



Pb-free  
HEAT



# 1112H Series

Single Color High Brightness Type

## Features

|                         |                                                                                                                                                                                                                                                                                                                                     |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------------------------|--------------|--------------------------------------------------------------|----------|--------------------------------------------------------------|--------|-------------|-----|-------------|
| Package                 | 2125(h =0.8mm) Type, Milky White resin                                                                                                                                                                                                                                                                                              |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Product features        | <ul style="list-style-type: none"><li>• Outer Dimension 2.0 x 1.25 x 0.8mm ( L x W x H )</li><li>• Temperature range<ul style="list-style-type: none"><li>Storage Temperature : -40℃~100℃</li><li>Operating Temperature : -40℃~85℃</li></ul></li><li>• Lead-free soldering compatible</li><li>• RoHS compliant</li></ul>            |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Dominant wavelength     | <table><tr><td>Green</td><td>: 562nm(YBG)</td></tr><tr><td>Yellow Green</td><td>: 572nm(YPY)</td></tr><tr><td>Yellow</td><td>: 590nm(FY)</td></tr><tr><td>Orange</td><td>: 605nm(FA)</td></tr><tr><td>Red</td><td>: 626nm(FR)</td></tr></table>                                                                                     | Green | : 562nm(YBG)                                                 | Yellow Green | : 572nm(YPY)                                                 | Yellow   | : 590nm(FY)                                                  | Orange | : 605nm(FA) | Red | : 626nm(FR) |
| Green                   | : 562nm(YBG)                                                                                                                                                                                                                                                                                                                        |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Yellow Green            | : 572nm(YPY)                                                                                                                                                                                                                                                                                                                        |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Yellow                  | : 590nm(FY)                                                                                                                                                                                                                                                                                                                         |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Orange                  | : 605nm(FA)                                                                                                                                                                                                                                                                                                                         |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Red                     | : 626nm(FR)                                                                                                                                                                                                                                                                                                                         |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Half Intensity Angle    | <table><tr><td>YBG</td><td>: <math>\theta_x = 140 \text{ deg.}, \theta_y = 150 \text{ deg.}</math></td></tr><tr><td>YPY</td><td>: <math>\theta_x = 151 \text{ deg.}, \theta_y = 156 \text{ deg.}</math></td></tr><tr><td>FY,FA,FR</td><td>: <math>\theta_x = 148 \text{ deg.}, \theta_y = 145 \text{ deg.}</math></td></tr></table> | YBG   | : $\theta_x = 140 \text{ deg.}, \theta_y = 150 \text{ deg.}$ | YPY          | : $\theta_x = 151 \text{ deg.}, \theta_y = 156 \text{ deg.}$ | FY,FA,FR | : $\theta_x = 148 \text{ deg.}, \theta_y = 145 \text{ deg.}$ |        |             |     |             |
| YBG                     | : $\theta_x = 140 \text{ deg.}, \theta_y = 150 \text{ deg.}$                                                                                                                                                                                                                                                                        |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| YPY                     | : $\theta_x = 151 \text{ deg.}, \theta_y = 156 \text{ deg.}$                                                                                                                                                                                                                                                                        |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| FY,FA,FR                | : $\theta_x = 148 \text{ deg.}, \theta_y = 145 \text{ deg.}$                                                                                                                                                                                                                                                                        |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Die materials           | YBG,YPY,FY,FA,FR : AlGaInP                                                                                                                                                                                                                                                                                                          |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Rank grouping parameter | Sorted by luminous intensity and wavelength per rank taping                                                                                                                                                                                                                                                                         |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Assembly method         | Auto pick & place machine (Auto Mounter)                                                                                                                                                                                                                                                                                            |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Soldering methods       | Reflow soldering and manual soldering                                                                                                                                                                                                                                                                                               |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| Taping and reel         | 4,000pcs per reel in a 8mm width tape. (Standard)<br>Reel diameter: $\phi 180\text{mm}$                                                                                                                                                                                                                                             |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |
| ESD                     | AlGaInP : More than 2kV(HBM)                                                                                                                                                                                                                                                                                                        |       |                                                              |              |                                                              |          |                                                              |        |             |     |             |

## Recommended Applications

Communication Machine, Electric Household Appliances, OA/FA, Other General Applications



# 1112H Series

Single Color High Brightness Type

## Color and Luminous Intensity

(Ta=25°C)

| Part No. | Material | Emitted Color | Lens Color  | Dominant Wavelength<br>$\lambda_d$ (nm) |       | Luminous Intensity<br>$I_v$ (mcd) |      |       |
|----------|----------|---------------|-------------|-----------------------------------------|-------|-----------------------------------|------|-------|
|          |          |               |             | TYP.                                    | $I_F$ | MIN.                              | TYP. | $I_F$ |
| YBG1112H | AlGaInP  | Green         | Milky White | 562                                     | 20    | 4.3                               | 12   | 20    |
| YPY1112H | AlGaInP  | Yellow Green  |             | 572                                     | 20    | 19.8                              | 35   | 20    |
| FY1112H  | AlGaInP  | Yellow        |             | 590                                     | 20    | 25                                | 65   | 20    |
| FA1112H  | AlGaInP  | Orange        |             | 605                                     | 20    | 25                                | 65   | 20    |
| FR1112H  | AlGaInP  | Red           |             | 626                                     | 20    | 25                                | 50   | 20    |

## Absolute Maximum Ratings

(Ta=25°C)

| Item                            | Symbol           | Absolute Maximum Ratings |      |      |      |      | Unit  |
|---------------------------------|------------------|--------------------------|------|------|------|------|-------|
|                                 |                  | YBG                      | YPY  | FY   | FA   | FR   |       |
| Power Dissipation               | $P_d$            | 78                       | 62.5 | 81   | 81   | 81   | mW    |
| Forward Current                 | $I_F$            | 30                       | 25   | 30   | 30   | 30   | mA    |
| Pulse Forward Current ※1        | $I_{FRM}$        | 100                      | 60   | 100  | 100  | 100  | mA    |
| Derating<br>(Ta=25°C or higher) | $\Delta I_F$     | 0.43                     | 0.36 | 0.43 | 0.43 | 0.43 | mA/°C |
|                                 | $\Delta I_{FRM}$ | 1                        | 0.86 | 1    | 1    | 1    | mA/°C |
| Reverse Voltage                 | $V_R$            | 5                        | 5    | 5    | 5    | 5    | V     |
| Operating Temperature           | $T_{opr}$        | -40~+85                  |      |      |      |      | °C    |
| Storage Temperature             | $T_{stg}$        | -40~+100                 |      |      |      |      | °C    |

※1  $I_{FRM}$  Measurement condition :  $t_w \leq 1\text{ms.}$ , Duty  $\leq 1/20$ .(FY,FA,FR : Duty  $\leq 1/10$ )

## Electro-Optical Characteristics (YBG, YPY, FY, FA, FR)

(Ta=25°C)

| Item                     | Conditions           | Symbol         | Characteristics |           |           |           |           |           | Unit |
|--------------------------|----------------------|----------------|-----------------|-----------|-----------|-----------|-----------|-----------|------|
|                          |                      |                |                 | YBG       | YPY       | FY        | FA        | FR        |      |
| Forward Voltage          | I <sub>F</sub> =20mA | V <sub>F</sub> | TYP.            | 2.1       | 2.1       | 1.9       | 1.9       | 1.9       | V    |
|                          |                      |                | MAX.            | 2.5       | 2.5       | 2.4       | 2.4       | 2.4       |      |
| Reverse Current          | V <sub>R</sub> =5V   | I <sub>R</sub> | MAX.            | 100       | 100       | 100       | 100       | 100       | μ A  |
| Peak Wavelength          | I <sub>F</sub> =20mA | λ <sub>p</sub> | TYP.            | 565       | 575       | 592       | 609       | 635       | nm   |
| Dominant Wavelength      | I <sub>F</sub> =20mA | λ <sub>d</sub> | TYP.            | 562       | 572       | 590       | 605       | 626       | nm   |
| Spectral Line Half Width | I <sub>F</sub> =20mA | Δ λ            | TYP.            | 15        | 15        | 15        | 15        | 15        | nm   |
| Half Intensity Angle     | I <sub>F</sub> =20mA | 2 θ 1/2        | TYP.            | 140( θ x) | 151( θ x) | 148( θ x) | 148( θ x) | 148( θ x) | deg. |
|                          |                      |                |                 | 150( θ y) | 156( θ y) | 145( θ y) | 145( θ y) | 145( θ y) |      |

## Luminous Intensity Rank

(Ta=25°C)

| Rank | I <sub>v</sub> (mcd) |      |                      |      |                      |      |                      |      |                      |      |
|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|
|      | YBG                  |      | YPY                  |      | FY                   |      | FA                   |      | FR                   |      |
|      | I <sub>F</sub> =20mA |      | I <sub>F</sub> =20mA |      | I <sub>F</sub> =20mA |      | I <sub>F</sub> =20mA |      | I <sub>F</sub> =20mA |      |
|      | MIN.                 | MAX. | MIN.                 | MAX. | MIN.                 | MAX. | MIN.                 | MAX. | MIN.                 | MAX. |
| A    | 4.3                  | 8.5  | 19.8                 | 28.0 | 25                   | 50   | 25                   | 50   | 25                   | 50   |
| B    | 6.0                  | 12.0 | 23.3                 | 33.0 | 35                   | 70   | 35                   | 70   | 35                   | 70   |
| C    | 8.5                  | 17.0 | 28.0                 | 40.0 | 50                   | 100  | 50                   | 100  | 50                   | 100  |
| D    | 12.0                 | 24.0 | 33.0                 | 46.7 | 70                   | 140  | 70                   | 140  | 70                   | 140  |
| E    | 17.0                 | 34.0 | 40.0                 | 56.6 | 100                  | 200  | 100                  | 200  | 100                  | 200  |
| F    | 24.0                 | -    | 46.7                 | -    | 140                  | -    | 140                  | -    | 140                  | -    |

※ Please contact our sales staff concerning rank designation.

## Color Tone Groups ( $\lambda d$ )

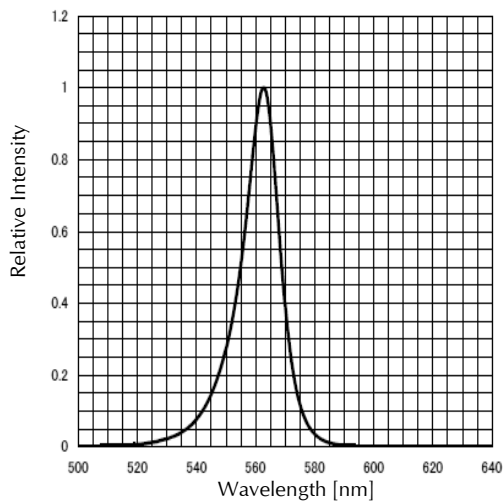
(Ta=25°C)

| Rank | Dominant Wavelength $\lambda$ d (nm) |       |                      |       |                      |       |
|------|--------------------------------------|-------|----------------------|-------|----------------------|-------|
|      | FY                                   |       | FA                   |       | FR                   |       |
|      | I <sub>F</sub> =20mA                 |       | I <sub>F</sub> =20mA |       | I <sub>F</sub> =20mA |       |
|      | MIN.                                 | MAX.  | MIN.                 | MAX.  | MIN.                 | MAX.  |
| A    | 581.5                                | 585.0 | 596.1                | 600.9 | 621.0                | 632.0 |
| B    | 584.0                                | 587.5 | 599.1                | 603.9 |                      |       |
| C    | 586.5                                | 590.0 | 602.1                | 606.9 |                      |       |
| D    | 589.0                                | 592.5 | 605.1                | 609.9 |                      |       |
| E    | 591.5                                | 595.0 | 608.1                | 612.9 |                      |       |
| F    | 594.0                                | 597.5 |                      |       |                      |       |

※ Please contact our sales staff concerning rank designation.

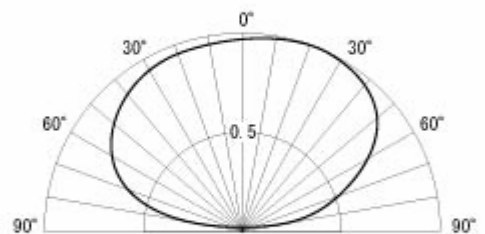
## Technical Data(YBG)

**Spectral Distribution**  
Relative Intensity vs. Wavelength  
Condition :  $T_a = 25^\circ\text{C}$ ,  $I_F = 20\text{mA}$

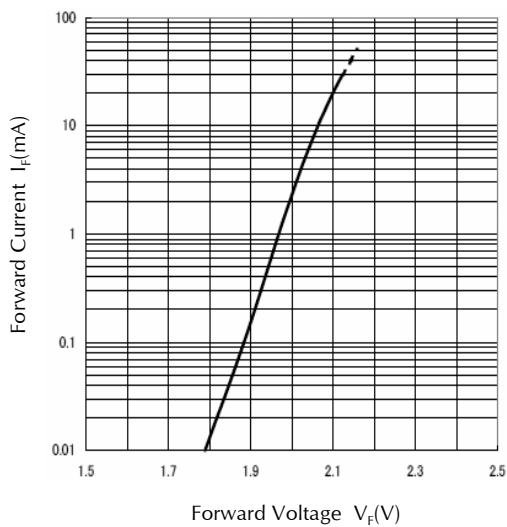


**Spatial Distribution Example**

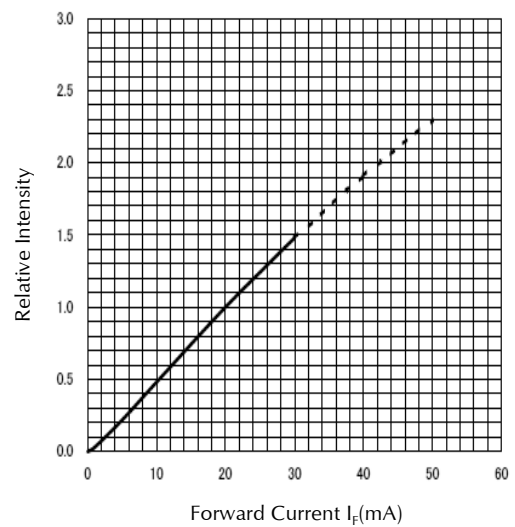
Condition :  $T_a = 25^\circ\text{C}$



**Forward Voltage vs. Forward Current**  
Condition :  $T_a = 25^\circ\text{C}$



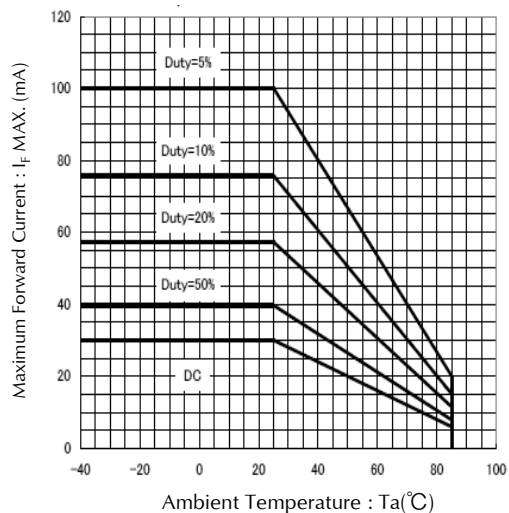
**Forward Current vs. Relative Intensity**  
Condition :  $T_a = 25^\circ\text{C}$



## Technical Data(YBG)

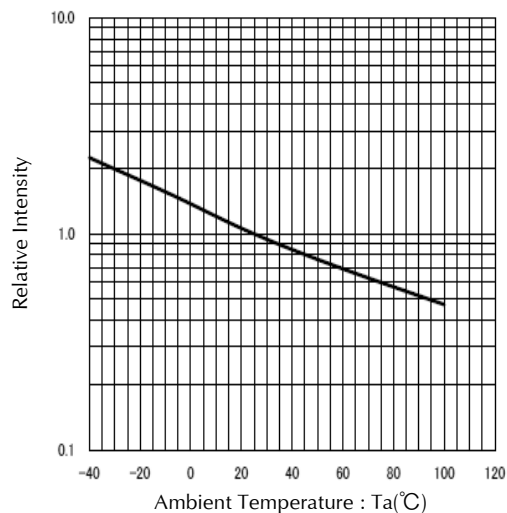
### Derating

Ambient Temperature vs. Maximum Forward Current  
Repetition Frequency :  $f \geq 50\text{Hz}$

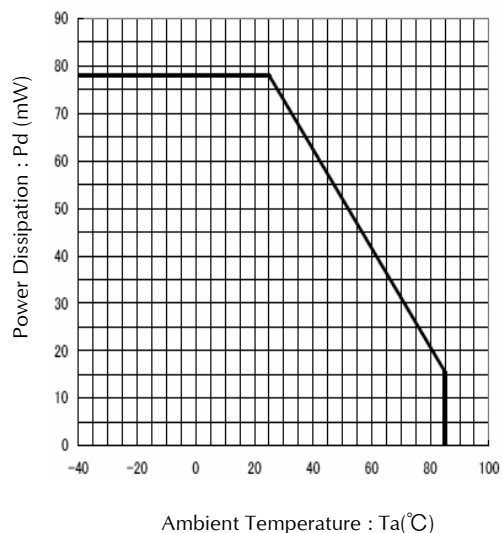


### Ambient Temperature vs. Relative Intensity

Condition :  $I_F = 20\text{mA}$

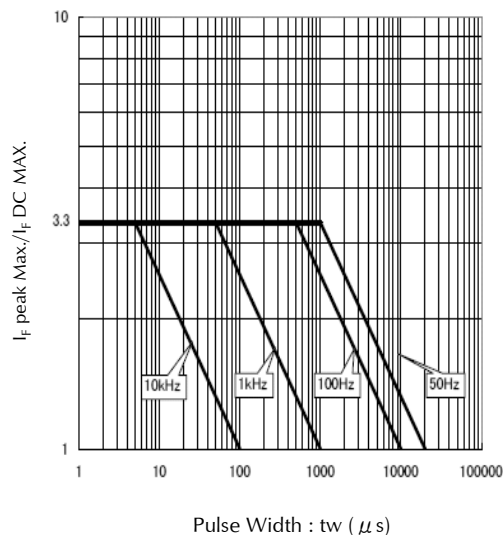


### Power Dissipation vs. Ambient Temperature



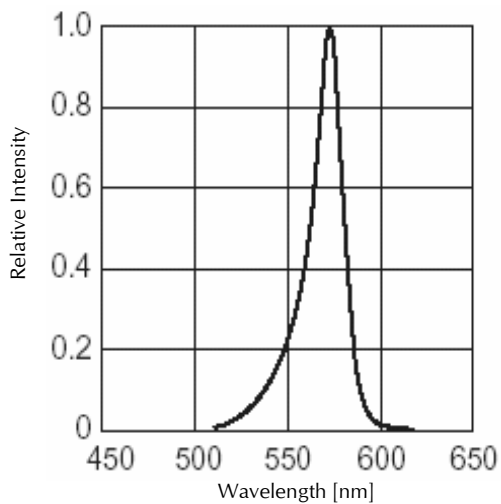
### Pulse Width vs. Maximum Tolerable Peak Current

Condition :  $T_a = 25^{\circ}\text{C}$



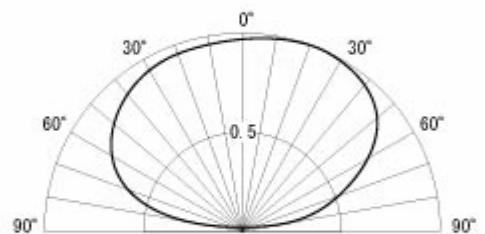
## Technical Data(YPY)

**Spectral Distribution**  
Relative Intensity vs. Wavelength  
Condition :  $T_a = 25^\circ\text{C}$ ,  $I_F = 20\text{mA}$

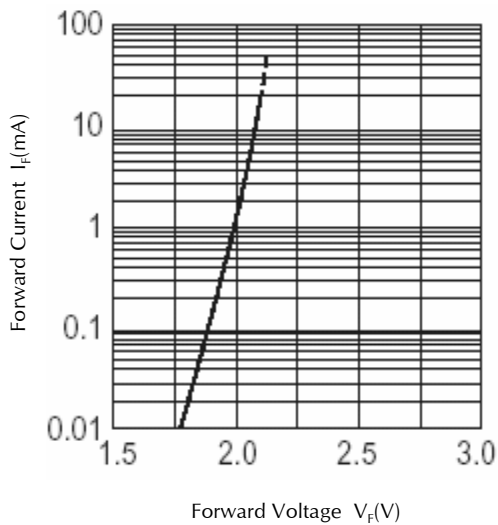


**Spatial Distribution Example**

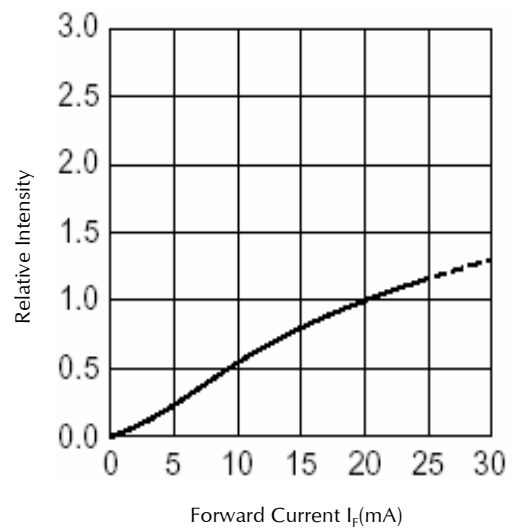
Condition :  $T_a = 25^\circ\text{C}$



**Forward Voltage vs. Forward Current**  
Condition :  $T_a = 25^\circ\text{C}$



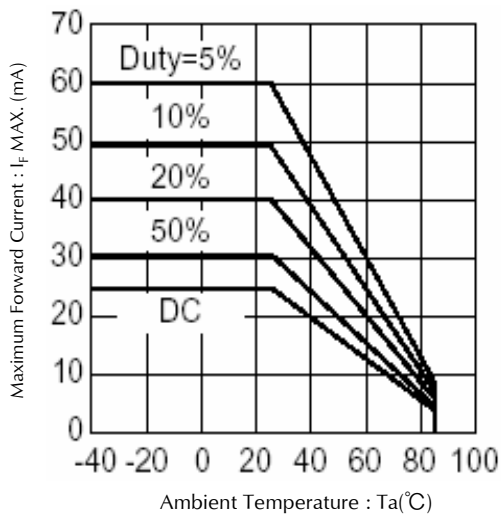
**Forward Current vs. Relative Intensity**  
Condition :  $T_a = 25^\circ\text{C}$



## Technical Data(YPY)

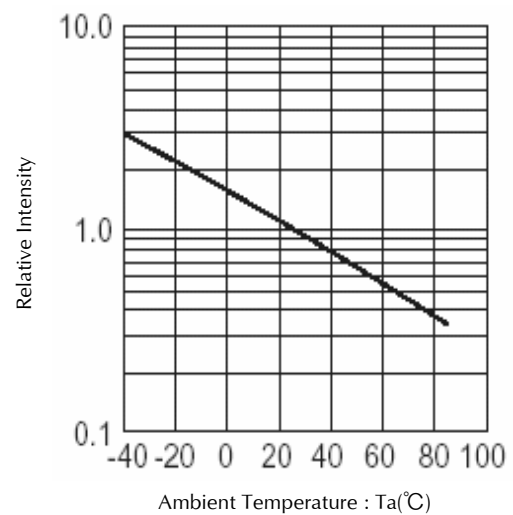
### Derating

Ambient Temperature vs. Maximum Forward Current  
Repetition Frequency :  $f \geq 50\text{Hz}$

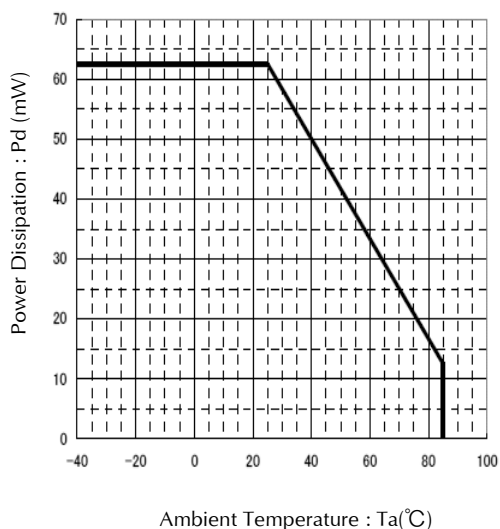


### Ambient Temperature vs. Relative Intensity

Condition :  $I_F=20\text{mA}$

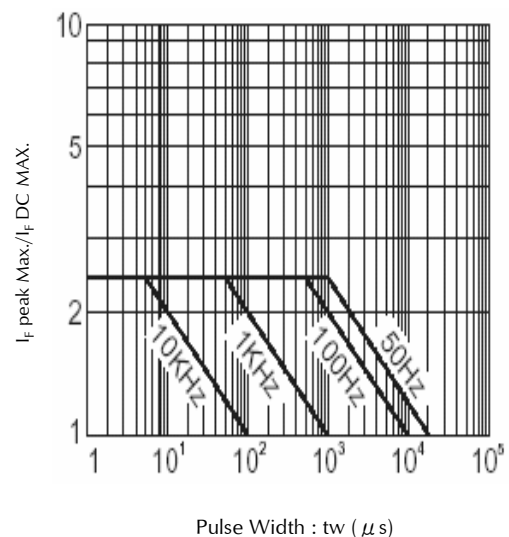


### Power Dissipation vs. Ambient Temperature



### Pulse Width vs. Maximum Tolerable Peak Current

Condition :  $T_a = 25^{\circ}\text{C}$

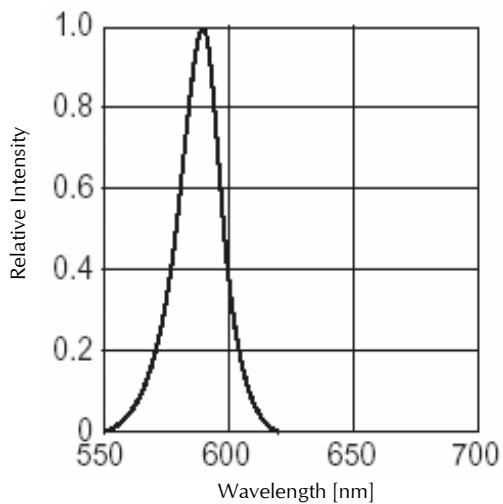


## Technical Data(FY)

Spectral Distribution

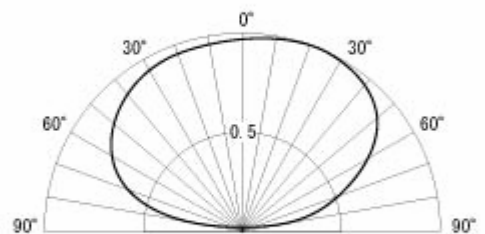
Relative Intensity vs. Wavelength

Condition :  $T_a = 25^\circ\text{C}$ ,  $I_F = 20\text{mA}$



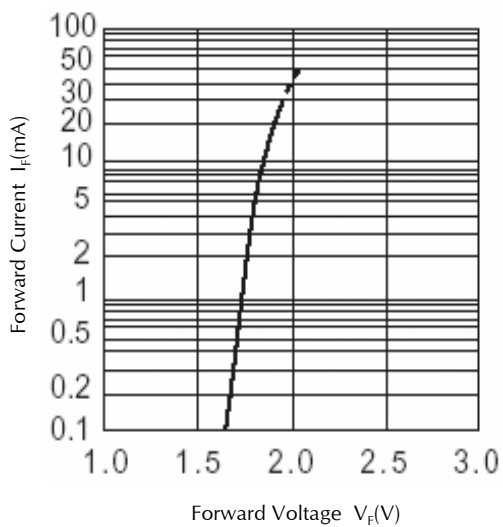
Spatial Distribution Example

Condition :  $T_a = 25^\circ\text{C}$



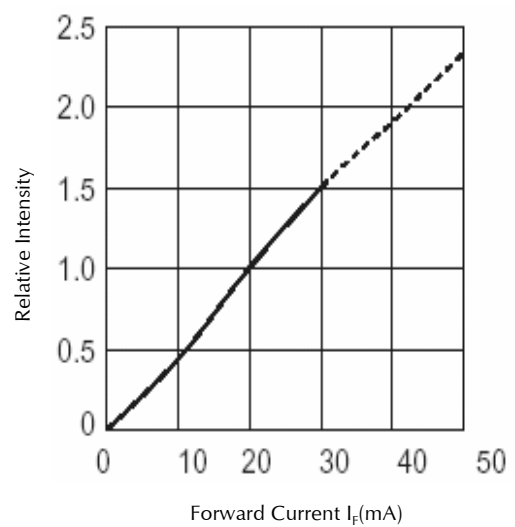
Forward Voltage vs. Forward Current

Condition :  $T_a = 25^\circ\text{C}$



Forward Current vs. Relative Intensity

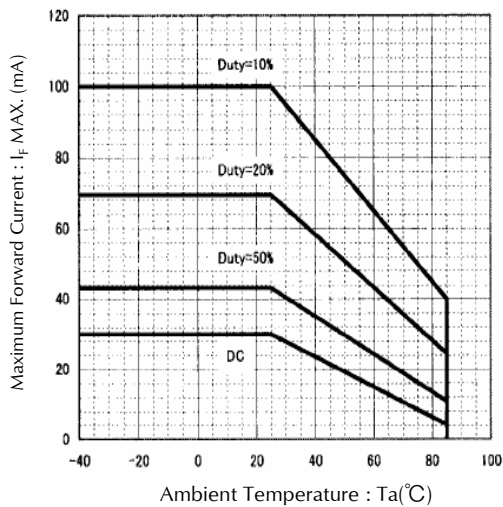
Condition :  $T_a = 25^\circ\text{C}$



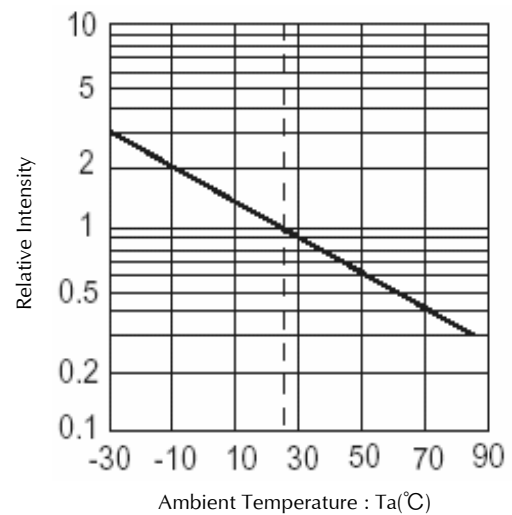
## Technical Data(FY)

### Derating

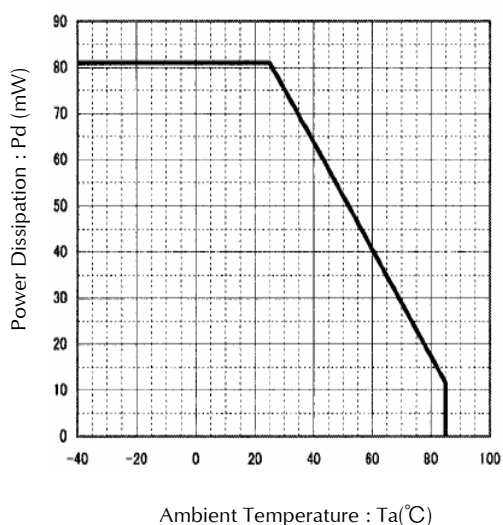
Ambient Temperature vs. Maximum Forward Current  
Repetition Frequency :  $f \geq 50\text{Hz}$



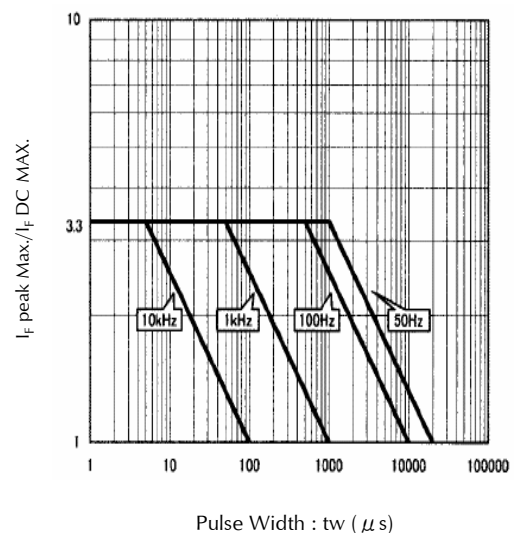
Ambient Temperature vs. Relative Intensity  
Condition :  $I_F=20\text{mA}$



### Power Dissipation vs. Ambient Temperature

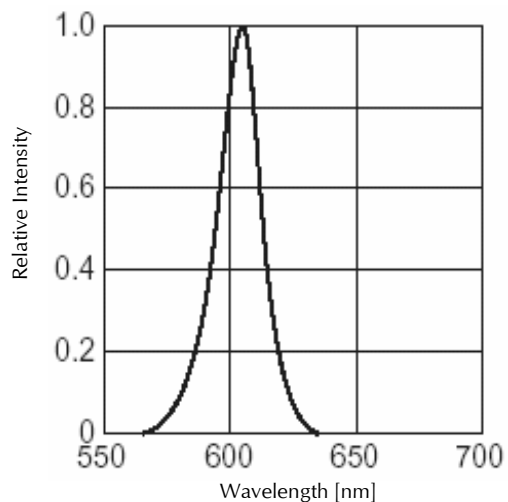


Pulse Width vs. Maximum Tolerable Peak Current  
Condition :  $T_a = 25^{\circ}\text{C}$



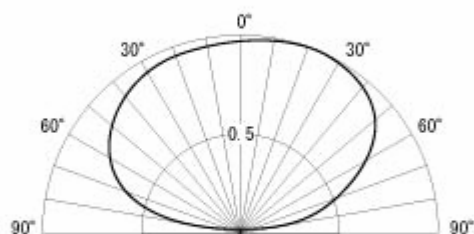
## Technical Data(FA)

**Spectral Distribution**  
Relative Intensity vs. Wavelength  
Condition :  $T_a = 25^\circ\text{C}$ ,  $I_F = 20\text{mA}$

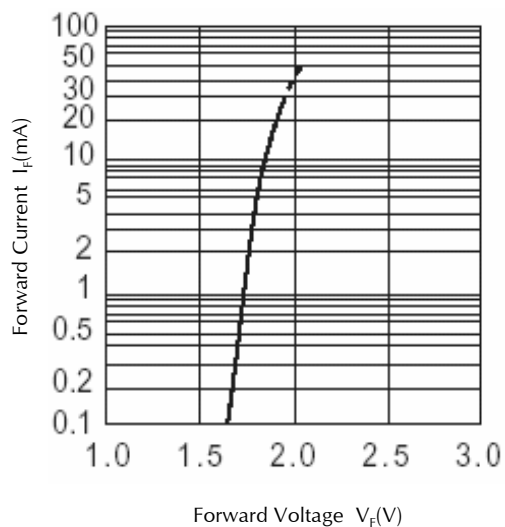


**Spatial Distribution Example**

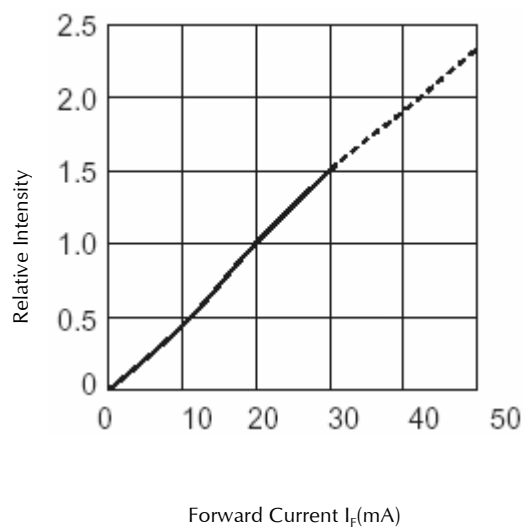
Condition :  $T_a = 25^\circ\text{C}$



**Forward Voltage vs. Forward Current**  
Condition :  $T_a = 25^\circ\text{C}$



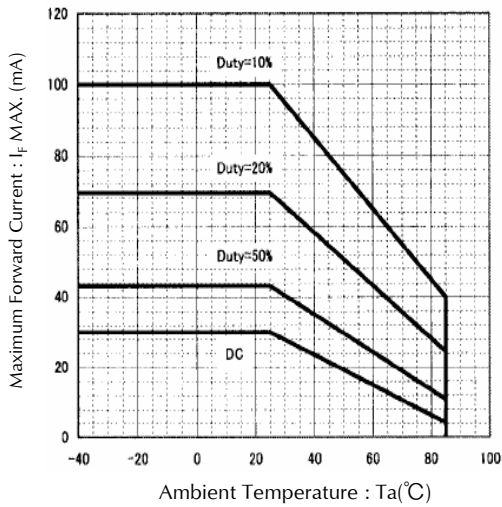
**Forward Current vs. Relative Intensity**  
Condition :  $T_a = 25^\circ\text{C}$



## Technical Data(FA)

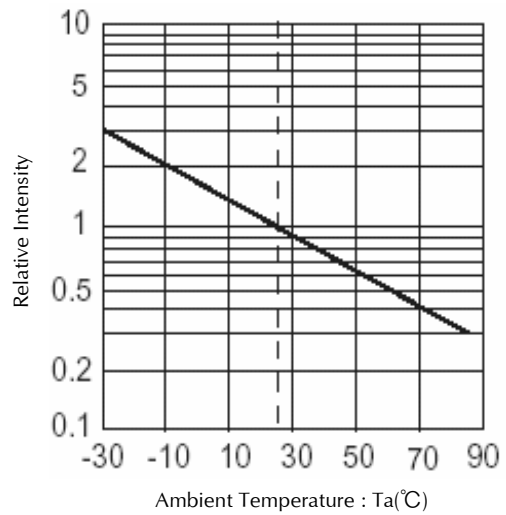
### Derating

Ambient Temperature vs. Maximum Forward Current  
Repetition Frequency :  $f \geq 50\text{Hz}$

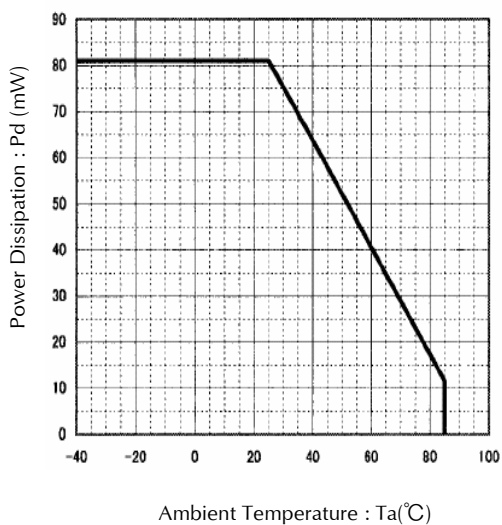


### Ambient Temperature vs. Relative Intensity

Condition :  $I_F=20\text{mA}$

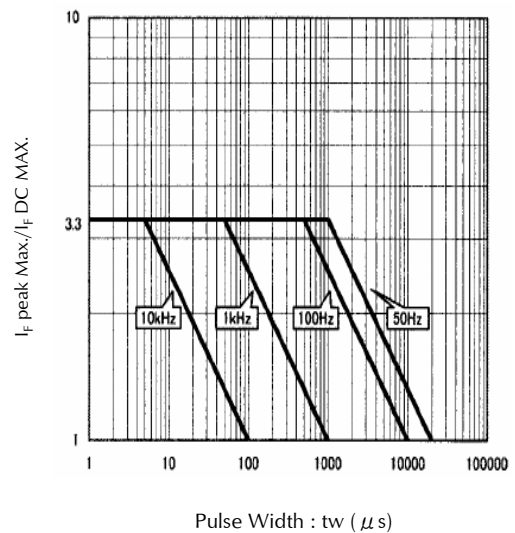


### Power Dissipation vs. Ambient Temperature



### Pulse Width vs. Maximum Tolerable Peak Current

Condition :  $T_a = 25^{\circ}\text{C}$

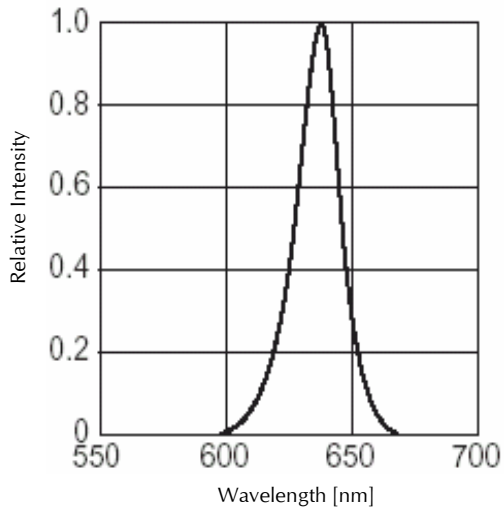


## Technical Data(FR)

Spectral Distribution

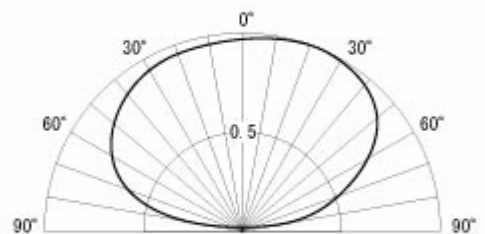
Relative Intensity vs. Wavelength

Condition :  $T_a = 25^\circ\text{C}$ ,  $I_F = 20\text{mA}$



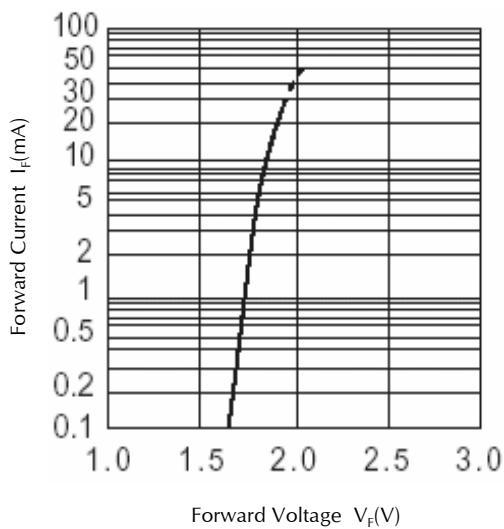
Spatial Distribution Example

Condition :  $T_a = 25^\circ\text{C}$



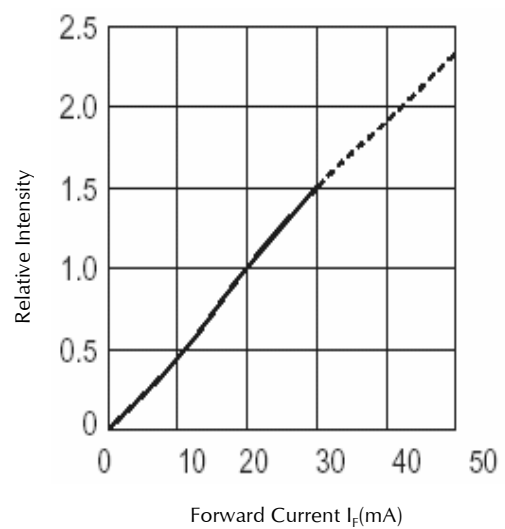
Forward Voltage vs. Forward Current

Condition :  $T_a = 25^\circ\text{C}$



Forward Current vs. Relative Intensity

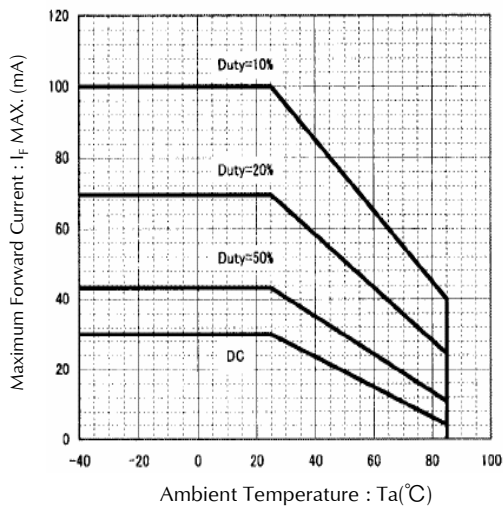
Condition :  $T_a = 25^\circ\text{C}$



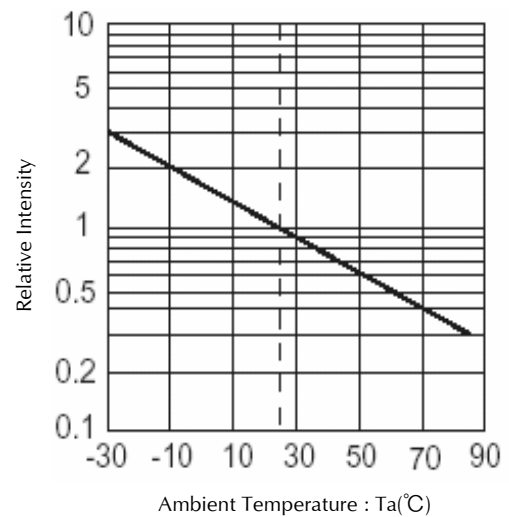
## Technical Data(FR)

### Derating

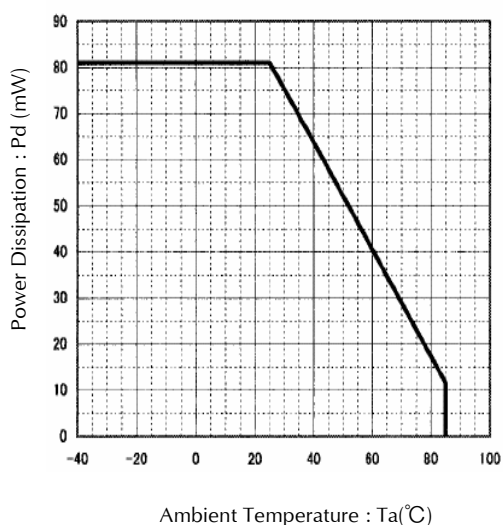
Ambient Temperature vs. Maximum Forward Current  
Repetition Frequency :  $f \geq 50\text{Hz}$



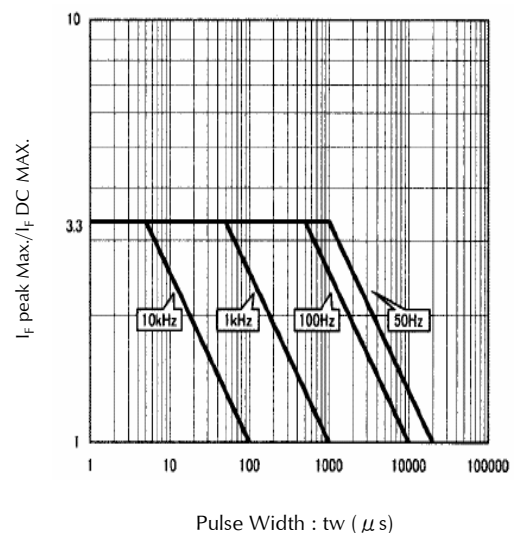
Ambient Temperature vs. Relative Intensity  
Condition :  $I_F=20\text{mA}$



### Power Dissipation vs. Ambient Temperature



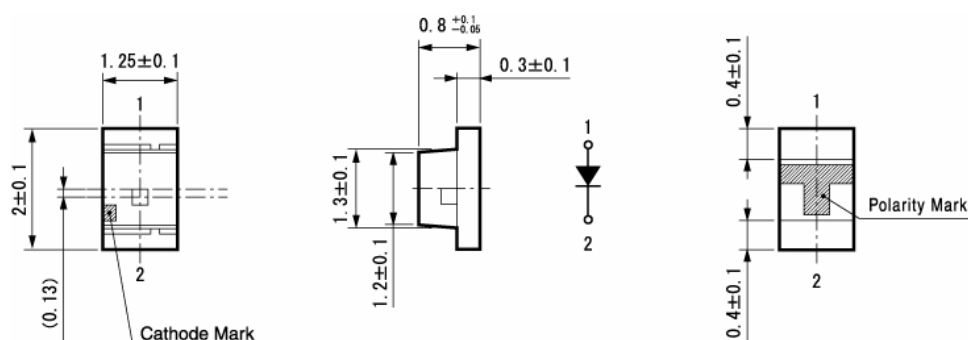
Pulse Width vs. Maximum Tolerable Peak Current  
Condition :  $T_a = 25^{\circ}\text{C}$



## Package Dimensions

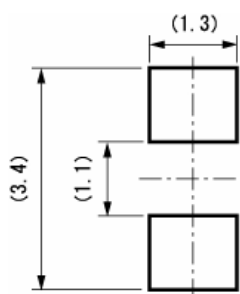
(Unit: mm)

Weight: (2.84)mg



## Recommended Soldering Pattern

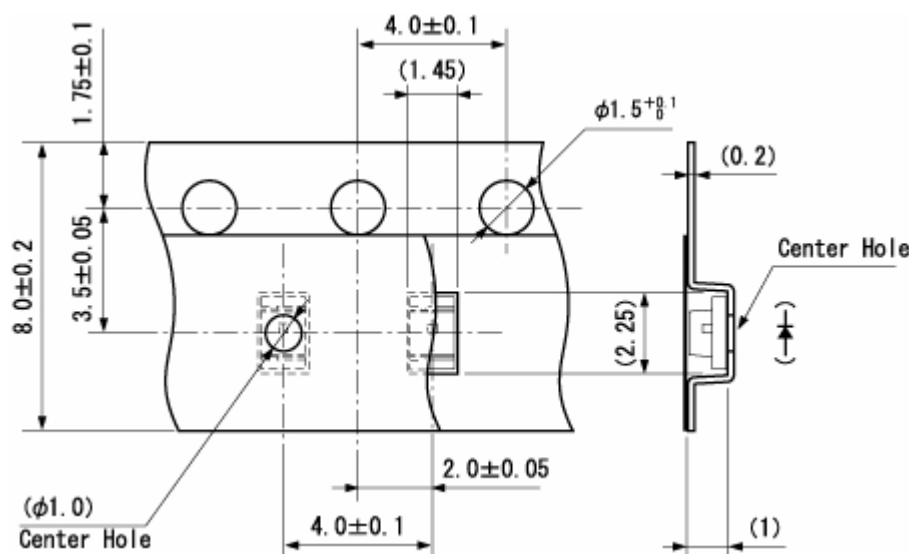
(Unit: mm)



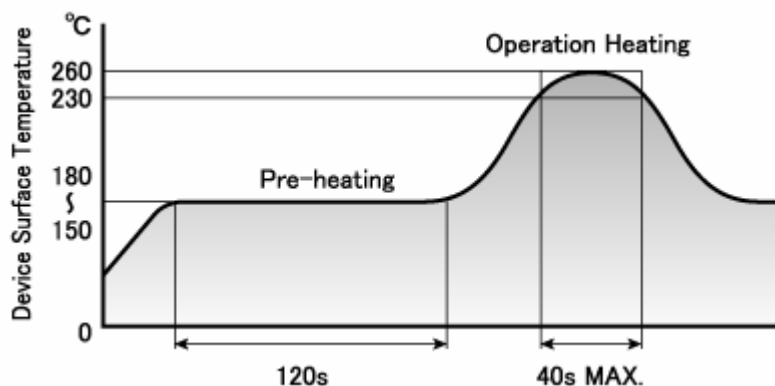
## Taping Specification

(Unit: mm)

Quantity : 4,000pcs/ reel (standard)



## Reflow Soldering Conditions



- 1) The above profile temperature gives the maximum temperature of the LED resin surface. Please set the temperature so as to avoid exceeding this range.
- 2) Total times of reflow soldering process shall be no more than 2 times. When the second reflow soldering process is performed, intervals between the first and second reflow should be short as possible (while allowing some time for the component to return to normal temperature after the first reflow) in order to prevent the LED from absorbing moisture.
- 3) Temperature fluctuation to the LED during the pre-heating process shall be minimized.

## Manual Soldering Conditions

Iron tip temp. 350 °C (MAX.)

Soldering time and frequency 3 s (MAX.)  
1 time (MAX.)

## Reliability Testing Result

| Reliability Testing Result    | Applicable Standard   | Testing Conditions                                                                                                                                   | Duration | Failure |
|-------------------------------|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------|
| Room Temp. Operating Life     | EIAJ ED-4701/100(101) | Ta = 25°C, If = Maximum Rated Current                                                                                                                | 1,000 h  | 0/25    |
| Resistance to Soldering Heat  | EIAJ ED-4701/300(301) | Pre-heating : 150~180°C 120s Max.<br>Operation Heating : 230°C 40s Max.<br>Peak Temperature : 260°C                                                  | Twice    | 0/25    |
| Temperature Cycling           | EIAJ ED-4701/100(105) | Minimum Rated Storage Temperature(30min)<br>~ Normal Temperature(15min)<br>~ Maximum Rated Storage Temperature(30min)<br>~ Normal Temperature(15min) | 5 cycles | 0/25    |
| Wet High Temp. Storage Life   | EIAJ ED-4701/100(103) | Ta = 60±2°C, RH = 90±5%                                                                                                                              | 1,000 h  | 0/25    |
| High Temp. Storage Life       | EIAJ ED-4701/200(201) | Ta = Maximum Rated Storage Temperature                                                                                                               | 1,000 h  | 0/25    |
| Low Temp. Storage Life        | EIAJ ED-4701/200(202) | Ta = Minimum Rated Storage Temperature                                                                                                               | 1,000 h  | 0/25    |
| Vibration, Variable Frequency | EIAJ ED-4701/400(403) | 98.1m/s <sup>2</sup> (10G), 100 ~ 2KHz sweep for 20min., XYZ each direction                                                                          | 2 h      | 0/10    |

## Failure Criteria

| Items               | Symbols | Conditions                                     | Failure criteria                                                |
|---------------------|---------|------------------------------------------------|-----------------------------------------------------------------|
| Luminous Intensity  | Iv      | If Value of each product<br>Luminous Intensity | Testing Min. Value < Spec. Min. Value x 0.5                     |
| Forward Voltage     | Vf      | If Value of each product<br>Forward Voltage    | Testing Max. Value ≥ Spec. Max. Value x 1.2                     |
| Reverse Current     | Ir      | Vr = Maximum Rated<br>Reverse Voltage V        | Testing Max. Value ≥ Spec. Max. Value x 2.5                     |
| Cosmetic Appearance | -       | -                                              | Occurrence of notable decoloration,<br>deformation and cracking |

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