



Pb-free
HEAT



105/107 Series

Numeric Display/Case Size 22.8 x 33.0 mm

Features

| | |
|-------------------|--|
| Case Size | 22.8 x 33.0 mm (W x H) |
| Product features | <ul style="list-style-type: none"> ▪ Each color has anode common and cathode common respectively. ▪ A black case and a gray case are available. ▪ No lead package ▪ Lead-free soldering compatible ▪ RoHS compliant |
| Peak wavelength | Green : 565nm Orange : 605nm Red : 660nm |
| Number of Digit | 1 Digit |
| Segment Shape | Arrow Feather Type |
| Character Height | 25.4 mm |
| Die materials | Green : GaP Orange : GaAsP 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 | ※1 Chip/ Segment |
|---------------------|--------------------|---------------------|--------------------|----------|---------------|------------------------|
| Anode Common | | Cathode Common | | | | |
| Case Color Black | Case Color Gray | Case Color Black | Case Color Gray | | | |
| NAG105P | NAG107P | NKG105P | NKG107P | GaP | Green | 2 |
| | | | | | | 1 |
| NAA105 | NAA107 | NKA105 | NKA107 | GaAsP | Orange | 2 |
| | | | | | | 1 |
| NAR105 | NAR107 | NKR105 | NKR107 | GaAlAs | Red | 2 |
| | | | | | | 1 |

※1 Segment NO. a, b, c, d, e, f, g : 2 chips / Segment
 Segment NO. D.P : 1 chip / Segment

Absolute Maximum Ratings

(Ta=25°C)

| Item | Symbol | Absolute Maximum Ratings | | | | | | Unit |
|---------------------------------|-------------------|--------------------------|----|---------|----|---------|----|--------|
| | | Green | | Orange | | Red | | |
| | | Chip / Segment | | | | | | |
| | | 2 | 1 | 2 | 1 | 2 | 1 | |
| Power Dissipation | Pd | 126 | 63 | 126 | 63 | 120 | 60 | mW/seg |
| Forward Current | I _F | 25 | | 25 | | 30 | | mA/seg |
| Pulse Forward Current ※2 | I _{FRM} | 100 | | 100 | | 120 | | mA/seg |
| Derating (Ta=25°C or higher) | ΔI _F | 0.34 | | 0.34 | | 0.41 | | mA/°C |
| | ΔI _{FRM} | 1.35 | | 1.35 | | 1.64 | | mA/°C |
| Reverse Voltage | V _R | 8 | 4 | 8 | 4 | 8 | 4 | V |
| Operating Temperature | T _{opr} | -20~+85 | | -20~+85 | | -20~+85 | | °C |
| Storage Temperature | T _{stg} | -20~+85 | | -20~+85 | | -20~+85 | | °C |

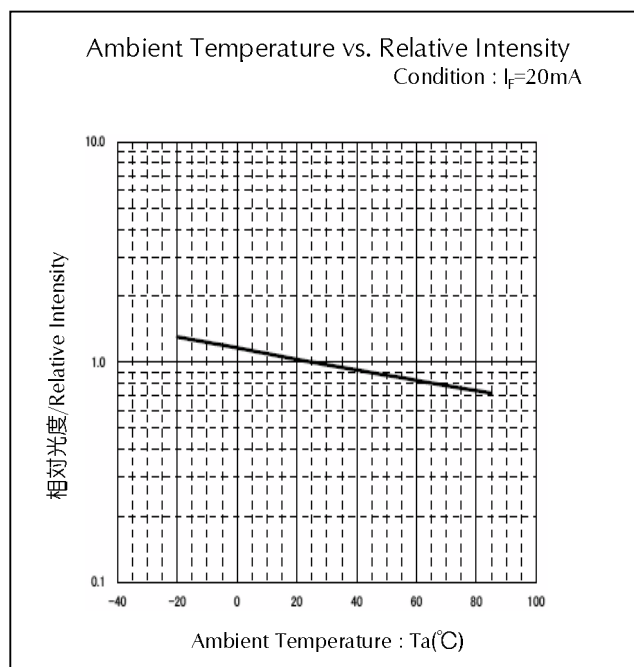
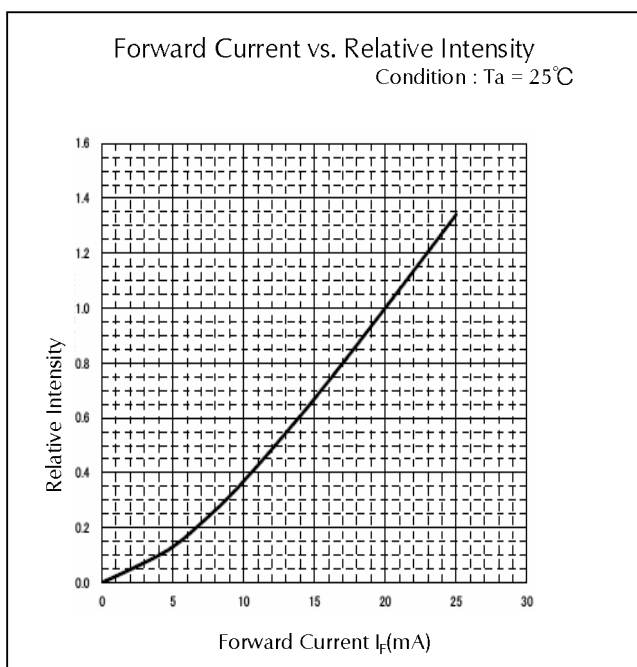
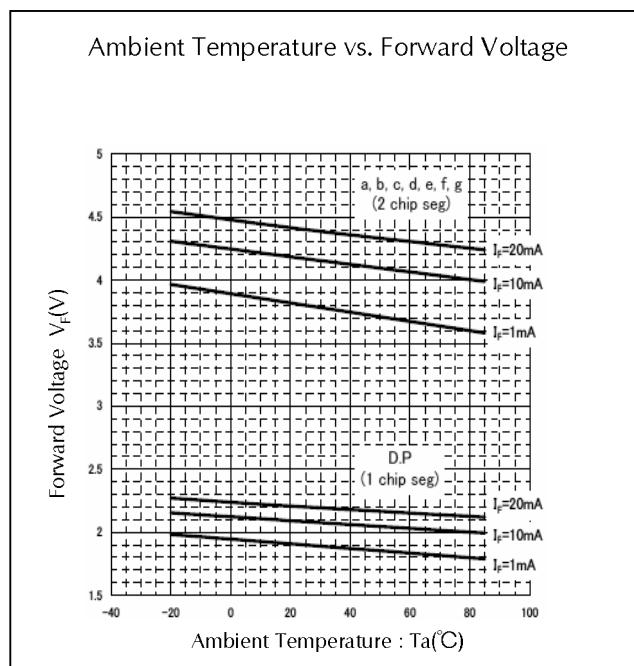
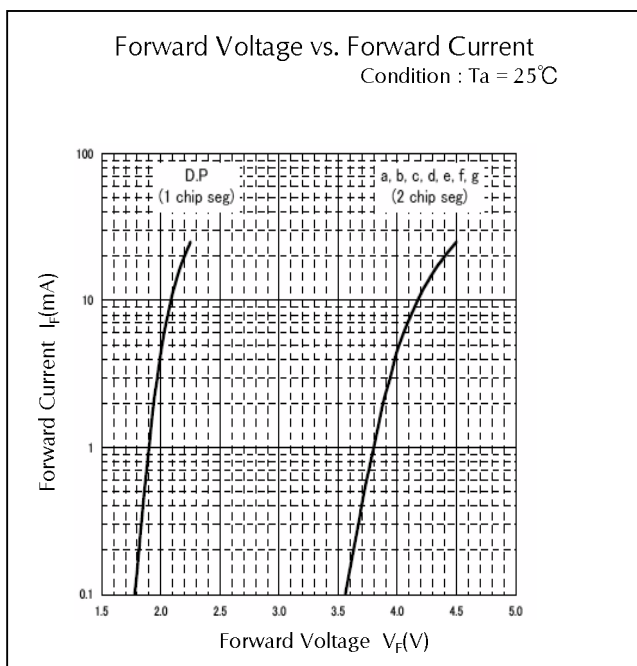
※2 I_{FRM} Measurement condition : Duty 1/5, f = 1kHz

Electro-Optical Characteristics

(Ta=25°C)

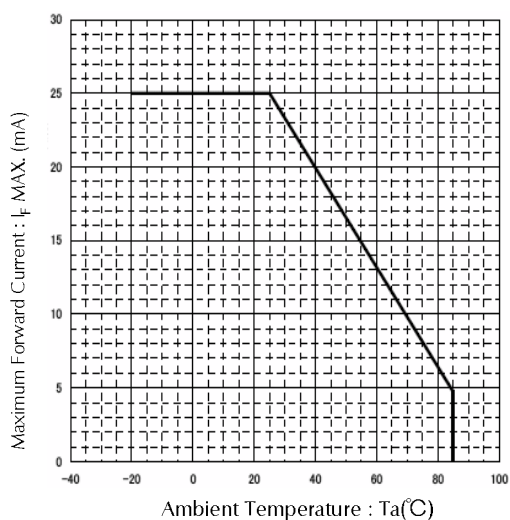
| Item | Conditions | Symbol | | Characteristics | | | | | | Unit |
|----------------------------|----------------------|----------------|------|-----------------|-----|--------|-----|-----|------|---------|
| | | | | Green | | Orange | | Red | | |
| | | | | Chip / Segment | | | | | | |
| | | | | 2 | 1 | 2 | 1 | 2 | 1 | |
| Luminous Intensity(Rank B) | I _F =20mA | I _V | MIN. | 4 | 2 | 8 | 4 | 10 | 5 | mcd/seg |
| | | | TYP. | 8 | 4 | 16 | 8 | 20 | 10 | |
| Luminous Intensity(Rank C) | I _F =20mA | I _V | MIN. | - | - | - | - | 20 | 10 | mcd/seg |
| | | | TYP. | - | - | - | - | 25 | 12.5 | |
| Forward Voltage | I _F =20mA | V _F | TYP. | 4.4 | 2.2 | 4.4 | 2.2 | 3.4 | 1.7 | V/seg |
| | | | MAX. | 5.0 | 2.5 | 5.0 | 2.5 | 4.0 | 2.0 | |
| Reverse Current | - | I _R | MAX. | 100 | 100 | 100 | 100 | 100 | 100 | μA/seg |
| Peak Wavelength | I _F =20mA | λ _D | TYP. | 565 | | 605 | | 660 | | nm |
| Spectral Line Half Width | I _F =20mA | Δλ | TYP. | 30 | | 30 | | 30 | | nm |

Technical Data(Green)

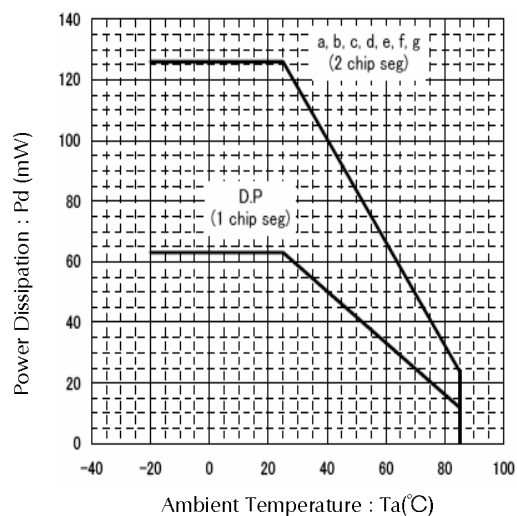


Technical Data(Green)

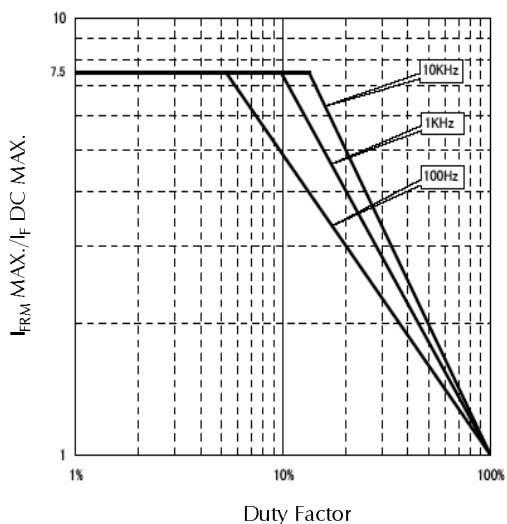
Ambient Temperature vs. Maximum Forward Current



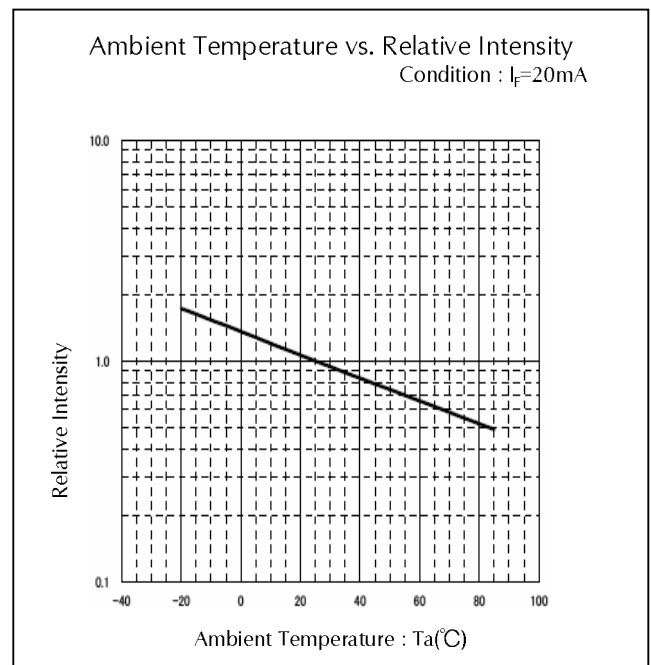
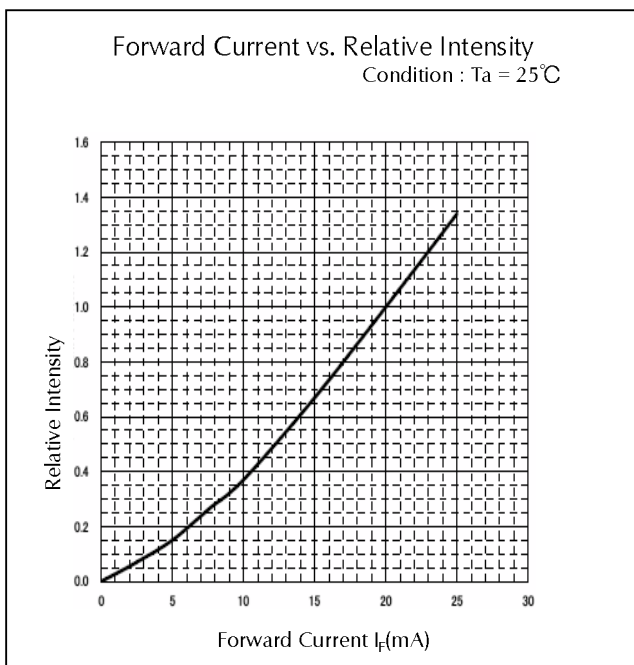
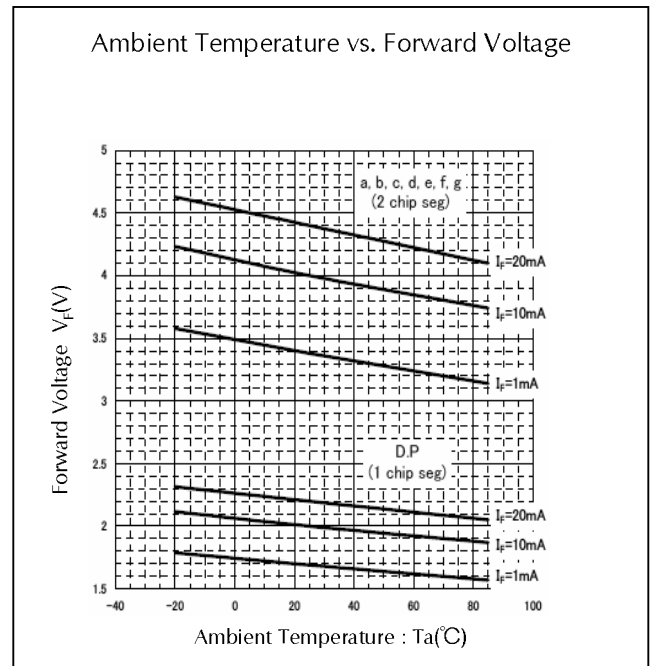
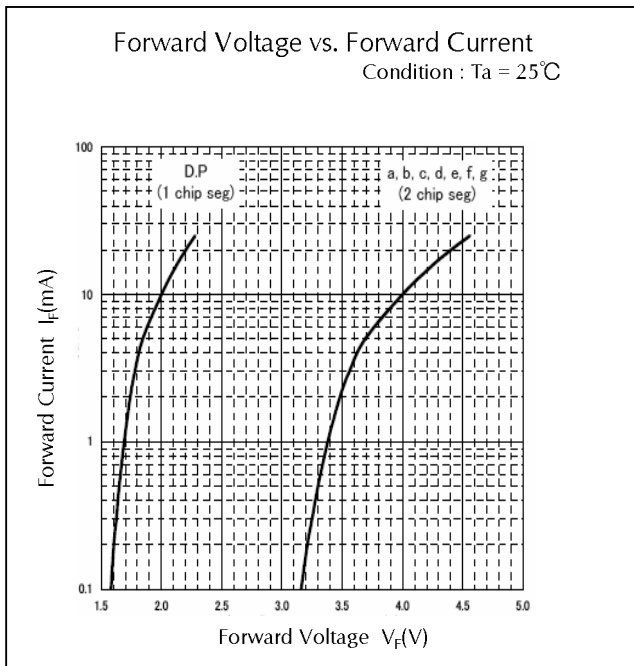
Ambient Temperature vs. Power Dissipation



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

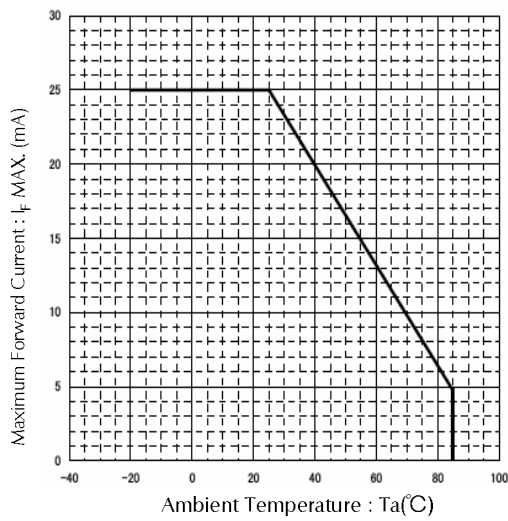


Technical Data(Orange)

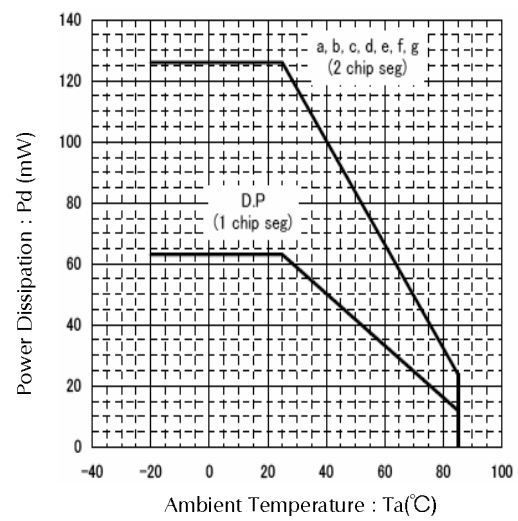


Technical Data(Orange)

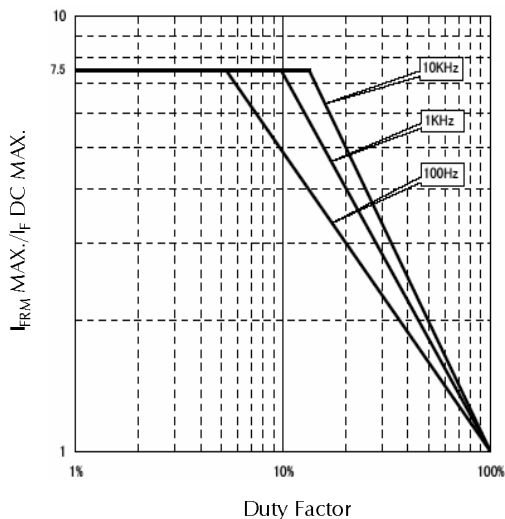
Ambient Temperature vs. Maximum Forward Current



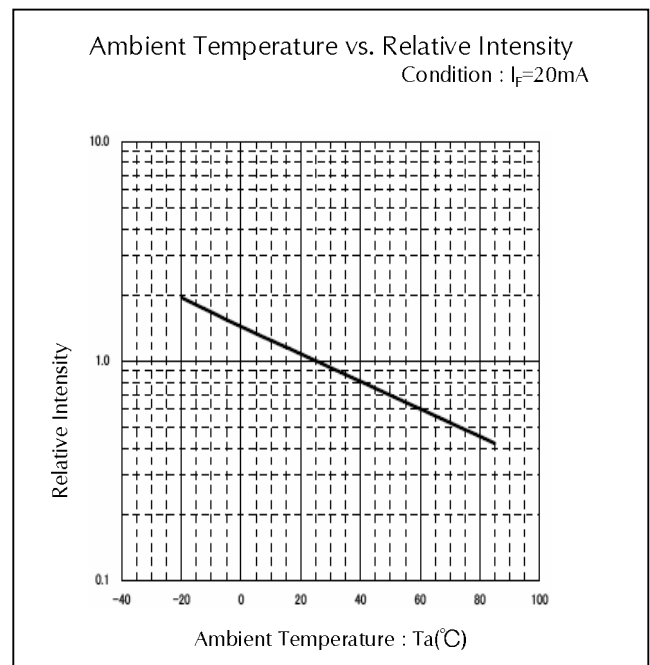
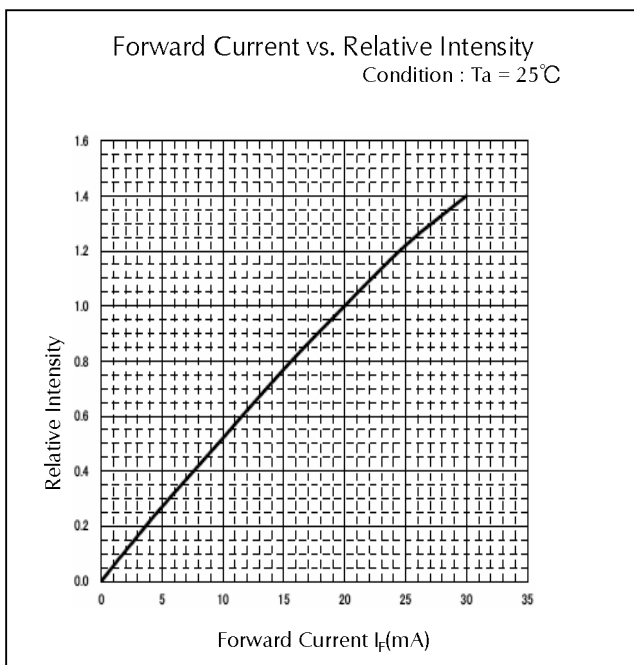
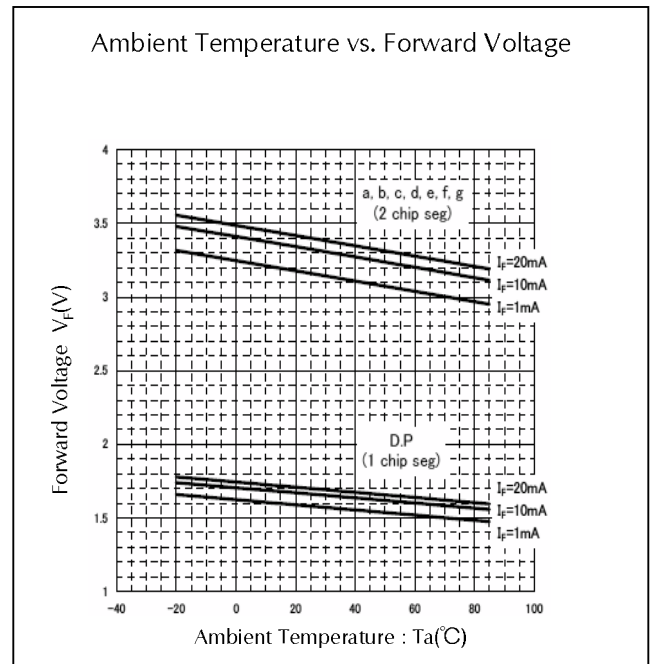
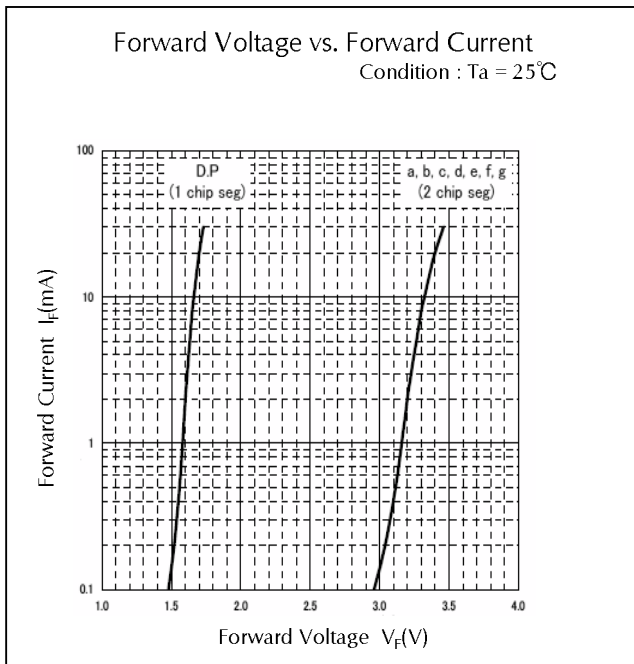
Ambient Temperature vs. Power Dissipation



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

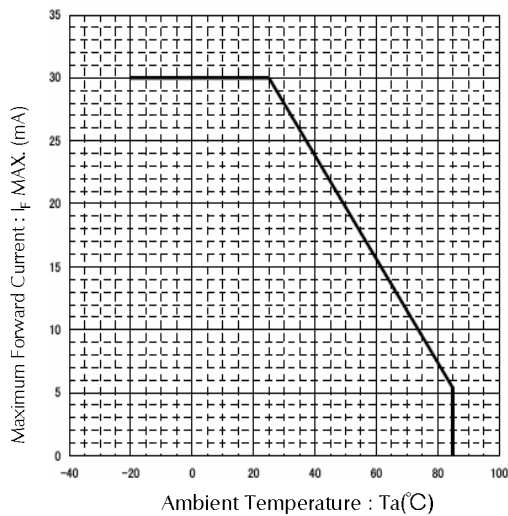


Technical Data(Red)

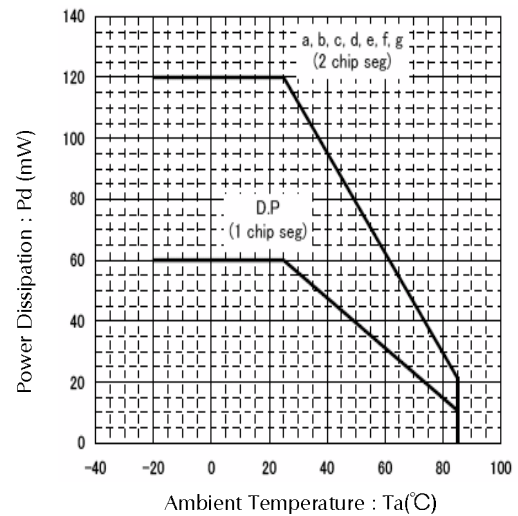


Technical Data(Red)

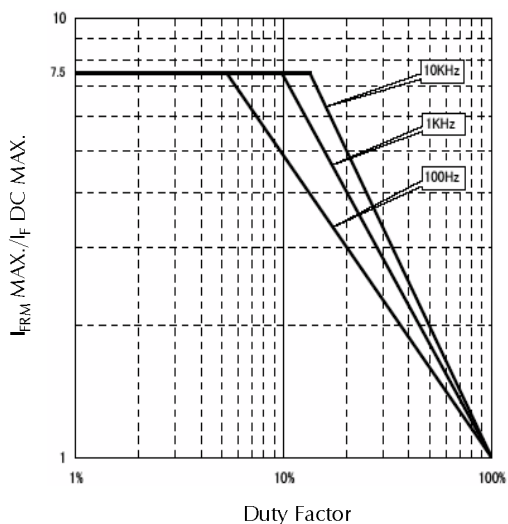
Ambient Temperature vs. Maximum Forward Current



Ambient Temperature vs. Power Dissipation



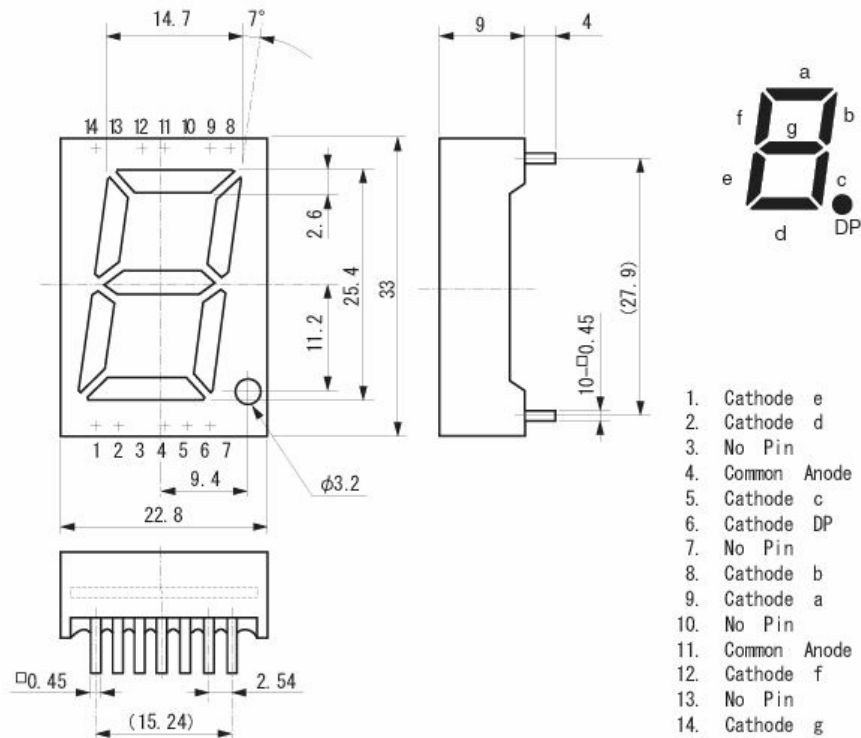
Duty Factor vs. Maximum Tolerable Pulse Forward Current
Condition : Ta = 25°C



Package Dimensions

(Unit: mm)

(Tolerance : ± 0.25 mm)



●Cathode common types have a reverse polarity.

TTW (Through The Wave) soldering Conditions

| | | |
|-------------------|--------------------------------------|--|
| Pre-heating | 100 °C 60 s | (MAX.) Resin surface temperature (MAX.) |
| Solder Bath Temp. | 265 °C | (MAX.) |
| Dipping Time | 5 s | (MAX.) |
| Position | At least 2.0 mm away from resin 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

| | | |
|------------------------------|--------------------------------------|--------------------|
| Iron tip temp. | 400 °C | (MAX.) (30 W Max.) |
| Soldering time and frequency | 3 s 2 times | (MAX.) (MAX.) |
| Position | At least 2.0 mm away from resin 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) ~Normal Temperature(15min) ~Maximum Rated Storage Temperature(30min) ~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 ² (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 _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 | - | - | No notable, decoloration, deformation and cracking |

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