

**Pb-free  
HEAT**



## 241/243 Series

Numeric Display/Case Size 25.2 x 19.0 mm

### Features

|                   |  |
|-------------------|--|
| Case Size         | 25.2 x 19.0 mm (W x H)   |
| Product features  | <ul style="list-style-type: none"> <li>• Each color has anode common and cathode common respectively.</li> <li>• A black case and a gray case are available.</li> <li>• No lead package</li> <li>• Lead-free soldering compatible</li> <li>• RoHS compliant</li> </ul> |
| Peak wavelength   | Green : 565nm<br>Orange : 605nm<br>Red : 660nm   |
| Number of Digit   | 2 Digits   |
| Segment Shape     | Square Shape Type  |
| Character Height  | 10.92 mm   |
| Die materials     | Green : GaP<br>Orange : GaAsP<br>Red : GaAlAs  |
| Soldering methods | TTW (Through The Wave) soldering and manual soldering  |
| ESD               | More than 2kV(HBM)   |
| Packing           | Tray   |

### Recommended Applications

Amusement Equipment, Electric Household Appliances, Other General Applications

## Emitted Color

| Part No.            |                    |                     |                    | Material | Emitted Color | Chip/<br>Segment |
|---------------------|--------------------|---------------------|--------------------|----------|---------------|------------------|
| Anode Common        |                    | Cathode Common      |                    |          |               |                  |
| Case Color<br>Black | Case Color<br>Gray | Case Color<br>Black | Case Color<br>Gray |          |               |                  |
| NAG241P             | NAG243P            | NKG241P             | NKG243P            | GaP      | Green         | 1                |
| NAA241              | NAA243             | NKA241              | NKA243             | GaAsP    | Orange        | 1                |
| NAR241              | NAR243             | NKR241              | NKR243             | GaAlAs   | Red           | 1                |

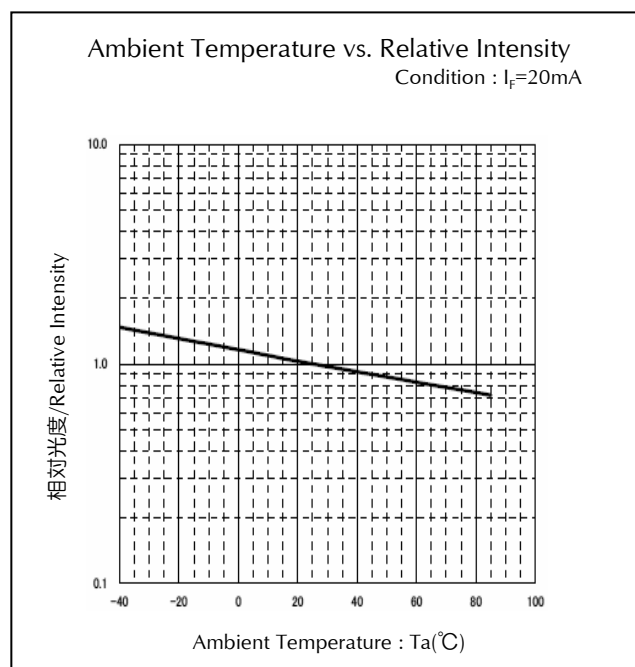
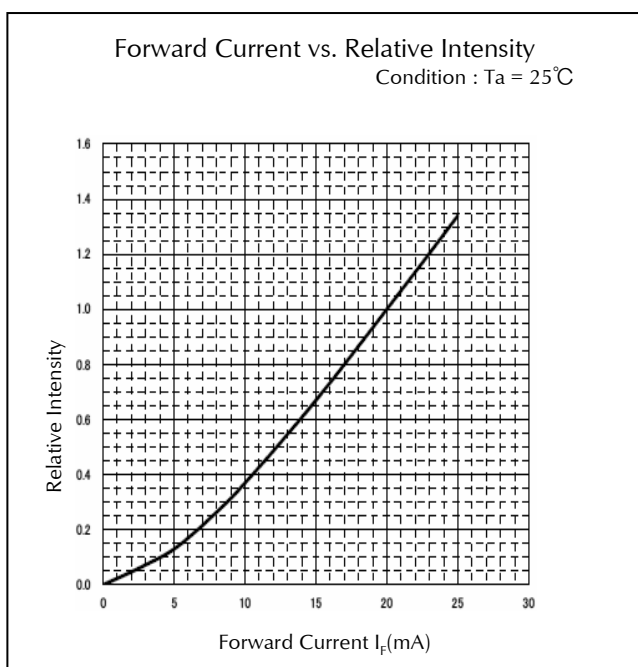
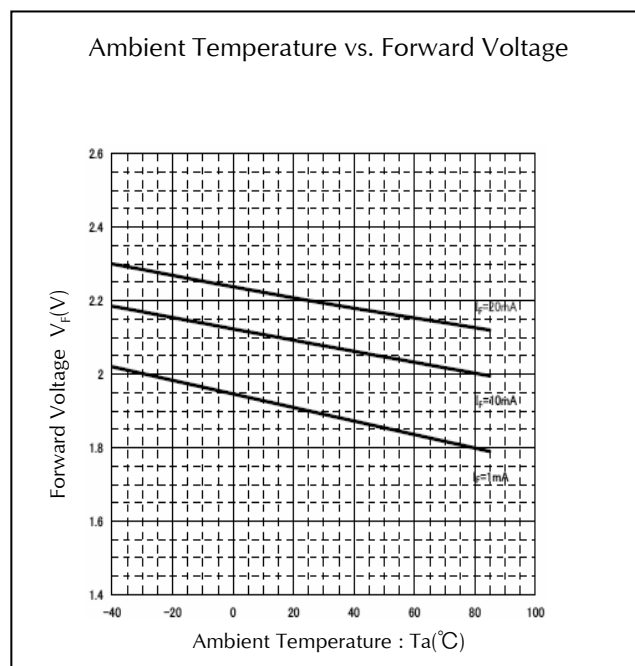
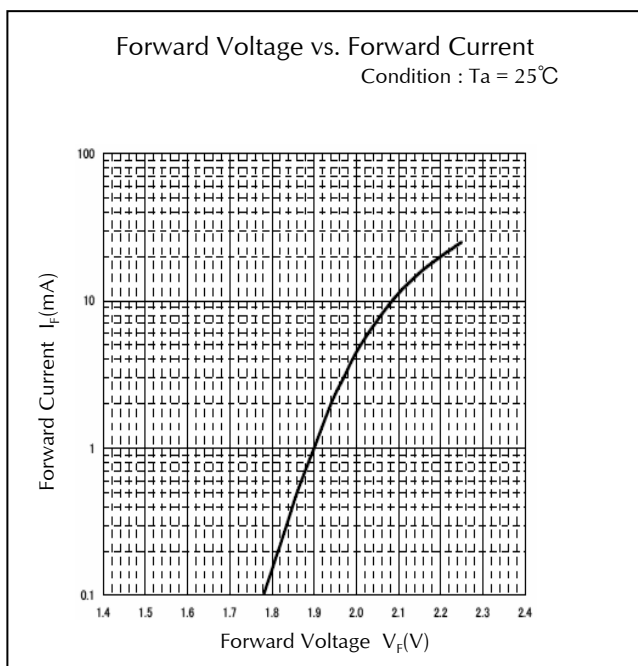
(Ta=25°C)

## Electro-Optical Characteristics

| Item                       | Conditions           | Symbol         | Characteristics |        |     | Unit |         |
|----------------------------|----------------------|----------------|-----------------|--------|-----|------|---------|
|                            |                      |                | Green           | Orange | Red |      |         |
| Luminous Intensity(Rank B) | I <sub>F</sub> =20mA | I <sub>V</sub> | MIN.            | 1      | 3   | 4    | mcd/seg |
|                            |                      |                | TYP.            | 2      | 6   | 8    |         |
| Luminous Intensity(Rank C) | I <sub>F</sub> =20mA | I <sub>V</sub> | MIN.            | -      | -   | 8    | mcd/seg |
|                            |                      |                | TYP.            | -      | -   | 11   |         |
| Forward Voltage            | I <sub>F</sub> =20mA | V <sub>F</sub> | TYP.            | 2.2    | 2.2 | 1.7  | V/seg   |
|                            |                      |                | MAX.            | 2.5    | 2.5 | 2.0  |         |
| Reverse Current            | V <sub>R</sub> =4V   | I <sub>R</sub> | MAX.            | 100    | 100 | 100  | μ A/seg |
| Peak Wavelength            | I <sub>F</sub> =20mA | λ <sub>p</sub> | TYP.            | 565    | 605 | 660  | nm      |
| Spectral Line Half Width   | I <sub>F</sub> =20mA | Δλ             | TYP.            | 30     | 30  | 30   | nm      |

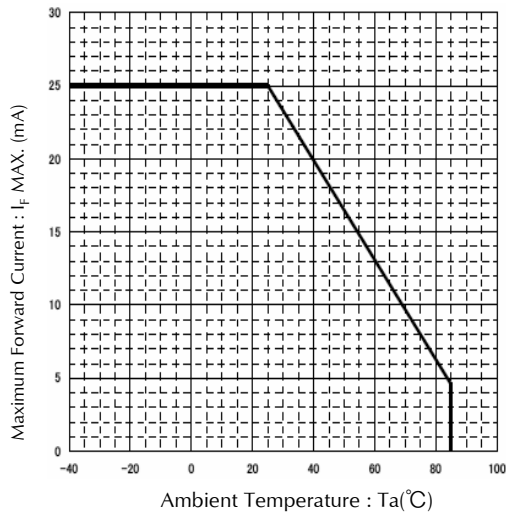
(Ta=25°C)

## Technical Data(Green)

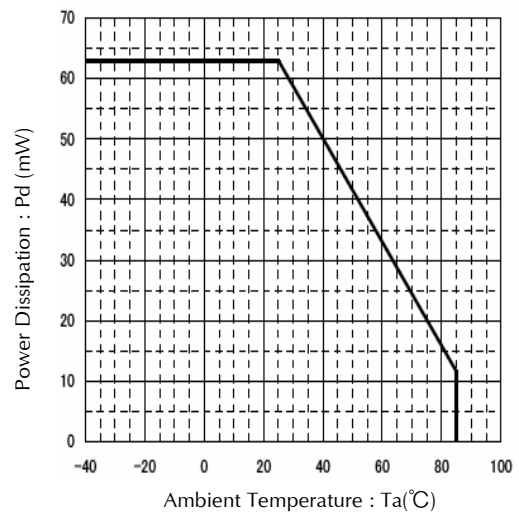


## Technical Data(Green)

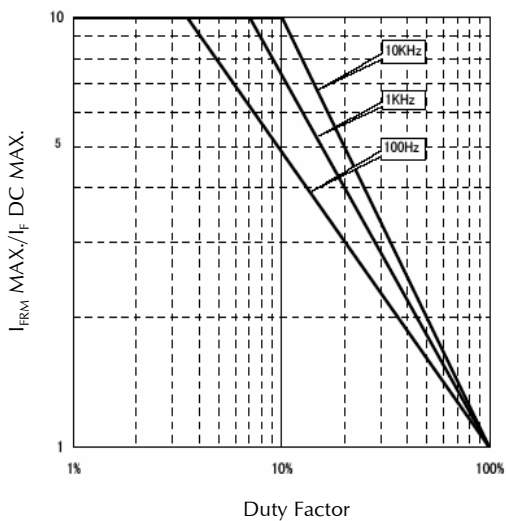
Ambient Temperature vs. Maximum Forward Current



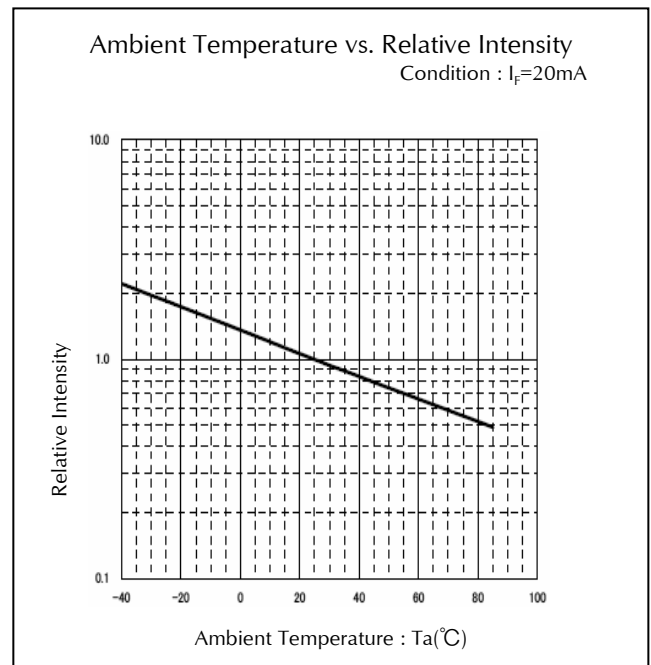
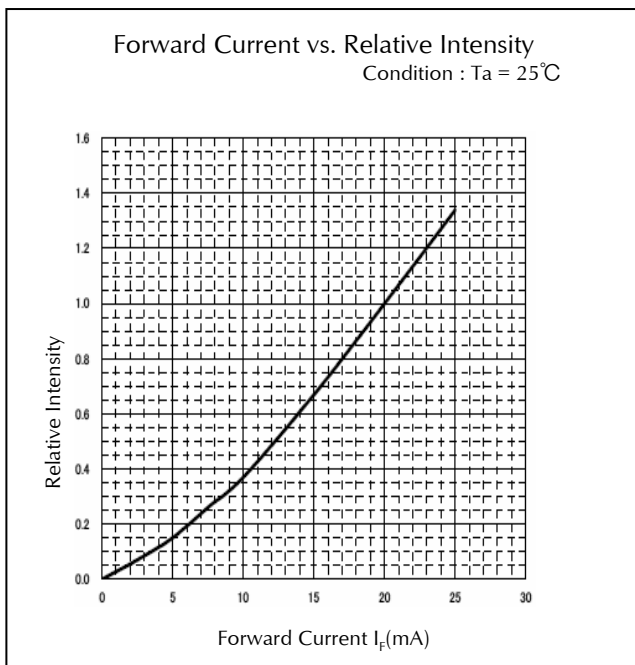
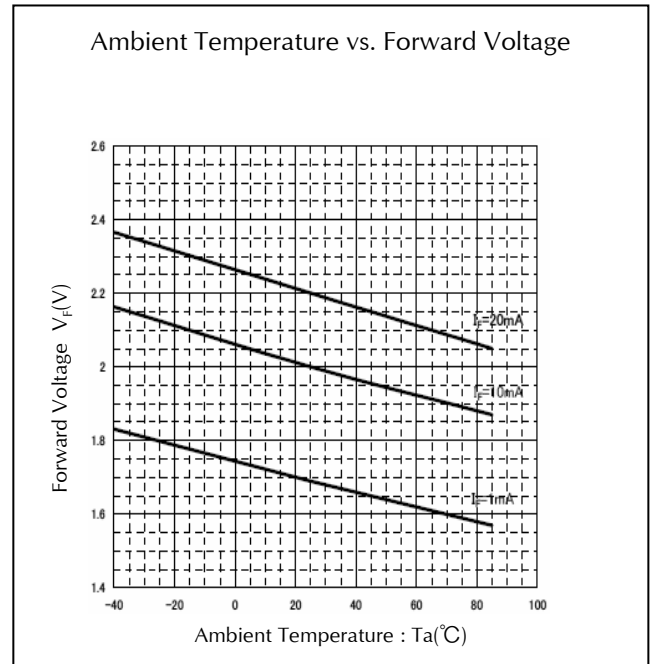
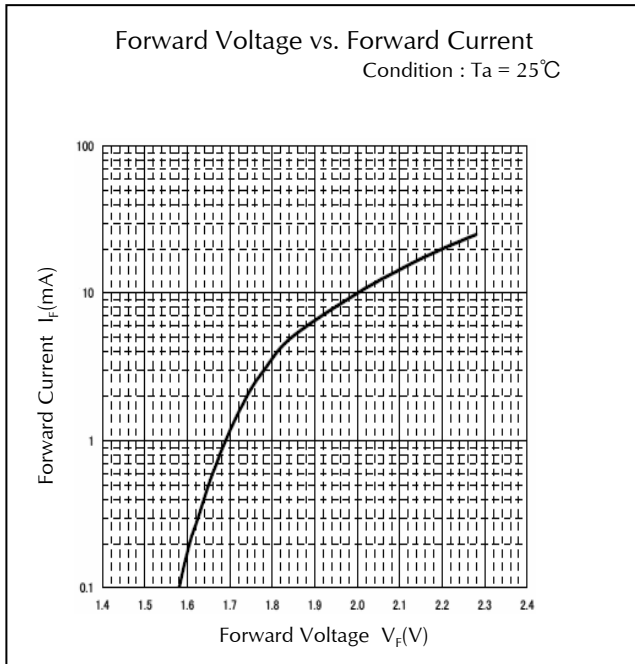
Ambient Temperature vs. Power Dissipation



Duty Factor vs. Maximum Tolerable Pulse Forward Current  
Condition : Ta = 25°C

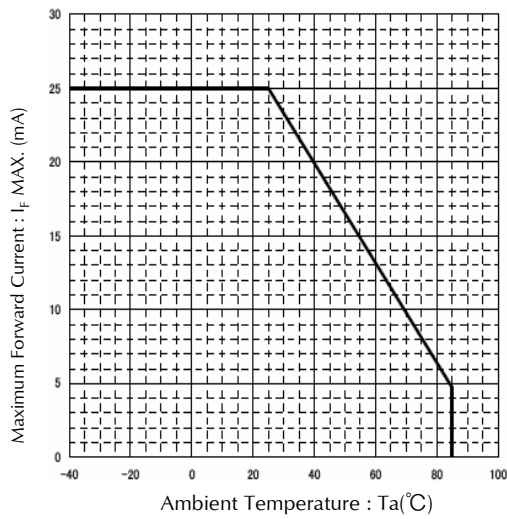


## Technical Data(Orange)

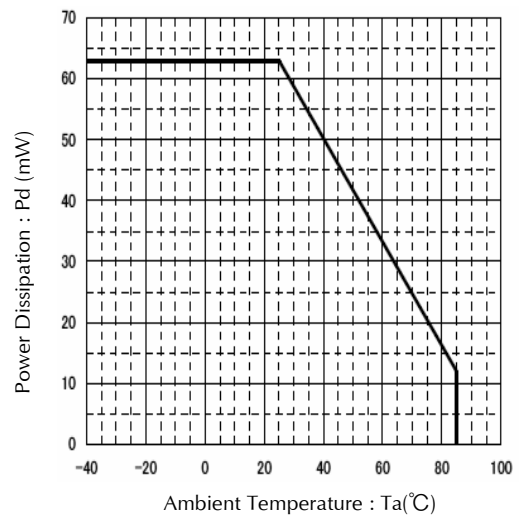


## Technical Data(Orange)

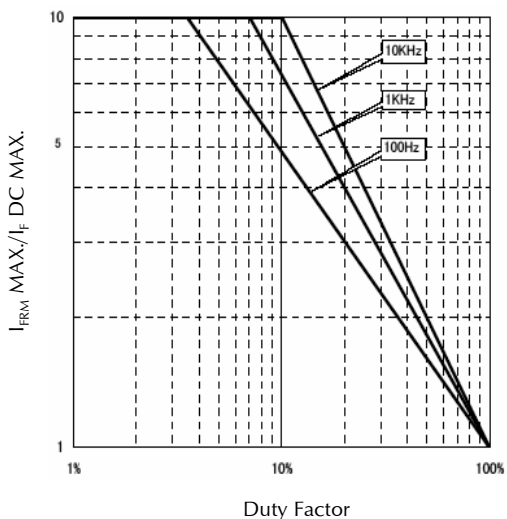
Ambient Temperature vs. Maximum Forward Current



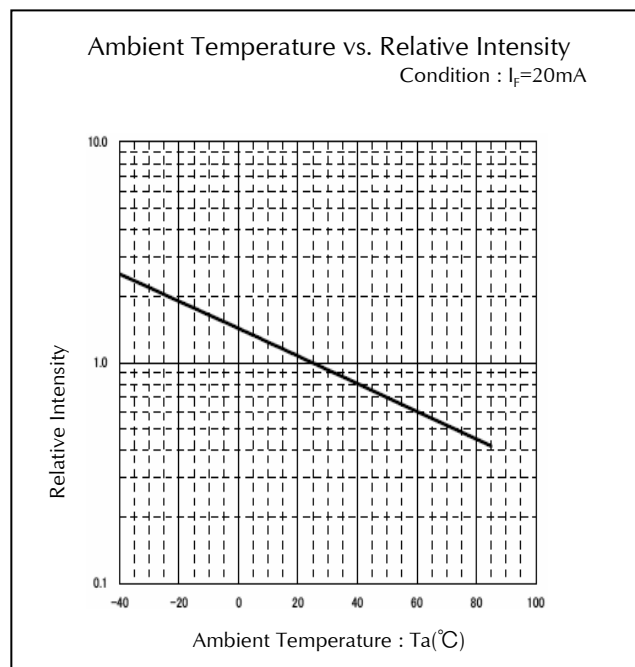
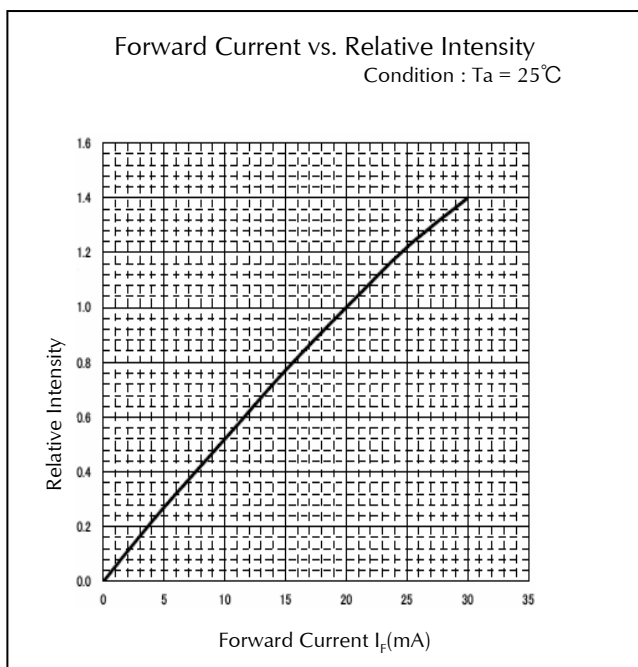
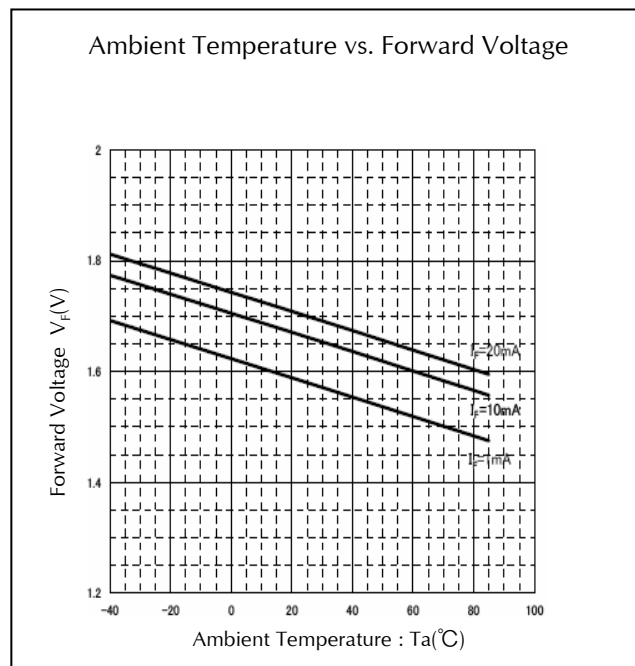
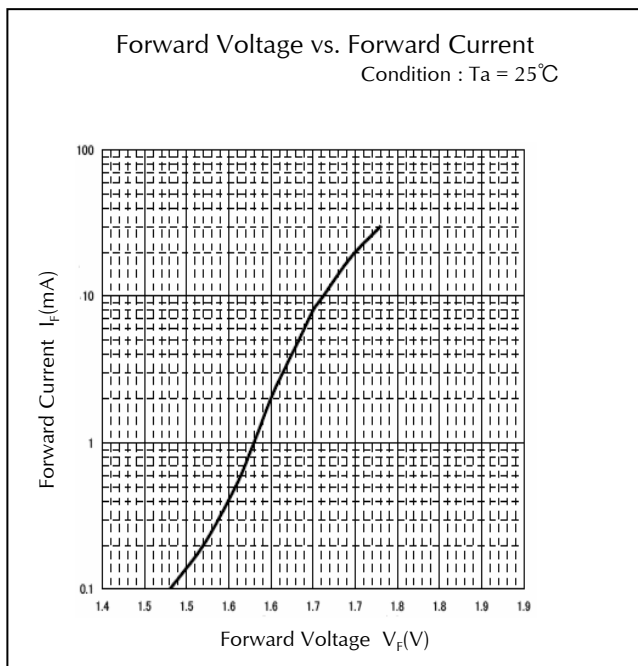
Ambient Temperature vs. Power Dissipation



Duty Factor vs. Maximum Tolerable Pulse Forward Current  
Condition : Ta = 25°C

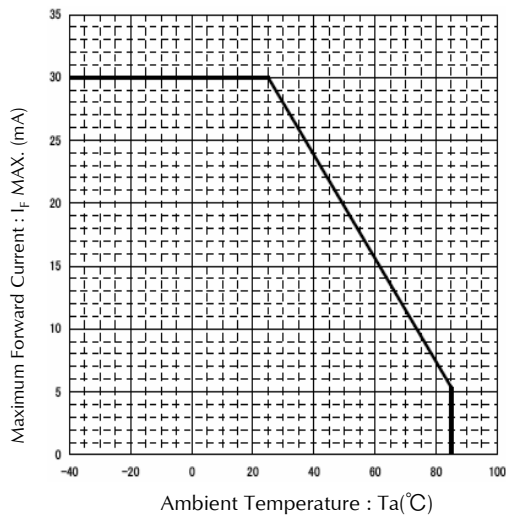


## Technical Data(RED)

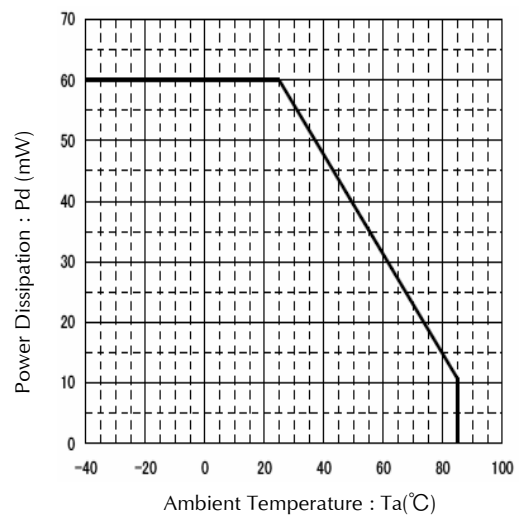


## Technical Data(Red)

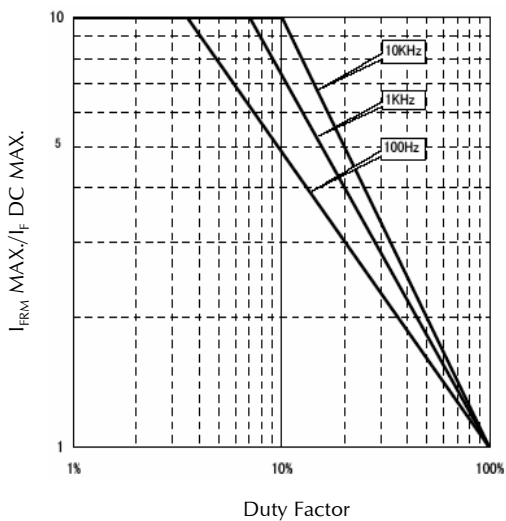
Ambient Temperature vs. Maximum Forward Current



Ambient Temperature vs. Power Dissipation



Duty Factor vs. Maximum Tolerable Pulse Forward Current  
Condition : Ta = 25°C

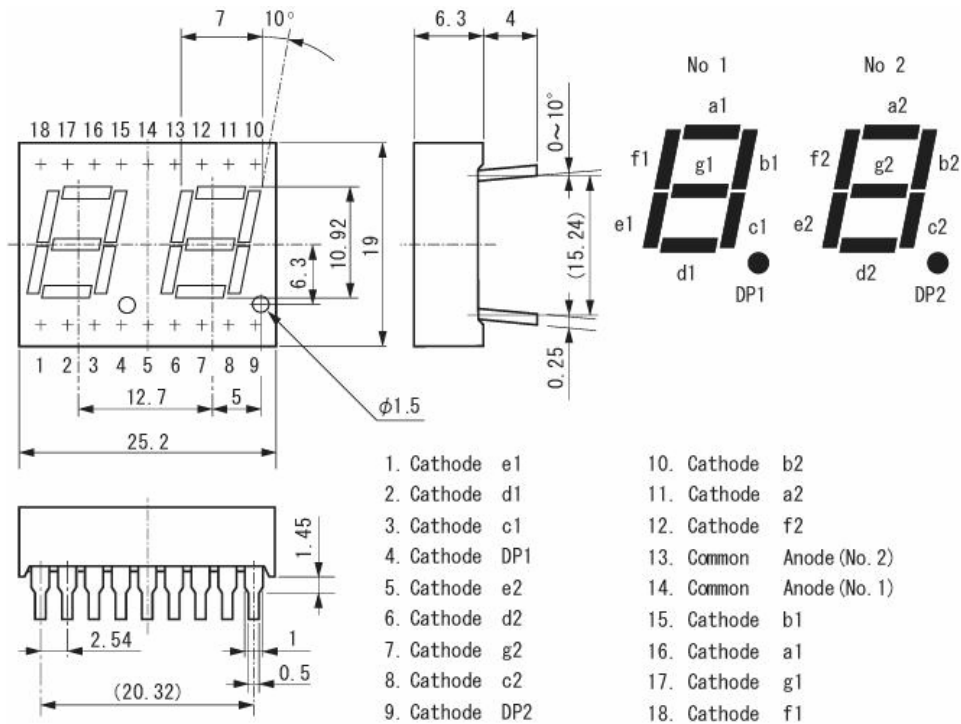




## Package Dimensions

(Unit: mm)

(Tolerance : ±0.25 mm)



- Cathode common types have a reverse polarity.
- Leave a minimum clearance of 1.45 mm from case body to solder.

## 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 1.45 mm away from case body |  |

- 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 1.45 mm away from case body |                    |

## 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/seg   | 1,000 h  | 0/10    |
| Resistance to Soldering Heat  | EIAJ ED-4701/300(302) | 260±5°C, 3mm from package base  | 10s      | 0/10    |
| 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 | 0/10    |
| Wet High Temp. Storage Life   | EIAJ ED-4701/100(103) | Ta = 60±2°C, RH = 90±5%   | 1,000 h  | 0/10    |
| High Temp. Storage Life       | EIAJ ED-4701/200(201) | Ta = Maximum Rated Storage Temperature  | 1,000 h  | 0/10    |
| Low Temp. Storage Life        | EIAJ ED-4701/200(202) | Ta = Minimum Rated Storage Temperature  | 1,000 h  | 0/10    |
| Lead Tension                  | EIAJ ED-4701/400(401) | 5N, 1time   | 10s      | 0/10    |
| 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    |
| Lead Bend                     | EIAJ ED-4701/400(401) | 2.5N, 0° ↔ 90°  | 2 times  | 0/10    |
| Shock                         | JIS C 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 Value of each product Luminous Intensity      | Testing Min. Value < Spec. Min. Value x 0.5        |
| Forward Voltage     | V <sub>F</sub> | If Value of each product Forward Voltage         | Testing Max. Value ≥ Spec. Max. Value x 1.2        |
| Reverse Current     | I <sub>R</sub> | V <sub>R</sub> = Maximum Rated Reverse Voltage V | Testing Max. Value ≥ Spec. Max. Value x 2.5        |
| Cosmetic Appearance | -              | -  | No notable, decoloration, deformation and cracking |

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