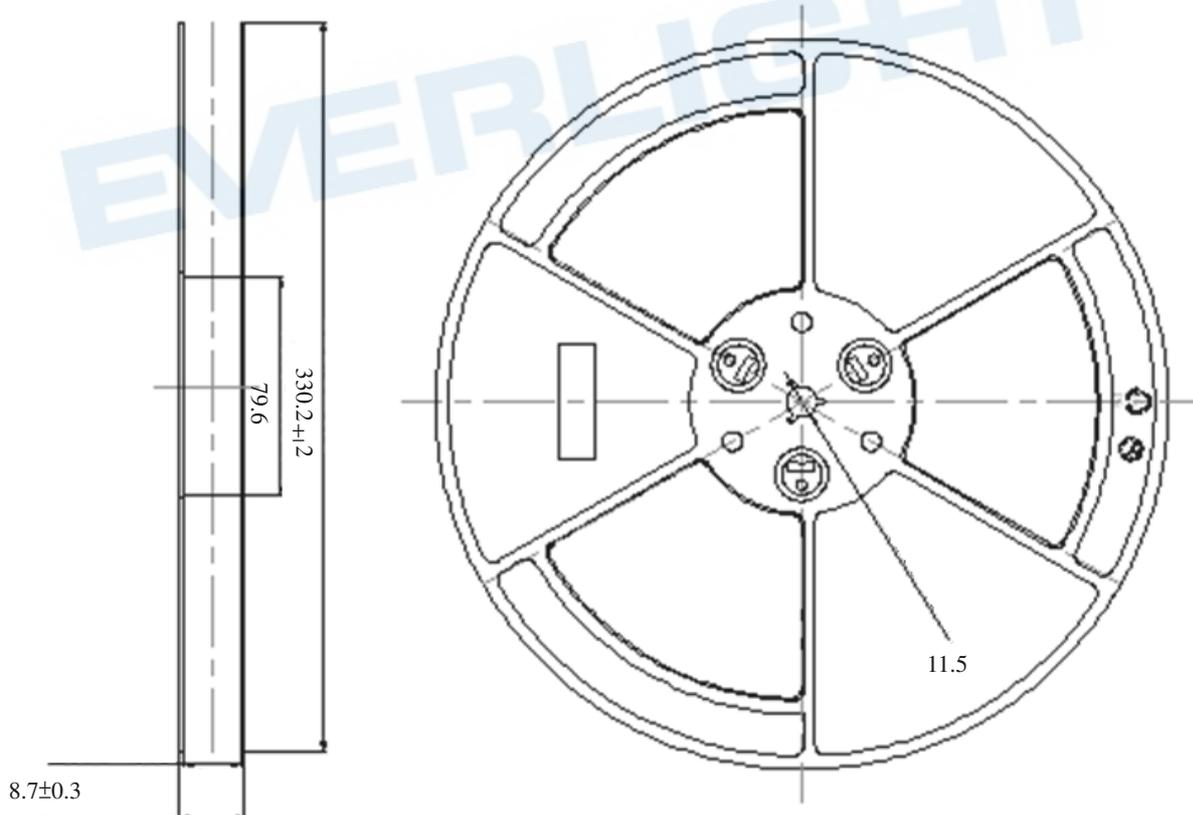
## Moisture Resistant Packing Materials

### Label Explanation



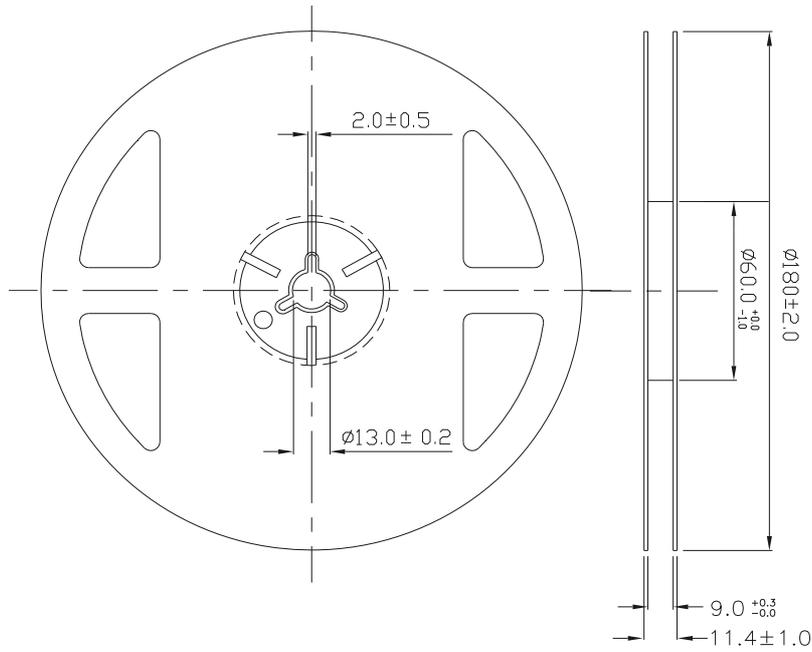
- CPN: Customer's Product Number
- P/N: Product Number
- QTY: Packing Quantity
- CAT: Luminous Intensity Rank
- HUE: Dom. Wavelength Rank
- REF: Forward Voltage Rank
- LOT No: Lot Number

### Reel Dimensions



1-1. Loaded Quantity 16000 pcs Per Reel

## 2. Carrier Tape Dimensions:

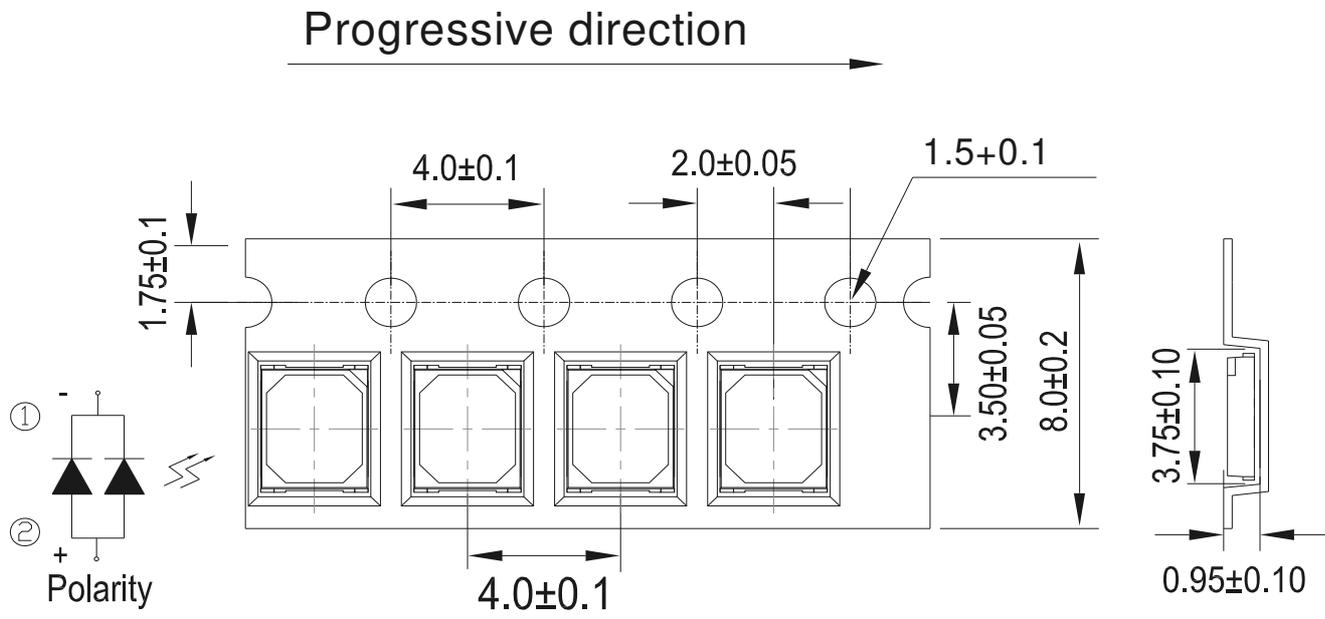


### 2-1. Loaded Quantity 500/1000/1500/2000/2500/3000/3500/4000 pcs Per Reel

Note:

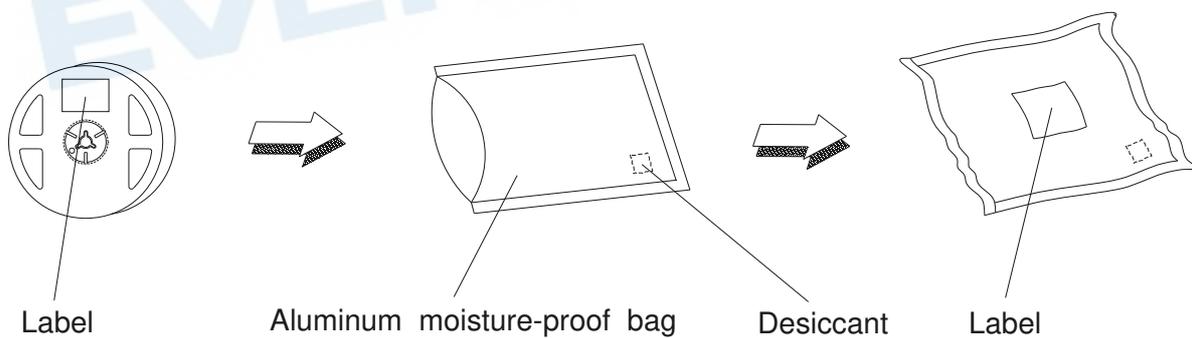
Tolerances unless mentioned  $\pm 0.1$ mm. Unit = mm

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Note:  
1. Tolerance unless mentioned is  $\pm 0.1$ 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	Resistance to Solder Heat	Temp. : 260°C/10sec.	3 Times.	8 PCS.	0/1
2	Temperature Cycle	-40°C~100°C / Dwell time 30min	200 Cycles	8 PCS.	0/1
3	High Temperature/Humidity Life	Ta=85°C,85%RH, I <sub>F</sub> = 180mA	1000 Hrs.	8 PCS.	0/1
4	Low Temperature Life	Ta=-40°C, I <sub>F</sub> = 180 mA	1000 Hrs.	8 PCS.	0/1
5	High Temperature Life	Ta=60°C, I <sub>F</sub> =180 mA	3000 Hrs.	8 PCS.	0/1
6	High Temperature Life	Ta=85°C, I <sub>F</sub> =180 mA	3000 Hrs.	8 PCS.	0/1
7	Pulse	ON 30ms / OFF 2500ms	30000 CYCLES	8 PCS.	0/1
8	Thermal Shock	H : +100°C 20min ∫ 10 sec L : -10°C 20min	200 Cycles	8 PCS.	0/1
9	Power Temperature Cycle	H : +100°C 30min ∫ 5 min L : -40°C 30min I <sub>F</sub> = 120 mA	200 Cycles	8 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.

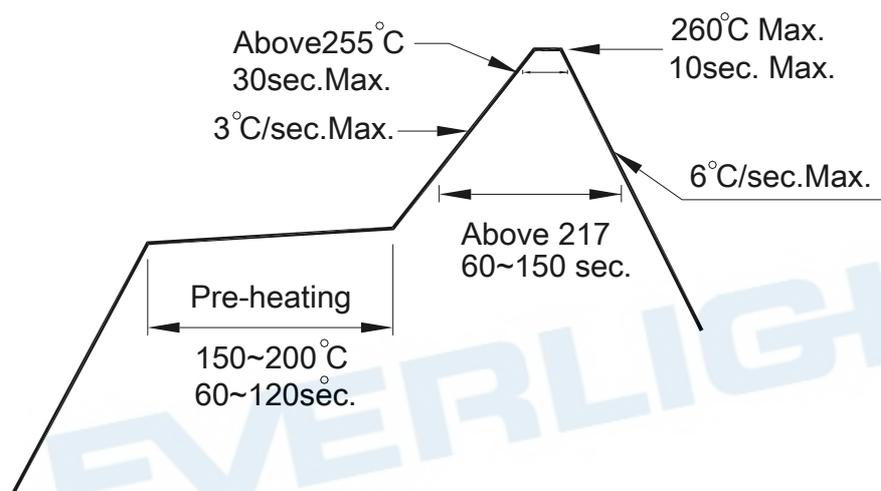
2.3 After opening the package: The LED's floor life is 168 Hrs under 30°C or less and 60% RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

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.

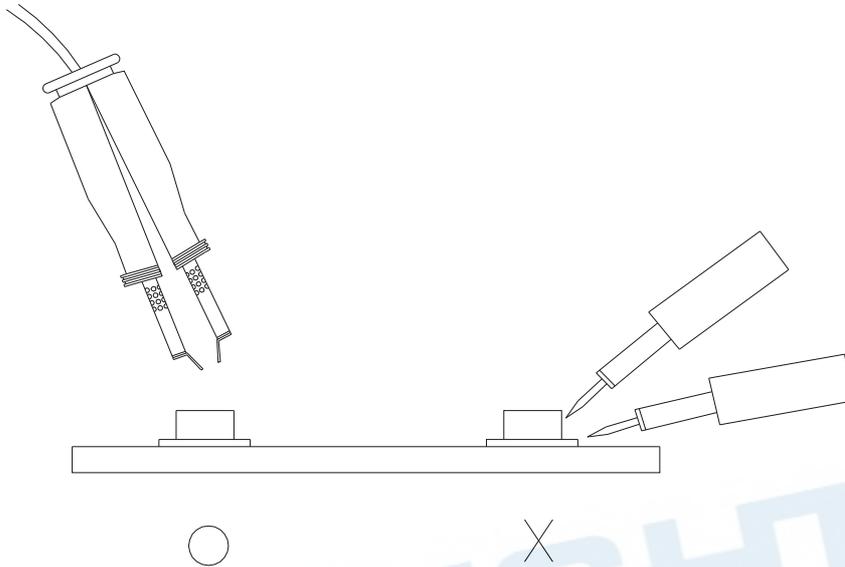
3.4 After soldering, do not warp the circuit board.

#### 4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350°C 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.



## DISCLAIMER

1. EVERLIGHT reserves the right(s) on the adjustment of product material mix for the specification.
2. The product meets EVERLIGHT published specification for a period of twelve (12) months from date of shipment.
3. The graphs shown in this datasheet are representing typical data only and do not show guaranteed values.
4. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from the use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.
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