



**Pb-free
HEAT**



1111R Series

Single Color 3216 Reverse Mount Type

Features

| | |
|-------------------------|--|
| Package | 3216 Reverse Mount Type, Water Clear resin |
| Product features | <ul style="list-style-type: none"> • Outer Dimension 3.2 x 1.6 x 1.1mm (L x W x H) • Temperature range Storage Temperature : -40°C~100°C Operating Temperature : -30°C~85°C • Lead-free soldering compatible • RoHS compliant |
| Dominant wavelength | Green : 558nm(BG),567nm(PG) Yellow Green : 572nm(PY) Yellow : 590nm(AY) Orange : 606nm(AA) Red : 647nm(BR) |
| Half Intensity Angle | BG : $\theta_x = 144 \text{ deg.}, \theta_y = 151 \text{ deg.}$ PG : $\theta_x = 145 \text{ deg.}, \theta_y = 149 \text{ deg.}$ PY : $\theta_x = 146 \text{ deg.}, \theta_y = 146 \text{ deg.}$ AY : $\theta_x = 147 \text{ deg.}, \theta_y = 152 \text{ deg.}$ AA : $\theta_x = 144 \text{ deg.}, \theta_y = 150 \text{ deg.}$ BR : $\theta_x = 149 \text{ deg.}, \theta_y = 151 \text{ deg.}$ |
| Die materials | BG,PG,PY : GaP AY,AA : GaAsP BR : GaAlAs |
| Rank grouping parameter | Sorted by luminous intensity per rank taping |
| Assembly method | Auto pick & place machine (Auto Mounter) |
| Soldering methods | Reflow soldering and manual soldering |
| Taping and reel | 3,000pcs per reel in a 8mm width tape. (Standard) Reel diameter: $\phi 180\text{mm}$ |
| ESD | More than 2kV(HBM) |

Recommended Applications

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

Color and Luminous Intensity

(Ta=25°C)

| Part No. | Material | Emitted Color | Lens Color | Dominant Wavelength | | Luminous Intensity | | |
|----------|----------|---------------|-------------|---------------------|----------------|--------------------|------|----------------|
| | | | | λ_d (nm) | | Iv (mcd) | | |
| | | | | TYP. | I _F | MIN. | TYP. | I _F |
| BG1111R | GaP | Green | Milky White | 558 | 20 | 1.6 | 2.7 | 20 |
| PG1111R | GaP | Green | | 567 | 20 | 4.1 | 6.9 | 20 |
| PY1111R | GaP | Yellow Green | | 572 | 20 | 7.6 | 12.7 | 20 |
| AY1111R | GaAsP | Yellow | | 590 | 20 | 2.2 | 3.7 | 20 |
| AA1111R | GaAsP | Orange | | 606 | 20 | 2.2 | 3.7 | 20 |
| BR1111R | GaAlAs | Red | | 647 | 20 | 7.6 | 12.7 | 20 |

Absolute Maximum Ratings

(Ta=25°C)

| Item | Symbol | Absolute Maximum Ratings | | | | | | Unit |
|---------------------------------|------------------|--------------------------|------|------|------|------|------|-------|
| | | BG | PG | PY | AY | AA | BR | |
| Power Dissipation | P_d | 70 | 70 | 70 | 70 | 70 | 57.5 | mW |
| Forward Current | I_F | 25 | 25 | 25 | 25 | 25 | 25 | mA |
| Pulse Forward Current ※1 | I_{FRM} | 60 | 60 | 60 | 60 | 60 | 60 | mA |
| Derating (Ta=25°C or higher) | ΔI_F | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | mA/°C |
| | ΔI_{FRM} | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | 0.86 | mA/°C |
| Reverse Voltage | V_R | 4 | 4 | 4 | 4 | 4 | 4 | V |
| Operating Temperature | T_{opr} | -30~+85 | | | | | | °C |
| Storage Temperature | T_{stg} | -40~+100 | | | | | | °C |

※1 I_{FRM} Measurement condition : Pulse Width ≤ 1 ms., Duty $\leq 1/20$.

Electro-Optical Characteristics

(Ta=25°C)

| Item | Conditions | Symbol | Characteristics | | | | | | Unit | |
|--------------------------|----------------------|----------------|-----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|------|
| | | | BG | PG | PY | AY | AA | BR | | |
| Forward Voltage | I _F =20mA | V _F | TYP. | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 1.7 | V |
| | | | MAX. | 2.8 | 2.8 | 2.8 | 2.8 | 2.8 | 2.3 | |
| Reverse Current | V _R =4V | I _R | MAX. | 100 | 100 | 100 | 100 | 100 | 100 | μ A |
| Peak Wavelength | I _F =20mA | λ _p | TYP. | 555 | 560 | 570 | 580 | 605 | 660 | nm |
| Dominant Wavelength | I _F =20mA | λ _d | TYP. | 558 | 567 | 572 | 590 | 606 | 647 | nm |
| Spectral Line Half Width | I _F =20mA | Δλ | TYP. | 30 | 30 | 30 | 30 | 30 | 30 | nm |
| Half Intensity Angle | I _F =20mA | 2θ 1/2 | TYP. | 144(θ _x) | 145(θ _x) | 146(θ _x) | 147(θ _x) | 144(θ _x) | 149(θ _x) | deg. |
| | | | | 151(θ _y) | 149(θ _y) | 146(θ _y) | 152(θ _y) | 150(θ _y) | 151(θ _y) | |

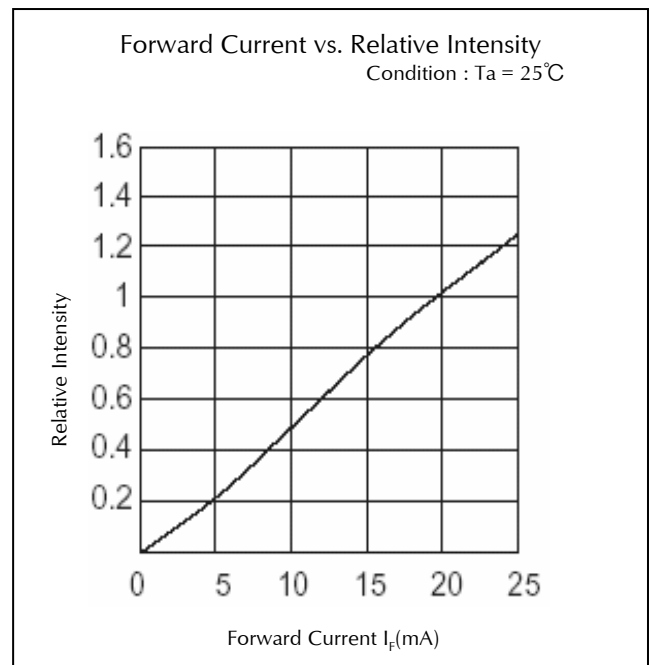
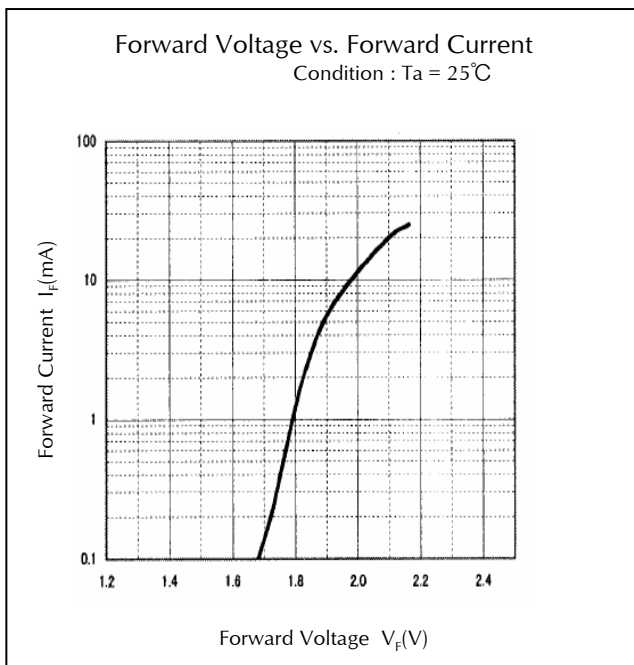
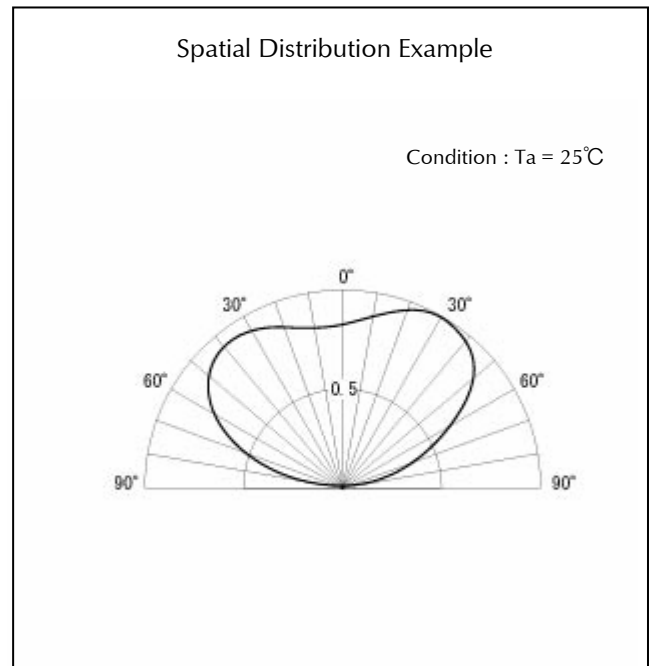
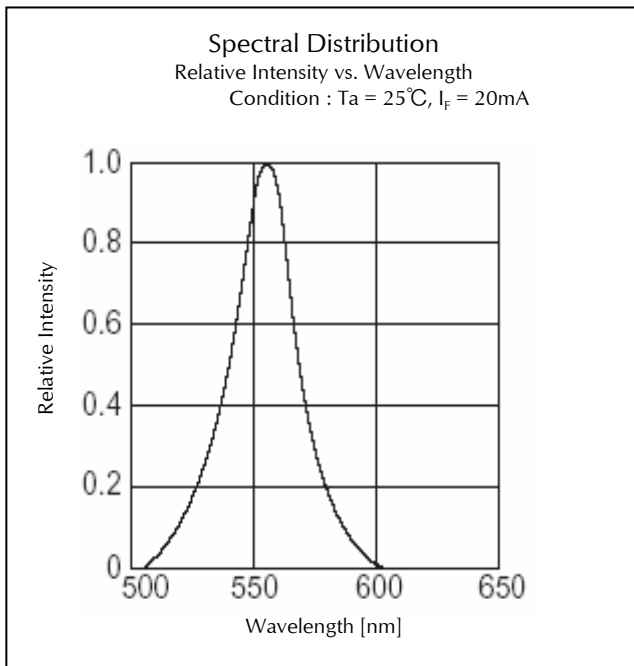
Luminous Intensity Rank

(Ta=25°C)

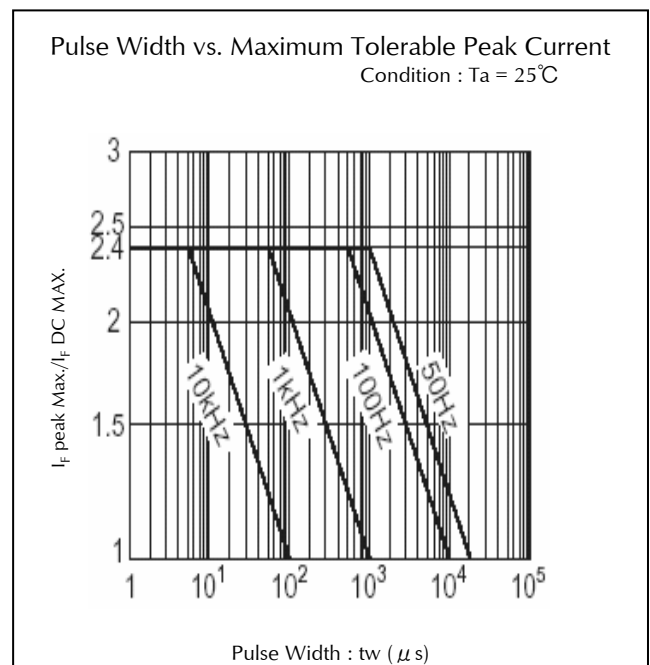
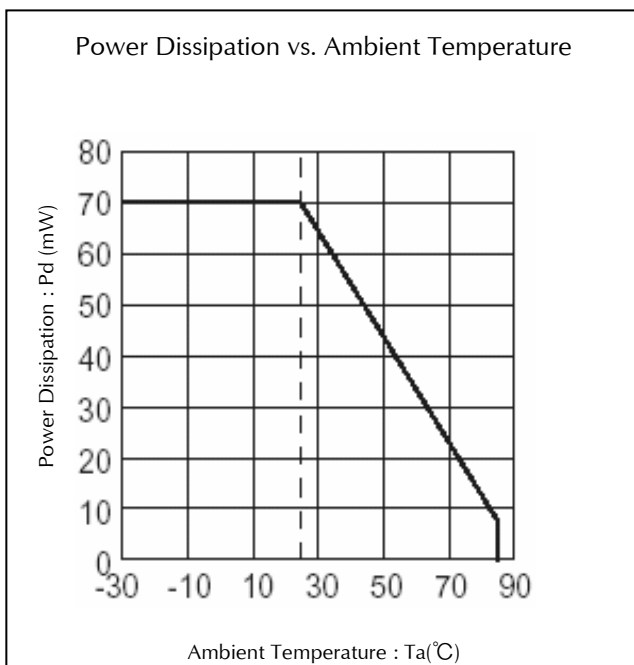
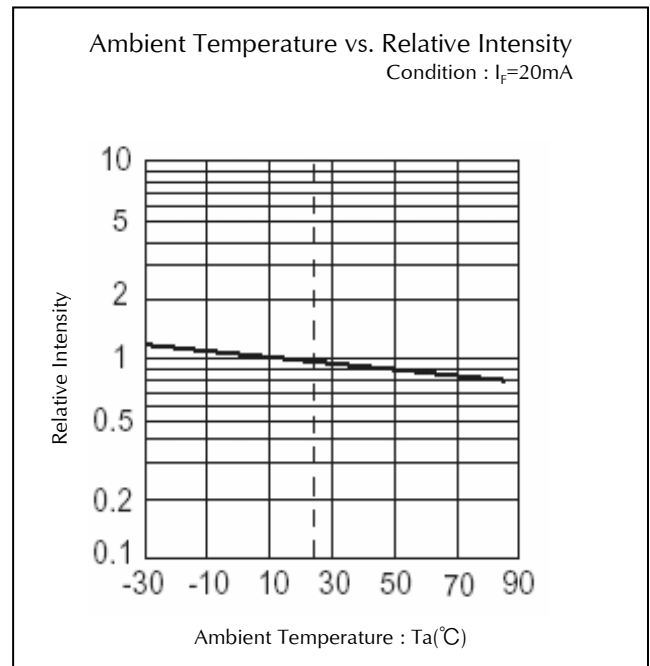
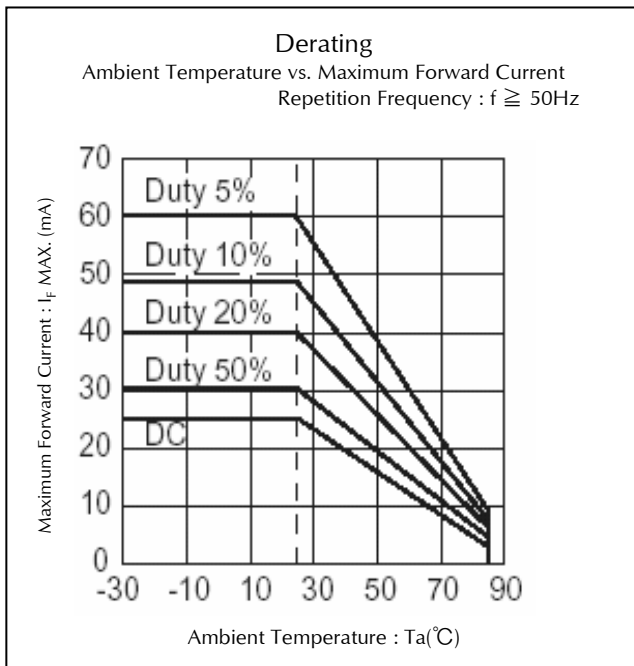
| Rank | I _v (mcd) | | | | | | | | | | | |
|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|----------------------|------|
| | BG | | PG | | PY | | AY | | AA | | BR | |
| | I _F =20mA | | I _F =20mA | | I _F =20mA | | I _F =20mA | | I _F =20mA | | I _F =20mA | |
| | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. | MIN. | MAX. |
| A | 1.6 | 2.3 | 4.1 | 5.8 | 7.6 | 10.7 | 2.2 | 3.1 | 2.2 | 3.1 | 7.6 | 10.7 |
| B | 1.9 | 2.7 | 4.9 | 6.9 | 9.0 | 12.7 | 2.6 | 3.7 | 2.6 | 3.7 | 9.0 | 12.7 |
| C | 2.3 | 3.3 | 5.8 | 8.2 | 10.7 | 15.1 | 3.1 | 4.4 | 3.1 | 4.4 | 10.7 | 15.1 |
| D | 2.7 | 3.8 | 6.9 | 9.8 | 12.7 | 18.0 | 3.7 | 5.2 | 3.7 | 5.2 | 12.7 | 18.0 |
| E | 3.3 | 4.7 | 8.2 | 11.6 | 15.1 | 21.4 | 4.4 | 6.2 | 4.4 | 6.2 | 15.1 | 21.4 |
| F | 3.8 | - | 9.8 | - | 18.0 | - | 5.2 | - | 5.2 | - | 18.0 | - |

※ Please contact our sales staff concerning rank designation.

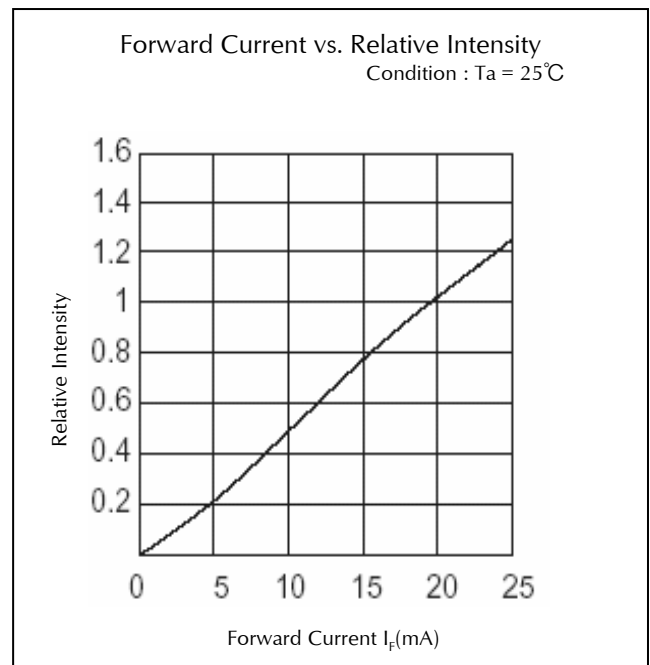
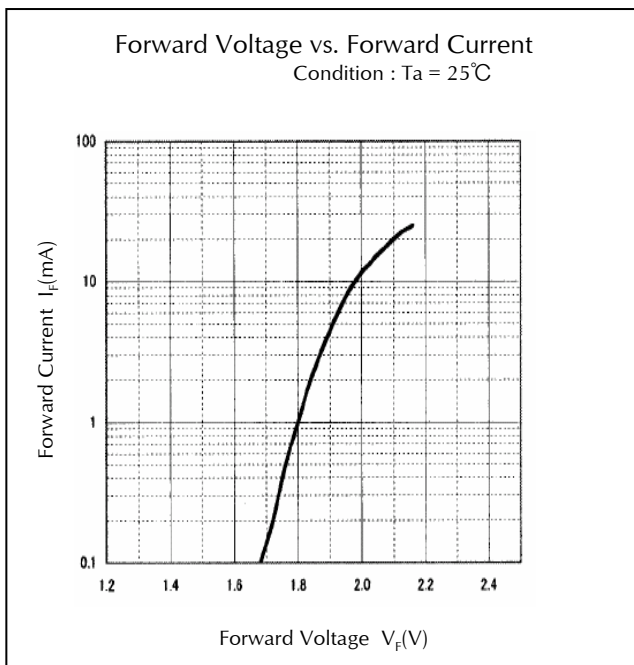
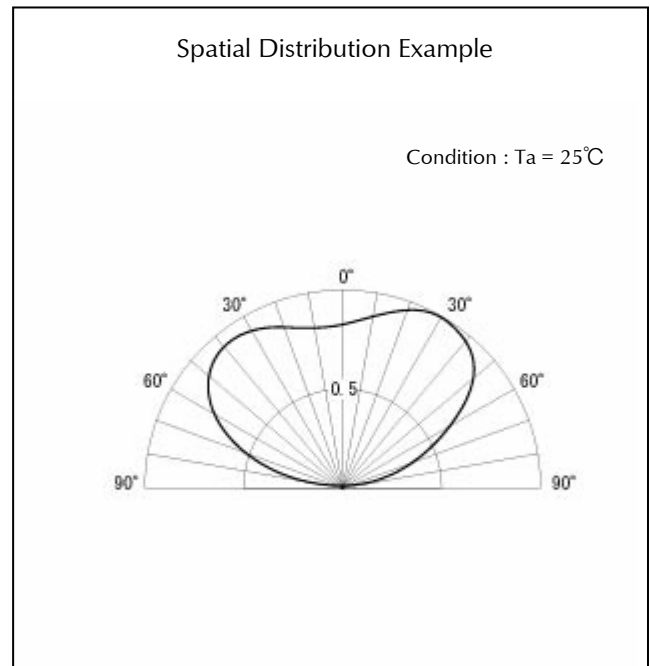
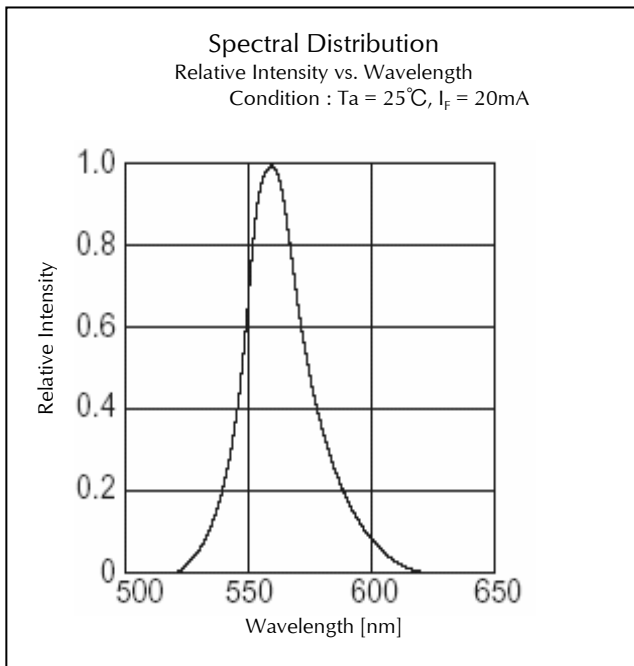
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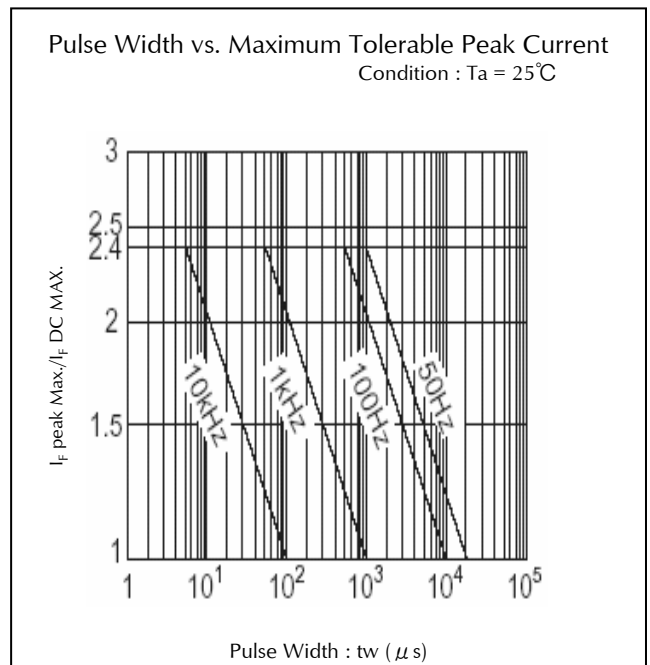
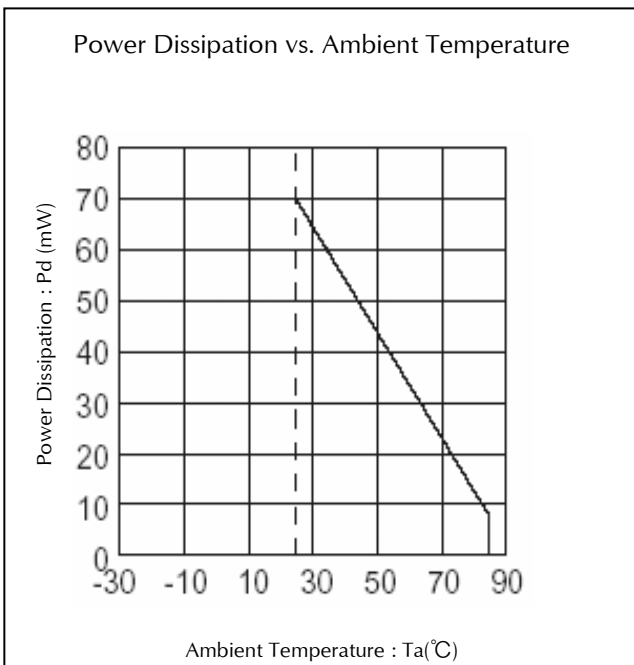
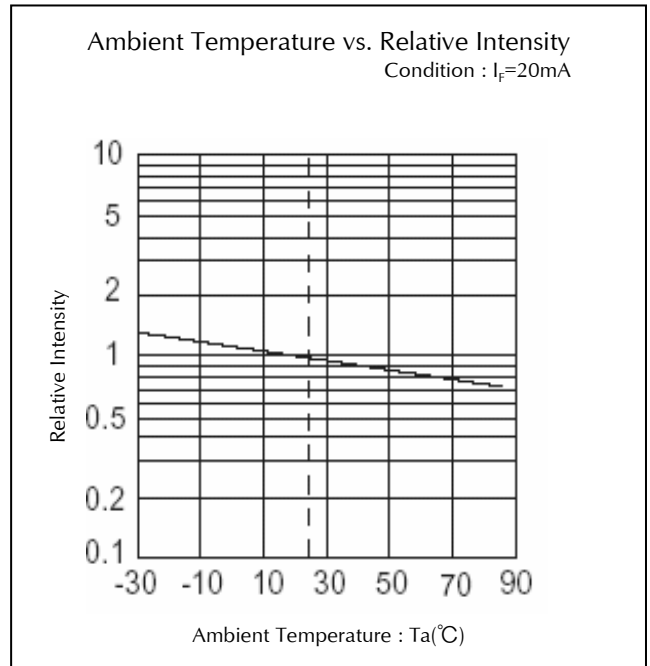
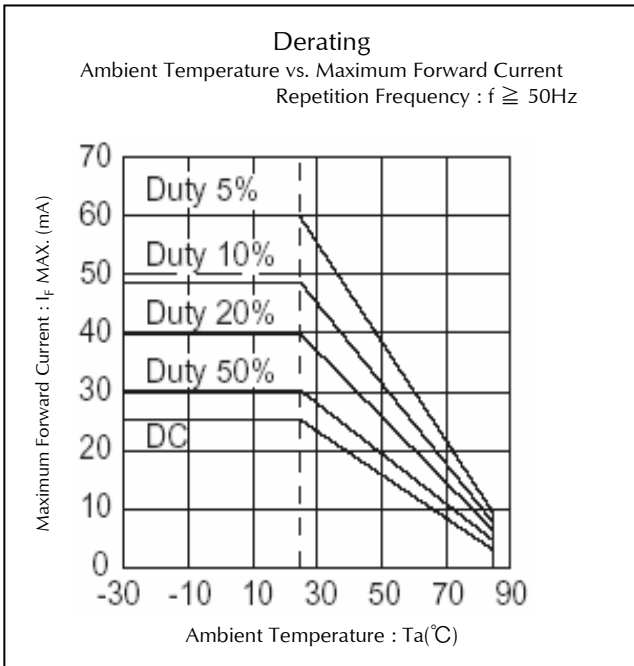
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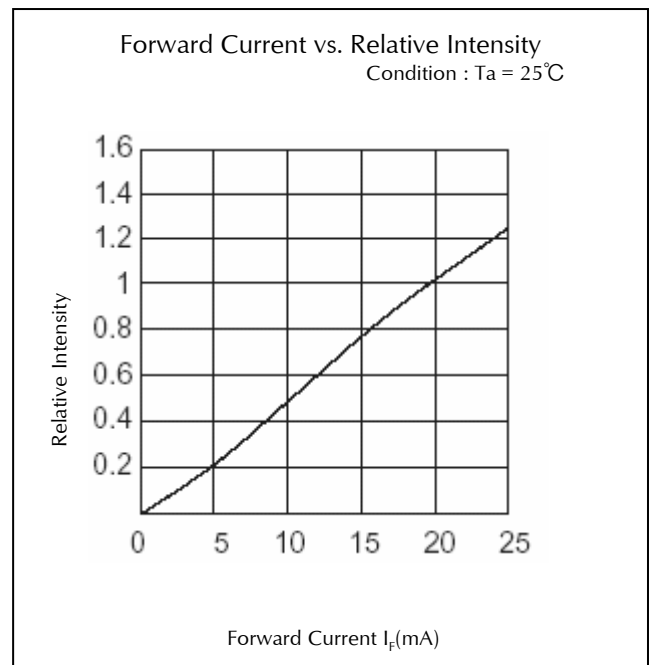
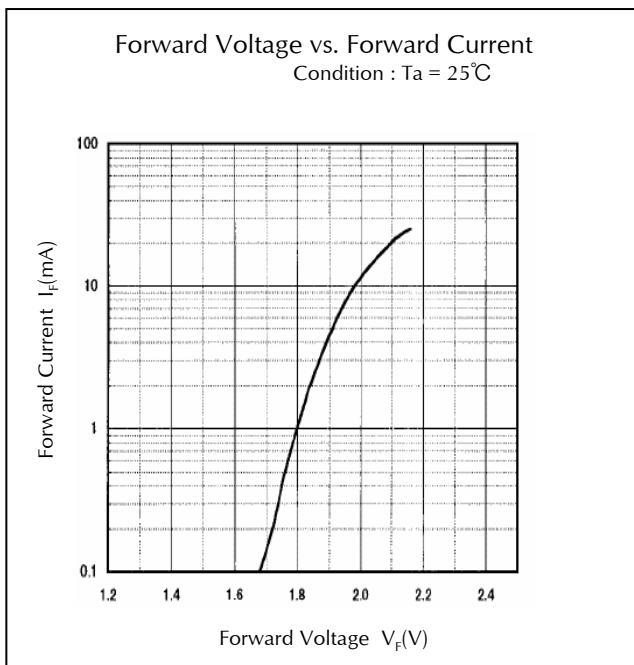
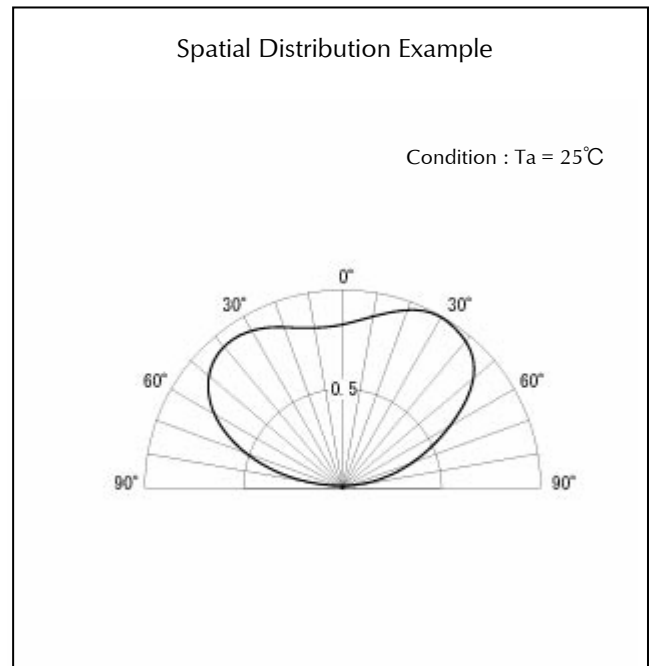
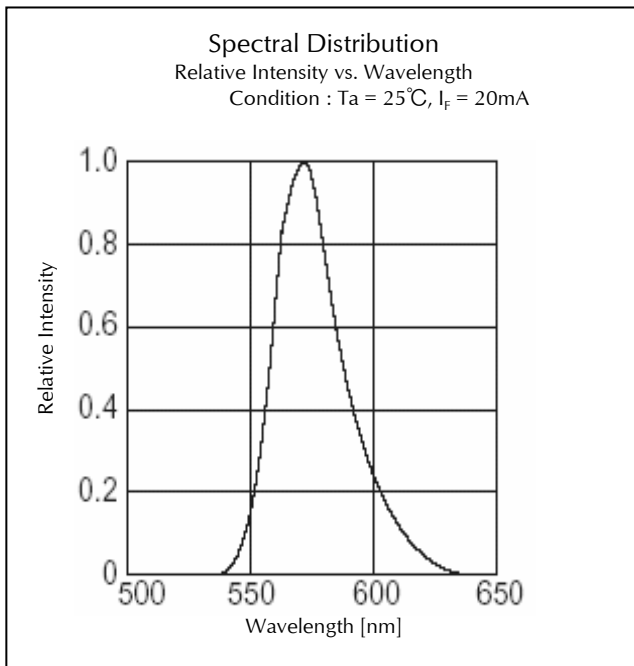
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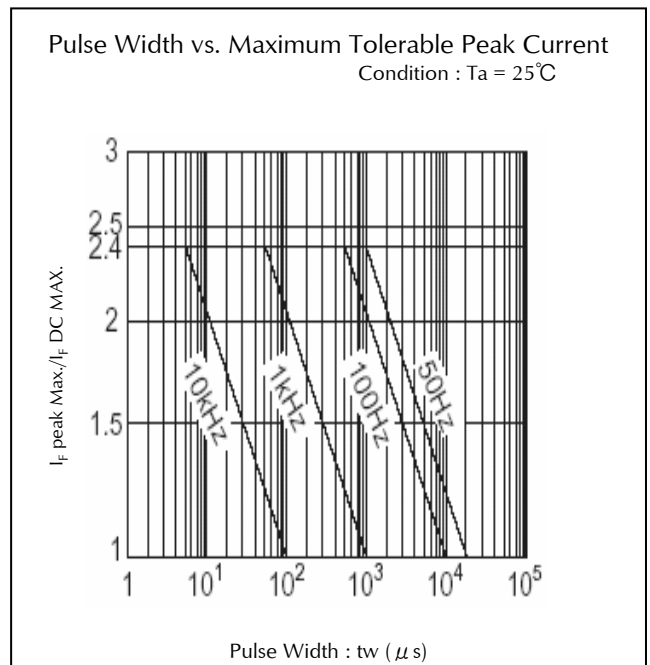
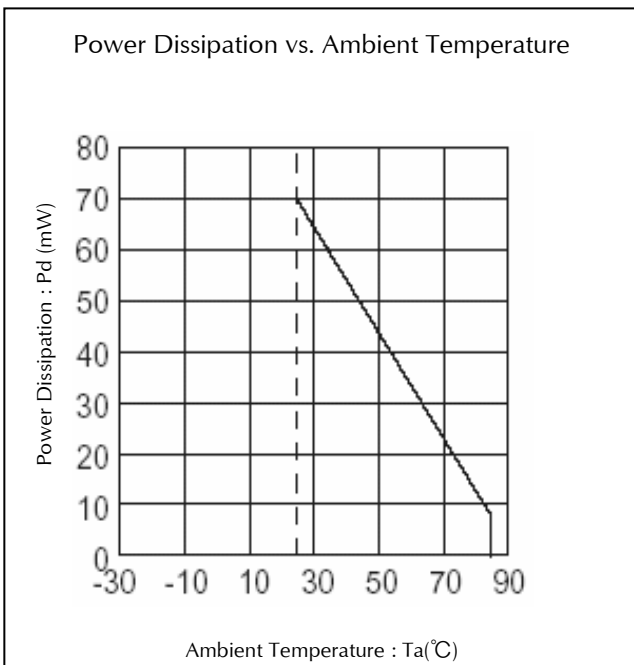
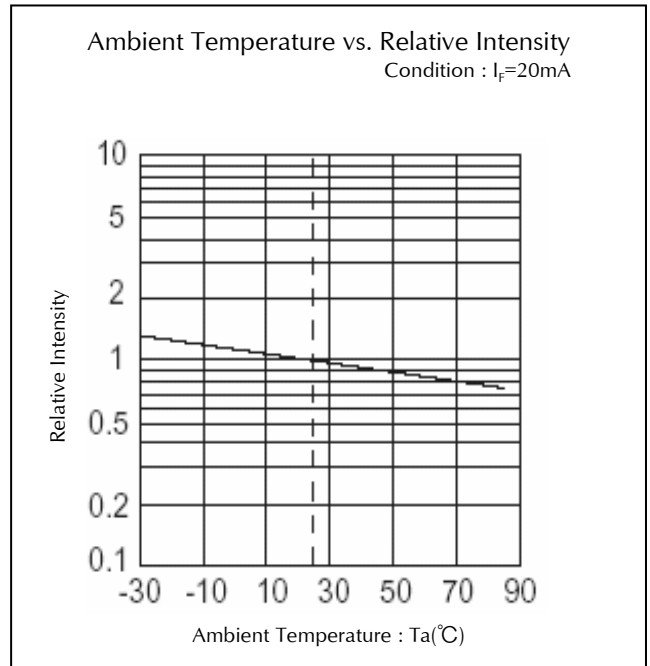
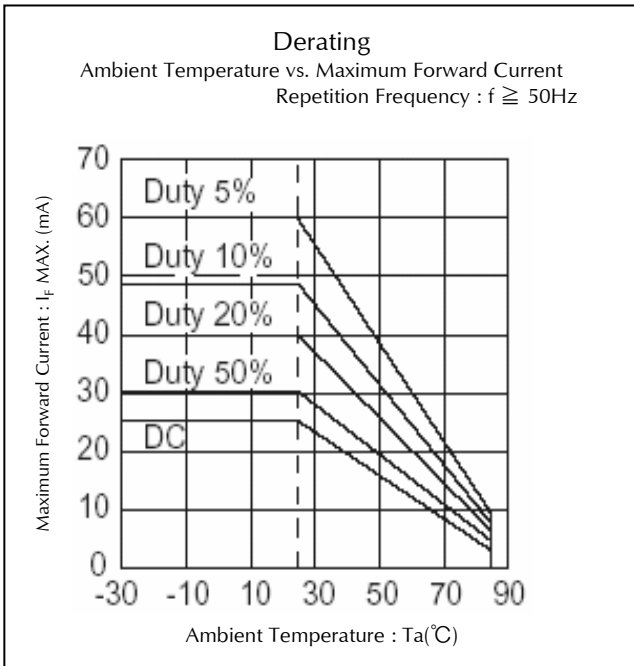
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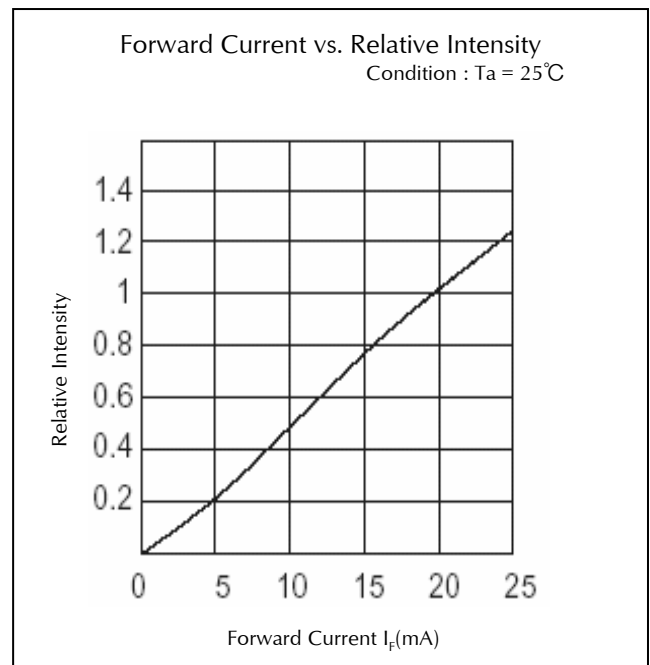
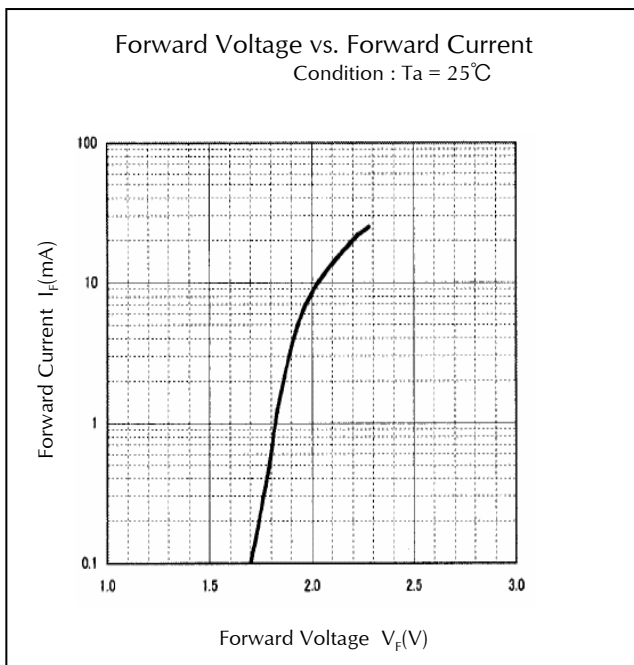
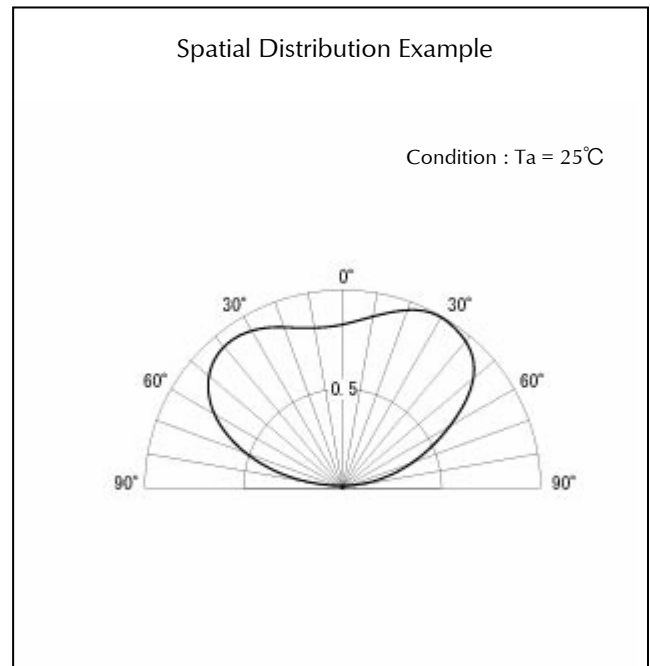
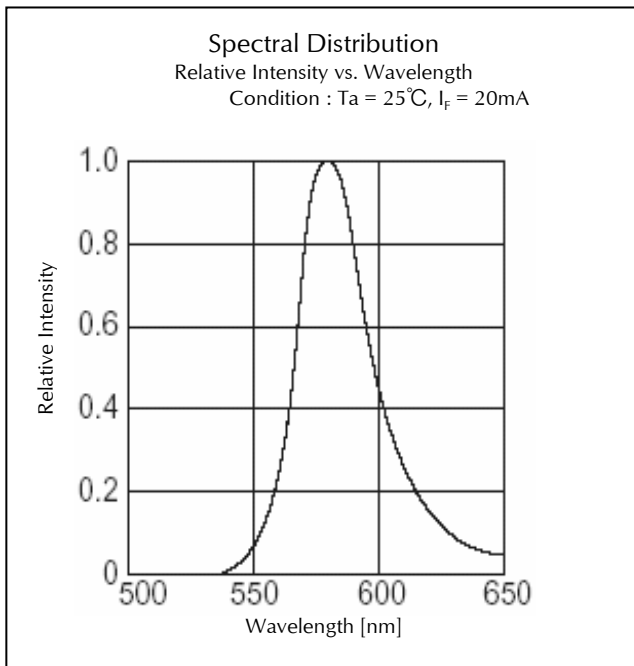
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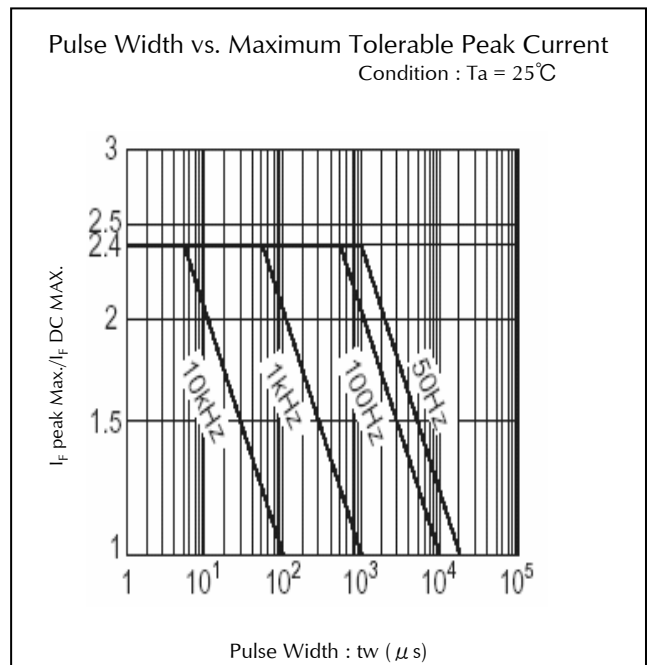
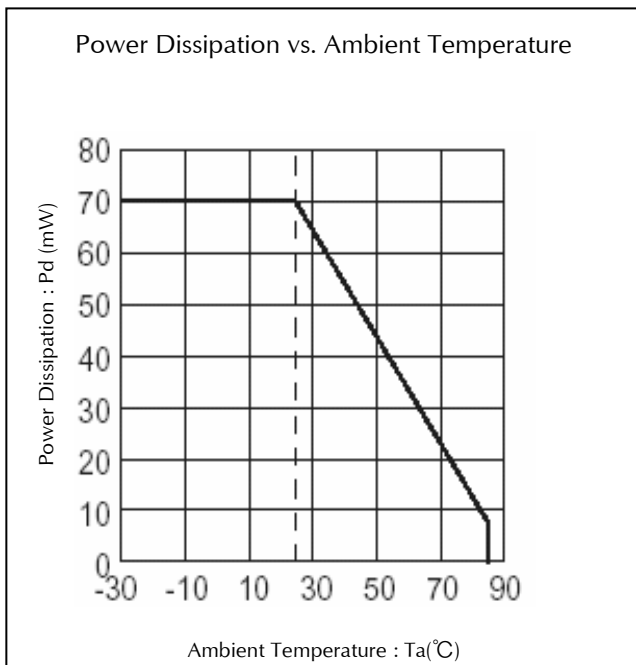
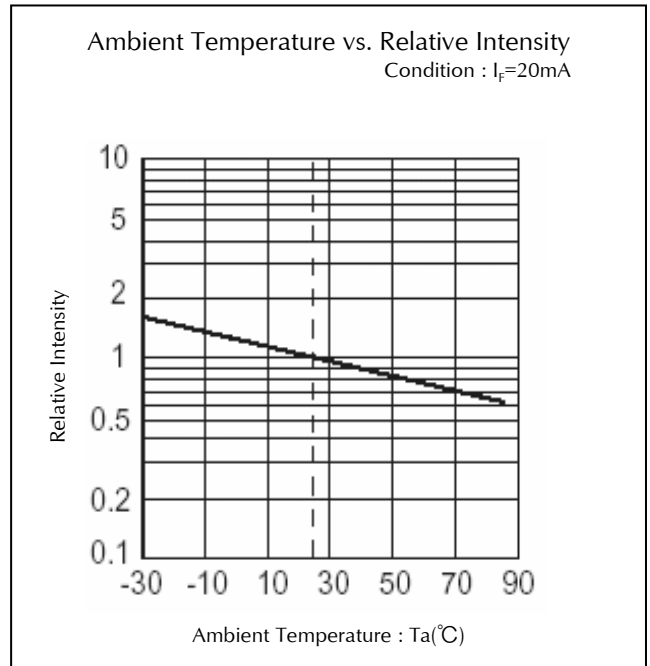
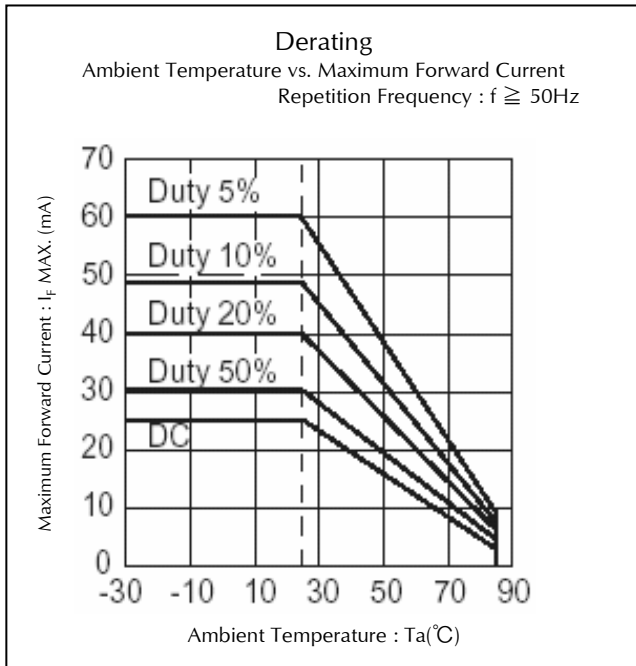
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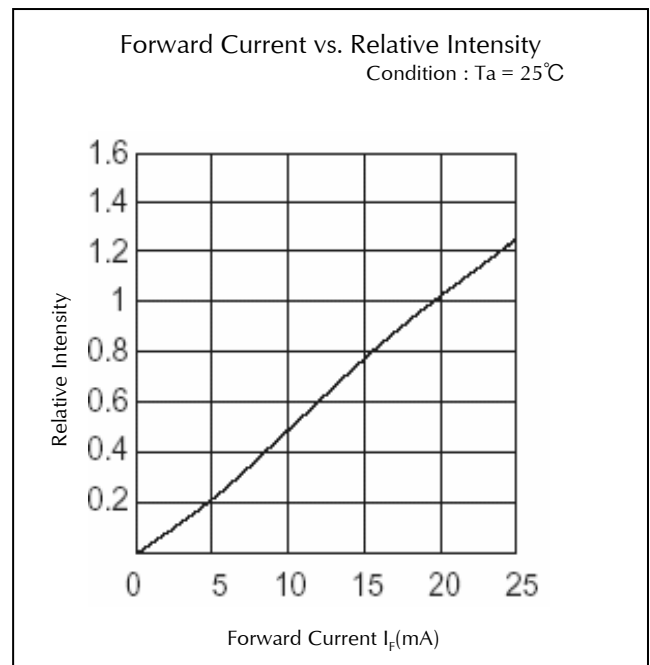
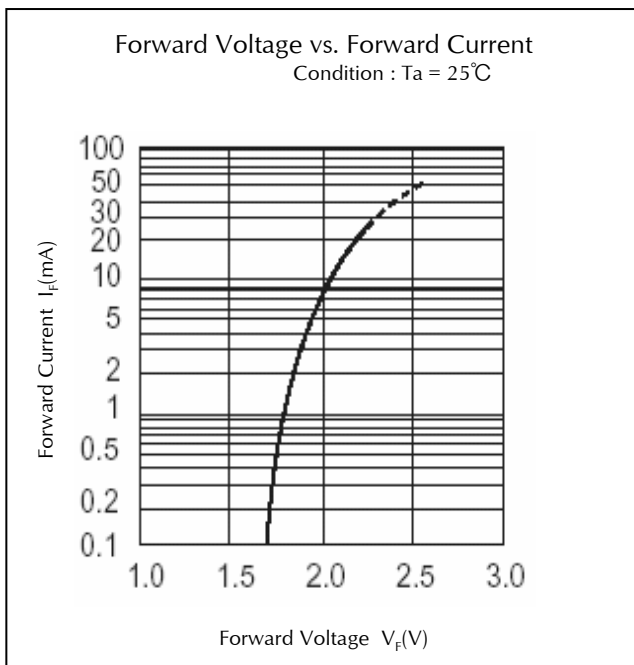
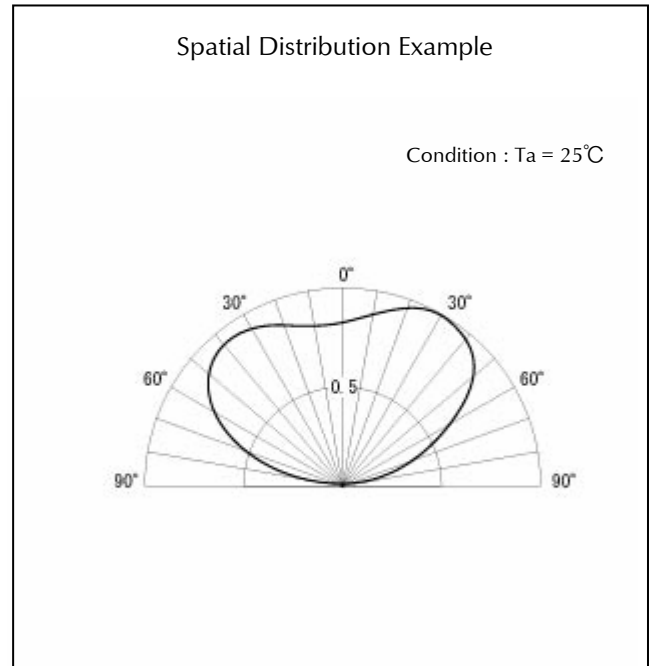
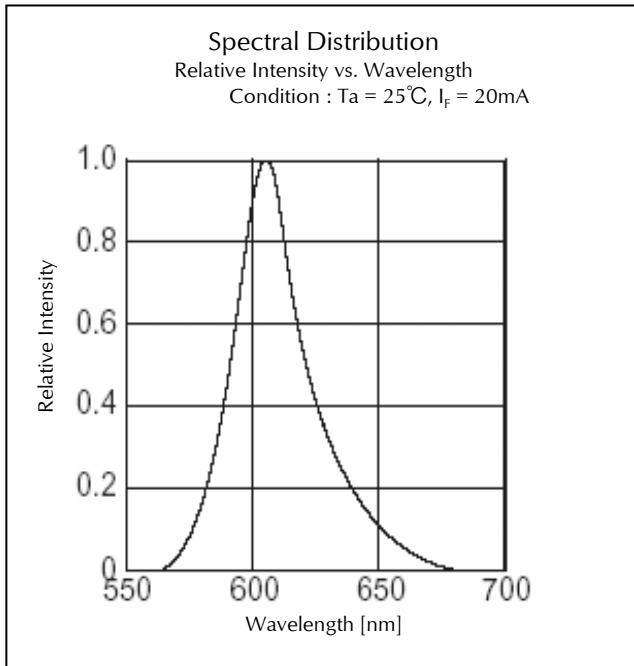
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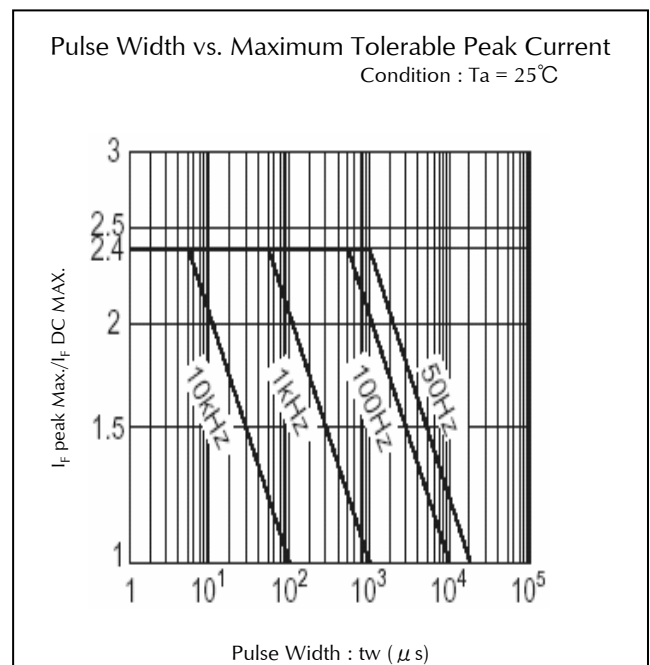
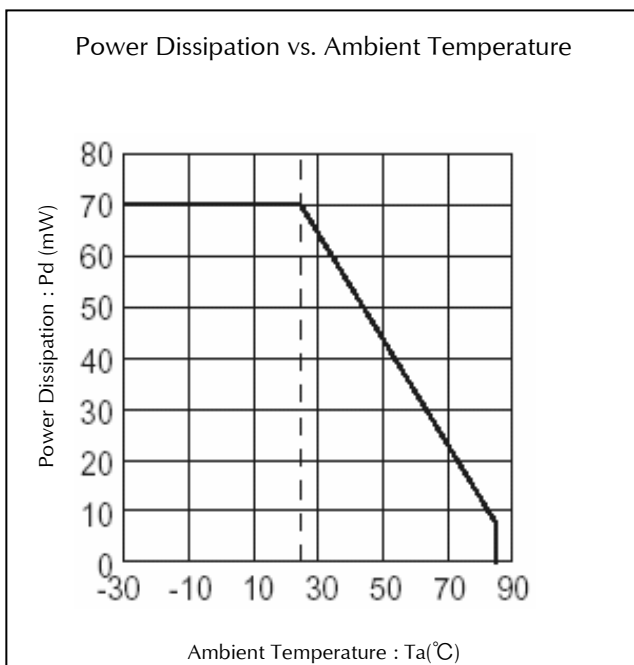
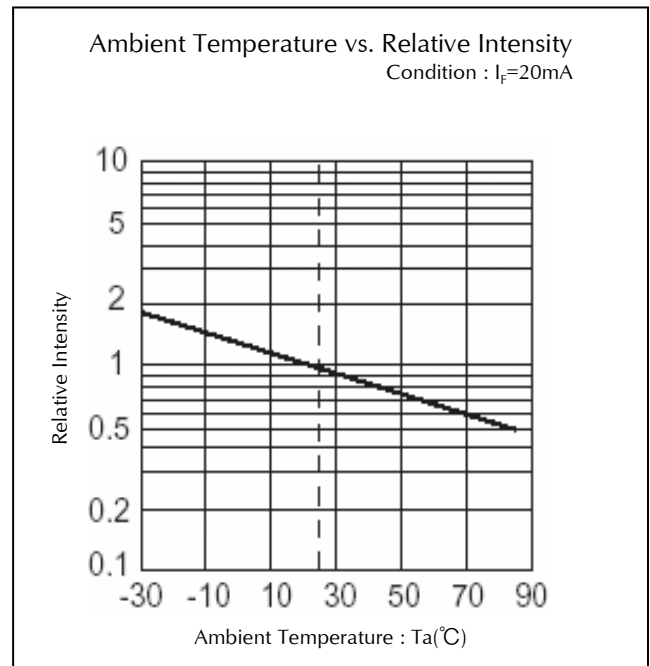
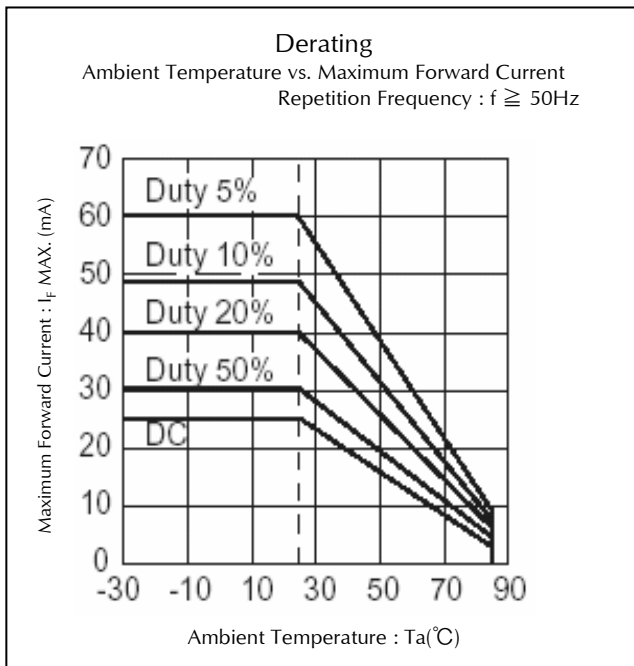
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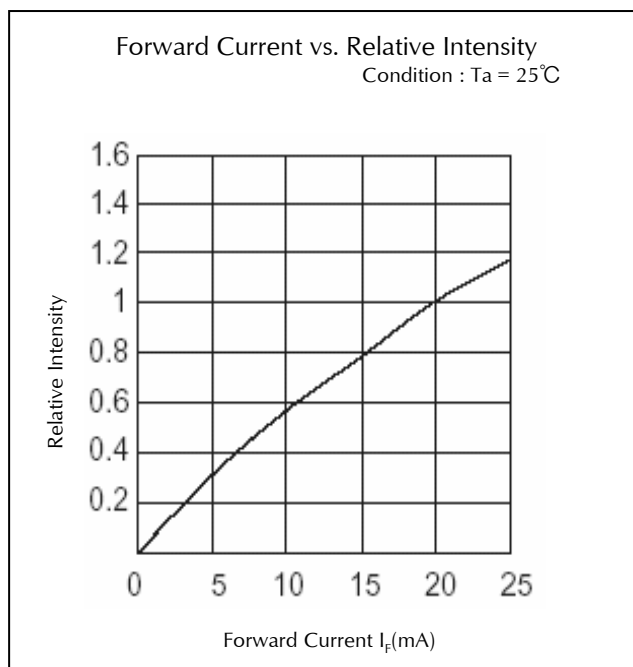
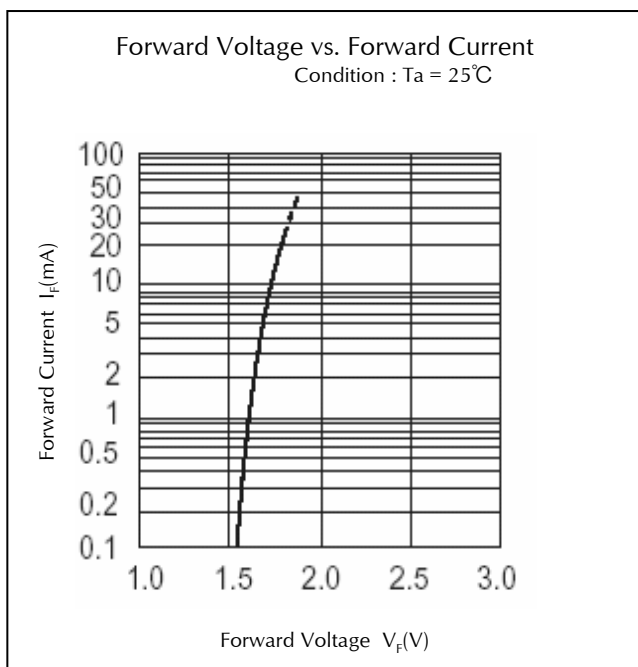
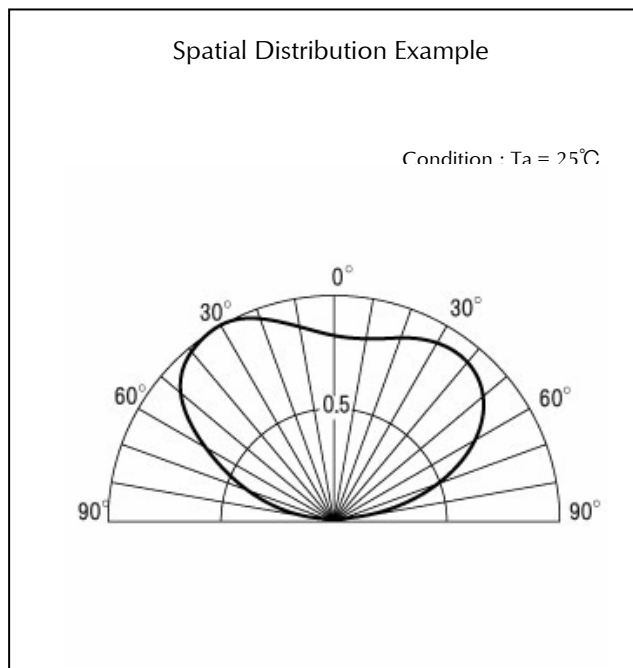
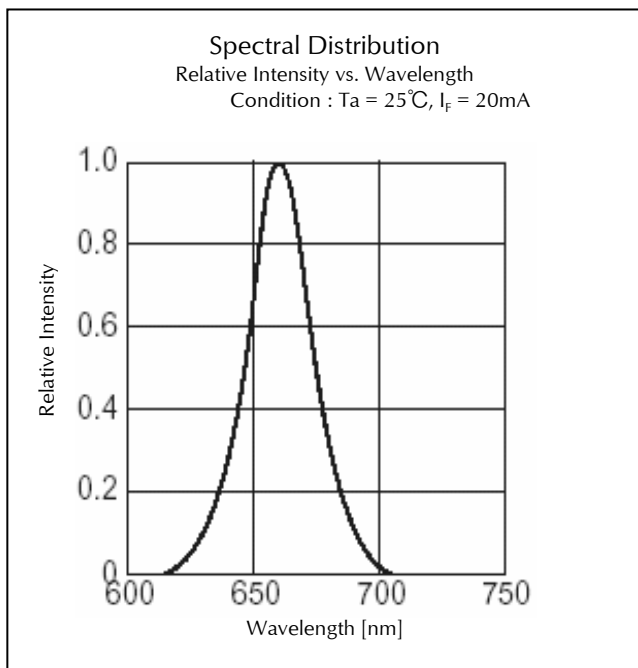
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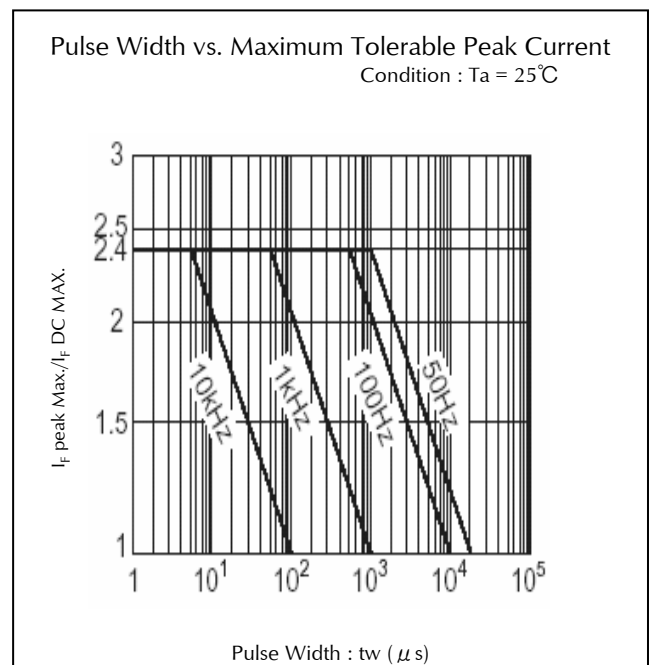
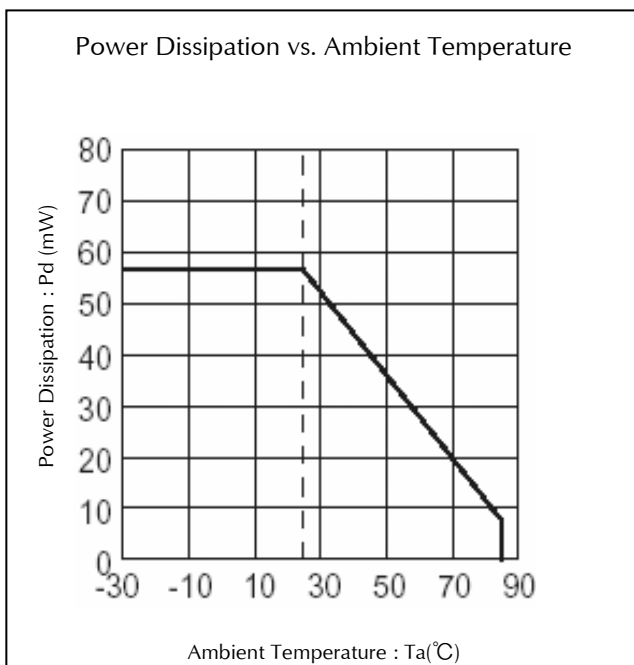
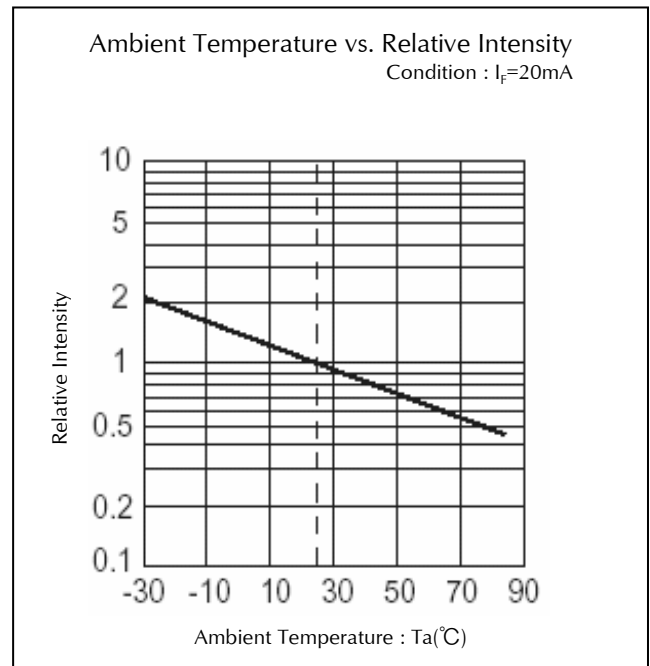
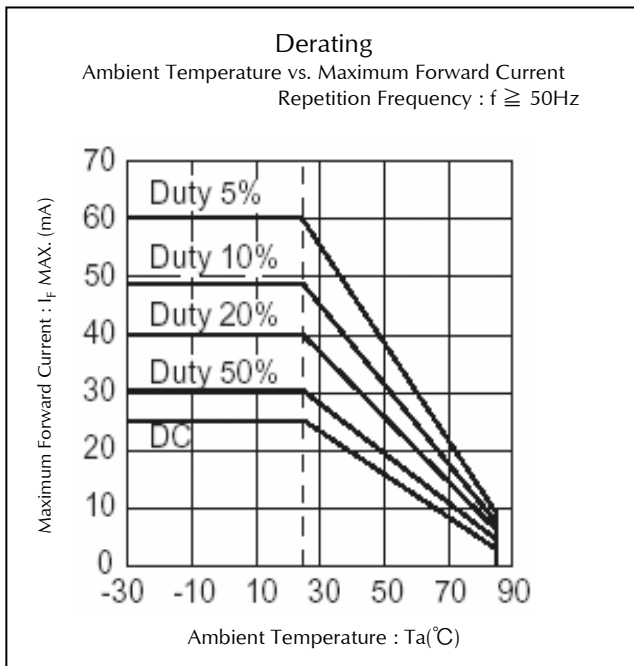
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Technical Data(BR)



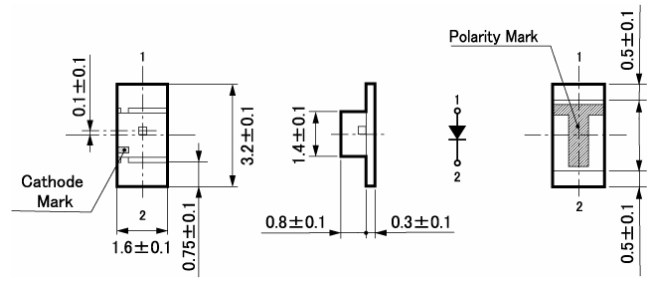
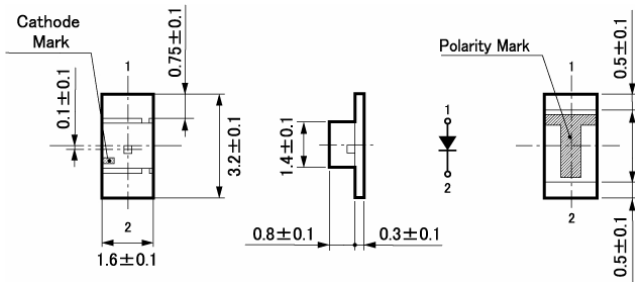
Technical Data(BR)



Package Dimensions (BG,PG,PY,AY,AA)

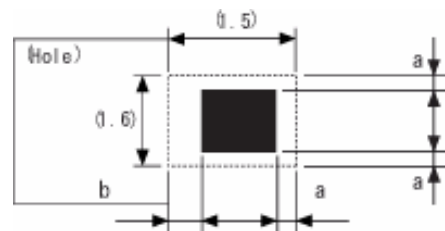
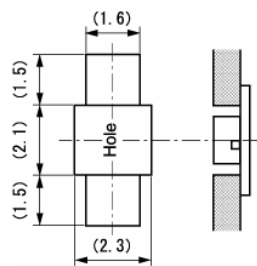
Package Dimensions (BR) (Unit: mm)

Weight: (6.60)mg



Recommended Soldering Pattern (Unit: mm)

Example of hole in the stencil mask for the stencil method (Unit: mm)



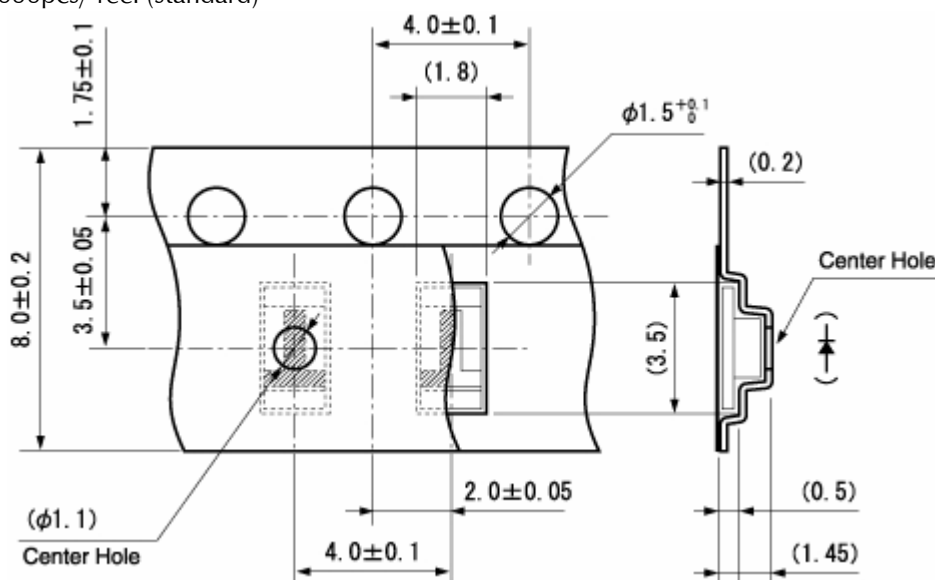
※The dimension of BR type is defined the chip position of the symmetry at the center line.

a : 0.05mm
b : 0.15mm
(Dot line : Recommended soldering pad)

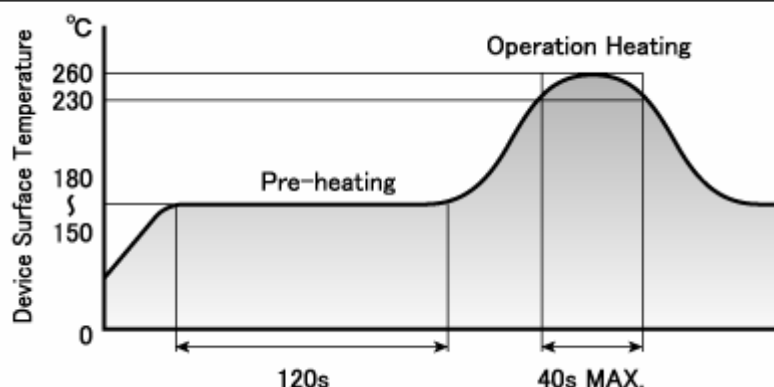
Taping Specification

(Unit: mm)

Quantity : 3,000pcs/ 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. Operation Heating : 230°C 40s Max. Peak Temperature : 260°C | Twice | 0/25 |
| Temperature Cycling | EIAJ ED-4701/100(105) | Minimum Rated Storage Temperature(30min) ~Normal Temperature(15min) ~Maximum Rated Storage Temperature(30min) ~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 ² (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 Luminous Intensity | Testing Min. Value < Spec. Min. Value x 0.5 |
| Forward Voltage | V _F | If Value of each product Forward Voltage | Testing Max. Value ≥ Spec. Max. Value x 1.2 |
| Reverse Current | I _R | V _R = Maximum Rated Reverse Voltage V | Testing Max. Value ≥ Spec. Max. Value x 2.5 |
| Cosmetic Appearance | - | - | Occurrence of notable decoloration, deformation and cracking |

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