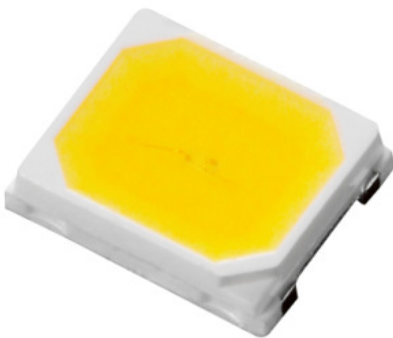


SMD ▪ Low Power LED 67-22S/KK4C-EXXXXXXX2633Z6/2T(GC)



Features

- PLCC-2 package
- Top view white LED
- High luminous intensity output
- Wide viewing angle
- Pb-free
- RoHS compliant
- IEC Binning

Description

The Everlight 67-22S 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

67-22S / K K 4 C – E XX XX XX XX XXXX Z6 / 2T

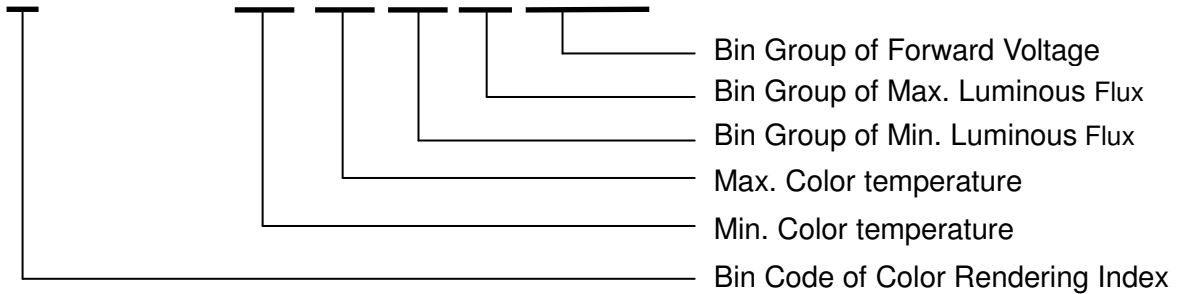


Table of Color Rendering Index

Symbol	Description
M	CRI(Min.) : 60
N	CRI(Min.) : 65
L	CRI(Min.) : 70
Q	CRI(Min.) : 75
K	CRI(Min.) : 80
P	CRI(Min.) : 85
H	CRI(Min.) : 90

Note:
 Tolerance of Color Rendering Index: ±2

Table of Forward Current Index

Symbol	Description
Z6	I _F :60mA

Example:
 67-22S/KK4C-E5959N31P3A2633Z6/2T(GC)

CRI	80(Min.)
CCT	5900K
Flux	25~36lm
V _F	2.6~3.3V
I _F	60mA

Mass Production List

Product	CRI Min. ⁽¹⁾	CCT(K)	Φ(lm) Min. ⁽²⁾	Φ(lm) Typ. ⁽²⁾	Φ(lm) Max. ⁽²⁾
67-22S/KK4C-7E3030M42N42633Z6/2T(GC)	80	3000K	23	25	33
67-22S /KK4C-7E4040N3P3A2633Z6/2T(GC)	80	4000K	24	26	36
67-22S /KK4C-7E5050N31P3A2633Z6/2T(GC)	80	5000K	25	27	36
67-22S /KK4C-E5959N31P3A2633Z6/2T(GC)	80	5900K	25	27	36
67-22S /KK4C-7E6565N3P3A2633Z6/2T(GC)	80	6500K	24	26	36

Notes:

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

Device Selection Guide

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

Absolute Maximum Ratings (T_{Soldering}=25°C)

Parameter	Symbol	Rating	Unit
Forward Current	I _F	150	mA
Peak Forward Current (Duty 1/10 @10ms)	I _{FP}	200	mA
Power Dissipation	P _d	480	mW
Operating Temperature	T _{opr}	-40 ~ +85	°C
Storage Temperature	T _{stg}	-40 ~ +100	°C
Thermal Resistance (Junction / Soldering point)	R _{th J-S}	25	°C/W
Junction Temperature	T _j	125	°C
Soldering Temperature	T _{sol}	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_{Soldering}=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous Flux ₍₁₎	Φ	23	-----	36	lm	I _F =60mA
Forward Voltage ₍₂₎	V _F	2.6	-----	3.3	V	I _F =60mA
Color Rendering Index ₍₃₎	Ra	80	-----	-----		I _F =60mA
Viewing Angle	2θ _{1/2}	-----	120	-----	deg	I _F =60mA
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
M42	23	24	lm	I _F =60mA
N3	24	27		
N31	25	27		
N4A	27	30		
N4B	30	33		
P3A	33	36		

Note:
 Tolerance of Luminous flux: ±11%.

Bin Range of Forward Voltage

Group	Bin Code	Min.	Max.	Unit	Condition
2633	33	2.6	2.7	V	I _F =60mA
	34	2.7	2.8		
	35	2.8	2.9		
	36	2.9	3.0		
	37	3.0	3.1		
	38	3.1	3.2		
	39	3.2	3.3		

Note:
 Tolerance of Forward Voltage: ±0.1V.

Electro-Optical Characteristics

Warm White

If (mA)	Vf(V)	Power(W)	Flux(lm)	Lm/W	ΔCCT	CRI
40	2.77	0.11	17.18	154.86	-2.3	81.6
60	2.86	0.17	25.00	145.61	0	81.2
80	2.94	0.24	32.33	137.46	2	80.9
120	3.08	0.37	45.67	123.68	8.9	80.4
150	3.18	0.48	51.68	108.51	13.4	80.1

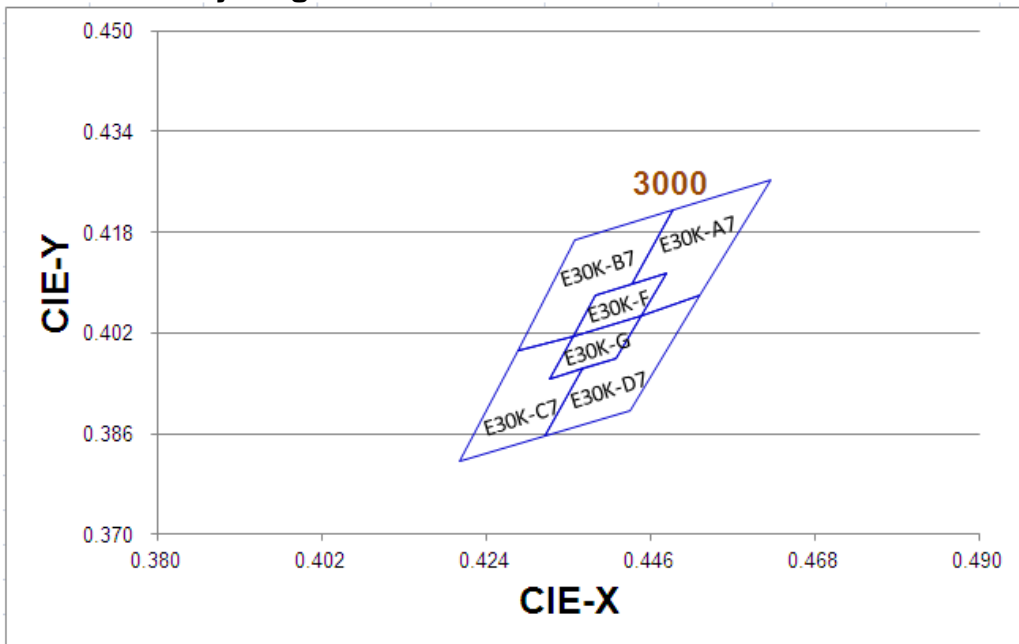
Cool White

If (mA)	Vf(V)	Power(W)	Flux(lm)	Lm/W	ΔCCT	CRI
40	2.77	0.11	18.93	170.64	46.6	85.5
60	2.86	0.17	27.54	160.40	0.0	84.6
80	2.94	0.24	35.61	151.40	-29.8	84.2
120	3.08	0.37	50.31	136.24	-61.8	83.2
150	3.18	0.48	56.93	119.53	-68.1	83.0

Notes:

Data is only for reference..

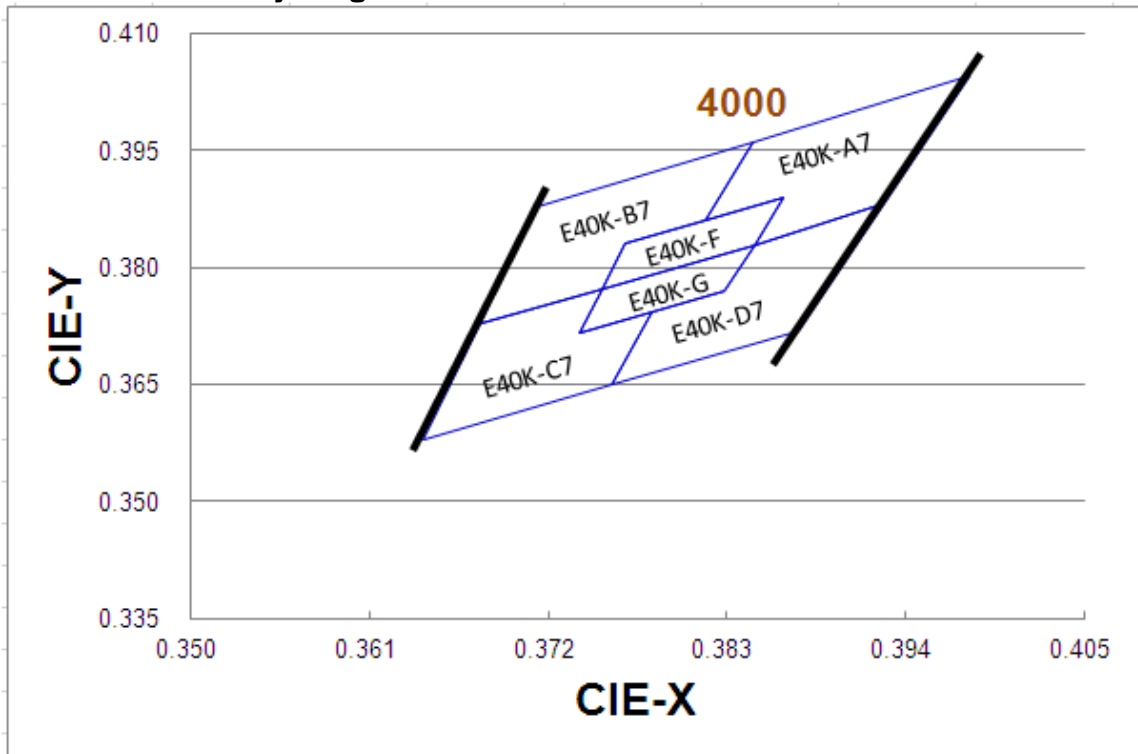
The C.I.E. 1931 Chromaticity Diagram



Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
3000K	E30K-A7	0.4619	0.4262	E30K-D7	0.4526	0.4079	
		0.4489	0.4215		0.4447	0.4047	
		0.4433	0.4098		0.4413	0.3979	
		0.4480	0.4115		0.4369	0.3964	
		0.4447	0.4047		0.4318	0.3856	
		0.4526	0.4079		0.4432	0.3896	
	Reference Range: 2780K~2950K						
	E30K-B7	0.4489	0.4215	E30K-C7	0.4281	0.3992	
		0.4359	0.4168		0.4204	0.3816	
		0.4281	0.3992		0.4318	0.3856	
		0.4356	0.4015		0.4369	0.3964	
		0.4386	0.4081		0.4325	0.3948	
		0.4433	0.4098		0.4356	0.4015	
	Reference Range: 2950K~3100K						
	E30K-F	0.4480	0.4115	E30K-G	0.4447	0.4047	
		0.4386	0.4081		0.4356	0.4015	
		0.4356	0.4015		0.4325	0.3948	
		0.4447	0.4047		0.4413	0.3979	
	Reference Range: 2875K~3000K						

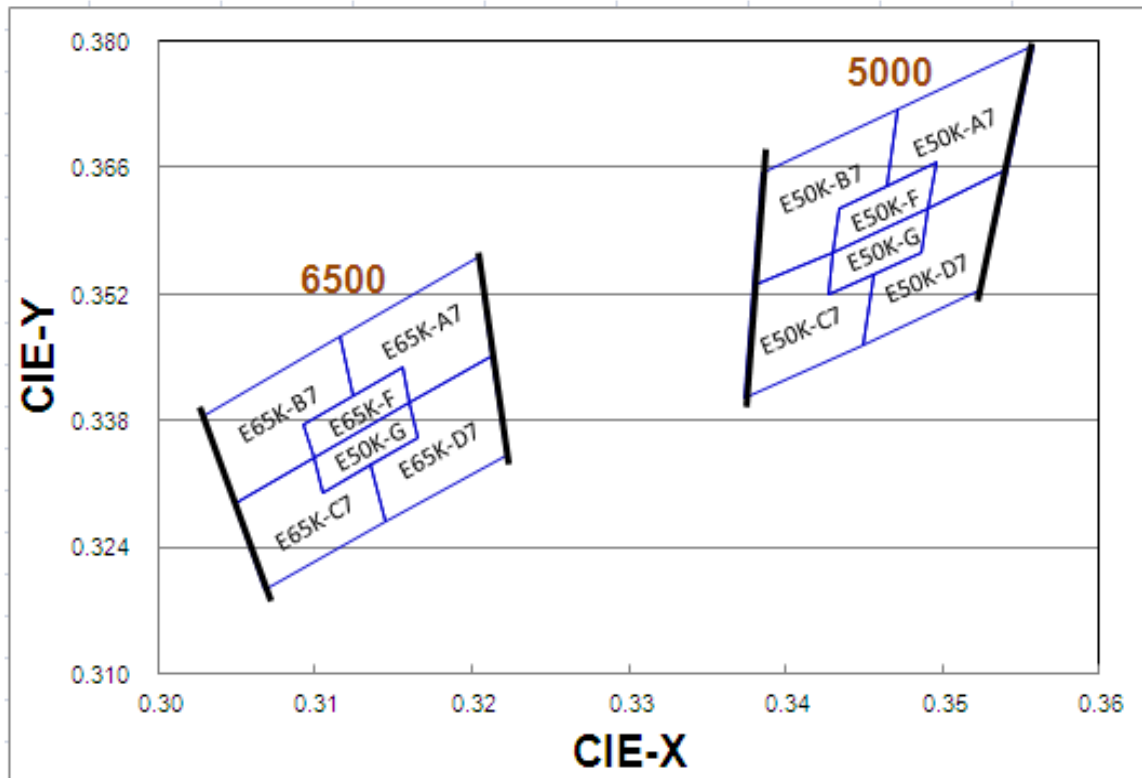
The C.I.E. 1931 Chromaticity Diagram



Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
4000K	E40K-A7	0.3980	0.4046	E40K-D7	0.3927	0.3883	
		0.3846	0.3961		0.3847	0.3830	
		0.3817	0.3860		0.3829	0.3770	
		0.3865	0.3889		0.3784	0.3743	
		0.3847	0.3830		0.3759	0.3650	
		0.3927	0.3883		0.3874	0.3720	
	Reference Range:3770K~4050K						
	E40K-B7	0.3846	0.3961	E40K-C7	0.3678	0.3728	
		0.3712	0.3876		0.3644	0.3580	
		0.3678	0.3728		0.3759	0.3650	
		0.3754	0.3773		0.3784	0.3743	
		0.3768	0.3830		0.3739	0.3715	
		0.3817	0.3860		0.3754	0.3773	
	Reference Range:4030K~4350K						
	E40K-F	0.3865	0.3889	E40K-G	0.3847	0.3830	
		0.3768	0.3830		0.3754	0.3773	
		0.3754	0.3773		0.3739	0.3715	
		0.3847	0.3830		0.3829	0.3770	
Reference Range:3930K~4150K							

The C.I.E. 1931 Chromaticity Diagram

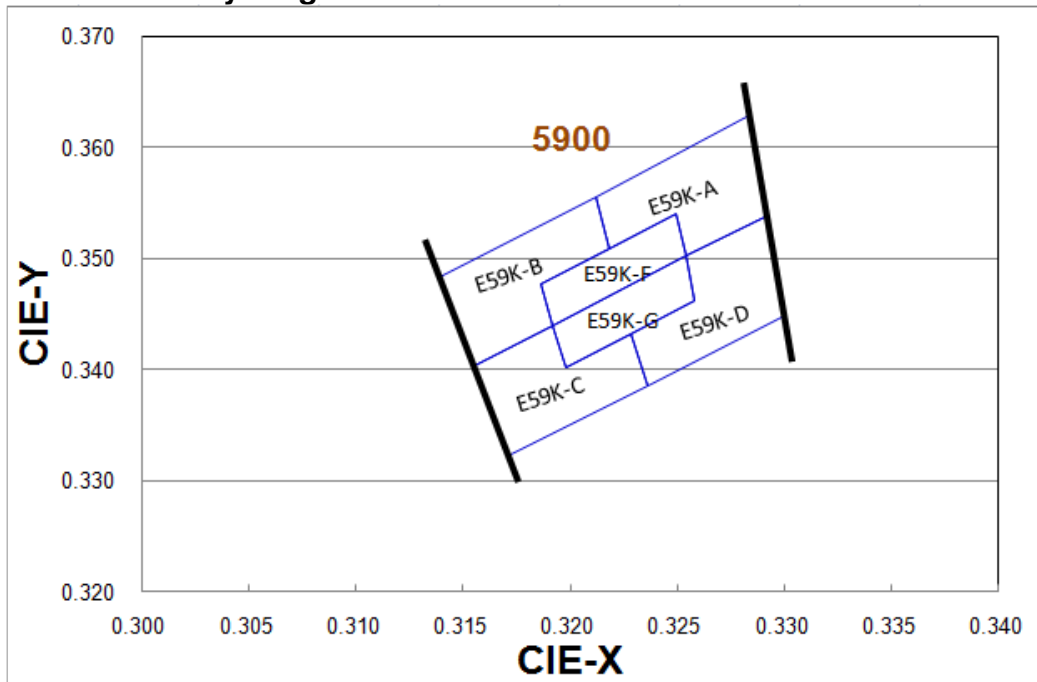


Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
5000K	E50K-A7	0.3559	0.3796	E50K-D7	0.3541	0.3660	
		0.3472	0.3725		0.3491	0.3616	
		0.3465	0.3640		0.3486	0.3566	
		0.3496	0.3665		0.3457	0.3543	
		0.3491	0.3616		0.3449	0.3464	
		0.3541	0.3660		0.3524	0.3524	
	Reference Range:4750K~5000K						
	E50K-B7	0.3472	0.3725	E50K-C7	0.3379	0.3529	
		0.3385	0.3653		0.3374	0.3404	
		0.3379	0.3529		0.3449	0.3464	
		0.3431	0.3567		0.3457	0.3543	
		0.3434	0.3615		0.3427	0.3519	
		0.3465	0.3640		0.3431	0.3567	
	Reference Range:5000K~5280K						
	E50K-F	0.3496	0.3665	E50K-G	0.3491	0.3616	
		0.3434	0.3615		0.3431	0.3567	
		0.3431	0.3567		0.3427	0.3519	
		0.3491	0.3616		0.3486	0.3566	
	Reference Range:4900K~5100K						

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
6500K	E65K-A7	0.3204	0.3560	E65K-D7	0.3213	0.3451	
		0.3116	0.3472		0.3161	0.3401	
		0.3125	0.3408		0.3165	0.3361	
		0.3156	0.3440		0.3135	0.3331	
		0.3161	0.3401		0.3145	0.3267	
		0.3213	0.3451		0.3222	0.3342	
	Reference Range:6000K~6450K						
	E65K-B7	0.3116	0.3472	E65K-C7	0.3049	0.3288	
		0.3029	0.3384		0.3068	0.3192	
		0.3049	0.3288		0.3145	0.3267	
		0.3099	0.3339		0.3135	0.3331	
		0.3093	0.3376		0.3105	0.3301	
		0.3125	0.3408		0.3099	0.3339	
	Reference Range:6450K~6950K						
	E65K-F	0.3156	0.3440	E65K-G	0.3161	0.3401	
		0.3093	0.3376		0.3099	0.3339	
		0.3099	0.3339		0.3105	0.3301	
		0.3161	0.3401		0.3165	0.3361	
	Reference Range:6250K~6620K						

The C.I.E. 1931 Chromaticity Diagram



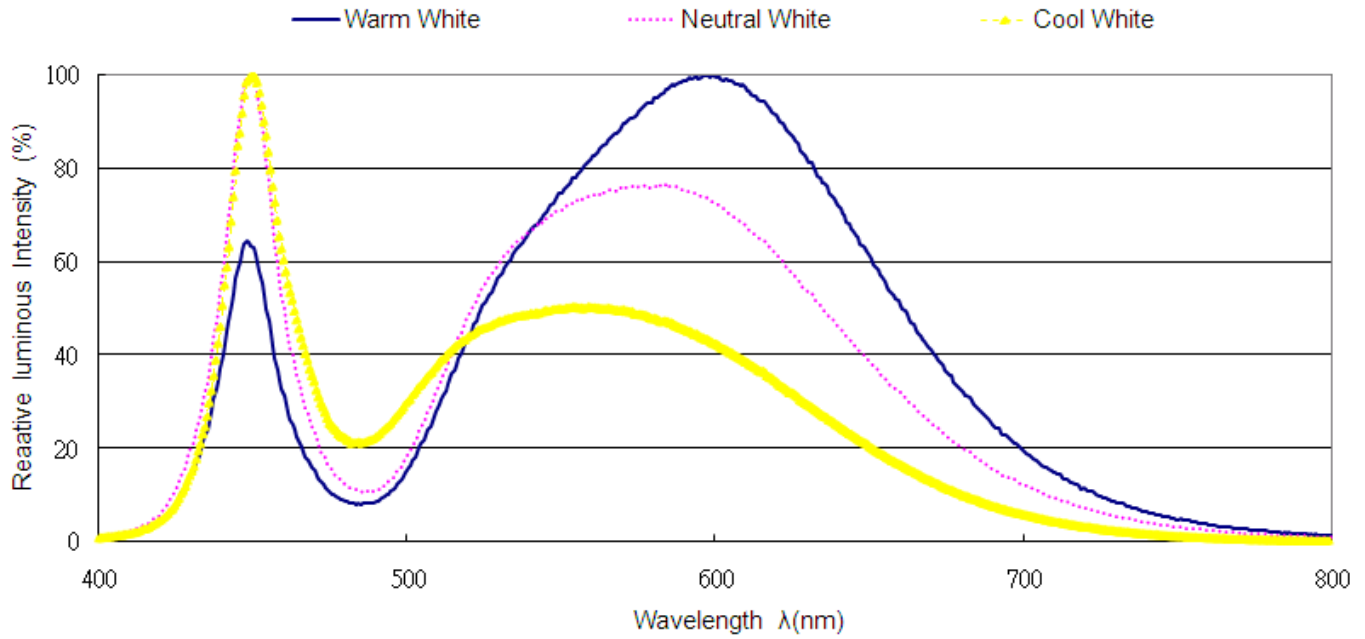
Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	Bin Code	CIE_x	CIE_y	
5900K	E59K-A	0.3284	0.3629	E59K-D	0.3292	0.3539	
		0.3212	0.3556		0.3254	0.3502	
		0.3218	0.3509		0.3258	0.3462	
		0.3249	0.3541		0.3228	0.3432	
		0.3254	0.3502		0.3236	0.3385	
		0.3292	0.3539		0.3300	0.3448	
	Reference Range:5650K~6000K						
	E59K-B	0.3212	0.3556	E59K-C	0.3155	0.3403	
		0.3139	0.3483		0.3171	0.3322	
		0.3155	0.3403		0.3236	0.3385	
		0.3192	0.3440		0.3228	0.3432	
		0.3186	0.3477		0.3198	0.3402	
0.3218		0.3509	0.3192		0.3440		
Reference Range:6000K~6400K							
E59K-F	0.3249	0.3541	E59K-G	0.3254	0.3502		
	0.3186	0.3477		0.3192	0.3440		
	0.3192	0.3440		0.3198	0.3402		
	0.3254	0.3502		0.3258	0.3462		
Reference Range:5810K~6150K							

Notes:

1. The value is based on driving current by 60mA.
2. Tolerance of Chromaticity Coordinates: ± 0.01 .

Spectrum Distribution



Typical Electro-Optical Characteristics Curves

Fig.1 – Forward Voltage Shift vs. Junction Temperature

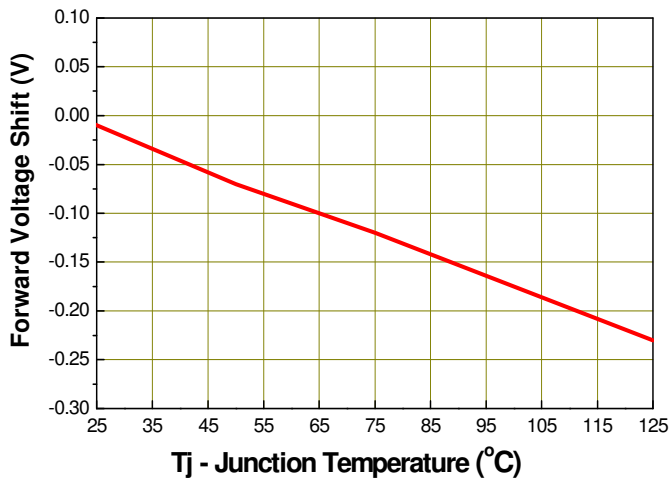
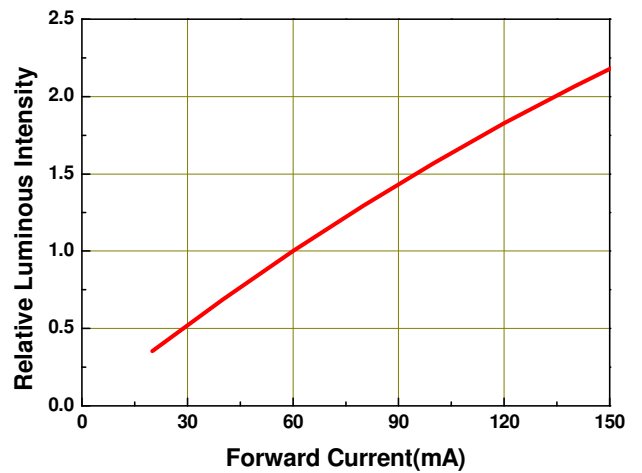


Fig.2 - Relative Luminous Intensity vs. Forward Current



Typical Electro-Optical Characteristics Curves

Fig.3 - Relative Luminous Intensity vs. Junction Temperature

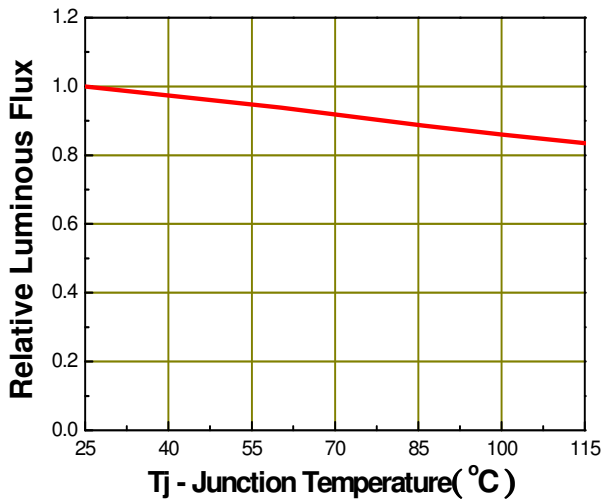


Fig.4 - Forward Current vs. Forward Voltage

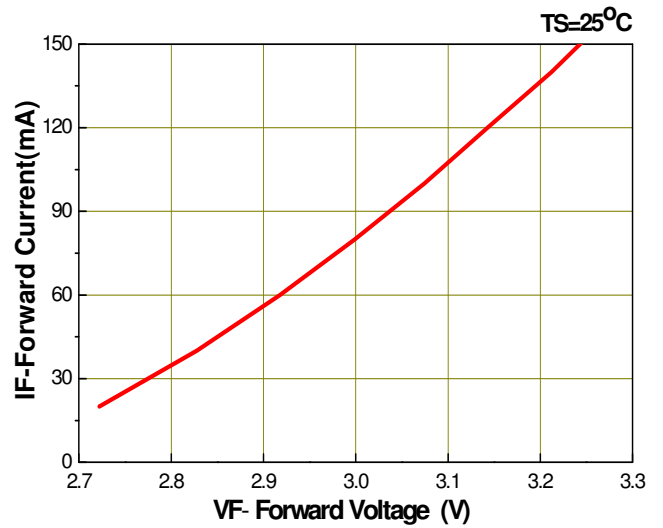


Fig.5 – Max. Driving Forward Current vs. Soldering Temperature

$R_{th\ j-s}=25\ ^\circ\text{C/W}$

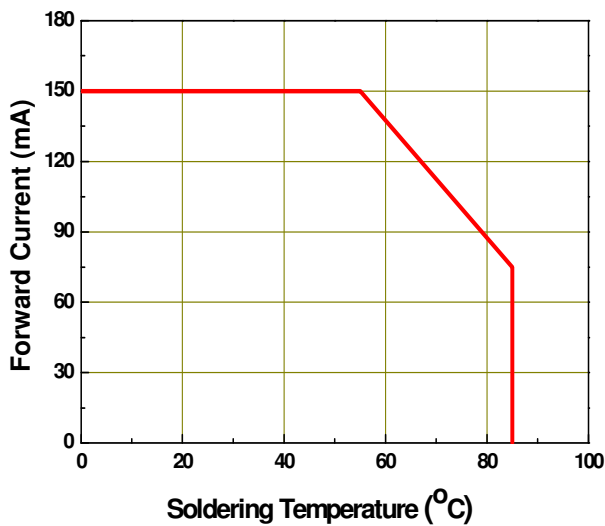
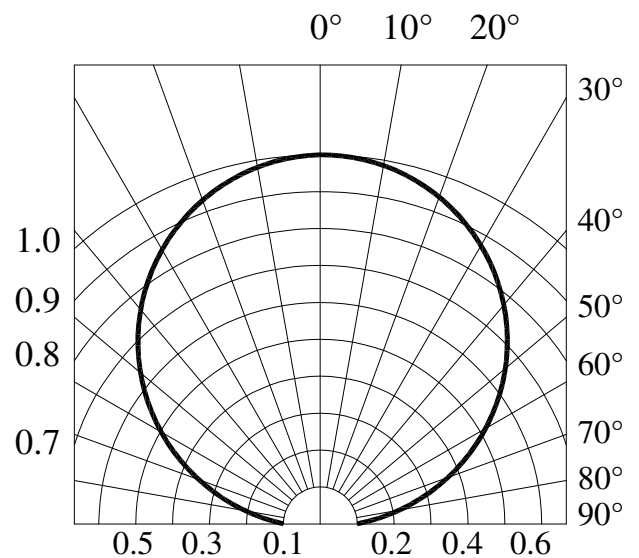
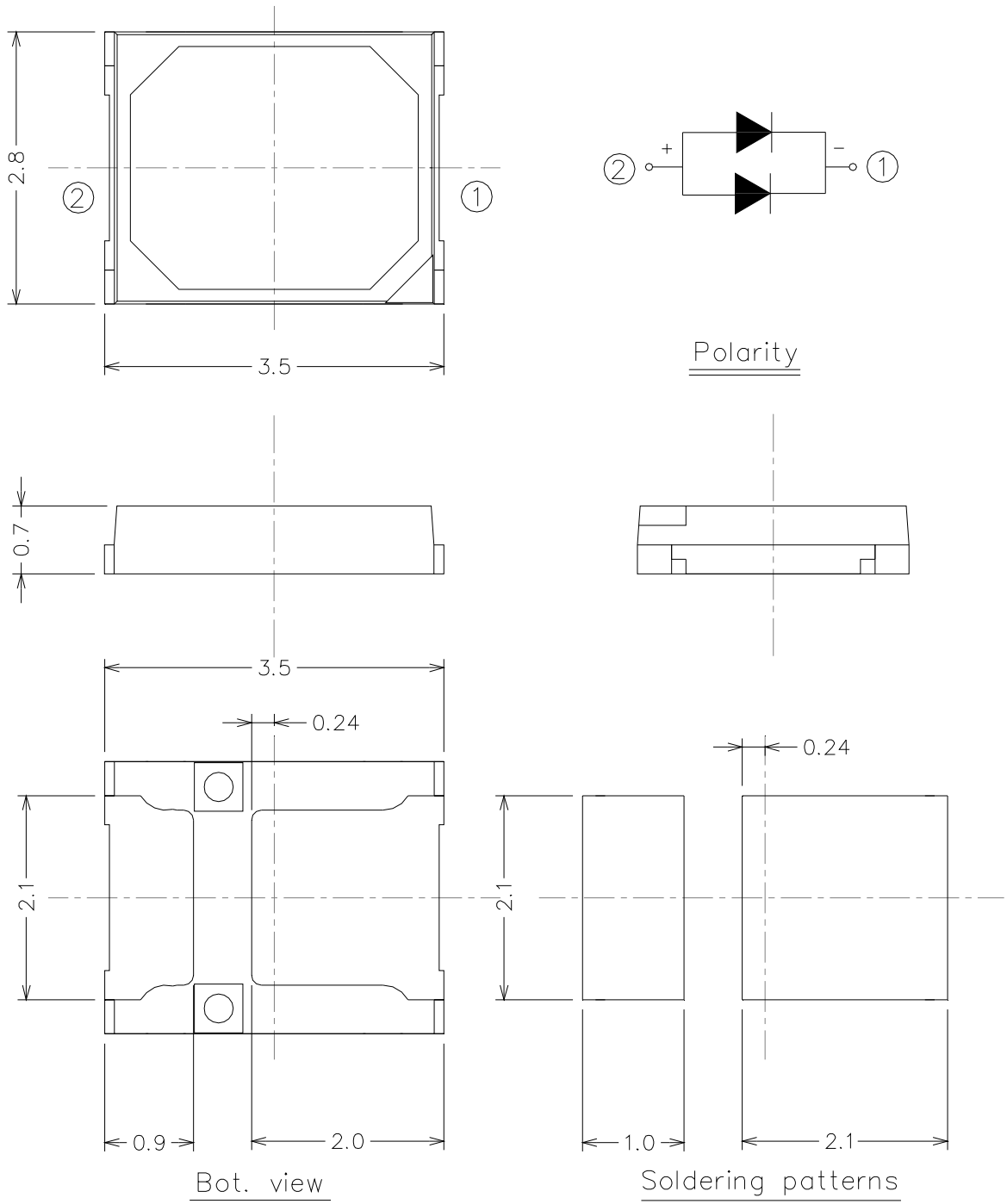


Fig.6 – Radiation Diagram



Package Dimension



Note:
Tolerance unless mentioned is ± 0.15 mm; Unit = mm

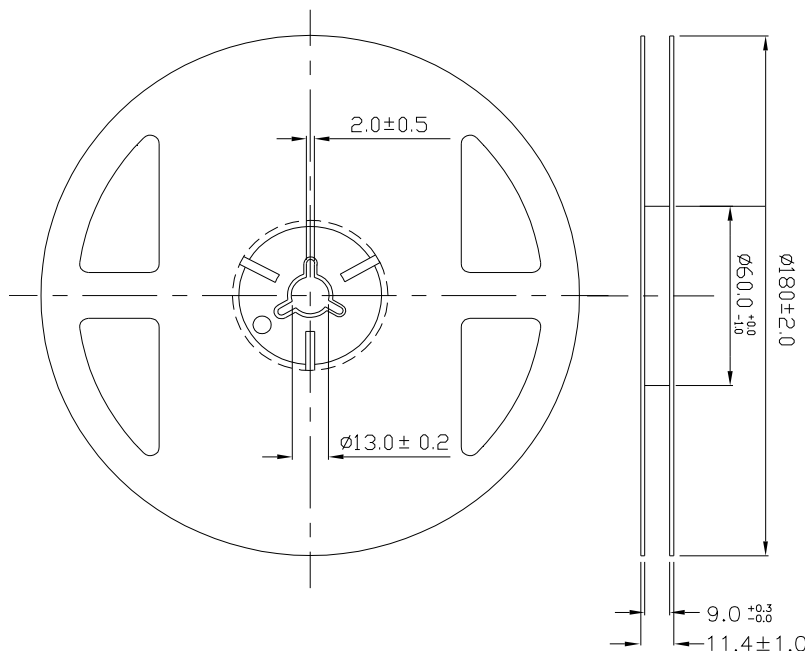
Moisture Resistant Packing Materials

Label Explanation



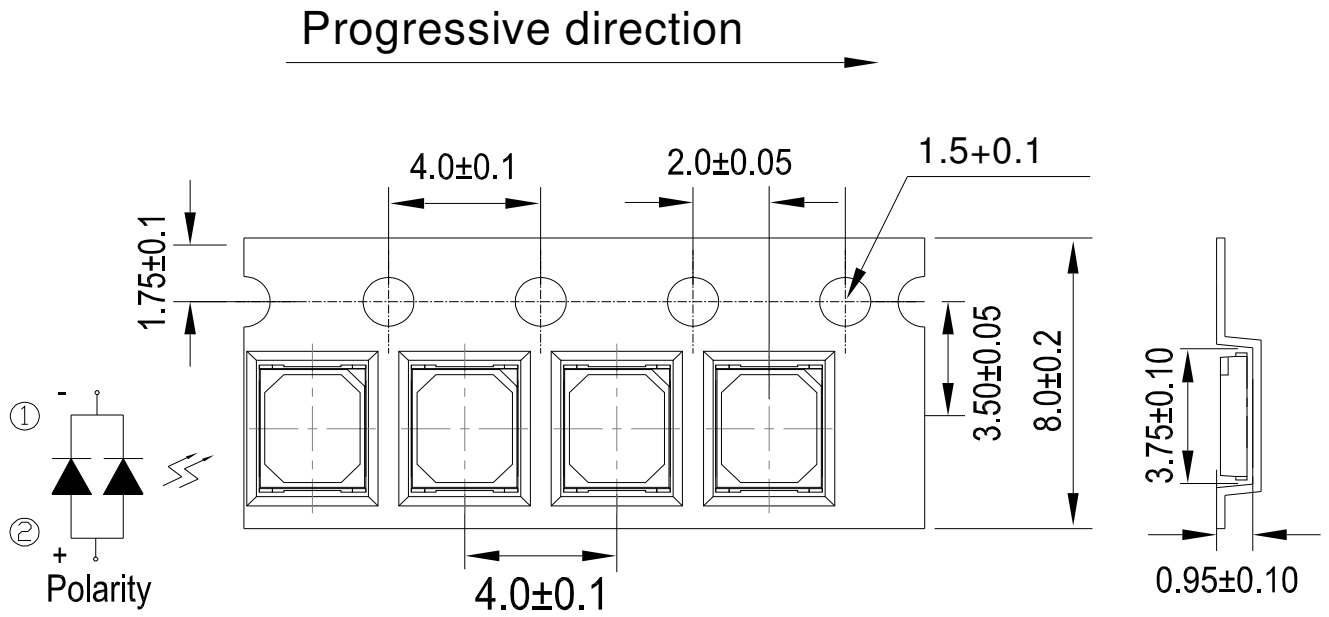
- CPN: Customer's Product Number
- P/N: Product Number
- QTY: Packing Quantity
- CAT: Luminous Intensity Rank
- HUE: Dom. Wavelength Rank
- REF: Forward Voltage Rank
- LOT No: Lot Number

Reel Dimensions



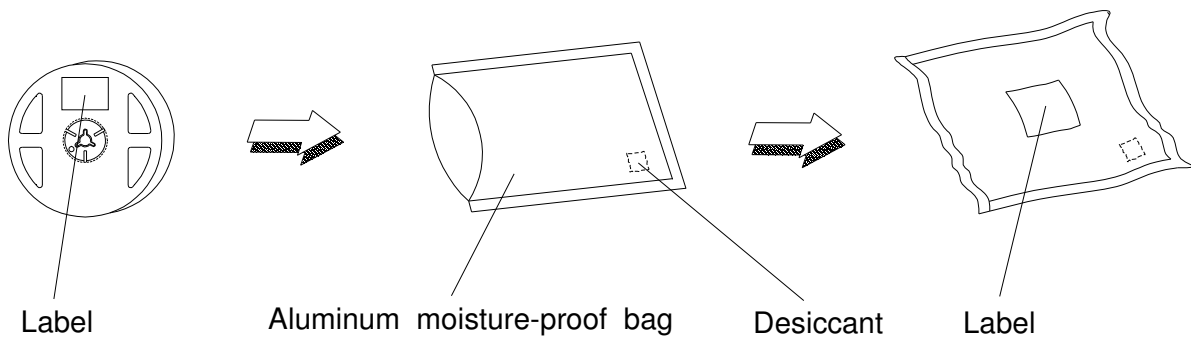
Note:
 Tolerances unless mentioned ± 0.1 mm. Unit = mm

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



Note:
 1. 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°C/10sec.	6 Min.	22 PCS.	0/1
2	Thermal Shock	H : +100°C 20min ∩ 10 sec L : -10°C 20min	200 Cycles	22 PCS.	0/1
3	Temperature Cycle	H : +100°C 30min ∩ 5 min L : -40°C 30min	200 Cycles	22 PCS.	0/1
4	High Temperature/Humidity Reverse Bias	Ta=85°C,85%RH	1000 Hrs.	22 PCS.	0/1
5	High Temperature/Humidity Operation	Ta=85°C,85%RH, I _F = 75 mA	1000 Hrs.	22 PCS.	0/1
6	Low Temperature Storage	Ta=-40°C	1000 Hrs.	22 PCS.	0/1
7	High Temperature Storage	Ta=85°C	1000 Hrs.	22 PCS.	0/1
8	Low Temperature Operation Life	Ta=-40°C, I _F = 150 mA	1000 Hrs.	22 PCS.	0/1
9	High Temperature Operation/ Life#1	Ta=25°C, I _F = 150 mA	1000 Hrs.	22 PCS.	0/1
10	High Temperature Operation/ Life#2	Ta=55°C, I _F =150 mA	1000 Hrs.	22 PCS.	0/1
11	High Temperature Operation/ Life#3	Ta=85°C, I _F = 75 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.

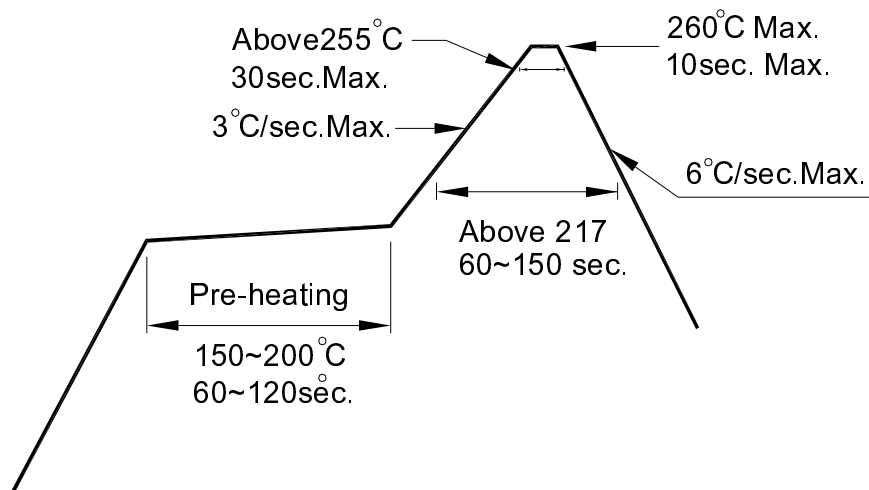
2.3 After opening the package: The LED's floor life is 168 Hrs under 30°C or less and 60% RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

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°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.

