



# Technical Data Sheet

## Mini Top View LEDs

**65-21-G6C-B0P2R1B7E-2T8-AM**



### Feature

- RoHS compliant.
- P-LCC-2 package.
- Colorless clear resin.
- Wide viewing angle 120°.
- Inner reflector and white package .
- Brightness: 56 to 140mcd at 20mA.
- Qualification according to AEC-Q101 rev C.
- Precondition: Bases on JEDEC J-STD 020D Level 3.
- Useable in severe lead free processes with automotive reflow profile (IR reflow or wave soldering)

### Applications

- Automotive backlighting or indicator: Dashboard, switch, audio and video equipments...etc.
- Backlight: LCD, switches, symbol, mobile phone and illuminated advertising.
- Display for indoor and outdoor application.
- Ideal for coupling into light guides.
- Substitution of traditional light.
- Optical indicator.
- General applications.

### Device Selection Guide

| Chip     | Emitted Color          | Resin Color |
|----------|------------------------|-------------|
| Material |                        |             |
| AlGaInP  | Brilliant Yellow Green | Green       |



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## Absolute Maximum Ratings (Ta=25°C)

| Parameter                                 | Symbol        | Rating  | Unit |
|---|---------------|---|------|
| Reverse Voltage                           | $V_R$         | 10  | V    |
| Forward Current                           | $I_F$         | 25  | mA   |
| Peak Forward Current<br>(Duty 1/10 @1KHz) | $I_{FP}$      | 60  | mA   |
| Power Dissipation                         | $P_d$         | 60  | mW   |
| Junction Temperature                      | $T_j$         | 115   | °C   |
| Operating Temperature                     | $T_{opr}$     | -40 ~ +100  | °C   |
| Storage Temperature                       | $T_{stg}$     | -40 ~ +100  | °C   |
| Thermal Resistance                        | $R_{th\ J-A}$ | 500   | K/W  |
|   | $R_{th\ J-S}$ | 400   | K/W  |
| ESD<br>(Classification acc. AEC Q101)     | $ESD_{HBM}$   | 2000  | V    |
|   | $ESD_{MM}$    | 200   | V    |
| Soldering Temperature                     | $T_{sol}$     | Reflow Soldering : 260 °C for 30 sec.<br>Hand Soldering : 350 °C for 3 sec. |      |

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## Electro-Optical Characteristics (Ta=25°C)

| Parameter                              | Symbol           | Min.  | Typ. | Max.  | Unit          | Condition           |
|--|------------------|-------|------|-------|---------------|---------------------|
| Luminous Intensity                     | $I_v$            | 56    | ---  | 140   | mcd           | $I_F = 20\text{mA}$ |
| Viewing Angle                          | $2\theta_{1/2}$  | ---   | 120  | ---   | deg           | $I_F = 20\text{mA}$ |
| Peak Wavelength                        | $\lambda_p$      | ---   | 575  | ---   | nm            | $I_F = 20\text{mA}$ |
| Dominant Wavelength                    | $\lambda_d$      | 567.5 | ---  | 575.5 | nm            | $I_F = 20\text{mA}$ |
| Spectrum Radiation Bandwidth           | $\Delta\lambda$  | ---   | 20   | ---   | nm            | $I_F = 20\text{mA}$ |
| Forward Voltage                        | $V_F$            | 1.7   | ---  | 2.4   | V             | $I_F = 20\text{mA}$ |
| Reverse Current                        | $I_R$            | ---   | ---  | 10    | $\mu\text{A}$ | $V_R = 10\text{V}$  |
| Temperature coefficient of $\lambda_p$ | $TC_{\lambda_p}$ | ---   | 0.13 | ---   | nm/K          | $I_F = 20\text{mA}$ |
| Temperature coefficient of $\lambda_d$ | $TC_{\lambda_d}$ | ---   | 0.12 | ---   | nm/K          | $I_F = 20\text{mA}$ |
| Temperature coefficient of $V_F$       | $TC_V$           | ---   | -2.5 | ---   | mV/K          | $I_F = 20\text{mA}$ |

Note:

1. Tolerance of Luminous Intensity:  $\pm 11\%$
2. Tolerance of Dominant Wavelength:  $\pm 1\text{nm}$
3. Tolerance of Forward Voltage:  $\pm 0.1\text{V}$

**Technical Data Sheet****Mini Top View LEDs****65-21-G6C-B0P2R1B7E-2T8-AM****Bin Range of Luminous Intensity**

| Bin Code | Min. | Max. | Unit | Condition            |
|----------|------|------|------|----------------------|
| P2       | 56   | 71   | mcd  | I <sub>F</sub> =20mA |
| Q1       | 71   | 90   |      |                      |
| Q2       | 90   | 112  |      |                      |
| R1       | 112  | 140  |      |                      |

Note:

Tolerance of Luminous Intensity: ±11%

**Bin Range of Dominant Wavelength**

| Bin Code | Min.  | Max.  | Unit | Condition            |
|----------|-------|-------|------|----------------------|
| C15      | 567.5 | 569.5 | nm   | I <sub>F</sub> =20mA |
| C16      | 569.5 | 571.5 |      |                      |
| C17      | 571.5 | 573.5 |      |                      |
| C18      | 573.5 | 575.5 |      |                      |

Note:

Tolerance of Dominant Wavelength: ±1nm

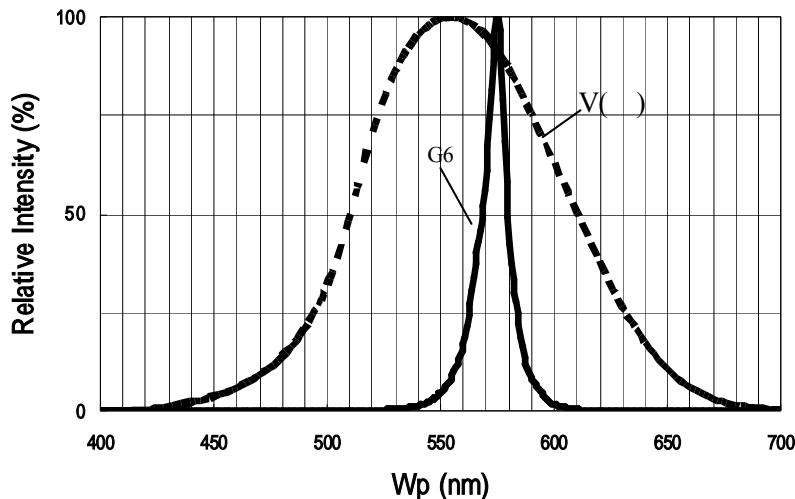
Technical Data Sheet

Mini Top View LEDs

**65-21-G6C-B0P2R1B7E-2T8-AM**

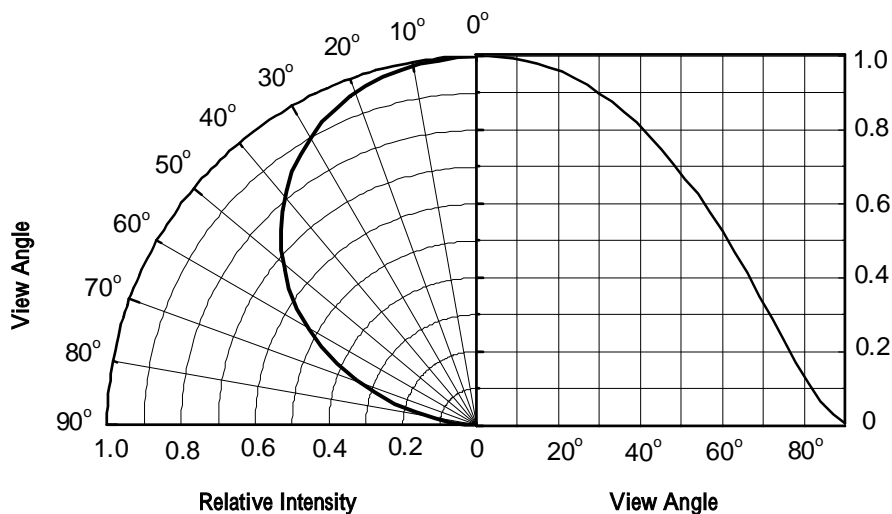
Typical Electro-Optical Characteristics Curves

Typical Curve of Spectral Distributio



Note:  $V(\lambda)$ =Standard eye response curve;  $I_F = 20\text{mA}$

Diagram Characteristics of Radiation



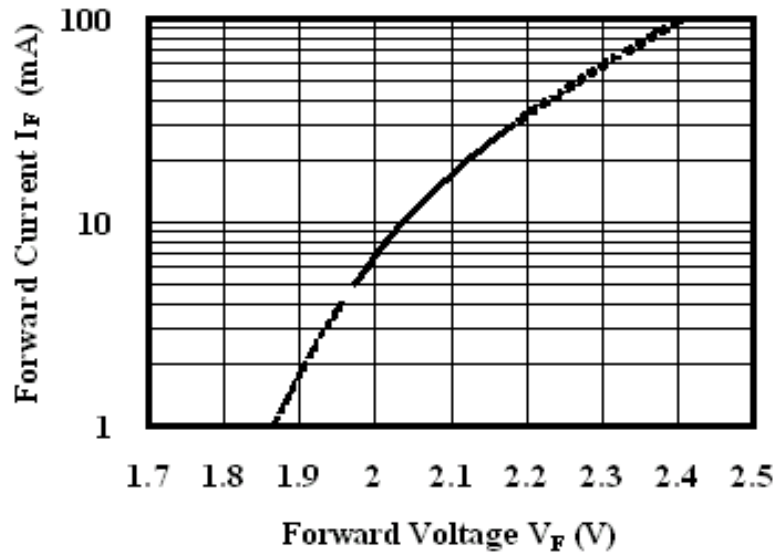


Technical Data Sheet

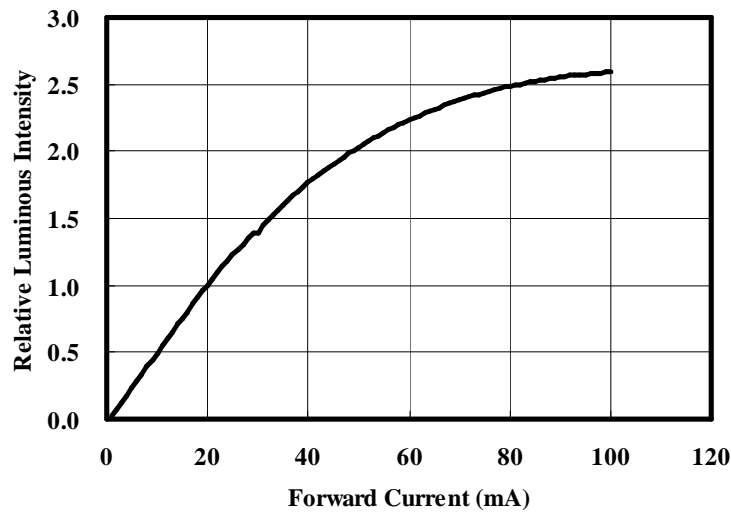
Mini Top View LEDs

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Forward Current vs. Forward Voltage (Ta=25°C)



Forward Current vs. Relative Luminous Intensity (Ta=25°C)



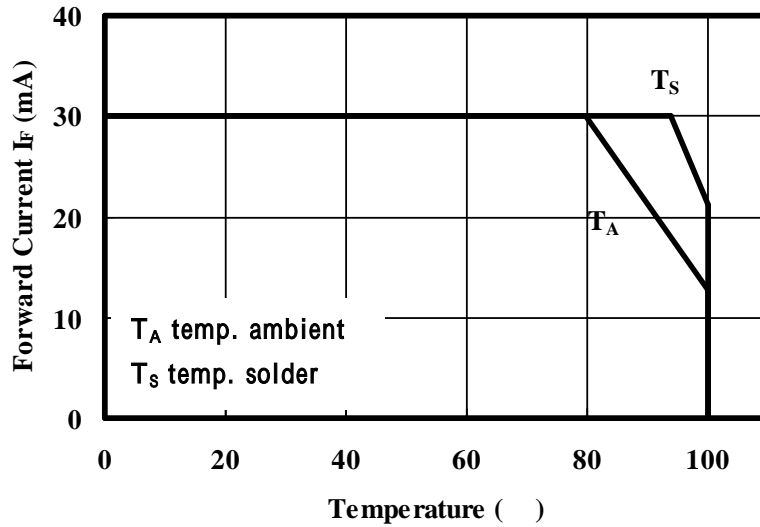


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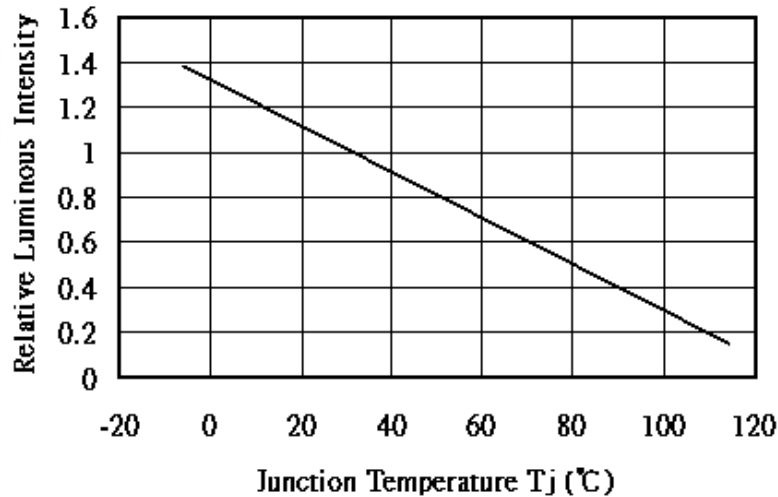
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Forward current vs. Ambient and Solder Temperature



Relative Luminous Intensity vs. Junction Temperature



Note:  $f(T_j) = I_v / I_v(25^\circ\text{C})$ ;  $I_F = 20\text{mA}$

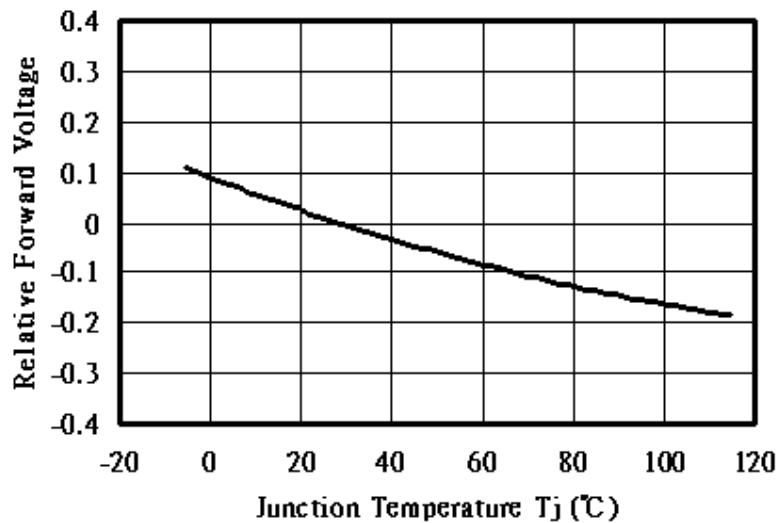


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Relative Forward Voltage vs. Junction Temperature



Note:  $\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j)$ ;  $I_F = 20\text{mA}$

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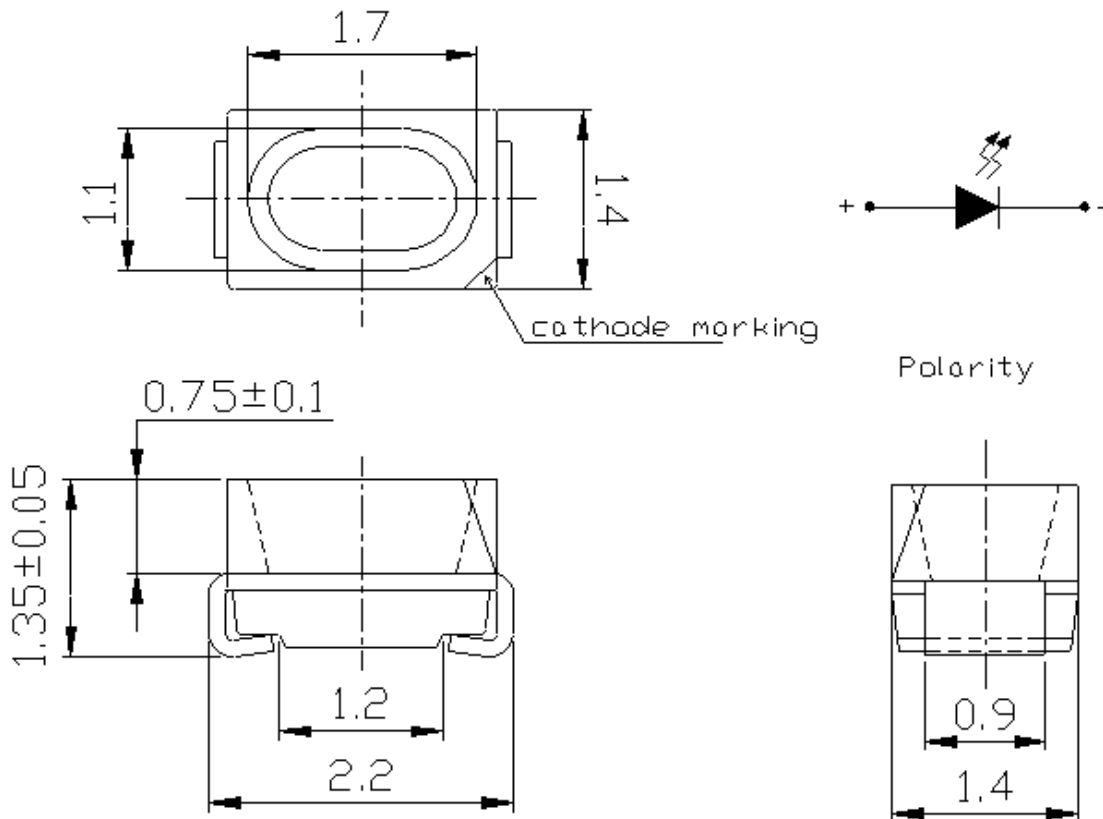


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Package Dimension



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



Technical Data Sheet

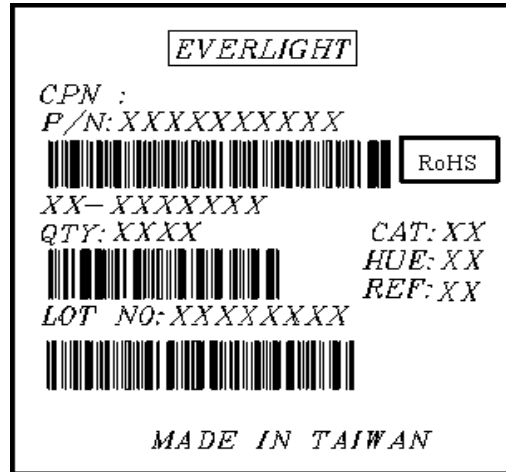
Mini Top View LEDs

65-21-G6C-B0P2R1B7E-2T8-AM

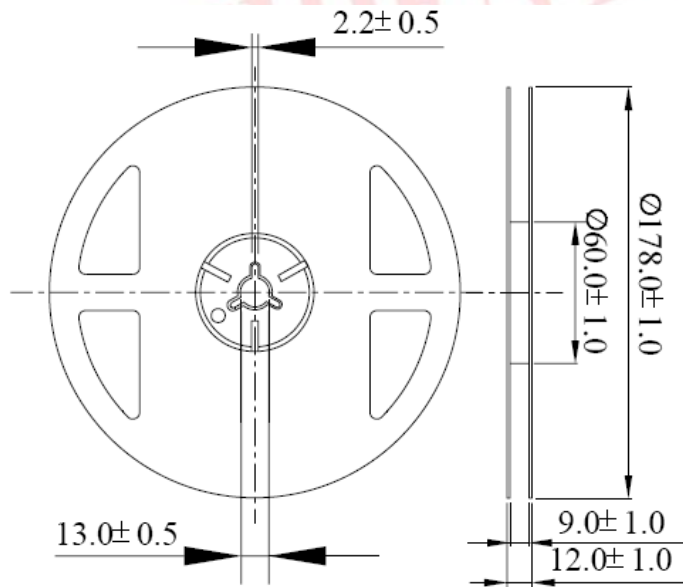
Moisture Resistant Packing Materials

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: Unit = mm

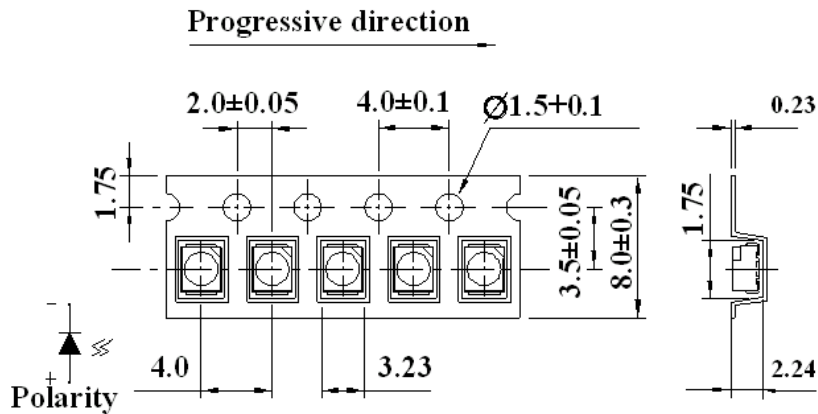


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Mini Top View LEDs

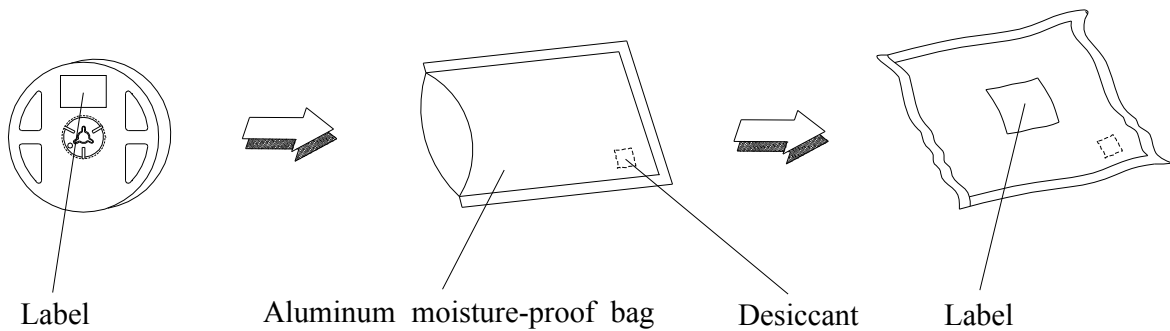
**65-21-G6C-B0P2R1B7E-2T8-AM**

Carrier Tape Dimensions: Loaded Quantity 2000 pcs Per Reel



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

Moisture Resistant Packing Process



Technical Data Sheet

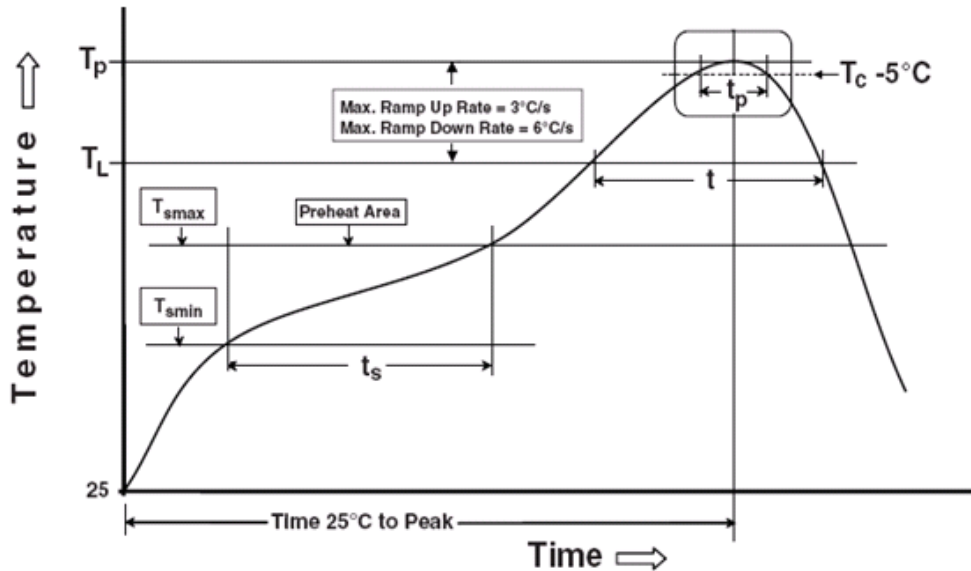
Mini Top View LEDs

**65-21-G6C-B0P2R1B7E-2T8-AM**

**Precautions for Use**

**1. Soldering Condition**

1.1 (A) Maximum Body Case Temperature Profile for evaluation of Reflow Profile



Note:

**Preheat**

|  |                 |
|--|-----------------|
| Temperature min ( $T_{smin}$ )               | 150 °C          |
| Temperature max ( $T_{smax}$ )               | 200°C           |
| Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )  | 60-120 seconds  |
| Average ramp-up rate ( $T_{smax}$ to $T_p$ ) | 3 °C/second max |

**Other**

|  |                  |
|--|------------------|
| Liquidus Temperature ( $T_L$ )                                 | 217 °C           |
| Time above Liquidus Temperature ( $t_L$ )                      | 60-150 sec       |
| Peak Temperature ( $T_P$ )                                     | 260°C            |
| Time within 5 °C of Actual Peak Temperature: $T_P - 5^\circ C$ | 30 s             |
| Ramp- Down Rate from Peak Temperature                          | 6°C /second max. |
| Time 25°C to peak temperature                                  | 8 minutes max.   |
| Reflow times   | 3 times          |

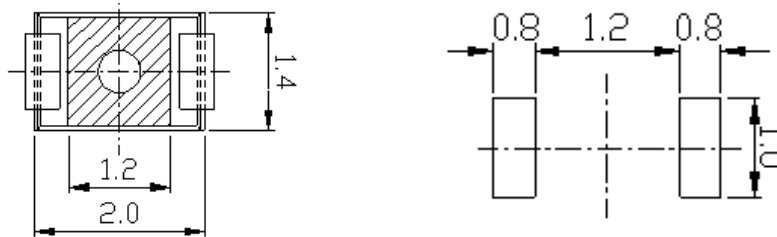
All parameters are maximum body case temperature values and cannot be considered as a soldering profile. The body temperature was measured by soldering a thermal couple to the soldering point of LEDs.

Reference: IPC/JEDEC J-STD-020D

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

#### 2. Current limiting

A resistor should be used to limit current spikes that can be caused by voltage fluctuations. Otherwise damage could occur.

#### 3. Storage

- 3.1 Moisture proof bag should only be opened immediately prior to usage.
- 3.2 Environment should be less than 30°C and 90% RH when moisture proof bag is opened.
- 3.3 After opening the package MSL Conditions stated on page 1 of this spec should not be exceeded.
- 3.4 If the moisture sensitivity card indicates higher than acceptable moisture, the component should be baked at min. 60deg +/-5deg for 25 hours.

#### 4. Iron Soldering

Hand soldering is not recommended for regular production. These guidelines are for rework only. Soldering iron tip should contact each terminal no more than 3 sec at 350°C, using soldering iron with nominal power less than 25W. Allow min. 2 sec. between soldering intervals.

#### 5. Usage

Do not exceed the values given in this specification.

#### Application Restrictions

High reliability applications such as military/aerospace, automotive safety/security systems, and medical equipment may require different product. If you have any concerns, please contact Everlight before using this product in your application. This specification guarantees the quality and performance of the product as an individual component. Do not use this product beyond the specification described in this document.