

SMD ▪ MID Power LED

67-22ST/KKE-NXXXX200Z3/SZM/2T



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 KE – N XX XX XXX Z3 /SZM/ 2 T

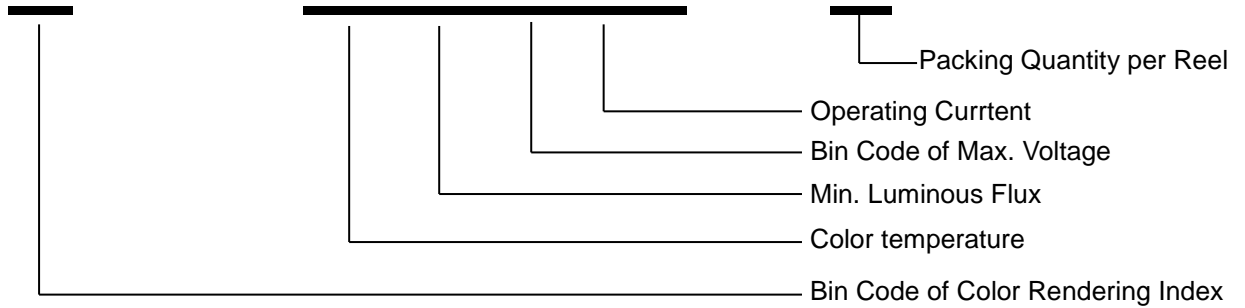


Table of Color Rendering Index

| 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: ±2

Table of Forward Current Index

| Symbol | Description |
|--------|----------------------|
| Z3 | I _F :30mA |

Table of Forward Voltage Index

| Symbol | Description |
|--------|-------------|
| 200 | 20.0V max |

Example:

67-22ST/KKE-N2765200Z3/SZM/2T

| | |
|----------------|-----------|
| CRI | 80(Min.) |
| CCT | 2700K |
| Flux | 65lm min |
| V _F | 20.0V max |
| I _F | 30mA |

Mass Production List

| Product | CRI Min. ⁽¹⁾ | CCT(K) | Φ(lm) Min. ⁽²⁾ |
|-------------------------------|----------------------------|--------|------------------------------|
| 67-22ST/KKE-N2765200Z3/SZM/2T | 80 | 2700K | 65 |
| 67-22ST/KKE-N3065200Z3/SZM/2T | 80 | 3000K | 65 |
| 67-22ST/KKE-N4070200Z3/SZM/2T | 80 | 4000K | 70 |
| 67-22ST/KKE-N5070200Z3/SZM/2T | 80 | 5000K | 70 |
| 67-22ST/KKE-N6570200Z3/SZM/2T | 80 | 6500K | 70 |

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 | 30 | mA |
| Peak Forward Current (Duty 1/10 @10ms) | I _{FP} | 60 | mA |
| Power Dissipation | P _d | 600 | mW |
| Operating Temperature | T _{opr} | -40 ~ +85 | °C |
| Storage Temperature | T _{stg} | -40 ~ +100 | °C |
| Thermal Resistance (Junction / Soldering point) | R _{th J-S} | 21 | °C/W |
| Junction Temperature | T _j | 115 | °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 | 65 | 75 | 85 | lm | I _F =30mA |
| Forward Voltage ⁽²⁾ | V _F | 17 | 18.5 | 20 | V | I _F =30mA |
| Color Rendering Index ⁽³⁾ | R _a | 80 | 82 | 86 | | I _F =30mA |
| | R ₉ | 0 | 4 | 15 | | I _F =30mA |
| Viewing Angle | 2θ _{1/2} | 115 | 120 | 125 | deg | I _F =30mA |

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 |
|----------|------|------|------|----------------------|
| 6570 | 65 | 70 | lm | I _F =30mA |
| 7075 | 70 | 75 | | |
| 7580 | 75 | 80 | | |
| 8085 | 80 | 85 | | |

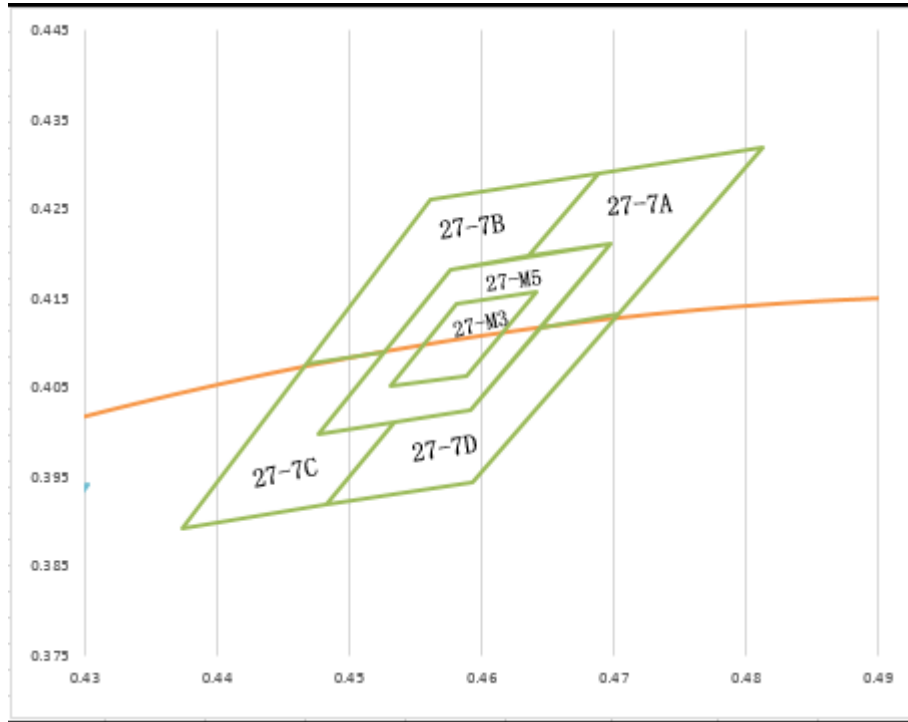
Note:
 Tolerance of Luminous flux: ±11%.

Bin Range of Forward Voltage

| Group | Bin Code | Min. | Max. | Unit | Condition |
|-------|----------|------|------|------|----------------------|
| A7A9 | A70 | 17.0 | 17.5 | V | I _F =30mA |
| | A75 | 17.5 | 18.0 | | |
| | A80 | 18.0 | 18.5 | | |
| | A85 | 18.5 | 19.0 | | |
| | A90 | 19.0 | 19.5 | | |
| | A95 | 19.5 | 20.0 | | |

Note:
 Tolerance of Forward Voltage : ±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 | | | |

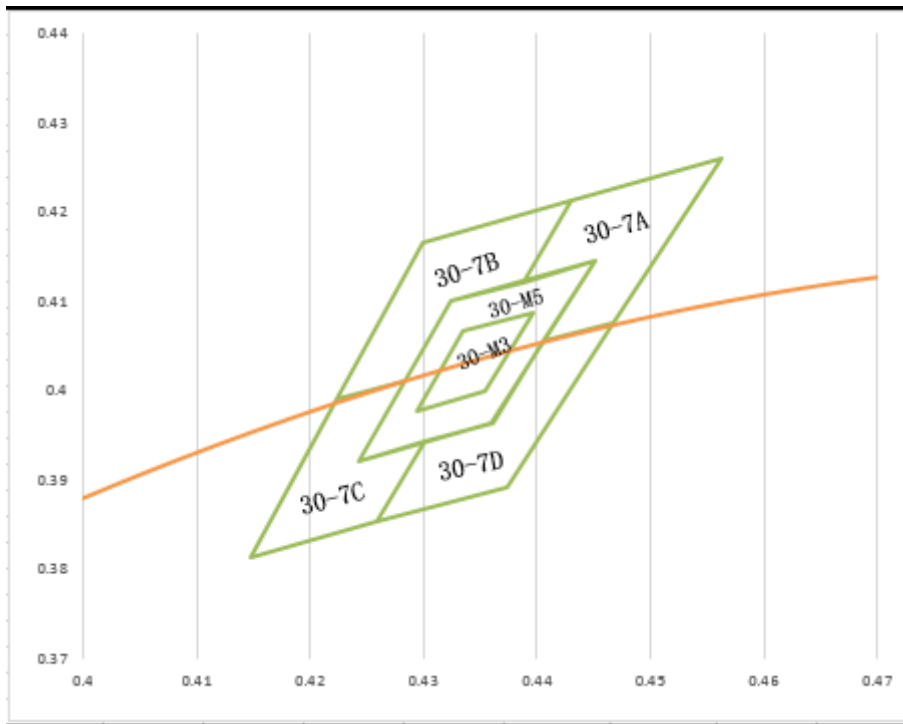
Bin Range of 5 STEP

| 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 | | | | | | | |

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 | | | |

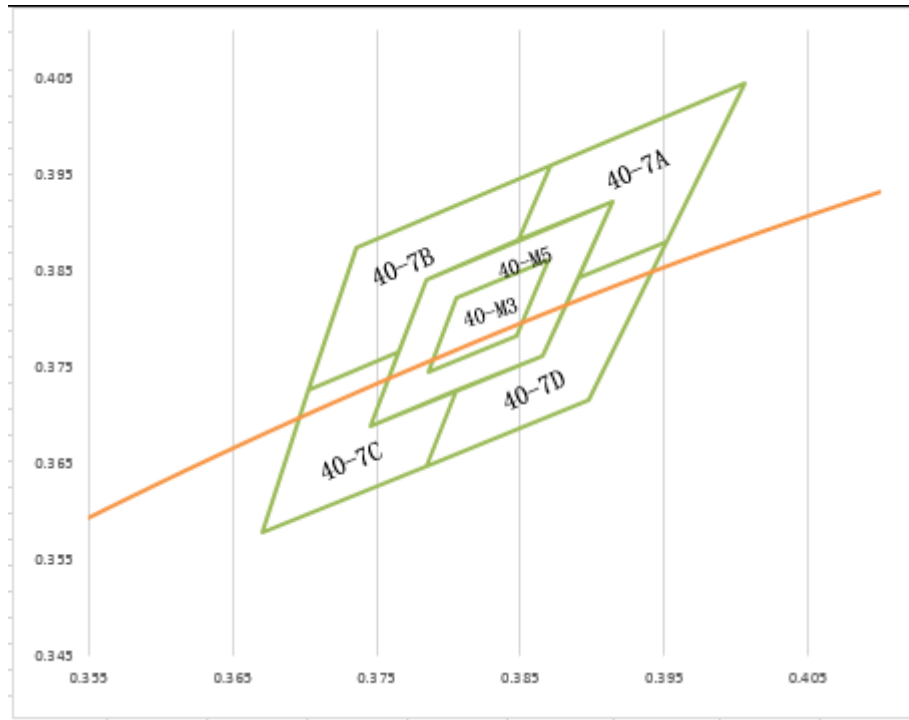
Bin Range of 5 STEP

| 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 | | | | | | | |

The C.I.E. 1931 Chromaticity Diagram



Bin Range of 3 STEP

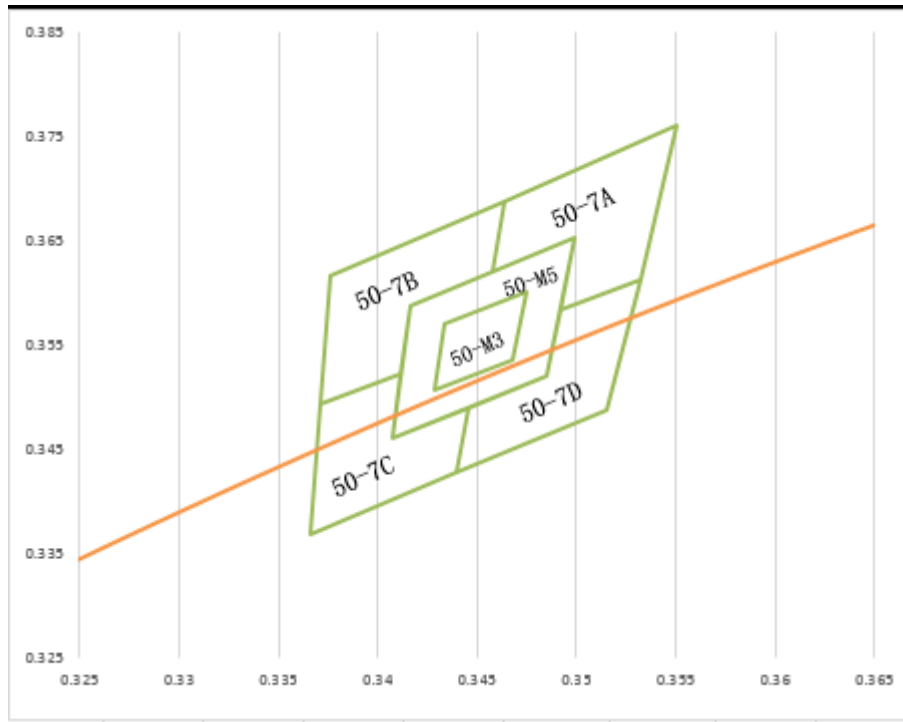
| CCT | Bin Code | CIE_x | CIE_y |
|-----------------------------|----------|--------|--------|
| 4000K | 40-M3 | 0.3806 | 0.3823 |
| | | 0.3786 | 0.3746 |
| | | 0.3847 | 0.3783 |
| | | 0.387 | 0.3862 |
| Reference Range:3897K~4036K | | | |

| 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 | | | | | | | |

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 | | | |

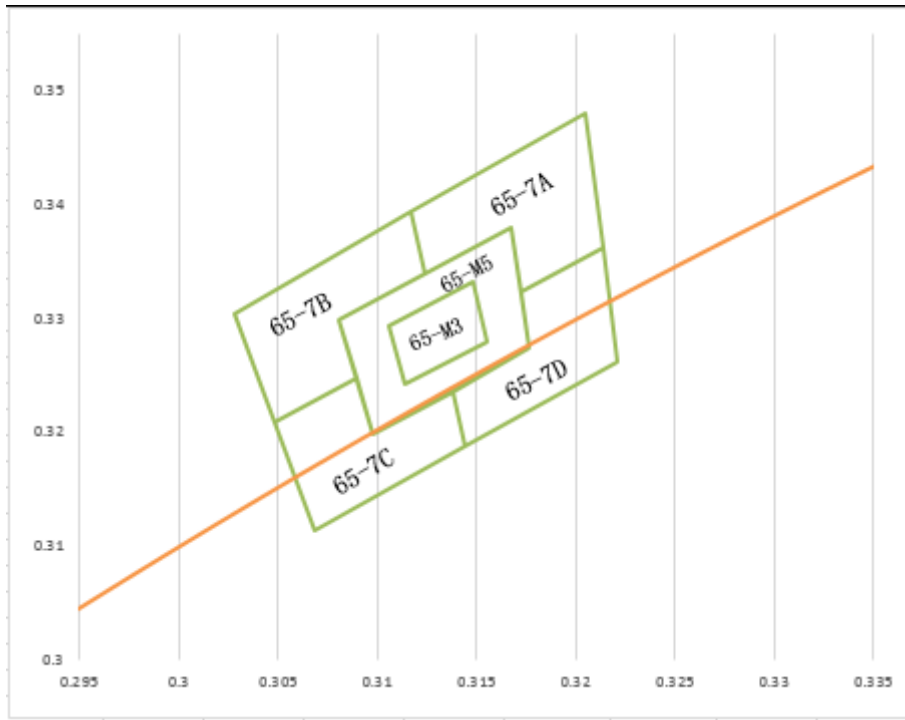
Bin Range of 5 STEP

| 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 | | | | | | | |

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 | | | |

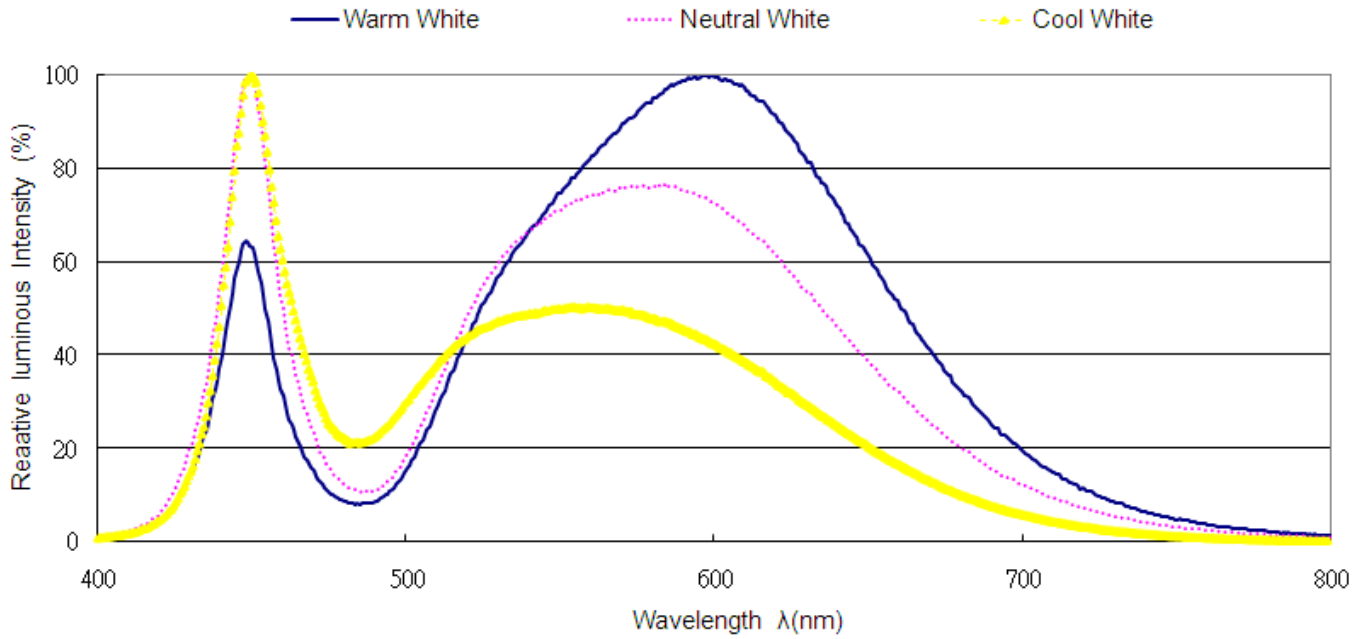
Bin Range of Chromaticity Coordinates

| 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 30mA.
2. Tolerance of Chromaticity Coordinates: ± 0.01 .
3. Bin Range of 3step & 5step can be shipped directly, 7A:7C and 7B:7D must be shipped in 1:1

Spectrum Distribution



Typical Electro-Optical Characteristics Curves

Fig.1 – Forward Voltage Shift vs. Junction Temperature

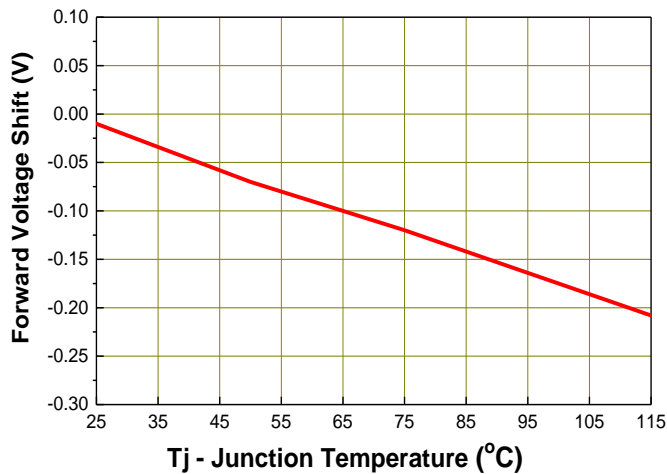
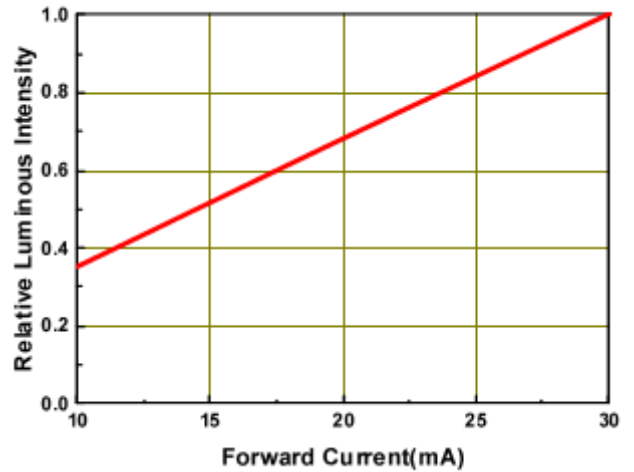


Fig.2 - Relative Luminous Intensity vs. Forward Current



Typical Electro-Optical Characteristics Curves

Fig.3 - Relative Luminous Intensity vs. Junction Temperature

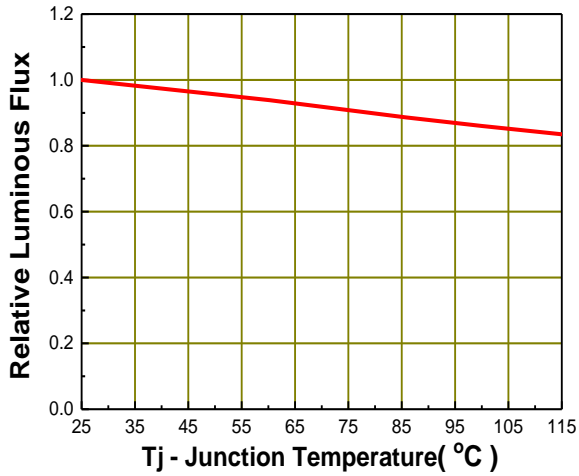


Fig.4 - Forward Current vs. Forward Voltage

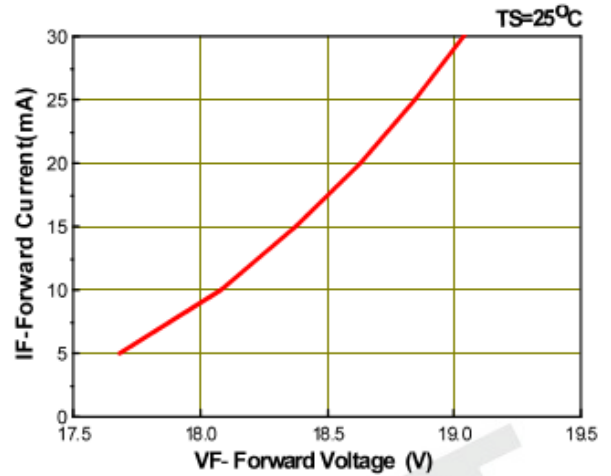


Fig.5 – Max. Driving Forward Current vs. Soldering Temperature

$R_{th\ j-s}=21\ ^\circ\text{C/W}$

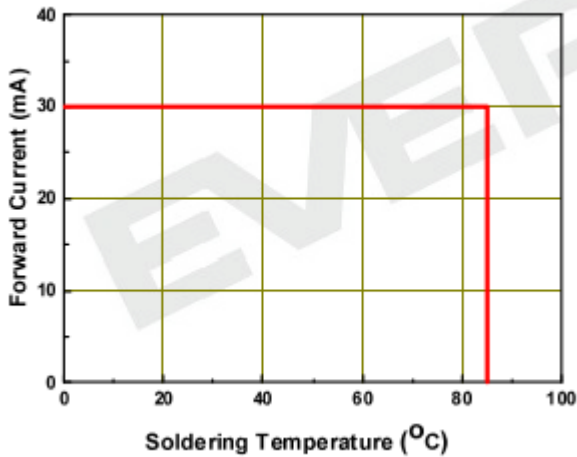
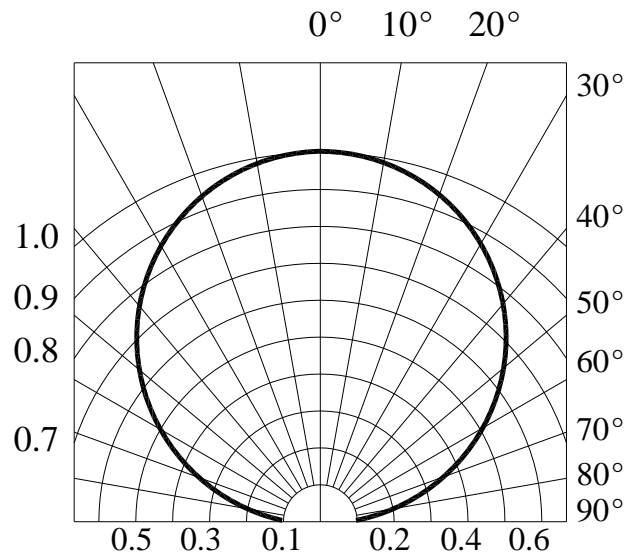
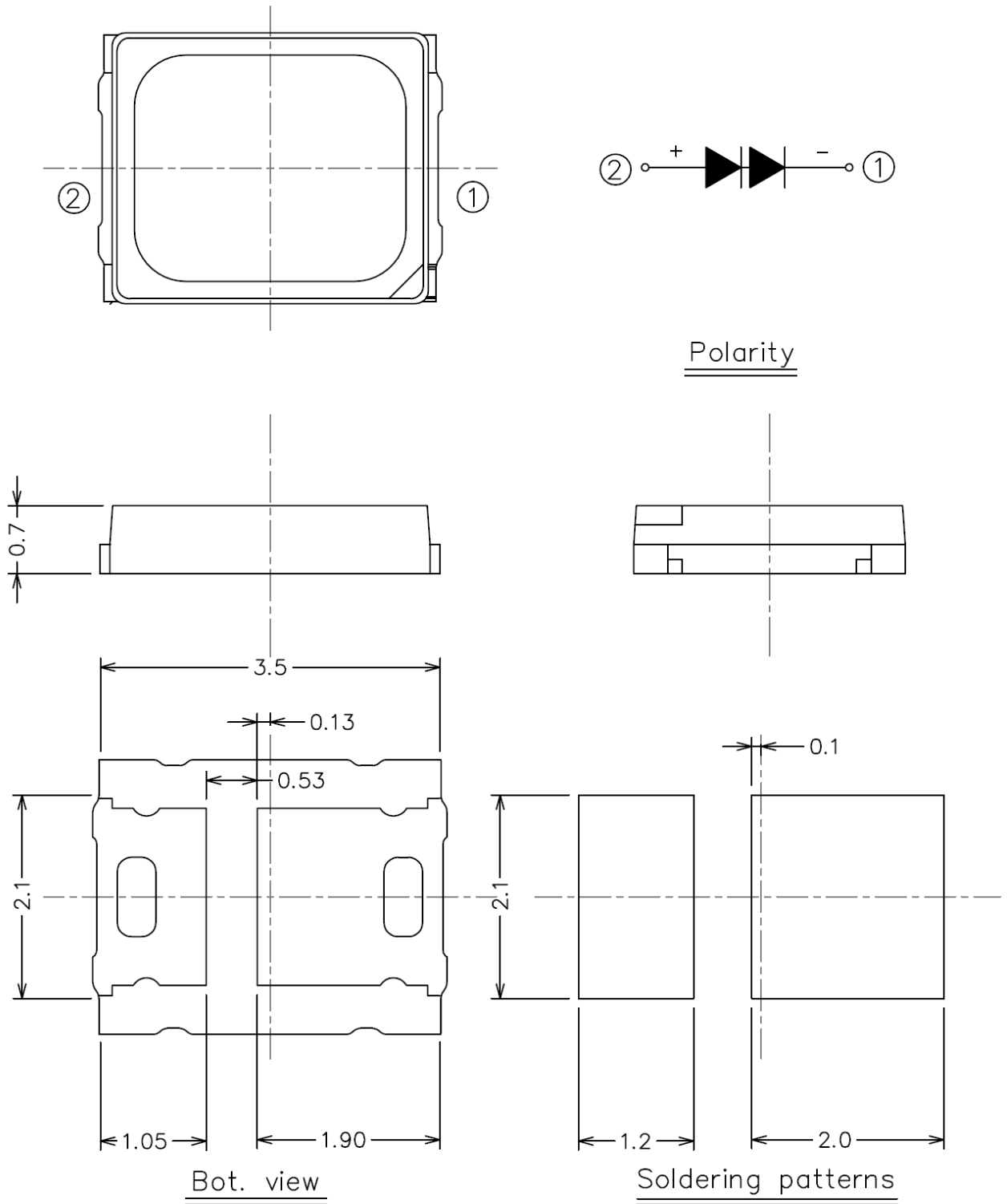


Fig.6 – Radiation Diagram



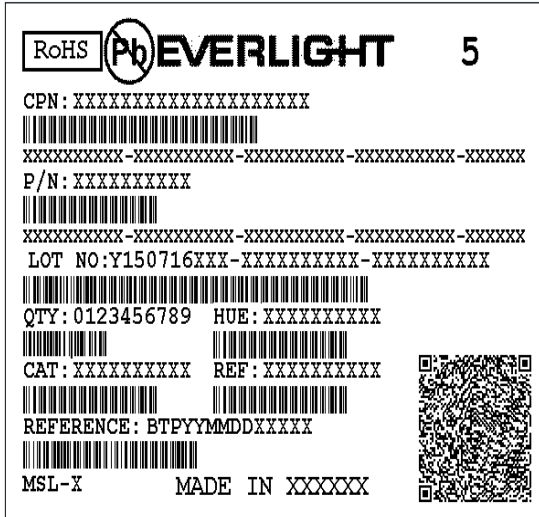
Package Dimension



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

Moisture Resistant Packing Materials

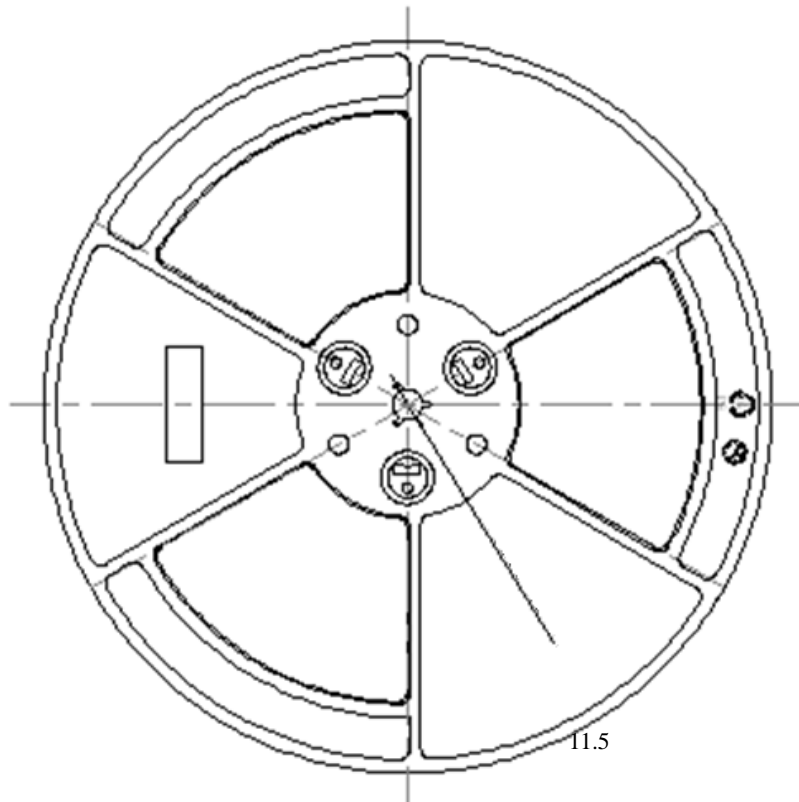
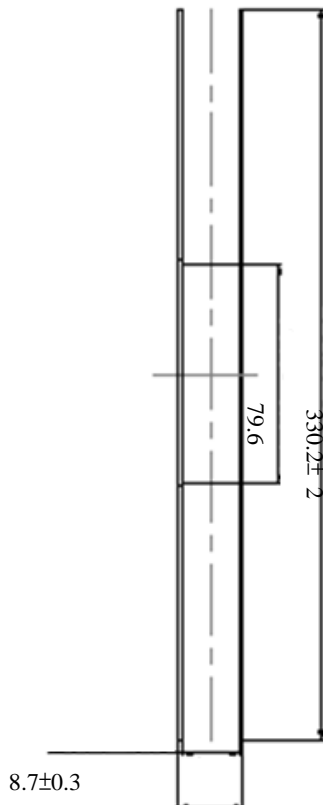
Label Explanation



- 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

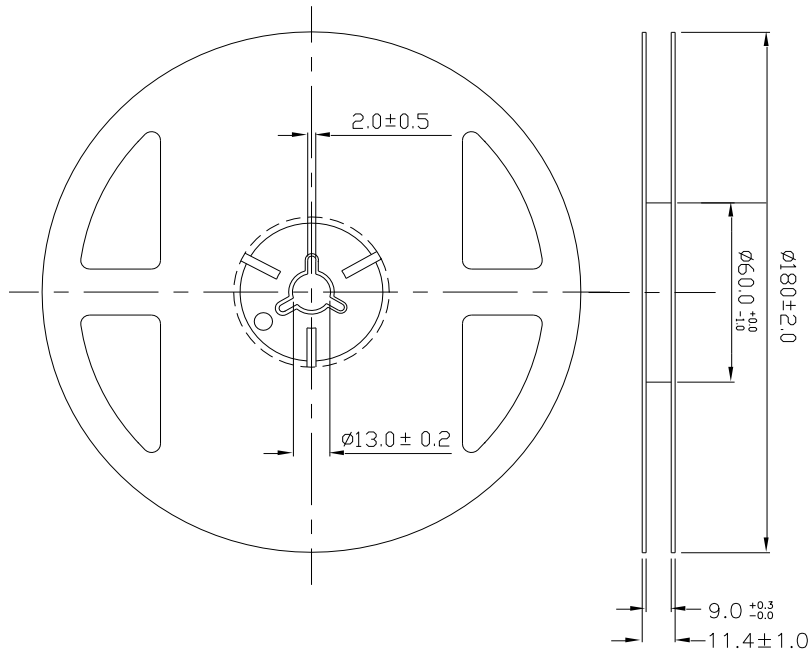
Reel Dimensions

1. Carrier Tape Dimensions:



1-1. Loaded Quantity 16000 pcs Per Reel

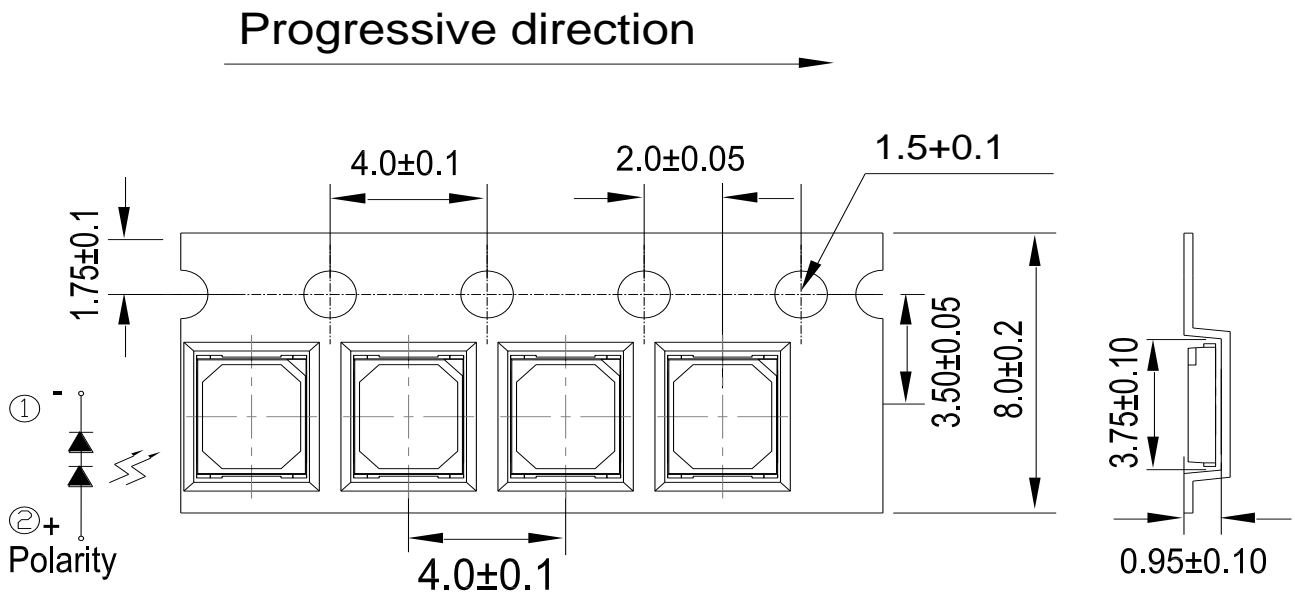
2.Carrier Tape Dimensions:



2-1.Loaded Quantity 2000/4000 pcs Per Reel

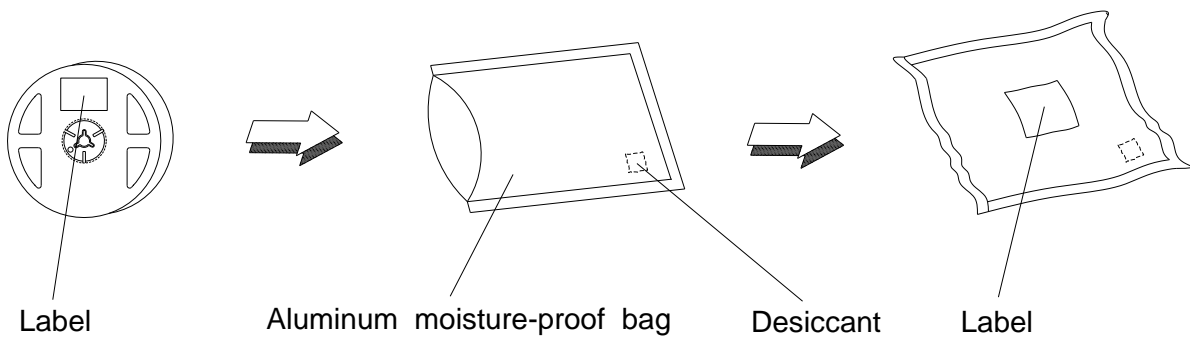
Note:

Tolerances unless mentioned ± 0.1 mm. Unit = mm



Note:
1. Tolerance unless mentioned is ±0.1mm; 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 _F =30mA | 1000 Hrs. | 8 PCS. | 0/1 |
| 4 | Low Temperature Life | Ta=-40°C, I _F = 30 mA | 1000 Hrs. | 8 PCS. | 0/1 |
| 5 | High Temperature Life | Ta=60°C, I _F =30 mA | 3000 Hrs. | 8 PCS. | 0/1 |
| 6 | High Temperature Life | Ta=85°C, I _F =30 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 : -40°C 20min | 200 Cycles | 8 PCS. | 0/1 |
| 9 | Power Temperature Cycle | H : +100°C 15min ∩ 5 min L : -40°C 15min I _F = 20 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.

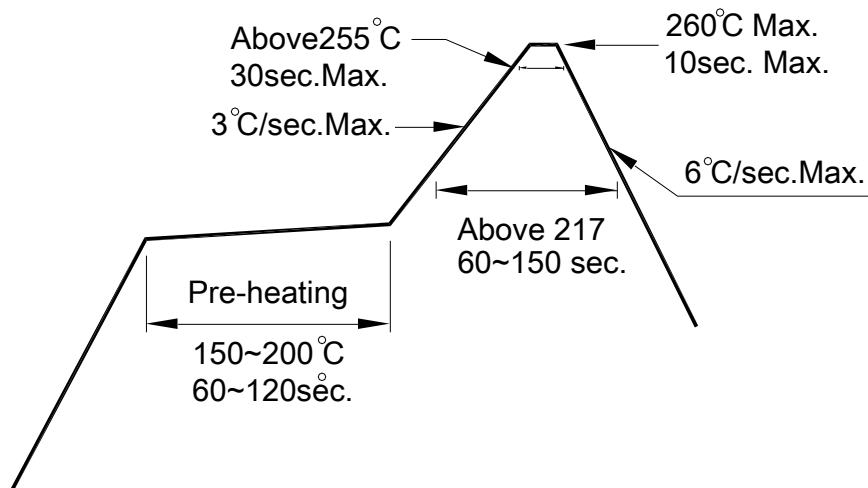
2.3 After opening the package: The LED's floor life is 168 Hrs under 30°C or less and 60% RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

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.

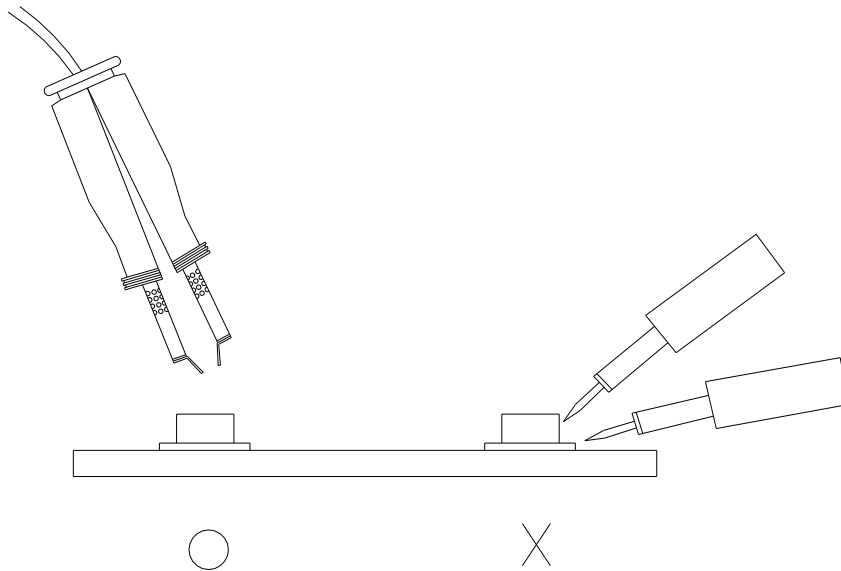
3.4 After soldering, do not warp the circuit board.

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.
5. These specification sheets include materials protected under copyright of EVERLIGHT. Reproduction in any form is prohibited without obtaining EVERLIGHT's prior consent.
6. This product is not intended to be used for military, aircraft, automotive, medical,