

**CML****INNOVATIVE TECHNOLOGIES, INC.****WHERE INNOVATION COMES TO LIGHT**Americas

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**CM DA52xx15D13L Series Power LED (5 Watt) on Star PCB**  
**CM DA53xx15D13L Series Power LED (5 Watt) on Square PCB**

**- Features**

- Super high flux output and high luminance
- Designed for high current operation
- Low thermal resistance
- SMT solder compatible
- Lead (Pb) Free Product – RoHS Compliant

**- Applications**

- General Illumination
  - Outdoor & Indoor Architectural Lighting
  - Decorative Lighting
  - Portable Lighting / Flash Light (Torch) Lamps
  - Reading Lamps and Task Lighting
  - Traffic Signaling

**- Description**

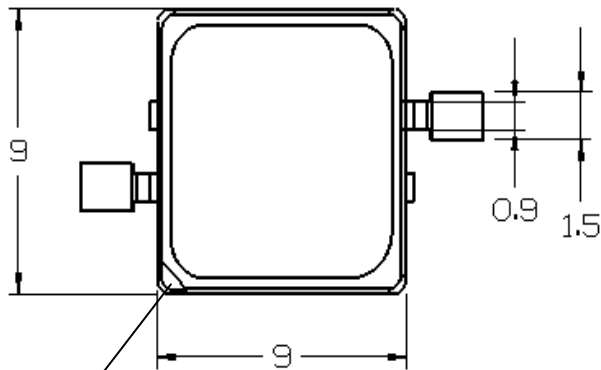
These packaged LED's on metal PCB's are designed for high current operation and high flux output applications. The package design features better thermal management characteristics than other LED solutions. Because of these advantages, this product has many applications such as internal & external lighting, automobile lighting, large size LCD backlight, etc.

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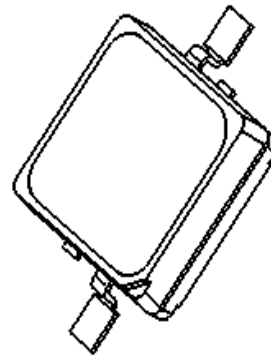
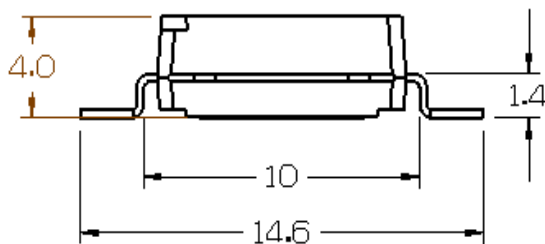
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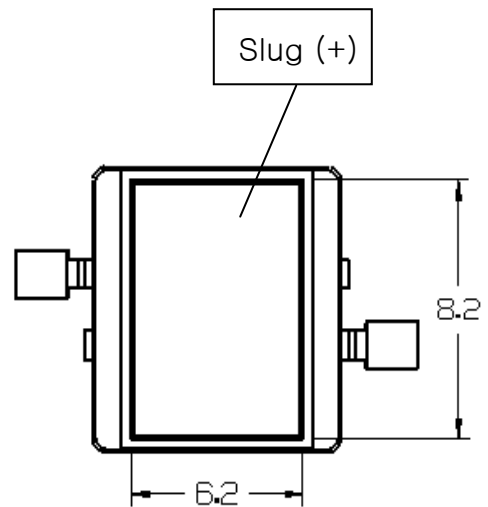
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**1. Outline Dimensions**

Cathode  
Mark



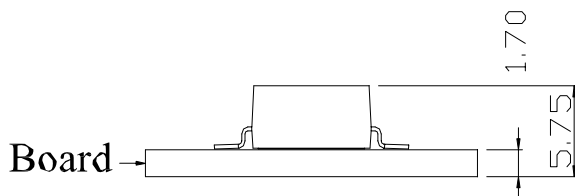
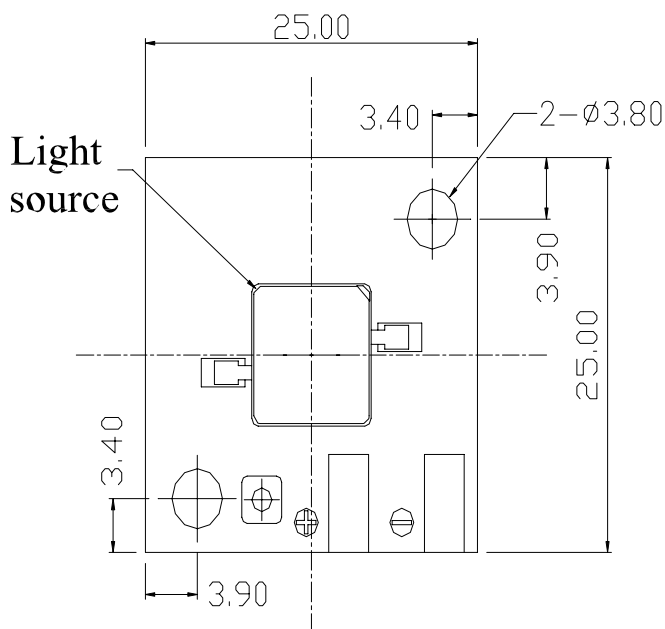
Isometric view  
Scale: None



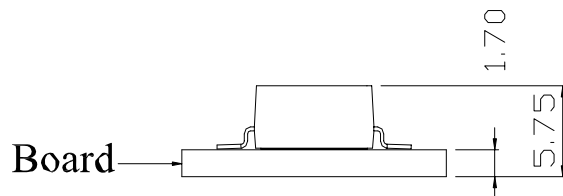
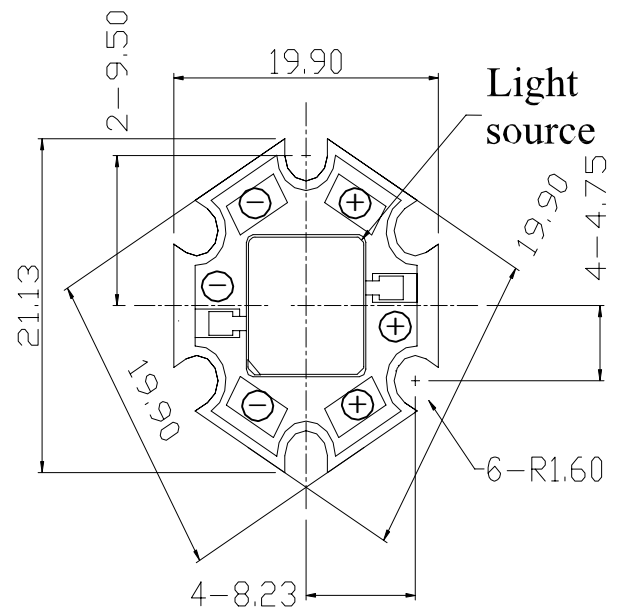
Rear view

- Notes : 1. All dimensions are in millimeters.  
2. Scale : none  
3. This drawing is reference only for engineering

## 2. Metal Outline Dimensions



**CMDA53xx15D13L  
Square Configuration**



**CMDA52xx15D13L  
Star Configuration**

- Note : 1. All dimensions are in millimeters  
 2. Scale : none  
 3. This drawing is reference only engineering.

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**3. Electro-Optical Characteristics (at IF=350mA, TA=25°C)****CMDA52xx15D13L Star PCB series**

| P/N            | Description | Luminous Flux<br>Min./Typ.<br>(lm) | Correlated Color<br>Temperature<br>(Kelvin) | CRI | Dominant<br>Wavelength (nm)<br>Min./Typ./Max. | Forward Voltage<br>(volts)<br>Min./Typ./Max. | View Angle<br>(degrees) | Thermal<br>resistance<br>(°C /W) |
|----------------|-------------|------------------------------------|---------------------------------------------|-----|-----------------------------------------------|----------------------------------------------|-------------------------|----------------------------------|
|                | Symbol      | ΦV [1]                             | CCT [3]                                     | Ra  | λD                                            | V                                            | 2Θ 1/2                  | Rθ [4]                           |
| CMDA52CW15D13L | Pure White  | 154 / 178                          | 6500                                        | 70  |                                               | 3.0 / 3.5 / 4.0                              | 110                     | 4                                |
| CMDA52WW15D13L | Warm White  | 91 / 120                           | 3000                                        | 80  |                                               | 3.0 / 3.5 / 4.0                              | 110                     | 4                                |
| CMDA52CB15D13L | Blue        | 24 / 30                            |                                             |     | 455 / 460 / 475                               | 3.0 / 3.5 / 4.0                              | 130                     | 4                                |
| CMDA52AG15D13L | Green       | 118 / 189                          |                                             |     | 520 / 527 / 535                               | 3.0 / 3.5 / 4.0                              | 130                     | 4                                |
| CMDA52AR15D13L | Red         | 91 / 114                           |                                             |     | 620 / 625 / 630                               | 2.0 / 2.5 / 3.0                              | 128                     | 6                                |
| CMDA52GB15D13L | Cyan        | 118 / 150                          |                                             |     | 500 / 505 / 510                               | 3.0 / 3.5 / 4.0                              | 130                     | 4                                |
| CMDA52DY15D13L | Amber       | 118 / 144                          |                                             |     | 585 / 590 / 595                               | 2.0 / 2.5 / 3.0                              | 128                     | 6                                |

**4. Absolute Maximum Ratings (at TA=25°C)**

| P/N            | Description | Forward<br>Current (A) | Power<br>Dissipation<br>(Watts) | Junction<br>Temperature<br>(°C) | Operating<br>Temperature (°C) | Storage<br>Temperature (°C) |
|----------------|-------------|------------------------|---------------------------------|---------------------------------|-------------------------------|-----------------------------|
|                | Symbol      | IF                     | PD                              | Tj                              | Topr                          | Tstg                        |
| CMDA52CW15D13L | Pure White  | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA52WW15D13L | Warm White  | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA52CB15D13L | Blue        | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA52AG15D13L | Green       | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA52AR15D13L | Red         | 1.6                    | 4.8                             | 100                             | -30~+85                       | -40~+120                    |
| CMDA52GB15D13L | Cyan        | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA52DY15D13L | Amber       | 1.6                    | 4.8                             | 100                             | -30~+85                       | -40~+120                    |

**\*Notes:**

[1] ΦV is the total luminous flux output as measured with an integrating sphere.

[2] Zener diode chip included to protect the LED from ESD.

[3] Rθ is measured with a metal core PCB (25 °C ≤ TJ ≤ 125 °C).

[4] CML maintains a tolerance of ± 10% on flux and power measurements.

[5] CCT ± 5% tester tolerance.

[6] Color Coordinate Measurement allowance is ± 0.005

[7] A tolerance of ± 0.006V on forward voltage measurements

**-----Caution-----****Please do not drive at rated current more than 5 sec. without proper heat sink**

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**5. Electro-Optical Characteristics (at IF=350mA, TA=25°C)****CMDA53xx15D13L Square PCB series**

| P/N            | Description | Luminous Flux<br>Min./Typ.<br>(lm) | Correlated Color<br>Temperature<br>(Kelvin) | CRI | Dominant<br>Wavelength (nm)<br>Min./Typ./Max. | Forward Voltage<br>(volts)<br>Min./Typ./Max. | View Angle<br>(degrees) | Thermal<br>resistance<br>(°C /W) |
|----------------|-------------|------------------------------------|---------------------------------------------|-----|-----------------------------------------------|----------------------------------------------|-------------------------|----------------------------------|
|                | Symbol      | ΦV [1]                             | CCT [3]                                     | Ra  | λD                                            | V                                            | 2Θ 1/2                  | Rθ [4]                           |
| CMDA53CW15D13L | Pure White  | 154 / 178                          | 6500                                        | 70  |                                               | 3.0 / 3.5 / 4.0                              | 110                     | 4                                |
| CMDA53WW15D13L | Warm White  | 91 / 120                           | 3000                                        | 80  |                                               | 3.0 / 3.5 / 4.0                              | 110                     | 4                                |
| CMDA53CB15D13L | Blue        | 24 / 30                            |                                             |     | 455 / 460 / 475                               | 3.0 / 3.5 / 4.0                              | 130                     | 4                                |
| CMDA53AG15D13L | Green       | 118 / 189                          |                                             |     | 520 / 527 / 535                               | 3.0 / 3.5 / 4.0                              | 130                     | 4                                |
| CMDA53AR15D13L | Red         | 91 / 114                           |                                             |     | 620 / 625 / 630                               | 2.0 / 2.5 / 3.0                              | 128                     | 6                                |
| CMDA53GB15D13L | Cyan        | 118 / 150                          |                                             |     | 500 / 505 / 510                               | 3.0 / 3.5 / 4.0                              | 130                     | 4                                |
| CMDA53DY15D13L | Amber       | 118 / 144                          |                                             |     | 585 / 590 / 595                               | 2.0 / 2.5 / 3.0                              | 128                     | 6                                |

**6. Absolute Maximum Ratings (at TA=25°C)**

| P/N            | Description | Forward<br>Current (A) | Power<br>Dissipation<br>(Watts) | Junction<br>Temperature<br>(°C) | Operating<br>Temperature (°C) | Storage<br>Temperature (°C) |
|----------------|-------------|------------------------|---------------------------------|---------------------------------|-------------------------------|-----------------------------|
|                | Symbol      | I <sub>F</sub>         | P <sub>D</sub>                  | T <sub>J</sub>                  | T <sub>opr</sub>              | T <sub>stg</sub>            |
| CMDA53CW15D13L | Pure White  | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA53WW15D13L | Warm White  | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA53CB15D13L | Blue        | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA53AG15D13L | Green       | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA53AR15D13L | Red         | 1.6                    | 4.8                             | 100                             | -30~+85                       | -40~+120                    |
| CMDA53GB15D13L | Cyan        | 1.6                    | 6.4                             | 125                             | -30~+85                       | -40~+120                    |
| CMDA53DY15D13L | Amber       | 1.6                    | 4.8                             | 100                             | -30~+85                       | -40~+120                    |

**\*Notes:**

[1] ΦV is the total luminous flux output as measured with an integrating sphere.

[2] Zener diode chip included to protect the LED from ESD.

[3] Rθ is measured with a metal core PCB (25 °C ≤ T<sub>J</sub> ≤ 125 °C).

[4] CML maintains a tolerance of ± 10% on flux and power measurements.

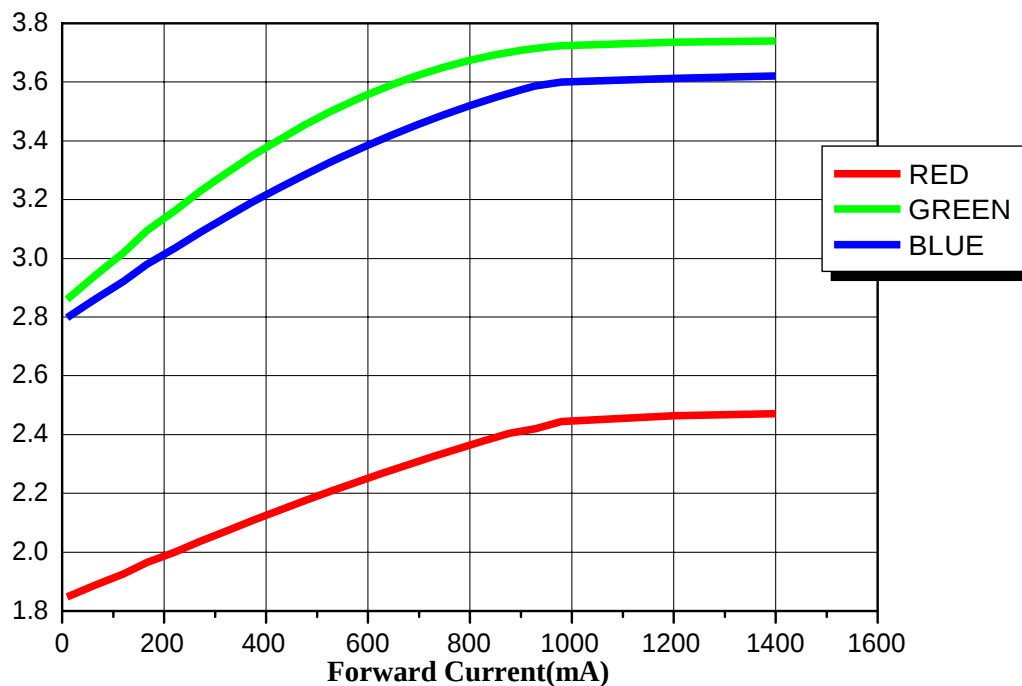
[5] CCT ± 5% tester tolerance.

[6] Color Coordinate Measurement allowance is ± 0.005

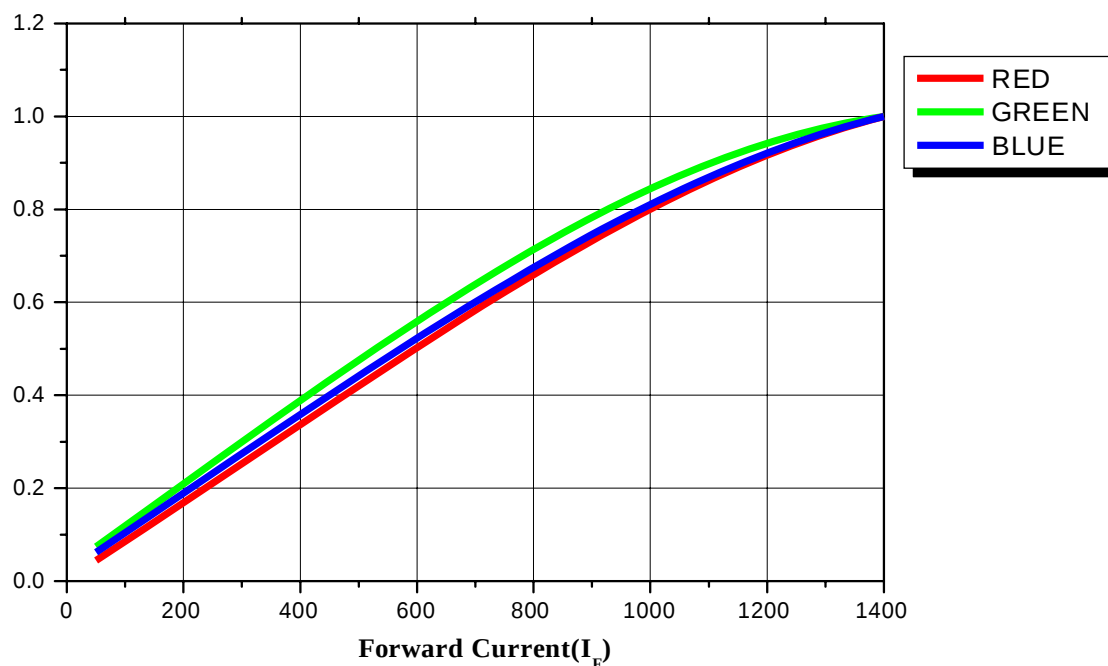
[7] A tolerance of ± 0.006V on forward voltage measurements

**-----Caution-----****Please do not drive at rated current more than 5 sec. without proper heat sink**

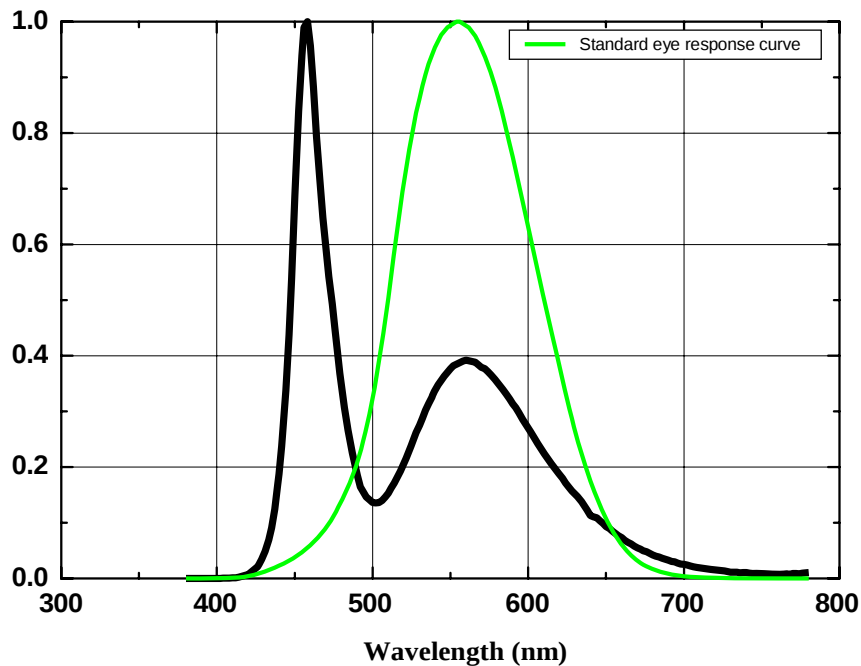
## 7. Forward Voltage vs. Forward Current (Ta=25°C)



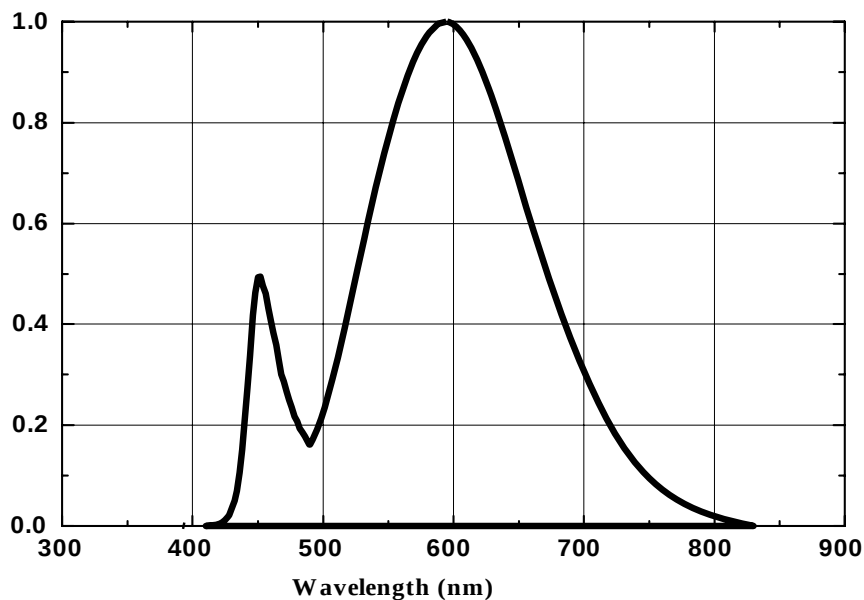
## 8. Forward Current vs. Normalized Relative Luminous Flux (Ta=25°C)



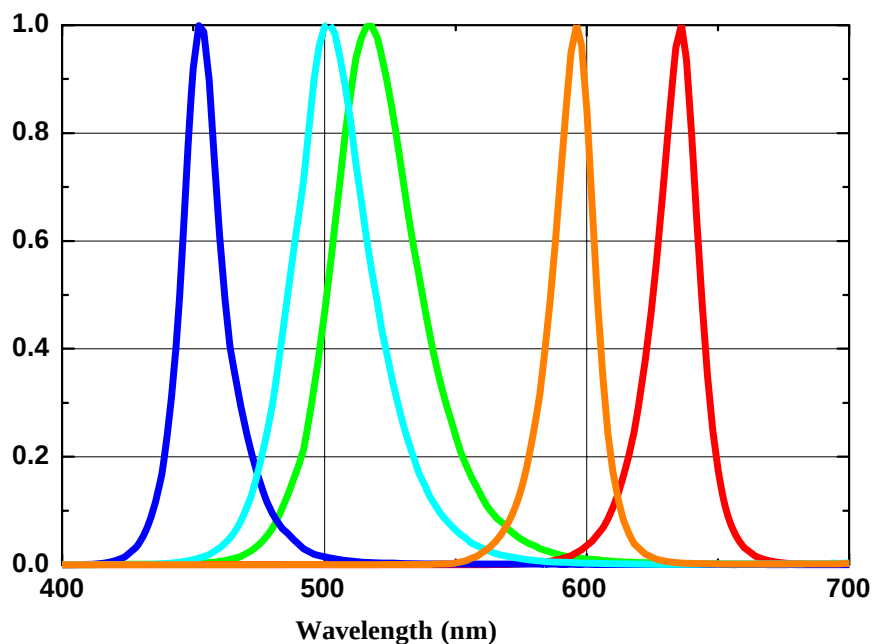
### 9. White Color spectrum of Typical CCT ( $T_a=25^{\circ}\text{C}$ )



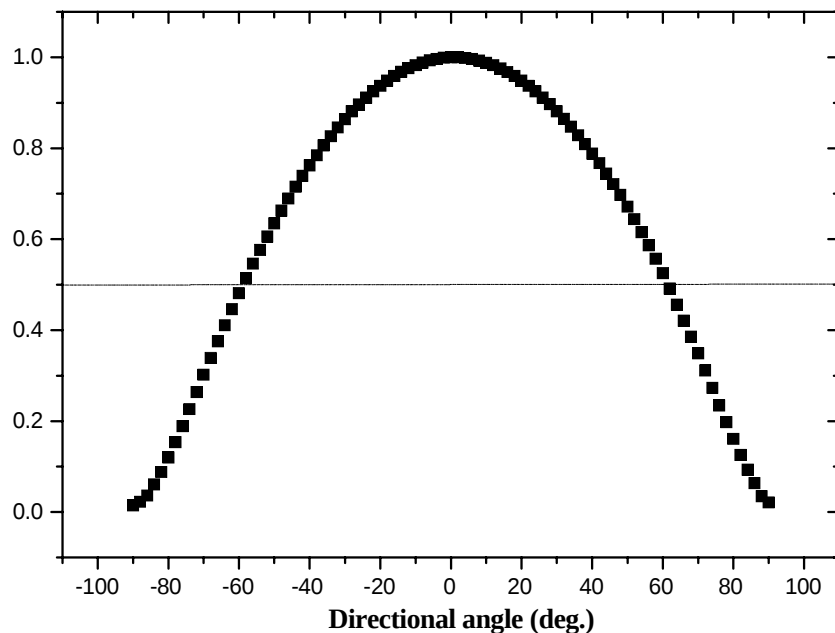
### 10. Warm White spectrum of Typical CCT



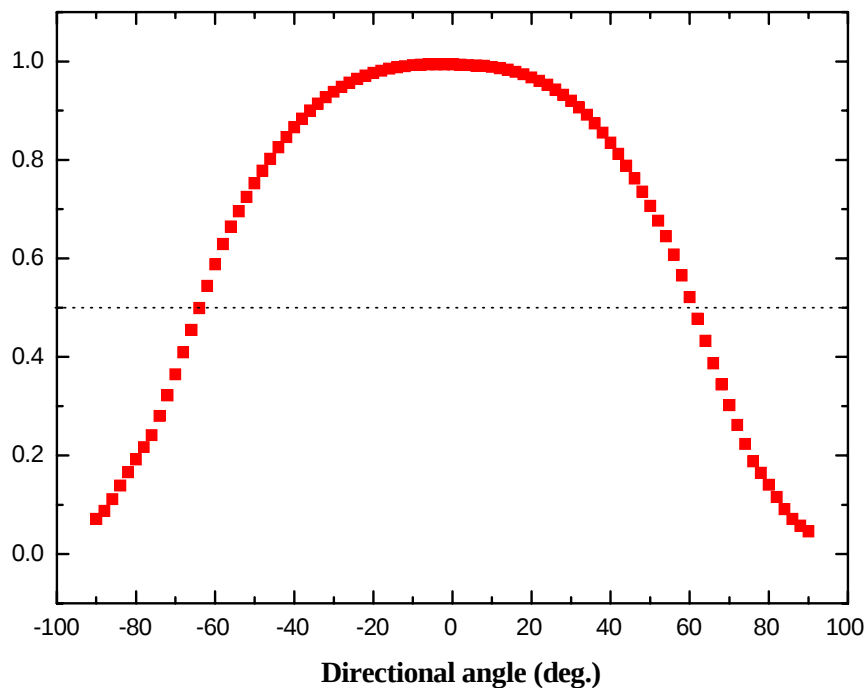
## 11. Spectrum for Red, Green, Blue, Amber, Cyan



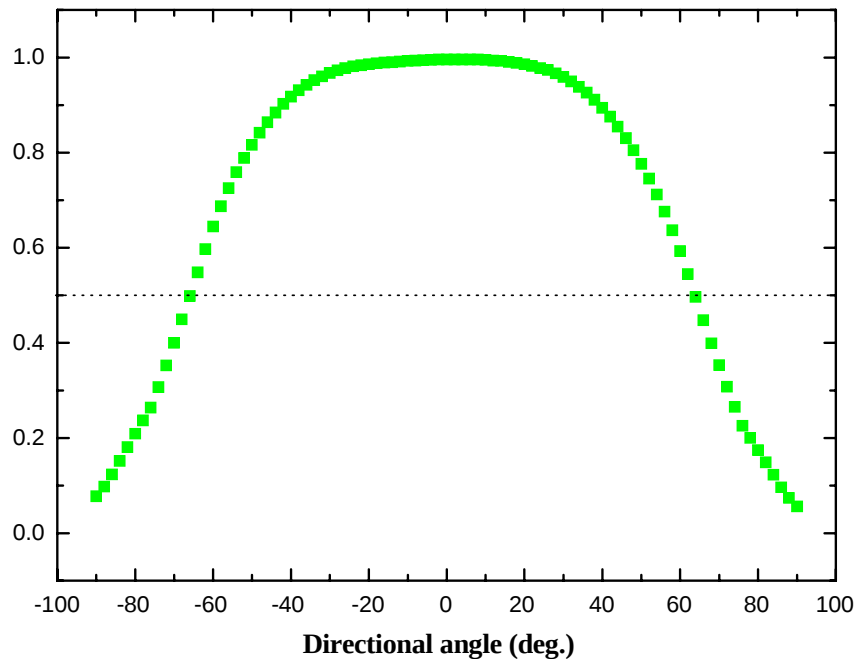
## 12. Radiation pattern for



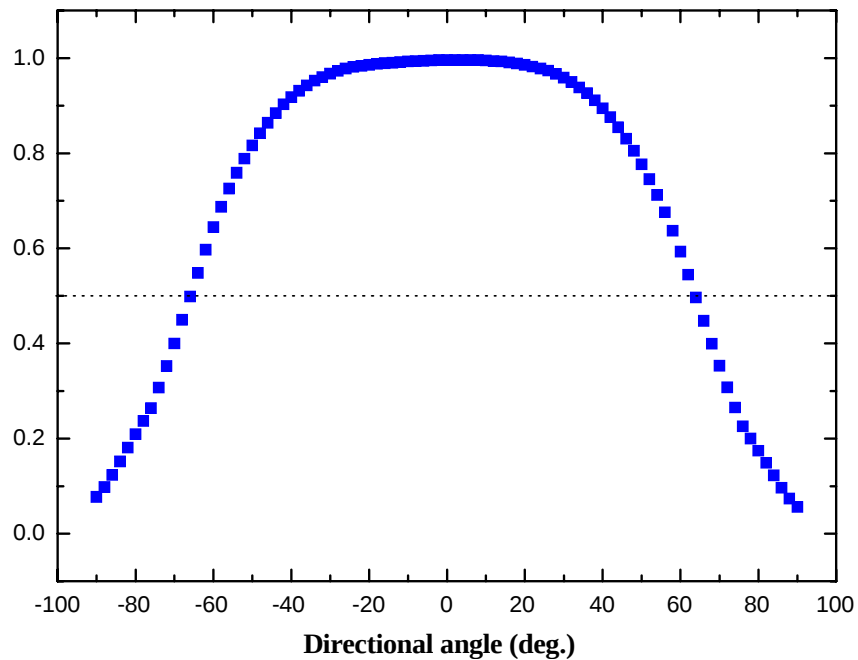
## 13. Radiation pattern for Red



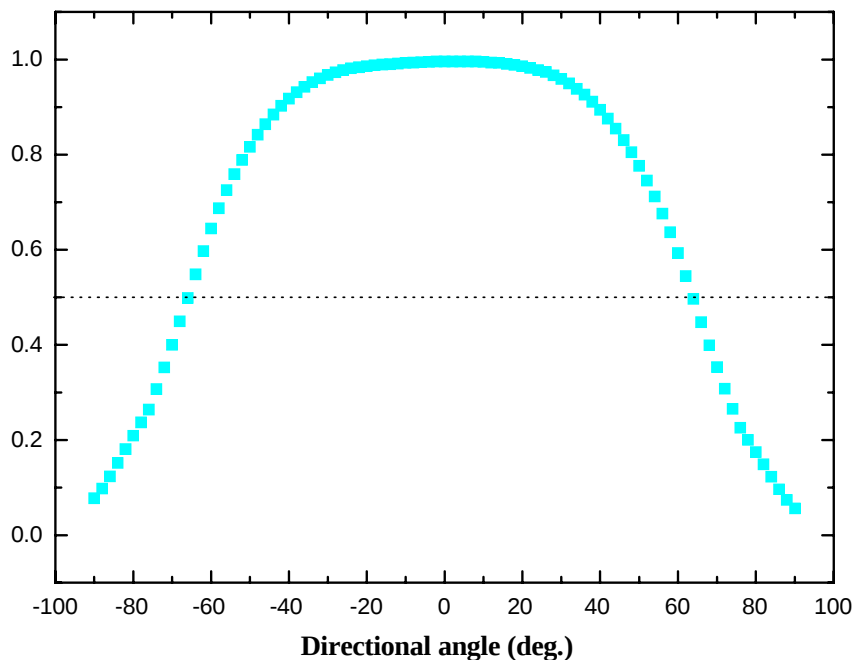
#### 14. Radiation pattern for Green



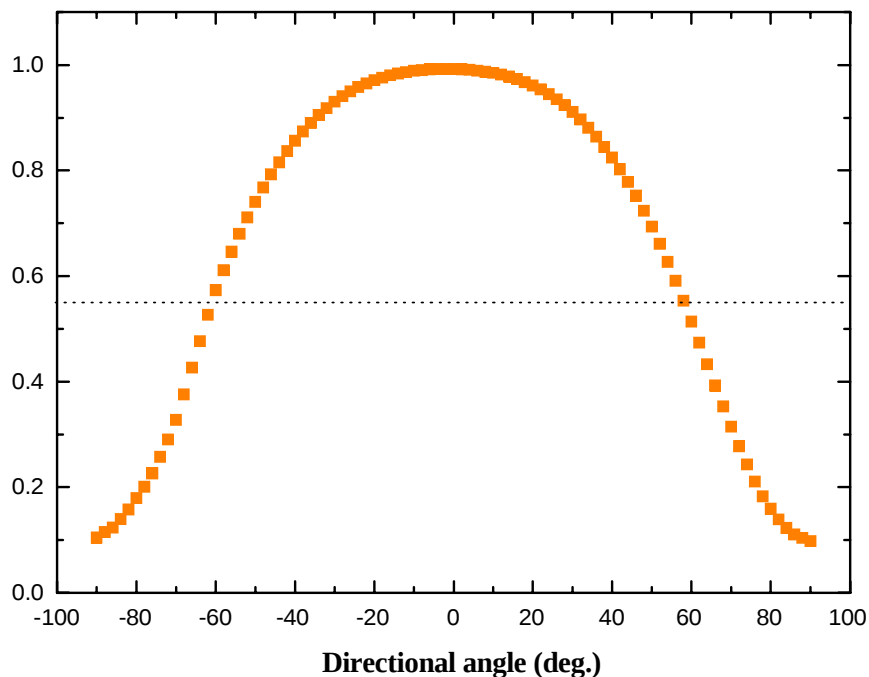
#### 15. Radiation pattern for Blue



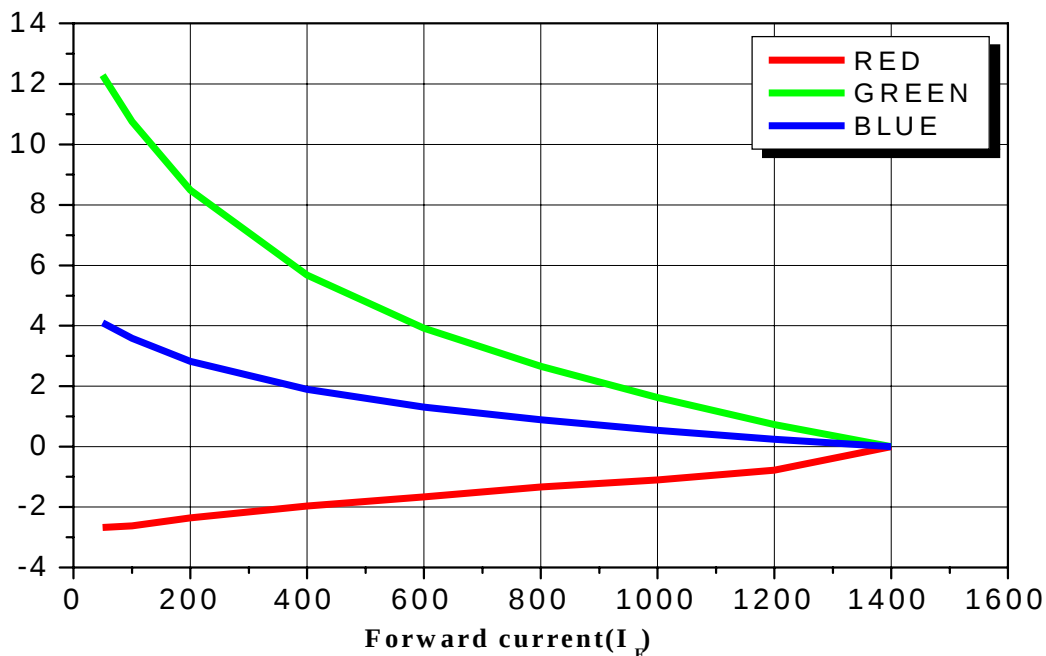
## 16. Radiation pattern for Cyan



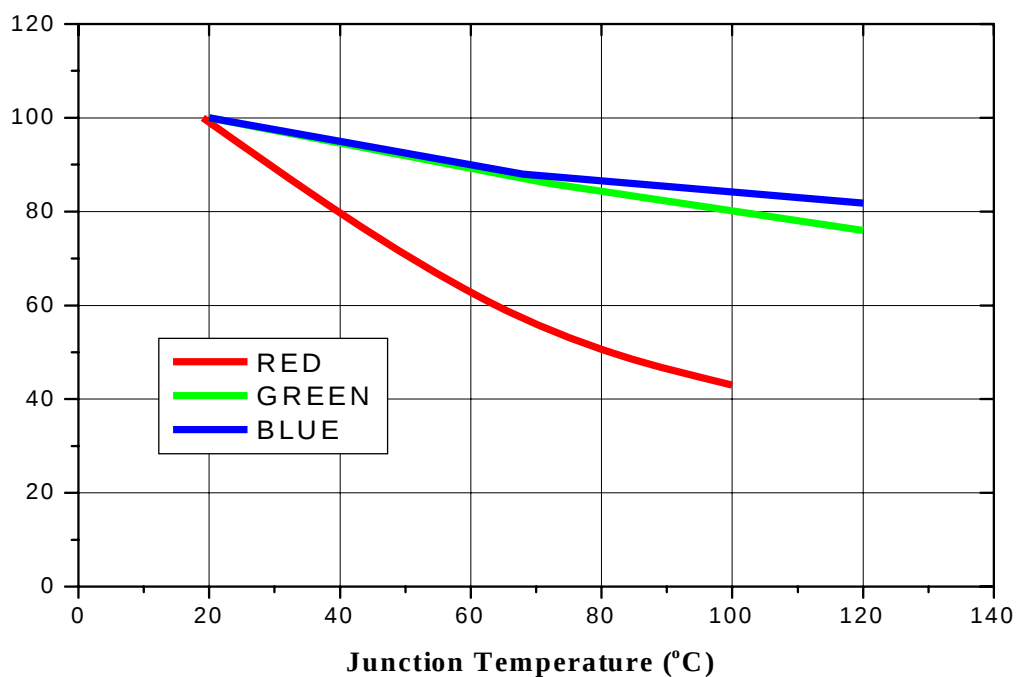
## 17. Radiation pattern for Amber



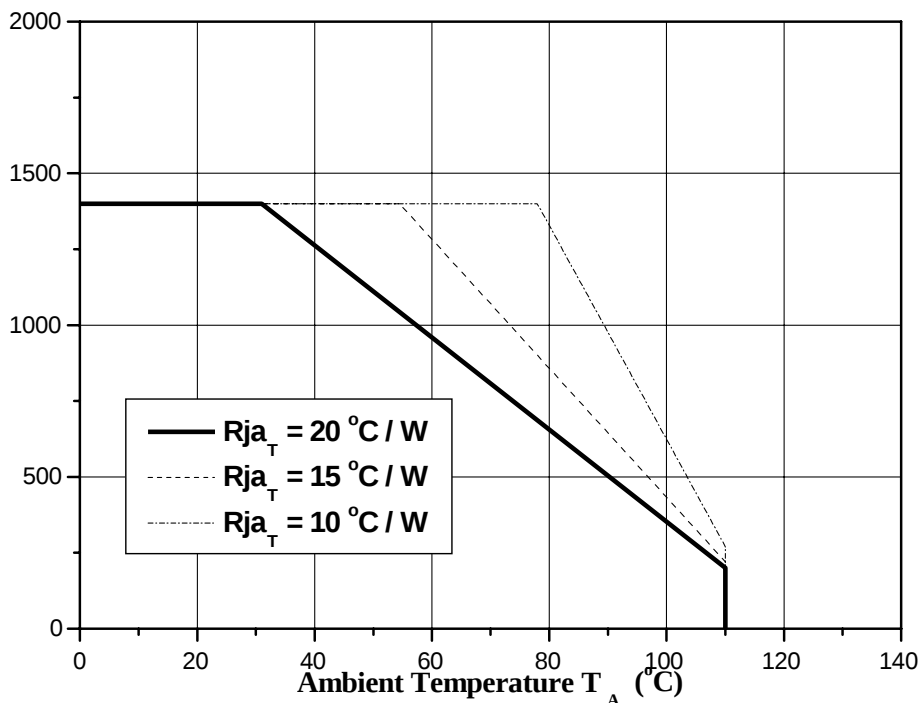
### 18. Forward Current vs. Wavelength shift ( $T_a=25^\circ\text{C}$ )



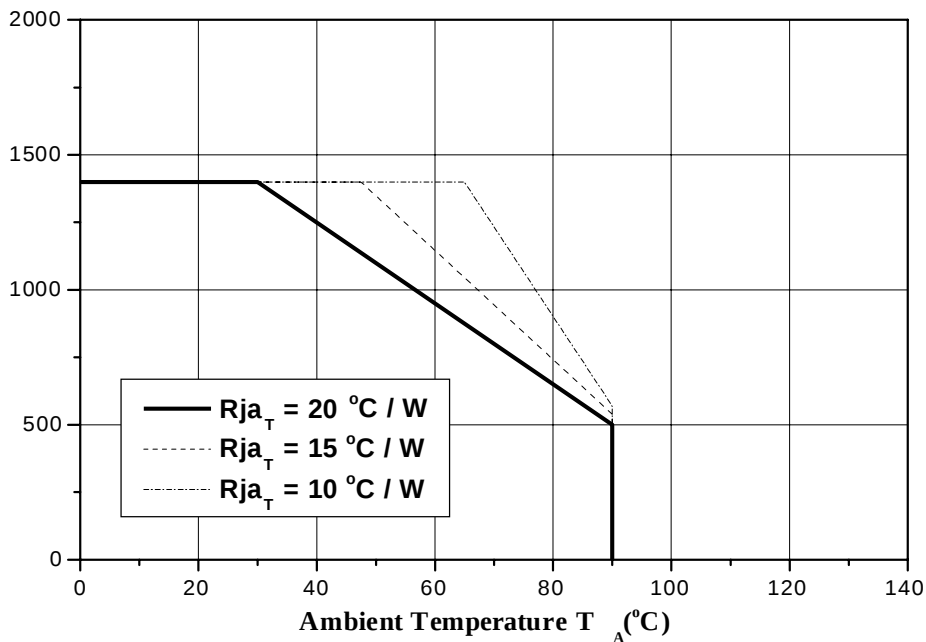
### 19. Temperature of Junction vs. Relative Light Output for Blue, Green, Red ( $T_a=25^\circ\text{C}$ )



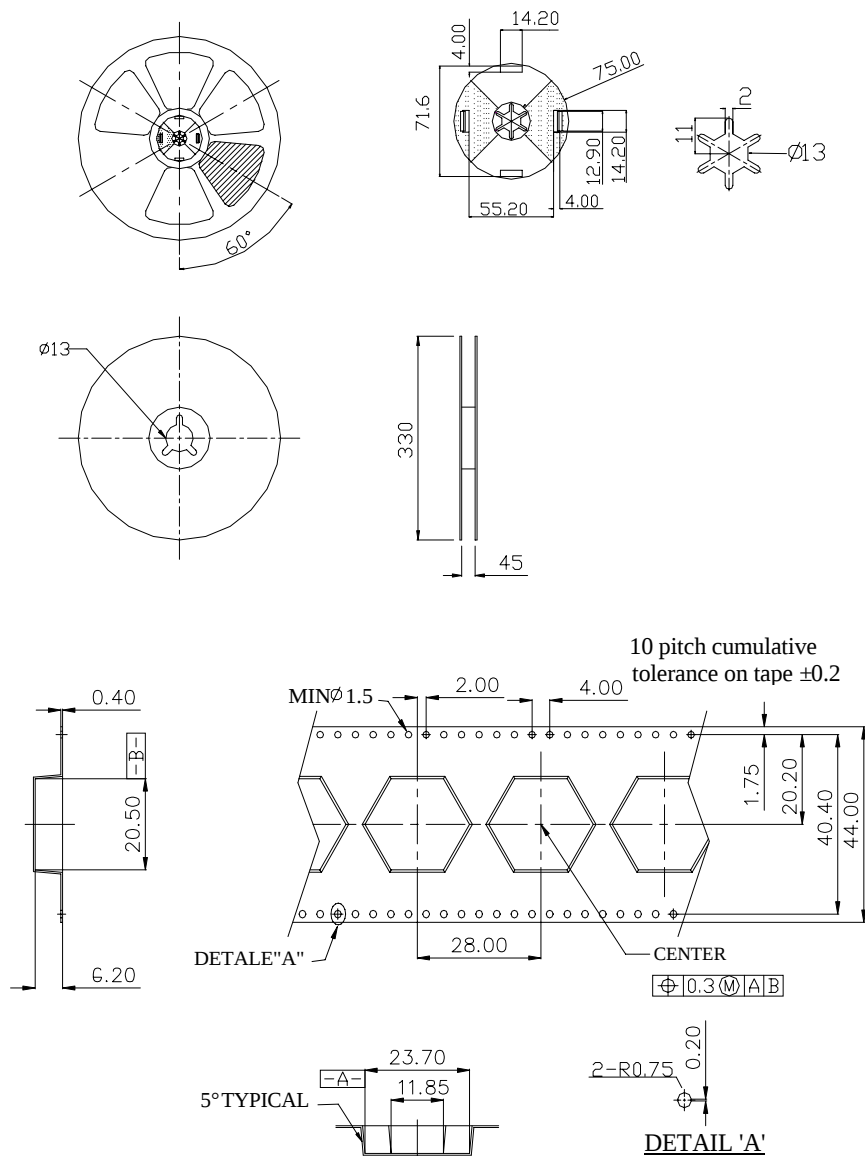
## 20. Ambient Temperature vs. Allowable Forward Current for White, Blue, Green, Cyan



## 21. Ambient Temperature vs. Allowable Forward Current for Red, Amber



## 22. Reel Packaging Dimensions (Star type)



Note : 1. The number of loaded products in the reel is 100 pieces

2. All dimensions are in millimeters

3. Scale : none

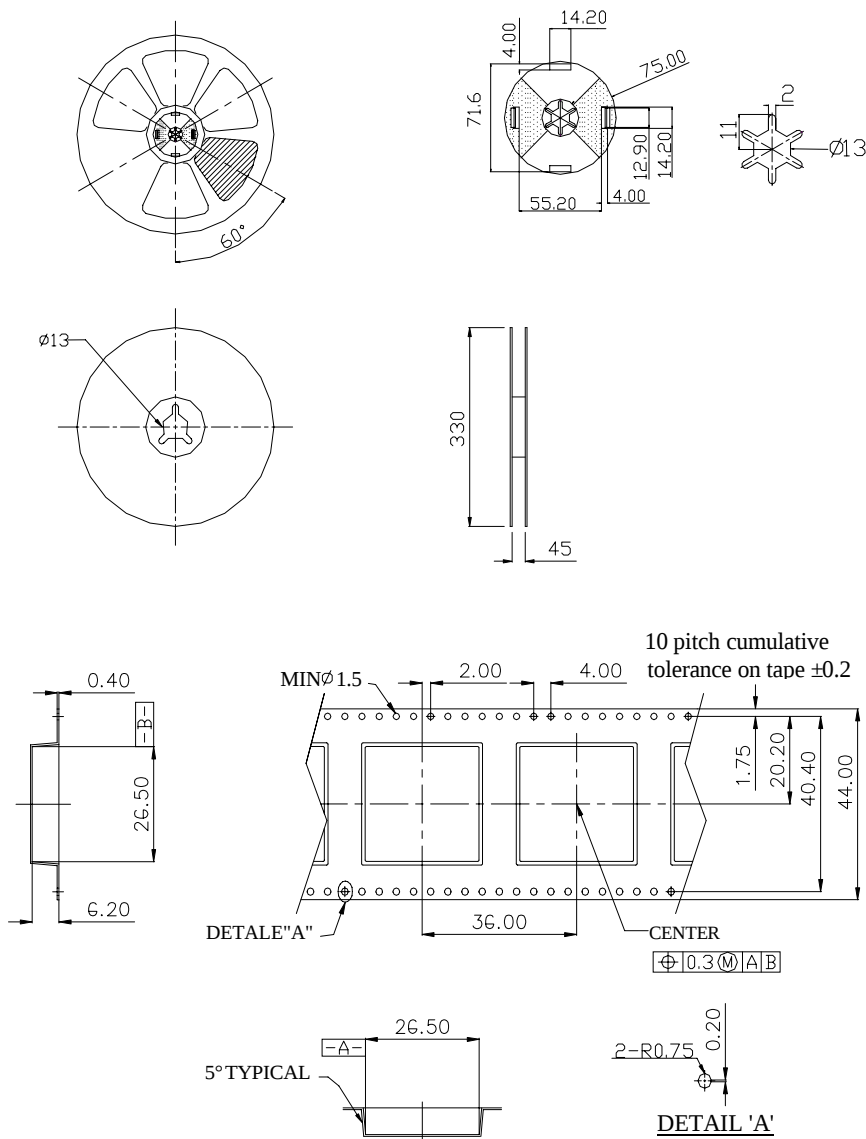
4. This drawing is reference only engineering



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## 23. Reel Packaging Dimensions (Square type)



Note : 1. The number of loaded products in the reel is 100 pieces

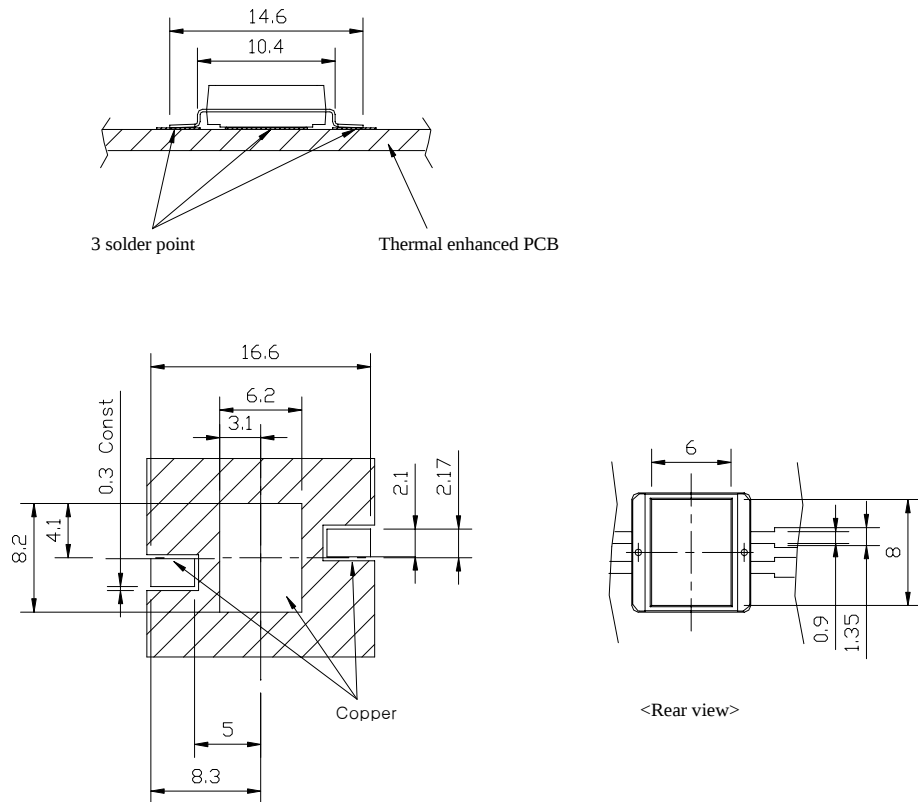
2. All dimensions are in millimeters

3. Scale is none

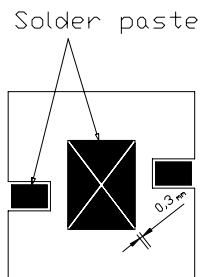
4. This is drawing is reference only engineering

## 24. Recommended soldering

### 1) Solder pad



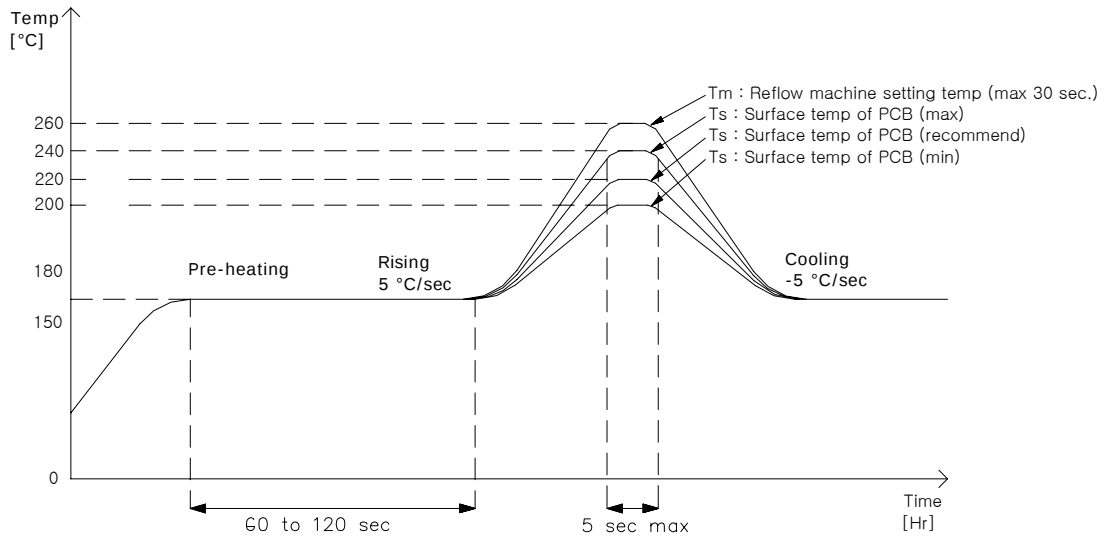
### 2) Solder paste pattern



Note : 1. Paste thickness : 0.2mm

## 25. Soldering Profile (Ta=25°C ±5 / RH=35% ±5)

### (1) Reflow Soldering Conditions / Profile



### (2) Hand Soldering conditions

- Lead : Not more than 3 seconds @ MAX 280°C
- Slug : Use a thermal-adhesives

#### \* Caution

1. Reflow soldering should not be done more than one time.
2. Repairing should not be done after the LED's have been soldered. When repairing is unavoidable, suitable tools must be used.
3. Die slug is to be soldered.
4. When soldering, do not put stress on the LED's during heating.
5. After soldering, do not warp the circuit board.
6. Recommend to use a convection type reflow machine with 7 ~ 8 zones.