

### EL Mini Top View LED 1608-PA0100M-AM(CG)

**Preliminary**



#### Features

- Package: PLCC 2 package
- Color: PC Amber
- Typical luminous intensity : 710 mcd @ 10mA
- Viewing angle : 120°
- ESD : up to 2KV
- MSL : 2
- Compliance with RoHS & REACH
- Compliance Halogen Free. (Br<900ppm, Cl<900ppm, Br+Cl<1500ppm)

#### Applications

- Automotive Interior Lighting.

## Contents

|                                          |           |
|------------------------------------------|-----------|
| <b>1.Characteristics .....</b>           | <b>3</b>  |
| <b>2.Absolute Maximum Ratings .....</b>  | <b>4</b>  |
| <b>3.Characteristics Graph.....</b>      | <b>5</b>  |
| <b>4.Binning Information .....</b>       | <b>9</b>  |
| <b>5.Part Number.....</b>                | <b>12</b> |
| <b>6.Ordering Information .....</b>      | <b>13</b> |
| <b>7.Mechanical Dimension.....</b>       | <b>14</b> |
| <b>8.Recommended Soldering Pad .....</b> | <b>15</b> |
| <b>9.Reflow Soldering Profile .....</b>  | <b>15</b> |
| <b>10.Packaging Information.....</b>     | <b>16</b> |
| <b>11.Precaution for Use.....</b>        | <b>18</b> |

## 1. Characteristics

| Parameter                                  |            | Symbol             | Min. | Typ.  | Max. | Unit | Condition         |
|--------------------------------------------|------------|--------------------|------|-------|------|------|-------------------|
| Forward Current                            |            | $I_F$              | 1    | 10    | 20   | mA   | ---               |
| Luminous Intensity <sup>[1][2]</sup>       |            | $I_V$              | 610  | 710   | 970  | mcd  | $I_F=10\text{mA}$ |
| Forward Voltage <sup>[3]</sup>             |            | $V_F$              | 2.5  | 2.85  | 3.5  | V    | $I_F=10\text{mA}$ |
| Viewing Angle                              |            | $\phi$             | ---  | 120   | ---  | deg  | $I_F=10\text{mA}$ |
| Color <sup>[4]</sup>                       |            | CIE x              | ---  | 0.563 | ---  | ---  | $I_F=10\text{mA}$ |
|                                            |            | CIE y              | ---  | 0.425 | ---  | ---  | $I_F=10\text{mA}$ |
| Thermal Resistance<br>(Junction to Solder) | Real       | $R_{th\ JS\ real}$ | ---  | 160   | ---  | K/W  | $I_F=10\text{mA}$ |
|                                            | Electrical | $R_{th\ JS\ el}$   | ---  | 140   | ---  |      |                   |

### Noes:

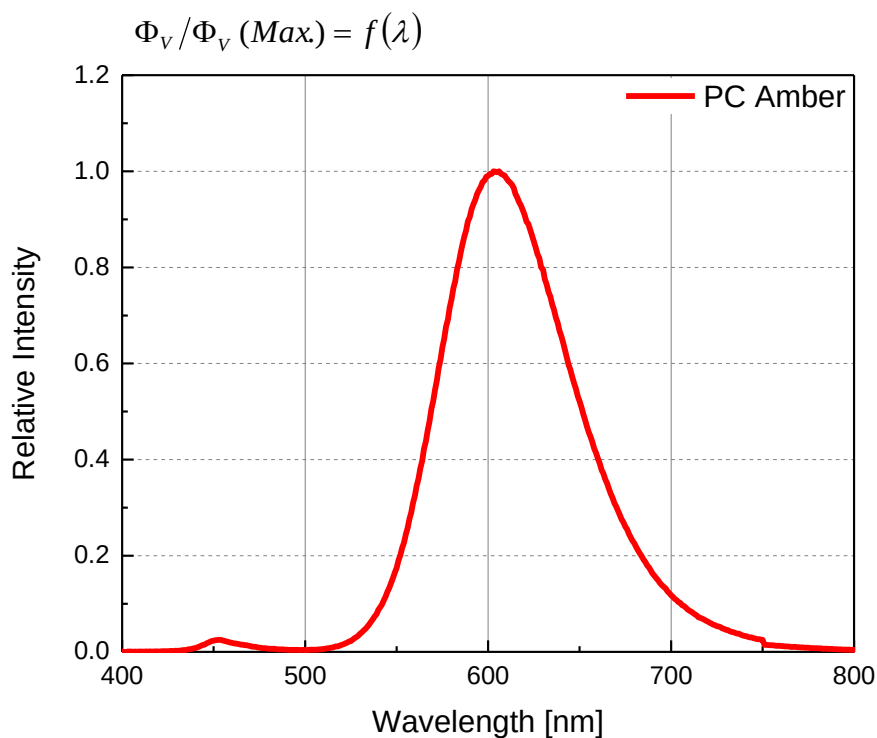
1. Luminous Intensity measurement tolerance:  $\pm 8\%$ .
2. The data of Luminous Intensity measured at thermal pad=25°C
3. Forward voltage measurement tolerance:  $\pm 0.05\text{V}$
4. Tolerance of Chromaticity Coordinates x,y :  $\pm 0.005$

## 2. Absolute Maximum Ratings

| Parameter                                                             | Symbol      | Ratings                            | Unit       |
|-----------------------------------------------------------------------|-------------|------------------------------------|------------|
| Power Dissipation                                                     | $P_d$       | 70                                 | mW         |
| Forward Current                                                       | $I_F$       | 20                                 | mA         |
| Surge Current<br>( $t \leq 10 \mu s$ ; $D=0.005$ ; $T_s=25^\circ C$ ) | $I_{FM}$    | 50                                 | mA         |
| Reverse Voltage                                                       | $V_R$       | Not designed for reverse operation | V          |
| Junction Temperature                                                  | $T_J$       | 125                                | $^\circ C$ |
| Operating Temperature                                                 | $T_{opr}$   | -40 ~ +110                         | $^\circ C$ |
| Storage Temperature                                                   | $T_{stg}$   | -40 ~ +110                         | $^\circ C$ |
| ESD Sensitivity<br>( $R=1.5k\Omega$ , $C=100pF$ )                     | $ESD_{HBM}$ | 2                                  | kV         |
| Soldering Temperature                                                 | Reflow      | 260 $^\circ C$ for 30sec           | $^\circ C$ |

### 3. Characteristics Graph

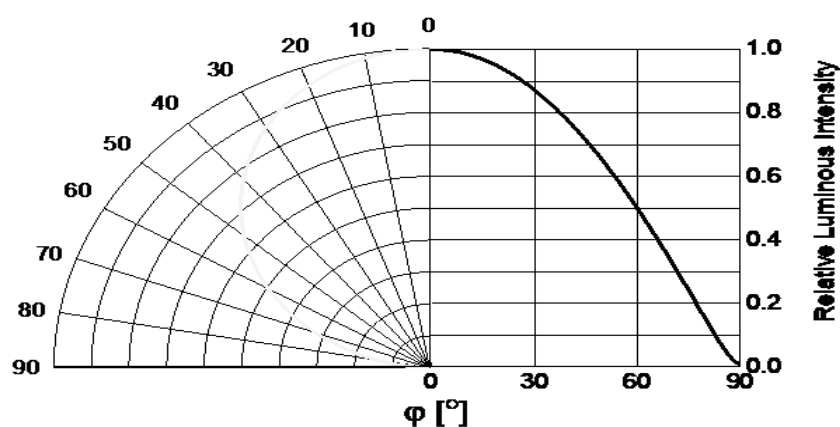
#### Wavelength Characteristics Relative Spectral Distribution @ Ts = 25°C, If=10mA



v

#### Typical Diagram Characteristics of Radiation

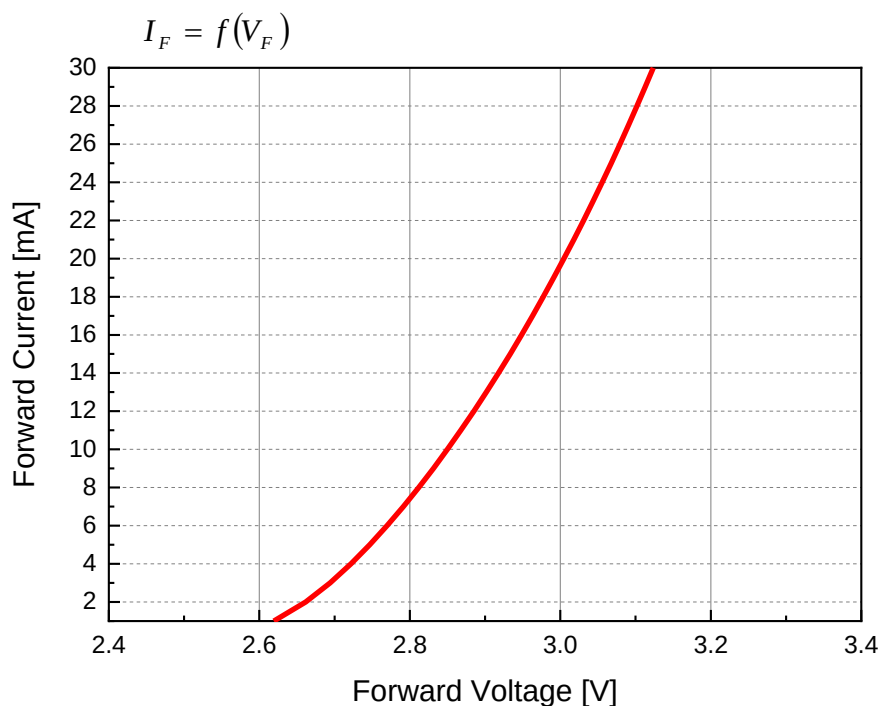
$$\Phi_V / \Phi_V (0^\circ) = f(\varphi)$$



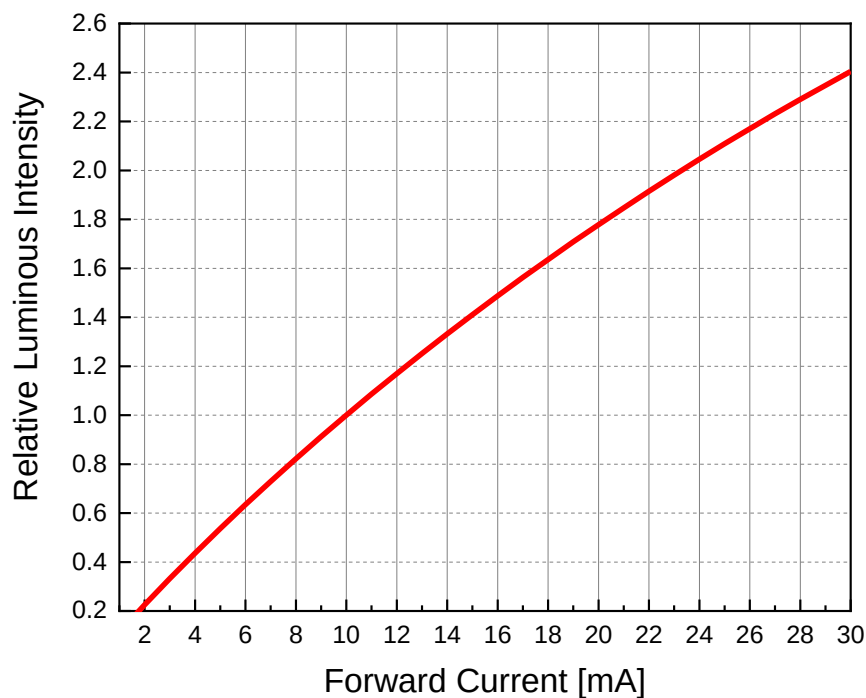
#### Notes:

1.  $\varphi$  is the off axis angle from lamp centerline where the luminous intensity is 1/2 of the peak value.
2. View angle tolerance is  $\pm 5^\circ$ .

### Forward Current vs. Forward Voltage @ Ts = 25°C

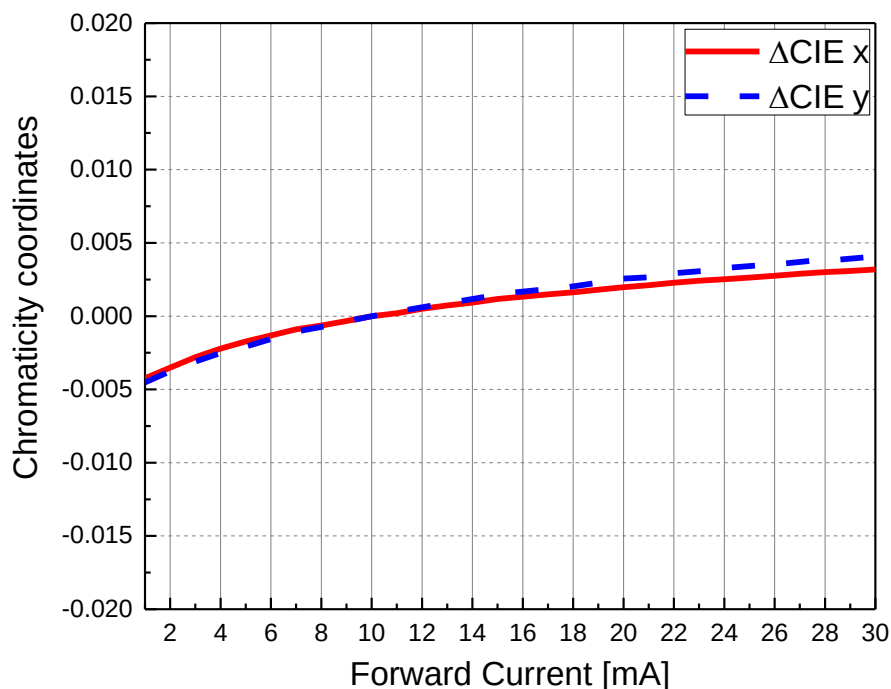


### Relative Luminous Intensity vs. Forward Current @ Ts = 25°C $I_v/I_{v(10mA)} = f(I_F)$



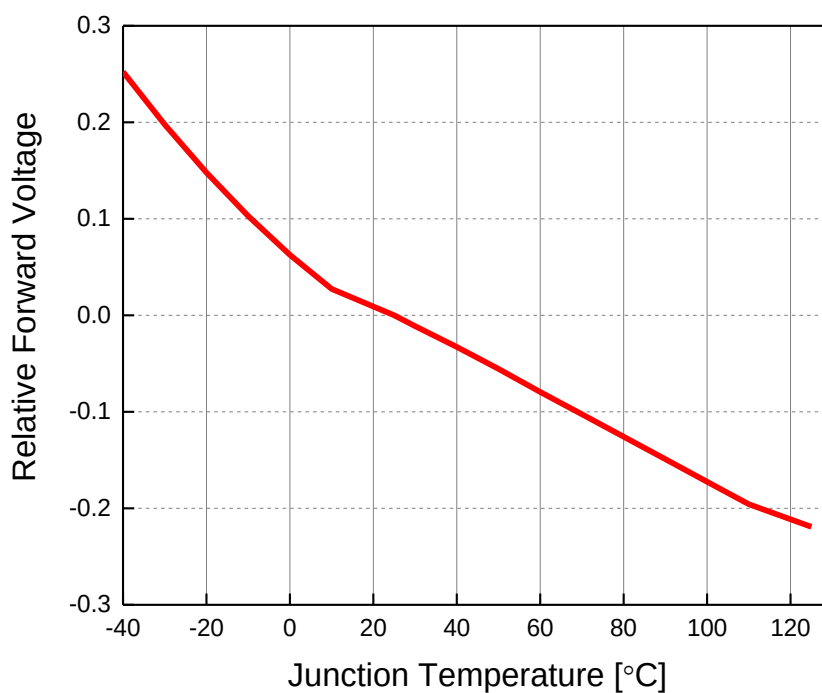
## Chromaticity Coordinates Shift vs. Forward Current @ $T_s = 25^\circ\text{C}$

$$\Delta CIE\ x, \Delta CIE\ y = f(I_F)$$



## Relative Forward Voltage vs. Junction Temperature @ $I_F = 10\text{mA}$

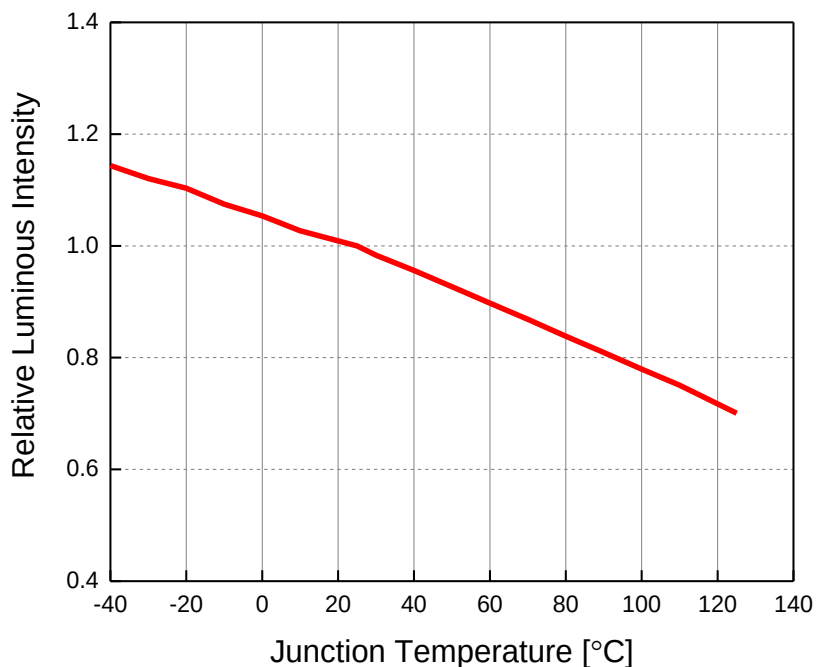
$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j)$$



## Relative Luminous Intensity vs. Junction Temperature

@  $I_F=10\text{mA}$

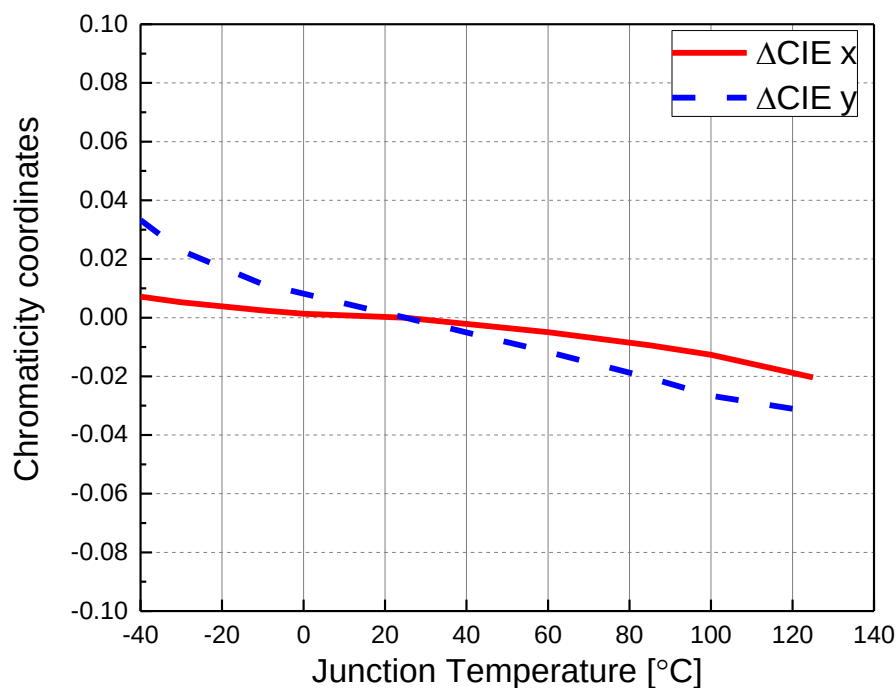
$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j)$$



## Chromaticity Coordinates Shift vs. Junction Temperature

@  $I_F=10\text{mA}$

$$\Delta \text{CIE } x, \Delta \text{CIE } y = f(T_j)$$





## 4. Binning Information

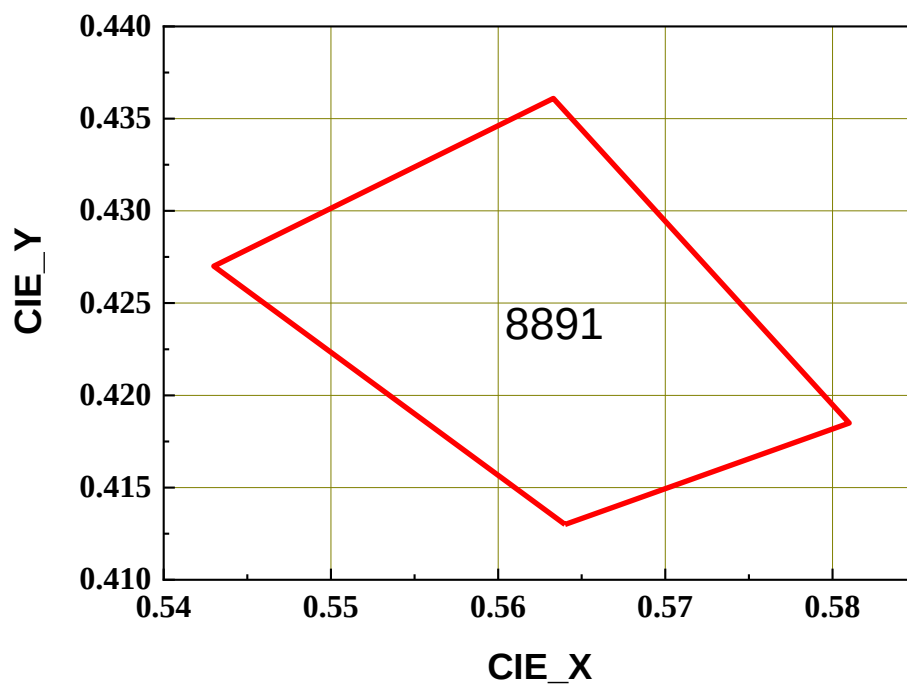
**Luminous Intensity Bins**

| Group | Bin | Minimum<br>Luminous Intensity<br>(mcd) | Maximum<br>Luminous Intensity<br>(mcd) |
|-------|-----|----------------------------------------|----------------------------------------|
| Q     | 1   | 71                                     | 82                                     |
|       | 2   | 82                                     | 97                                     |
|       | 3   | 97                                     | 112                                    |
| R     | 1   | 112                                    | 130                                    |
|       | 2   | 130                                    | 150                                    |
|       | 3   | 150                                    | 180                                    |
| S     | 1   | 180                                    | 210                                    |
|       | 2   | 210                                    | 240                                    |
|       | 3   | 240                                    | 280                                    |
| T     | 1   | 280                                    | 330                                    |
|       | 2   | 330                                    | 390                                    |
|       | 3   | 390                                    | 450                                    |
| U     | 1   | 450                                    | 520                                    |
|       | 2   | 520                                    | 610                                    |
|       | 3   | 610                                    | 710                                    |
| V     | 1   | 710                                    | 820                                    |
|       | 2   | 820                                    | 970                                    |
|       | 3   | 970                                    | 1120                                   |
| A     | 1   | 1120                                   | 1300                                   |
|       | 2   | 1300                                   | 1500                                   |
|       | 3   | 1500                                   | 1800                                   |
| B     | 1   | 1800                                   | 2100                                   |
|       | 2   | 2100                                   | 2400                                   |
|       | 3   | 2400                                   | 2800                                   |

**Notes:**

1. Luminous flux measurement tolerance:  $\pm 8\%$ .
2. Highlighted Black Box is possible output bins.

### Standard Phosphor Converted Amber Bin Structure



### Phosphor Converted Amber Bin Coordinates

| Bin Code | CIE_x  | CIE_y  |
|----------|--------|--------|
| 8891     | 0.5640 | 0.4130 |
|          | 0.5430 | 0.4270 |
|          | 0.5633 | 0.4361 |
|          | 0.5810 | 0.4185 |

#### Notes:

1. Tolerance of Chromaticity Coordinates x,y :  $\pm 0.005$

### Forward Voltage Bins

| Bin  | Minimum Forward Voltage [V] | Maximum Forward Voltage [V] |
|------|-----------------------------|-----------------------------|
| 1012 | 1.00                        | 1.25                        |
| 1215 | 1.25                        | 1.75                        |
| 1517 | 1.50                        | 1.75                        |
| 1720 | 1.75                        | 2.00                        |
| 2022 | 2.00                        | 2.25                        |
| 2225 | 2.25                        | 2.50                        |
| 2527 | 2.50                        | 2.75                        |
| 2730 | 2.75                        | 3.00                        |
| 3032 | 3.00                        | 3.25                        |
| 3235 | 3.25                        | 3.50                        |
| 3537 | 3.50                        | 3.75                        |
| 3740 | 3.75                        | 4.00                        |
| 4042 | 4.00                        | 4.25                        |
| 4245 | 4.25                        | 4.50                        |
| 4547 | 4.50                        | 4.75                        |
| 4750 | 4.75                        | 5.00                        |
| 5052 | 5.00                        | 5.25                        |
| 5255 | 5.25                        | 5.50                        |
| 5557 | 5.50                        | 5.75                        |
| 5760 | 5.75                        | 6.00                        |
| 6062 | 6.00                        | 6.25                        |
| 6265 | 6.25                        | 6.50                        |
| 6567 | 6.50                        | 6.75                        |
| 6770 | 6.75                        | 7.00                        |

**Notes:**

1. Forward voltage measurement tolerance:  $\pm 0.05V$ .
2. Forward voltage bins are defined at  $I_F = 10mA$  operation.
3. Highlighted Black Box is possible output bins.

## 5. Part Number

### 1608-PA0100M-AM

Part number is designated with below details.

1608= Product family name.

PA = Color <sup>[1]</sup>

010 = Test current [mA]

0 = Metallic Plating Type ( 0=Ag ; 1=Au : 2=MLP)

M = Brightness Level ( H=High ; M=Medium ; L=Low)

AM = automotive application

Note

<sup>[1]</sup> Color :

| Symbol | Description              |
|--------|--------------------------|
| C      | Cool White               |
| N      | Neutral White            |
| W      | Warm White               |
| PA     | Phosphor Converted Amber |
| PR     | Phosphor Converted Red   |
| PYG    | Phosphor Yellow Green    |
| UB     | Blue                     |
| IB     | Ice Blue                 |
| SB     | Sky Blue                 |
| UP     | Purple                   |
| UG     | Green                    |
| UY     | Yellow                   |
| UA     | Amber                    |
| UR     | Red                      |
| SR     | Super Red                |
| RGB    | RGB-Color                |
| RGBY   | RGBY-Color               |

## 6. Ordering Information

**1608-PA0100M-ABCDEFGHIJKLMNO-PQ-AM**

| Part Number of the<br>EL Mini Top View LED | Order Code                       |
|--------------------------------------------|----------------------------------|
| 1608-PA0100M-AM                            | 1608-PA0100M-ABCDEFGHIJKLM-NO-AM |

Order code contains information with below details :

ABCD = min/max wavelength or CCT

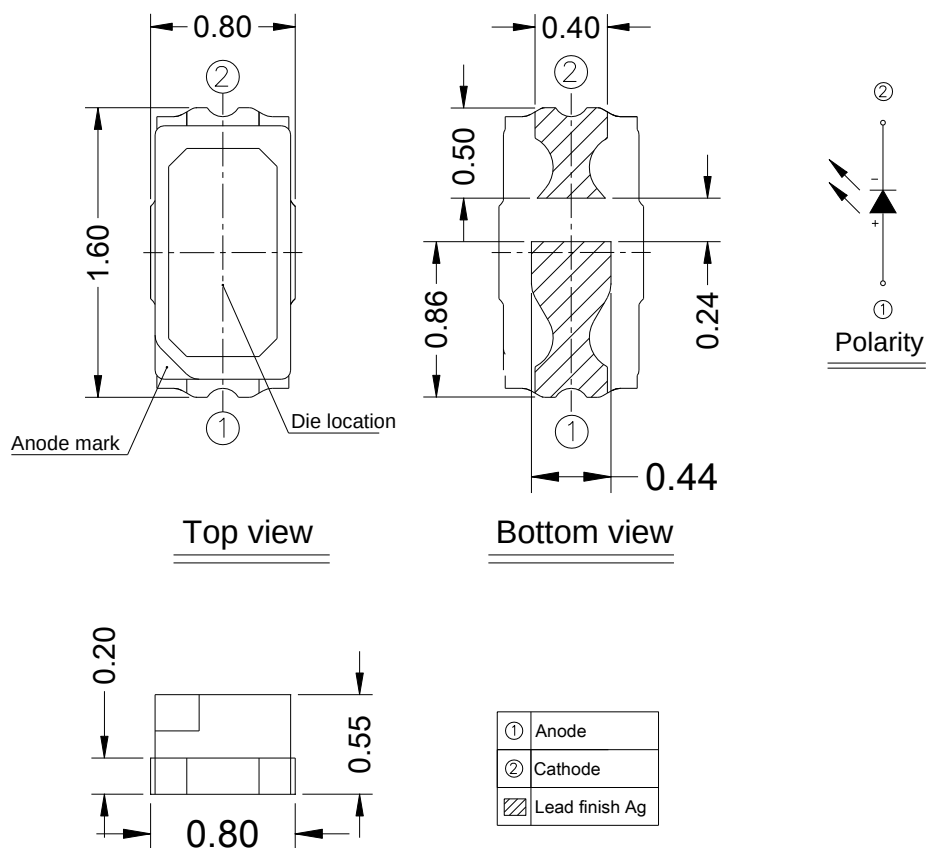
EFGH = min./max. luminous flux in [lm] or luminous intensity in [mcd]

JKLM = min./max. forward voltage

NO =Internal code

AM = Automotive Application

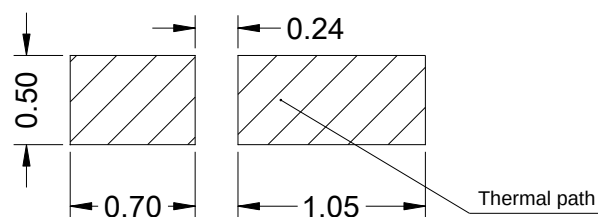
## 7. Mechanical Dimension



### Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are  $\pm 0.1\text{mm}$ .

## 8. Recommended Soldering Pad



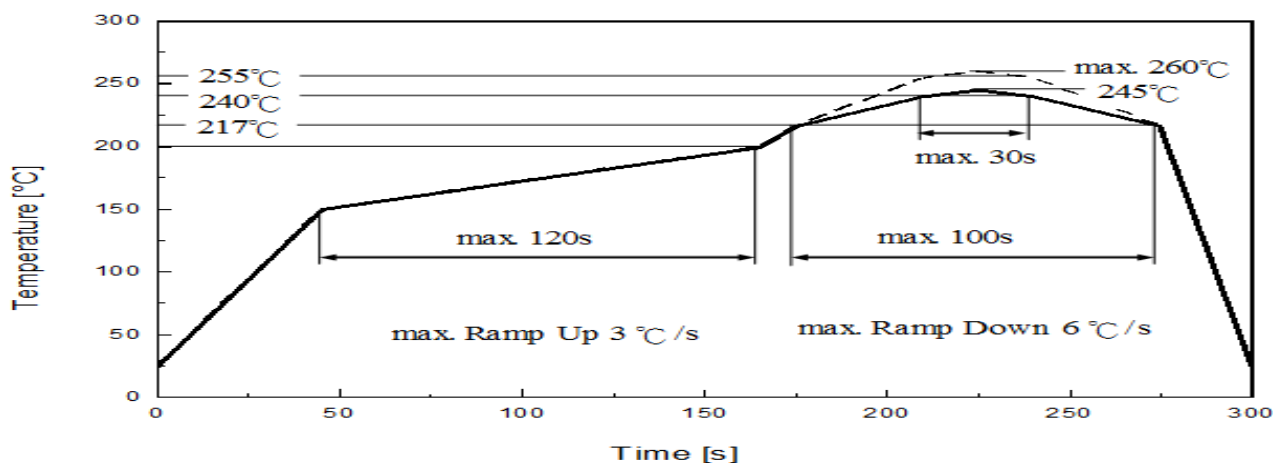
**Soldering Pad**

### Notes:

1. Dimensions are in millimeters.
2. Tolerances unless mentioned are  $\pm 0.1\text{mm}$ .

## 9. Reflow Soldering Profile

Soldering Condition (Reference: IPC/JEDEC J-STD-020D)



| Profile Feature                                   | Pb-Free Assembly | Unit Einheit |
|---------------------------------------------------|------------------|--------------|
|                                                   | Recommendation   |              |
| Ramp-up rate to preheat 25 °C to 150 °C           | 3                | °C /sec      |
| Time of soaking zone 150 °C to 200 °C             | 120              | sec          |
| Ramp-up rate to peak                              | 3                | °C /sec      |
| Liquidus temperature                              | 217              | °C           |
| Time above liquidus temperature                   | 100              | sec          |
| Peak temperature (max.)                           | 260              | °C           |
| Time within 5°C of the specified peak temperature | 30               | sec          |
| Ramp-down Rate (max.)                             | 6                | °C /sec      |

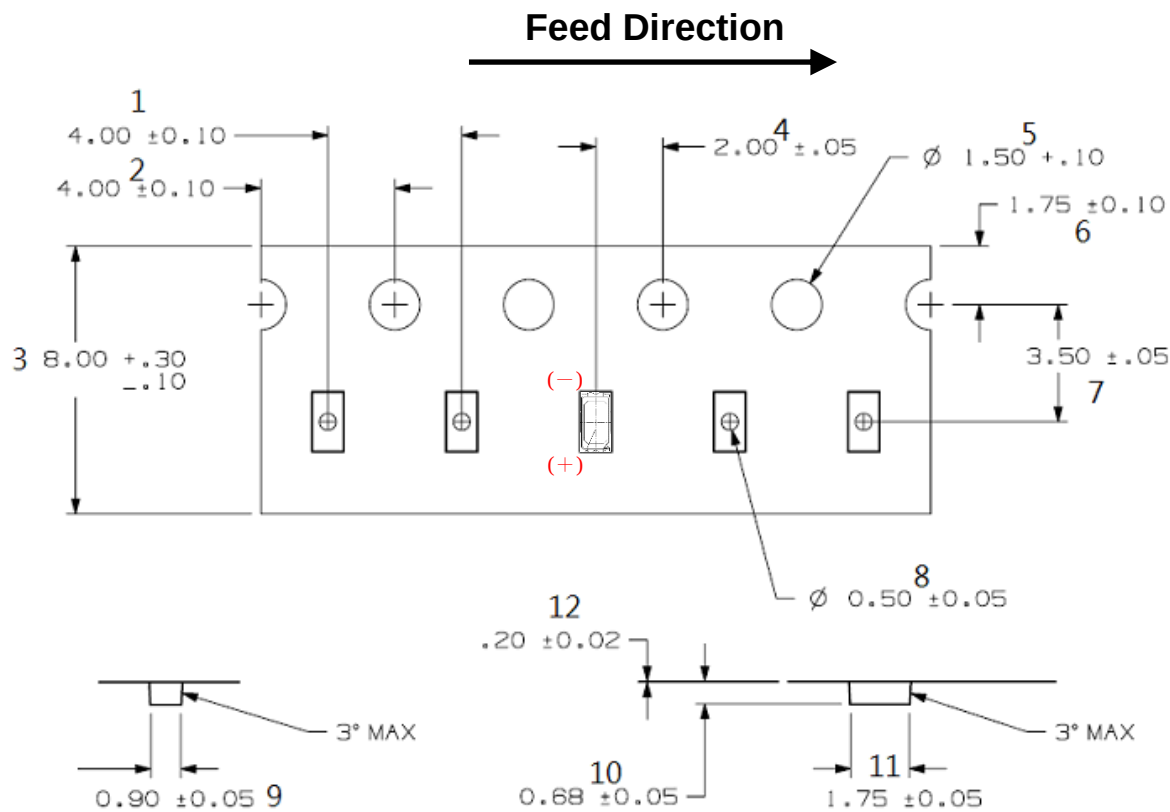
## 10. Packaging Information

### • Product Labeling



- CPN : Customer's Product Number
- P/N : Everlight Part Number
- QTY : Packing Quantity
- CAT : Luminous Flux (Brightness) Bin
- HUE : Color Bin
- REF : Forward Voltage Bin
- LOT No : Lot Number

### • Packing: Loaded Quantity 2000 pcs Per Reel

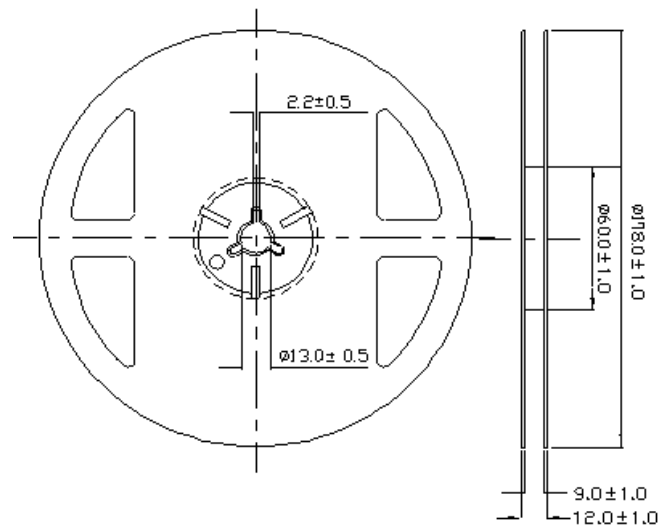


#### Notes:

Dimensions are in millimeters.



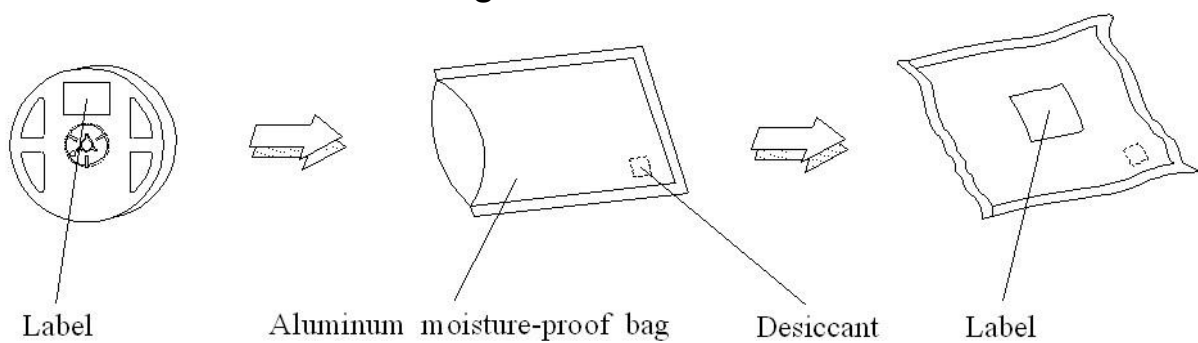
- **Reel Dimensions**



**Notes:**

1. Dimensions are in millimeters.

- **Moisture Resistant Packing Process**



## 11. Precaution 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. Assemblies

Do not stack assemblies containing LEDs to prevent damage to the optical surface of LEDs. Forces applied to the optical surface may result in the surface being damaged.

### 3. Soldering Condition

3.1 When soldering, do not put stress on the LEDs during heating.

3.2 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.