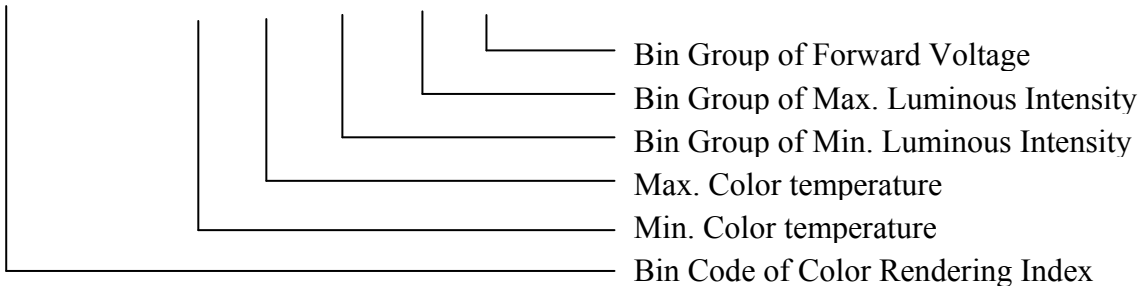
# Technical Data Sheet

# Top View LEDs

## GT3528/X2C-BXXXXXXXXX/2T

### Product Number Explanation

GT3528 / X 2 C - B XX XX XX XX XX / 2T




### Notes

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 |

**Notes:**

1. Tolerance of Color Rendering Index: ±2

Example:

GT3528/Q2C-B45562C4CB2/2T

| | |
|---|---|
| CRI | Min=75 |
| CCT | 4500K~5650K |
| IV | 2000mcd~2400mcd |
| VF | 2.9V~3.6V |

# Technical Data Sheet

# Top View LEDs

## GT3528/X2C-BXXXXXXXXX/2T

### Mass Production list

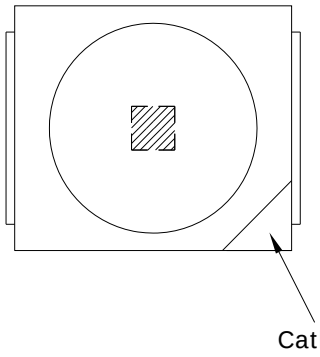
| Product | CRI min. | CCT(K) | $I_V$(mcd) Min | $I_V$(mcd) Max | Φ(lm) Typ. |
|---|---|---|---|---|---|
| GT3528/L2C-B56702C4CB2/2T | 70 | 5650K~7000K | 2000 | 2400 | 6.8 |
| GT3528/L2C-B50634C6CB2/2T | 70 | 5000K~6300K | 2200 | 2600 | 7.4 |
| GT3528/L2C-B50632C4CB2/2T | | | 2000 | 2400 | 6.8 |
| GT3528/ L2C-B45564C6CB2/2T | 70 | 4500K~5650K | 2200 | 2600 | 7.4 |
| GT3528/ L2C-B45562C4CB2/2T | | | 2000 | 2400 | 6.8 |
| GT3528/ L2C-B28322C4CB2/2T | 70 | 2850K~3250K | 2000 | 2400 | 6.8 |
| GT3528/ L2C-B2832AC2CB2/2T | | | 1800 | 2200 | 6.2 |
| GT3528/Q2C-B50632C4CB2/2T | 75 | 5000K~6300K | 2000 | 2400 | 6.8 |
| GT3528/Q2C-B5063AC2CB2/2T | | | 1800 | 2200 | 6.2 |
| GT3528/Q2C-B45562C4CB2/2T | 75 | 4500K~5650K | 2000 | 2400 | 6.8 |
| GT3528/Q2C-B4556AC2CB2/2T | | | 1800 | 2200 | 6.2 |
| GT3528/Q2C-B28322C4CB2/2T | 75 | 2850K~3250K | 2000 | 2400 | 6.8 |
| GT3528/Q2C-B2832AC2CB2/2T | | | 1800 | 2200 | 6.2 |

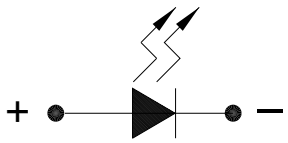
# Technical Data Sheet

# Top View LEDs

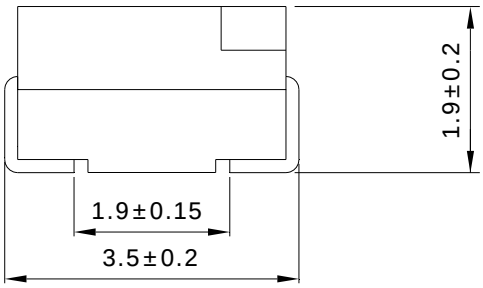
## GT3528/X2C-BXXXXXXXXX/2T

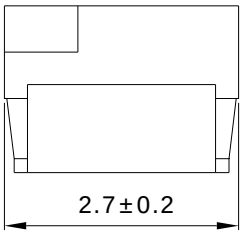
### Package Dimensions

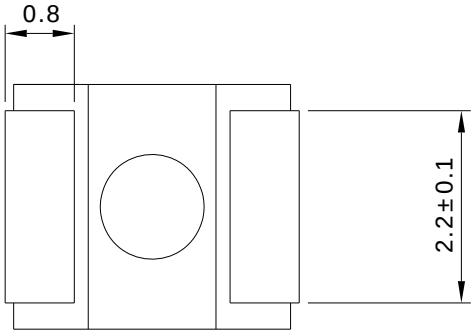


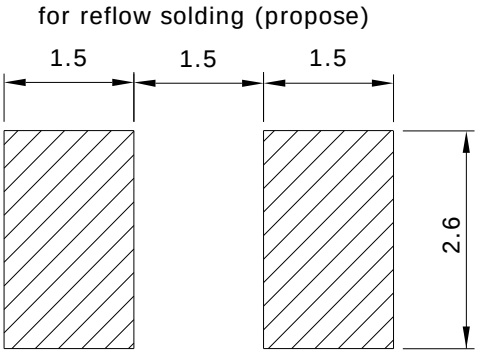




Polarity




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

# Technical Data Sheet

# Top View LEDs

**GT3528/X2C-BXXXXXXXXX/2T**

## Absolute Maximum Ratings (Ta=25℃)

| Parameter | Symbol | Rating | Unit |
|---|---|---|---|
| Reverse Voltage | $V_R$ | 5 | V |
| Forward Current | $I_F$ | 30 | mA |
| Peak Forward Current (Duty 1/10 @1KHz) | $I_{FP}$ | 100 | mA |
| Power Dissipation | Pd | 110 | mW |
| Electrostatic Discharge | ESD | 1000 | V |
| Operating Temperature | Topr | -40 ~ +85 | ℃ |
| Storage Temperature | Tstg | -40 ~ +90 | ℃ |
| Soldering Temperature | Tsol | Reflow Soldering : 260 ℃ for 10 sec.<br>Hand Soldering : 350 ℃ for 3 sec. | |

## Electro-Optical Characteristics (Ta=25℃)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| Viewing Angle | 2θ1/2 | ----- | 120 | ----- | deg | $I_F$=20mA |
| Reverse Current | $I_R$ | ----- | ----- | 10 | μA | $V_R$=5V |

# Technical Data Sheet

# Top View LEDs

## GT3528/X2C-BXXXXXXXXX/2T

### Bin Range of Luminous Intensity

| Bin Code | Min. | Max. | Unit | Condition |
|---|---|---|---|---|
| 4B | 1200 | 1400 | mcd | $I_F$=20mA |
| 6B | 1400 | 1600 | | |
| 8B | 1600 | 1800 | | |
| AC | 1800 | 2000 | | |
| 2C | 2000 | 2200 | | |
| 4C | 2200 | 2400 | | |
| 6C | 2400 | 2600 | | |
| 8C | 2600 | 2800 | | |

### Bin Range of Forward Voltage

| Group | | Bin Code | Min. | Max. | Unit | Condition |
|---|---|---|---|---|---|---|
| G | | 34 | 2.7 | 2.8 | V | $I_F$=20mA |
| | | 35 | 2.8 | 2.9 | | |
| | B2 | 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 | | |
| | | 42 | 3.5 | 3.6 | | |
| | | 43 | 3.6 | 3.7 | | |

**Notes:**

1. Tolerance of Luminous Intensity: ±11%
2. Tolerance of Forward Voltage: ±0.05V

# Technical Data Sheet

# Top View LEDs

## GT3528/X2C-BXXXXXXXXX/2T

**Bin Range of Chromaticity Coordinates** $I_F$=20mA

| CCT | Bin Code | CIE_x | CIE_y | CCT | Bin Code | CIE_x | CIE_y |
|---|---|---|---|---|---|---|---|
| 7000K ~6300K | X5 | 0.3031 | 0.3327 | 5000K ~4500K | U5 | 0.3469 | 0.3717 |
| | | 0.3148 | 0.3444 | | | 0.3642 | 0.3829 |
| | | 0.3160 | 0.3332 | | | 0.3622 | 0.3716 |
| | | 0.3052 | 0.3224 | | | 0.3458 | 0.3592 |
| | X6 | 0.3052 | 0.3224 | | U6 | 0.3458 | 0.3592 |
| | | 0.3160 | 0.3332 | | | 0.3622 | 0.3716 |
| | | 0.3175 | 0.3204 | | | 0.3594 | 0.3557 |
| | | 0.3076 | 0.3108 | | | 0.3444 | 0.3442 |
| 6300K ~5650K | W5 | 0.3148 | 0.3444 | 3250K ~3050K | P5 | 0.4312 | 0.4234 |
| | | 0.3288 | 0.3569 | | | 0.4456 | 0.4287 |
| | | 0.3290 | 0.3451 | | | 0.4376 | 0.4116 |
| | | 0.3160 | 0.3332 | | | 0.4240 | 0.4065 |
| | W6 | 0.3160 | 0.3332 | | P6 | 0.4240 | 0.4065 |
| | | 0.3290 | 0.3451 | | | 0.4376 | 0.4116 |
| | | 0.3292 | 0.3313 | | | 0.4294 | 0.3943 |
| | | 0.3175 | 0.3204 | | | 0.4165 | 0.3890 |
| 5650K ~5000K | V5 | 0.3288 | 0.3569 | 3050K ~2850K | N5 | 0.4456 | 0.4287 |
| | | 0.3469 | 0.3717 | | | 0.4614 | 0.4333 |
| | | 0.3458 | 0.3592 | | | 0.4525 | 0.4162 |
| | | 0.3290 | 0.3451 | | | 0.4376 | 0.4116 |
| | V6 | 0.3290 | 0.3451 | | N6 | 0.4376 | 0.4116 |
| | | 0.3458 | 0.3592 | | | 0.4525 | 0.4162 |
| | | 0.3444 | 0.3442 | | | 0.4436 | 0.3991 |
| | | 0.3292 | 0.3313 | | | 0.4294 | 0.3943 |

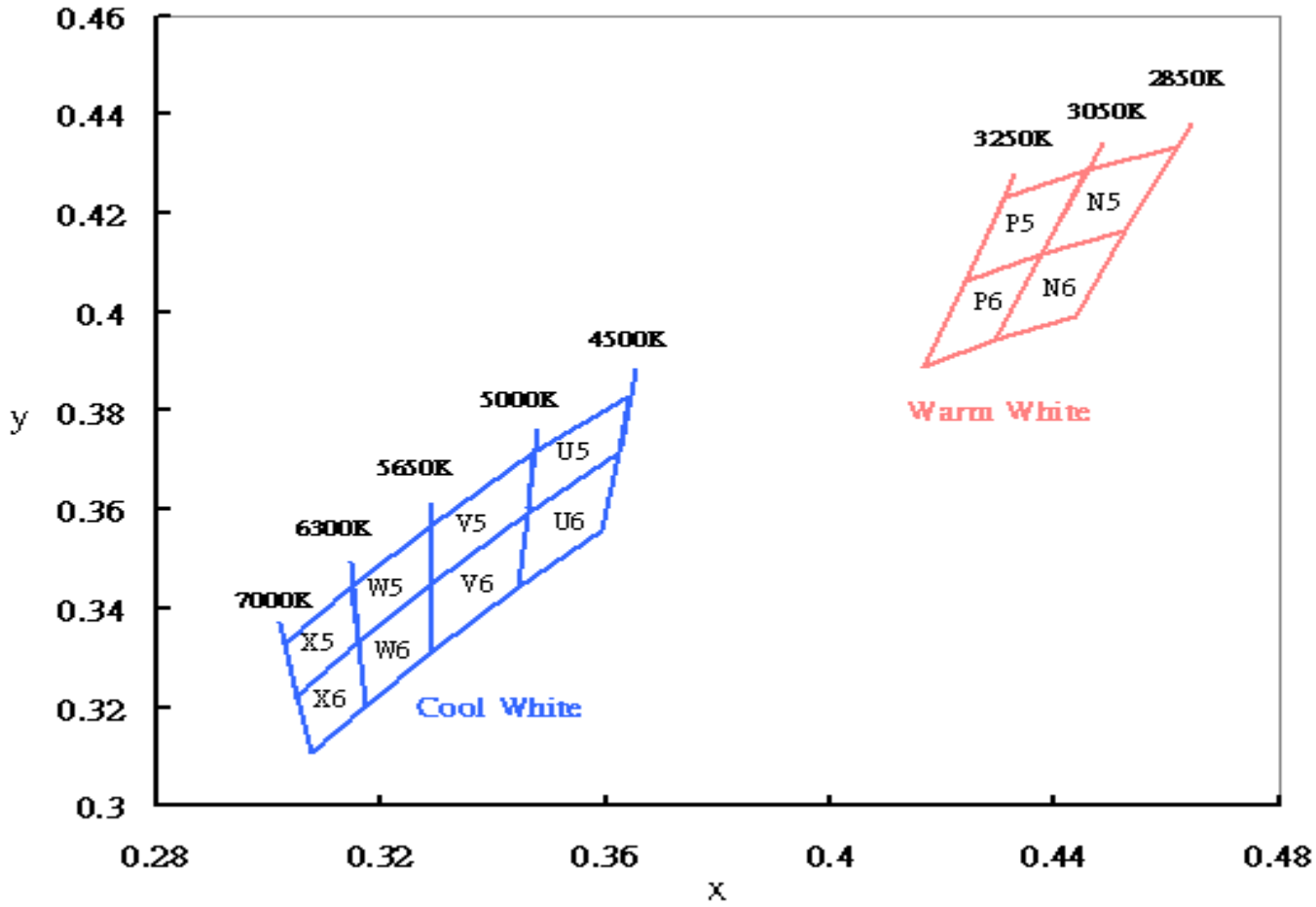
**Note:** Tolerance of Chromaticity Coordinates: ±0.01

# Technical Data Sheet

# Top View LEDs

**GT3528/X2C-BXXXXXXXXX/2T**

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



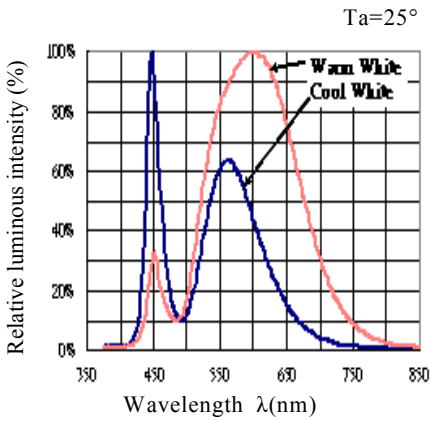
# Technical Data Sheet

# Top View LEDs

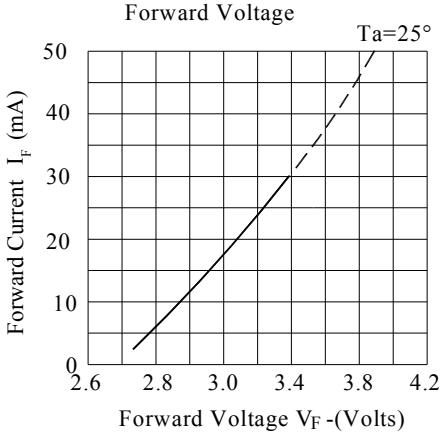
## GT3528/X2C-BXXXXXXXXX/2T

## Typical Electro-Optical Characteristics Curves

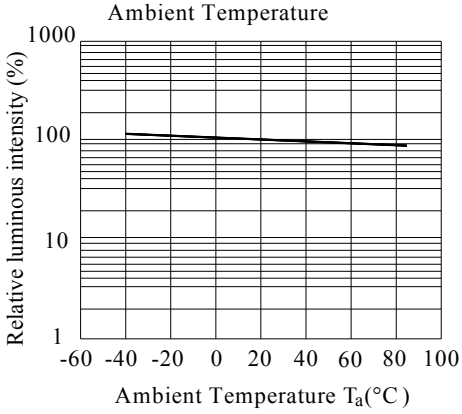
Spectrum Distribution



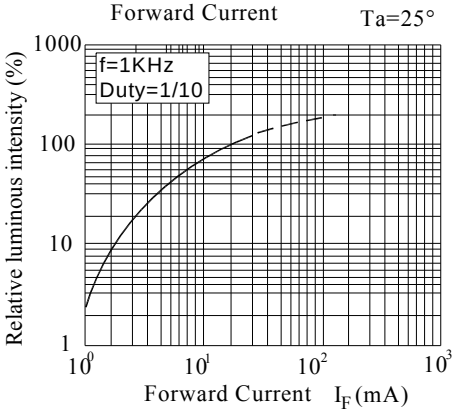

Forward Current vs. Forward Voltage



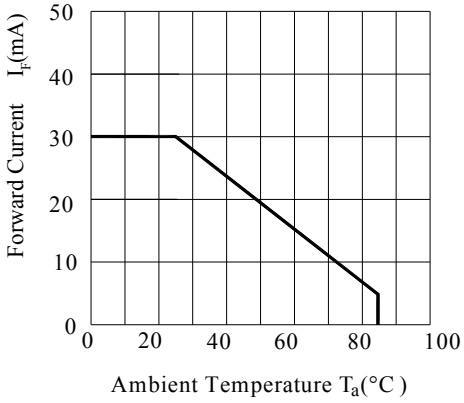

Relative Luminous Intensity vs. Ambient Temperature



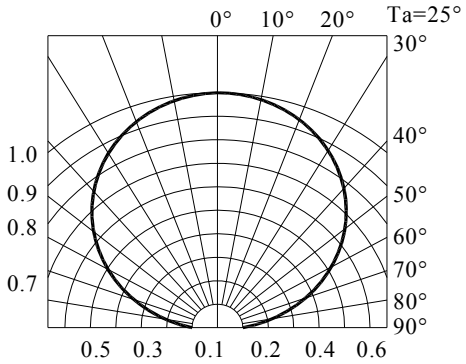

Relative Luminous Intensity vs. Forward Current




Forward Current Derating Curve




Radiation Diagram



# Technical Data Sheet

# Top View LEDs

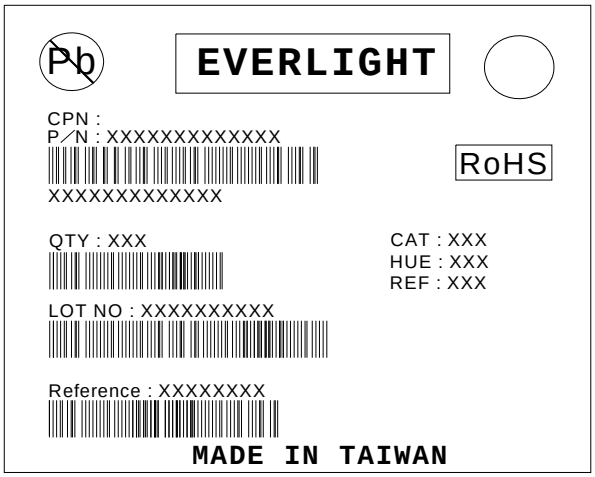
## GT3528/X2C-BXXXXXXXXX/2T

### Label Explanation

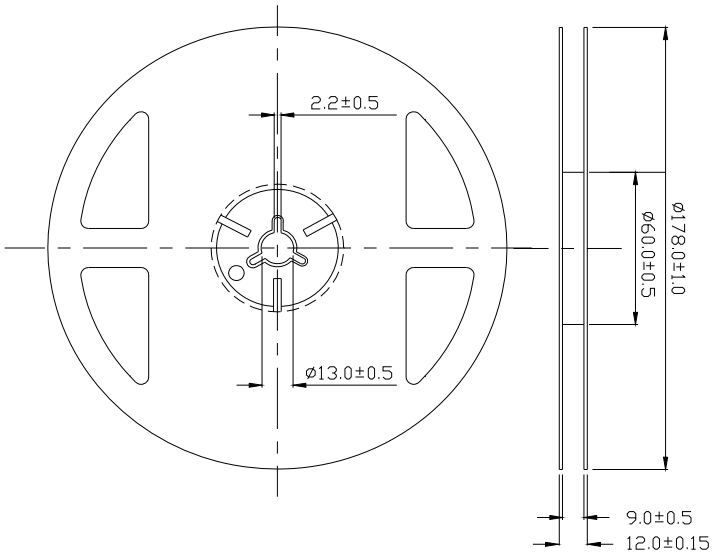
**CAT: Luminous Intensity Rank**

**HUE: Chromaticity Coordinates**

**REF: Forward Voltage Rank**




### Reel Dimensions



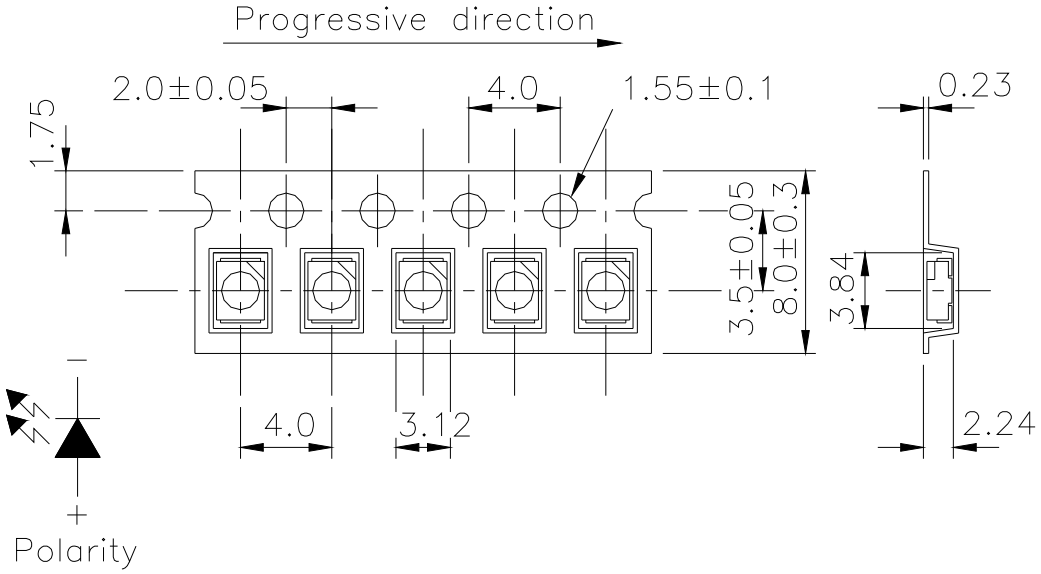

**Note**: Tolerance unless mentioned is ±0.1mm; Unit = mm

# Technical Data Sheet

# Top View LEDs

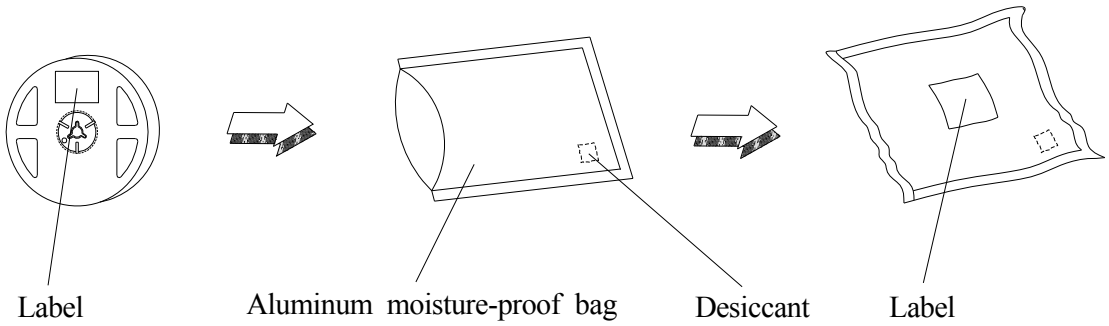
**GT3528/X2C-BXXXXXXXXX/2T**

**Carrier Tape Dimensions: Loaded Quantity 2000 pcs Per Reel.**




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

## Moisture Resistant Packaging



# Technical Data Sheet

# Top View LEDs

**GT3528/X2C-BXXXXXXXXX/2T**

## 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℃±5℃<br>Min. 5sec. | 6 Min. | 22 PCS. | 0/1 |
| 2 | Temperature Cycle | H : +100℃ 15min<br>∫ 5 min<br>L : -40℃ 15min | 300 Cycles | 22 PCS. | 0/1 |
| 3 | Thermal Shock | H : +100℃ 5min<br>∫ 10 sec<br>L : -10℃ 5min | 300 Cycles | 22 PCS. | 0/1 |
| 4 | High Temperature Storage | Temp. : 100℃ | 1000 Hrs. | 22 PCS. | 0/1 |
| 5 | Low Temperature Storage | Temp. : -40℃ | 1000 Hrs. | 22 PCS. | 0/1 |
| 6 | DC Operating Life | $I_F$ = 20 mA | 1000 Hrs. | 22 PCS. | 0/1 |
| 7 | High Temperature / High Humidity | 85℃/ 85%RH | 1000 Hrs. | 22 PCS. | 0/1 |

**GT3528/X2C-BXXXXXXXXX/2T**

## 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.

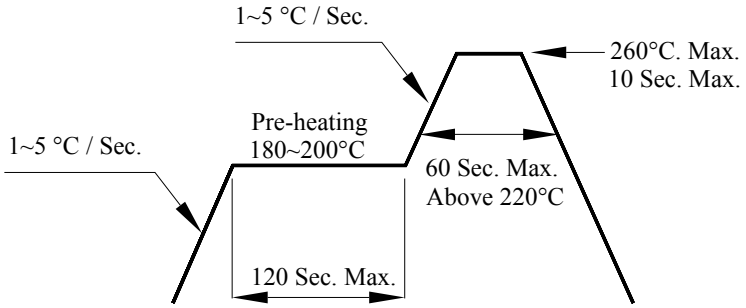
   2.2 Before opening the package: The LEDs should be kept at 30℃ or less and 90%RH or less.

   2.3 After opening the package: The LED's floor life are 168 hours 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




   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.