Pb-free HEAT

4361F Series

Single Color Φ3.6 Right Angle Type

Features

Package	Φ3.6 Right Angle type, MBG,MPG : Pale Green Clear epoxy MPY,MAY : Pale Yellow Clear epoxy MAA : Pale Orange Clear epoxy MVR,BR,MPR : Pale Red Clear epoxy
Product features	• Outer Dimension Φ3.6 Right Angle type, • Operation temperature range. Storage Temperature :-30°C～100°C Operating Temperature :-30°C～85°C • No lead package and lead–free soldering compatible
Dominant wavelength	Green : 558nm (MBG), 567nm (MPG) Yellow Green : 572nm (MPY) Yellow : 590nm (MAY) Orange : 606nm (MAA) Red : 624nm (MVR) 647nm (BR) 630nm (MPR)
Half Intensity Angle	MBG : 100deg., MPG : 74deg. MPY : 76deg., MAY : 72deg. MAA : 73deg., MVR : 84deg BR : 94deg., MPR : 97deg.
Die materials	MBG, MPG, MPY, MPR : GaP MAY, MAA, MVR : GaAsP BR : GaAlAs
Soldering methods	TTW (Through The Wave) soldering and manual soldering
ESD	More than 2kV(HBM)
Packing	Bulk : 200pcs(MIN.)

Packing

Recommended Applications

Amusement Equipment, Electric Household Appliances, OA/FA, Other General Applications

Color and Luminous Intensity

(Ta=25℃)

Part No.	Material	Emitted Color	Lens Color		Dominant Wavelength λd (nm)		Luminous Intensity Iv (mcd)		
					TYP.	I_F	MIN.	TYP.	I_F
MBG4361F	GaP	Green	Pale Green	Clear	558	20	3	6	20
MPG4361F	GaP	Green			567	20	5	10	20
MPY4361F	GaP	Yellow Green	Pale Yellow		572	20	6	12	20
MAY4361F	GaAsP	Yellow			590	20	5	10	20
MAA4361F	GaAsP	Orange	Pale Orange		606	20	5	10	20
MVR4361F	GaAsP	Red	Pale Red		624	20	4	8	20
BR4361F	GaAlAs	Red			647	20	10	20	20
MPR4361F	GaP	Red			630	10	0.6	1.2	10

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Absolute Maximum Ratings

(Ta=25℃)

Item	Symbol	Absolute Maximum Ratings								Unit
		MBG	MPG	MPY	MAY	MAA	MVR	BR	MPR	
Power Dissipation	P_d	70	70	85	85	70	75	100	75	mW
Forward Current	I_F	25	25	30	30	25	30	50	30	mA
Pulse Forward Current ※1	I_{FRM}	60	60	75	75	60	75	300	75	mA
Derating (Ta=25℃ or higher)	ΔI_F	0.33	0.33	0.40	0.40	0.33	0.40	0.67	0.40	mA/℃
Reverse Voltage	V_R	4	4	4	4	4	4	4	4	V
Operating Temperature	T_{opr}	-30～+85								℃
Storage Temperature	T_{stg}	-30～+100								℃

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

4361F Series

Single Color φ3.6 Right Angle Type

Electro-Optical Characteristics(MBG,MPG,MPY,MAY,MAA,MVR,BR) (Ta=25℃)

Item	Conditions	Symbol		Characteristics							Unit
				MBG	MPG	MPY	MAY	MAA	MVR	BR	
Forward Voltage	I_F=20mA	V_F	TYP.	2.1	2.1	2.1	2.2	2.2	2.0	1.7	V
			MAX.	2.8	2.8	2.8	2.8	2.8	2.8	2.0	
Reverse Current	V_R=4V	I_R	MAX.	20	20	20	20	20	20	100	μA
Peak Wavelength	I_F=20mA	λ_p	TYP.	555	560	570	580	605	630	660	nm
Dominant Wavelength	I_F=20mA	λ_d	TYP.	558	567	572	590	606	624	647	nm
Spectral Line Half Width	I_F=20mA	$\Delta\lambda$	TYP.	30	30	30	30	30	30	30	nm
Half Intensity Angle	I_F=20mA	$2\theta 1/2$	TYP.	100	74	76	72	73	84	94	deg.

Electro-Optical Characteristics(MPR) (Ta=25℃)

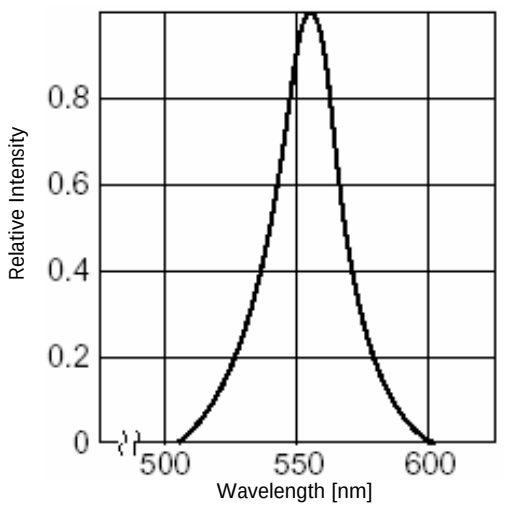
Item	Conditions	Symbol	Characteristics		Unit
				MPR	
Forward Voltage	I_F=10mA	V_F	TYP.	2.1	V
			MAX.	2.8	
Reverse Current	V_R=4V	I_R	MAX.	20	μA
Peak Wavelength	I_F=10mA	λ_p	TYP.	700	nm
Dominant Wavelength	I_F=10mA	λ_d	TYP.	630	nm
Spectral Line Half Width	I_F=10mA	$\Delta\lambda$	TYP.	100	nm
Half Intensity Angle	I_F=10mA	$2\theta 1/2$	TYP.	85	deg.

Technical Data**(MBG)**

Spectral Distribution

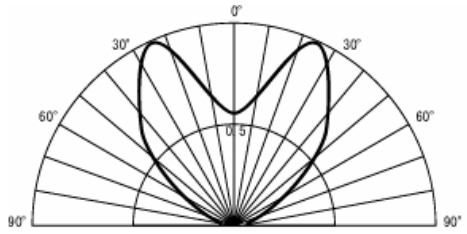
Relative Intensity vs. Wavelength

Condition : Ta = 25°C, I_F = 20mA



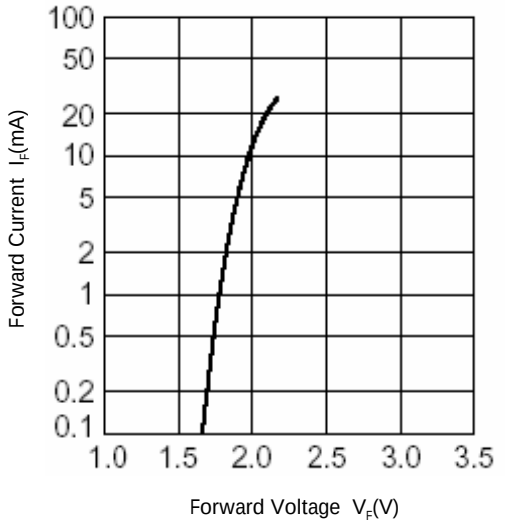
Spatial Distribution Example

Condition : Ta = 25°C



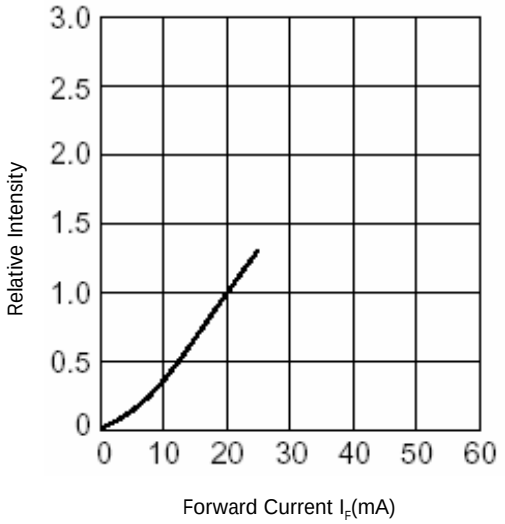
Forward Voltage vs. Forward Current

Condition : Ta = 25°C



Forward Current vs. Relative Intensity

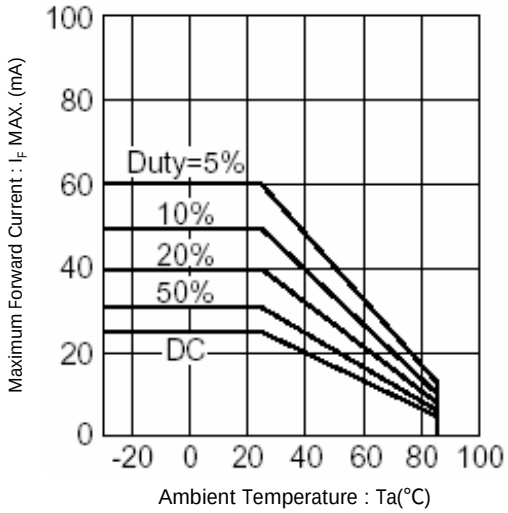
Condition : Ta = 25°C



Technical Data**(MBG)**

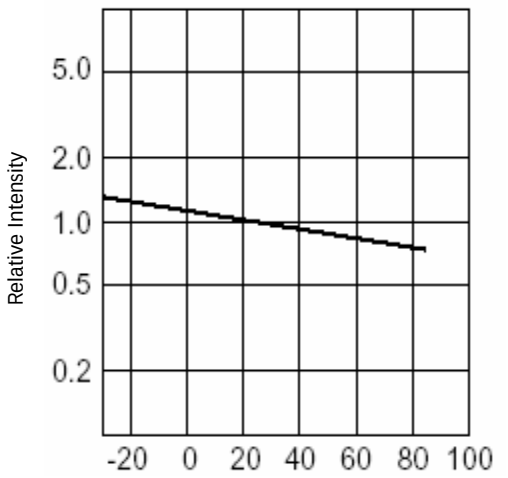
Derating

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

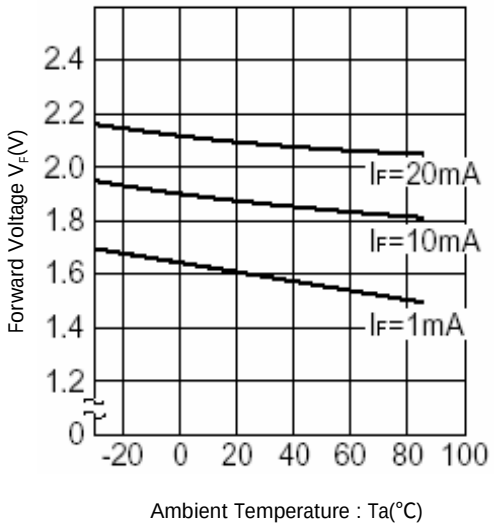


Ambient Temperature vs. Relative Intensity

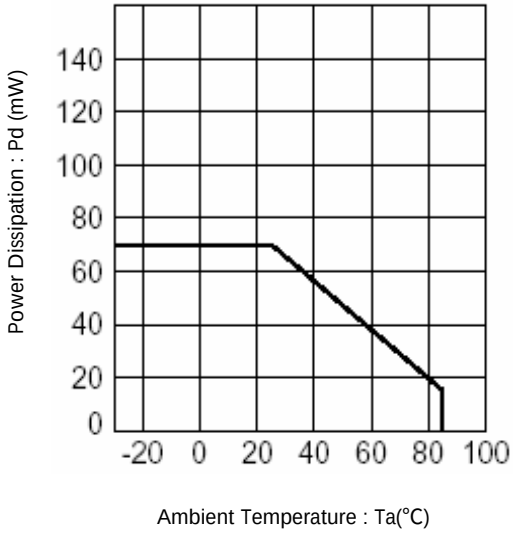
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage



Power Dissipation vs. Ambient Temperature

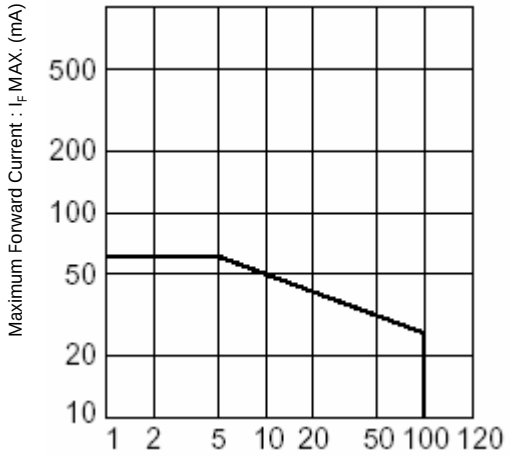


Technical Data**(MBG)**

Dynamic Drive Rating

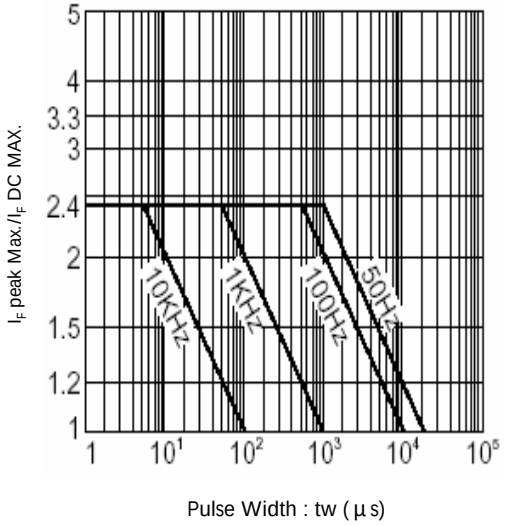
Duty cycle vs. Maximum Forward Current

Condition : Ta = 25°C



Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25°C

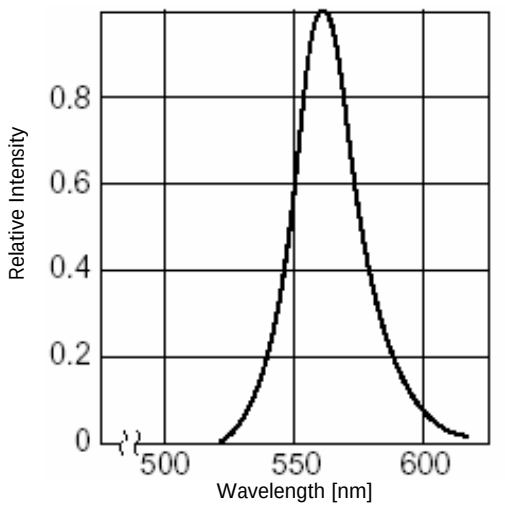


Technical Data**(MPG)**

Spectral Distribution

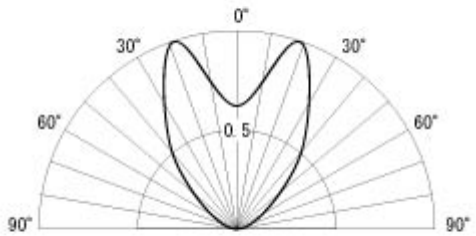
Relative Intensity vs. Wavelength

Condition : Ta = 25°C, I_F = 20mA



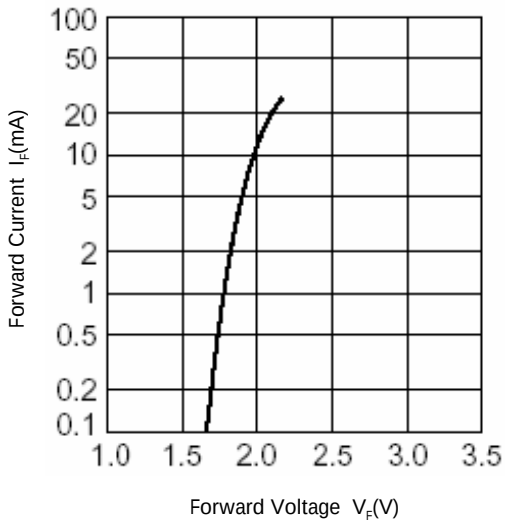
Spatial Distribution Example

Condition : Ta = 25°C



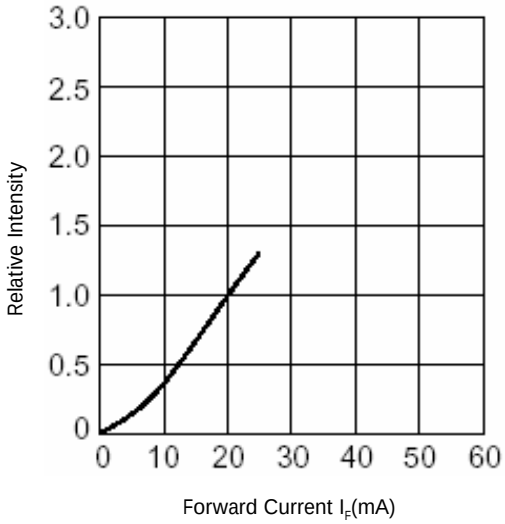
Forward Voltage vs. Forward Current

Condition : Ta = 25°C



Forward Current vs. Relative Intensity

Condition : Ta = 25°C

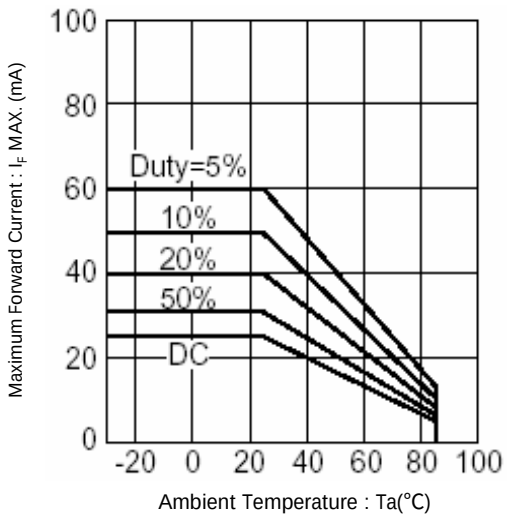


Technical Data**(MPG)**

Derating

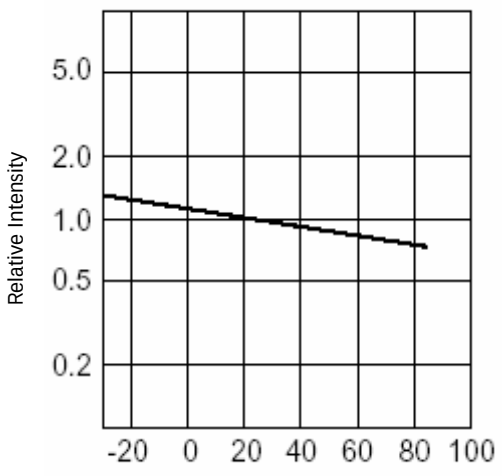
Ambient Temperature vs. Maximum Forward Current

Repetition Frequency : f ≧ 50Hz

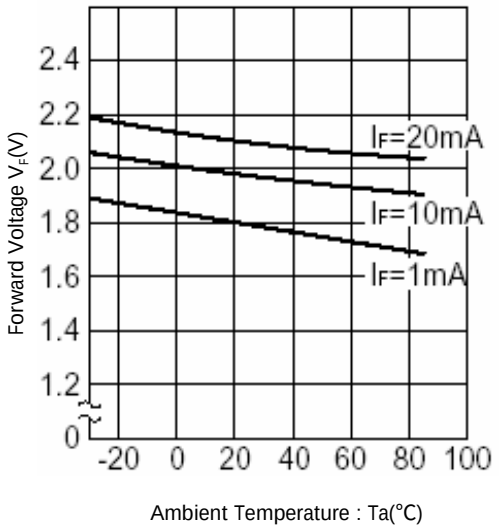


Ambient Temperature vs. Relative Intensity

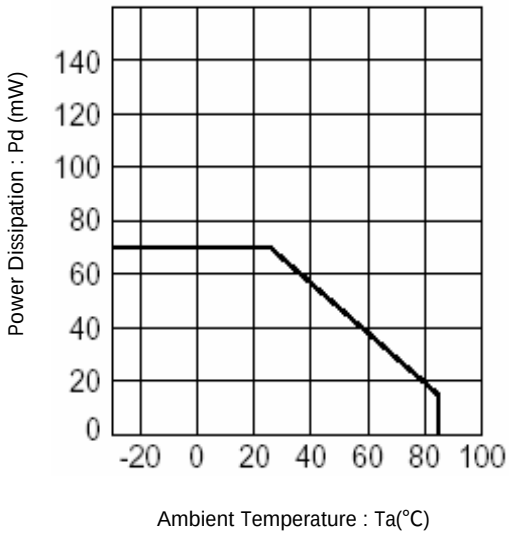
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage

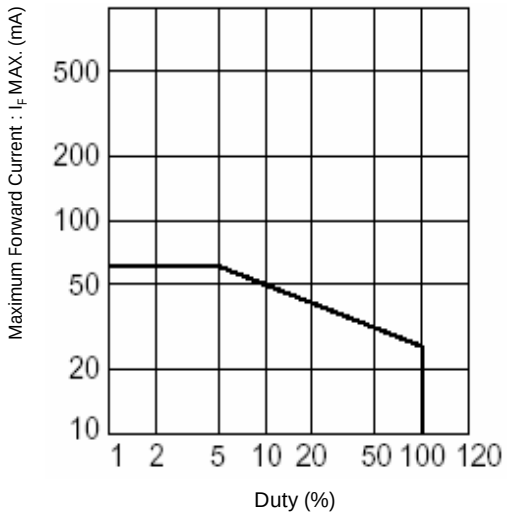


Power Dissipation vs. Ambient Temperature

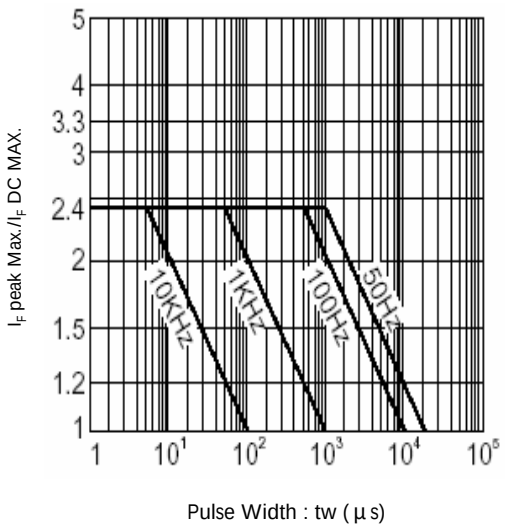


Technical Data**(MPG)**

Dynamic Drive Rating
Duty cycle vs. Maximum Forward Current
Condition : Ta = 25°C



Pulse Width vs. Maximum Tolerable Peak Current
Condition : Ta = 25°C

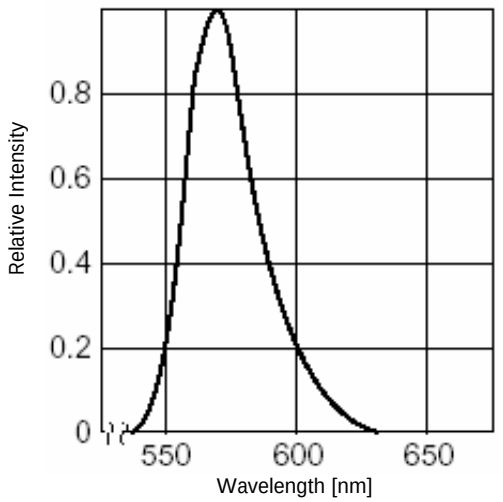


Technical Data**(MPY)**

Spectral Distribution

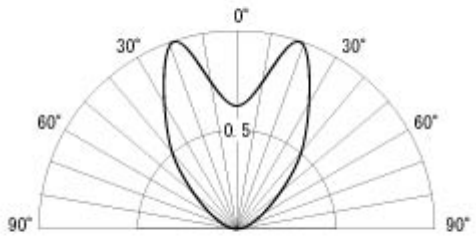
Relative Intensity vs. Wavelength

Condition : Ta = 25°C, I_F = 20mA



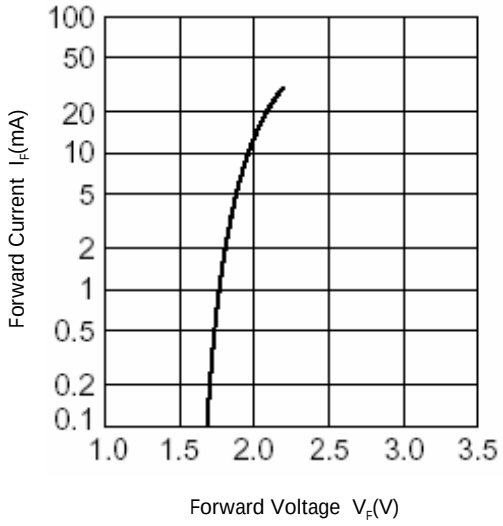
Spatial Distribution Example

Condition : Ta = 25°C



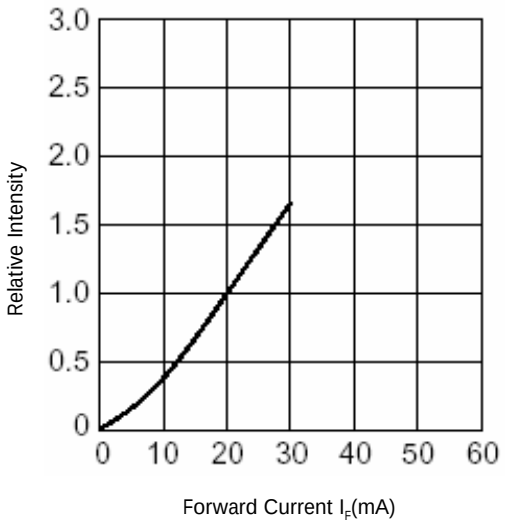
Forward Voltage vs. Forward Current

Condition : Ta = 25°C



Forward Current vs. Relative Intensity

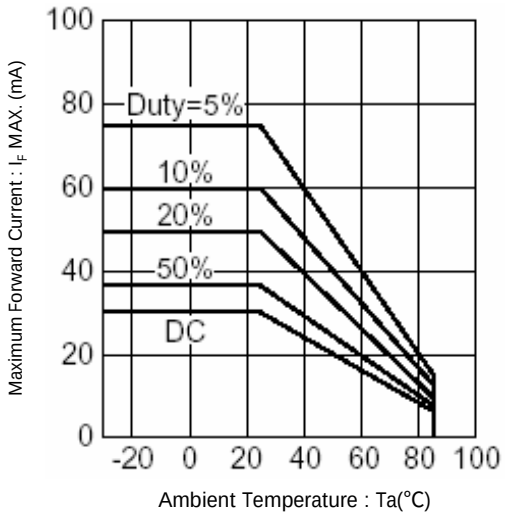
Condition : Ta = 25°C



Technical Data**(MPY)**

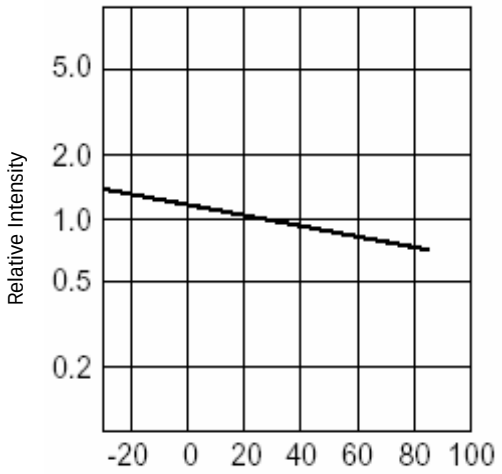
Derating

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

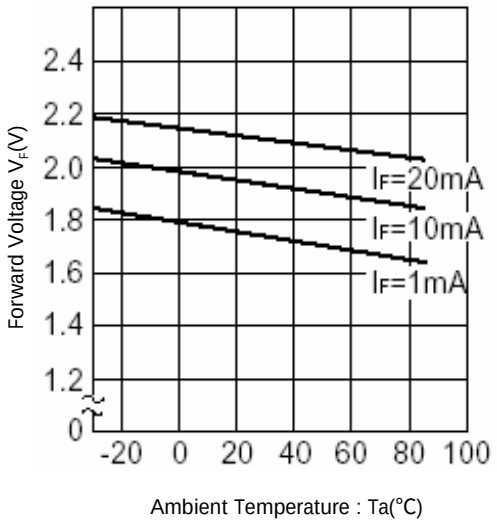


Ambient Temperature vs. Relative Intensity

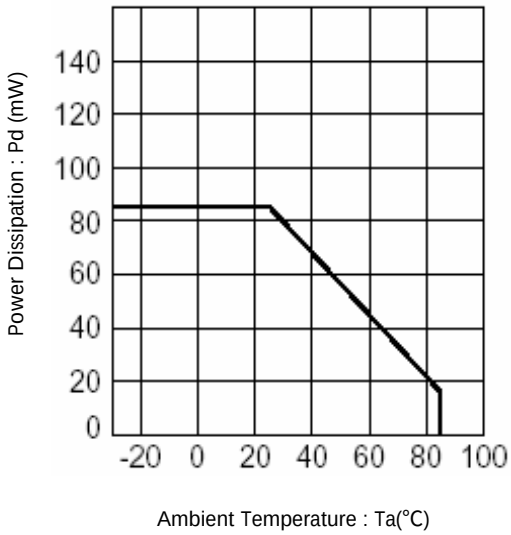
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage

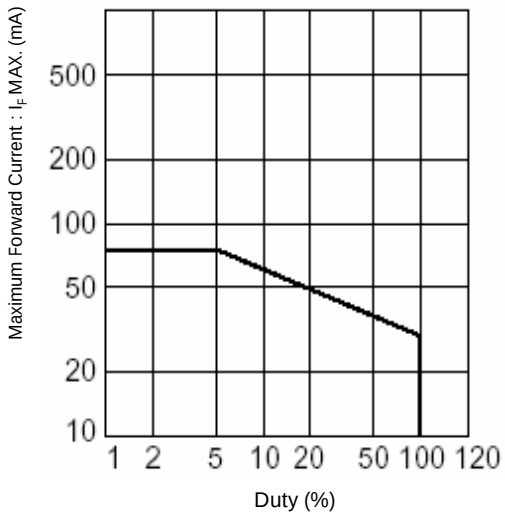


Power Dissipation vs. Ambient Temperature

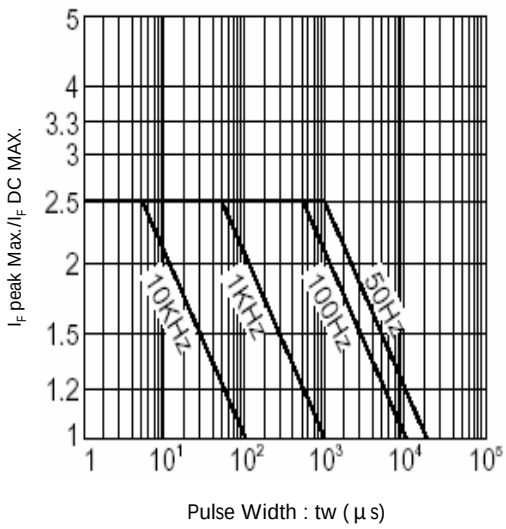


Technical Data**(MPY)**

Dynamic Drive Rating
Duty cycle vs. Maximum Forward Current
Condition : Ta = 25°C



Pulse Width vs. Maximum Tolerable Peak Current
Condition : Ta = 25°C

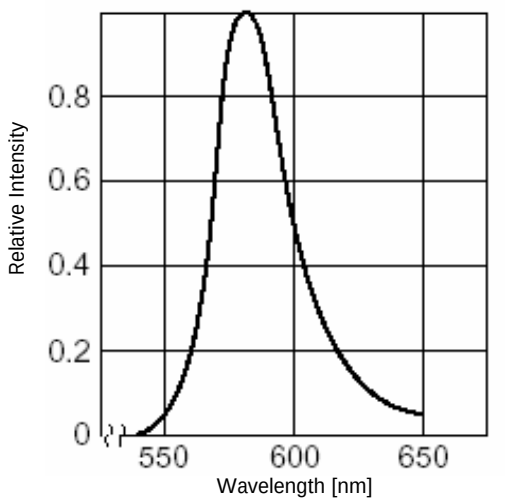


Technical Data**(MAY)**

Spectral Distribution

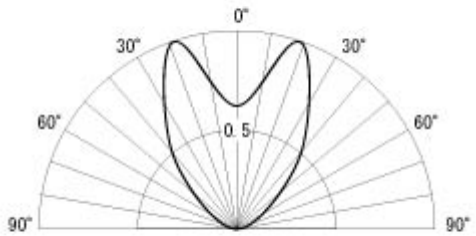
Relative Intensity vs. Wavelength

Condition : Ta = 25°C, I_F = 20mA



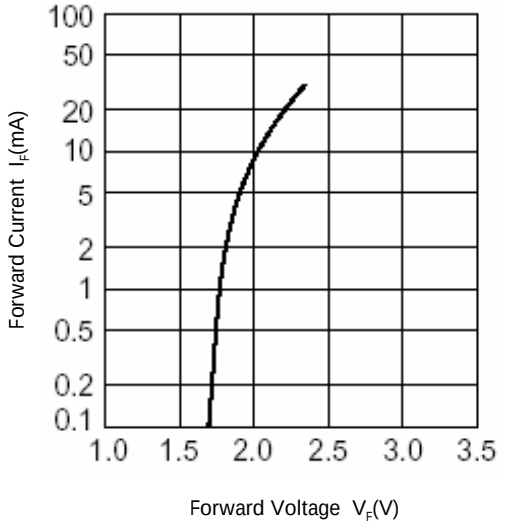
Spatial Distribution Example

Condition : Ta = 25°C



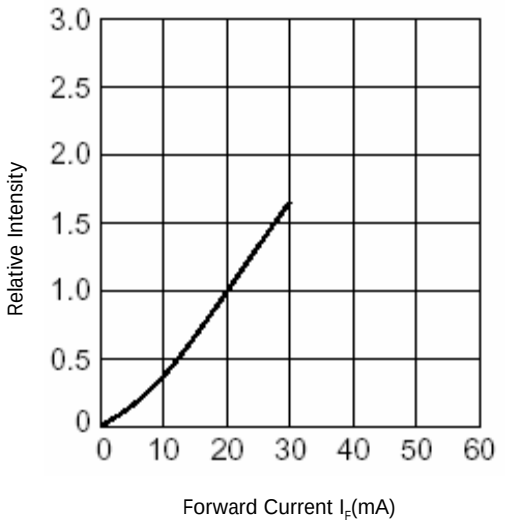
Forward Voltage vs. Forward Current

Condition : Ta = 25°C



Forward Current vs. Relative Intensity

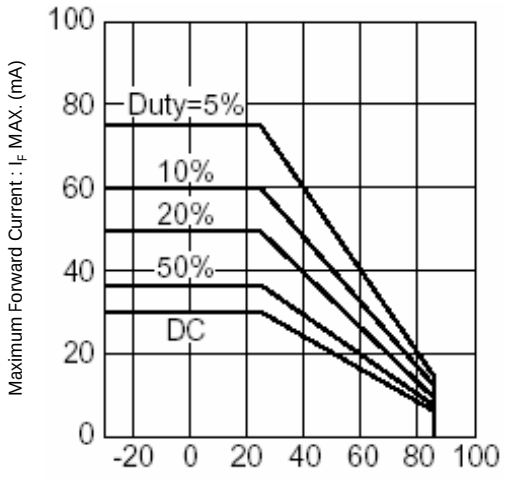
Condition : Ta = 25°C



Technical Data**(MAY)**

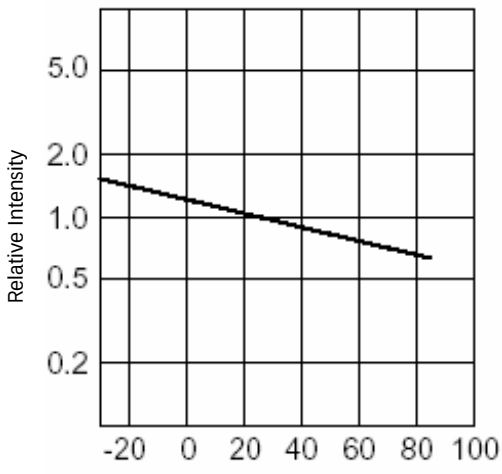
Derating

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

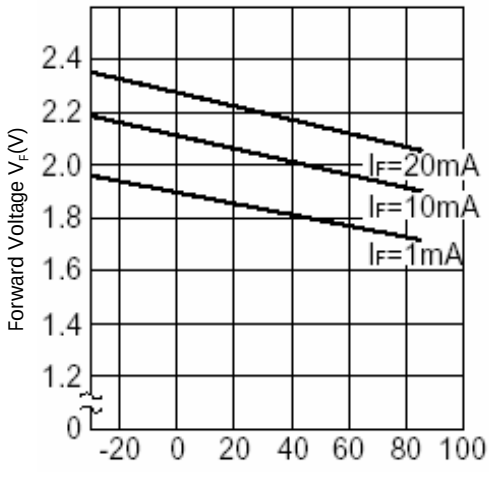


Ambient Temperature vs. Relative Intensity

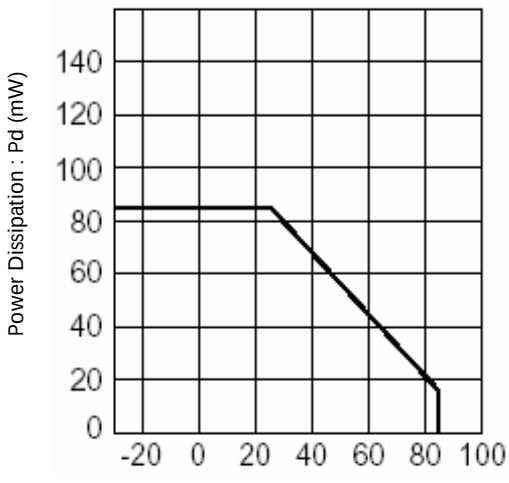
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage

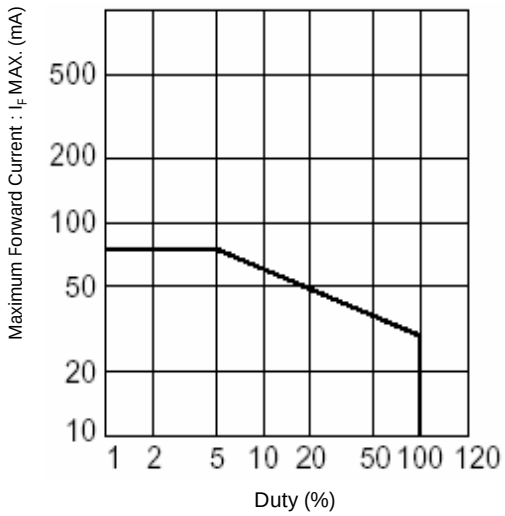


Power Dissipation vs. Ambient Temperature

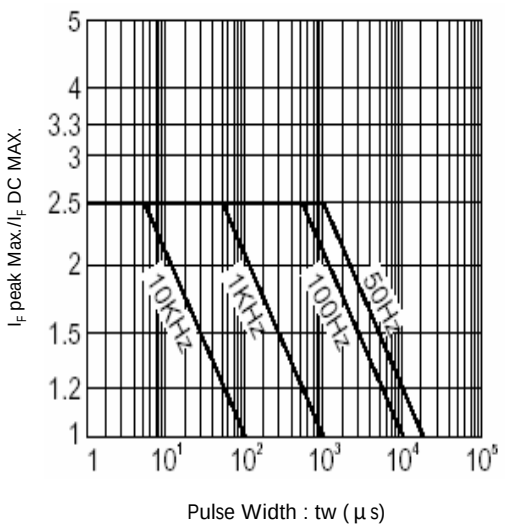


Technical Data**(MAY)**

Dynamic Drive Rating
Duty cycle vs. Maximum Forward Current
Condition : Ta = 25°C



Pulse Width vs. Maximum Tolerable Peak Current
Condition : Ta = 25°C

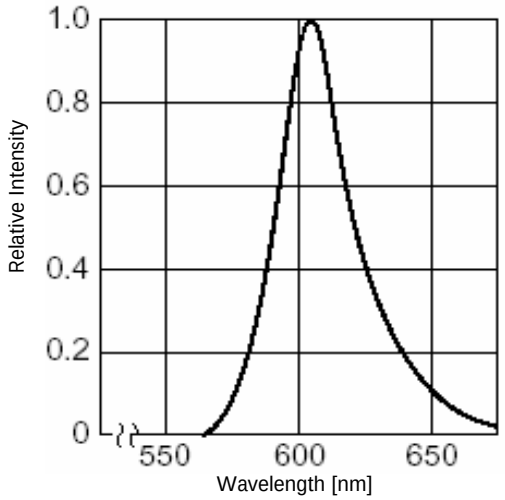


Technical Data**(MAA)**

Spectral Distribution

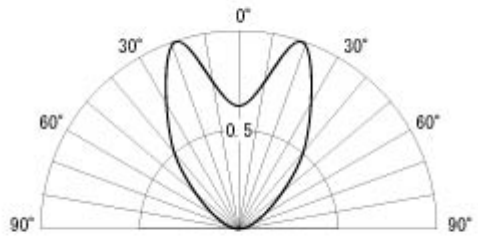
Relative Intensity vs. Wavelength

Condition : Ta = 25°C, I_F = 20mA



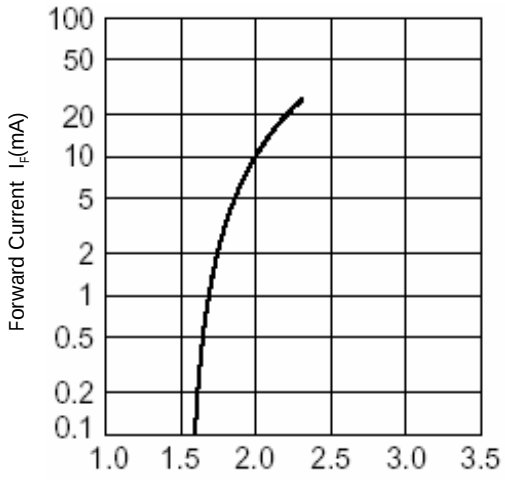
Spatial Distribution Example

Condition : Ta = 25°C



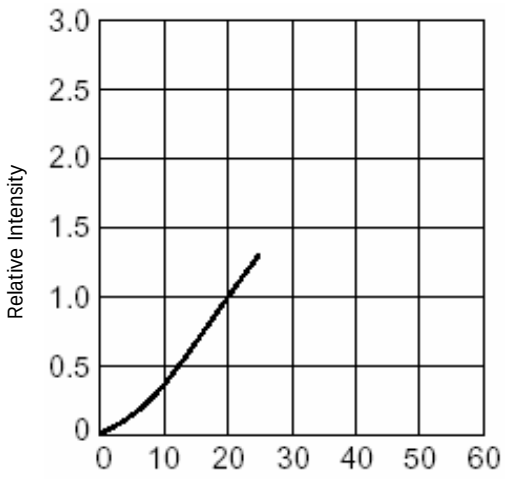
Forward Voltage vs. Forward Current

Condition : Ta = 25°C



Forward Current vs. Relative Intensity

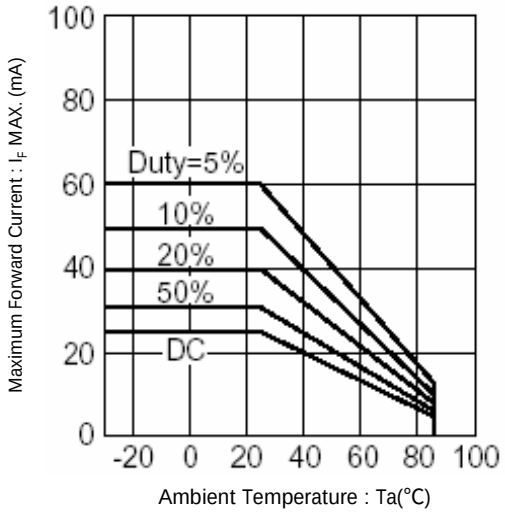
Condition : Ta = 25°C



Technical Data**(MAA)**

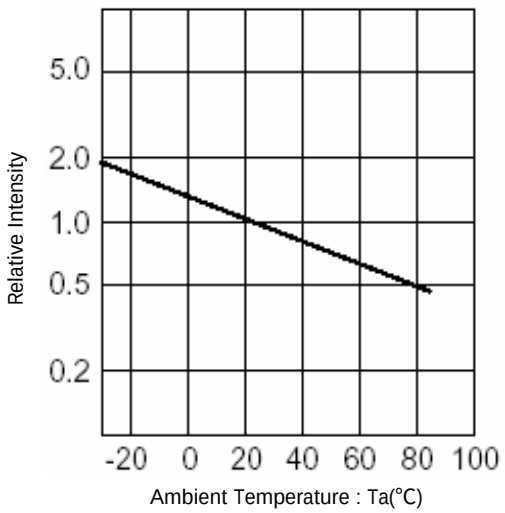
Derating

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

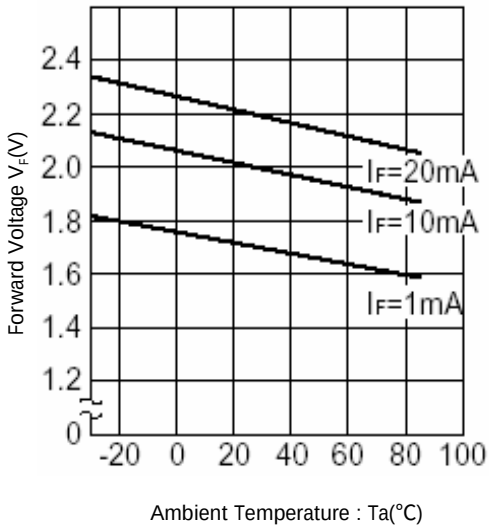


Ambient Temperature vs. Relative Intensity

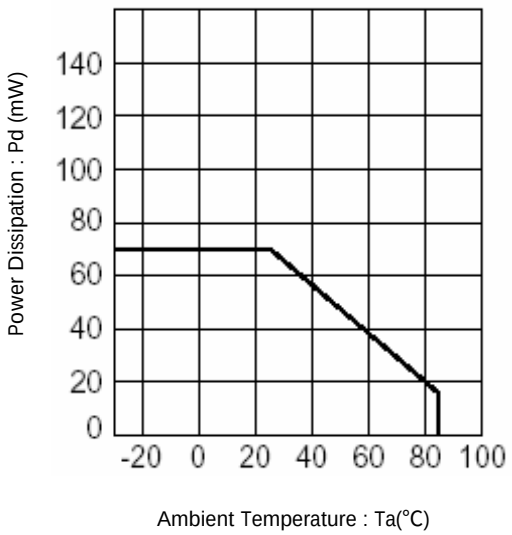
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage

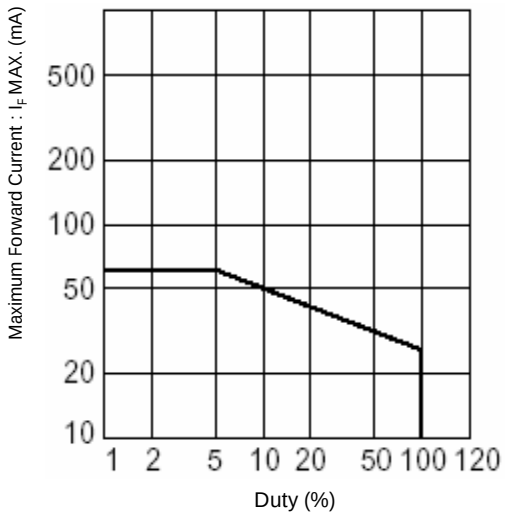


Power Dissipation vs. Ambient Temperature

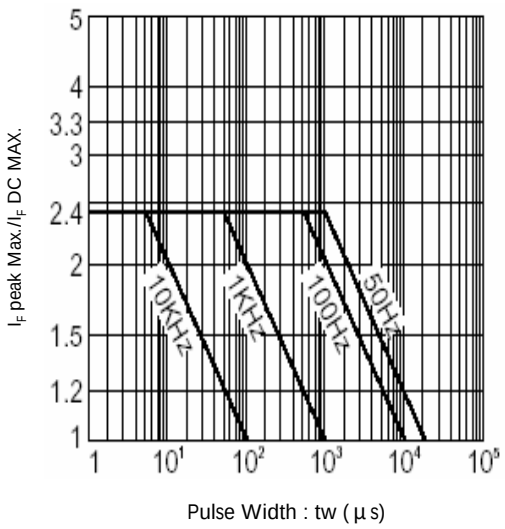


Technical Data**(MAA)**

Dynamic Drive Rating
Duty cycle vs. Maximum Forward Current
Condition : Ta = 25°C



Pulse Width vs. Maximum Tolerable Peak Current
Condition : Ta = 25°C

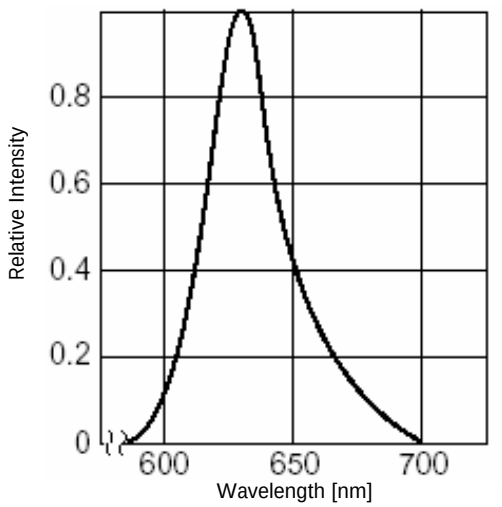


Technical Data**(MVR)**

Spectral Distribution

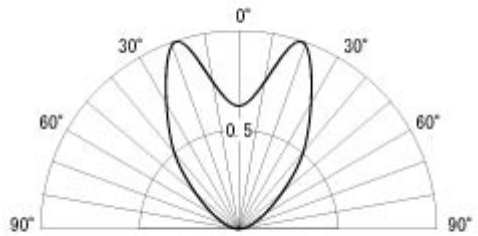
Relative Intensity vs. Wavelength

Condition : Ta = 25°C, I_F = 20mA



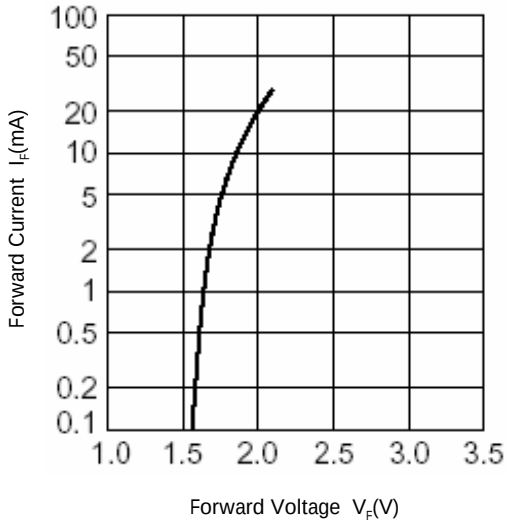
Spatial Distribution Example

Condition : Ta = 25°C



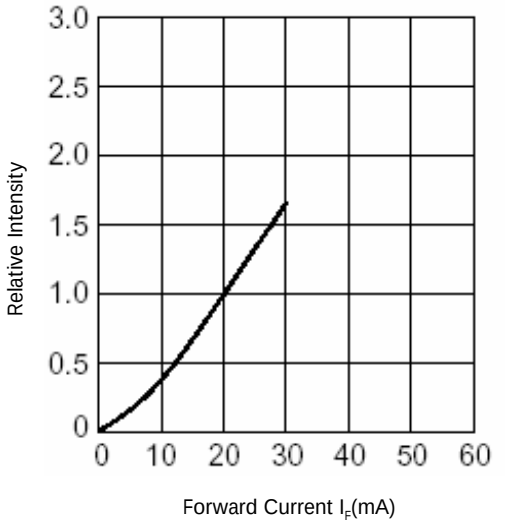
Forward Voltage vs. Forward Current

Condition : Ta = 25°C



Forward Current vs. Relative Intensity

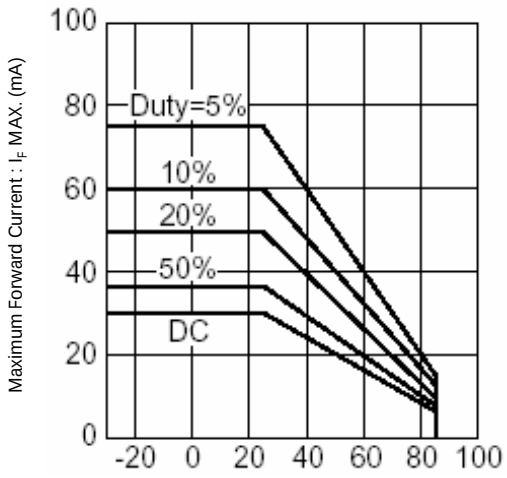
Condition : Ta = 25°C



Technical Data**(MVR)**

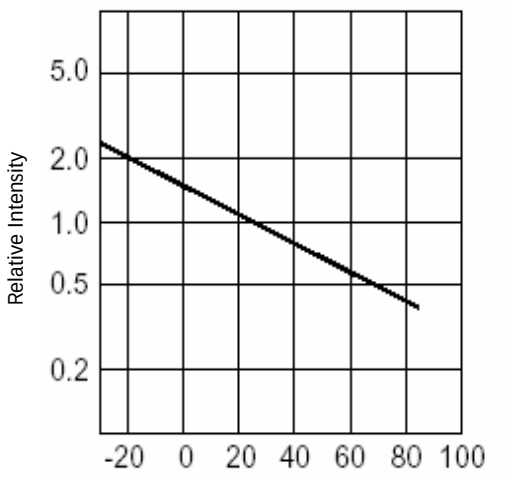
Derating

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

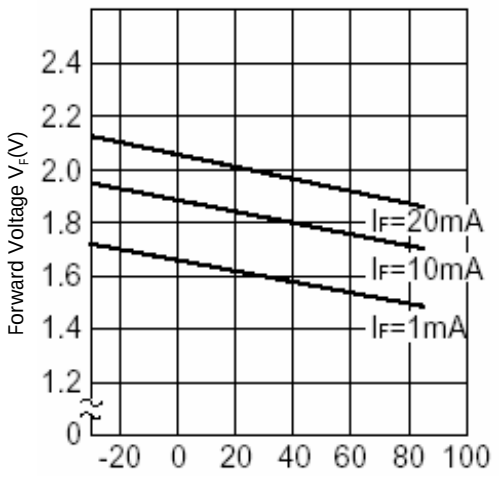


Ambient Temperature vs. Relative Intensity

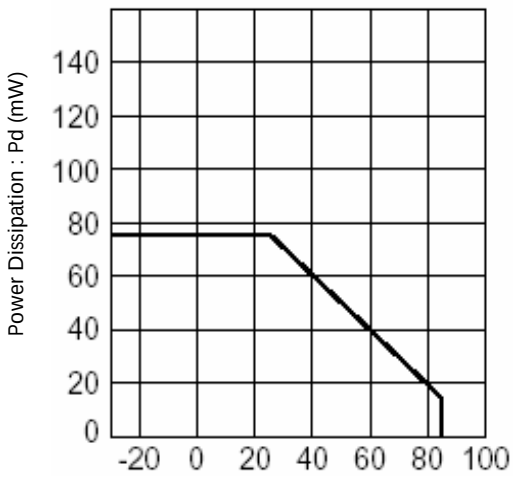
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage

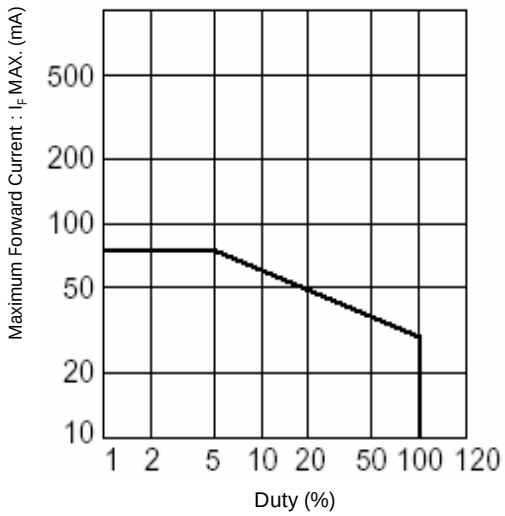


Power Dissipation vs. Ambient Temperature

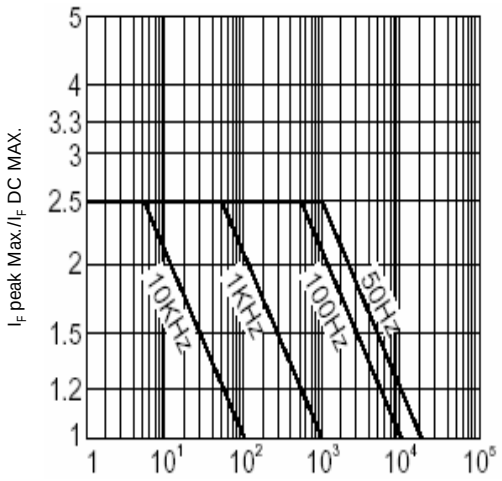


Technical Data**(MVR)**

Dynamic Drive Rating
Duty cycle vs. Maximum Forward Current
Condition : Ta = 25°C



Pulse Width vs. Maximum Tolerable Peak Current
Condition : Ta = 25°C

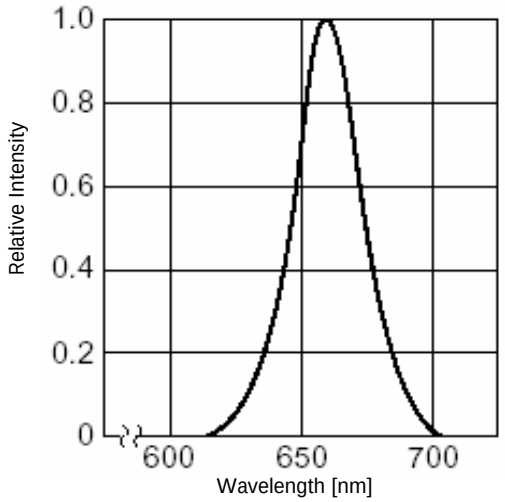


Technical Data**(BR)**

Spectral Distribution

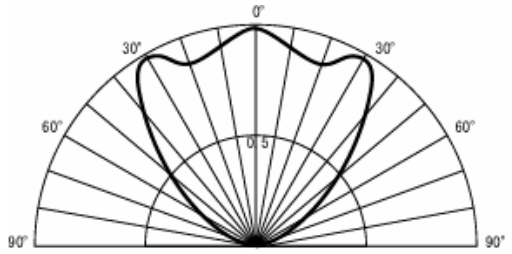
Relative Intensity vs. Wavelength

Condition : Ta = 25°C, I_F = 20mA



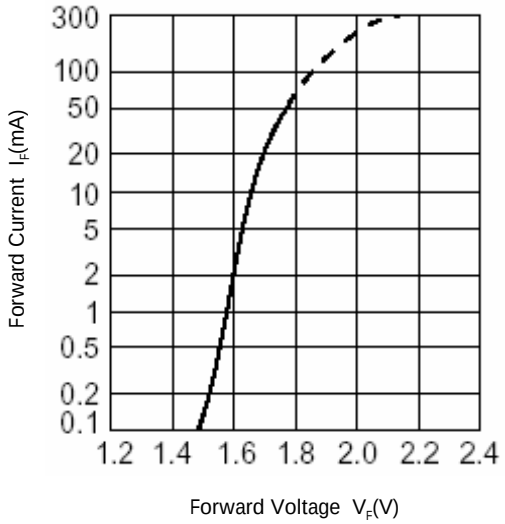
Spatial Distribution Example

Condition : Ta = 25°C



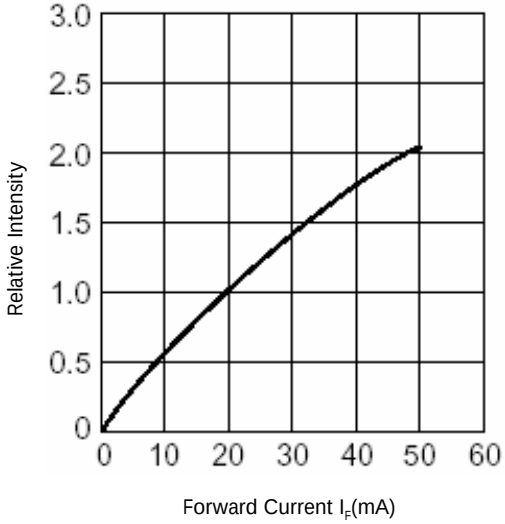
Forward Voltage vs. Forward Current

Condition : Ta = 25°C



Forward Current vs. Relative Intensity

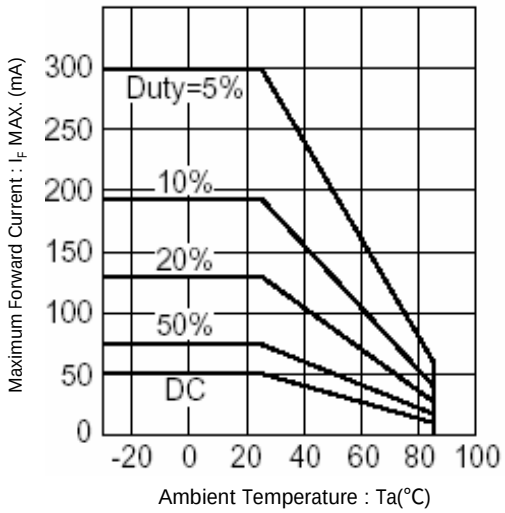
Condition : Ta = 25°C



Technical Data**(BR)**

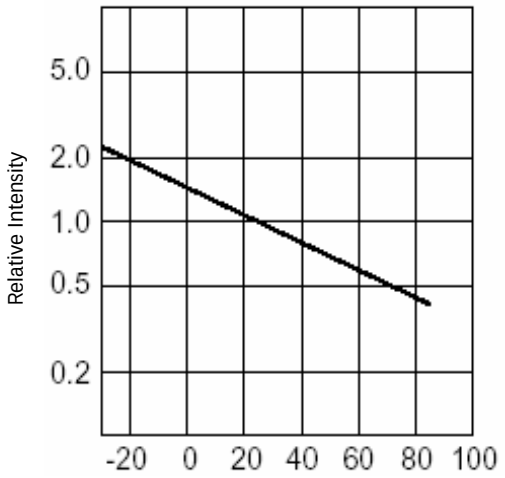
Derating

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

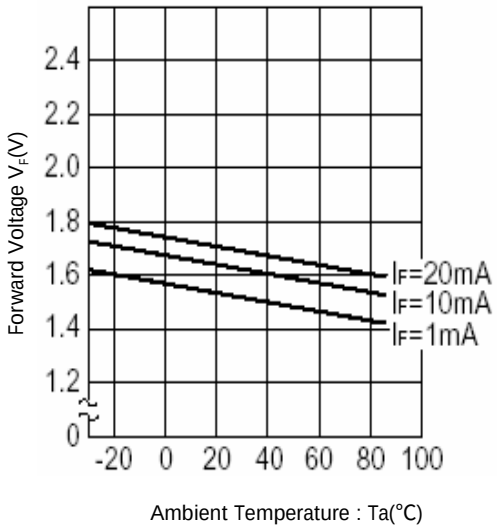


Ambient Temperature vs. Relative Intensity

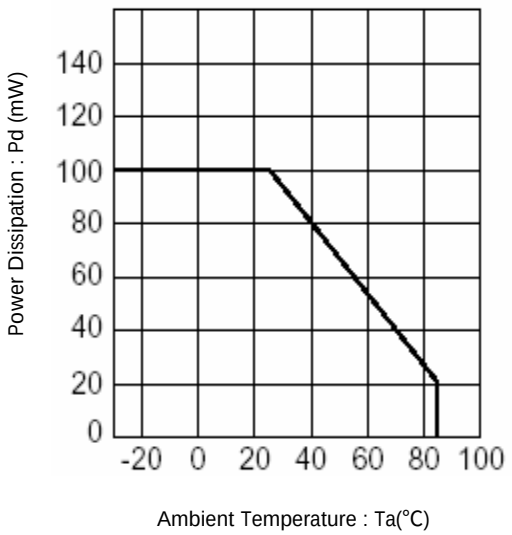
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage



Power Dissipation vs. Ambient Temperature

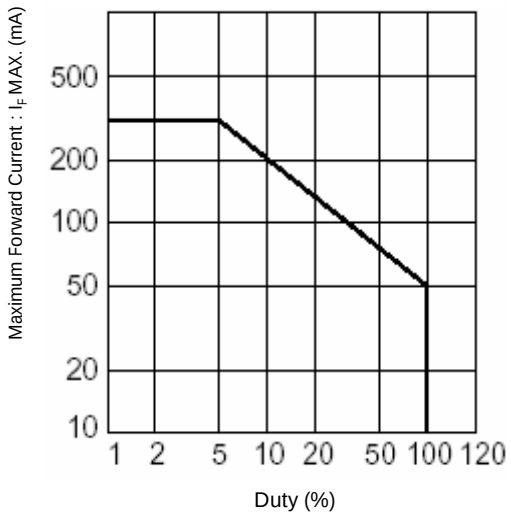


Technical Data**(BR)**

Dynamic Drive Rating

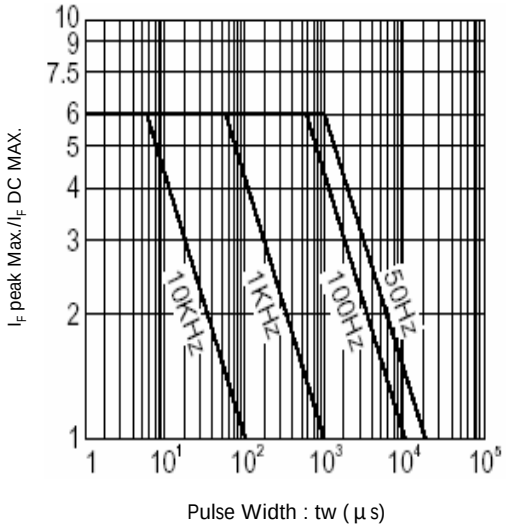
Duty cycle vs. Maximum Forward Current

Condition : Ta = 25°C



Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25°C

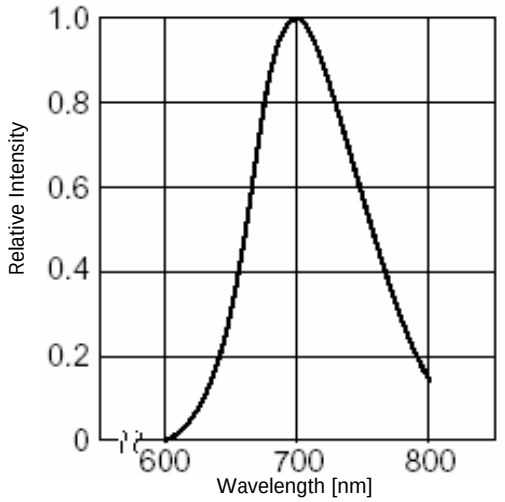


Technical Data**(MPR)**

Spectral Distribution

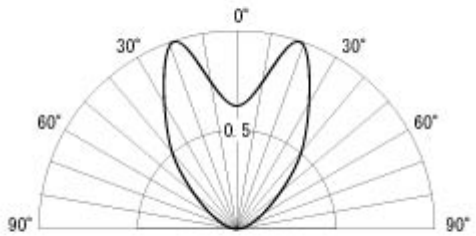
Relative Intensity vs. Wavelength

Condition : Ta = 25°C, I_F = 10mA



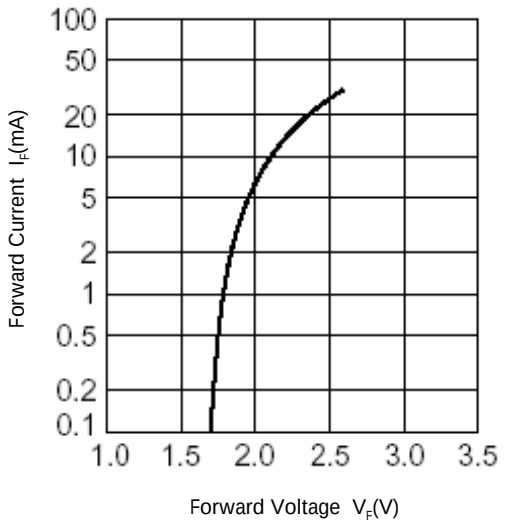
Spatial Distribution Example

Condition : Ta = 25°C



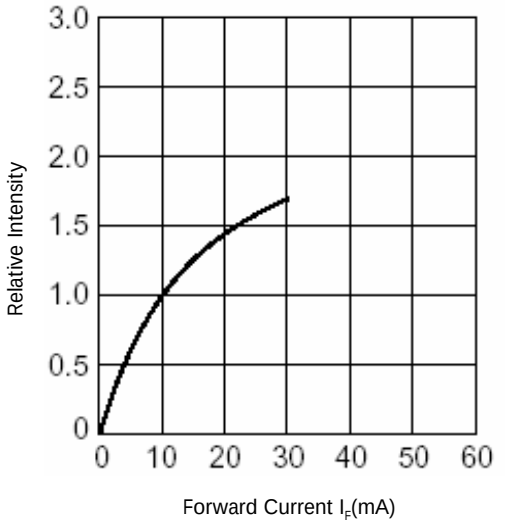
Forward Voltage vs. Forward Current

Condition : Ta = 25°C



Forward Current vs. Relative Intensity

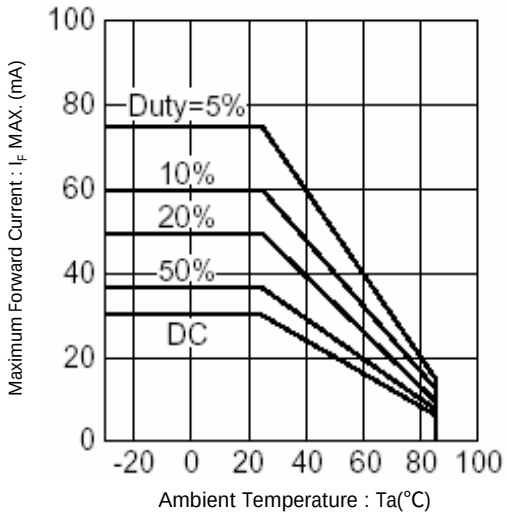
Condition : Ta = 25°C



Technical Data**(MPR)**

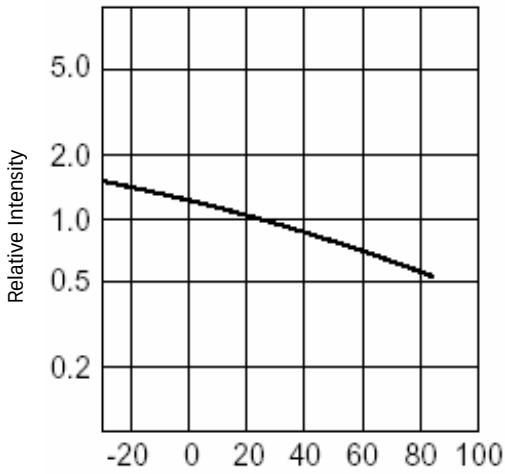
Derating

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

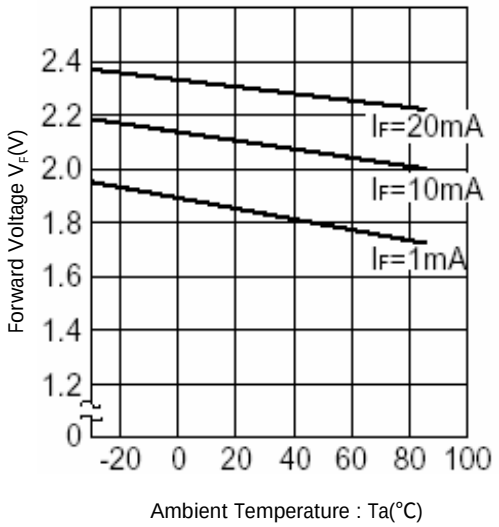


Ambient Temperature vs. Relative Intensity

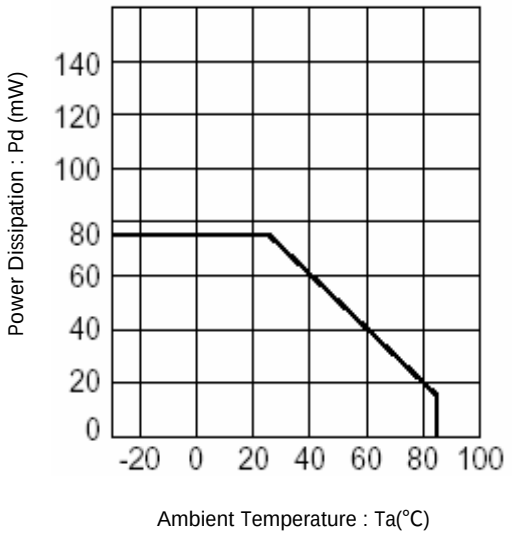
Condition : I_F=10mA



Ambient Temperature vs. Forward Voltage

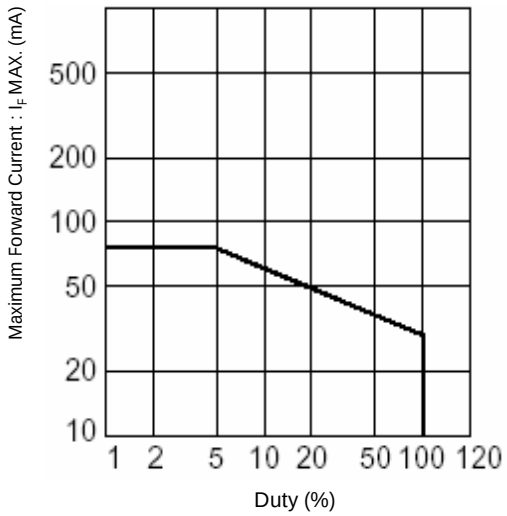


Power Dissipation vs. Ambient Temperature

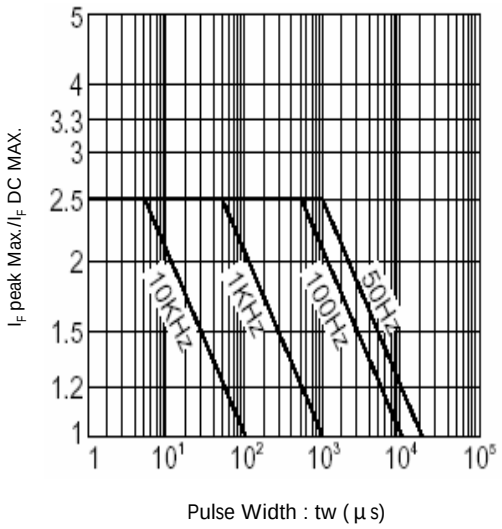


Technical Data**(MPR)**

Dynamic Drive Rating
Duty cycle vs. Maximum Forward Current
Condition : Ta = 25°C

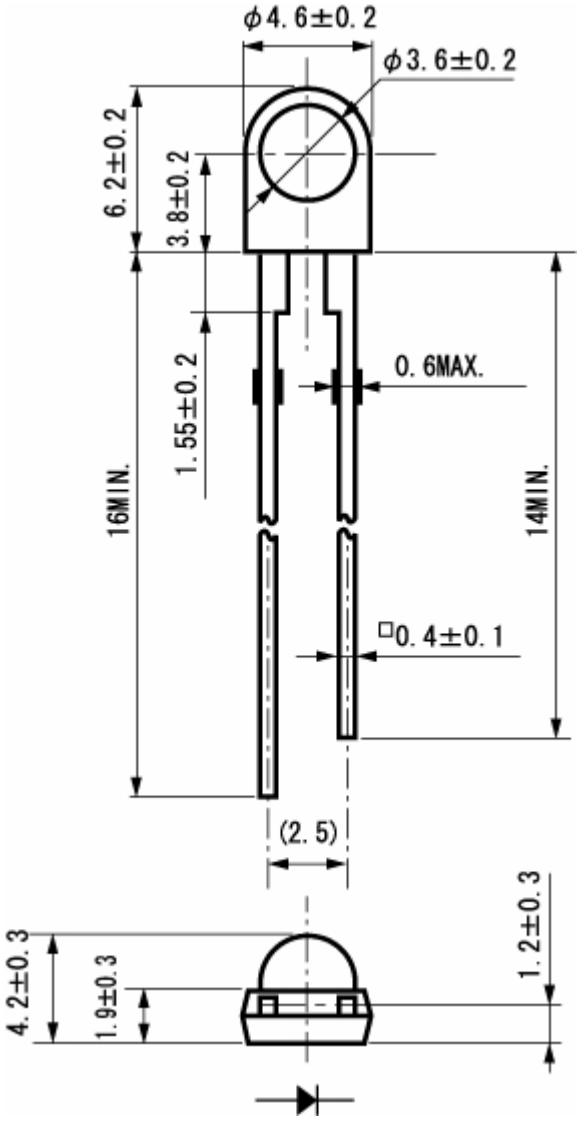


Pulse Width vs. Maximum Tolerable Peak Current
Condition : Ta = 25°C



Package Dimensions

(Unit: mm)



TTW (Through The Wave) soldering Conditions

Pre-heating	100 °C 60 s	(MAX.) (MAX.)
Solder Bath Temp.	265 °C	(MAX.)
Dipping Time	5 s	(MAX.)

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.)
Soldering time and frequency	3 s 2 times	(MAX.) (MAX.)

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	0/25
Resistance to Soldering Heat	EIAJ ED-4701/300(302)	260±5℃, 3mm from package base	10sec	0/25
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	0/25
Wet High Temp. Storage Life	EIAJ ED-4701/100(103)	Ta = 60±2℃, RH = 90±5%	1,000 h	0/25
High Temp. Storage Life	EIAJ ED-4701/200(201)	Ta = Maximum Rated Storage Temperature	1,000 h	0/25
Low Temp. Storage Life	EIAJ ED-4701/200(202)	Ta = Minimum Rated Storage Temperature	1,000 h	0/25
Lead Tension	EIAJ ED-4701/400(401)	10N,1time (□0.4 and Flat Package : 5N)	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

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	-	-	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.

5) If the products in the data sheets are to be used for purposes other than the above which requires high level reliability and safety where failure and or malfunction of the product may cause death or other serious effects on the human body such as airplane, space activity, transportation, medical, nuclear), please contact our sales personnel.

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