Pb-free HEAT

MU91 Series

Single Color / Light Bar Module

Features

Light emitting surface (Outer size)	6 x 6 mm (6 x 6 mm) (L x W)
Product features	・Single Color (Green, Yellow, Orange or Red) ・Lead-free soldering compatible ・RoHS compliant
Peak wavelength	Green : 555 nm Yellow : 570 nm Orange : 605 nm Red : 660 nm
Die materials	Green, Yellow : GaP Orange : GaAsP Red : GaAlAs
Soldering methods	TTW (Through The Wave) soldering and manual soldering
Soldering methods	More than 2kV(HBM)
Packing	Plastic bag

Recommended Applications

Electric Household Appliances, OA/FA, Other General Applications

MU91 Series

Single Color / Light Bar Module

Color and Luminous Intensity

Part No.	Material	Emitted Color	Resin Color	Luminous Intensity Iv (mcd)			Number of Chips
				MIN.	TYP.	I_F	
MU91-5001	GaP	Green	Green	1.2	2.4	20	1
MU91-4001	GaP	Yellow	Yellow	3	6	20	1
MU91-3001	GaAsP	Orange	Orange	3	6	20	1
MU91-2001	GaAlAs	Red	Red	3	6	20	1

Absolute Maximum Ratings

(Ta=25℃)

Item	Symbol	Absolute Maximum Ratings				Unit
		5001	4001	3001	2001	
Power Dissipation	P_d	75	75	75	60	mW
Forward Current	I_F	30	30	30	30	mA
Pulse Forward Current ※1	I_{FRM}	100	100	100	300	mA
Derating (Ta=25℃ or higher)	ΔI_F	0.33	0.33	0.33	0.33	mA/℃
	ΔI_{FRM}	1.33	1.33	1.33	4.00	mA/℃
Reverse Voltage	V_R	4	4	4	4	V
Operating Temperature	T_{opr}	-30～+85				℃
Storage Temperature	T_{stg}	-30～+85				℃

※1 I_{FRM} Measurement condition : Pulse Width ≦ 1ms, Duty ≦1/20

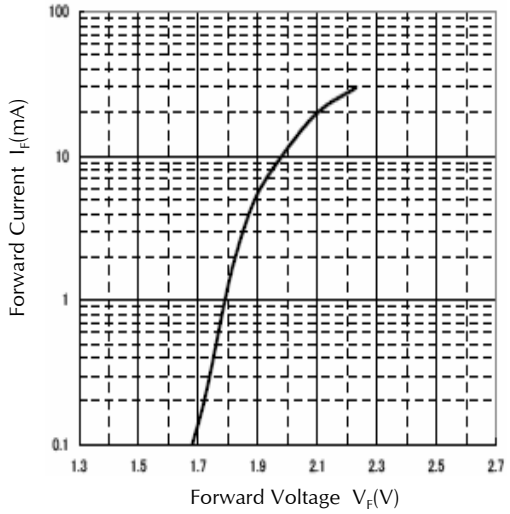
Electro-Optical Characteristics

(Ta=25℃)

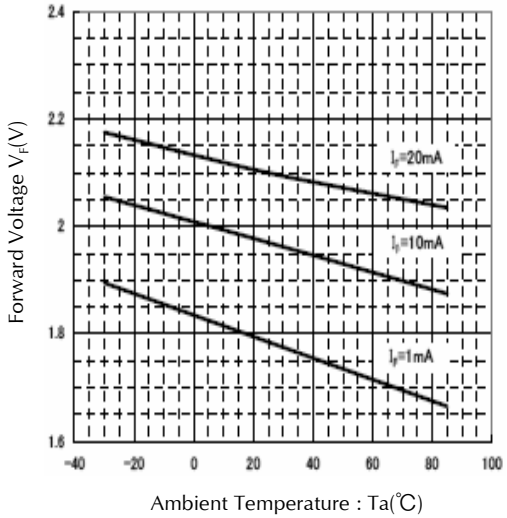
Item	Conditions	Symbol		Characteristics				Unit
				5001	4001	3001	2001	
Forward Voltage	I_F=20mA	V_F	TYP.	2.2	2.1	2.2	1.7	V
			MAX.	2.5	2.5	2.5	2.0	
Reverse Current	V_R=4V	I_R	MAX.	100	100	100	100	μA
Peak Wavelength	I_F=20mA	λ_p	TYP.	555	570	605	660	nm
Spectral Line Half Width	I_F=20mA	$\Delta\lambda$	TYP.	30	30	30	30	nm

Technical Data(**5001**)

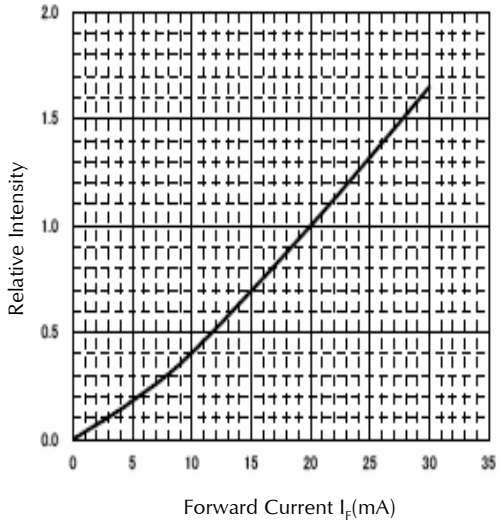
Forward Voltage vs. Forward Current
Condition : Ta = 25℃



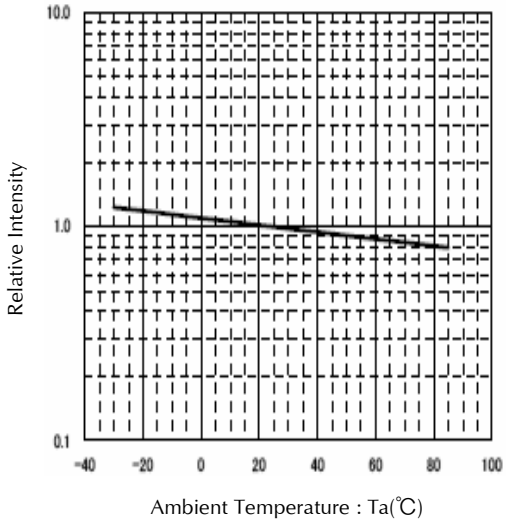
Ambient Temperature vs. Forward Voltage



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



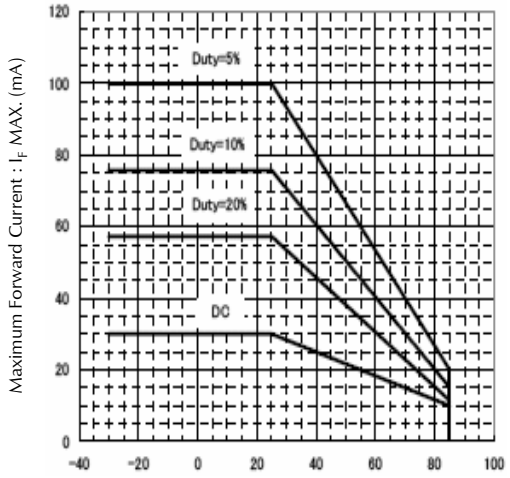
Ambient Temperature vs. Relative Intensity
Condition : I_F=20mA



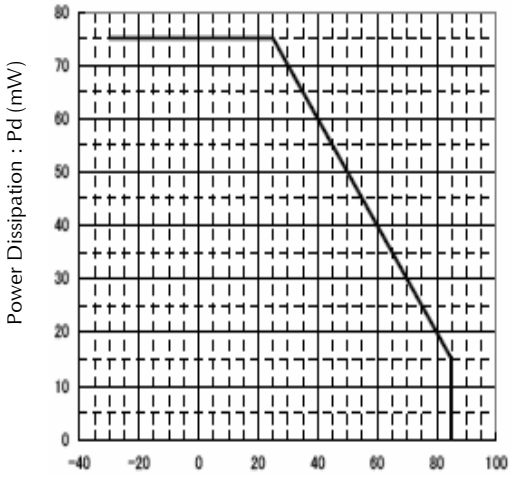
Technical Data(**5001**)

Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz

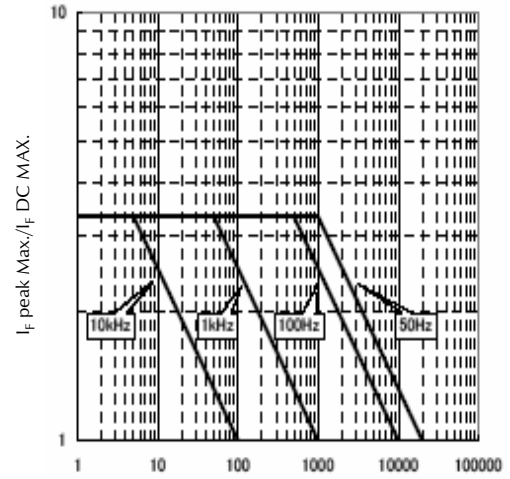


Power Dissipation vs. Ambient Temperature



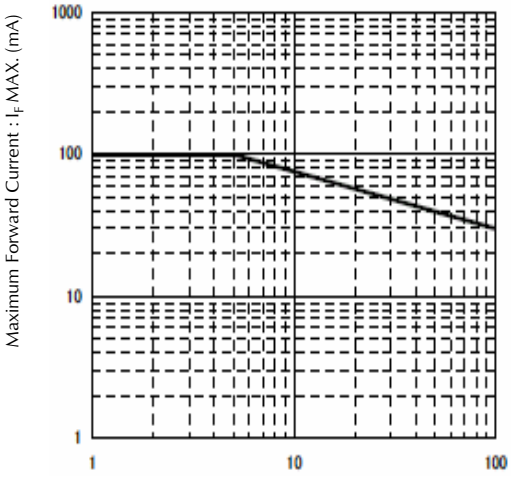
Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃



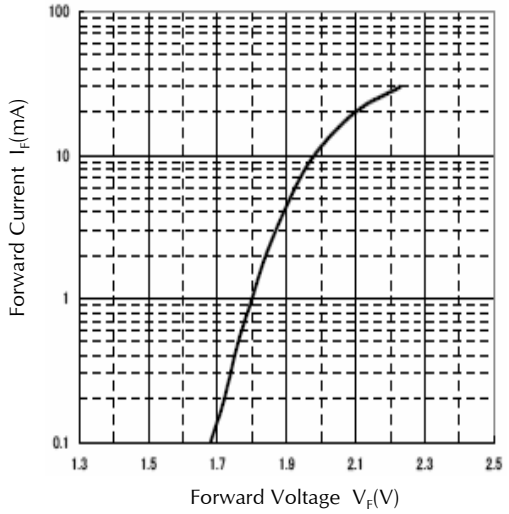
Dynamic Drive Rating

Duty cycle vs. Maximum Forward Current
Condition : Ta = 25℃

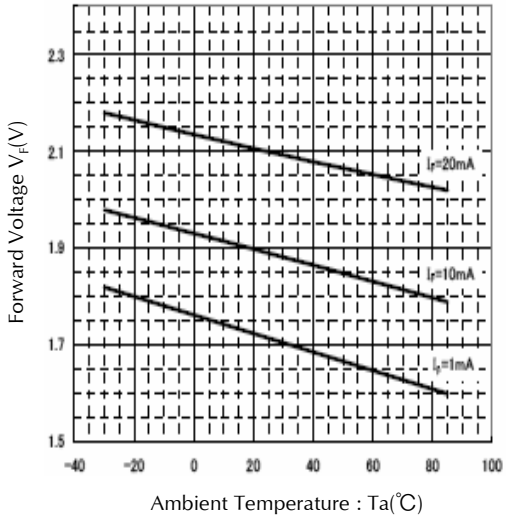


Technical Data(**4001**)

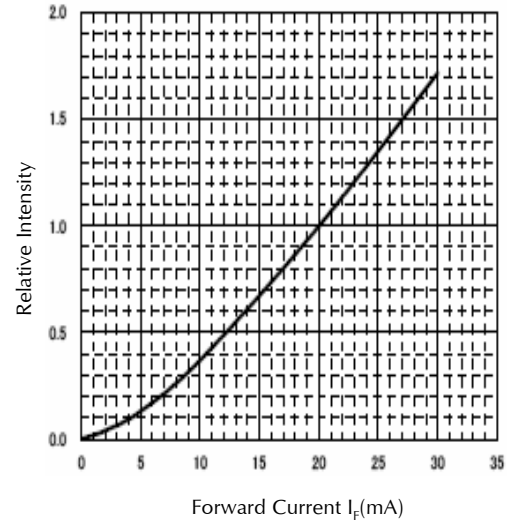
Forward Voltage vs. Forward Current
Condition : Ta = 25℃



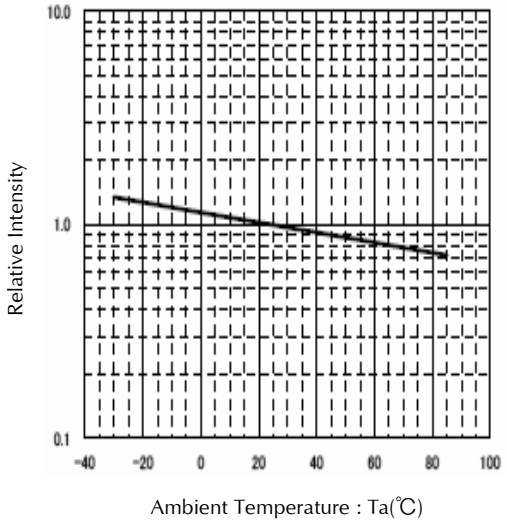
Ambient Temperature vs. Forward Voltage



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



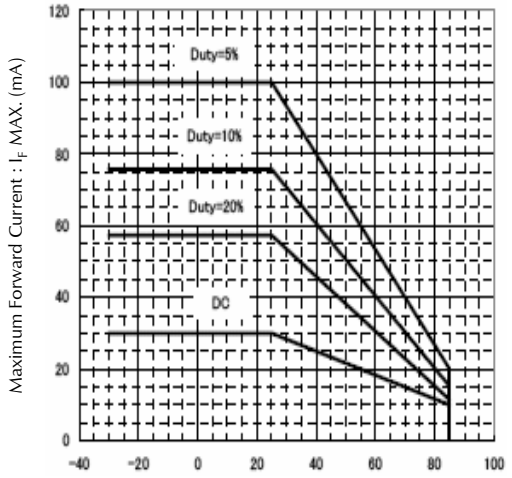
Ambient Temperature vs. Relative Intensity
Condition : I_F=20mA



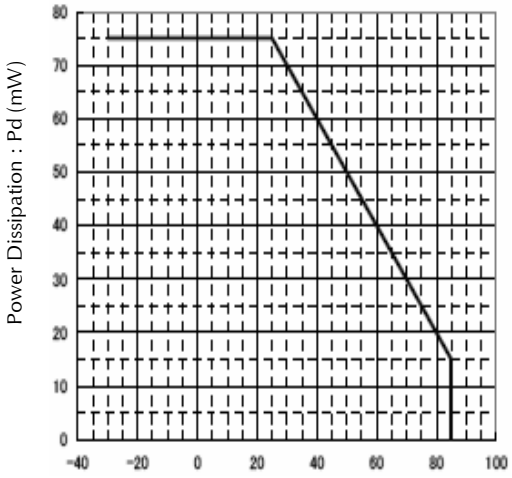
Technical Data(**4001**)

Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz

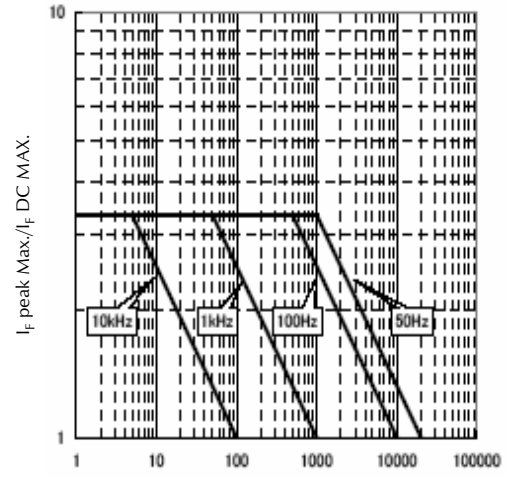


Power Dissipation vs. Ambient Temperature



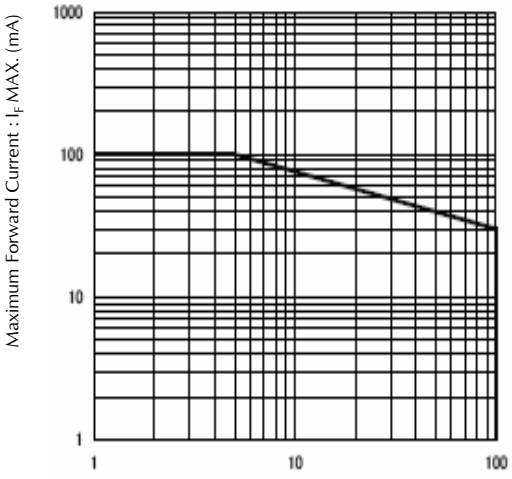
Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃



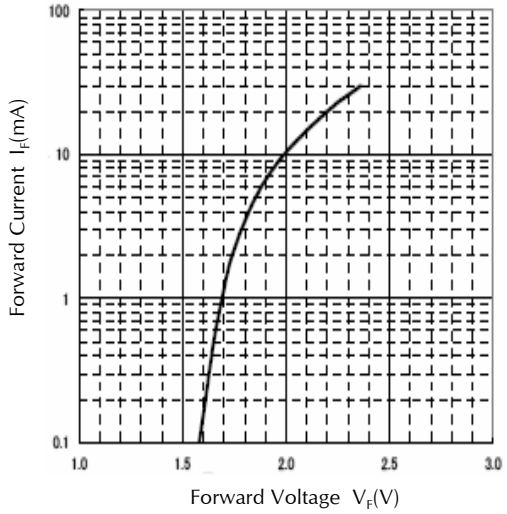
Dynamic Drive Rating

Duty cycle vs. Maximum Forward Current
Condition : Ta = 25℃

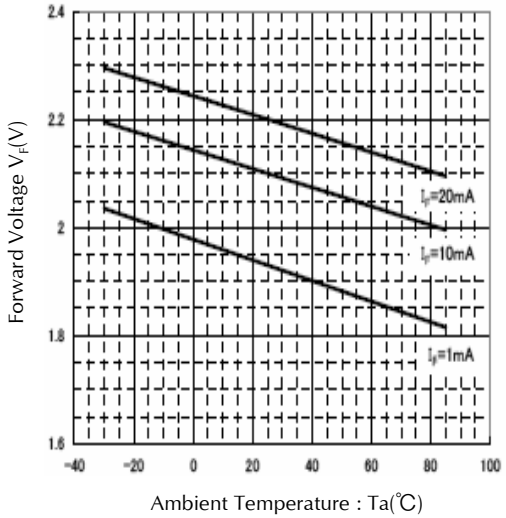


Technical Data(**3001**)

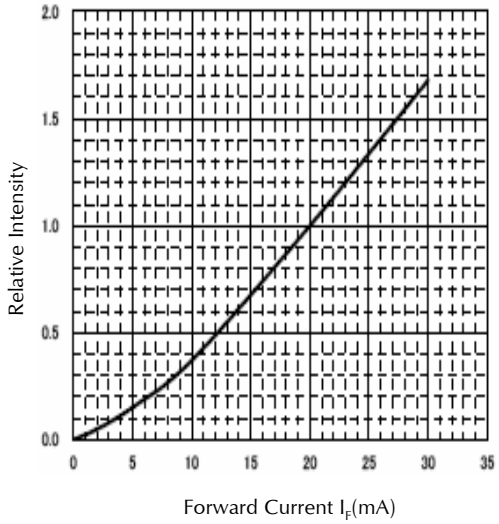
Forward Voltage vs. Forward Current
Condition : Ta = 25℃



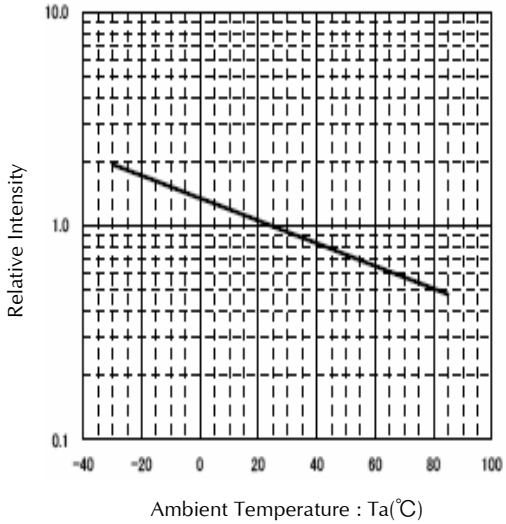
Ambient Temperature vs. Forward Voltage



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



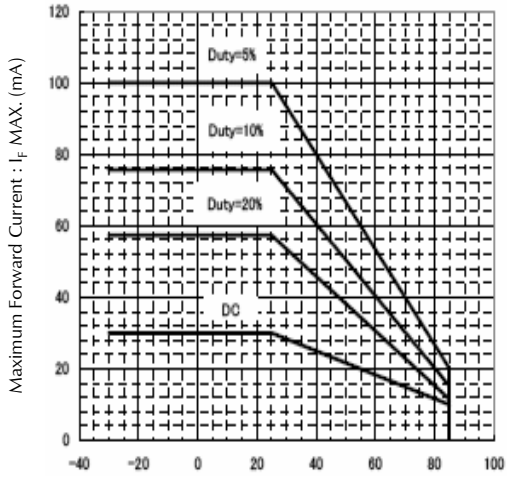
Ambient Temperature vs. Relative Intensity
Condition : I_F=20mA



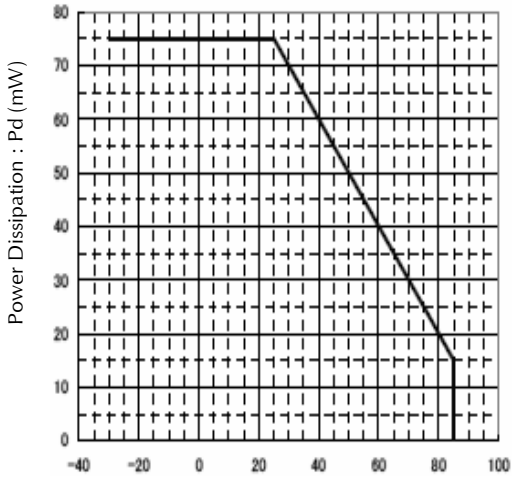
Technical Data(**3001**)

Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz

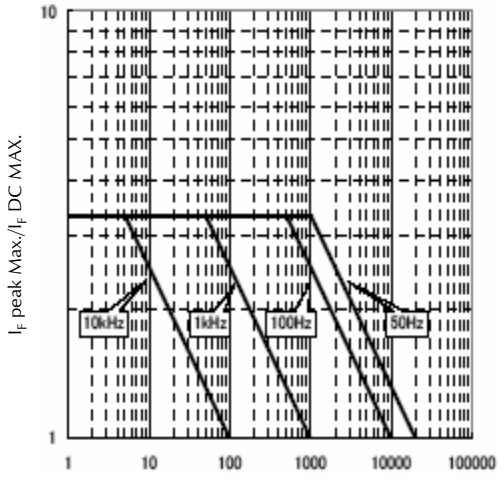


Power Dissipation vs. Ambient Temperature



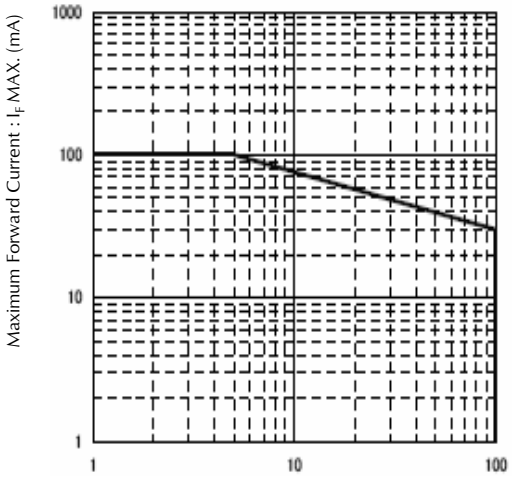
Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃



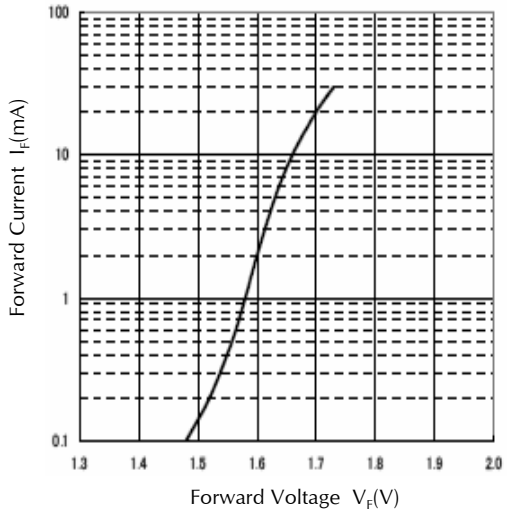
Dynamic Drive Rating

Duty cycle vs. Maximum Forward Current
Condition : Ta = 25℃

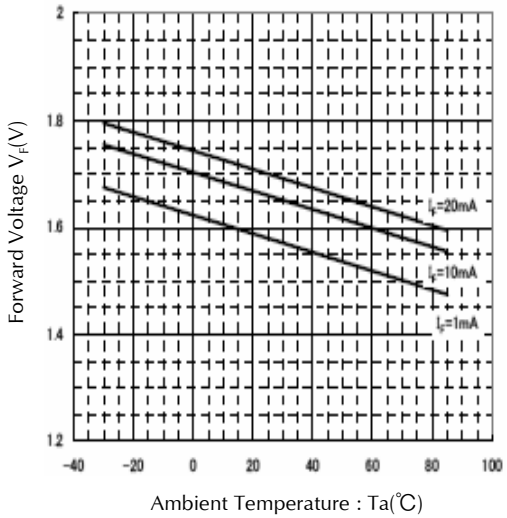


Technical Data(**2001**)

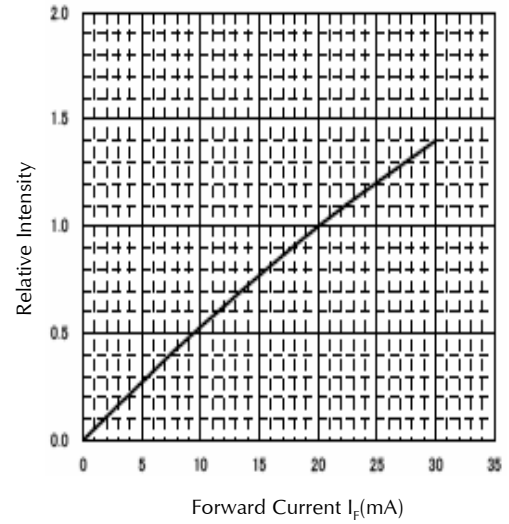
Forward Voltage vs. Forward Current
Condition : Ta = 25℃



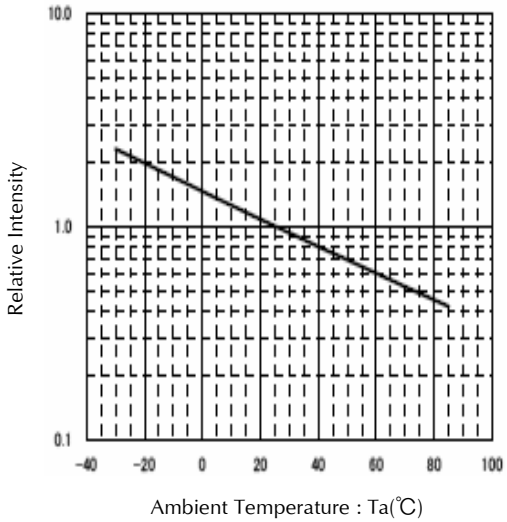
Ambient Temperature vs. Forward Voltage



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



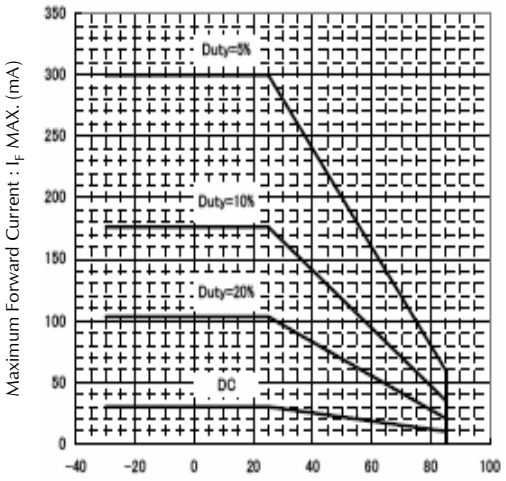
Ambient Temperature vs. Relative Intensity
Condition : I_F=20mA



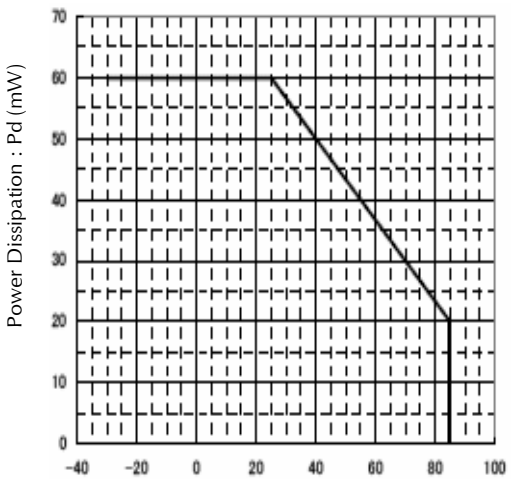
Technical Data(**2001**)

Derating

Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz

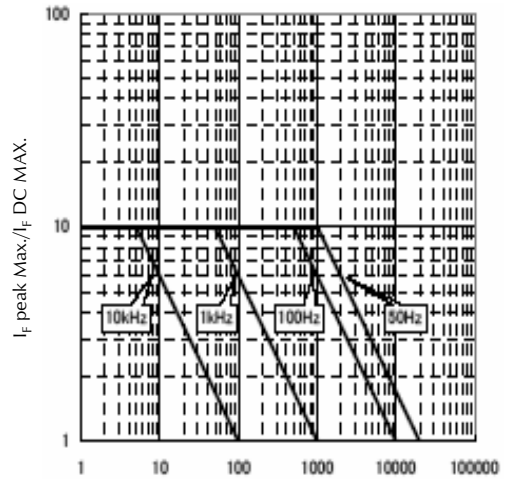


Power Dissipation vs. Ambient Temperature



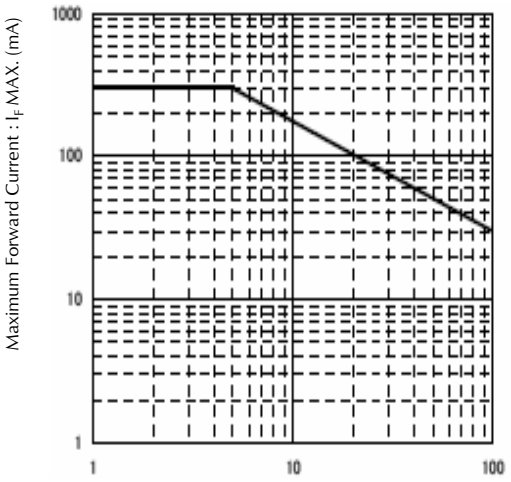
Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃



Dynamic Drive Rating

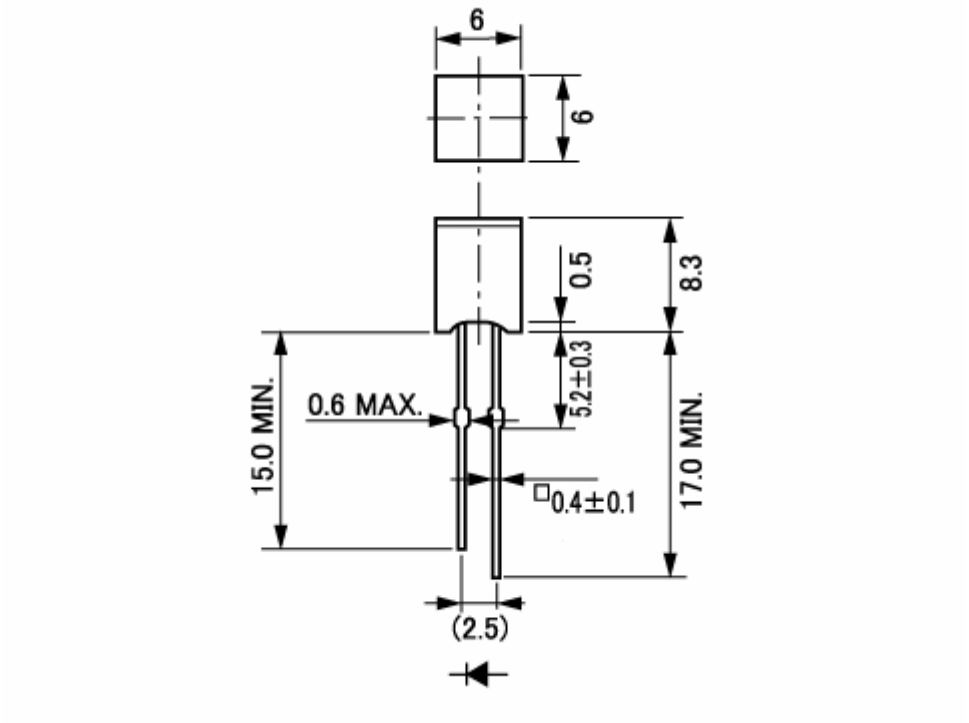
Duty cycle vs. Maximum Forward Current
Condition : Ta = 25℃



Package Dimensions

(Unit: mm)

(Tolerance：±0.25 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 3.0 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 ℃	(MAX.) (30 W Max.)
Soldering time and frequency	3 s 2 times	(MAX.) (MAX.)
Position	At least 3.0 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℃, I_F = Maxium Rated Current	1,000 h	0/10
Resistance to Soldering Heat	EIAJ ED-4701/300(302)	260±5℃, 3mm from package base	10sec	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	10sec	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	I_F=20mA	Testing Min. Value < Spec. Min. Value x 0.5
Forward Voltage	V_F	I_F=20mA	Testing Max. Value ≧ Spec. Max. Value x 1.2
Reverse Current	I_R	V_R=4V	Testing Max. Value ≧ Spec. Max. Value x 2.5
Cosmetic Appearance	-	-	No notable, decoloration, deformation and cracking

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2) For the purpose of product improvement, the specifications, characteristics and technical data described in the data sheets are subject to change without prior notice. Therefore it is recommended that the most updated specifications be used in your design.

3) When using the products described in the data sheets, please adhere to the maximum ratings for operating voltage, heat dissipation characteristics, and other precautions for use. We are not responsible for any damage which may occur if these specifications are exceeded.

4) The products described in the data sheets are made to be used in standard electronic applications such as office automation appliances, communication devices, audio visual, home appliances, and measuring instruments.

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