

**Pb-free  
HEAT**



# MU03 Series

Single Color / Light Bar Module

## Features

|                                     |   |
|-------------------------------------|---|
| Light emitting surface (Outer size) | 6 x 9 mm (7 x 10 mm) (L x W)  |
| Product features                    | <ul style="list-style-type: none"> <li>• Single Color (Green, Yellow Green, Orange or Red)</li> <li>• Lead-free soldering compatible</li> <li>• RoHS compliant</li> </ul> |
| Peak wavelength                     | Green : 555 nm (5201,5205)<br>: 560 nm (5202)<br>Yellow Green : 570 nm (4201,4205)<br>Orange : 605 nm (3201,3205)<br>Red : 660 nm (2201,2205)                             |
| Die materials                       | Green, Yellow Green : GaP<br>Orange : GaAsP<br>Red : GaAlAs   |
| Soldering methods                   | TTW (Through The Wave) soldering and manual soldering   |
| Soldering methods                   | More than 2kV(HBM)  |
| Packing                             | Plastic bag   |

## Recommended Applications

Electric Household Appliances, OA/FA, Other General Applications

## Color and Luminous Intensity

| Part No.  | Material | Emitted Color | Resin Color | Intensity <sup>※1</sup><br>I <sub>v</sub> (mcd) |      |                | Number of Chips |
|-----------|----------|---------------|-------------|---|------|----------------|-----------------|
|           |          |               |             | MIN.  | TYP. | I <sub>F</sub> |                 |
| MU03-5201 | GaP      | Green         | Green       | 3   | 7    | 20             | 2               |
| MU03-5205 | GaP      |               | Milky White | 5   | 10   | 20             | 2               |
| MU03-5202 | GaP      |               | Green       | 8   | 16   | 20             | 2               |
| MU03-4201 | GaP      | Yellow Green  | Yellow      | 10  | 20   | 20             | 2               |
| MU03-4205 | GaP      |               | Milky White | 10  | 20   | 20             | 2               |
| MU03-3201 | GaAsP    | Orange        | Orange      | 5   | 10   | 20             | 2               |
| MU03-3205 | GaAsP    |               | Milky White | 5   | 10   | 20             | 2               |
| MU03-2201 | GaAlAs   | Red           | Red         | 10  | 20   | 20             | 2               |
| MU03-2205 | GaAlAs   |               | Milky White | 10  | 20   | 20             | 2               |

※1 Luminous Intensity : 2 chips

## Absolute Maximum Ratings

(Ta=25°C)

| Item                                | Symbol            | Absolute Maximum Ratings |      |      |      |      |      |      |      |      |       | Unit |
|-------------------------------------|-------------------|--------------------------|------|------|------|------|------|------|------|------|-------|------|
|                                     |                   | 5201                     | 5205 | 5202 | 4201 | 4205 | 3201 | 3205 | 2201 | 2205 |       |      |
| Power Dissipation <sup>※2</sup>     | P <sub>d</sub>    | 125                      | 125  | 150  | 150  | 150  | 125  | 125  | 120  | 120  | mW    |      |
| Forward Current                     | I <sub>F</sub>    | 25                       | 25   | 30   | 30   | 30   | 25   | 25   | 30   | 30   | mA    |      |
| Pulse Forward Current <sup>※3</sup> | I <sub>FRM</sub>  | 60                       | 60   | 60   | 60   | 60   | 60   | 60   | 60   | 60   | mA    |      |
| Derating<br>(Ta=25°C or higher)     | ΔI <sub>F</sub>   | 0.33                     | 0.33 | 0.40 | 0.40 | 0.40 | 0.33 | 0.33 | 0.40 | 0.40 | mA/°C |      |
|                                     | ΔI <sub>FRM</sub> | 0.80                     | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | 0.80 | mA/°C |      |
| Reverse Voltage                     | V <sub>R</sub>    | 4                        | 4    | 4    | 4    | 4    | 4    | 4    | 4    | 4    | V     |      |
| Operating Temperature               | T <sub>opr</sub>  | -40~+85                  |      |      |      |      |      |      |      |      |       | °C   |
| Storage Temperature                 | T <sub>stg</sub>  | -40~+85                  |      |      |      |      |      |      |      |      |       | °C   |

※2 Power Dissipation : 2chips, The other Items : 1 chip

※3 I<sub>FRM</sub> Measurement condition : Pulse Width ≤ 2ms, Duty ≤ 1/5

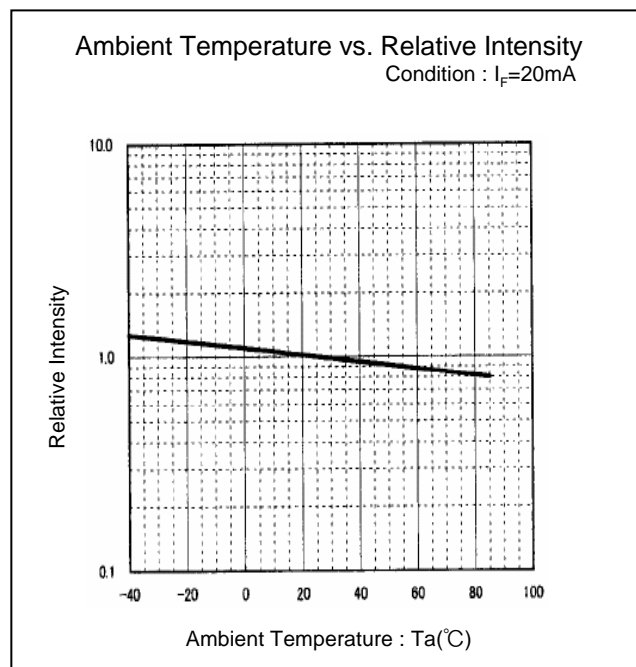
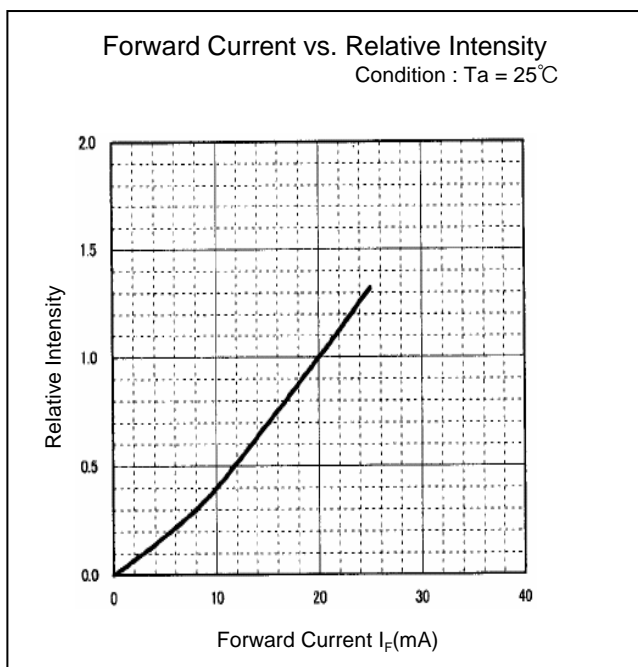
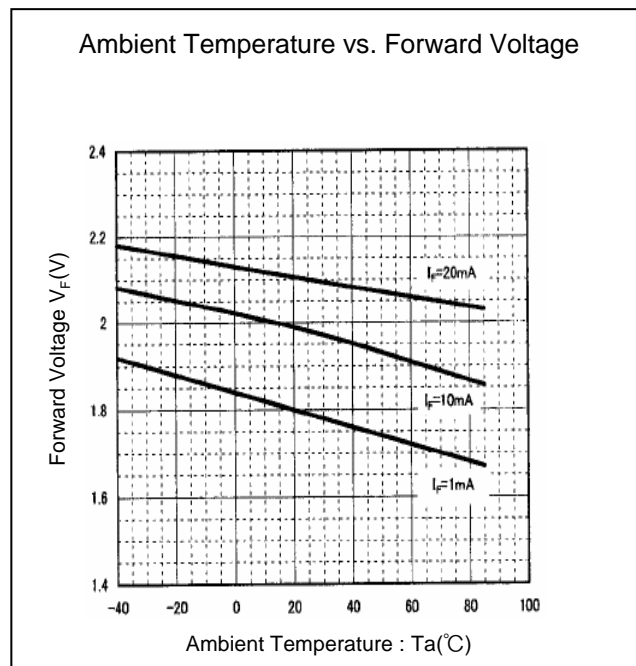
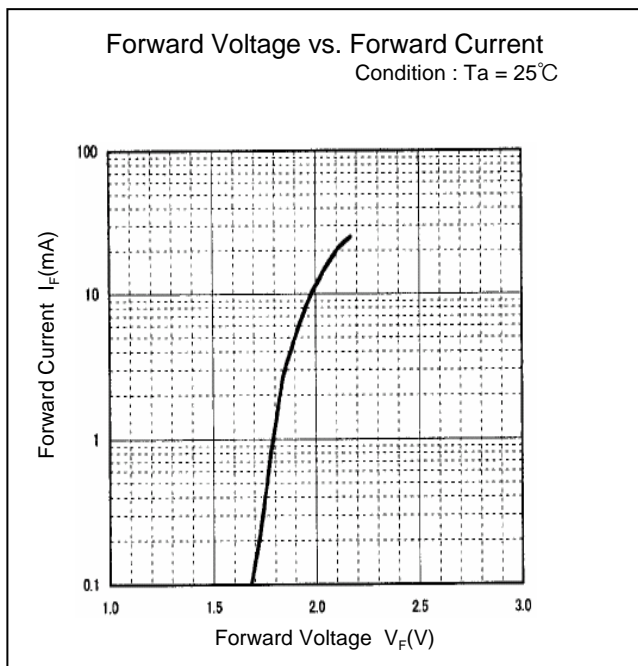
## Electro-Optical Characteristics

(Ta=25°C)

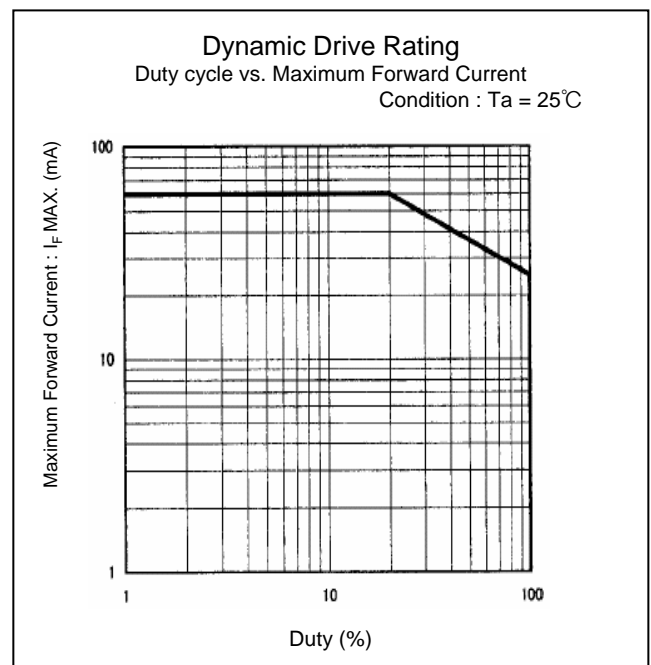
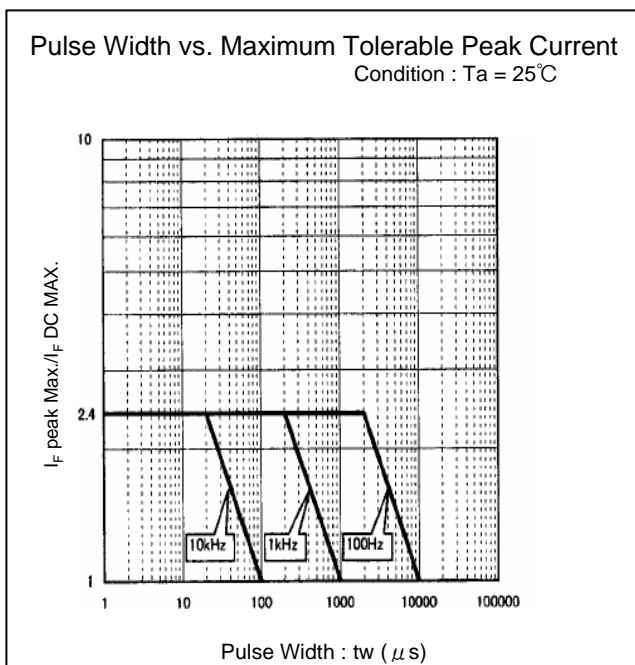
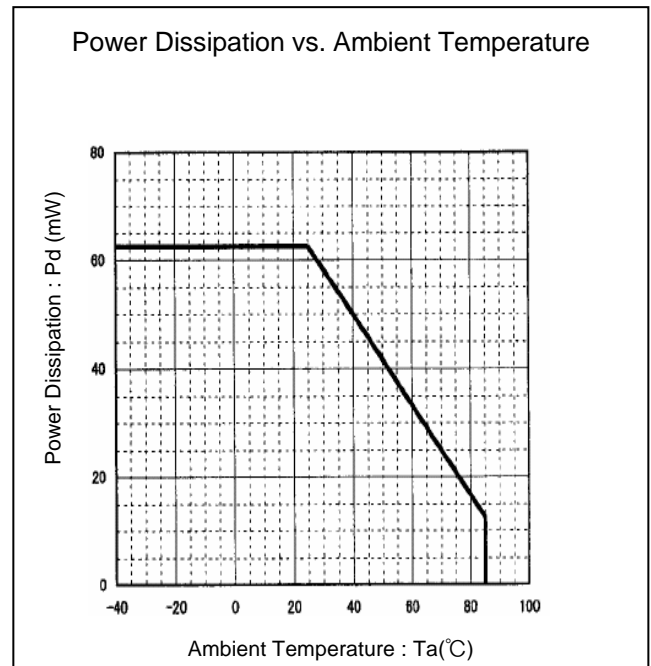
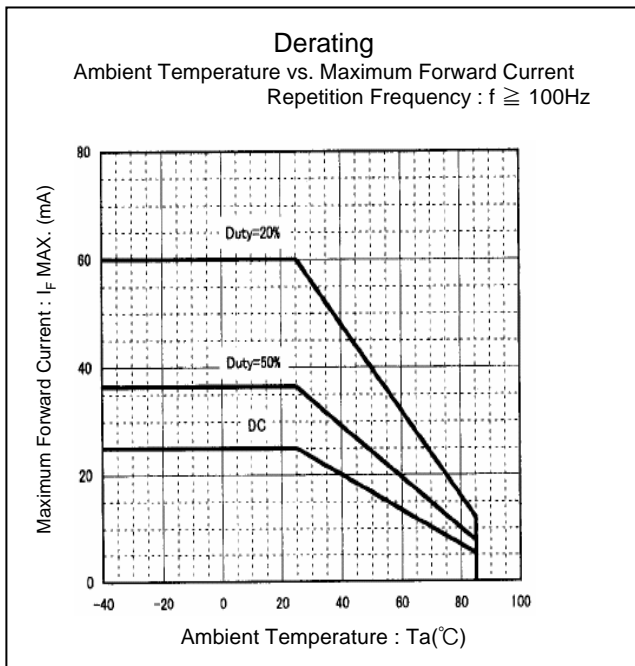
| Item                     | Conditions           | Symbol         |      | Characteristics |      |      |      |      |      |      |      |      |    | Unit |
|--------------------------|----------------------|----------------|------|-----------------|------|------|------|------|------|------|------|------|----|------|
|                          |                      |                |      | 5201            | 5205 | 5202 | 4201 | 4205 | 3201 | 3205 | 2201 | 2205 |    |      |
| Forward Voltage          | I <sub>F</sub> =20mA | V <sub>F</sub> | TYP. | 2.2             | 2.2  | 2.1  | 2.1  | 2.1  | 2.2  | 2.2  | 1.7  | 1.7  | V  |      |
|                          |                      |                | MAX. | 2.5             | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.5  | 2.0  |    | 2.0  |
| Reverse Current          | V <sub>R</sub> =4V   | I <sub>R</sub> | MAX. | 100             | 100  | 100  | 100  | 100  | 100  | 100  | 100  | 100  | μA |      |
| Peak Wavelength          | I <sub>F</sub> =20mA | λ <sub>p</sub> | TYP. | 555             | 555  | 560  | 570  | 570  | 605  | 605  | 660  | 660  | nm |      |
| Spectral Line Half Width | I <sub>F</sub> =20mA | Δλ             | TYP. | 30              | 30   | 30   | 30   | 30   | 30   | 30   | 30   | 30   | nm |      |

※ The above Items : 1 chip

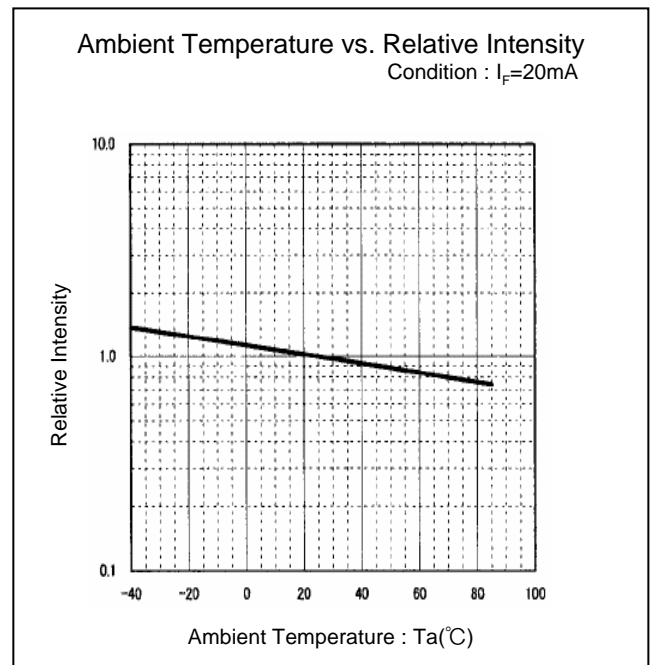
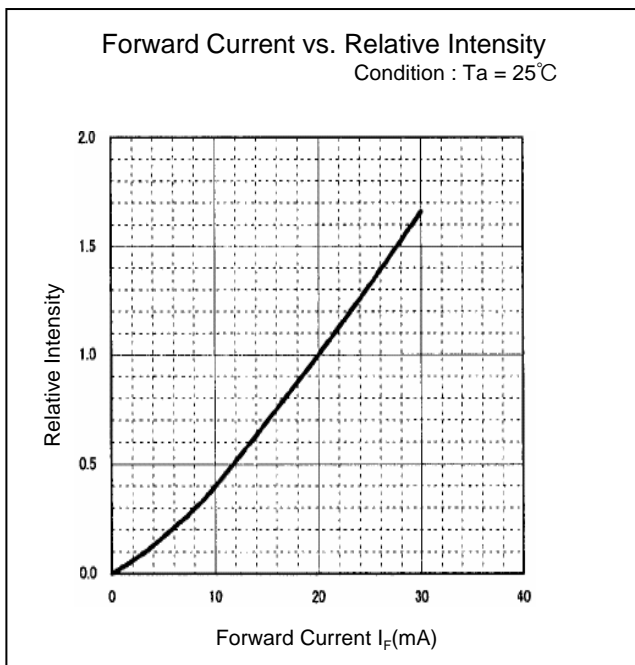
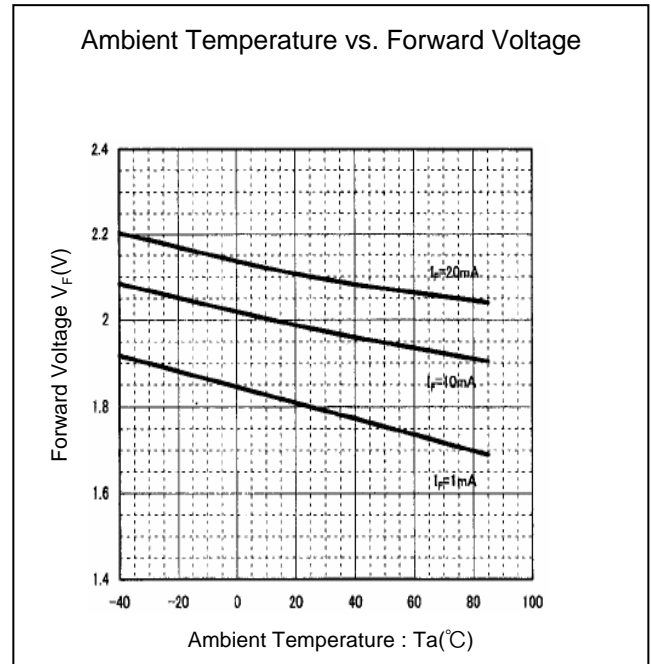
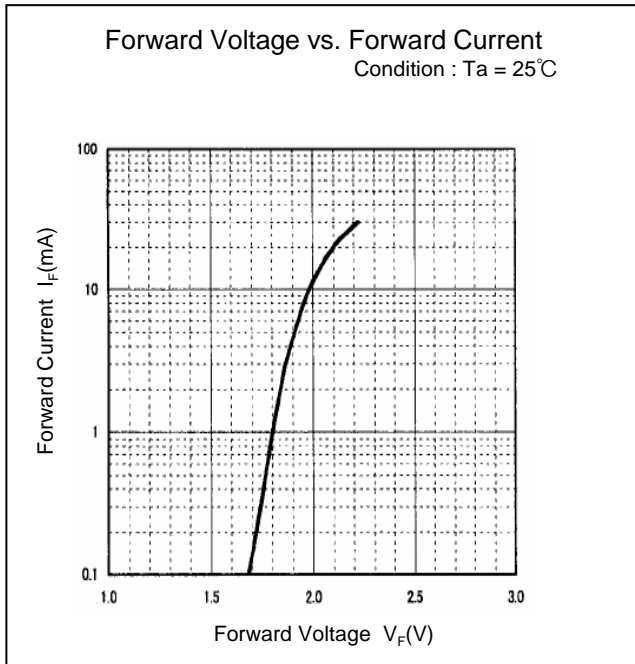
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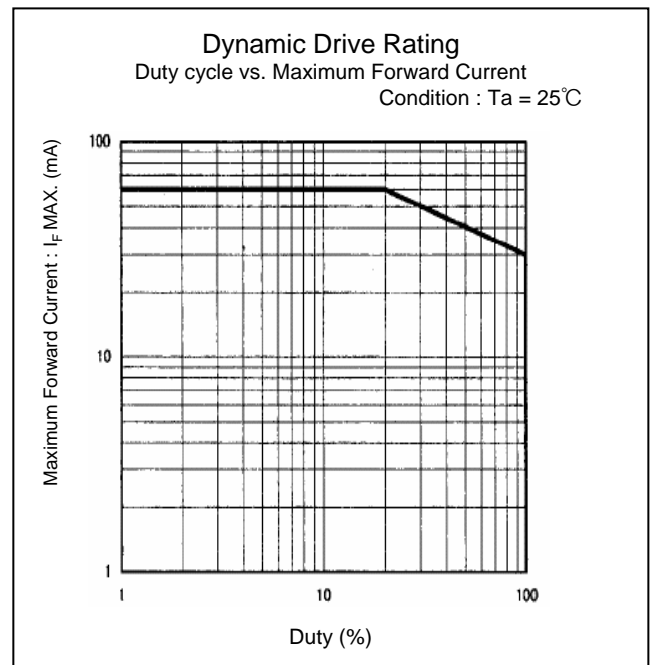
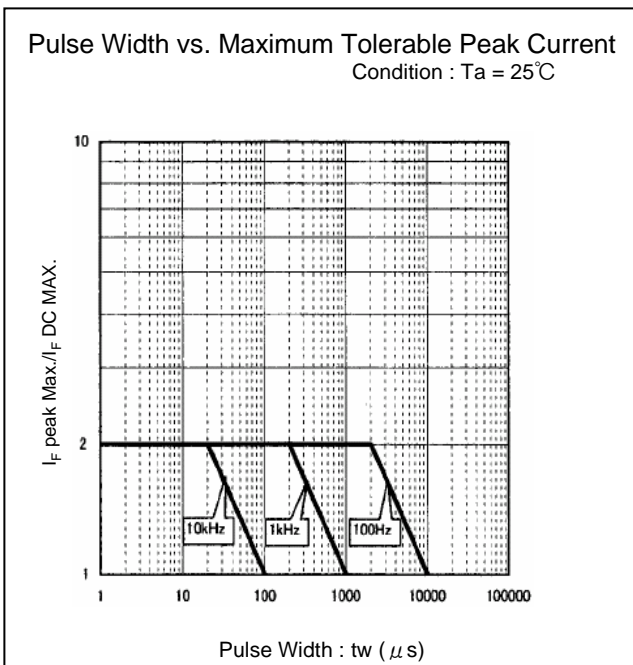
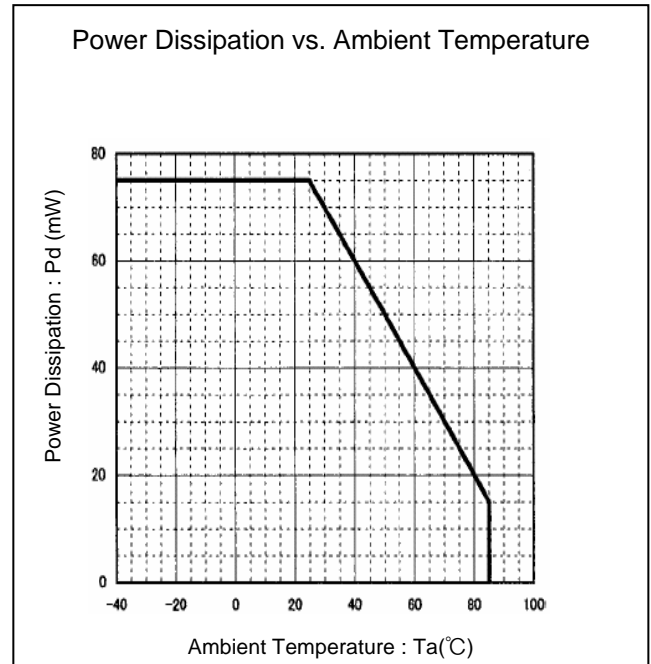
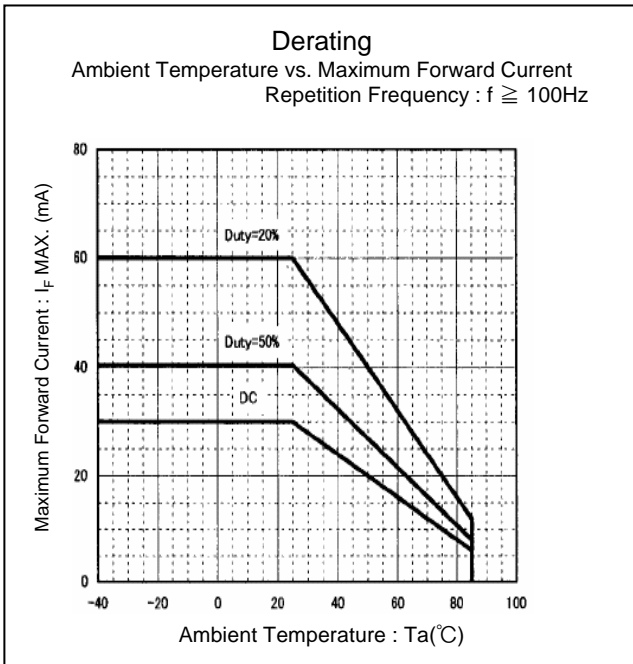
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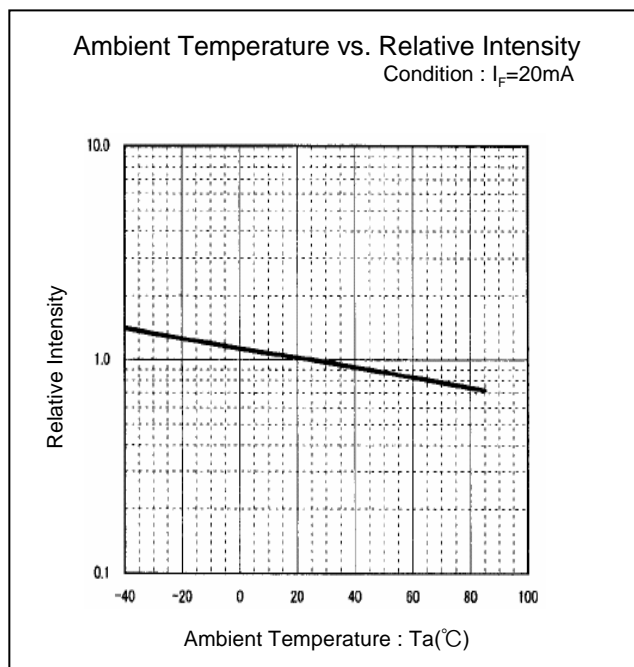
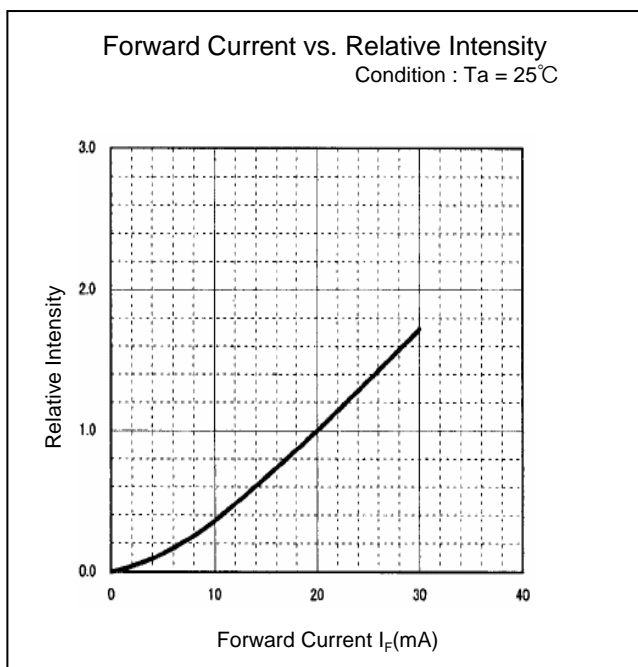
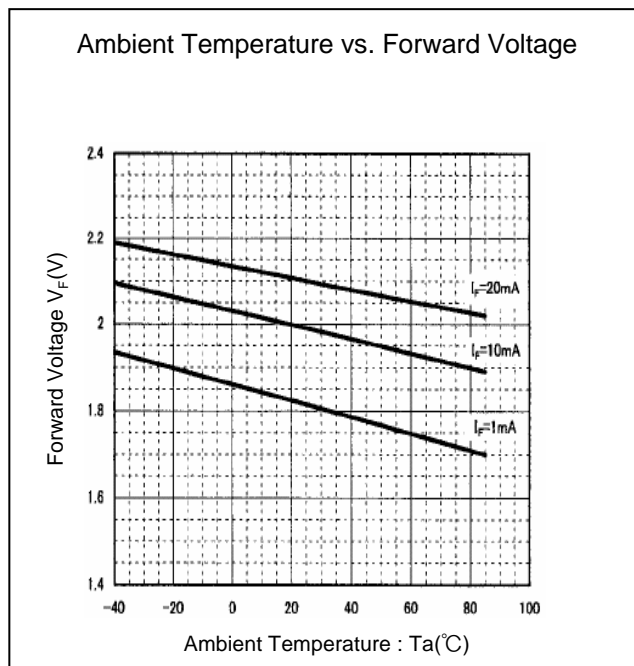
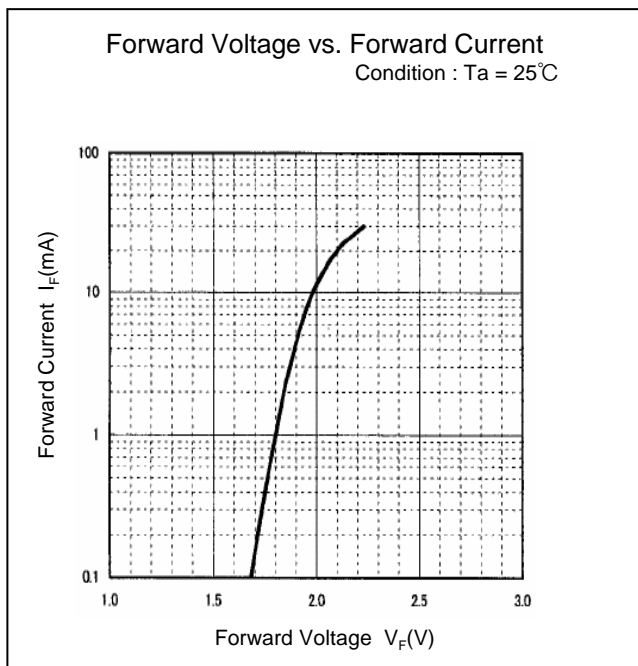


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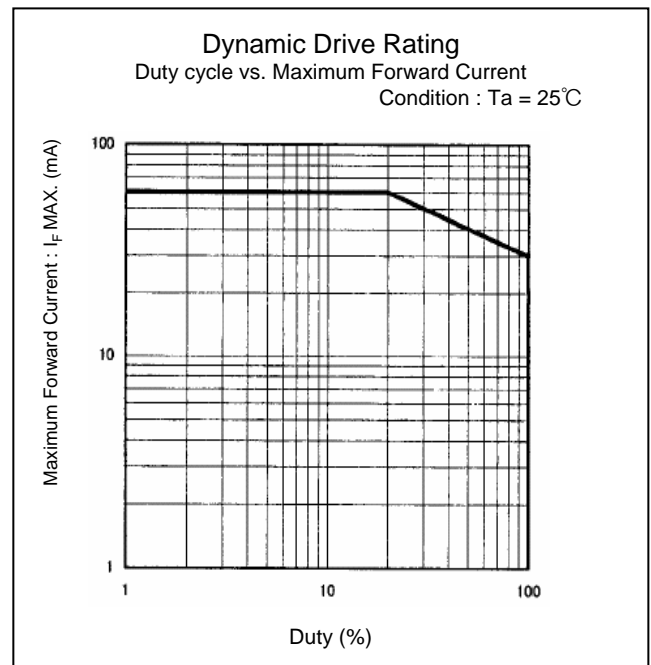
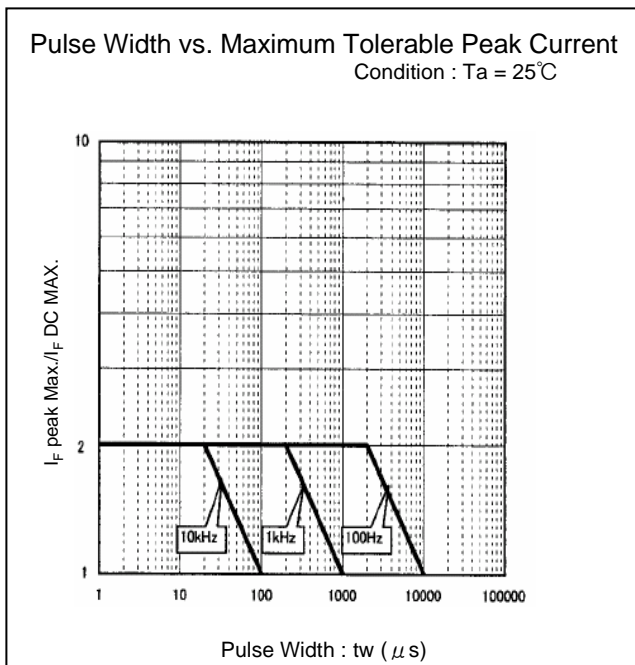
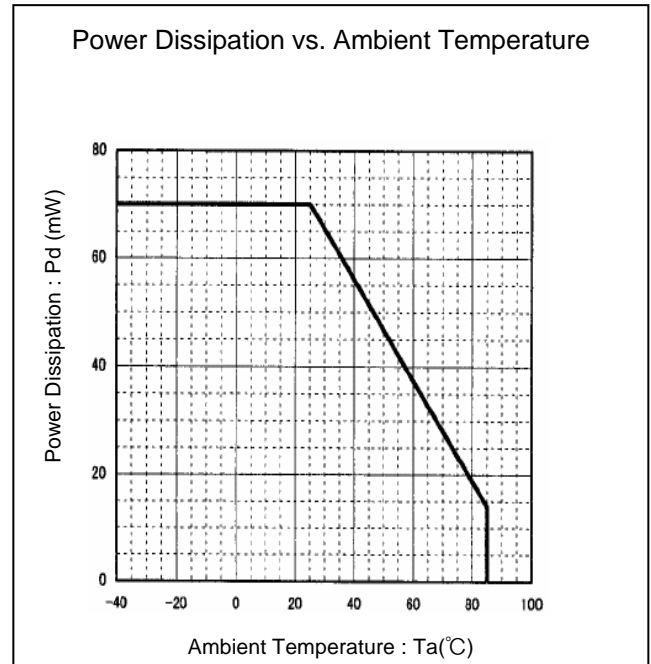
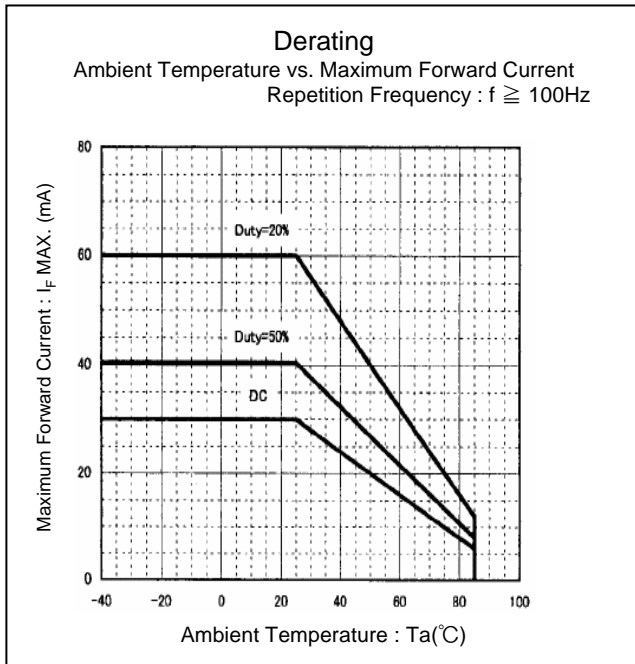




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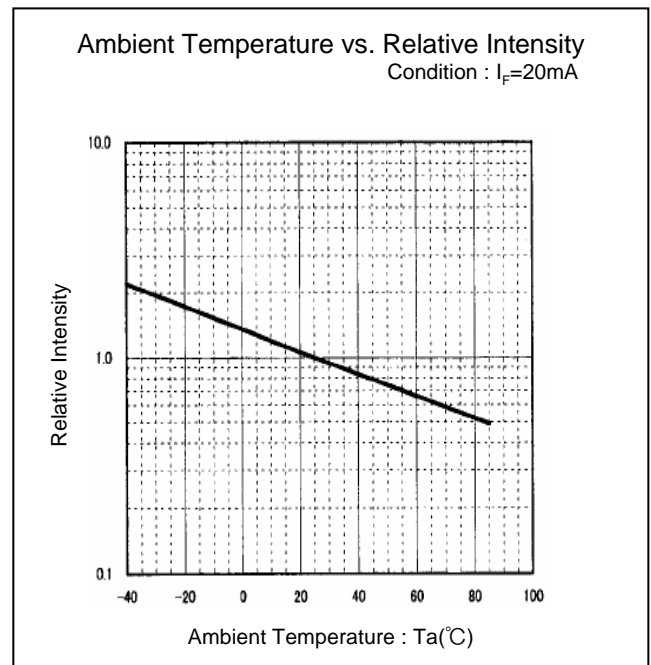
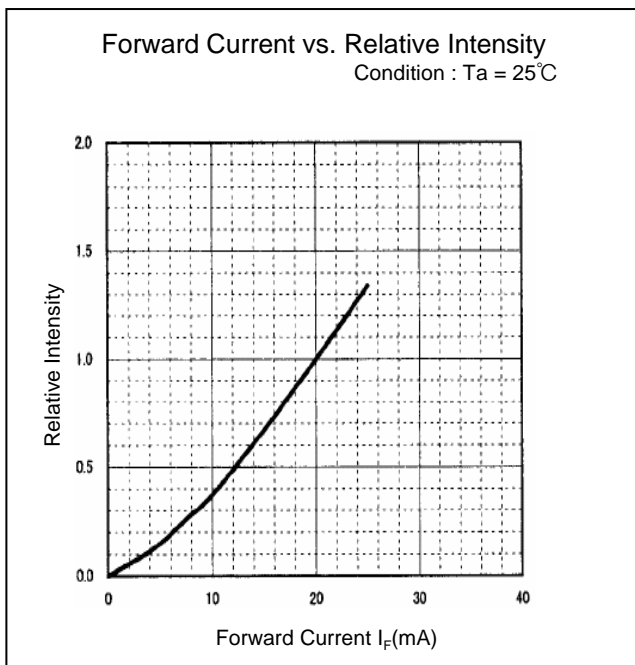
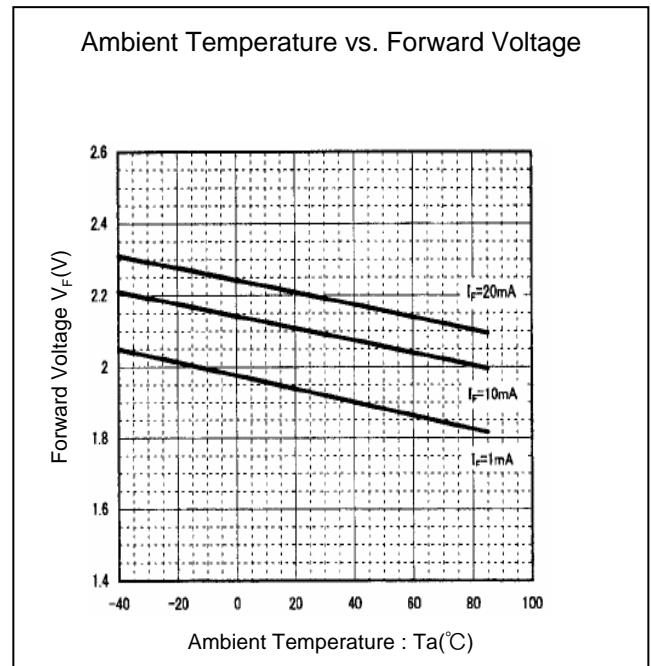
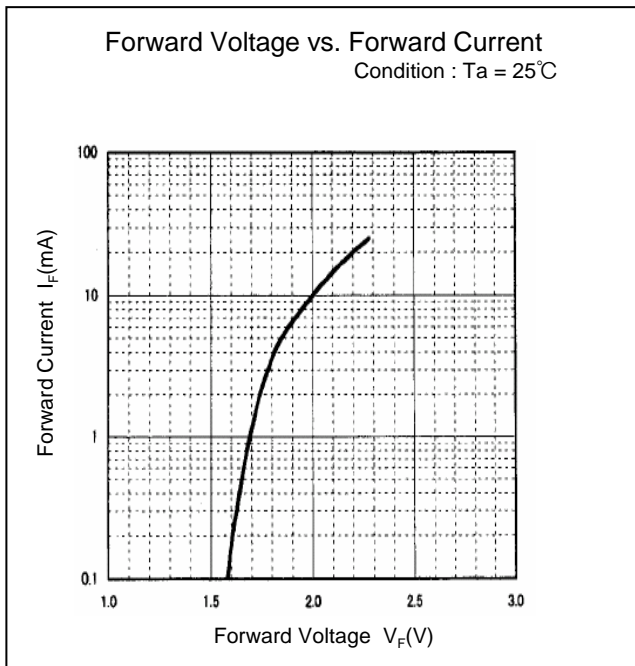


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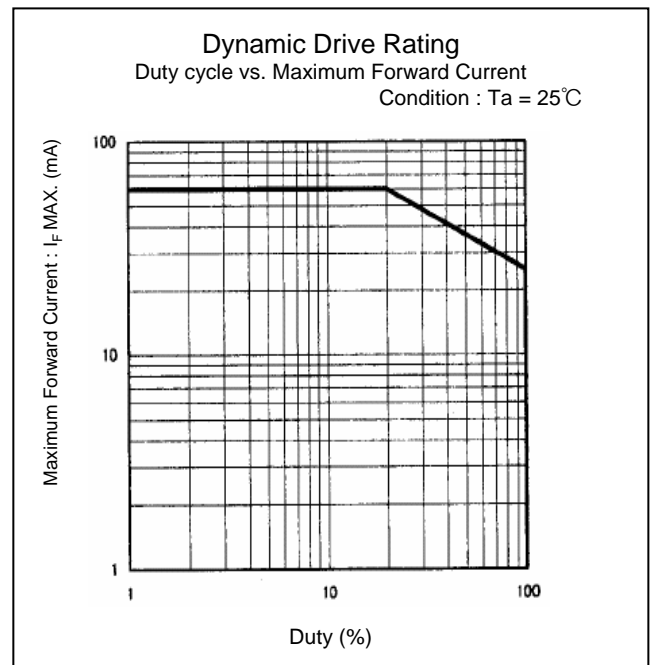
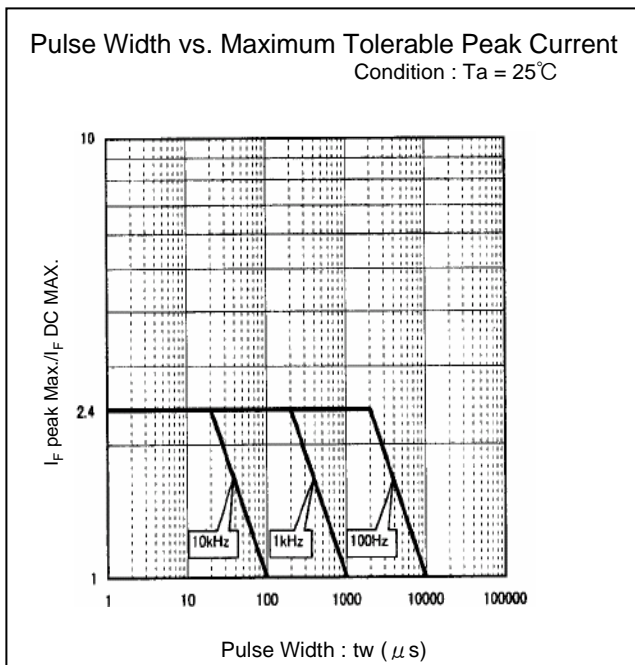
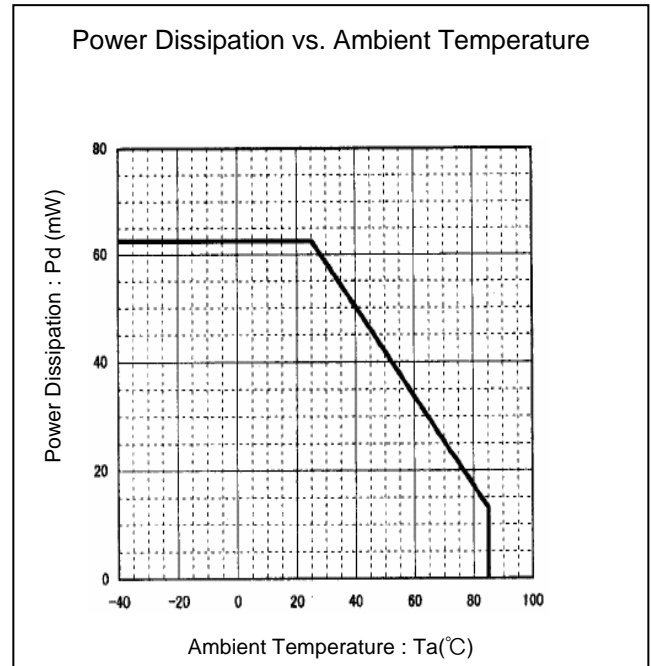
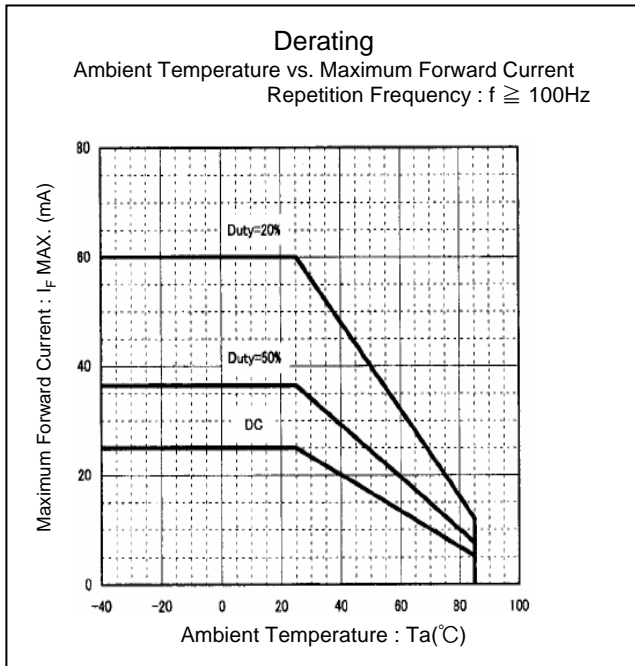




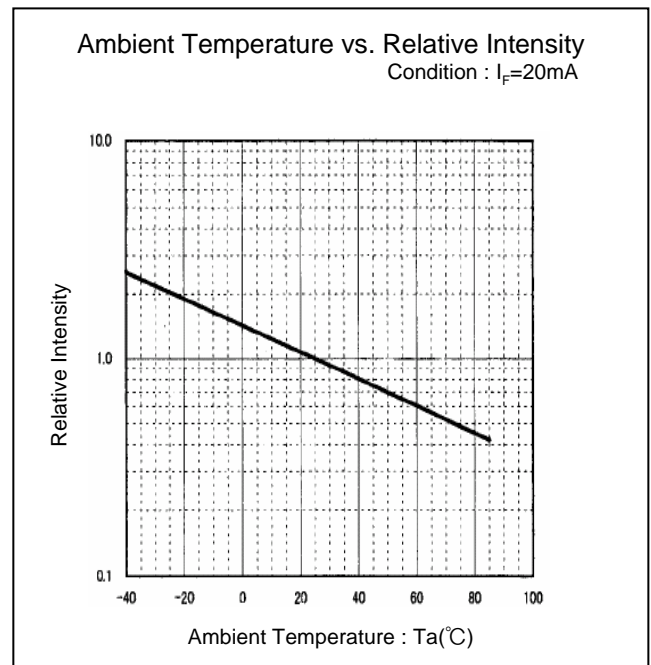
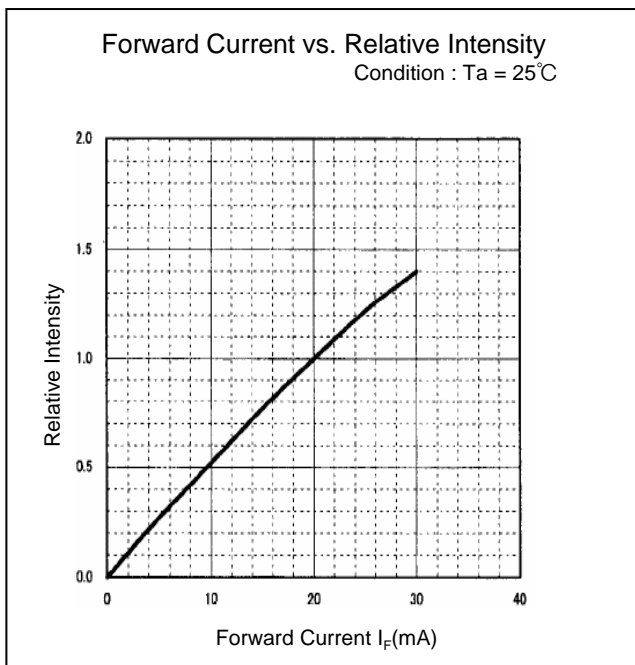
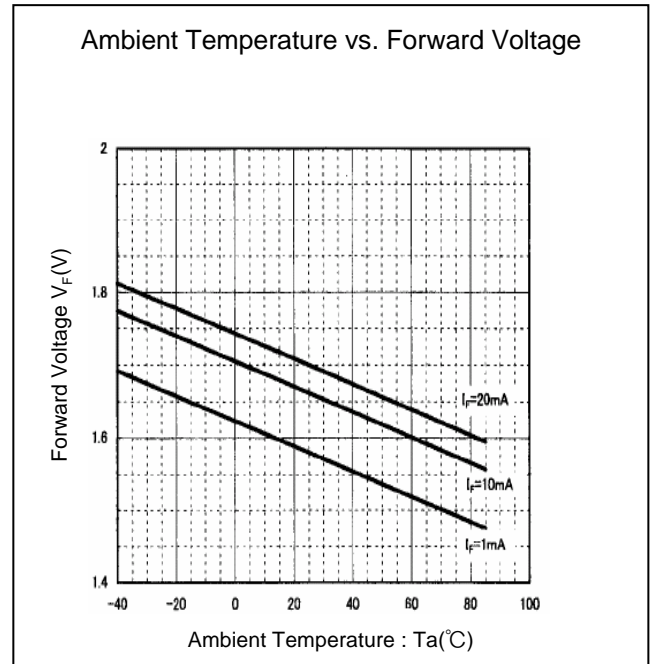
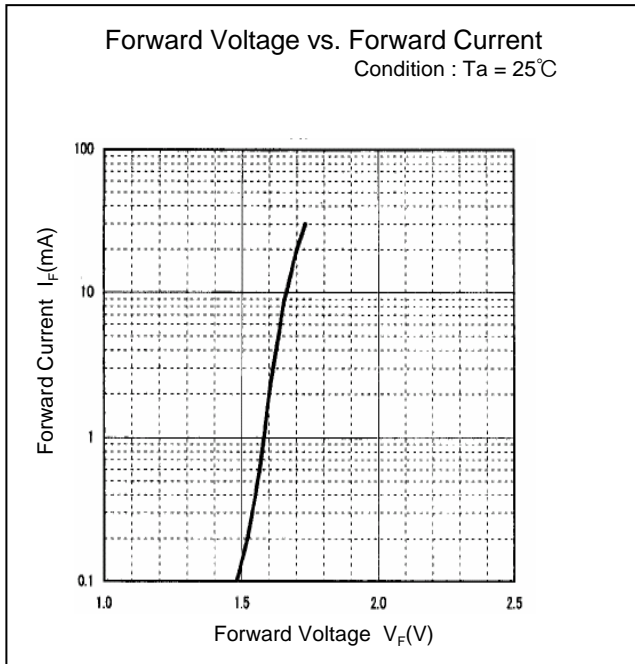
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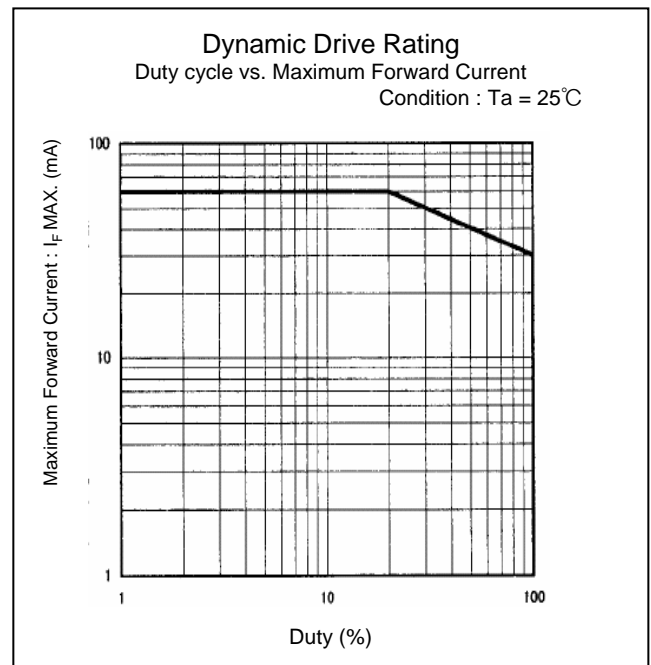
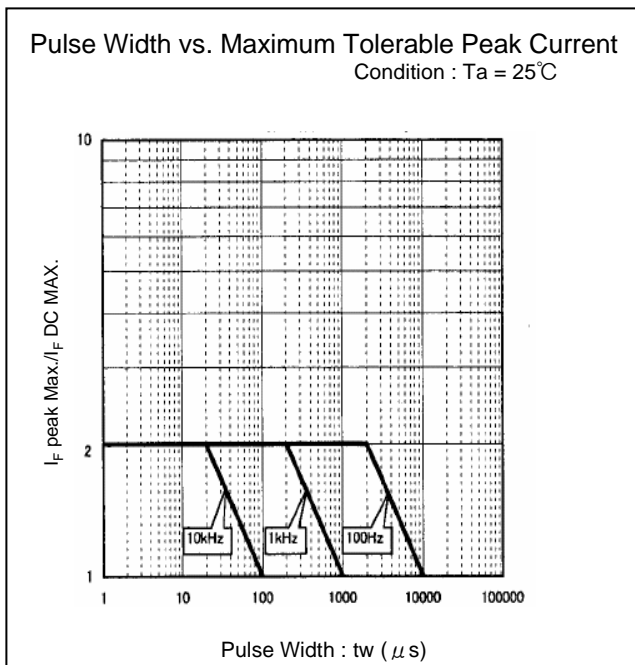
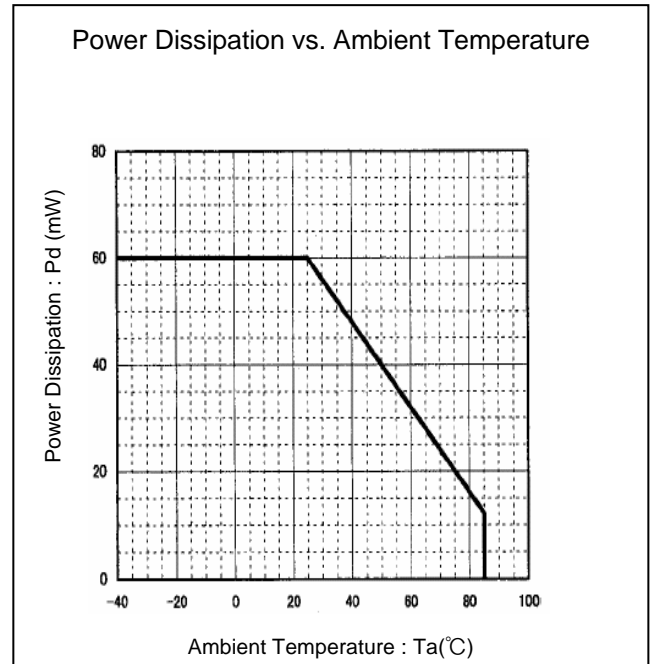
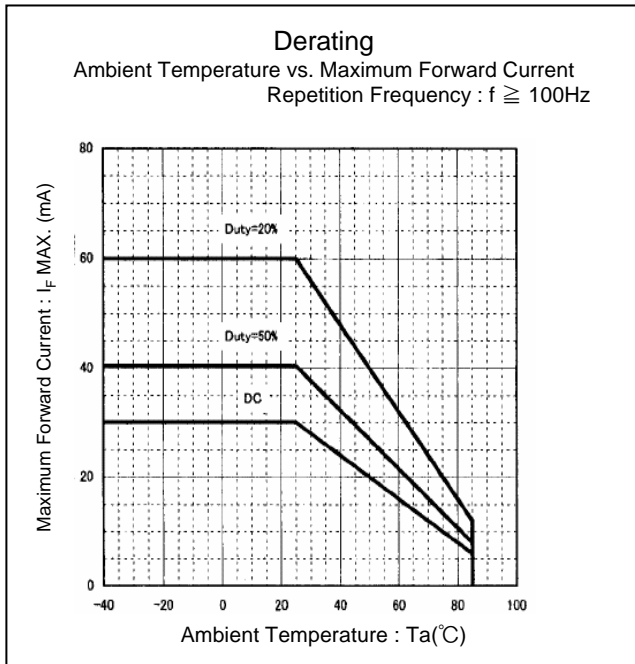
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## Technical Data(2201/2205)



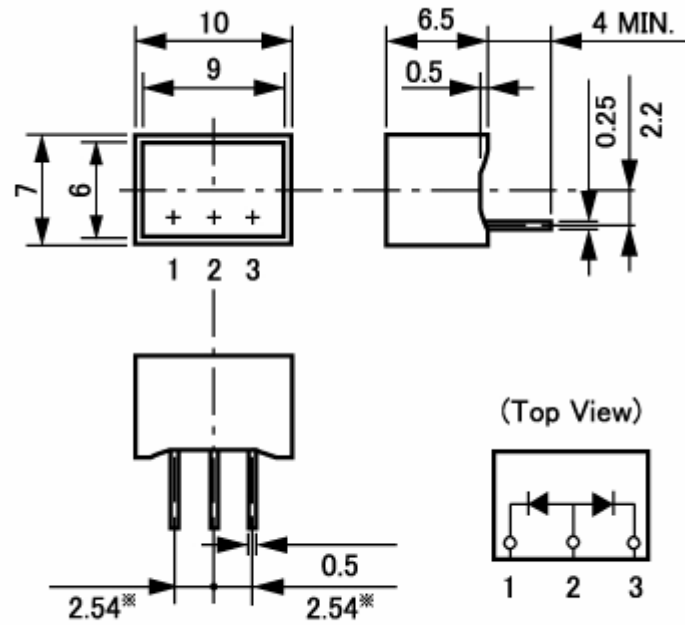
## Technical Data(2201/2205)



## Package Dimensions

(Unit: mm)

(Tolerance :  $\pm 0.25$  mm)



● ※ mark : The measure of lead root

## TTW (Through The Wave) soldering Conditions

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|                   |  |  |
|-------------------|--|--|
| Pre-heating       | 100 °C<br>60 s                             | (MAX.) Resin surface temperature<br>(MAX.) |
| Solder Bath Temp. | 265 °C                                     | (MAX.)                                     |
| Dipping Time      | 5 s  | (MAX.)                                     |
| Position          | At least 2.0 mm away from the root of lead |  |

- 1) The dip soldering process shall be 2 times maximum.
- 2) The product shall be cooled to normal temperature before the second dipping process.

## Manual Soldering Conditions

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|                              |  |                    |
|------------------------------|--|--------------------|
| Iron tip temp.               | 400 °C                                     | (MAX.) (30 W Max.) |
| Soldering time and frequency | 3 s<br>2 times                             | (MAX.)<br>(MAX.)   |
| Position                     | At least 2.0 mm away from the root of lead |                    |



## Reliability Testing Result

| Reliability Testing Result    | Applicable Standard | Testing Conditions  | Duration | Failure |
|-------------------------------|---------------------|---|----------|---------|
| Room Temp. Operating Life     | EAJED-4701/100(101) | Ta = 25°C, If = Maximum Rated Current   | 1,000 h  | 0/10    |
| Resistance to Soldering Heat  | EAJED-4701/300(302) | 260±5°C, 3mm from package base  | 10s      | 0/10    |
| Temperature Cycling           | EAJED-4701/100(105) | Minimum Rated Storage Temperature(30min)<br>~Normal Temperature(15min)<br>~Maximum Rated Storage Temperature(30min)<br>~Normal Temperature(15min) | 5 cycles | 0/10    |
| Wet High Temp. Storage Life   | EAJED-4701/100(103) | Ta = 60±2°C, RH = 90±5%   | 1,000 h  | 0/10    |
| High Temp. Storage Life       | EAJED-4701/200(201) | Ta = Maximum Rated Storage Temperature  | 1,000 h  | 0/10    |
| Low Temp. Storage Life        | EAJED-4701/200(202) | Ta = Minimum Rated Storage Temperature  | 1,000 h  | 0/10    |
| Lead Tension                  | EAJED-4701/400(401) | 5N, 1time   | 10s      | 0/10    |
| Vibration, Variable Frequency | EAJED-4701/400(403) | 98.1m/s <sup>2</sup> (10G), 100 ~ 2KHz sweep for 20min., XYZ each direction   | 2 h      | 0/10    |
| Lead Bend                     | EAJED-4701/400(401) | 2.5N, 0°←→ 90°  | Twice    | 0/10    |
| Shock                         | JSC 7201 A-8        | It falls on wood engraving from height of 75cm.   | 3 times  | 0/10    |

## Failure Criteria

| Items               | Symbols        | Conditions         | Failure criteria   |
|---------------------|----------------|--------------------|--|
| Luminous Intensity  | Iv             | If=20mA            | Testing Min. Value < Spec. Min. Value x 0.5                  |
| Forward Voltage     | V <sub>F</sub> | If=20mA            | Testing Max. Value ≥ Spec. Max. Value x 1.2                  |
| Reverse Current     | I <sub>R</sub> | V <sub>R</sub> =4V | Testing Max. Value ≥ Spec. Max. Value x 2.5                  |
| Cosmetic Appearance | -              | -                  | Occurrence of notable decoloration, deformation and cracking |

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