



**Pb-free  
HEAT**



# 161/163 Series

Numeric Display/Case Size 12.5 x 19.0 mm

## Features

Case Size	12.5 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 Orange : 605nm Red : 660nm
Number of Digit	1 Digit
Segment Shape	Arrow Feather Type
Character Height	15.24 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	Chip/ Segment
Anode Common		Cathode Common				
Case Color Black	Case Color Gray	Case Color Black	Case Color Gray			
NAG161P	NAG163P	NKG161P	NKG163P	GaP	Green	1
NAA161	NAA163	NKA161	NKA163	GaAsP	Orange	1
NAR161	NAR163	NKR161	NKR163	GaAlAs	Red	1

## Absolute Maximum Ratings

(Ta=25°C)

Item	Symbol	Absolute Maximum Ratings			Unit
		Green	Orange	Red	
Power Dissipation	Pd	63	63	60	mW/seg
Forward Current	I <sub>F</sub>	25	25	30	mA/seg
Pulse Forward Current ※1	I <sub>FRM</sub>	100	100	120	mA/seg
Derating (Ta=25°C or higher)	ΔI <sub>F</sub>	0.34	0.34	0.41	mA/°C
	ΔI <sub>FRM</sub>	1.35	1.35	1.64	mA/°C
Reverse Voltage	V <sub>R</sub>	4	4	4	V
Operating Temperature	T <sub>opr</sub>	-40~+85	-40~+85	-40~+85	°C
Storage Temperature	T <sub>stg</sub>	-40~+85	-40~+85	-40~+85	°C

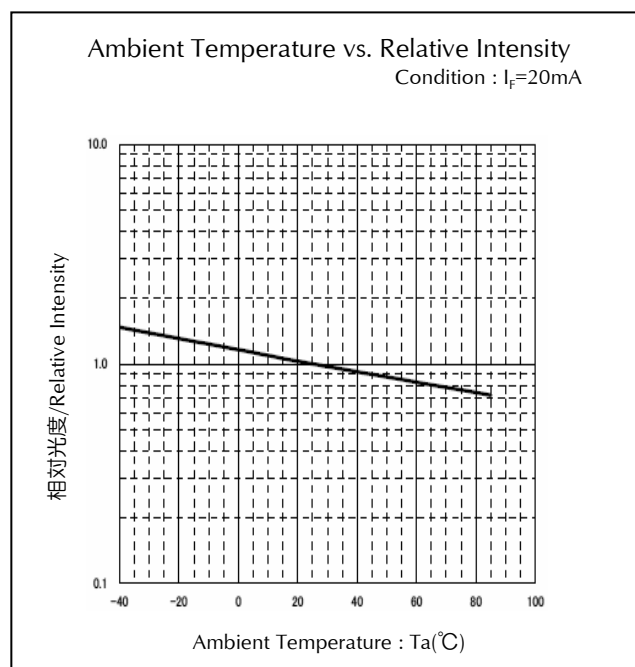
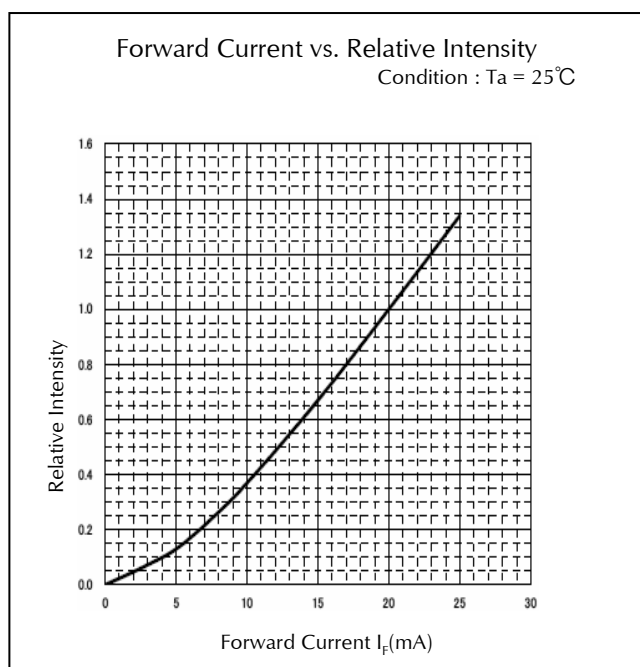
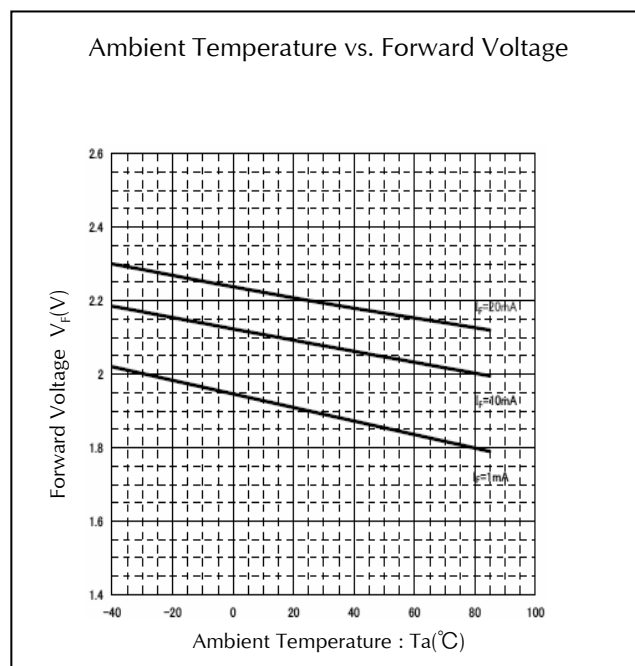
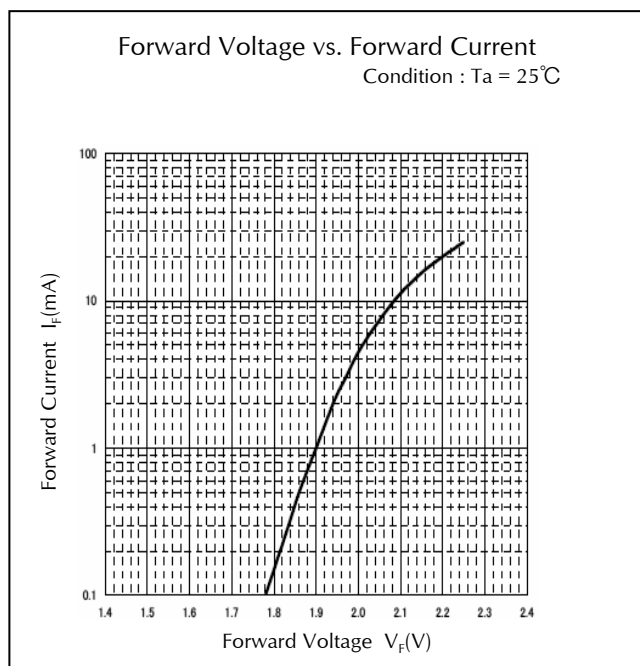
 ※1 I<sub>FRM</sub> Measurement condition : Duty 1/5, f = 1kHz

## Electro-Optical Characteristics

(Ta=25°C)

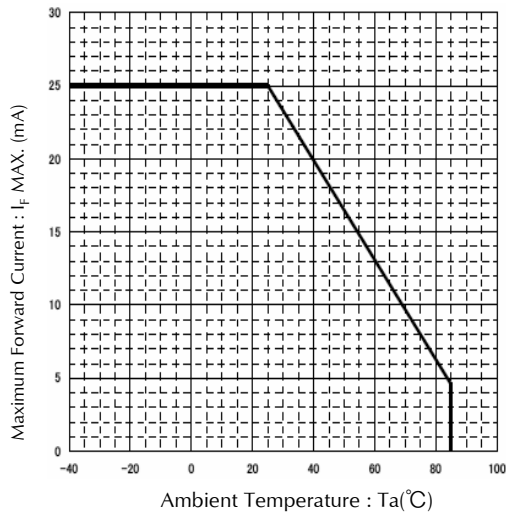
Item	Conditions	Symbol		Characteristics			Unit
				Green	Orange	Red	
Luminous Intensity(Rank B)	I <sub>F</sub> =20mA	I <sub>V</sub>	MIN.	2	4	6	mcd/seg
			TYP.	4	8	12	
Luminous Intensity(Rank C)	I <sub>F</sub> =20mA	I <sub>V</sub>	MIN.	-	-	12	mcd/seg
			TYP.	-	-	15	
Forward Voltage	I <sub>F</sub> =20mA	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	μA/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

## Technical Data(Green)

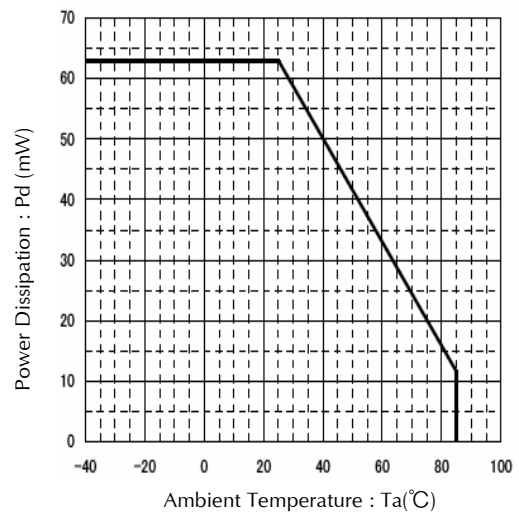


## Technical Data(Green)

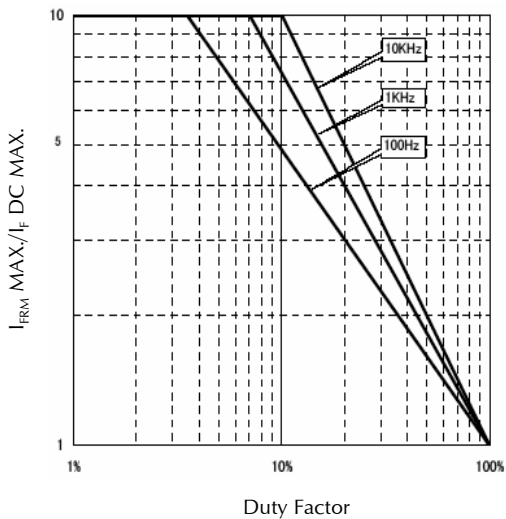
Ambient Temperature vs. Maximum Forward Current



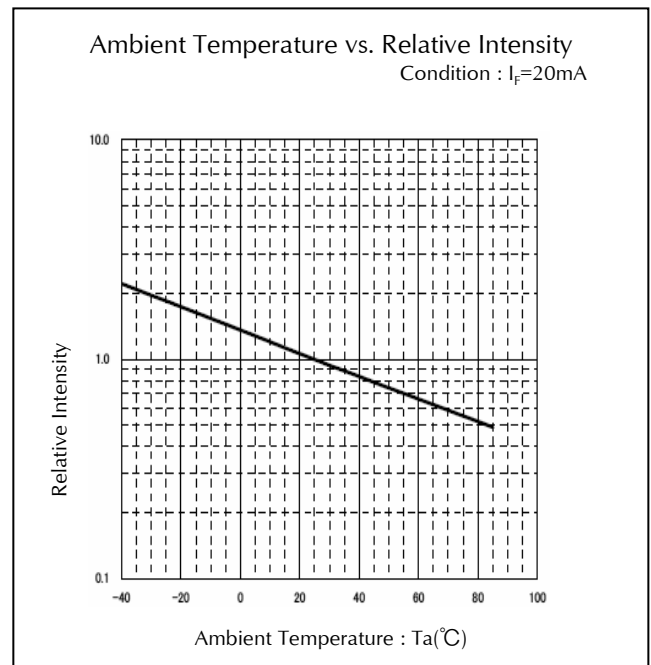
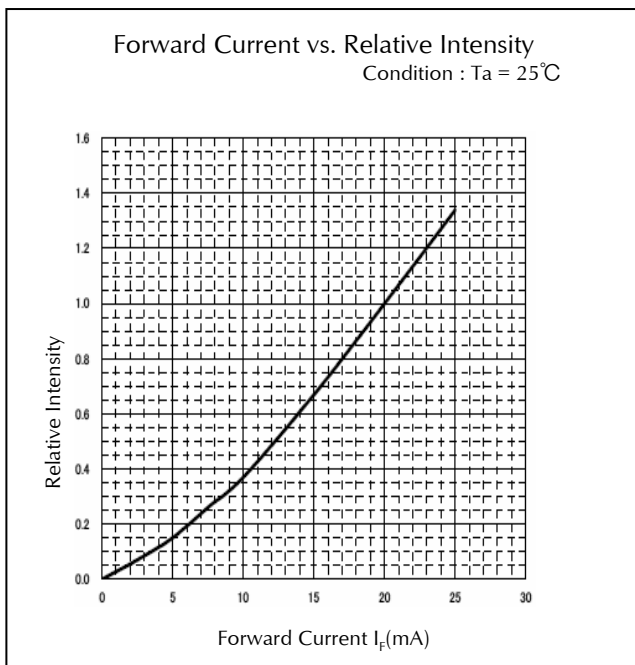
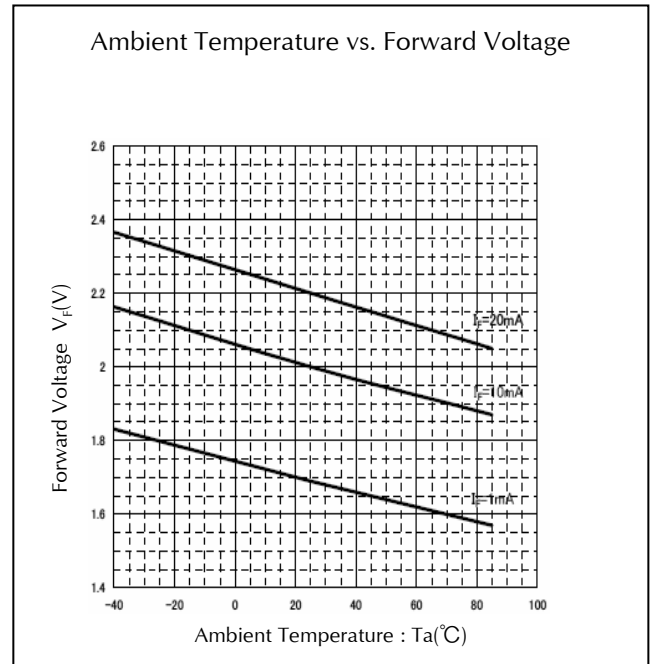
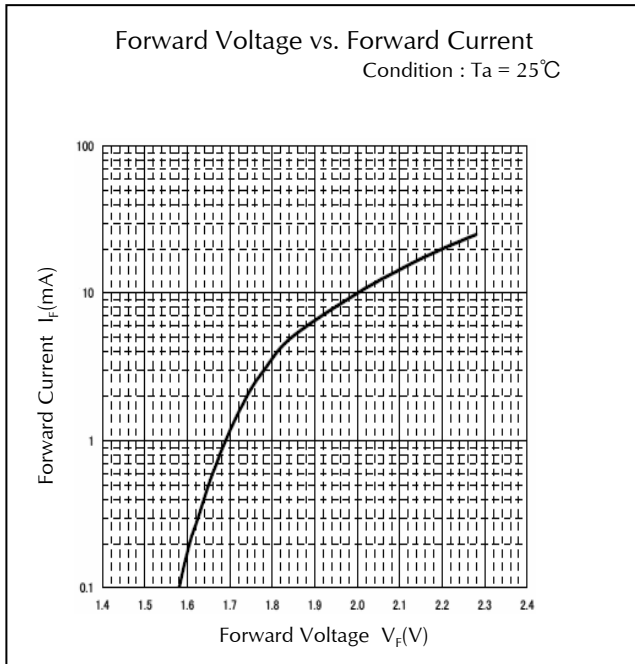
Ambient Temperature vs. Power Dissipation



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

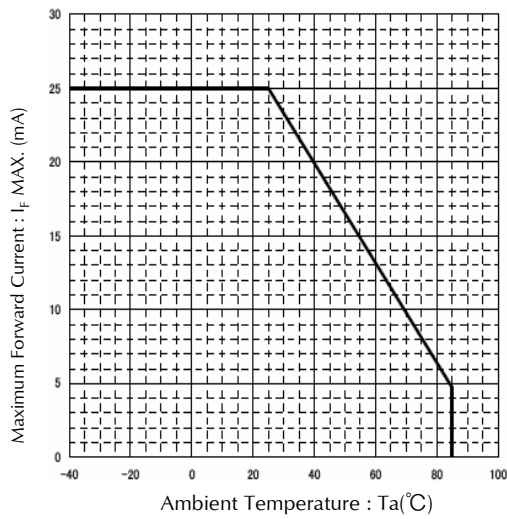


## Technical Data(Orange)

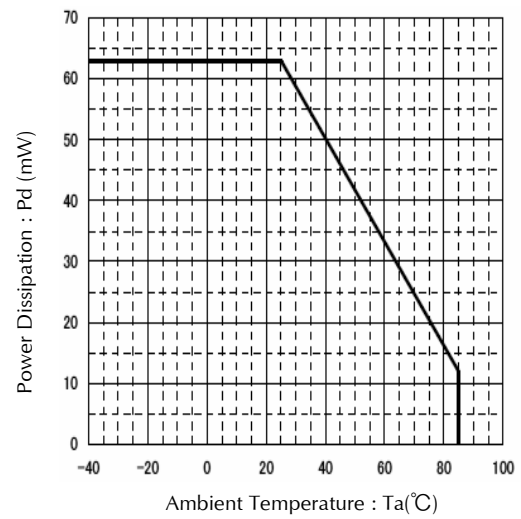


## Technical Data(Orange)

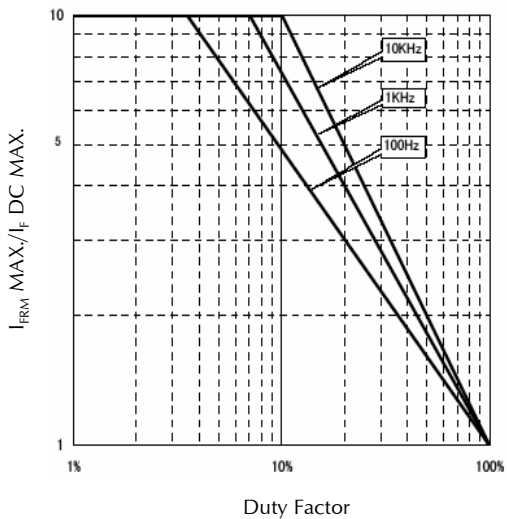
Ambient Temperature vs. Maximum Forward Current



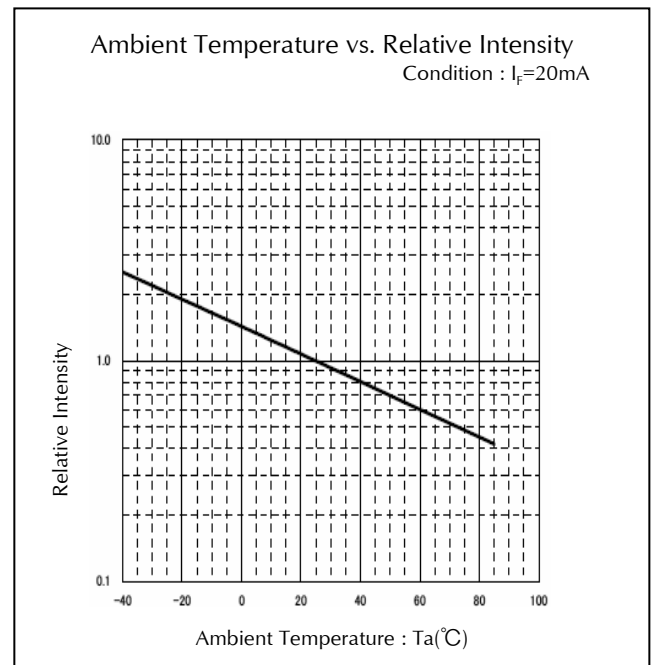
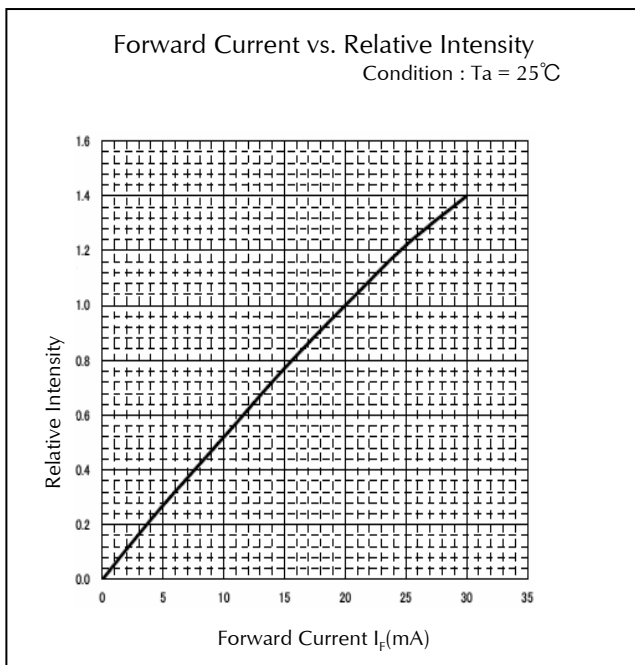
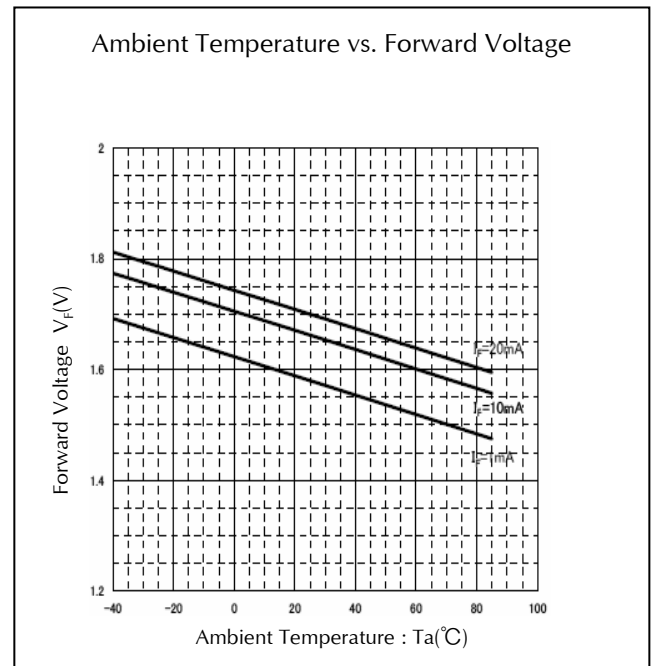
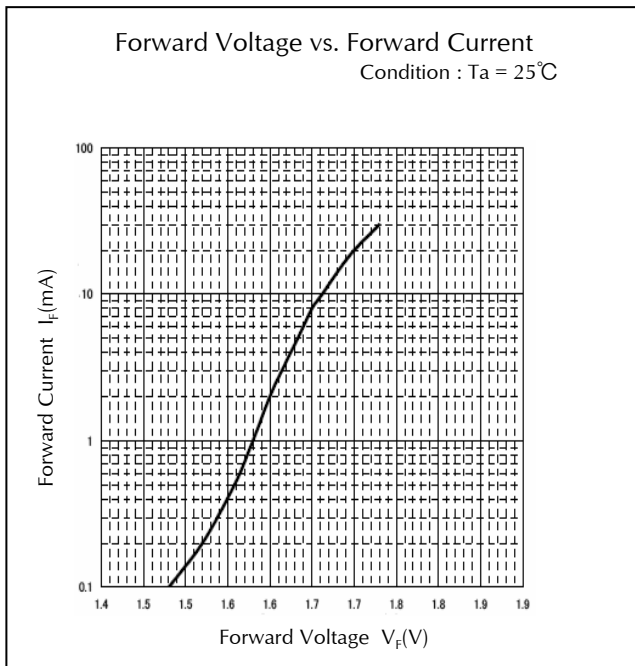
Ambient Temperature vs. Power Dissipation



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

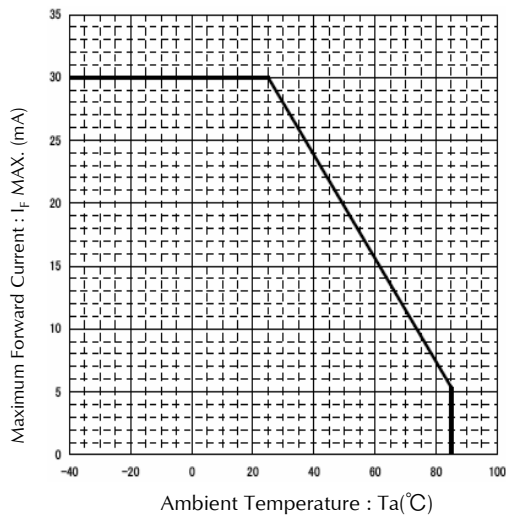


## Technical Data(Red)

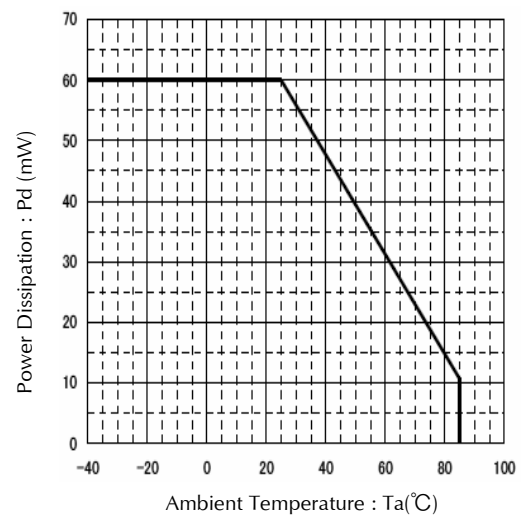


## Technical Data(Red)

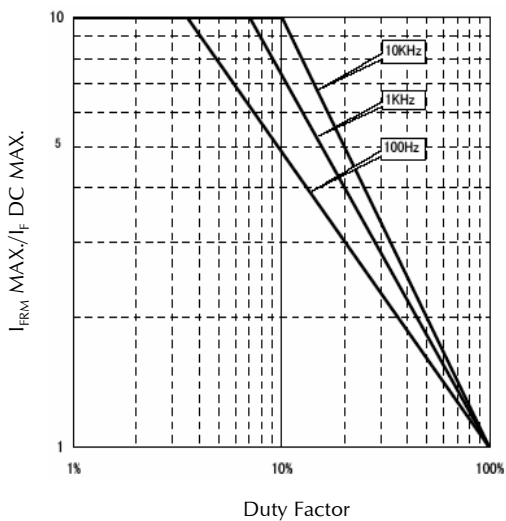
Ambient Temperature vs. Maximum Forward Current



Ambient Temperature vs. Power Dissipation



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

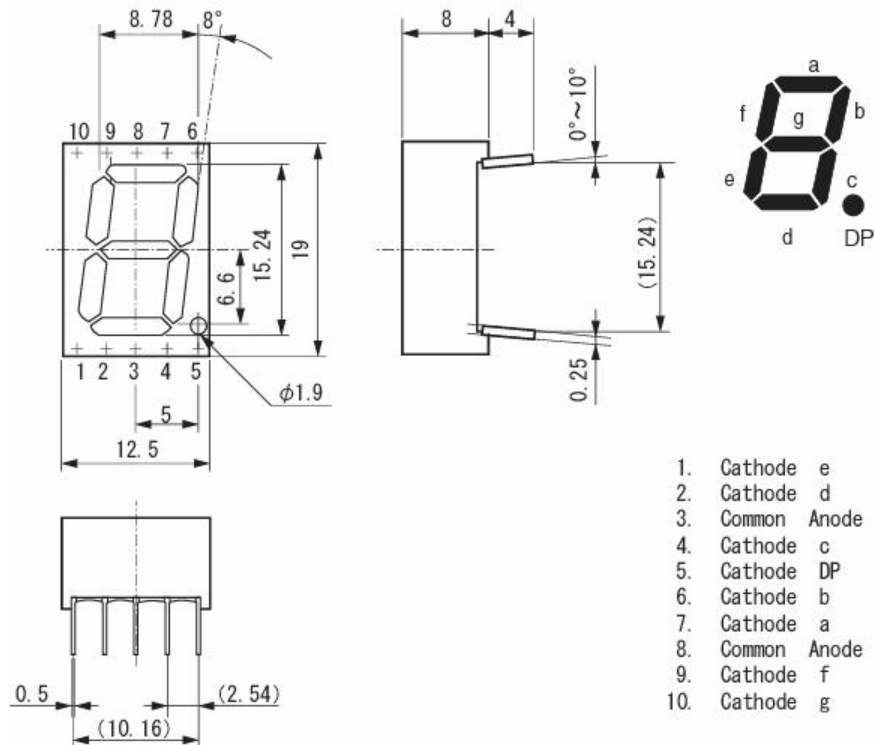




## Package Dimensions

(Unit: mm)

(Tolerance :  $\pm 0.25$  mm)



●Cathode common types have a reverse polarity.

## TTW (Through The Wave) soldering Conditions

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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

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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 <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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