Pb-free HEAT

5304S Series

Single Color φ5 Round Shape Type

Features

Package	φ5 Round shape type Water Clear epoxy
Product features	• Outer Dimension φ5 Round shape type • Operation temperature range. Storage Temperature :-30℃～100℃ Operating Temperature :-30℃～85℃ • Lead-free soldering compatible • RoHS compliant
Dominant wavelength	Green : 558nm (EBG) : 567nm (EPG) Yellow Green : 572nm (EPY) Yellow : 590nm (EAY) Orange : 606nm (EAA) Red : 624nm (EVR) : 647nm (EBR) : 630nm (PR)
Half Intensity Angle	EBG,EPG,EAY,EAA,EVR,PR : 20 deg. EPY : 16 deg. EBR : 12 deg.
Die materials	EBG,EPG,EPY,PR : GaP EAY,EAA,EVR : GaAsP EBR : GaAlAs
Rank grouping parameter	Sorted by luminous intensity per rank taping
Soldering methods	TTW (Through The Wave) soldering and manual soldering
ESD	More than 2kV (HBM)
Packing	Bulk : 200pcs(MIN.)

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 λ d (nm)		Luminous Intensity Iv (mcd)		
					TYP.	I_F	MIN.	TYP.	I_F
EBG5304S	GaP	Green	Water Clear	Clear	558	20	50	80	20
EPG5304S	GaP				567	20	60	90	20
EPY5304S	GaP	Yellow Green			572	20	80	160	20
EAY5304S	GaAsP	Yellow			590	20	60	90	20
EAA5304S	GaAsP	Orange			606	20	60	90	20
EVR5304S	GaAsP	Red			624	20	60	90	20
EBR5304S	GaAlAs				647	20	80	160	20
PR5304S	GaP				630	10	6	12	10

Absolute Maximum Ratings

(Ta=25℃)

Item	Symbol	Absolute Maximum Ratings								Unit
		EBG	EPG	EPY	EAY	EAA	EVR	EBR	PR	
Power Dissipation	P_d	125	125	125	125	125	75	100	75	mW
Continuous Forward Current	I_F	50	50	50	50	50	30	50	30	mA
Repetitive Peak Forward Current ※1	I_{FRM}	100	100	100	100	100	100	300	100	mA
Derating (Ta=25℃ or higher)	ΔI_F	0.67	0.67	0.67	0.67	0.67	0.33	0.67	0.33	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.

Electro-Optical Characteristics(EBG,EPG,EPY,EAY,EAA,EVR,EBR) (Ta=25℃)

Item	Conditions	Symbol		Characteristics							Unit
				EBG	EPG	EPY	EAY	EAA	EVR	EBR	
Forward Voltage	I_F=20mA	V_F	TYP.	2.1	2.1	2.1	2.2	2.2	2.0	1.7	V
			MAX.	2.5	2.5	2.5	2.5	2.5	2.5	2.0	
Reverse Current	V_R=4V	I_R	MAX.	100	100	100	100	100	100	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.	20	20	16	20	20	20	12	deg.

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

Item	Conditions	Symbol	Characteristics		Unit
				PR	
Forward Voltage	I_F=10mA	V_F	TYP.	2.1	V
			MAX.	2.5	
Reverse Current	V_R=4V	I_R	MAX.	100	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.	20	deg.

Luminous Intensity Rank

(Ta=25℃)

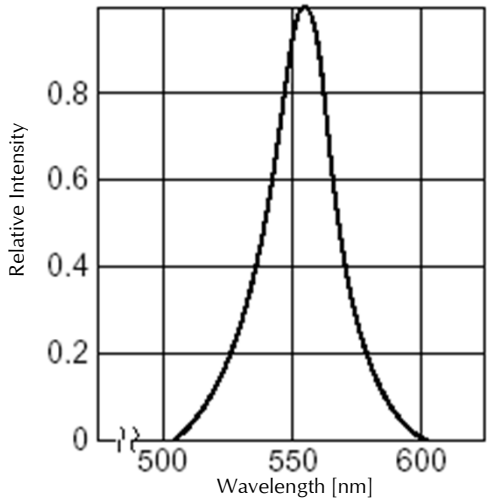
Rank	I_V(mcd)													
	EBG		EPG		EPY		EAY		EAA		EVR		EBR	
	I_F=20mA		I_F=20mA		I_F=20mA		I_F=20mA		I_F=20mA		I_F=20mA		I_F=20mA	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
C	50	100	60	120	80	160	60	120	60	120	60	120	80	160
D	70	140	84	168	112	224	84	168	84	168	84	168	112	224
E	100	-	120	-	160	-	120	-	120	-	120	-	160	-

Rank	I_V(mcd)	
	PR	
	I_F=10mA	
	MIN.	MAX.
A	6	12
B	8.4	16.8
C	12	24
D	16.8	33.6
E	24	-

※Please contact our sales staff concerning rank designation.

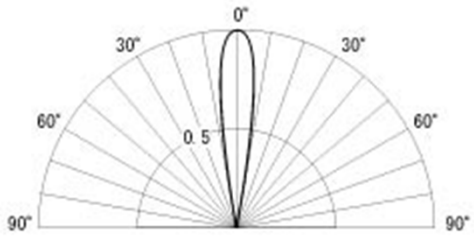
Technical Data(**EBG**)

Spectral Distribution
Relative Intensity vs. Wavelength
Condition : Ta = 25℃, I_F = 20mA

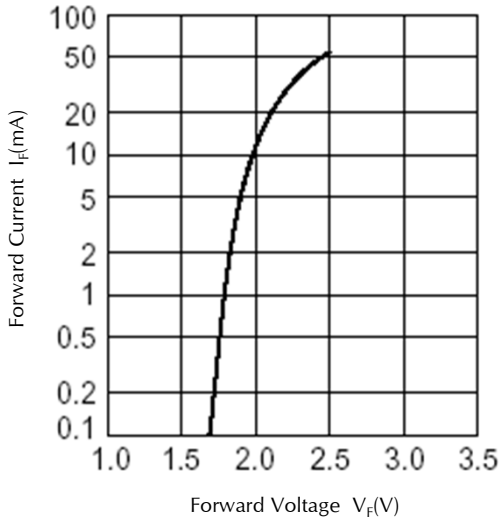


Spatial Distribution Example

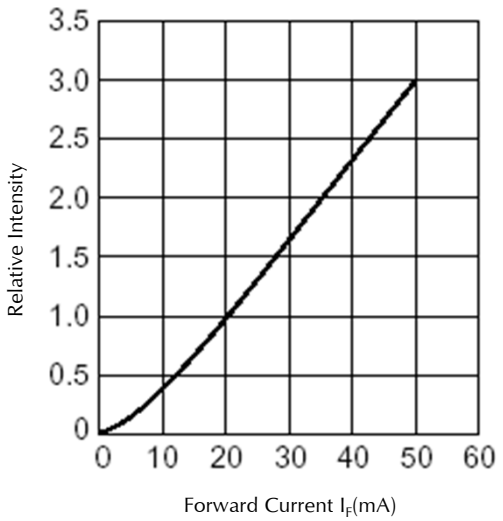
Condition : Ta = 25℃



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



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

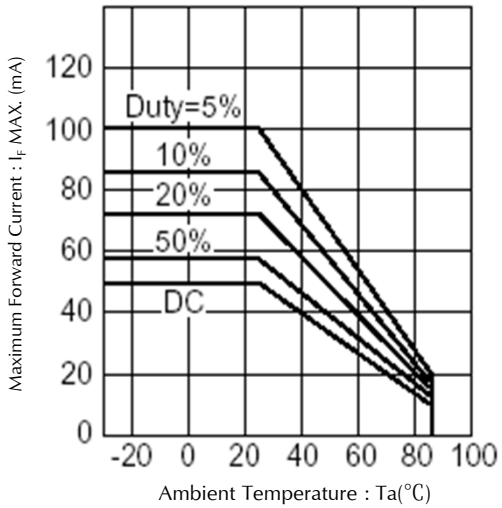


Technical Data(**EBG**)

Derating

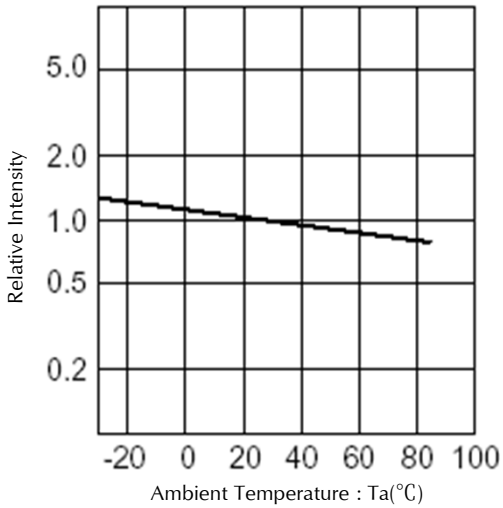
Ambient Temperature vs. Maximum Forward Current

Repetition Frequency : f ≧ 50Hz

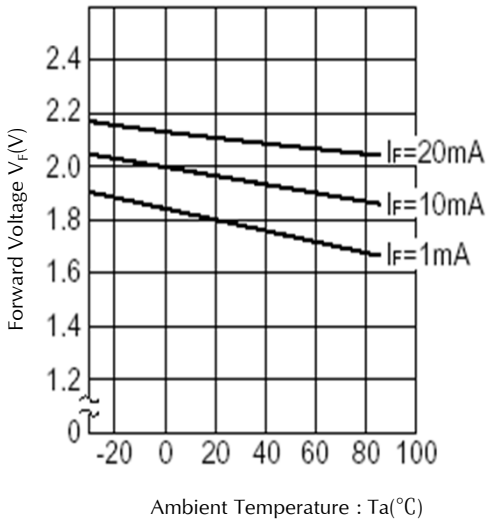


Ambient Temperature vs. Relative Intensity

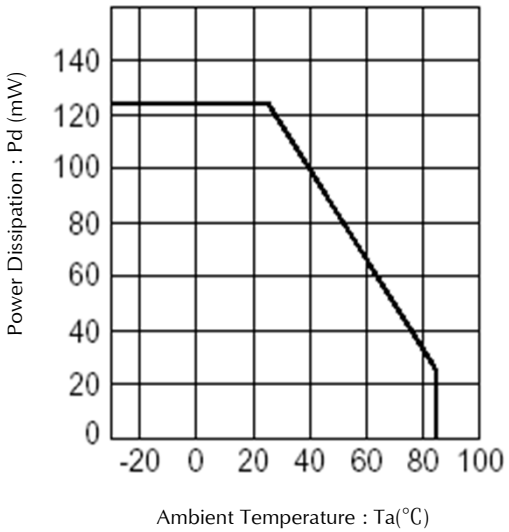
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage



Power Dissipation vs. Ambient Temperature

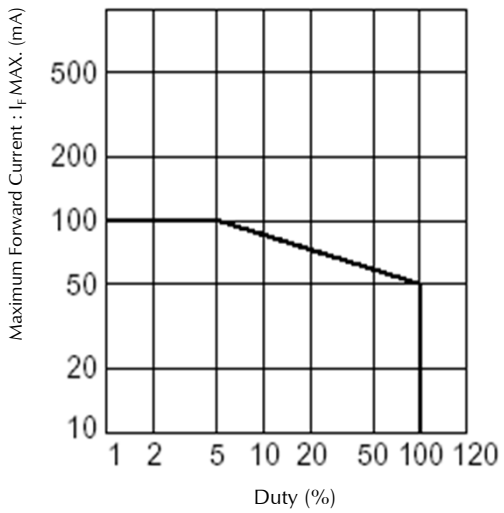


Technical Data(**EBG**)

Dynamic Drive Rating

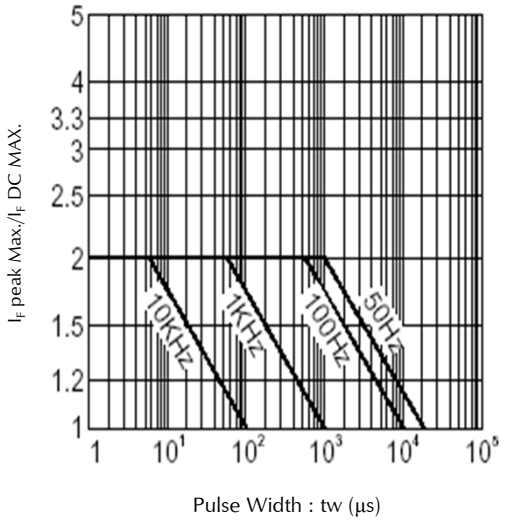
Duty cycle vs. Maximum Forward Current

Condition : Ta = 25℃



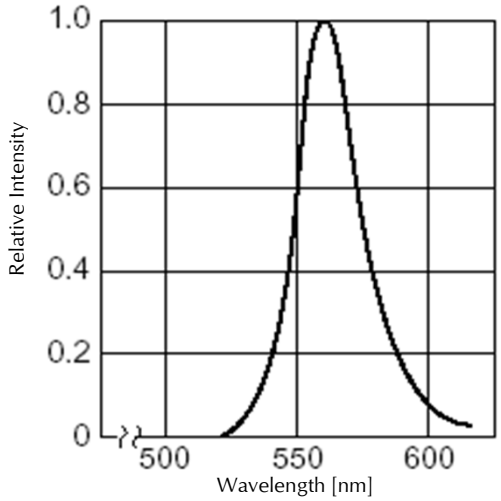
Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃



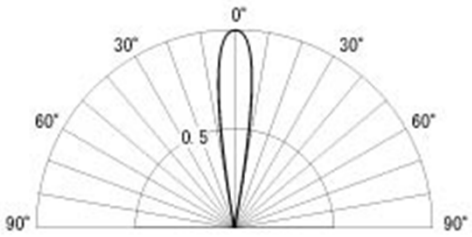
Technical Data(**EPG**)

Spectral Distribution
Relative Intensity vs. Wavelength
Condition : Ta = 25℃, I_F = 20mA

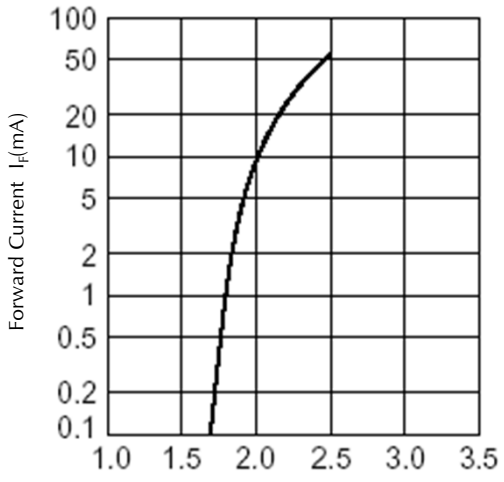


Spatial Distribution Example

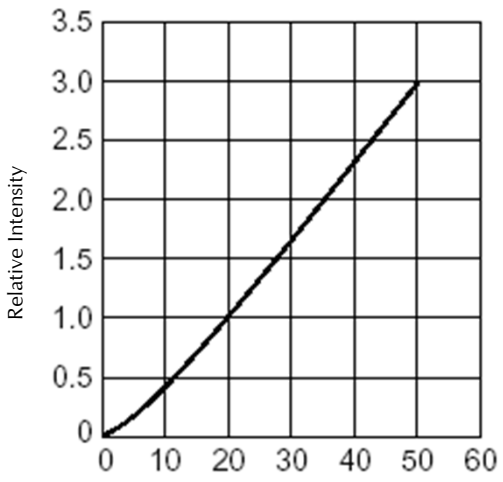
Condition : Ta = 25℃



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

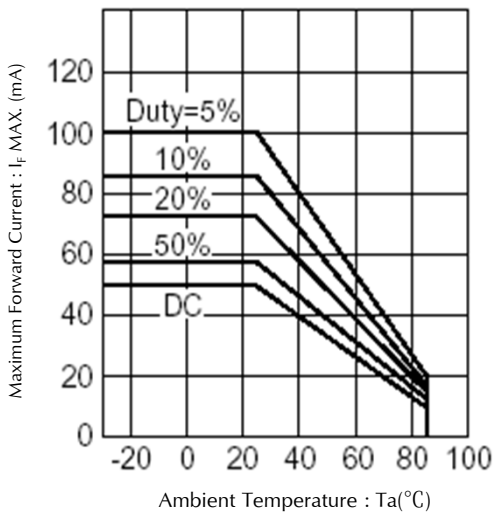


Forward Current vs. Relative Intensity
Condition : Ta = 25℃

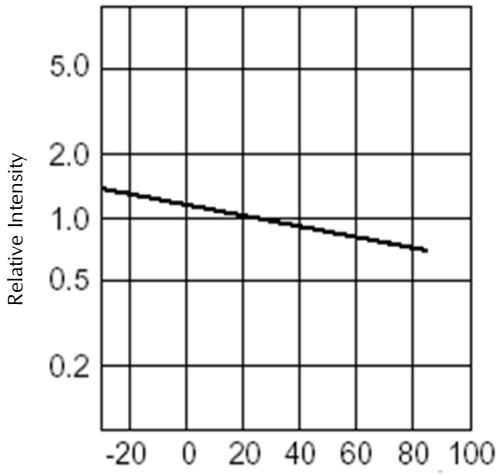


Technical Data(**EPG**)

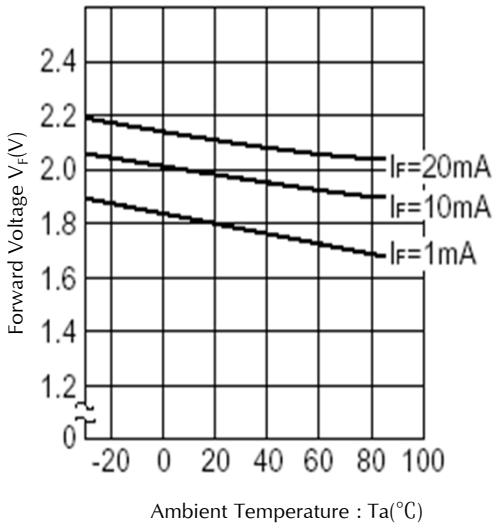
Derating
Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz



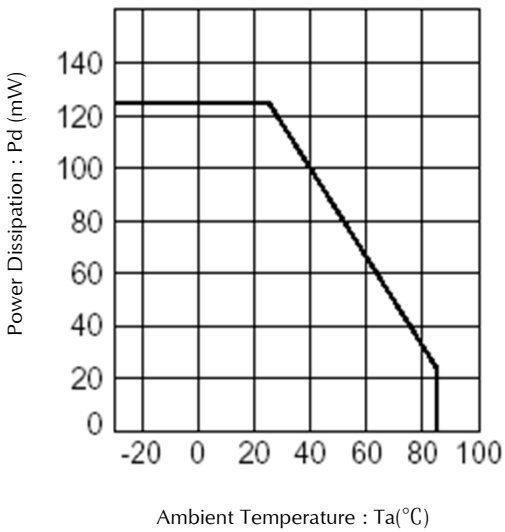
Ambient Temperature vs. Relative Intensity
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage



Power Dissipation vs. Ambient Temperature

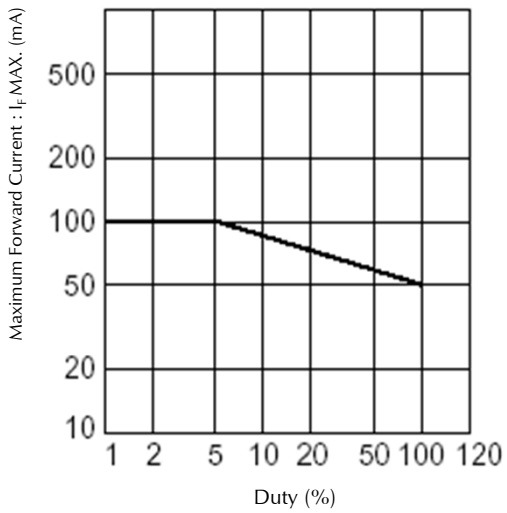


Technical Data(**EPG**)

Dynamic Drive Rating

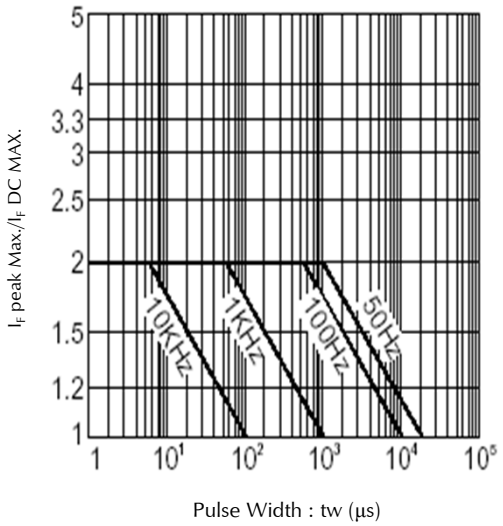
Duty cycle vs. Maximum Forward Current

Condition : Ta = 25℃



Pulse Width vs. Maximum Tolerable Peak Current

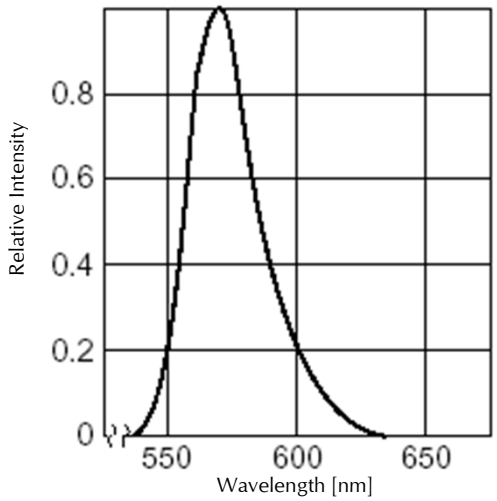
Condition : Ta = 25℃



Technical Data(**EPY**)

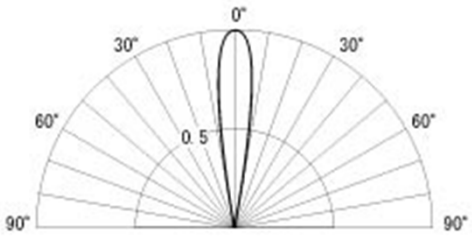
Spectral Distribution

Relative Intensity vs. Wavelength
Condition : Ta = 25℃, I_F = 20mA



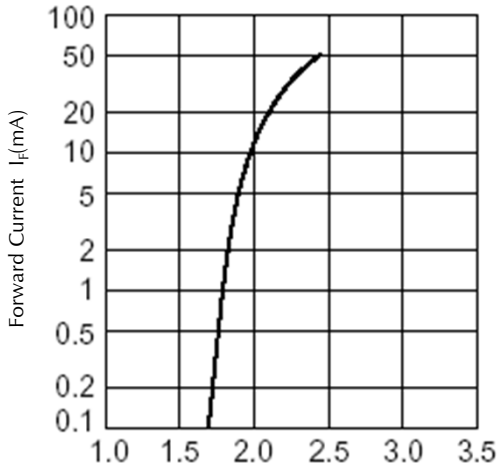
Spatial Distribution Example

Condition : Ta = 25℃



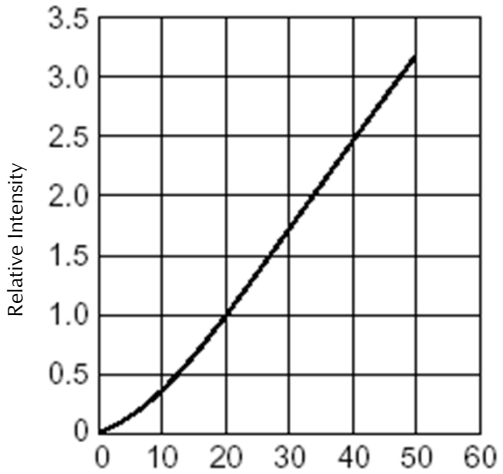
Forward Voltage vs. Forward Current

Condition : Ta = 25℃



Forward Current vs. Relative Intensity

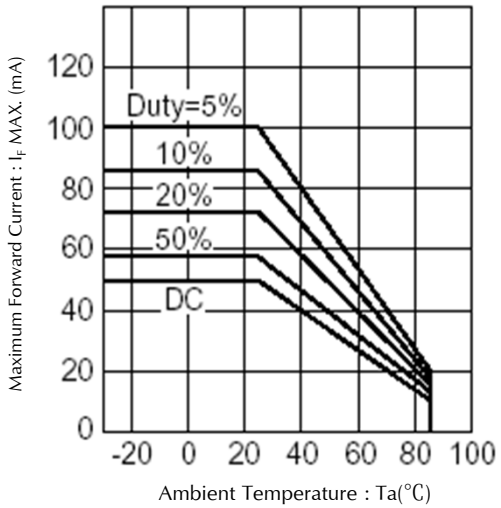
Condition : Ta = 25℃



Technical Data(**EPY**)

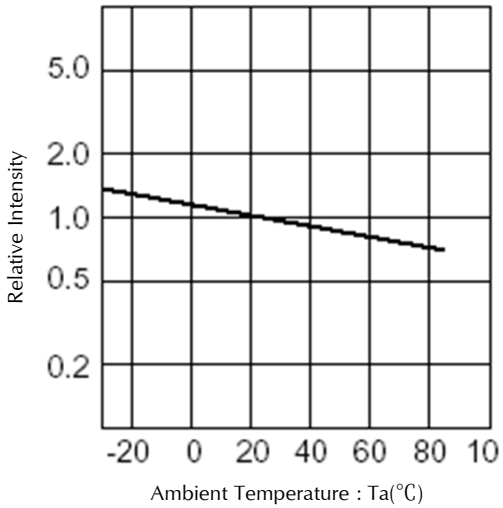
Derating

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

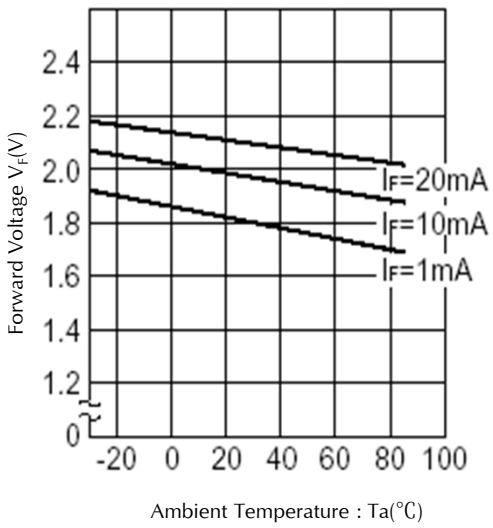


Ambient Temperature vs. Relative Intensity

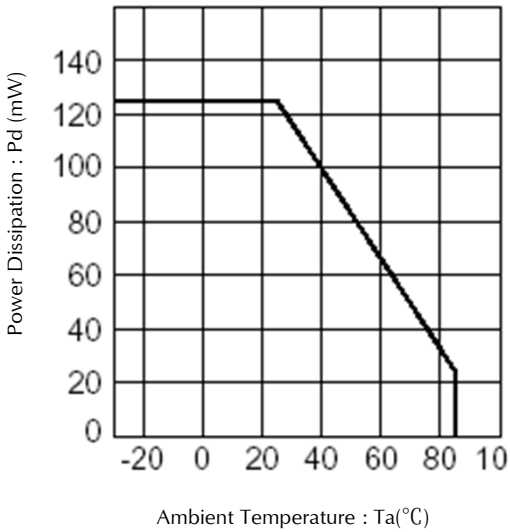
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage

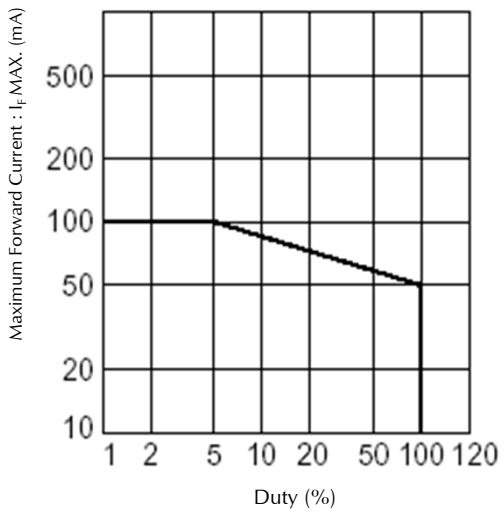


Power Dissipation vs. Ambient Temperature

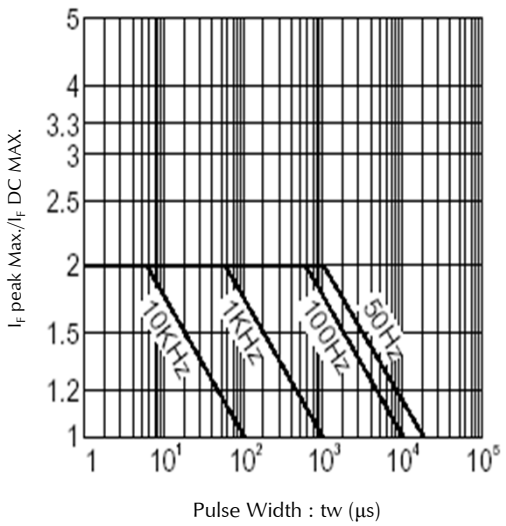


Technical Data(**EPY**)

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



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

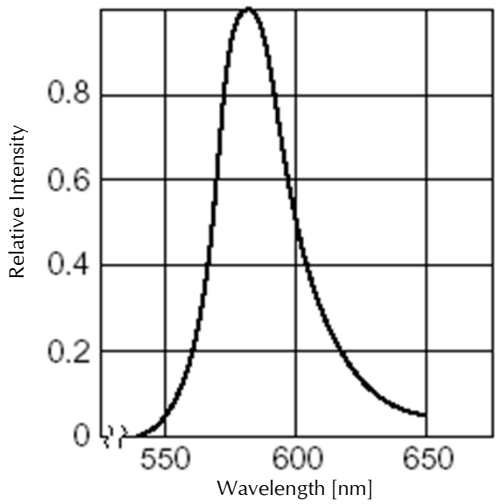


Technical Data(**EAY**)

Spectral Distribution

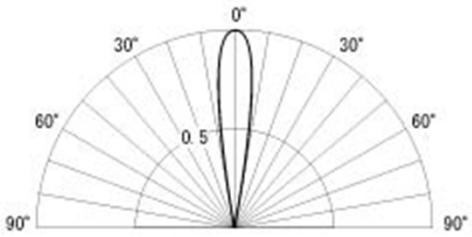
Relative Intensity vs. Wavelength

Condition : Ta = 25℃, I_F = 20mA



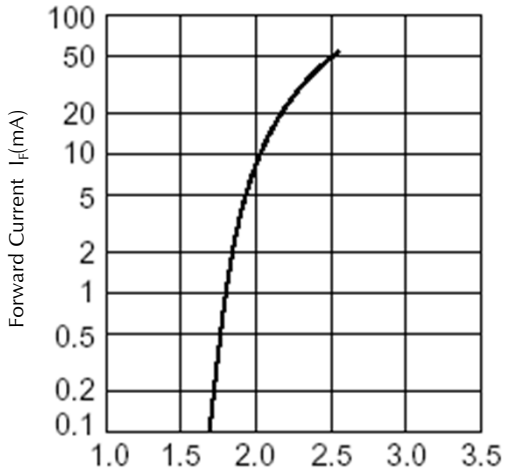
Spatial Distribution Example

Condition : Ta = 25℃



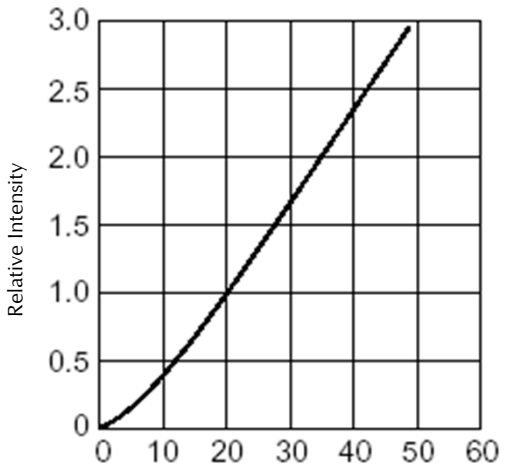
Forward Voltage vs. Forward Current

Condition : Ta = 25℃



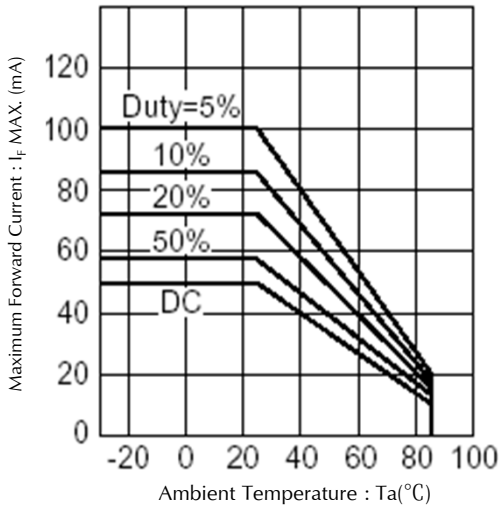
Forward Current vs. Relative Intensity

Condition : Ta = 25℃

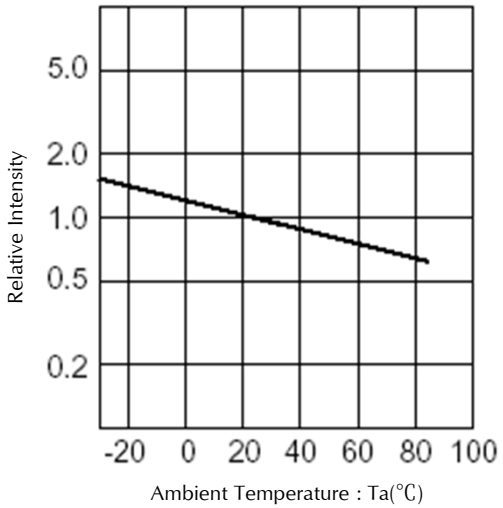


Technical Data(**EAY**)

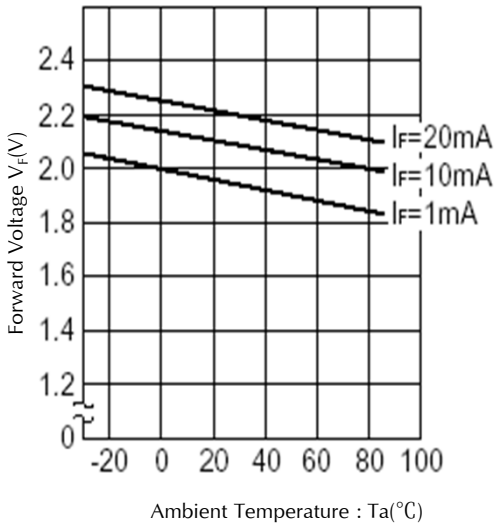
Derating
Ambient Temperature vs. Maximum Forward Current
Repetition Frequency : f ≧ 50Hz



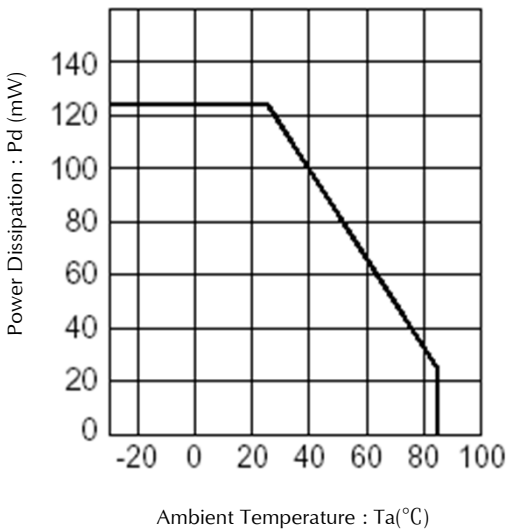
Ambient Temperature vs. Relative Intensity
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage

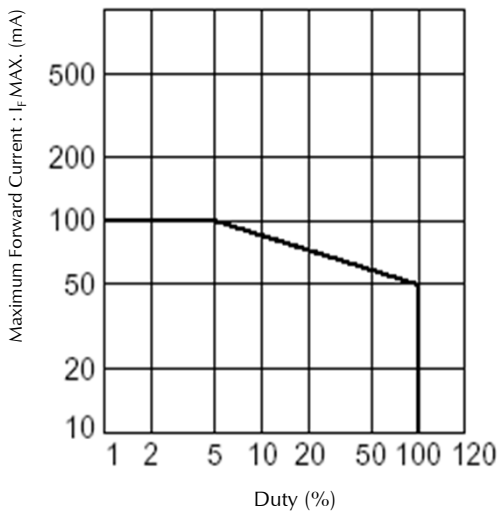


Power Dissipation vs. Ambient Temperature

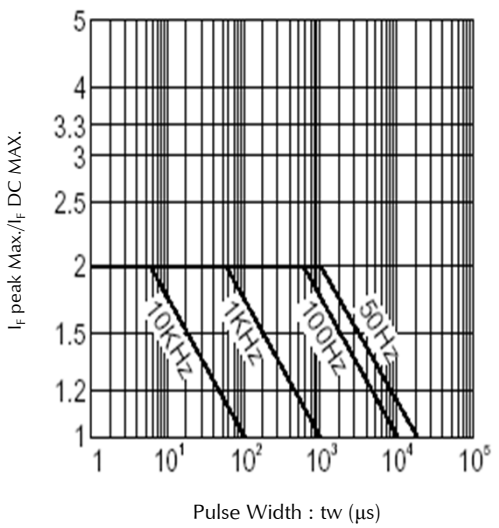


Technical Data(**EAY**)

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



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

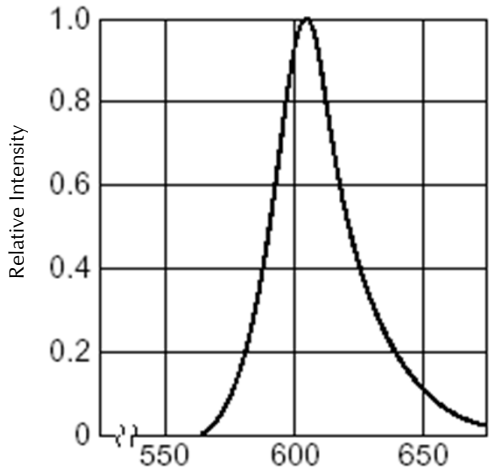


Technical Data(**EAA**)

Spectral Distribution

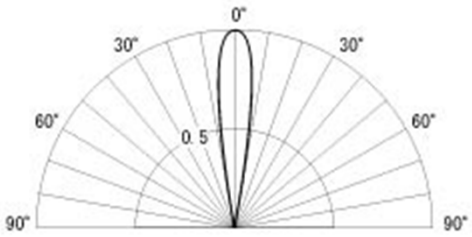
Relative Intensity vs. Wavelength

Condition : Ta = 25℃, I_F = 20mA



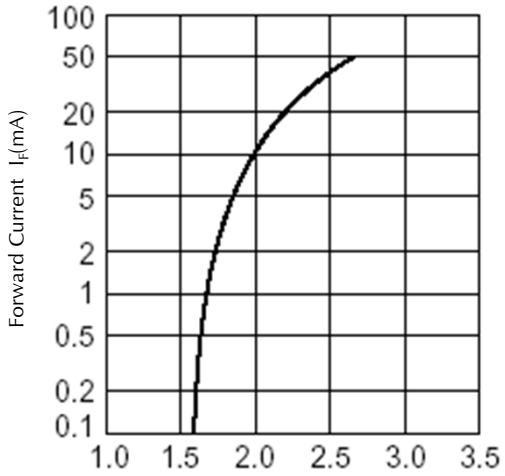
Spatial Distribution Example

Condition : Ta = 25℃



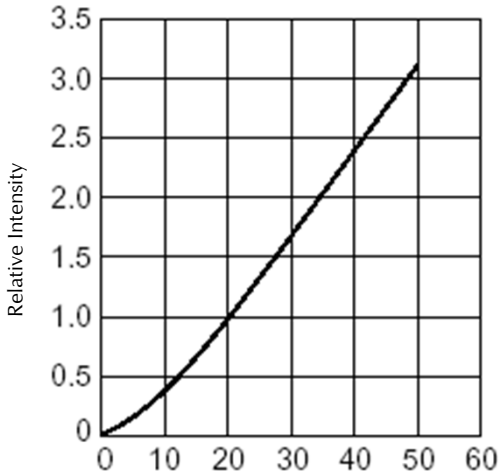
Forward Voltage vs. Forward Current

Condition : Ta = 25℃



Forward Current vs. Relative Intensity

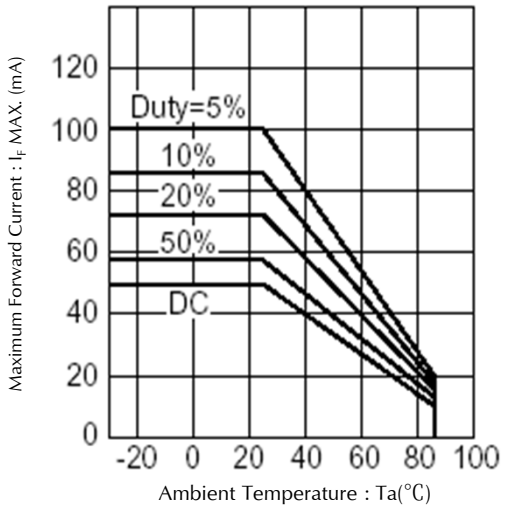
Condition : Ta = 25℃



Technical Data(**EAA**)

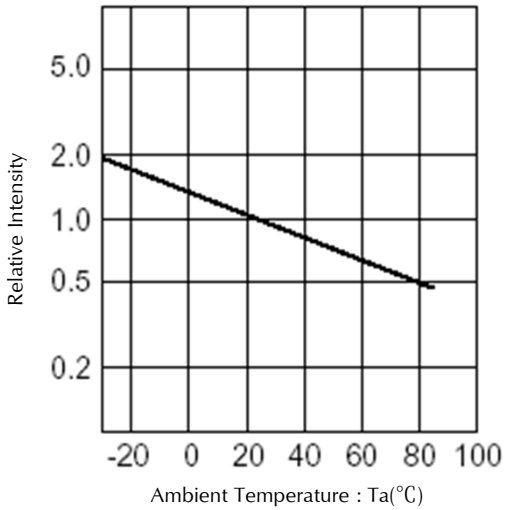
Derating

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

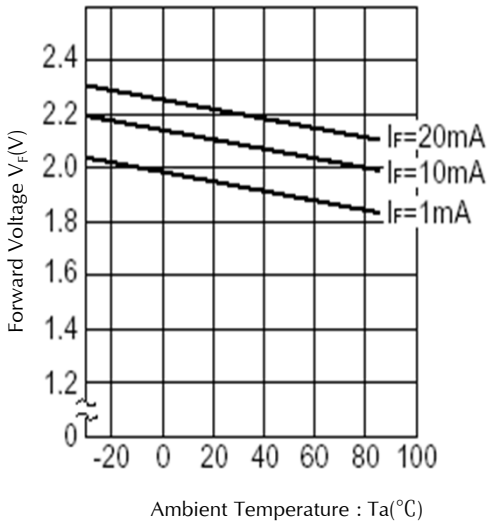


Ambient Temperature vs. Relative Intensity

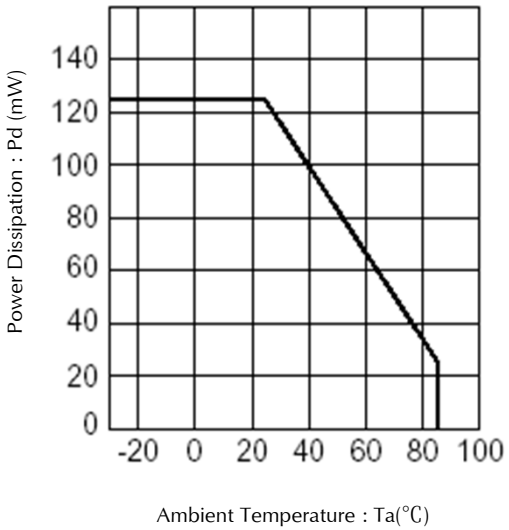
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage



Power Dissipation vs. Ambient Temperature

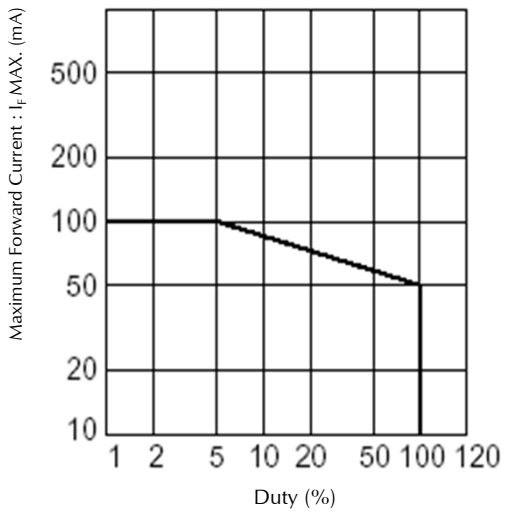


Technical Data(**EAA**)

Dynamic Drive Rating

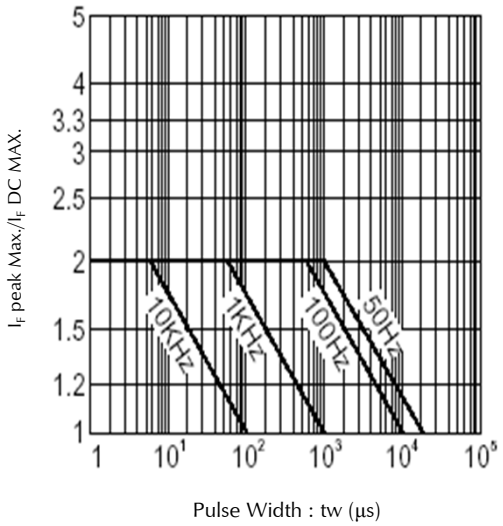
Duty cycle vs. Maximum Forward Current

Condition : Ta = 25℃



Pulse Width vs. Maximum Tolerable Peak Current

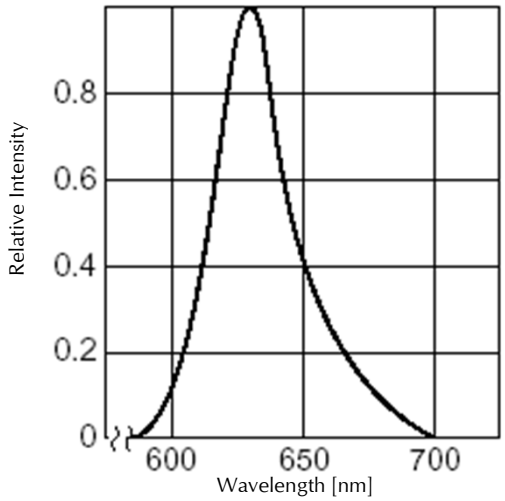
Condition : Ta = 25℃



Technical Data(**EVR**)

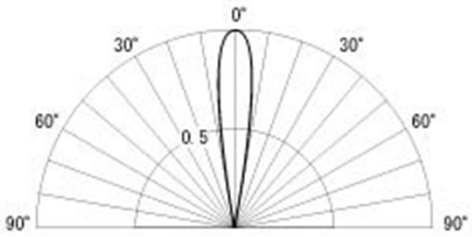
Spectral Distribution

Relative Intensity vs. Wavelength
Condition : Ta = 25℃, I_F = 20mA



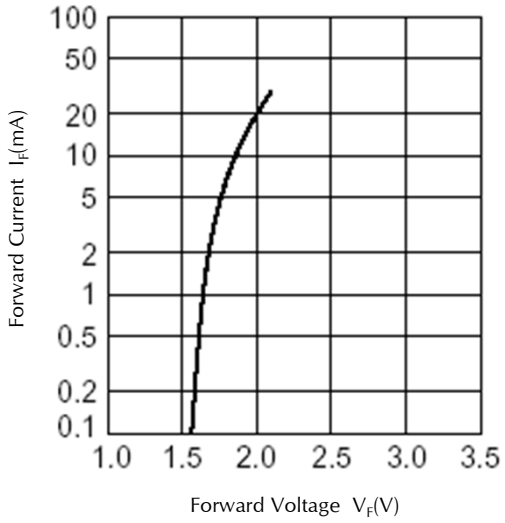
Spatial Distribution Example

Condition : Ta = 25℃



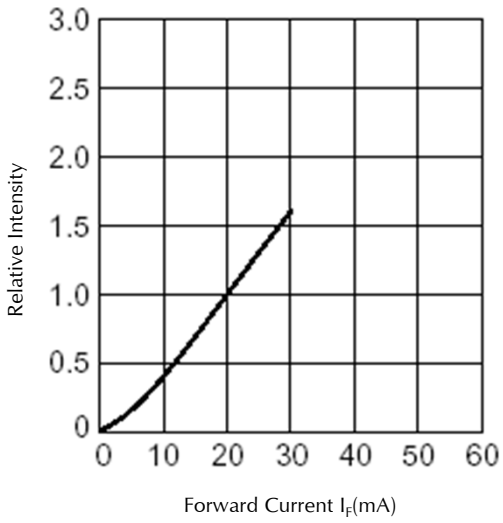
Forward Voltage vs. Forward Current

Condition : Ta = 25℃



Forward Current vs. Relative Intensity

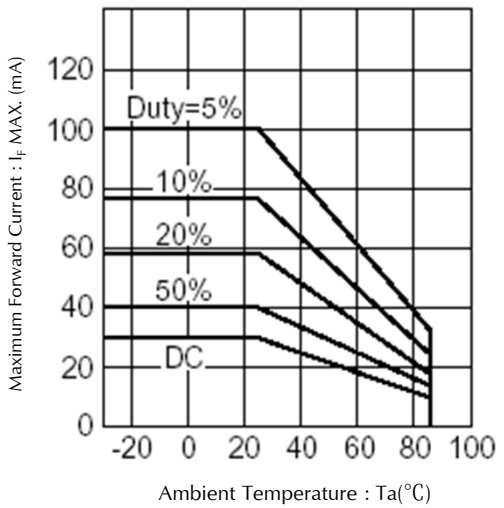
Condition : Ta = 25℃



Technical Data(**EVR**)

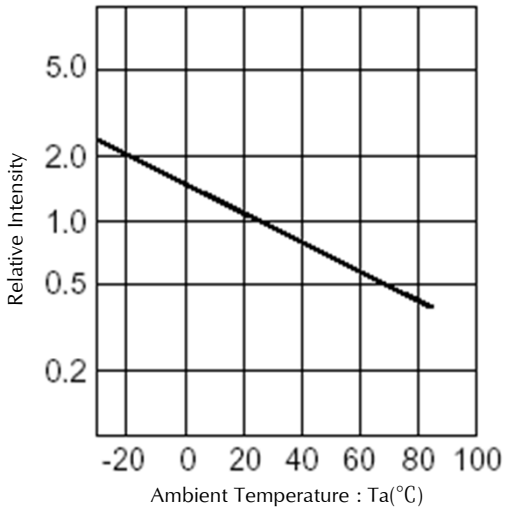
Derating

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

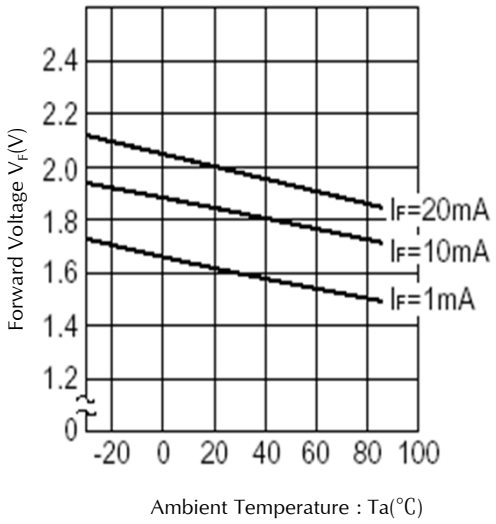


Ambient Temperature vs. Relative Intensity

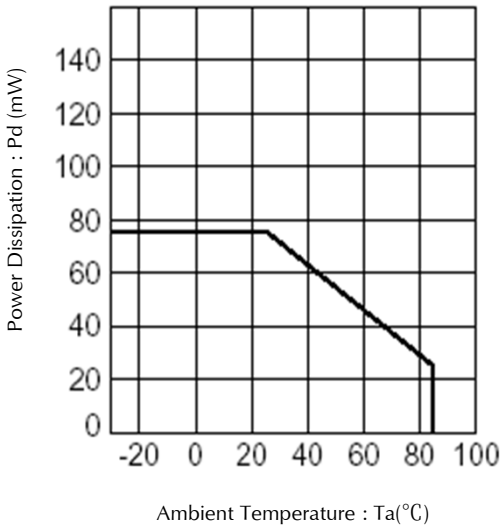
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage

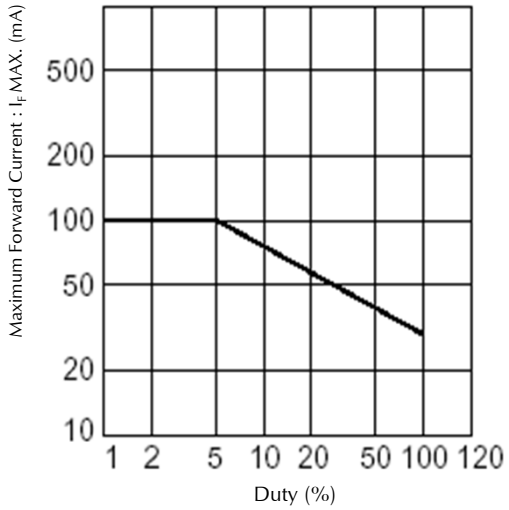


Power Dissipation vs. Ambient Temperature

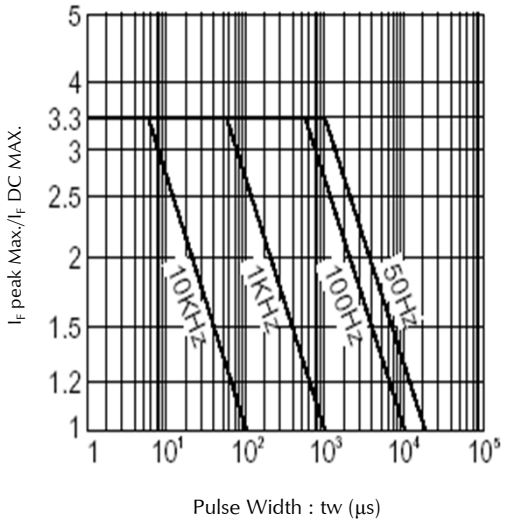


Technical Data(**EVR**)

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



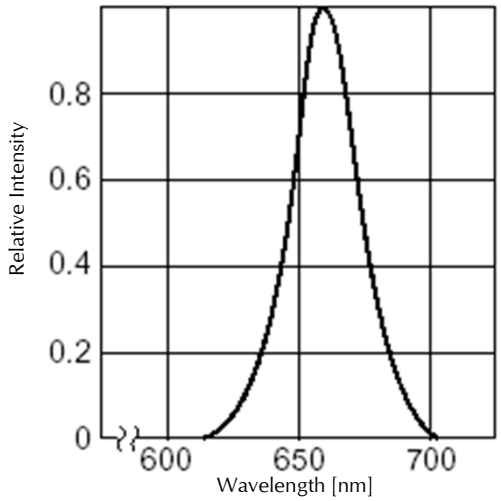
Pulse Width vs. Maximum Tolerable Peak Current
Condition : Ta = 25℃



Technical Data(**EBR**)

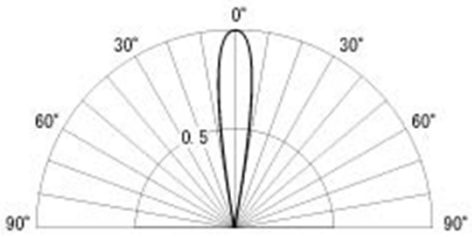
Spectral Distribution

Relative Intensity vs. Wavelength
Condition : Ta = 25℃, I_F = 20mA



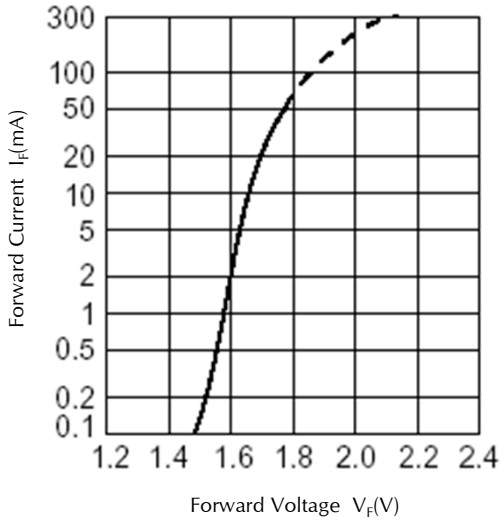
Spatial Distribution Example

Condition : Ta = 25℃



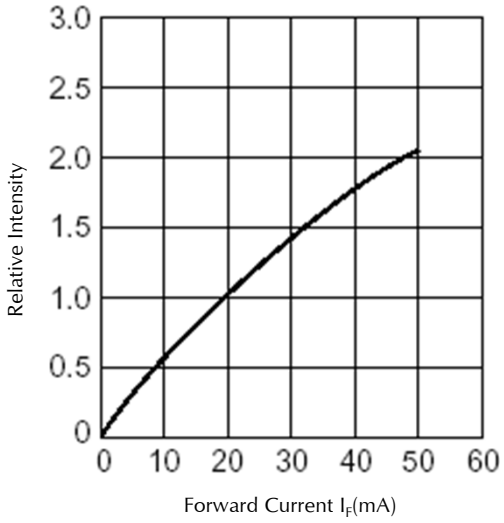
Forward Voltage vs. Forward Current

Condition : Ta = 25℃



Forward Current vs. Relative Intensity

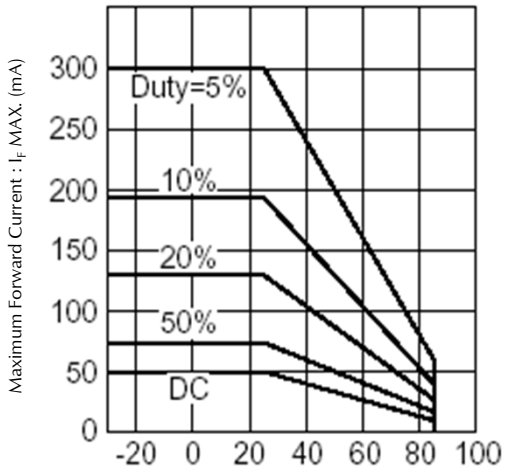
Condition : Ta = 25℃



Technical Data(**EBR**)

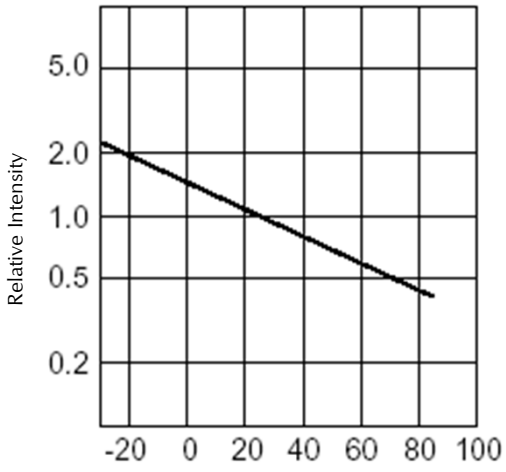
Derating

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

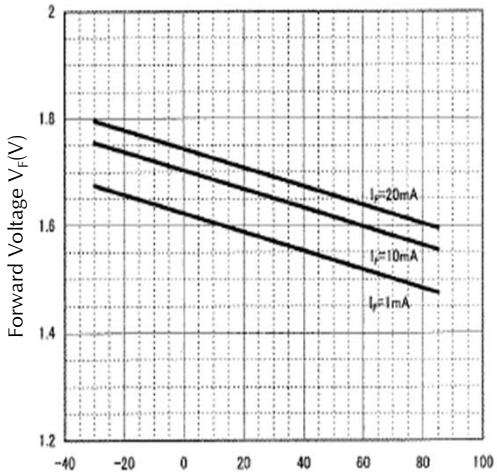


Ambient Temperature vs. Relative Intensity

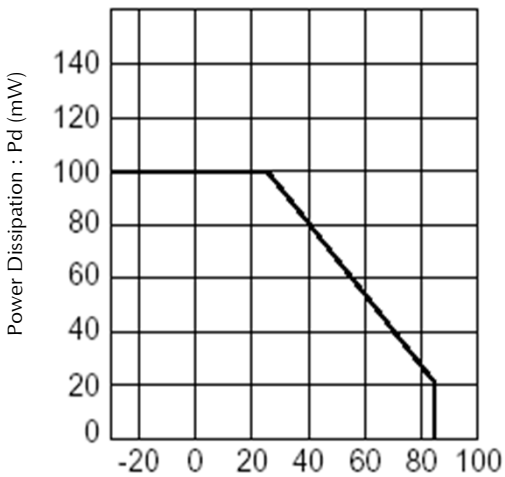
Condition : I_F=20mA



Ambient Temperature vs. Forward Voltage



Power Dissipation vs. Ambient Temperature

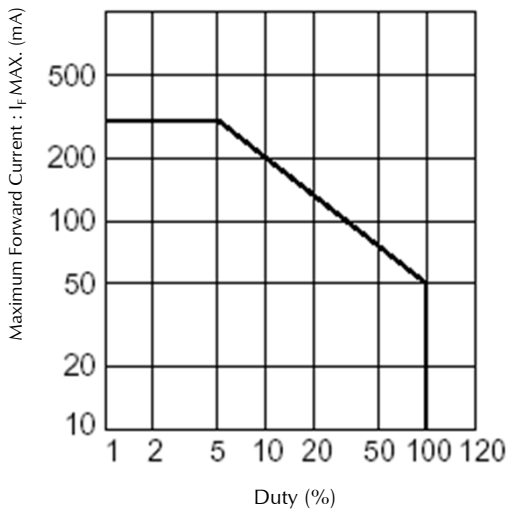


Technical Data(**EBR**)

Dynamic Drive Rating

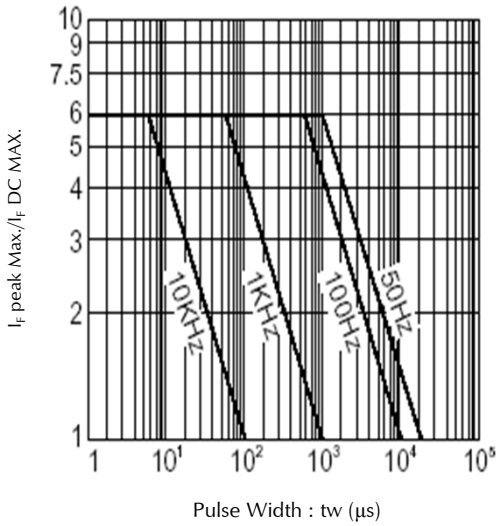
Duty cycle vs. Maximum Forward Current

Condition : Ta = 25℃



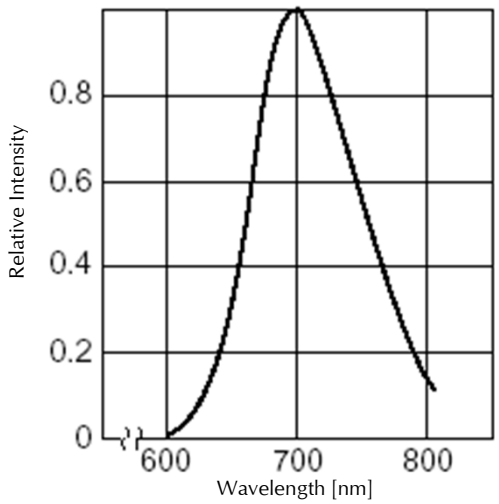
Pulse Width vs. Maximum Tolerable Peak Current

Condition : Ta = 25℃



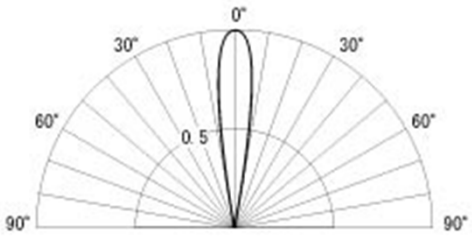
Technical Data(**PR**)

Spectral Distribution
Relative Intensity vs. Wavelength
Condition : Ta = 25℃, I_F = 10mA

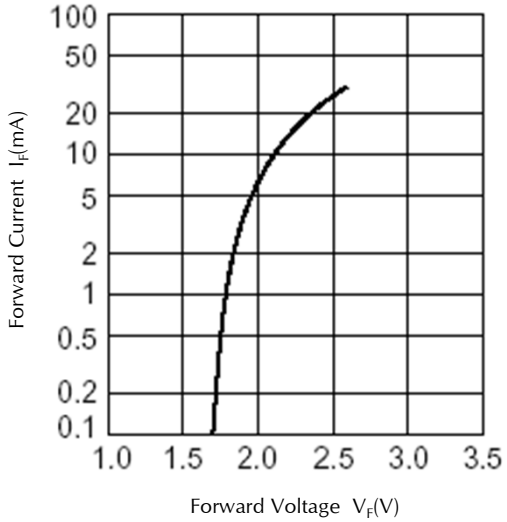


Spatial Distribution Example

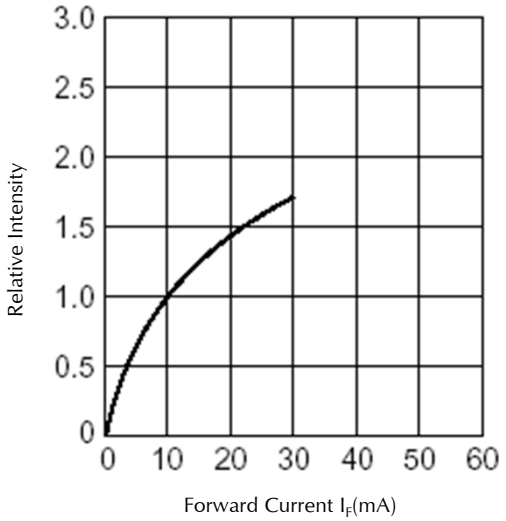
Condition : Ta = 25℃



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



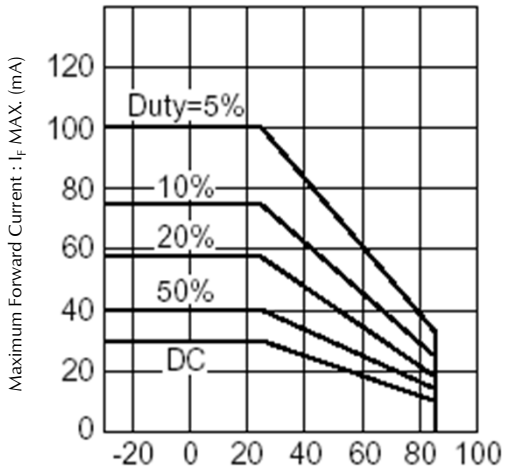
Forward Current vs. Relative Intensity
Condition : Ta = 25℃



Technical Data(**PR**)

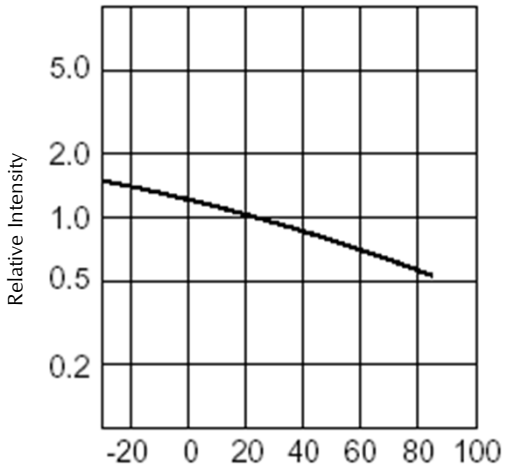
Derating

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

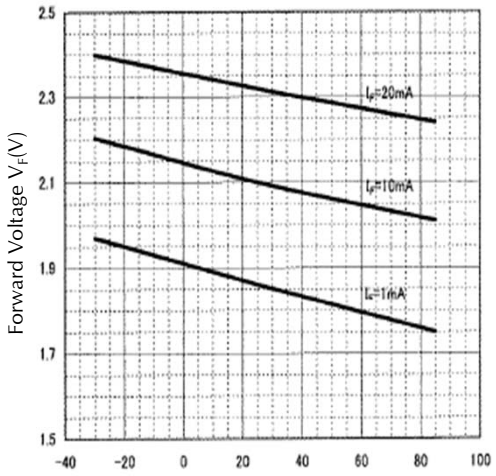


Ambient Temperature vs. Relative Intensity

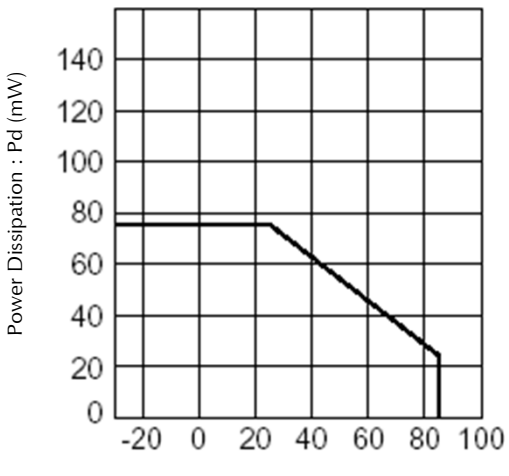
Condition : I_F=10mA



Ambient Temperature vs. Forward Voltage

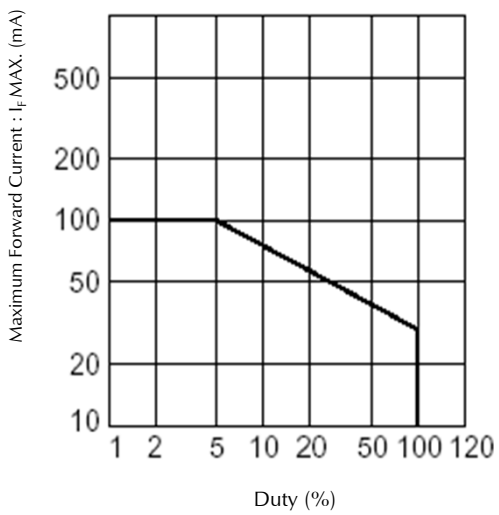


Power Dissipation vs. Ambient Temperature

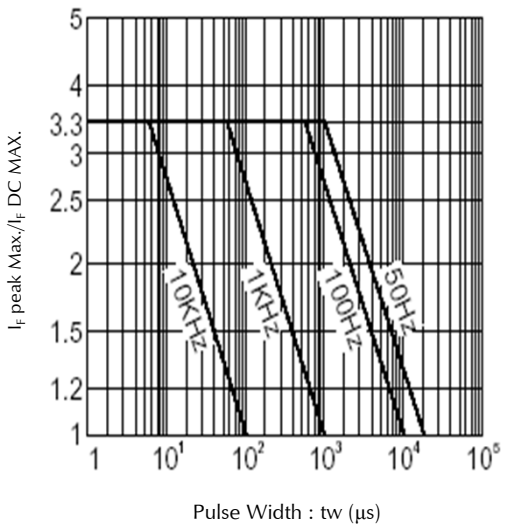


Technical Data(**PR**)

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



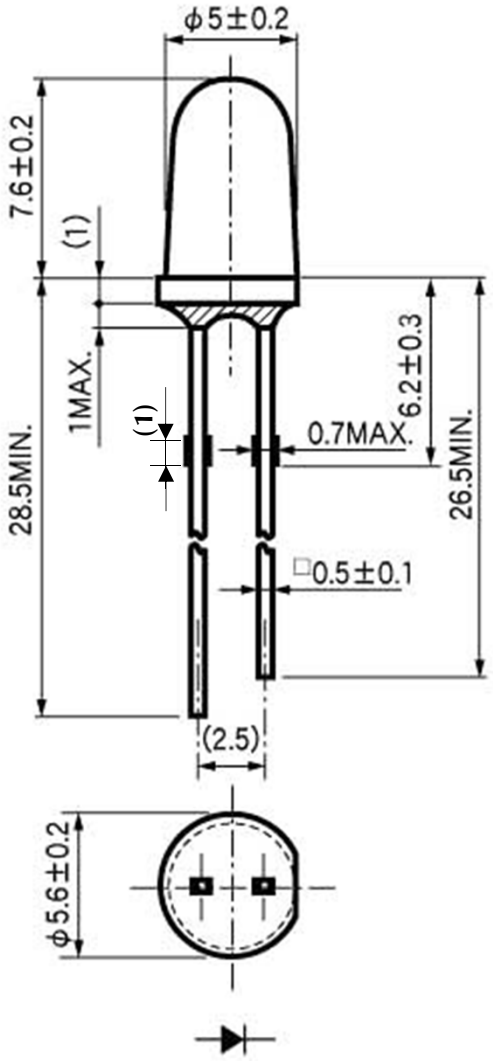
Pulse Width vs. Maximum Tolerable Peak Current
Condition : Ta = 25℃



Package Dimensions

(Unit: mm)

Mass : (0.34)g



TTW (Through The Wave) soldering Conditions

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

1) The dip soldering process shall be 2 times maximum.
2) The product shall be cooled to room temp. before the second dipping process.

※The detail is described to LED and Photodetector handling precautions of home page:
"Mounting through-hole Type Devices" and "Soldering", and use it after the confirmation, please.

Manual Soldering Conditions

Iron tip temp.	360℃	(MAX.)
Soldering time and frequency	3 s 2 times	(MAX.) (MAX.)

※The detail is described to LED and Photodetector handling precautions of home page:
"Mounting through-hole Type Devices" and "Soldering", and use it after the confirmation, please.

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	10s	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)	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

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

Special Notice to Customers Using the Products and Technical Information Shown in This Data Sheet

1) The technical information shown in the data sheets are limited to the typical characteristics and circuit examples of the referenced products. It does not constitute the warranting of industrial property nor the granting of any license.

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 that have been described to this catalog are manufactured so that they will be used for the electrical instrument of the benchmark (OA equipment, telecommunications equipment, AV machine, home appliance and measuring instrument).
The application of aircrafts, space borne application, transportation equipment, medical equipment and nuclear power control equipment, etc. needs a high reliability and safety, and the breakdown and the wrong operation might influence the life or the human body. Please consult us beforehand if you plan to use our product for the usages of aircrafts, space borne application, transportation equipment, medical equipment and nuclear power control equipment, etc. except OA equipment, telecommunications equipment, AV machine, home appliance and measuring instrument.

5) In order to export the products or technologies described in this data sheet which are under the "Foreign Exchange and Foreign Trade Control Law," it is necessary to first obtain an export permit from the Japanese government.

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7) The most updated edition of this data sheet can be obtained from the address below:
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