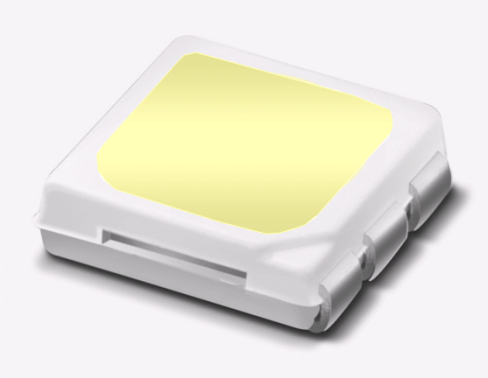
DATASHEET

SMD ▪ Low Power LED
61-238/XK2C-BXXXXXXXXX/ET



Features

- PLCC-6 package
- Top view white LED
- High luminous intensity output
- Wide viewing angle
- Pb-free
- RoHS compliant

Description

The Everlight 61-238 package has high efficacy, 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

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Product Number Explanation

61–238 / X K 2 C – B XX XX XX XX XX / ET

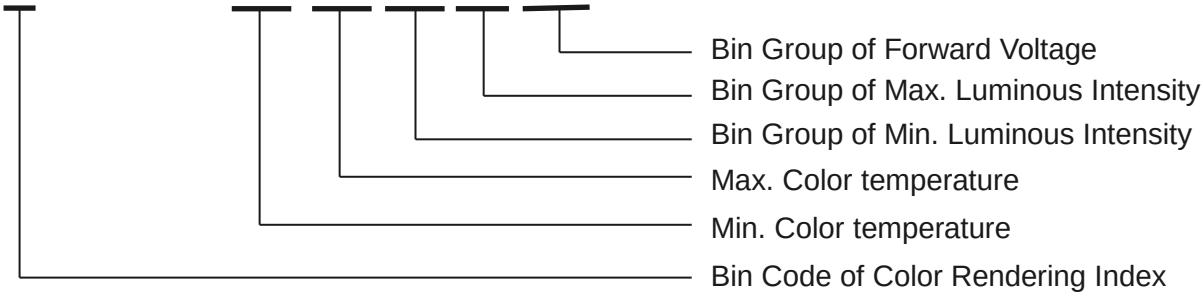

Table of Color Rendering Index

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:
61-238/QK2C-B2832A8C2B2/ET

CRI	75(Min.)
CCT	2850K~3250K
Iv	5000mcd~7000mcd
V_F	2.9V~3.6V
I_F	20mA

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Mass Production list for CRI>70

Product	CRI Min.	CCT(K)	Iv(mcd) Min.	Iv(mcd) Max.
61-238/LK2C-B56706F2HB2/ET	70	5650K~7000K	5400	7200
61-238/LK2C-B5063A9C3B2/ET	70	5000K~6300K	5500	7600
61-238/LK2C-B50638F6GB2/ ET	70		5600	6600
61-238/LK2C-B50632FAGB2/ET	70		5000	6000
61-238/LK2C-B45568F6HB2/ET	70	4500K~5650K	5600	6600
61-238/LK2C-B45568F4HB2/ET	70		5600	7400
61-238/LK2C-B45562FAGB2/ET	70		5000	6000
61-238/LK2C-B3845A8C2B2/ET	70	3800K~4500K	5000	7000
61-238/LK2C-B28322F6GB2/ET	70	2850K~3250K	5000	6600
61-238/LK2C-B28328E6FB2/ET	70		4600	5600

Mass Production list for CRI>75

Product	CRI Min.	CCT(K)	Iv(mcd) Min.	Iv(mcd) Max.
61-238/QK2C-B50632F6GB2/ET	75	5000K~6300K	5000	6600
61-238/QK2C-B50634E2FB2/ET	75		4200	5200
61-238/QK2C-B45562F6GB2/ET	75	4500K~5650K	5000	6600
61-238/QK2C-B28322FAGB2/ET	75	2850K~3250K	5000	6000
61-238/QK2C-B2832A8C2B2/ET	75		5000	7000

Note:
1.When three LED dices are operated simultaneously.

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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 ($T_{Soldering}$=25℃)

Parameter	Symbol	Rating	Unit
Forward Current*1	I_F	30	mA
Peak Forward Current (Duty 1/10 @10ms) *1	I_{FP}	100	mA
Power Dissipation*1	P_d	110	mW
Operating Temperature	T_{opr}	-40 ~ +85	℃
Storage Temperature	T_{stg}	-40 ~ +100	℃
Thermal Resistance (Junction / Soldering point)	$R_{th\ J-S}$	75	℃/W
Junction Temperature	T_j	125	℃
Soldering Temperature	T_{sol}	Reflow Soldering : 260 ℃ for 10 sec. Hand Soldering : 350 ℃ for 3 sec.	

Note:
1.The value are based on one dice performance.
2.The products are sensitive to static electricity and must be carefully taken when handling products.

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous intensity*1	Iv	4200	-----	8200	mcd	I_F=20mA*2
Forward Voltage*2	V_F	2.9	-----	3.6	V	I_F=20mA*2
Viewing Angle	$2\theta_{1/2}$	-----	120	-----	deg	I_F=20mA*2

Notes:
1. When three LED dices are operated simultaneously.
2. For each dice.
3. Tolerance of Luminous flux: ±11%.
4. Tolerance of Forward Voltage : ±0.1V.

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Bin Range of Luminous intensity*1

Bin Code	Min.	Max.	Unit	Condition
4E	4200	4400	mcd	I_F=20mA*2
6E	4400	4600		
8E	4600	4800		
AF	4800	5000		
2F	5000	5200		
4F	5200	5400		
6F	5400	5600		
8F	5600	5800		
AG	5800	6000		
2G	6000	6200		
4G	6200	6400		
6G	6400	6600		
8G	6600	6800		
AH	6800	7000		
2H	7000	7200		
4H	7200	7400		
6H	7400	7600		
8H	7600	7800		
AJ	7800	8000		
2J	8000	8200		

Bin Code	Min.	Max.	Unit	Condition
A8	5000	5500	mcd	I_F=20mA*2
A9	5500	6000		
C1	6000	6500		
C2	6500	7000		
C3	7000	7600		

Bin Range of Forward Voltage*2

Group	Bin Code	Min.	Max.	Unit	Condition
B2	36	2.9	3.0	V	I_F=20mA*2
	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		
	42	3.5	3.6		

Notes:
1. When three LED dices are operated simultaneously.
2. For each dice.
3. Tolerance of Luminous flux: ±11%.
4. Tolerance of Forward Voltage : ±0.1V.

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Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	CCT	Bin Code	CIE_x	CIE_y
7000K ~6300K	X5	0.3031	0.3327	5650K ~5000K	V5	0.3288	0.3569
		0.3148	0.3444			0.3469	0.3717
		0.3160	0.3332			0.3458	0.3592
		0.3052	0.3224			0.3290	0.3451
	X6	0.3052	0.3224		V6	0.3290	0.3451
		0.3160	0.3332			0.3458	0.3592
		0.3175	0.3204			0.3444	0.3442
		0.3076	0.3108			0.3292	0.3313
6300K ~5650K	W5	0.3148	0.3444	5000K ~4500K	U5	0.3469	0.3717
		0.3288	0.3569			0.3642	0.3829
		0.3290	0.3451			0.3622	0.3716
		0.3160	0.3332			0.3458	0.3592
	W6	0.3160	0.3332		U6	0.3458	0.3592
		0.3290	0.3451			0.3622	0.3716
		0.3292	0.3313			0.3594	0.3557
		0.3175	0.3204			0.3444	0.3442

Note:
1. The value is based on driving current for each dice by 20mA.
2. Tolerance of Chromaticity Coordinates: ±0.01.

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Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	CCT	Bin Code	CIE_x	CIE_y
4500K ~4100K	T5	0.3642	0.3829	3800K ~3500K	R5	0.3963	0.4035
		0.3811	0.3937			0.4148	0.4161
		0.3783	0.3825			0.4086	0.3995
		0.3622	0.3716			0.3924	0.3909
	T6	0.3622	0.3716		R6	0.3924	0.3909
		0.3783	0.3825			0.4086	0.3995
		0.3741	0.3658			0.4021	0.3822
		0.3594	0.3557			0.3871	0.3739
4100K ~3800K	S5	0.3811	0.3937	3500K ~3250K	Q5	0.4148	0.4161
		0.3963	0.4035			0.4312	0.4234
		0.3924	0.3909			0.4240	0.4065
		0.3783	0.3825			0.4086	0.3995
	S6	0.3783	0.3825		Q6	0.4086	0.3995
		0.3924	0.3909			0.4240	0.4065
		0.3871	0.3739			0.4165	0.3890
		0.3741	0.3658			0.4021	0.3822
3250K ~3050K	P5	0.4312	0.4234	3050K ~2850K	N5	0.4456	0.4287
		0.4456	0.4287			0.4614	0.4333
		0.4376	0.4116			0.4525	0.4162
		0.4240	0.4065			0.4376	0.4116
	P6	0.4240	0.4065		N6	0.4376	0.4116
		0.4376	0.4116			0.4525	0.4162
		0.4294	0.3943			0.4436	0.3991
		0.4165	0.3890			0.4294	0.3943

Note:
1. The value is based on driving current for each dice by 20mA.
2. Tolerance of Chromaticity Coordinates: ±0.01

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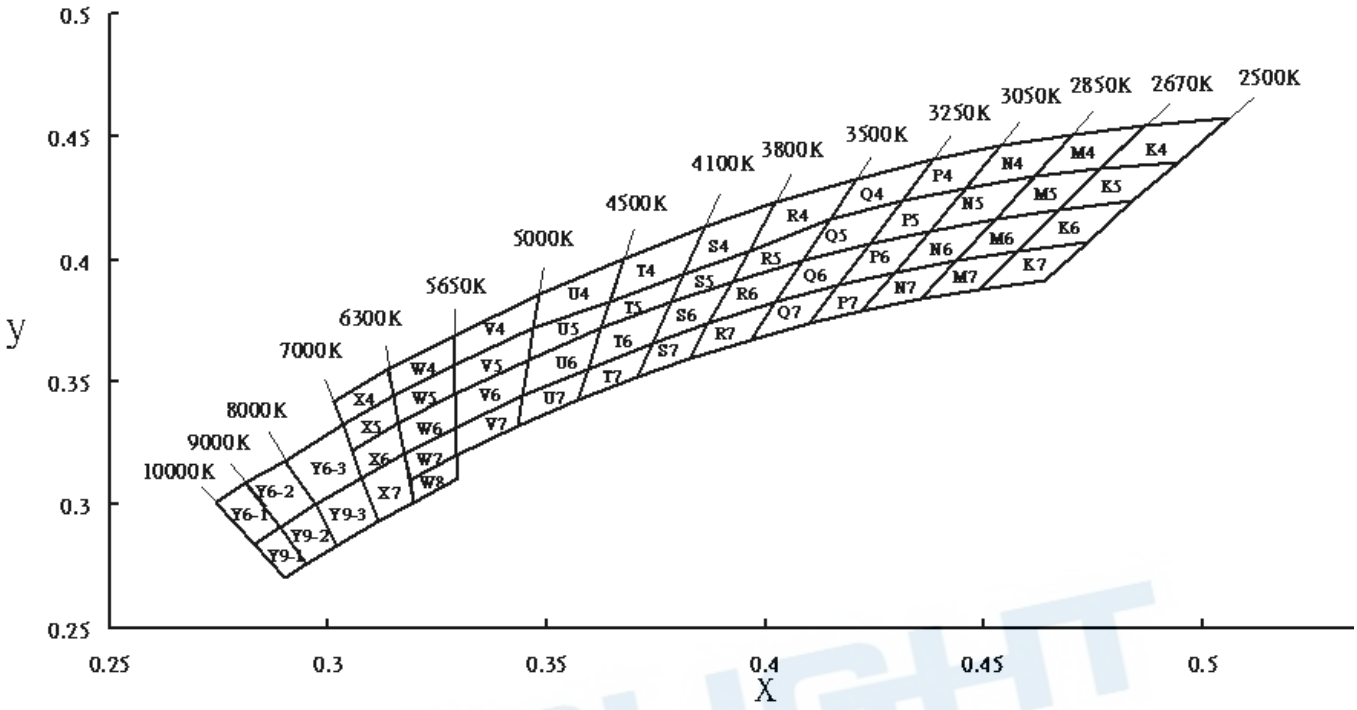
The C.I.E. 1931 Chromaticity Diagram



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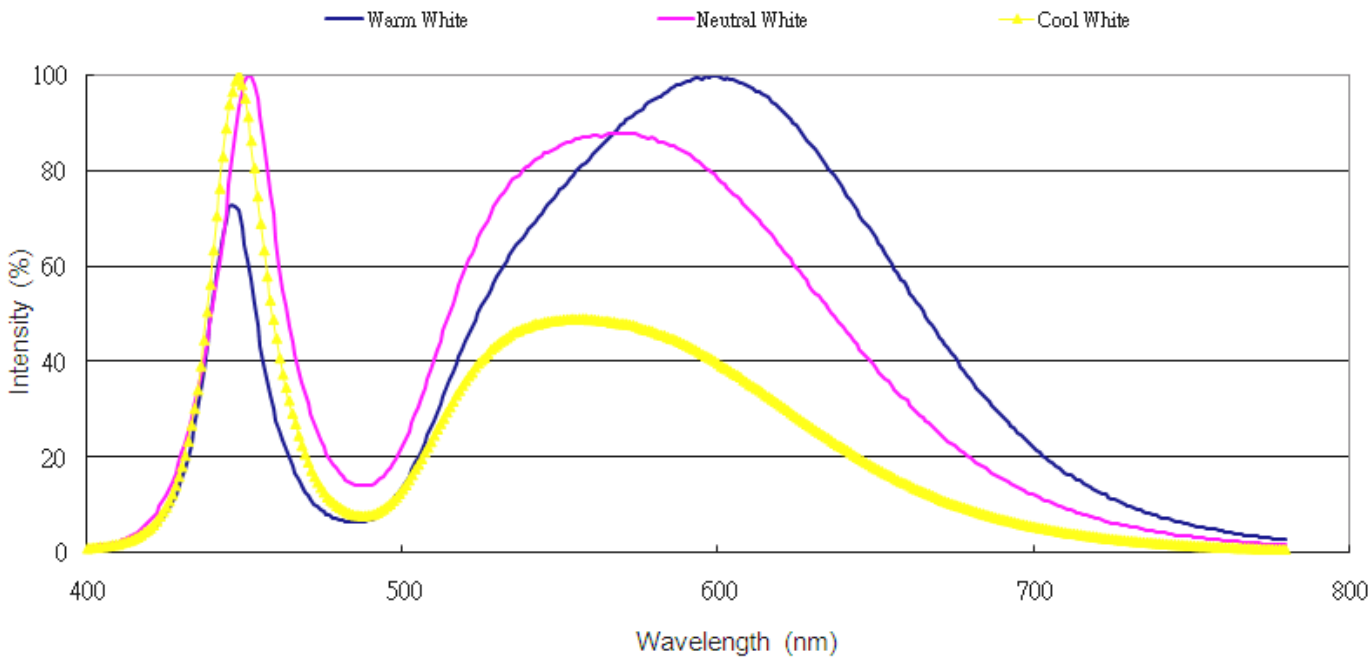
Spectrum Distribution



Typical Electro-Optical Characteristics Curves

Fig.1 - Forward Voltage Shift vs. Junction Temperature

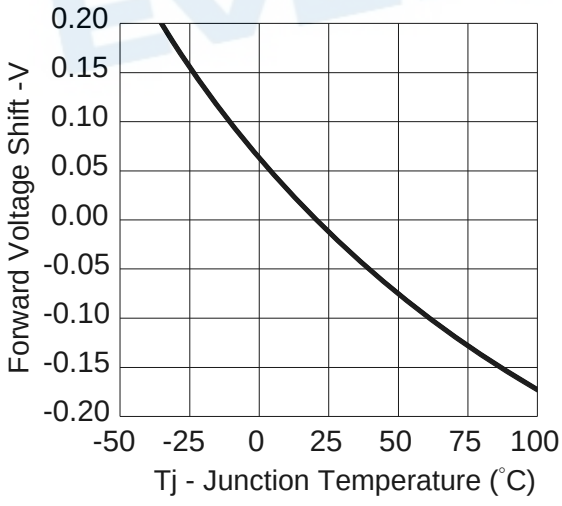
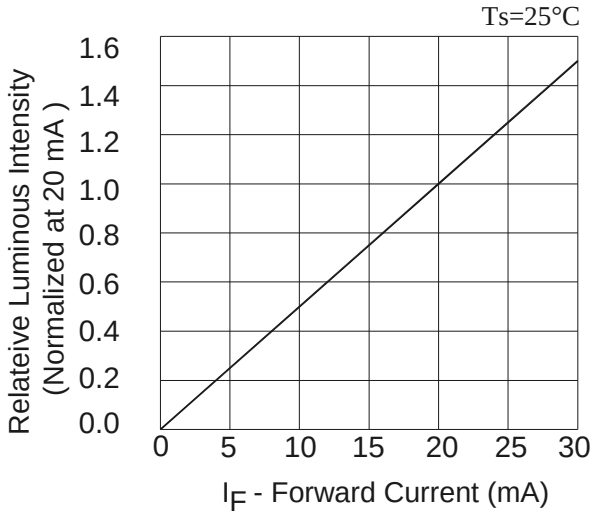


Fig.2 - Relative Luminous Intensity vs. Forward Current



Note:
The value is based on driving current for each dice by 20mA.

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Typical Electro-Optical Characteristics Curves

Fig.3 - Relative Luminous Intensity vs. Junction Temperature

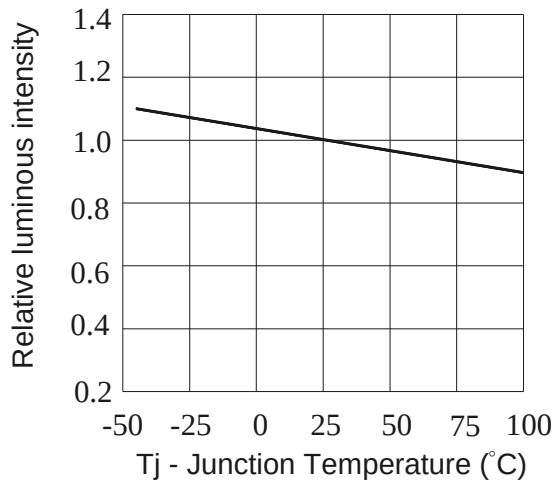


Fig.4 - Forward Current vs. Forward Voltage

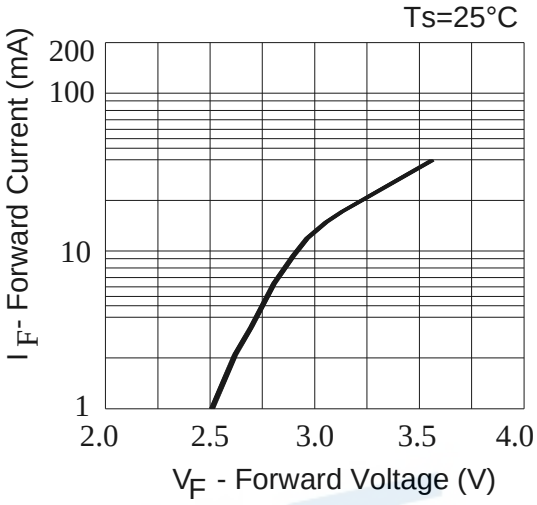


Fig.5 - Max. Driving Forward Current vs.Soldering Temperature

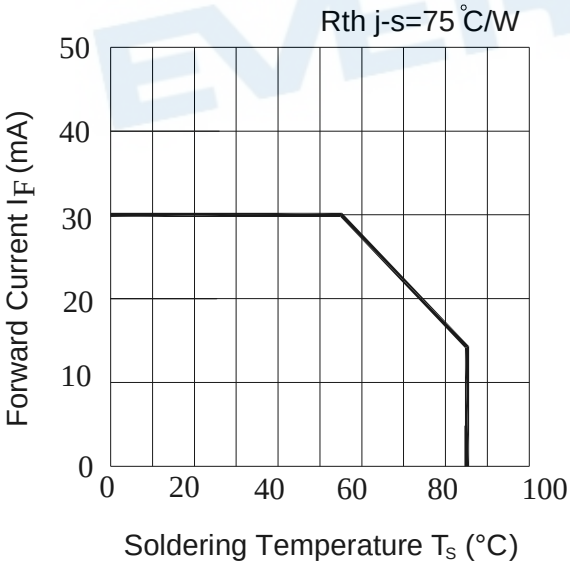
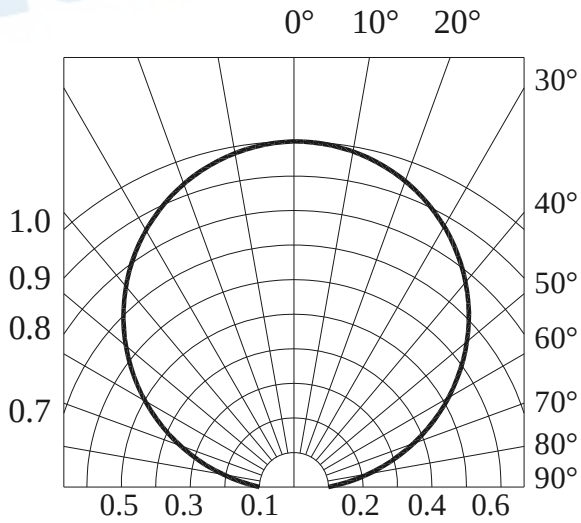


Fig.6 - Radiation Diagram



Note:
The value is based on driving current for each dice by 20mA.

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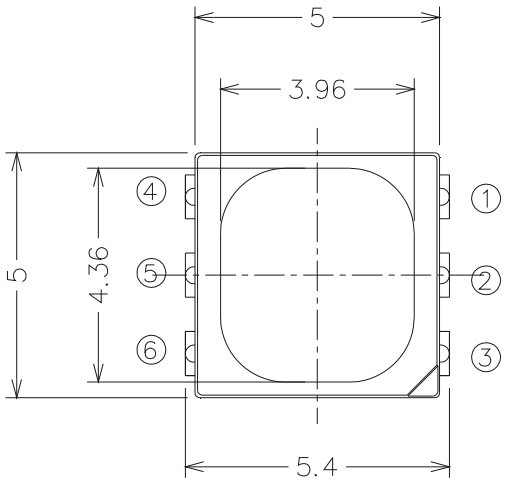
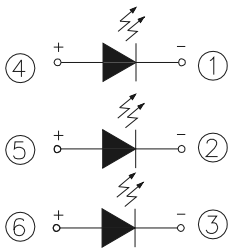
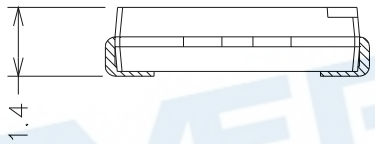
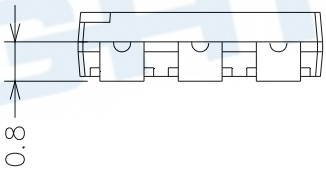
Package Dimension

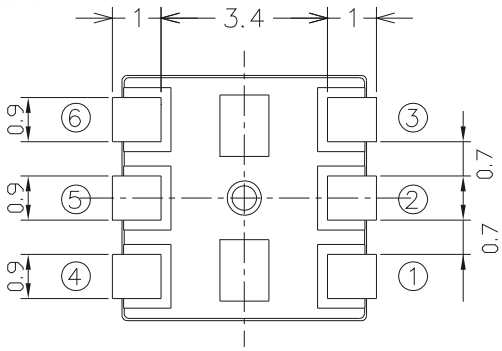




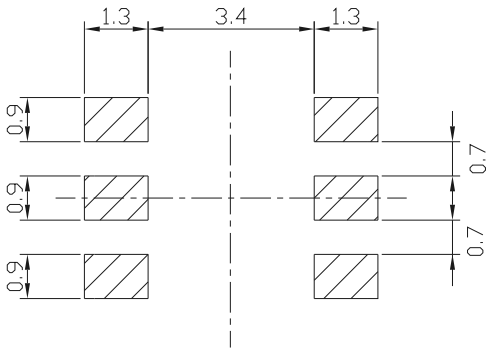
Polarity







Bot. view



Soldering patterns

Note:
Tolerance unless mentioned is ±0.2mm; Unit = mm

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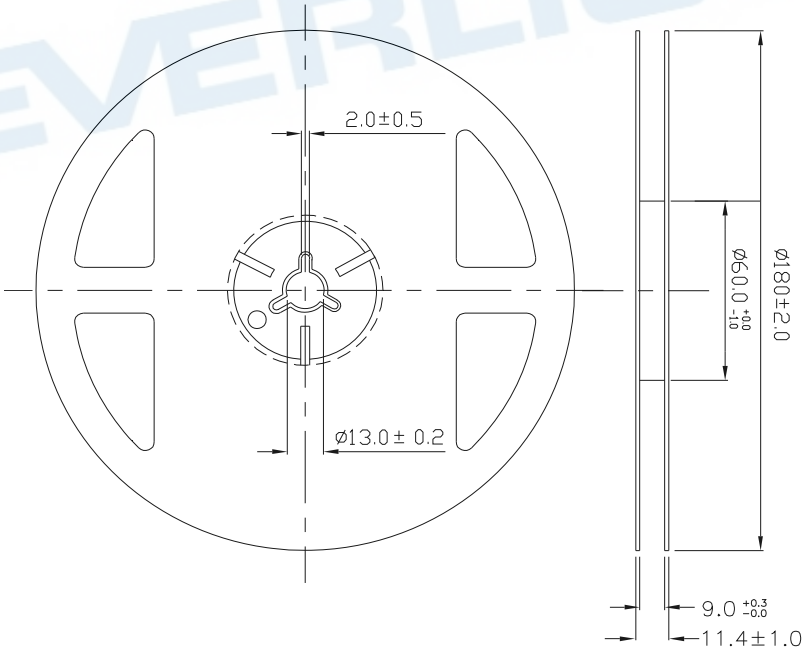
Moisture Resistant Packing Materials

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 ±0.1mm. Unit = mm

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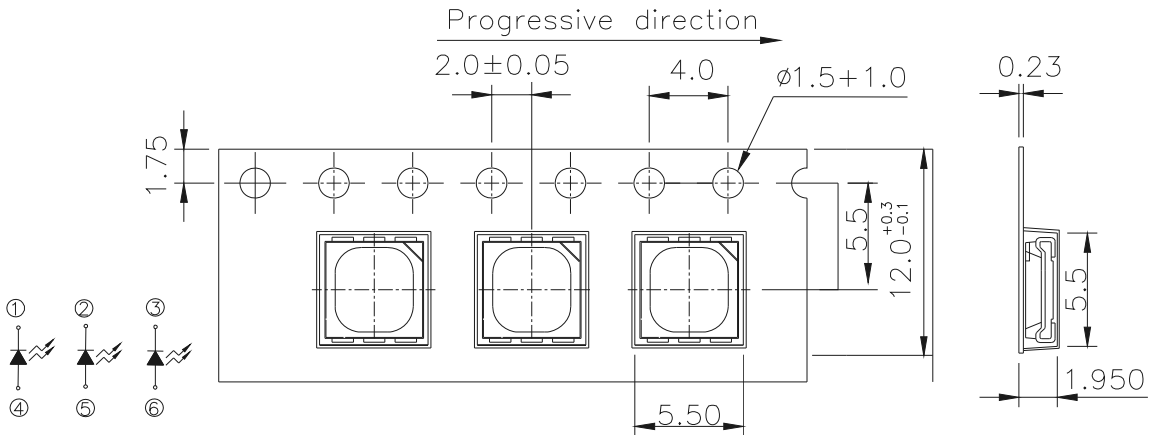
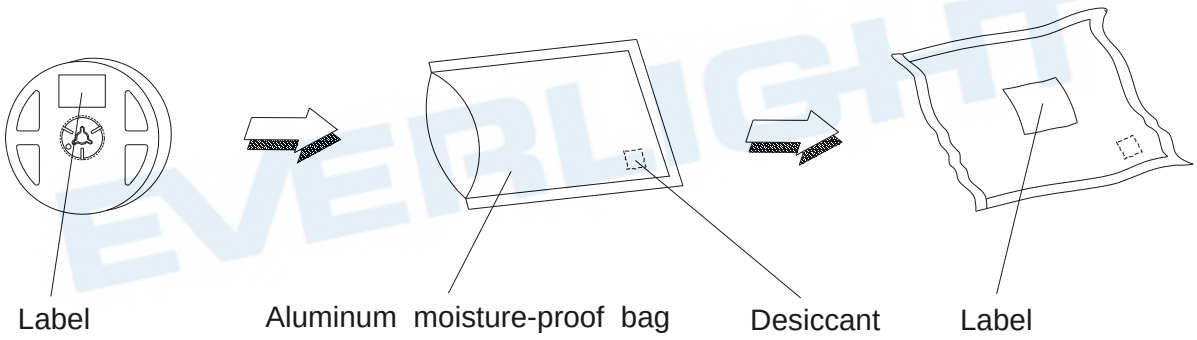
Carrier Tape Dimensions: Loaded Quantity 800 pcs Per Reel



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

Moisture Resistant Packing Process



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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℃ 5min ∫ 10 sec L : -10℃ 5min	200 Cycles	22 PCS.	0/1
3	Temperature Cycle	H : +100℃ 15min ∫ 5 min L : -40℃ 15min	200 Cycles	22 PCS.	0/1
4	High Temperature/Humidity Reverse Bias	Ta=85℃,85%RH	1000 Hrs.	22 PCS.	0/1
5	High Temperature/Humidity Operation	Ta=85℃,85%RH, I_F = 20 mA(for each dice)	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 = 30 mA(for each dice)	1000 Hrs.	22 PCS.	0/1
9	High Temperature Operation/ Life#1	Ta=25℃, I_F = 30 mA(for each dice)	1000 Hrs.	22 PCS.	0/1
10	High Temperature Operation/ Life#2	Ta=55℃, I_F =30 mA(for each dice)	1000 Hrs.	22 PCS.	0/1
11	High Temperature Operation/ Life#3	Ta=85℃, I_F = 20 mA(for each dice)	1000 Hrs.	22 PCS.	0/1

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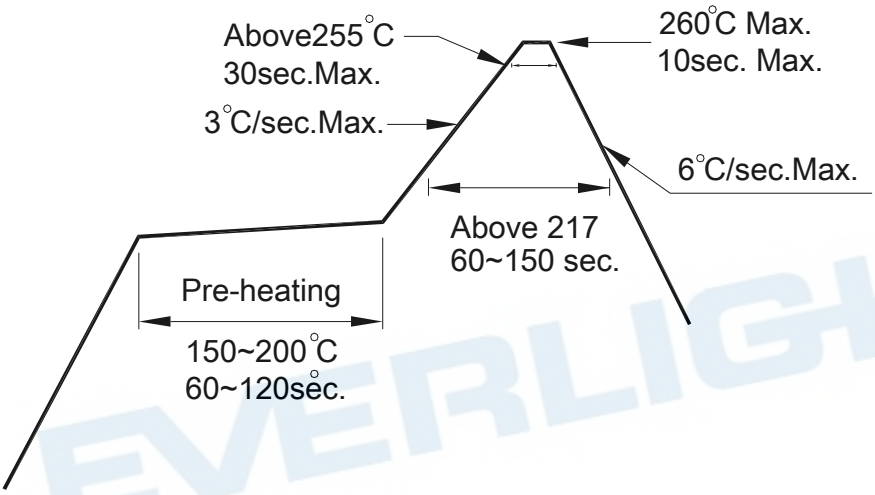
Precautions for Use

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℃ or less and 90%RH or less.
   2.3 After opening the package: The LED's floor life is 168 Hrs under 30℃ 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℃ for 24 hours.
3. Soldering Condition
   3.1 Pb-free solder temperature profile



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   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.

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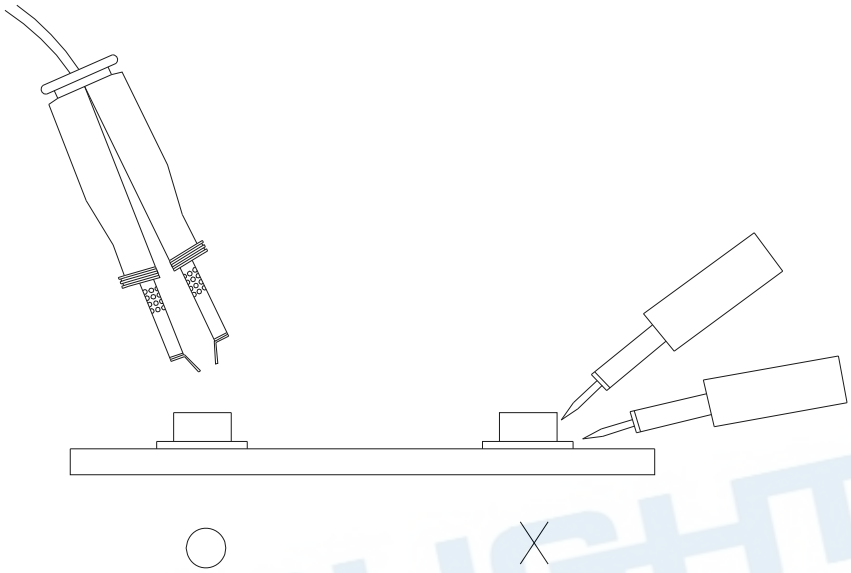
4. Soldering Iron

   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.



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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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