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	・Each color has anode common and cathode common respectively. ・A black case and a gray case are available. ・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	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-B	NAG163P-B	NKG161P-B	NKG163P-B	GaP	Green	1
NAA161-B	NAA163-B	NKA161-B	NKA163-B	GaAsP	Orange	1
NAR161-B	NAR163-B	NKR161-B	NKR163-B	GaAlAs	Red	1
NAR161-C	NAR163-C	NKR161-C	NKR163-C	GaAlAs	Red	1

Absolute Maximum Ratings

(Ta=25℃)

Item	Symbol	Absolute Maximum Ratings			Unit
		Green	Orange	Red	
Power Dissipation	Pd	63	63	60	mW/seg
Forward Current	I_F	25	25	30	mA/seg
Pulse Forward Current ※1	I_{FRM}	100	100	120	mA/seg
Derating (Ta=25℃ or higher)	ΔI_F	0.34	0.34	0.41	mA/℃
	ΔI_{FRM}	1.35	1.35	1.64	mA/℃
Reverse Voltage	V_R	4	4	4	V
Operating Temperature	T_{opr}	-40～+85	-40～+85	-40～+85	℃
Storage Temperature	T_{stg}	-40～+85	-40～+85	-40～+85	℃

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

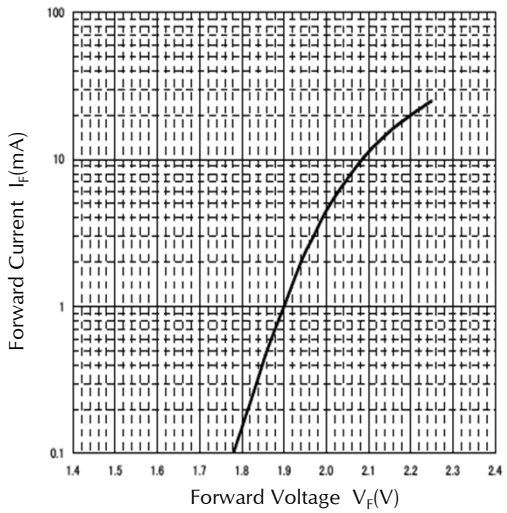
Electro-Optical Characteristics

(Ta=25℃)

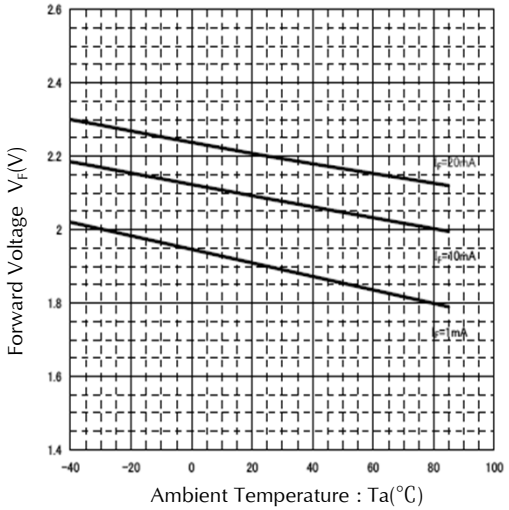
Item	Conditions	Symbol		Characteristics			Unit
				Green	Orange	Red	
Luminous Intensity (-B Product)	I_F=20mA	I_V	MIN.	2	4	6	mcd/seg
			TYP.	4	8	12	
Luminous Intensity (-C Product)	I_F=20mA	I_V	MIN.	-	-	12	mcd/seg
			TYP.	-	-	15	
Forward Voltage	I_F=20mA	V_F	TYP.	2.2	2.2	1.7	V/seg
			MAX.	2.5	2.5	2.0	
Reverse Current	V_R=4V	I_R	MAX.	100	100	100	μA/seg
Peak Wavelength	I_F=20mA	λ_p	TYP.	565	605	660	nm
Spectral Line Half Width	I_F=20mA	$\Delta\lambda$	TYP.	30	30	30	nm

Technical Data(**Green**)

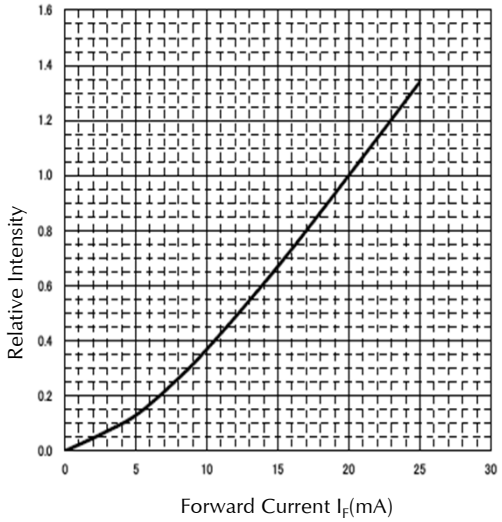
Forward Voltage vs. Forward Current
Condition : Ta = 25℃



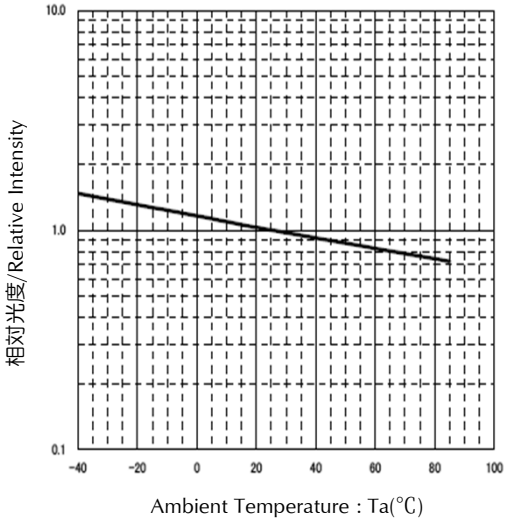
Ambient Temperature vs. Forward Voltage



Forward Current vs. Relative Intensity
Condition : Ta = 25℃

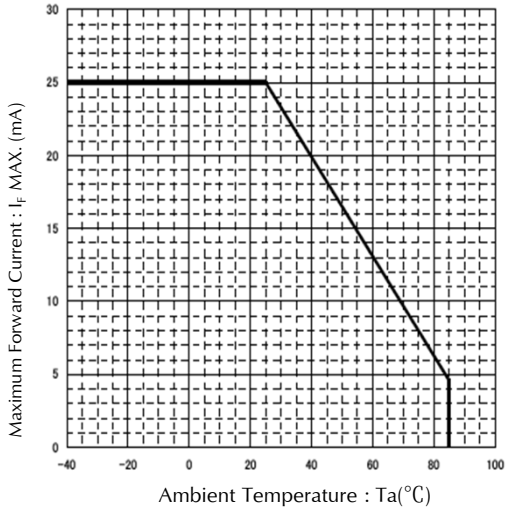


Ambient Temperature vs. Relative Intensity
Condition : I_F=20mA

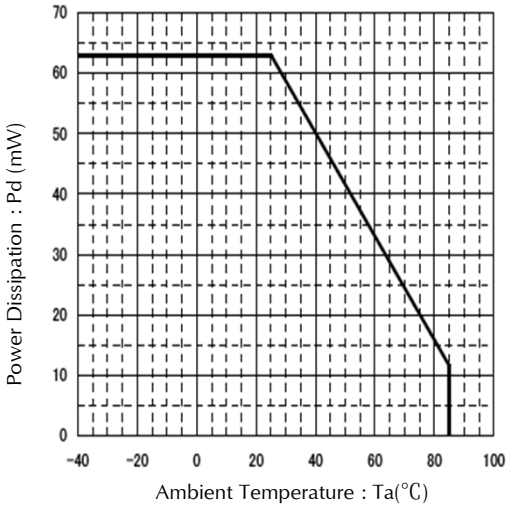


Technical Data(**Green**)

Ambient Temperature vs. Maximum Forward Current

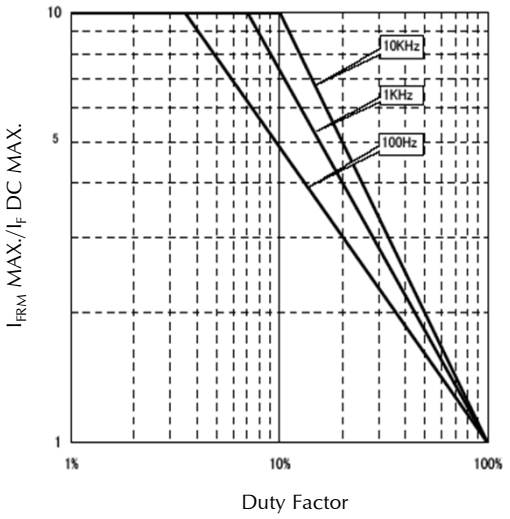


Ambient Temperature vs. Power Dissipation



Duty Factor vs. Maximum Tolerable Pulse Forward Current

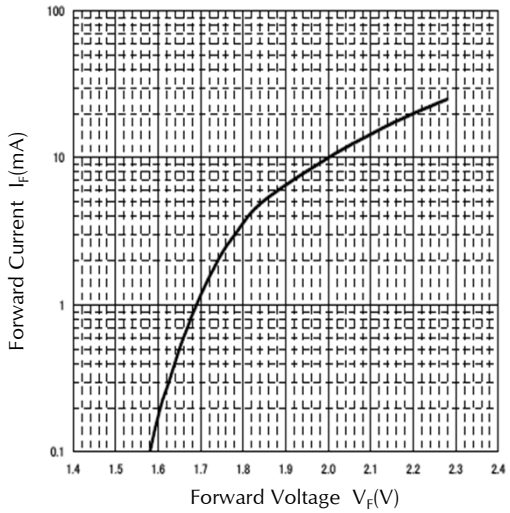
Condition : Ta = 25℃



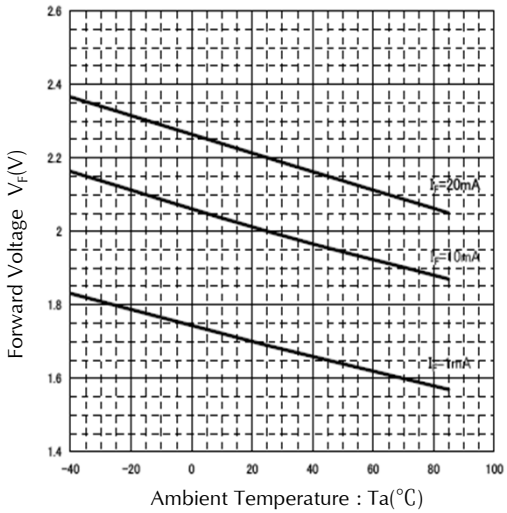
Technical Data(**Orange**)

Forward Voltage vs. Forward Current

Condition : Ta = 25℃

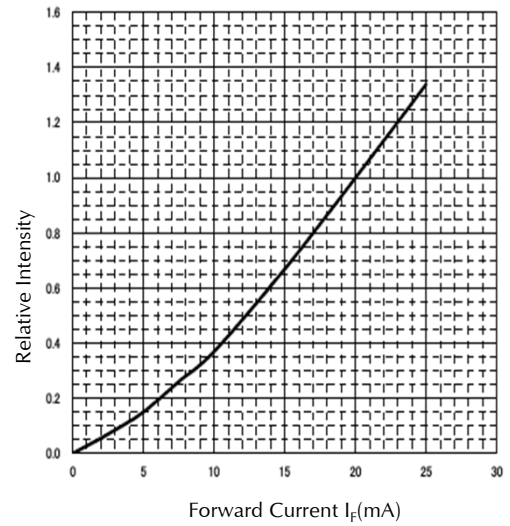


Ambient Temperature vs. Forward Voltage



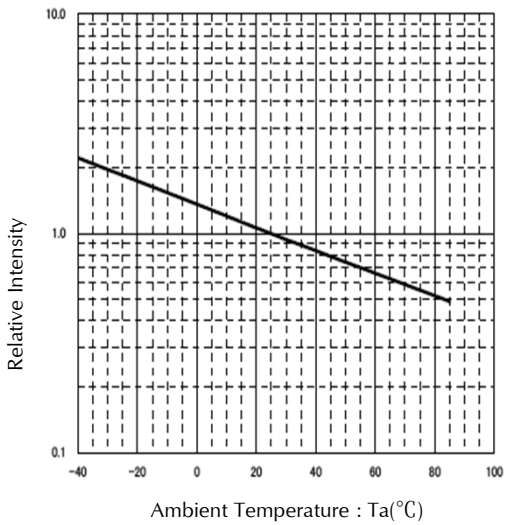
Forward Current vs. Relative Intensity

Condition : Ta = 25℃



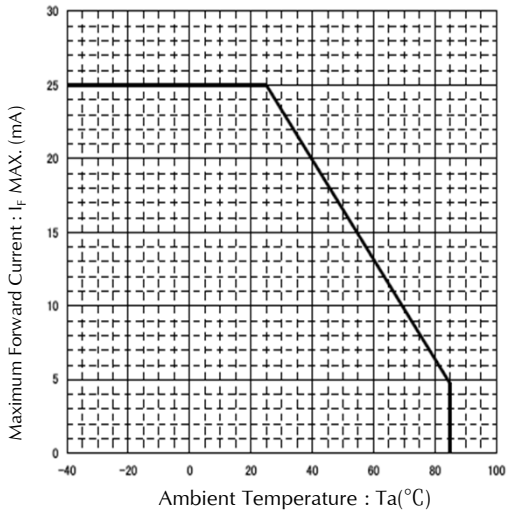
Ambient Temperature vs. Relative Intensity

Condition : I_F=20mA

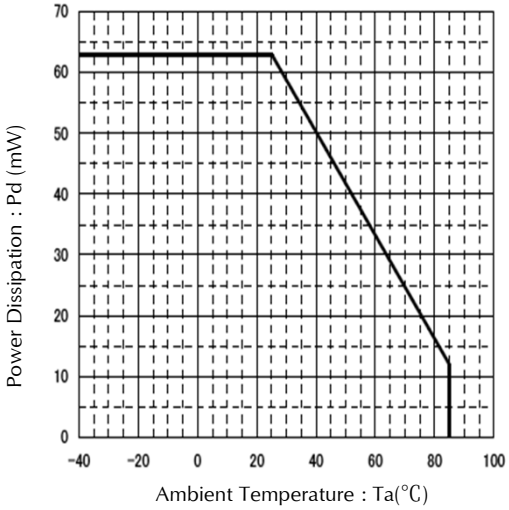


Technical Data(**Orange**)

Ambient Temperature vs. Maximum Forward Current

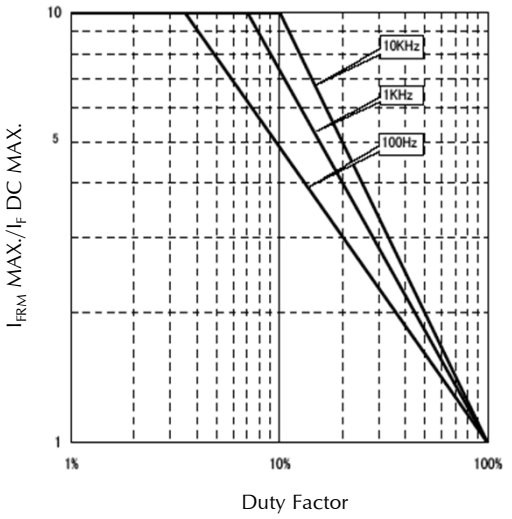


Ambient Temperature vs. Power Dissipation



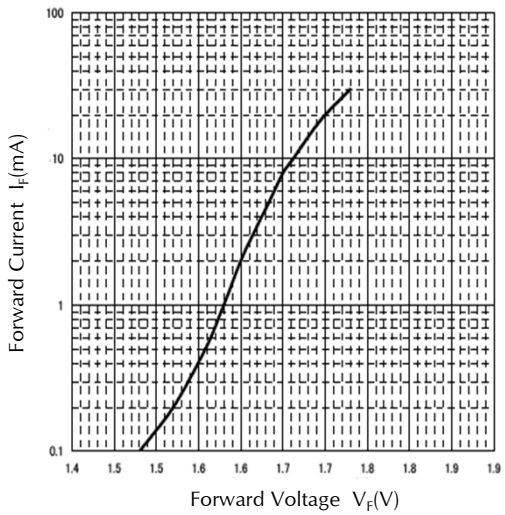
Duty Factor vs. Maximum Tolerable Pulse Forward Current

Condition : Ta = 25℃

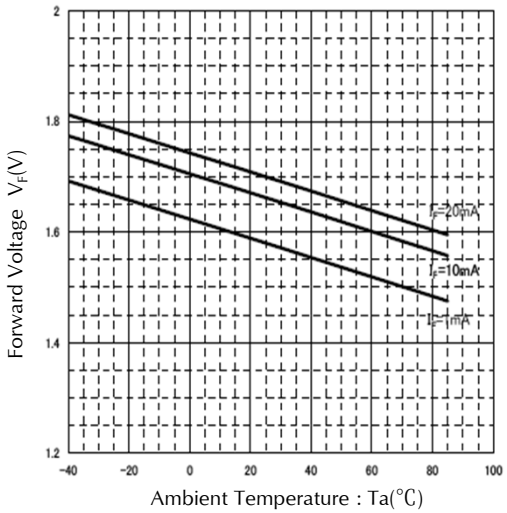


Technical Data(**Red**)

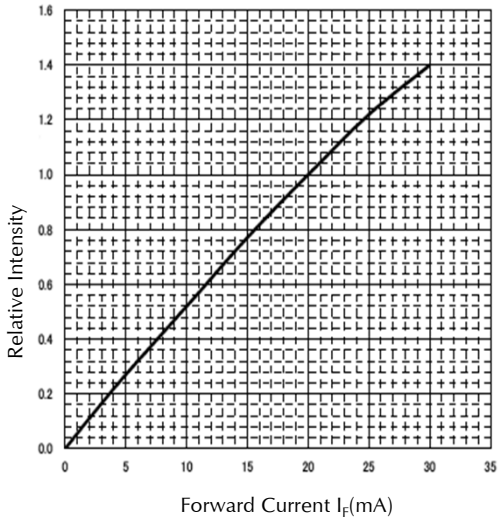
Forward Voltage vs. Forward Current
Condition : Ta = 25℃



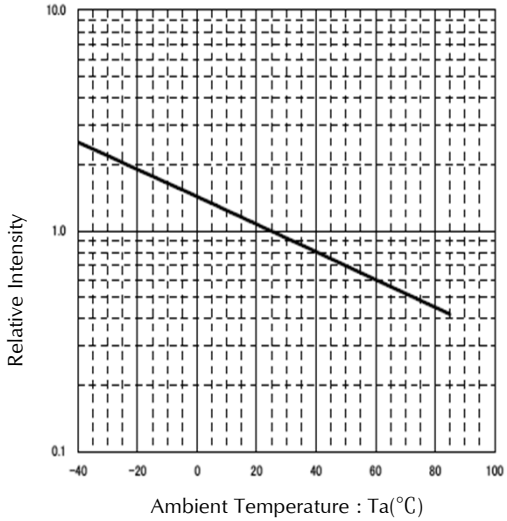
Ambient Temperature vs. Forward Voltage



Forward Current vs. Relative Intensity
Condition : Ta = 25℃

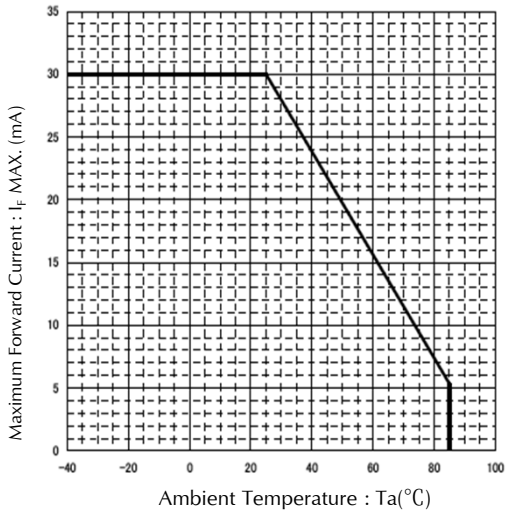


Ambient Temperature vs. Relative Intensity
Condition : I_F=20mA

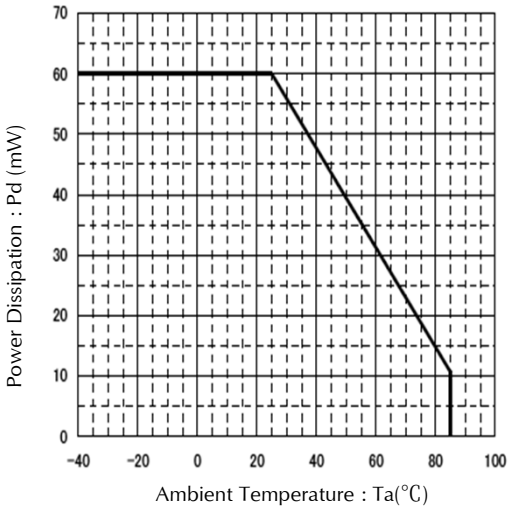


Technical Data(**Red**)

Ambient Temperature vs. Maximum Forward Current

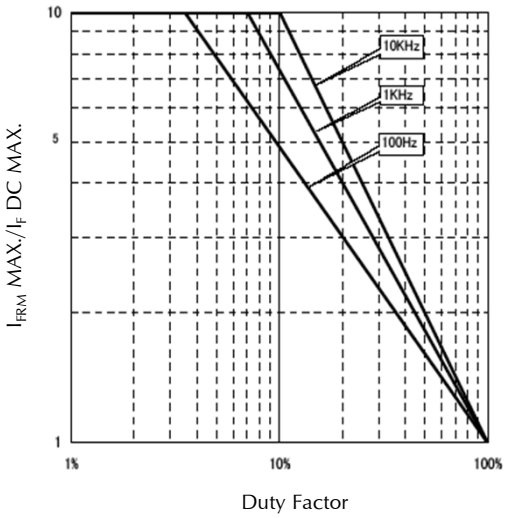


Ambient Temperature vs. Power Dissipation



Duty Factor vs. Maximum Tolerable Pulse Forward Current

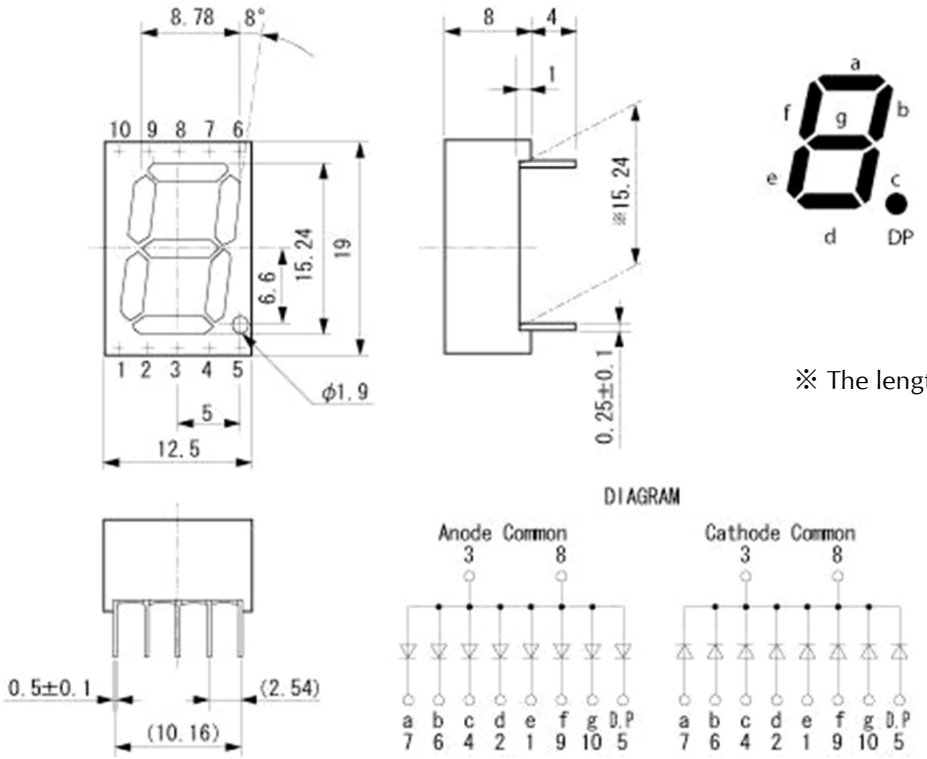
Condition : Ta = 25℃



Package Dimensions

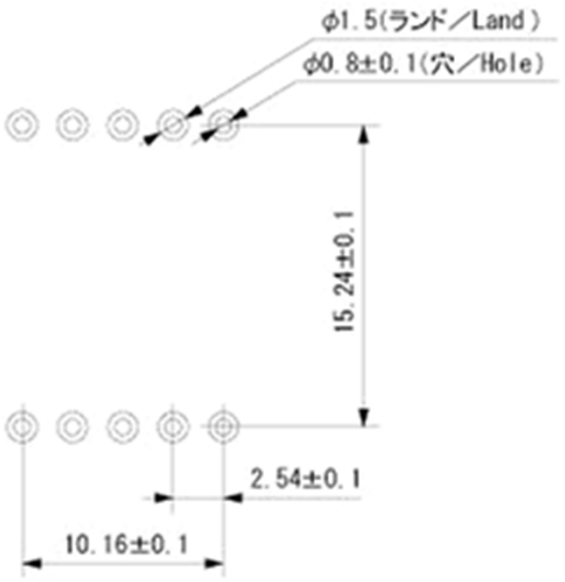
(Unit: mm)

(Tolerance : ±0.25 mm)



Recommended Soldering Pattern

(Unit: mm)



TTW (Through The Wave) soldering Conditions

Pre-heating	100 ℃ 60 s	(MAX.) Resin surface temperature (MAX.)
Solder Bath Temp.	265 ℃	(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

Iron tip temp.	360 ℃	(MAX.)
Soldering time and frequency	3 s 2 times	(MAX.) (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	EIAJ ED-4701/100(101)	Ta = 25℃, I_F = Maxium Rated Current/seg	1,000 h	0/10
Resistance to Soldering Heat	EIAJ ED-4701/300(302)	260±5℃, 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℃, 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°	Twice	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	I_F Value of each product Luminous Intensity	Testing Min. Value < Spec. Min. Value x 0.5
Forward Voltage	V_F	I_F 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	-	-	Occurrence of notable decoloration, deformation and cracking

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