



**Pb-free  
HEAT**



# 101/103 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"> <li>• Each color has anode common and cathode common respectively.</li> <li>• A black case and a gray case are available.</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	Square Shape 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			
NAG101P-B	NAG103P-B	NKG101P-B	NKG103P-B	GaP	Green	2
						1
NAA101-B	NAA103-B	NKA101-B	NKA103-B	GaAsP	Orange	2
						1
NAR101-B	NAR103-B	NKR101-B	NKR103-B	GaAlAs	Red	2
						1
NAR101-C	NAR103-C	NKR101-C	-	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 <sub>F</sub>	25		25		30		mA/seg
Pulse Forward Current ※2	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>	8	4	8	4	8	4	V
Operating Temperature	T <sub>opr</sub>	-20~+85		-20~+85		-20~+85		°C
Storage Temperature	T <sub>stg</sub>	-20~+85		-20~+85		-20~+85		°C

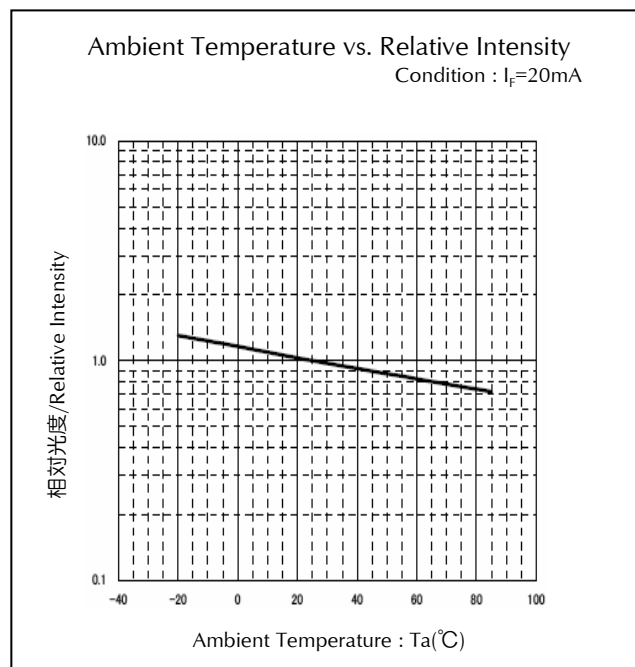
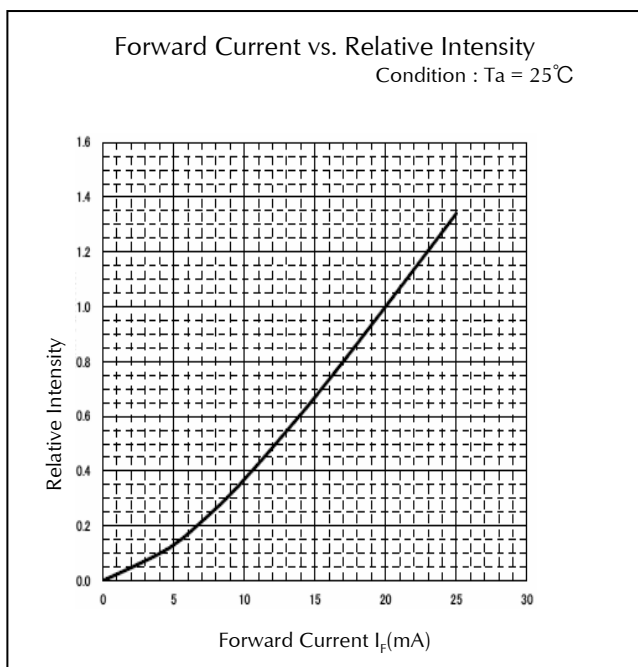
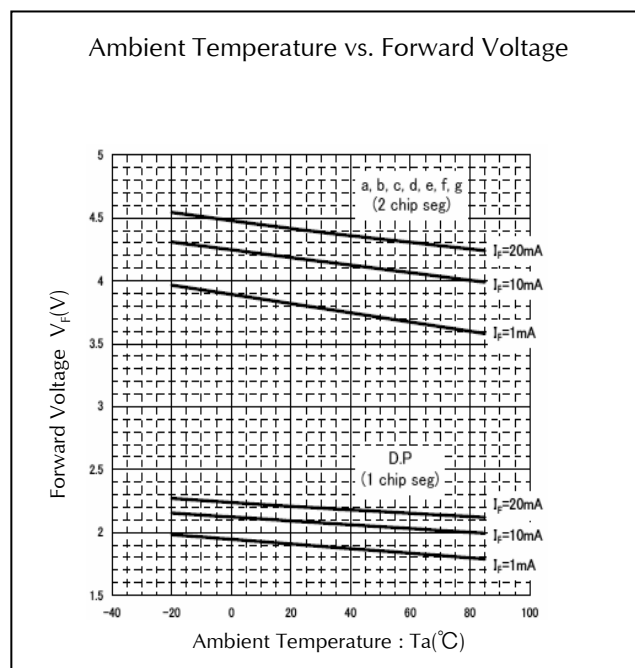
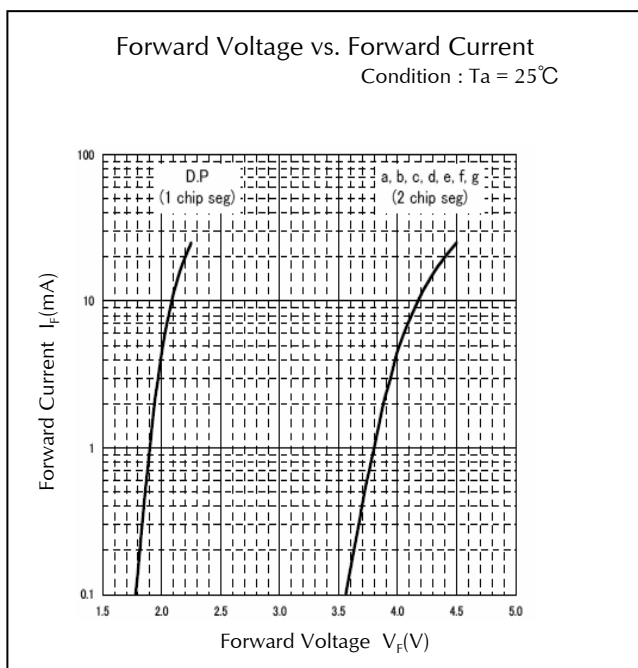
※2 I<sub>FRM</sub> Measurement condition : Duty 1/5, f = 1kHz

## Electro-Optical Characteristics

(Ta=25°C)

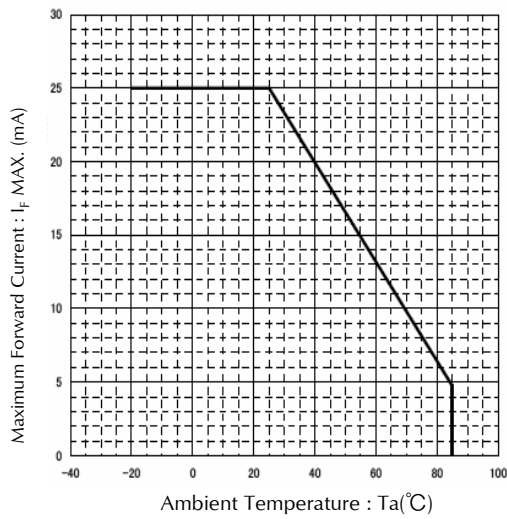
Item	Conditions	Symbol	Characteristics						Unit	
			Green		Orange		Red			
			Chip / Segment							
			2	1	2	1	2	1		
Luminous Intensity (-B Product)	I <sub>F</sub> =20mA	I <sub>V</sub>	MIN.	4	2	8	4	10	5	mcd/seg
			TYP.	8	4	16	8	20	10	
Luminous Intensity (-C Product)	I <sub>F</sub> =20mA	I <sub>V</sub>	MIN.	-		-		20	10	mcd/seg
			TYP.	-		-		25	12.5	
Forward Voltage	I <sub>F</sub> =20mA	V <sub>F</sub>	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 <sub>R</sub>	MAX.	100 (V <sub>R</sub> =8V)	100 (V <sub>R</sub> =4V)	100 (V <sub>R</sub> =8V)	100 (V <sub>R</sub> =4V)	100 (V <sub>R</sub> =8V)	100 (V <sub>R</sub> =4V)	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)

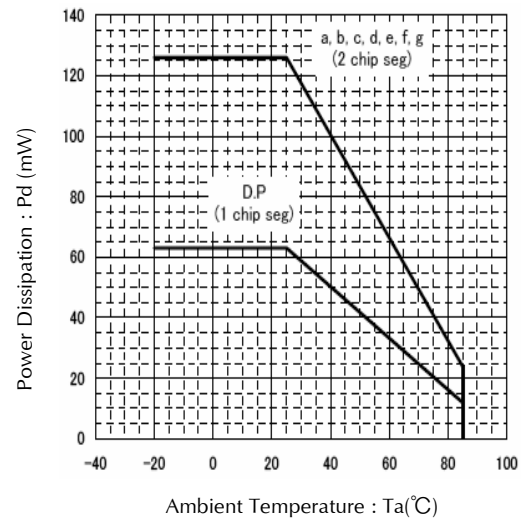


## Technical Data(Green)

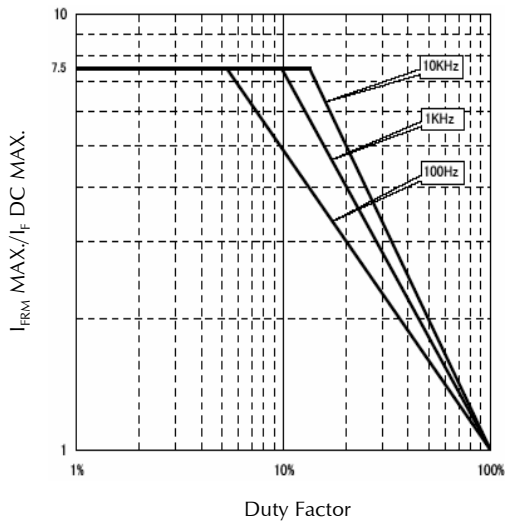
Ambient Temperature vs. Maximum Forward Current



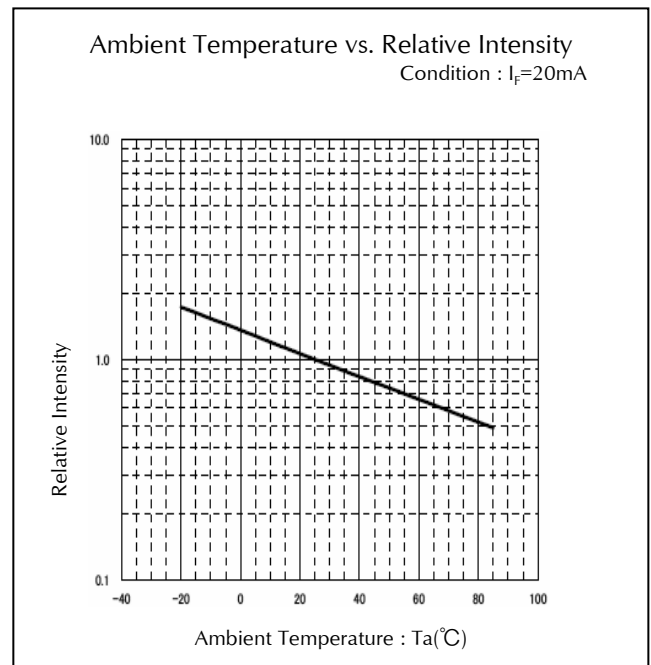
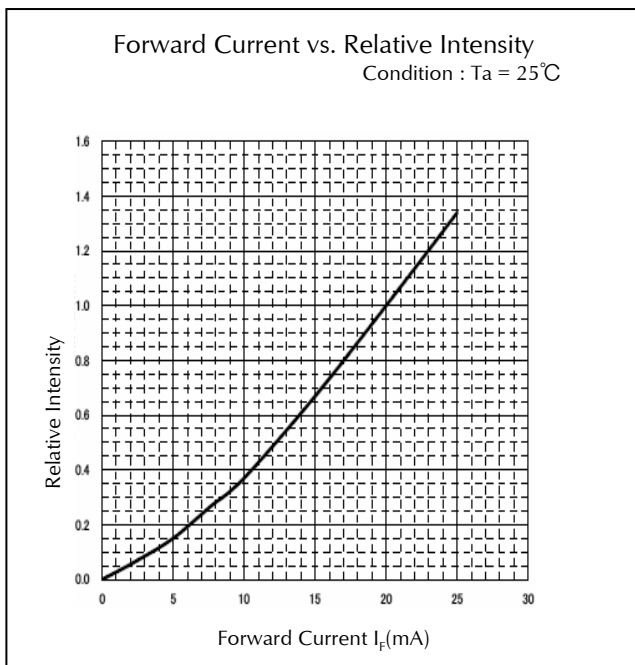
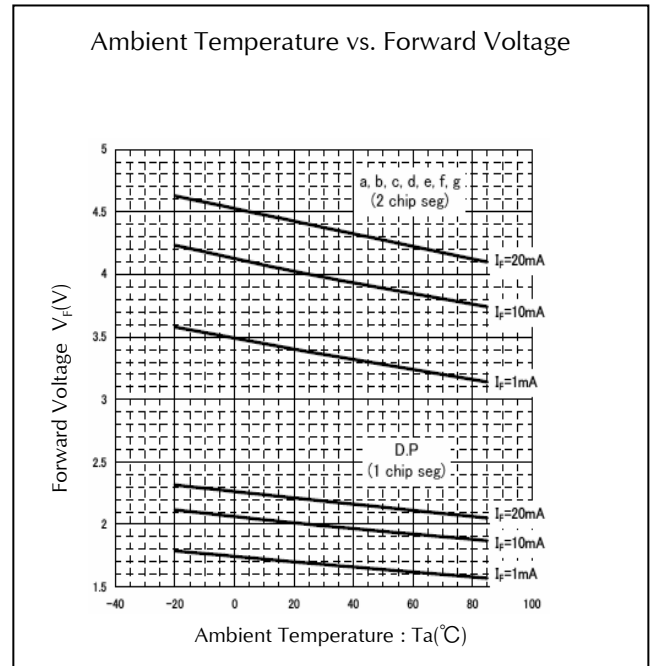
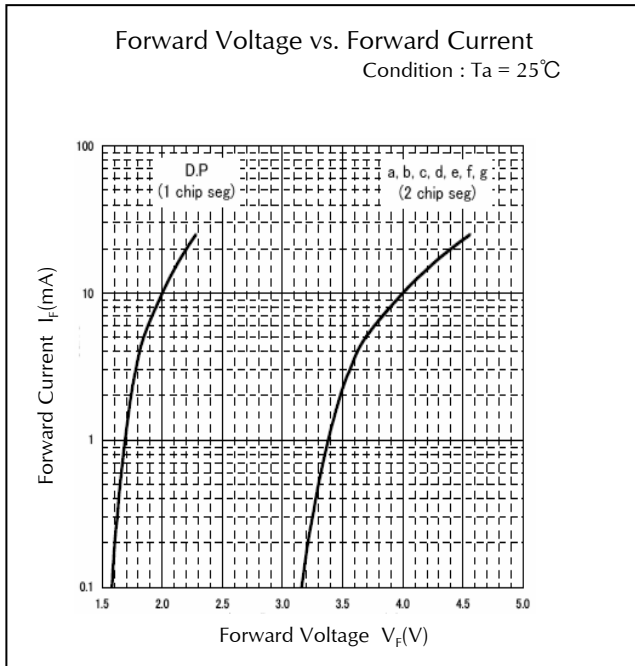
Ambient Temperature vs. Power Dissipation



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

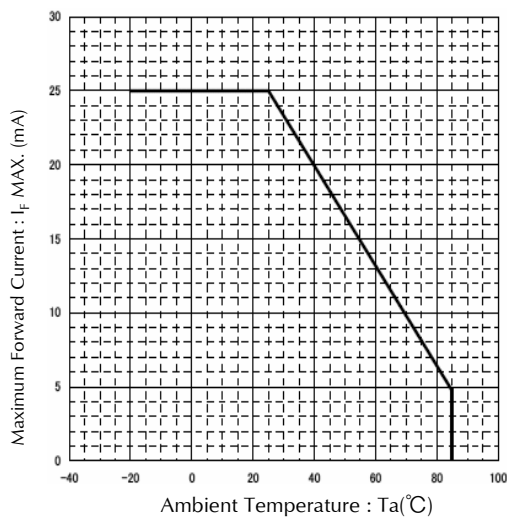


## Technical Data(Orange)

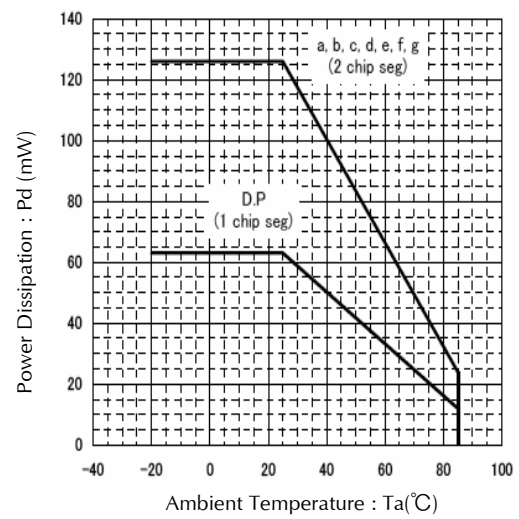


## Technical Data(Orange)

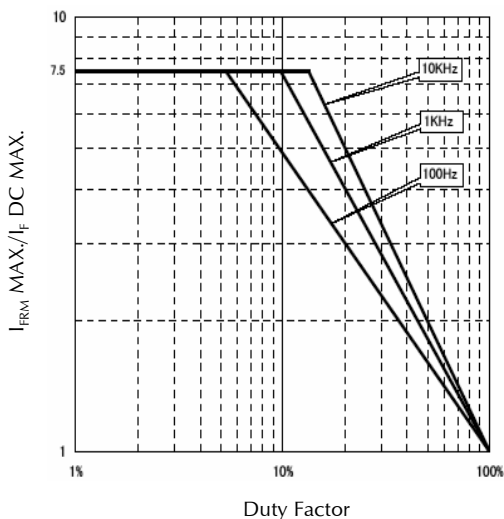
Ambient Temperature vs. Maximum Forward Current



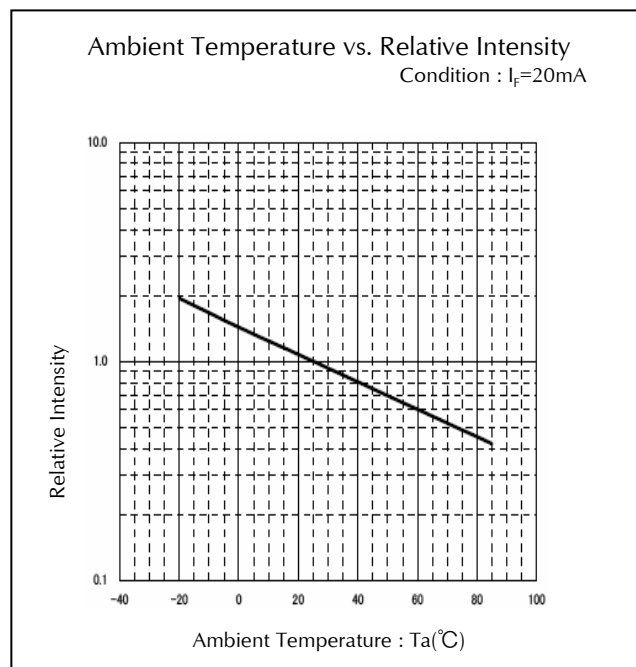
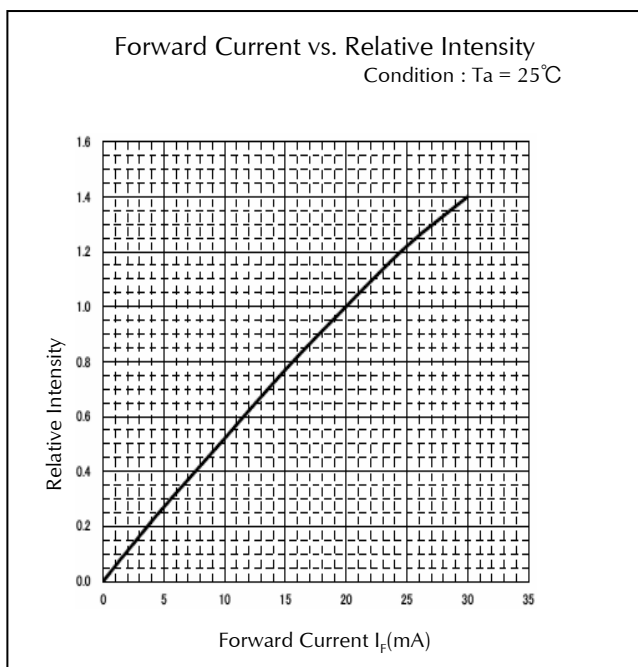
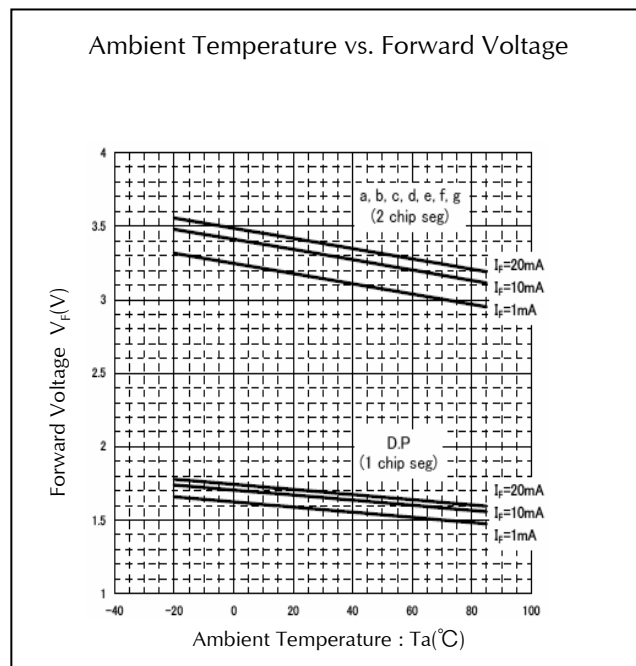
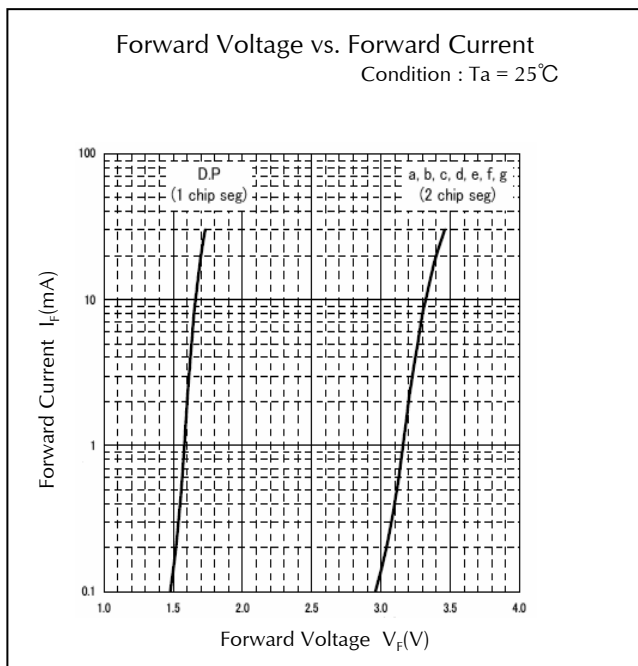
Ambient Temperature vs. Power Dissipation



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

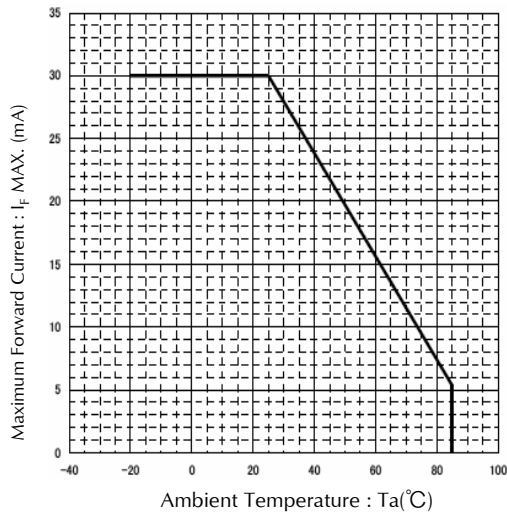


## Technical Data(Red)

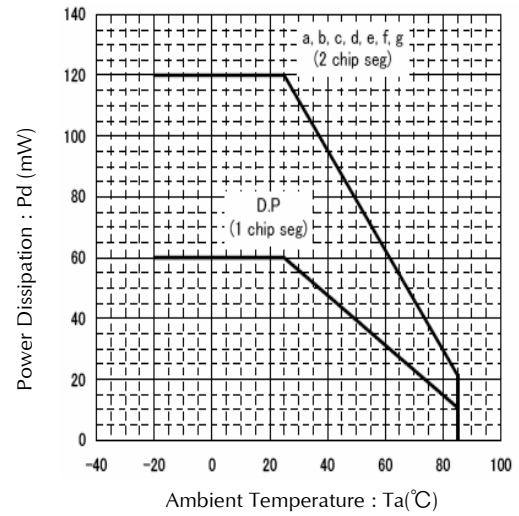


## Technical Data(Red)

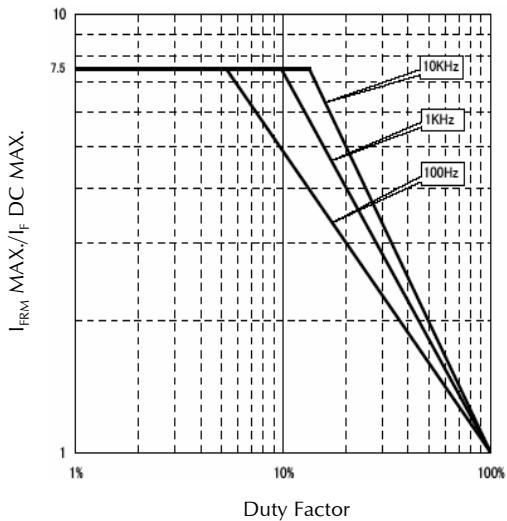
Ambient Temperature vs. Maximum Forward Current



Ambient Temperature vs. Power Dissipation



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

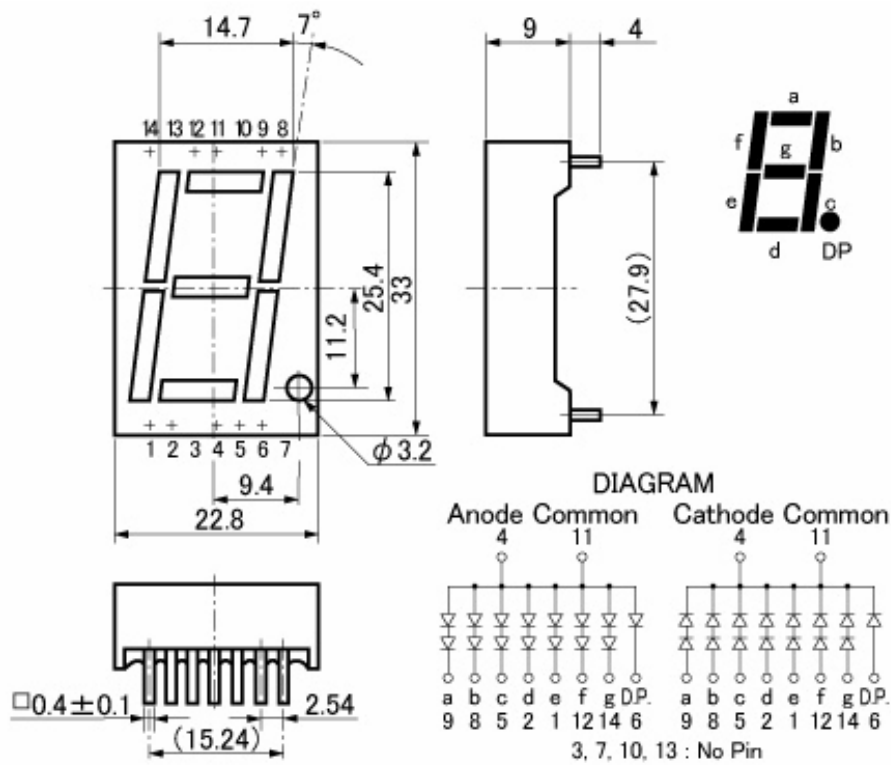




### Package Dimensions

(Unit: mm)

(Tolerance : ±0.25 mm)



## 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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