

## EL Mini TOP VIEW LED 65-11-C70100M-AM



### Features

- Package : PLCC 2 package
- Color : Cool White
- Typ. Luminance Intensity : 450 mcd @ 10mA
- Viewing angle : 120°
- ESD : 8KV
- MSL : 2
- Typ.color coordinates : (0.3,0.3)
- Qualified AEC-Q101
- The product itself will remain within RoHS compliant version
- Compliance with EU REACH
- Compliance Halogen Free .(Br <900 ppm ,Cl <900 ppm , Br+Cl < 1500 ppm)

### Applications

- Automotive Interior Lighting
- Switches
- Cluster

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## 1. Characteristics

| Parameter                                  |            | Symbol                   | Min. | Typ. | Max. | Unit | Condition         |
|--------------------------------------------|------------|--------------------------|------|------|------|------|-------------------|
| Forward Current                            |            | $I_F$                    | 2    | 10   | 20   | mA   | ---               |
| Luminous Intensity                         |            | $I_V$                    | 280  | 450  | 710  | mcd  | $I_F=10\text{mA}$ |
| Forward Voltage                            |            | $V_F$                    | 2.5  | 3.1  | 3.75 | V    | $I_F=10\text{mA}$ |
| Viewing Angle                              |            | $\phi$                   | ---  | 120  | ---  | deg  | $I_F=10\text{mA}$ |
| Color                                      |            | CIE x                    | ---  | 0.3  | ---  |      | $I_F=10\text{mA}$ |
| Color                                      |            | CIE y                    | ---  | 0.3  | ---  | ---  | $I_F=10\text{mA}$ |
| Thermal Resistance<br>(Junction to Solder) | Real       | $R_{th JS \text{ real}}$ | ---  | ---  | 120  | K/W  | $I_F=10\text{mA}$ |
|                                            | Electrical | $R_{th JS \text{ el}}$   | ---  | ---  | 95   |      |                   |

### Notes:

1. Luminous Flux measurement tolerance:  $\pm 8\%$ .
2. The data of Luminous Flux measured at thermal pad= $25^\circ\text{C}$
3. Forward voltage measurement tolerance:  $\pm 0.05\text{V}$
4. The  $V_F$  range shown in the table above indicates 99% output.
5. Tolerance of Chromaticity Coordinates x,y :  $\pm 0.005$

## 2. Absolute Maximum Ratings

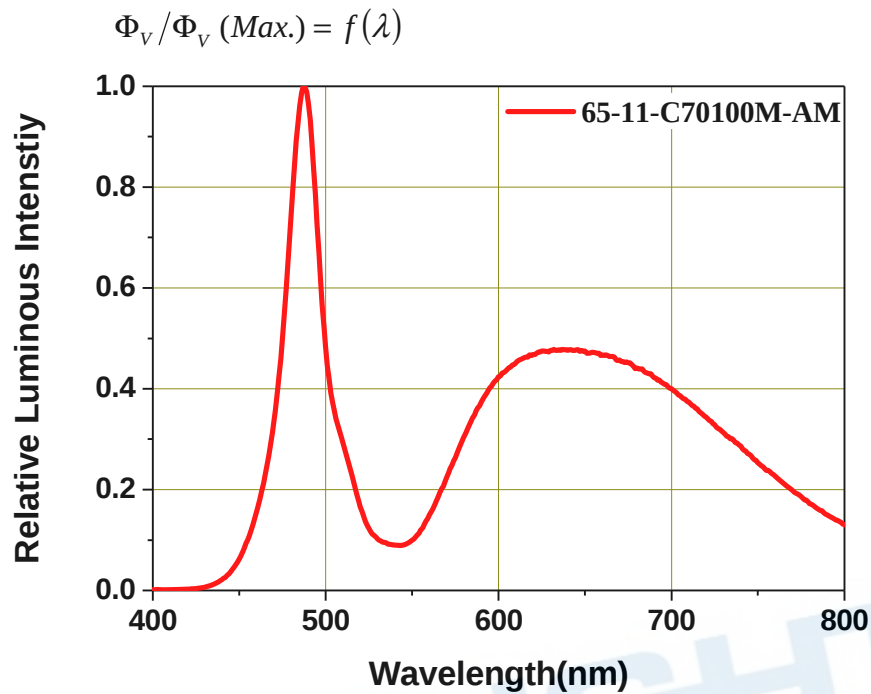
| Parameter                                                             | Symbol      | Ratings                            | Unit       |
|-----------------------------------------------------------------------|-------------|------------------------------------|------------|
| Power Dissipation                                                     | $P_d$       | 75                                 | mW         |
| Forward Current                                                       | $I_F$       | 20                                 | mA         |
| Surge Current<br>( $t \leq 10 \mu s$ ; $D=0.005$ ; $T_s=25^\circ C$ ) | $I_{FM}$    | 100                                | 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>( $R=1.5k\Omega$ , $C=100pF$ )                     | $ESD_{HBM}$ | 8                                  | kV         |
| Soldering Temperature                                                 | Reflow      | 260 $^\circ C$ for 30sec           | $^\circ C$ |

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### 3. Characteristics Graph

#### Wavelength Characteristics Relative Spectral Distribution

@ Ts = 25°C, If=10mA



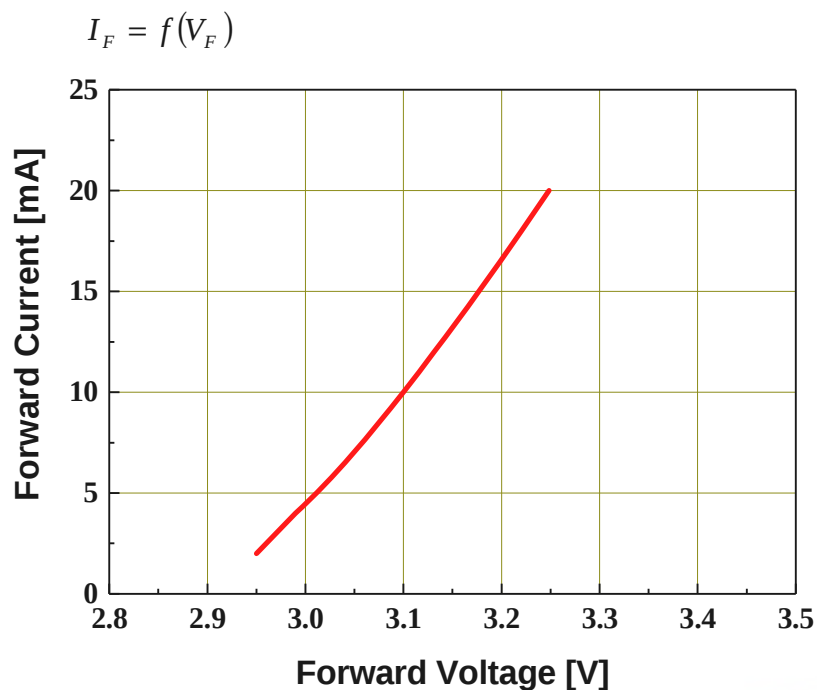
#### Typical Diagram Characteristics of Radiation

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

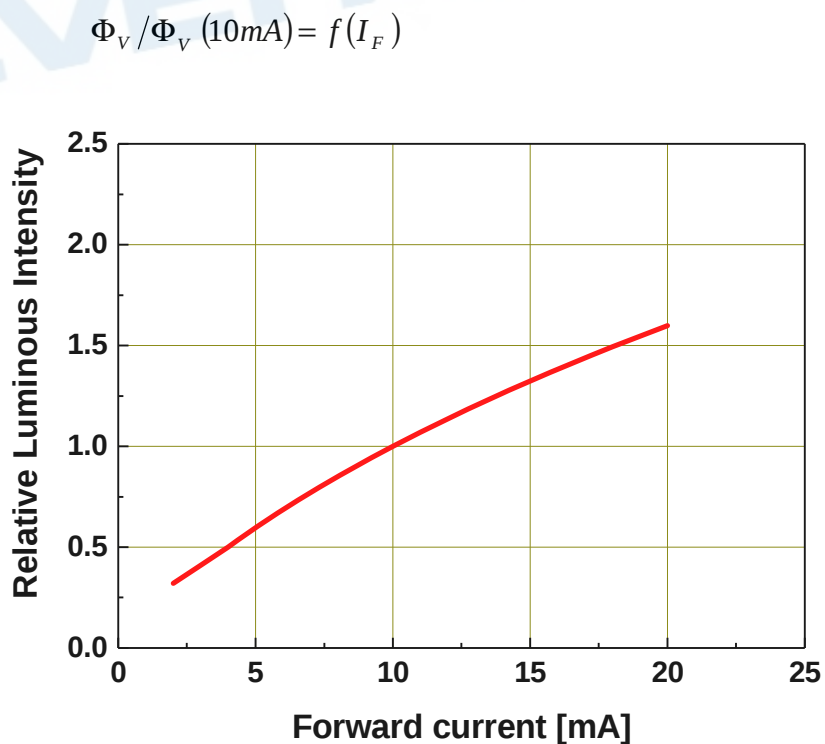
#### Notes:

1.  $\phi$  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



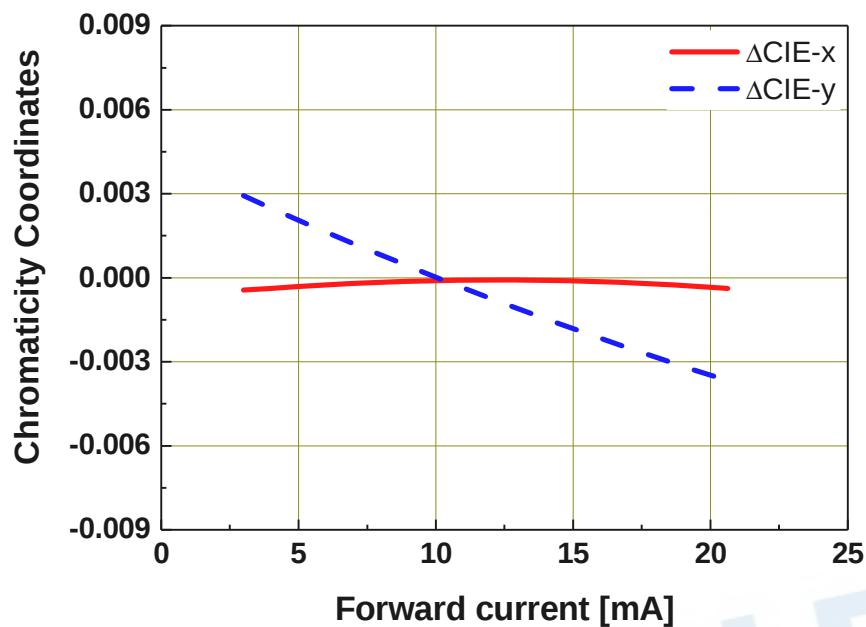
### Relative Luminous Intensity vs. Forward Current @ Ts = 25°C



## Chromaticity Coordinates Shift vs. Forward Current

@  $T_s = 25^\circ\text{C}$

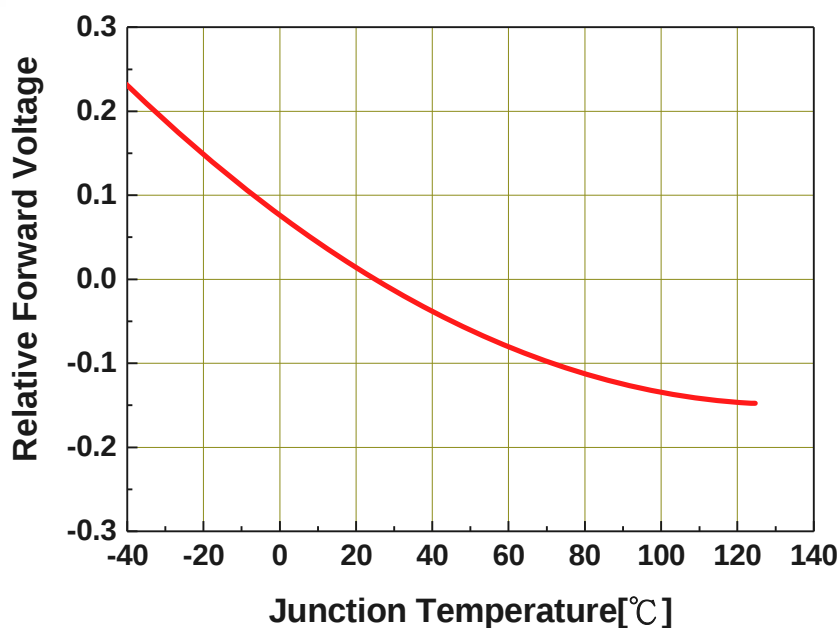
$$\Delta CIE\ x, \Delta CIE\ y = f(I_F)$$



## Relative Forward Voltage vs. Junction Temperature

@  $I_F = 10\text{mA}$

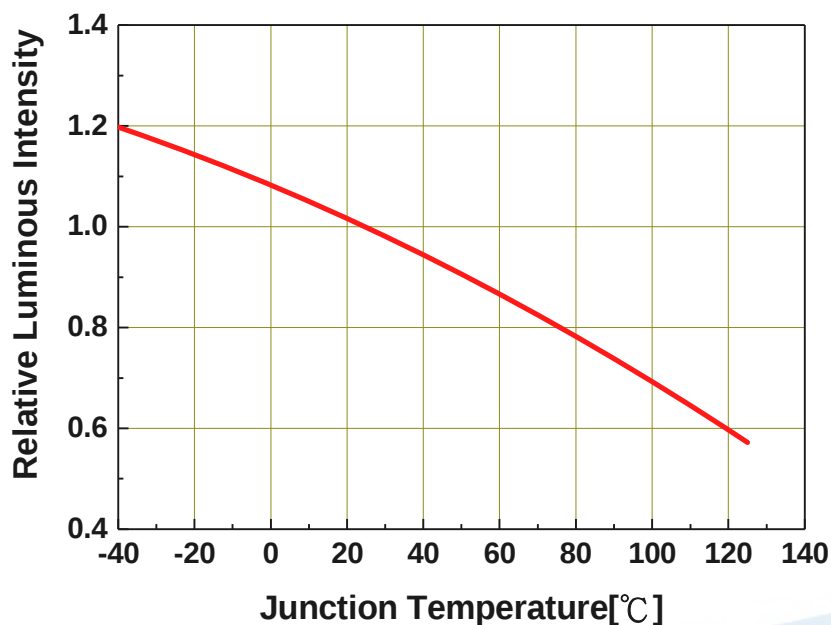
$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j)$$



## Relative Luminous Intensity vs. Junction Temperature

@  $I_F=10\text{mA}$

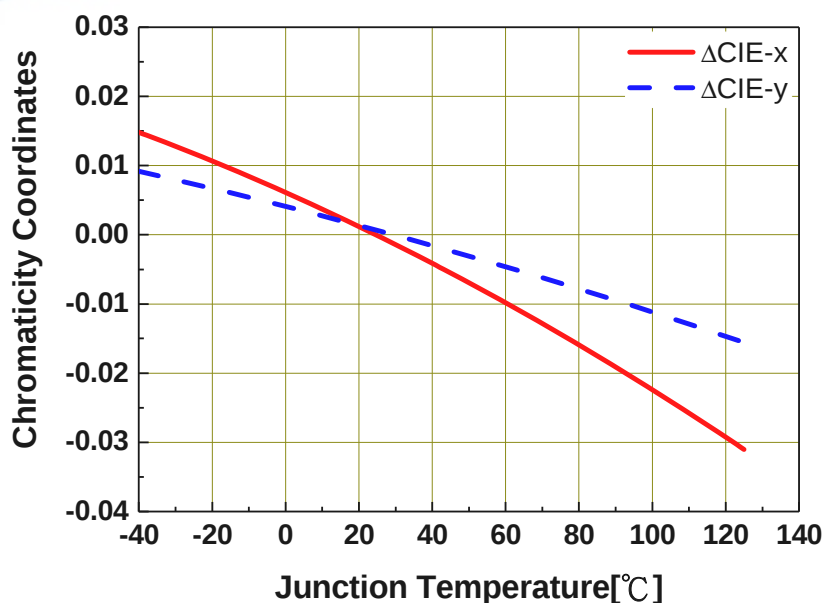
$$\Phi_V / \Phi_V(25^\circ\text{C}) = f(T_j)$$



## Chromaticity Coordinates Shift vs. Junction Temperature

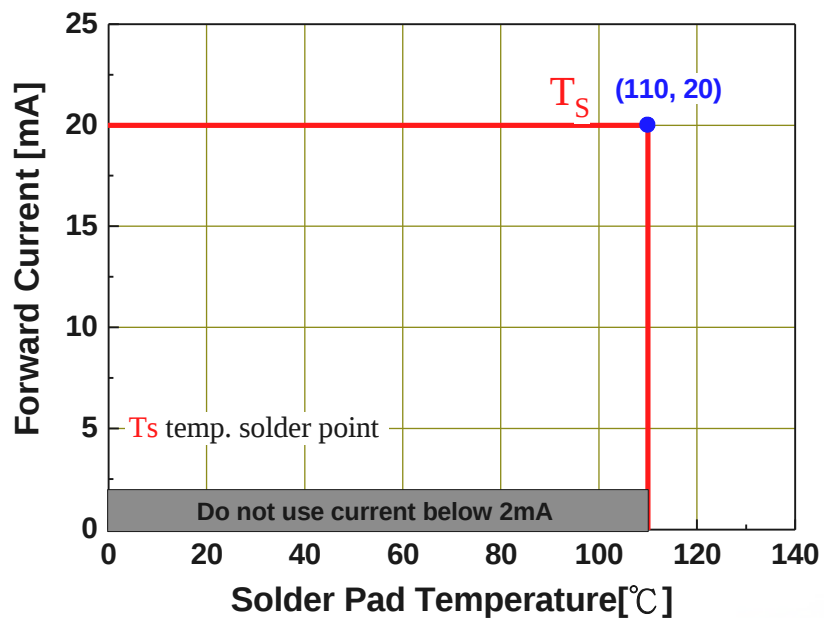
@  $I_F=10\text{mA}$

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



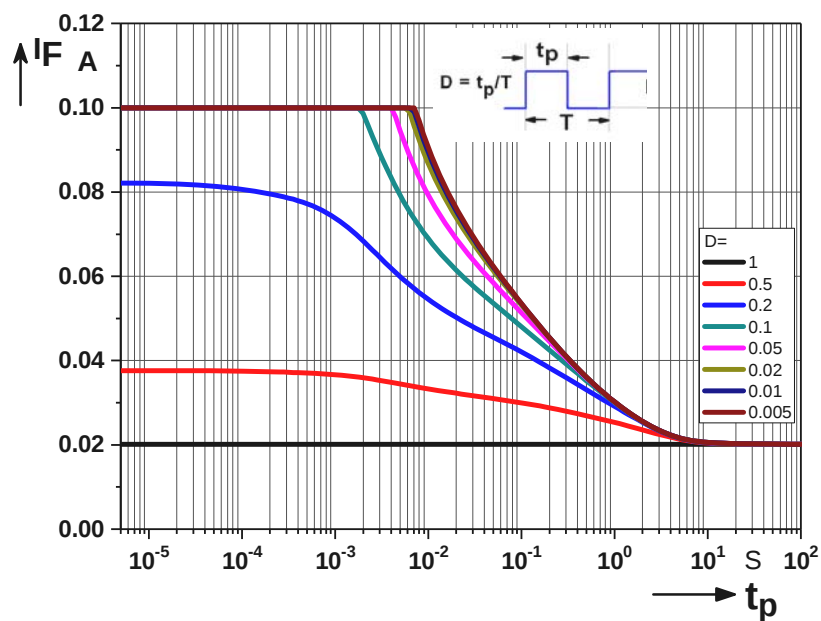
## Forward Current Derating Curve

$$I_F = f(T_S)$$



## Permissible Pulse Handling Capability

D=Duty cycle ,  $T_s = 25^{\circ}\text{C}$



# Binning Information

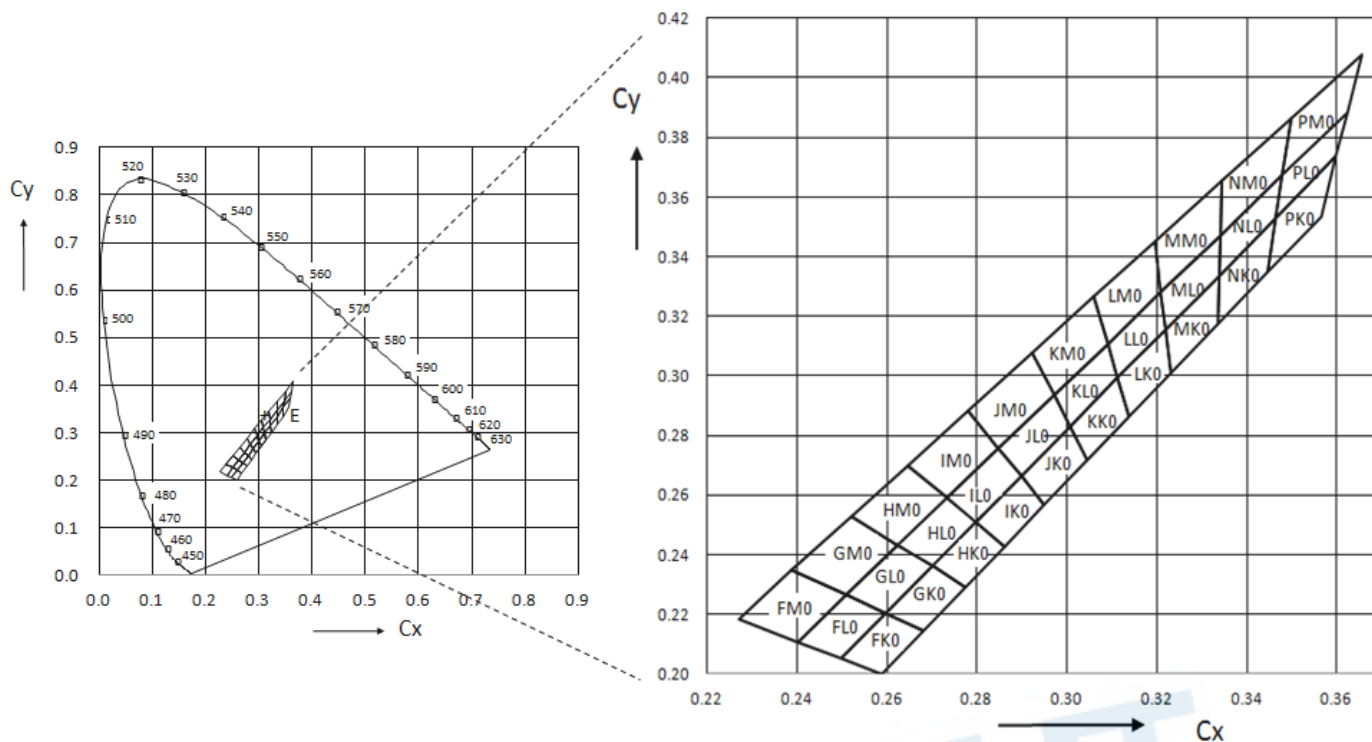
## Luminous Intensity Bins

| Group Bin | Minimum<br>Luminous Intensity<br>(mcd) | Maximum<br>Luminous Intensity<br>(mcd) |
|-----------|----------------------------------------|----------------------------------------|
| L1        | 11.2                                   | 14                                     |
| L2        | 14                                     | 18                                     |
| M1        | 18                                     | 22.4                                   |
| M2        | 22.4                                   | 28                                     |
| N1        | 28                                     | 35.5                                   |
| N2        | 35.5                                   | 45                                     |
| P1        | 45                                     | 56                                     |
| P2        | 56                                     | 71                                     |
| Q1        | 71                                     | 90                                     |
| Q2        | 90                                     | 112                                    |
| R1        | 112                                    | 140                                    |
| R2        | 140                                    | 180                                    |
| S1        | 180                                    | 224                                    |
| S2        | 224                                    | 280                                    |
| T1        | 280                                    | 355                                    |
| T2        | 355                                    | 450                                    |
| U1        | 450                                    | 560                                    |
| U2        | 560                                    | 710                                    |
| V1        | 710                                    | 900                                    |
| V2        | 900                                    | 1120                                   |
| AA        | 1120                                   | 1400                                   |
| AB        | 1400                                   | 1800                                   |
| BA        | 1800                                   | 2240                                   |
| BB        | 2240                                   | 2800                                   |
| CA        | 2800                                   | 3550                                   |
| CB        | 3550                                   | 4500                                   |
| DA        | 4500                                   | 5600                                   |
| DB        | 5600                                   | 7100                                   |
| EA        | 7100                                   | 9000                                   |
| EB        | 9000                                   | 11200                                  |
| FA        | 11200                                  | 14000                                  |
| FB        | 14000                                  | 18000                                  |
| GA        | 18000                                  | 22400                                  |

### Notes:

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

## Standard White Color Bin Structure



### Cool White Color Bin Coordinates

| Bin Code | CIE_x  | CIE_y  | Bin Code | CIE_x  | CIE_y  |
|----------|--------|--------|----------|--------|--------|
| FK0      | 0.2589 | 0.2000 | NK0      | 0.3339 | 0.3336 |
|          | 0.2498 | 0.2053 |          | 0.3335 | 0.3172 |
|          | 0.2597 | 0.2204 |          | 0.3447 | 0.3347 |
|          | 0.2682 | 0.2146 |          | 0.3465 | 0.3530 |
| GK0      | 0.2682 | 0.2146 | PK0      | 0.3465 | 0.3530 |
|          | 0.2597 | 0.2204 |          | 0.3447 | 0.3347 |
|          | 0.2700 | 0.2361 |          | 0.3567 | 0.3535 |
|          | 0.2775 | 0.2292 |          | 0.3599 | 0.3735 |
| HK0      | 0.2775 | 0.2292 | FL0      | 0.2498 | 0.2053 |
|          | 0.2700 | 0.2361 |          | 0.2402 | 0.2108 |
|          | 0.2797 | 0.2509 |          | 0.2509 | 0.2264 |
|          | 0.2861 | 0.2427 |          | 0.2597 | 0.2204 |
| IK0      | 0.2861 | 0.2427 | GL0      | 0.2597 | 0.2204 |
|          | 0.2797 | 0.2509 |          | 0.2509 | 0.2264 |
|          | 0.2898 | 0.2664 |          | 0.2624 | 0.2431 |
|          | 0.2950 | 0.2568 |          | 0.2700 | 0.2361 |
| JK0      | 0.2950 | 0.2568 | HL0      | 0.2700 | 0.2361 |
|          | 0.2898 | 0.2664 |          | 0.2624 | 0.2431 |
|          | 0.3007 | 0.2830 |          | 0.2733 | 0.2590 |
|          | 0.3045 | 0.2717 |          | 0.2797 | 0.2509 |
| KK0      | 0.3045 | 0.2717 | ILO      | 0.2797 | 0.2509 |
|          | 0.3007 | 0.2830 |          | 0.2733 | 0.2590 |
|          | 0.3113 | 0.2992 |          | 0.2848 | 0.2757 |
|          | 0.3138 | 0.2862 |          | 0.2898 | 0.2664 |
| LK0      | 0.3138 | 0.2862 | JL0      | 0.2898 | 0.2664 |
|          | 0.3113 | 0.2992 |          | 0.2848 | 0.2757 |
|          | 0.3219 | 0.3154 |          | 0.2971 | 0.2935 |
|          | 0.3231 | 0.3008 |          | 0.3007 | 0.2830 |
| MK0      | 0.3339 | 0.3336 | KL0      | 0.3007 | 0.2830 |
|          | 0.3219 | 0.3154 |          | 0.2971 | 0.2935 |
|          | 0.3231 | 0.3008 |          | 0.3090 | 0.3108 |
|          | 0.3335 | 0.3172 |          | 0.3113 | 0.2992 |

### Cool White Color Bin Coordinates

| Bin Code | CIE_x  | CIE_y  | Bin Code | CIE_x  | CIE_y  |
|----------|--------|--------|----------|--------|--------|
| LL0      | 0.3113 | 0.2992 | IM0      | 0.2733 | 0.2590 |
|          | 0.3090 | 0.3108 |          | 0.2646 | 0.2700 |
|          | 0.3209 | 0.3281 |          | 0.2780 | 0.2883 |
|          | 0.3219 | 0.3154 |          | 0.2848 | 0.2757 |
| ML0      | 0.3341 | 0.3472 | JM0      | 0.2848 | 0.2757 |
|          | 0.3209 | 0.3281 |          | 0.2780 | 0.2883 |
|          | 0.3219 | 0.3154 |          | 0.2922 | 0.3077 |
|          | 0.3339 | 0.3336 |          | 0.2971 | 0.2935 |
| NL0      | 0.3341 | 0.3472 | KM0      | 0.2971 | 0.2935 |
|          | 0.3339 | 0.3336 |          | 0.2922 | 0.3077 |
|          | 0.3465 | 0.3530 |          | 0.3060 | 0.3266 |
|          | 0.3479 | 0.3673 |          | 0.3090 | 0.3108 |
| PL0      | 0.3479 | 0.3673 | LM0      | 0.3090 | 0.3108 |
|          | 0.3465 | 0.3530 |          | 0.3060 | 0.3266 |
|          | 0.3599 | 0.3735 |          | 0.3196 | 0.3451 |
|          | 0.3623 | 0.3882 |          | 0.3209 | 0.3281 |
| FM0      | 0.2388 | 0.2348 | MM0      | 0.3345 | 0.3654 |
|          | 0.2269 | 0.2185 |          | 0.3196 | 0.3451 |
|          | 0.2402 | 0.2108 |          | 0.3209 | 0.3281 |
|          | 0.2509 | 0.2264 |          | 0.3341 | 0.3472 |
| GM0      | 0.2509 | 0.2264 | NM0      | 0.3345 | 0.3654 |
|          | 0.2388 | 0.2348 |          | 0.3341 | 0.3472 |
|          | 0.2520 | 0.2527 |          | 0.3479 | 0.3673 |
|          | 0.2624 | 0.2431 |          | 0.3498 | 0.3863 |
| HM0      | 0.2624 | 0.2431 | PM0      | 0.3498 | 0.3863 |
|          | 0.2520 | 0.2527 |          | 0.3479 | 0.3673 |
|          | 0.2646 | 0.2700 |          | 0.3623 | 0.3882 |
|          | 0.2733 | 0.2590 |          | 0.3655 | 0.4079 |

### Forward Voltage Bins

| Bin code | Min Forward Voltage [V] | Max Forward Voltage [V] |
|----------|-------------------------|-------------------------|
| 1012     | 1.00                    | 1.25                    |
| 1215     | 1.25                    | 1.50                    |
| 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.

## 4. Part Number

### 65-11-C70100M-AM

Part number is designated with below details.

65-11 = Product family name.

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

7 = CRI (0=N/A; >70%=7; >80%=8; >90%=9)

010 = Test current [mA]

0 = Lead Frame Type

M = Chip Code

AM = Automotive application

Note

[1] Color :

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

## 6. Ordering Information

### 65-11- C70100M-**ABCDEFGHJKLMNO-PQ-AM**

| Part Number of the<br>65-11 | Order Code                         |
|-----------------------------|------------------------------------|
| 65-11-C70100M-AM            | 65-11-C70100M-ABCDEFGHJKLMNO-PQ-AM |

Order code contains information with below details :

ABCDEF = min/max wavelength or CCT

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

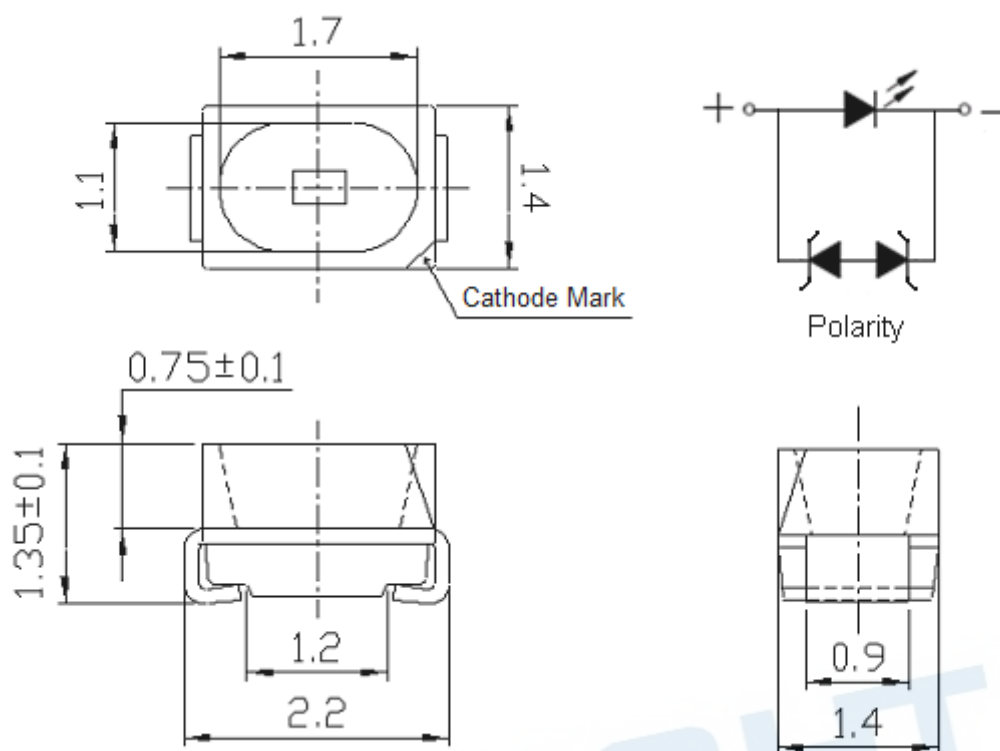
LMNO = min./max. forward voltage

PQ = internal code

AM = Automotive Application

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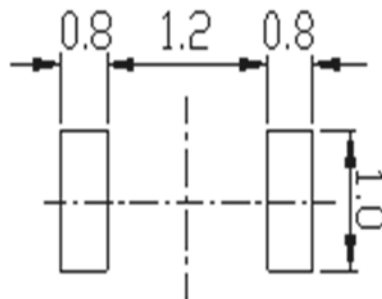
## 7. Mechanical Dimension



### Notes:

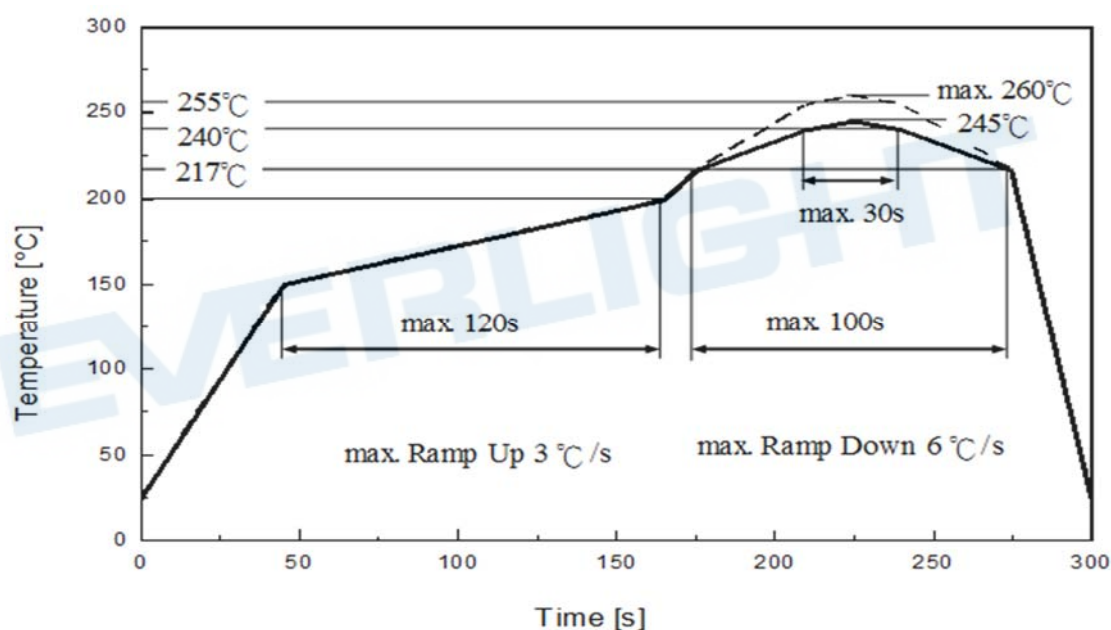
1. Dimensions are in millimeters.
2. Tolerances unless mentioned are  $\pm 0.1$ mm.

## 8. Recommended Soldering Pad



## 9. Reflow Soldering Profile

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



| Profile Feature                                      | Pb-Free Assembly | Unit    |
|------------------------------------------------------|------------------|---------|
|                                                      | Recommendation   |         |
| Ramp-up rate to preheat<br>25 °C to 150 °C           | 3                | °C /sec |
| Time of soaking zone<br>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<br>temperature | 30               | sec     |
| Ramp-down Rate (max.)                                | 6                | °C /sec |

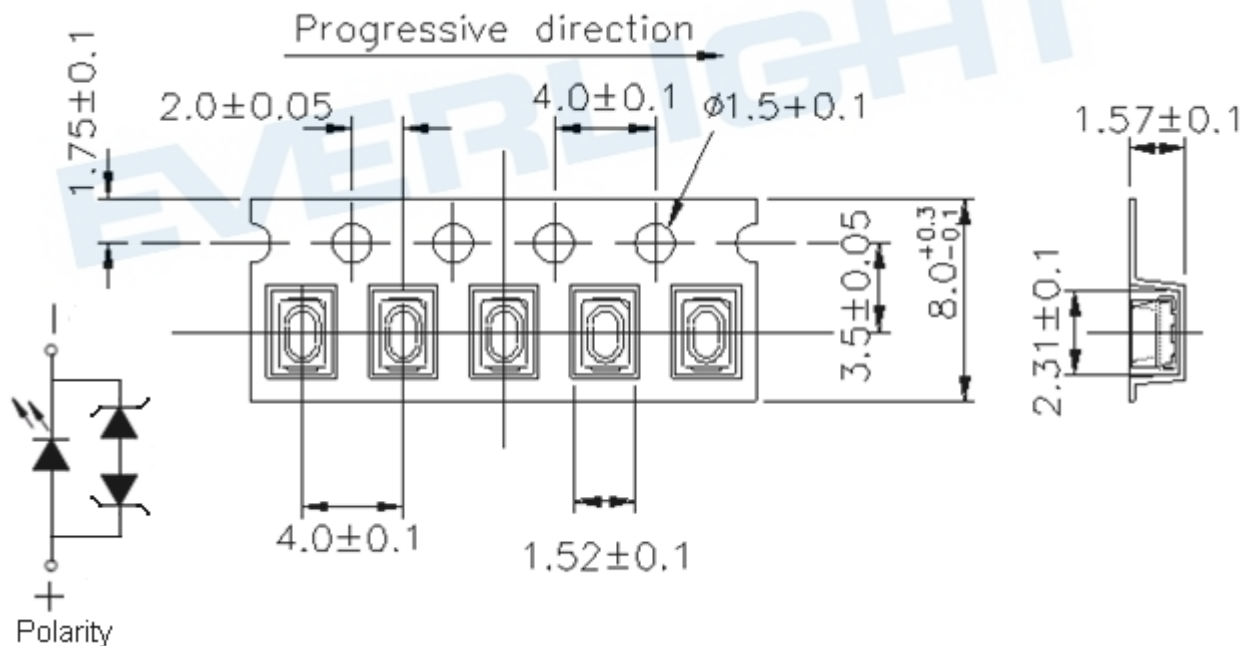
## 10. Packaging Information

### • 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

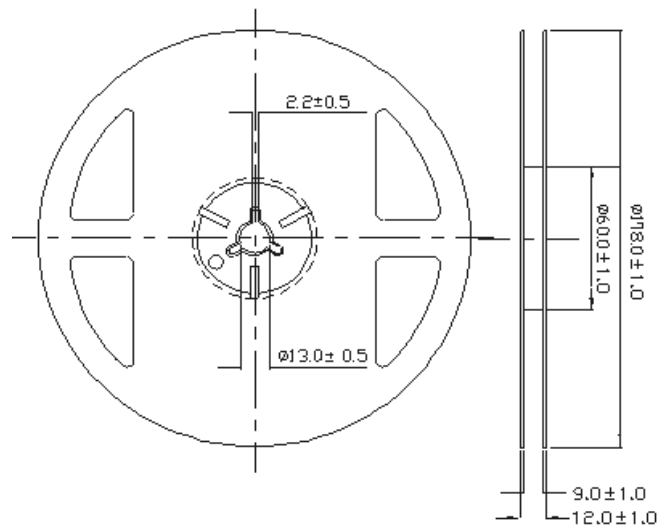
### • Packing: Loaded Quantity 2000 pcs Per Reel



#### Notes:

1. Dimensions are in millimeters.

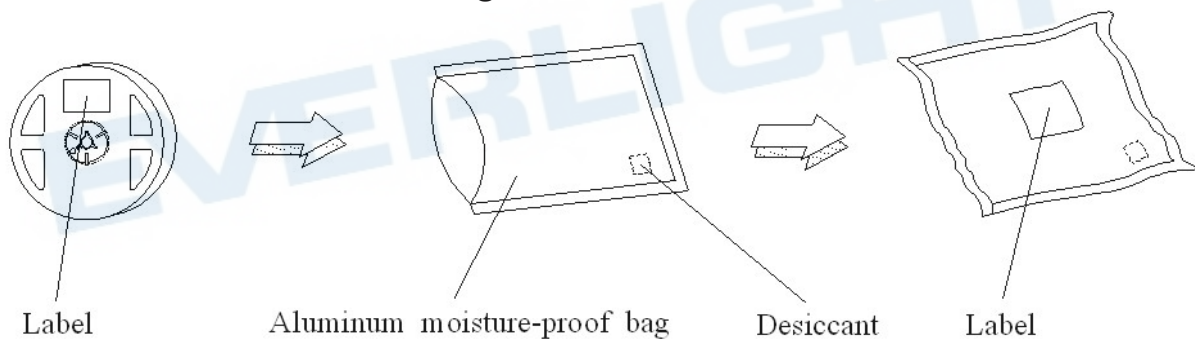
- Reel Dimensions



**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.

