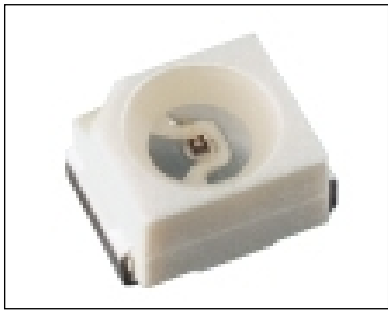




Pb-free
HEAT



1104B Series

Single Color PLCC-2 Bathtub Type
(High Reliability type, V-Series)

Product features

Package	PLCC-2 Bathtub Type. Water clear epoxy	
Product features	• Outer Dimension 3.5 x 2.8 x 1.9mm(L x W x H) • Wide operation temperature range Storage Temperature : -40℃~110℃ Operating Temperature : -40℃~100℃ Operation Guarantee • Ramification of luminosity group sorting. It is possible to have a uniform transmission with little irregularities even when several are lined up. • Systematization of luminosity groups and color tone groups. Unified to a simple standard. • Corresponding to a use requiring high reliability in cars etc... • Spatial distribution characteristics. (2 θ 1/2 : 120deg) • Lead-free soldering compatible • RoHS compliant	
Dominant wavelength	Blue : 470nm (VUB) Green : 530nm (VUG) , 562nm(VYBG) Yellow Green : 572nm (VYPY) Yellow : 590nm (VFY) Orange : 605nm (VFA) Red : 615nm (VFV) , 626nm (VFR)	
Spatial distribution	120 deg.	
Die materials	VUB,VUG : InGaN VYBG, VYPY, VFY, VFA, VFV, VFR :AlGaInP	
Optical efficiency	VUB : 4.4lm/W VUG : 17.6lm/W VYBG : 1.9lm/W VYPY : 7.1lm/W VFY : 15.0lm/W VFA : 15.0lm/W VFV : 18.4lm/W VFR : 13.8lm/W	
Rank grouping parameter	Sorted by luminous intensity and wavelength and taped according to rank.	
Assembly methods (customer)	Corresponding to surface mounter.	
Soldering methods	Corresponding to reflow soldering and manual soldering.	
Taping dimensions	2,000pcs(standard) per reel in a 8mm width tape. Reel diameter : ϕ 180mm	
ESD	AlGaInP:2kV (HBM) InGaN:1kV (HBM)	

Recommended Applications

SW lighting for car indicators, meter panel, car audio and heater control, etc...



1104B Series

Single Color PLCC-2 Bathtub Type
(High Reliability type, V-Series)

Color Variations and Luminous Intensity

(Ta=25°C)

Part No.	Material	Emitted Color	Lens Color	Dominant Wavelength		Luminous Intensity			Luminous Flux	
				λ d (nm)		I _v (mcd)			ϕ v(mlm)	
				TYP.	I _F	MIN.	MAX.	I _F	TYP.	I _F
VUB1104B	InGaN	Blue	Water Clear	470	20	33	150	20	300	20
VUG1104B	InGaN	Green		530	20	120	470	20	1,200	20
VYBG1104B	AlGaInP			562	20	10	47	20	80	20
VYPY1104B	AlGaInP	Yellow Green		572	20	33	220	20	300	20
VFY1104B	AlGaInP	Yellow		590	20	100	330	20	600	20
VFA1104B	AlGaInP	Orange		605	20	82	270	20	600	20
VFV1104B	AlGaInP	Red		615	20	120	390	20	700	20
VFR1104B	AlGaInP			626	20	100	330	20	550	20

※Note : The luminous intensity(I_v) and dominant wavelength (λd) above are the setup values of the sorting machine.
(Tolerance : I_v ... $\pm 10\%$, λd ... ± 1 nm)

Absolute Maximum Ratings

(Ta=25°C)

Item	Symbol	Absolute Maximum Ratings								Unit
		VUB	VUG	VYBG	VYPY	VFY	VFA	VFV	VFR	
Power Dissipation	P _d	78	78	81	81	81	81	81	81	mW
Forward Current	I _F	20	20	30	30	30	30	30	30	mA
Pulse Forward Current ※1	I _{FRM}	50	50	100	100	100	100	100	100	mA
Derating (Ta=72.5°C or higher)	ΔI _F	0.4※2	0.4※2	0.8	0.8	0.8	0.8	0.8	0.8	mA/°C
	ΔI _{FRM}	1.0※2	1.0※2	2.67	2.67	2.67	2.67	2.67	2.67	mA/°C
Reverse Voltage	V _R	5	5	5	5	5	5	5	5	V
Operating Temperature	T _{opr}	-40~+100								°C
Storage Temperature	T _{stg}	-40~+110								°C

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

※2 Temperature Condition: Ta=60°C or higher.

Thermal Characteristics

Item	Symbol	Ratings								Unit
		VUB	VUG	VYBG	VYPY	VFY	VFA	VFV	VFR	
Junction Temperature (MAX.)	T _j	110	110	110	110	110	110	110	110	°C
Thermal Resistance (TYP.) (Junction/ ambient)	R _(th j-a)	350	350	400	400	400	400	400	400	°C/W

※R_(th j-a) Measurement Condition / Substrate: FR4(t=1.6mm) Pattern Size: 16mm².

Electro-Optical Characteristics (VUB,VUG)

(Ta=25°C)

Item	Conditions	Symbol	Characteristic Ratings		Unit
			VUB	VUG	
Forward Voltage	I _F =20mA	V _F	TYP.	3.4	V
			MAX.	3.9	
Reverse Current	V _R =5V	I _R	MAX.	100	μ A
Peak Wavelength	I _F =20mA	λ _p	TYP.	465	nm
Dominant Wavelength	I _F =20mA	λ _d	TYP.	470	nm
Spectral Line Half Width	I _F =20mA	Δλ	TYP.	26	nm
Half Intensity Angle	I _F =20mA	2θ 1/2	TYP.	120	deg.

※Note: The dominant wave length (λ d) above is the setup value of the sorting machine.
(Tolerance : λ d...±1nm)

Electro-Optical Characteristics (VYBG, VYPY, VFY, VFA, VFV, VFR) (Ta=25°C)

Item		Symbol	Characteristic Rating							Unit
	Conditions			VYBG	VYPY	VFY	VFA	VFV	VFR	
Forward Voltage	I _F =20mA	V _F	TYP.	2.1	2.1	2.0	2.0	1.9	2.0	V
			MAX.	2.5	2.5	2.5	2.5	2.4	2.5	
Reverse Current	V _R =5V	I _R	MAX.	100	100	100	100	100	100	μ A
Peak Wavelength	I _F =20mA	λ _p	TYP.	565	575	592	609	624	635	nm
Dominant Wavelength	I _F =20mA	λ _d	TYP.	562	572	590	605	615	626	nm
Spectral Line Half Width	I _F =20mA	Δλ	TYP.	15	15	15	15	15	15	nm
Half Intensity Angle	I _F =20mA	2 θ 1/2	TYP.	120	120	120	120	120	120	deg.

※Note: The dominant wave length (λ d) above is the setup value of the sorting machine.
(Tolerance : λ d...±1nm)

Luminous Intensity Rank

(Ta=25°C)

Standard Chart(Unit: mcd)

Rank	I _v (mcd)		VUB	VUG	VYBG	VYPY	VFY	VFA	VFV	VFR
	MIN.	MAX.	I _F =20mA							
A9	4.7	5.6								
AX	5.6	6.8								
AY	6.8	8.2								
AZ	8.2	10								
B1	10	12			B1					
B2	12	15								
B3	15	18								
B4	18	22								
B5	22	27								
B6	27	33								
B7	33	39	B7			B7				
B8	39	47			B8					
B9	47	56								
BX	56	68								
BY	68	82								
BZ	82	100						BZ		
C1	100	120	C2	C2		C4	C1		C2	C1
C2	120	150								
C3	150	180								
C4	180	220				C4				
C5	220	270					C6	C5		
C6	270	330							C7	C6
C7	330	390								
C8	390	470		C8						
C9	470	560								
CX	560	680								
CY	680	820								
CZ	820	1,000								

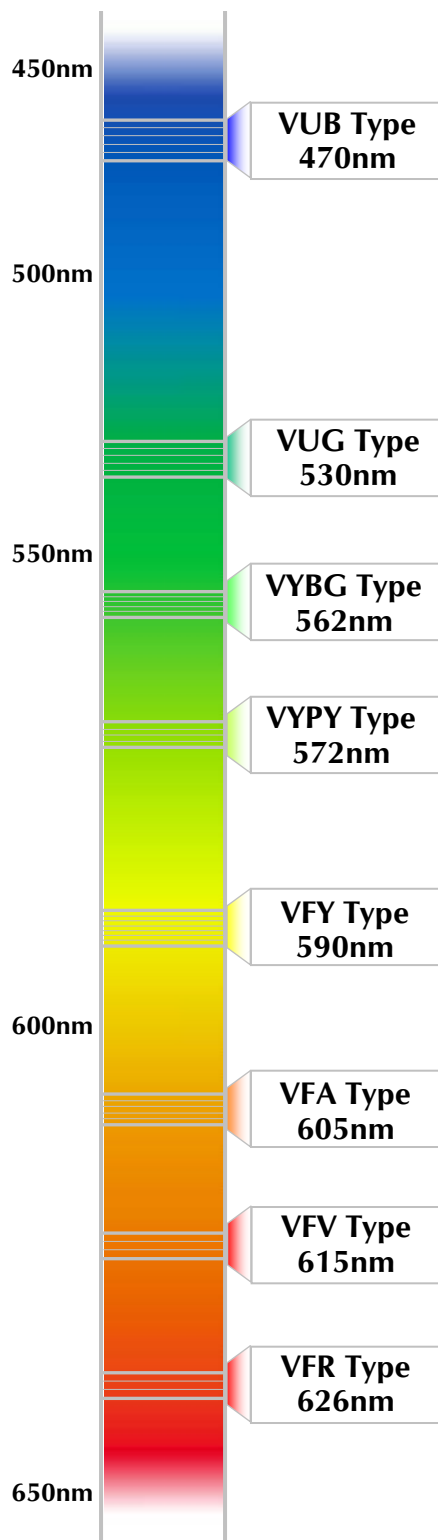
※Limited width of luminous intensity rank is from Min.4 rank width.

Color Tone Groups (λ_d)

(Ta=25°C)

(unit: nm)

Tolerance: +/-1nm



VUB Type (I_F=20mA)

	A	B	C	D
MIN.	460.0	464.0	468.0	472.0
MAX.	464.0	468.0	472.0	476.0

VUG Type (I_F=20mA)

	A	B	C	D
MIN.	515.0	520.0	525.0	530.0
MAX.	520.0	525.0	530.0	535.0

VYBG Type (I_F=20mA)

	B	C	D
MIN.	555.0	558.0	561.0
MAX.	558.0	561.0	564.0

VYPY Type (I_F=20mA)

	A	B	C
MIN.	567.0	570.0	573.0
MAX.	570.0	573.0	576.0

VFY Type (I_F=20mA)

	D	E	F
MIN.	586.0	589.0	592.0
MAX.	589.0	592.0	595.0

VFA Type (I_F=20mA)

	B	C	D
MIN.	600.0	603.0	606.0
MAX.	603.0	606.0	609.0

VFV Type (I_F=20mA)

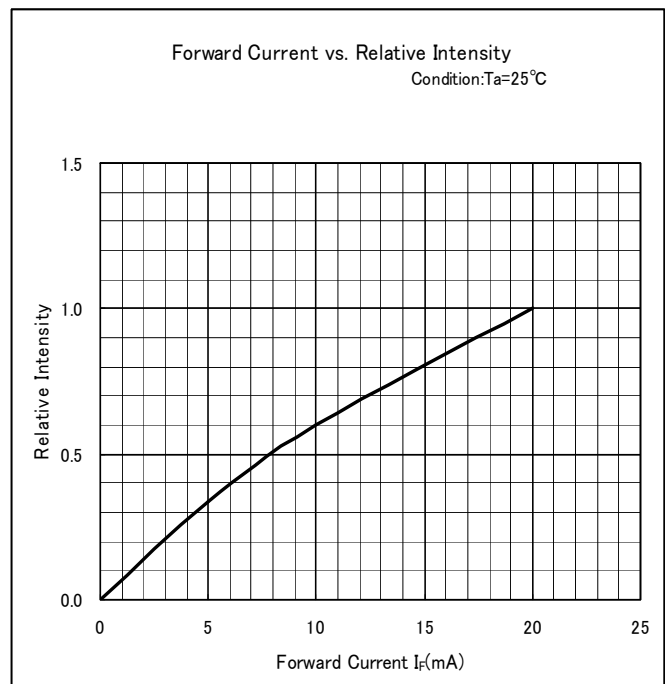
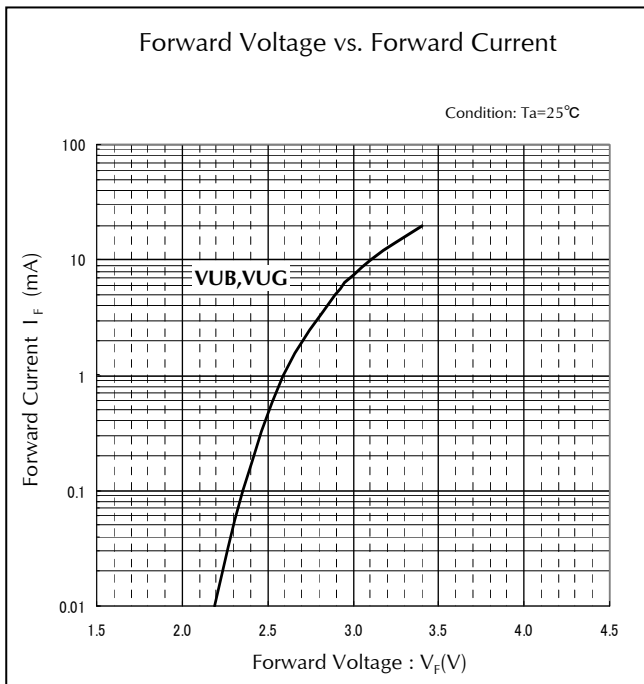
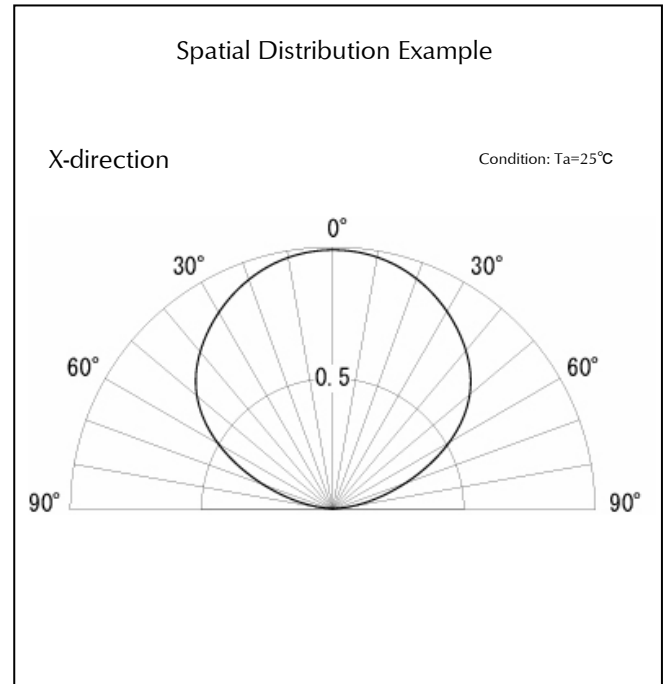
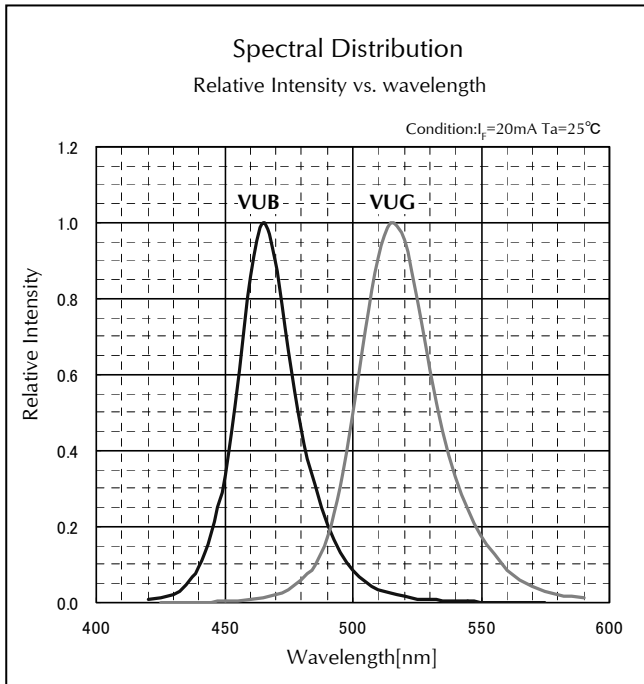
	B	C	D
MIN.	613.0	616.0	619.0
MAX.	616.0	619.0	622.0

VFR Type (I_F=20mA)

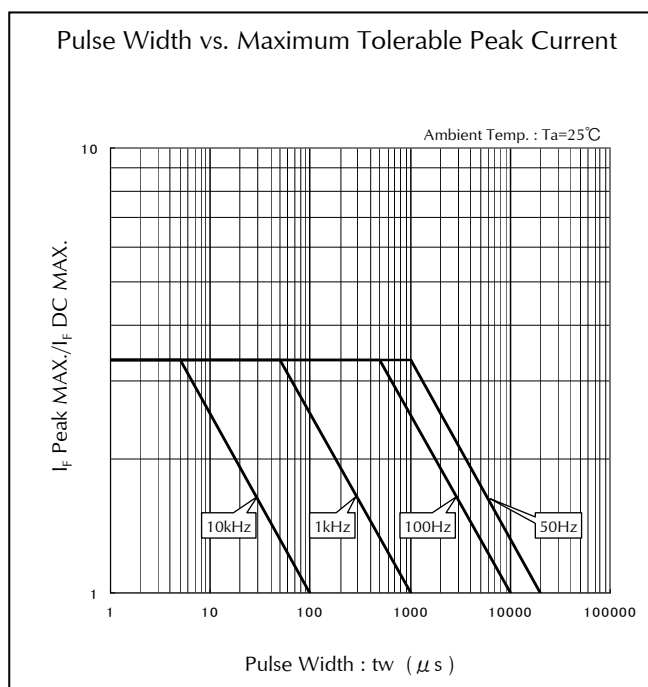
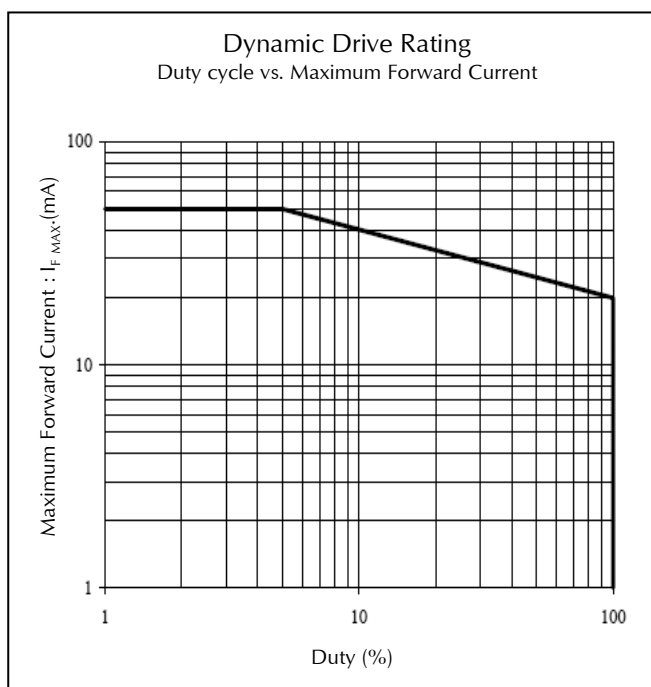
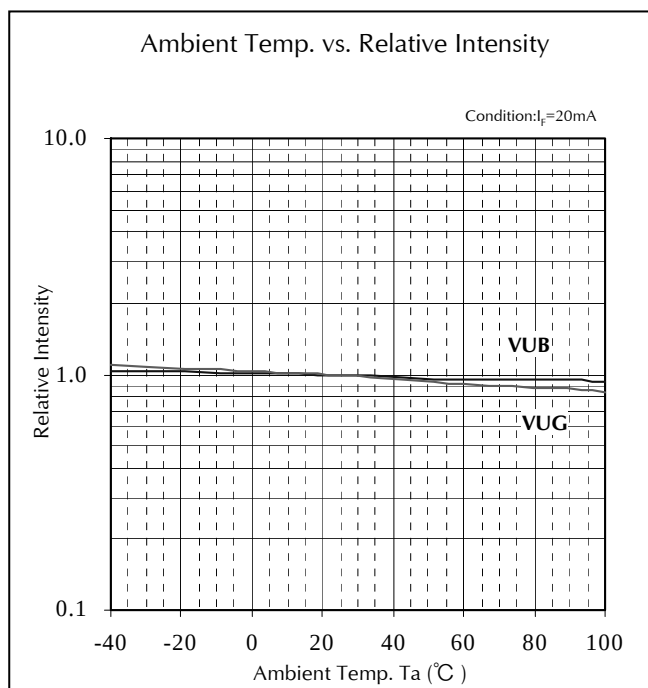
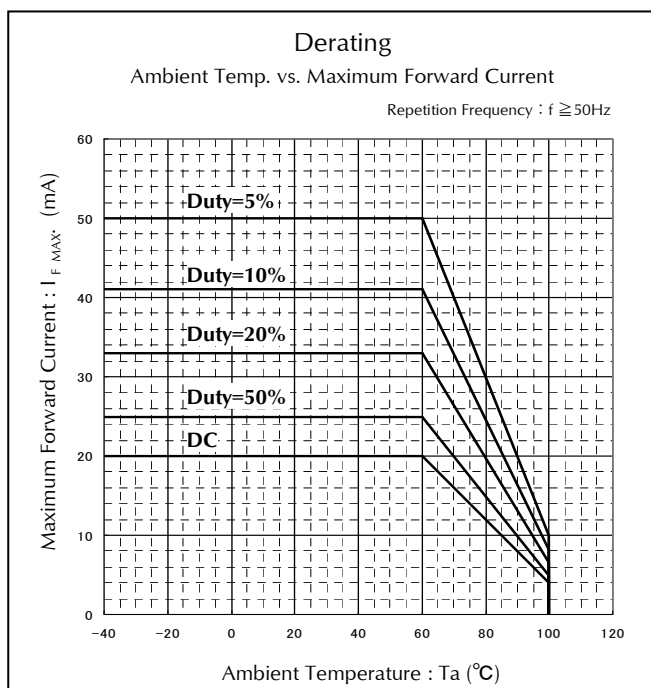
	A	B	C
MIN.	620.0	626.0	632.0
MAX.	626.0	632.0	638.0

※Limited width of color tone rank is from Min.3 to Min.4 rank width.
(It changes with product.)

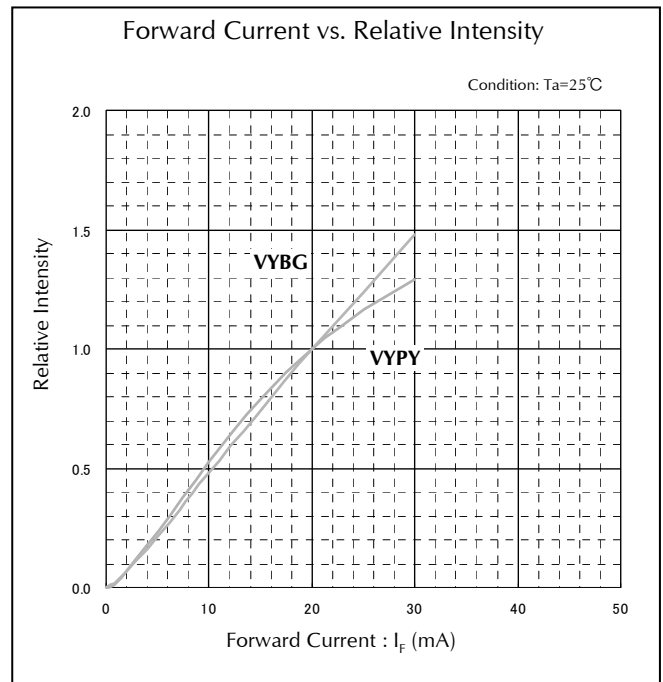
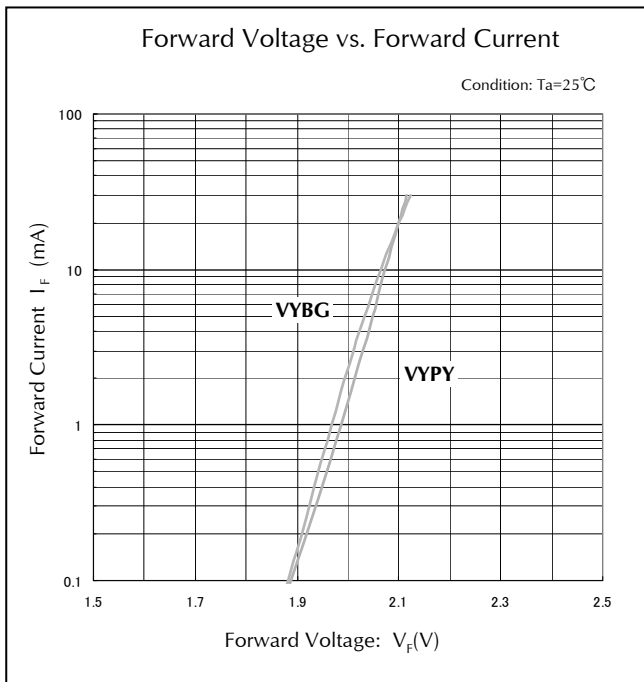
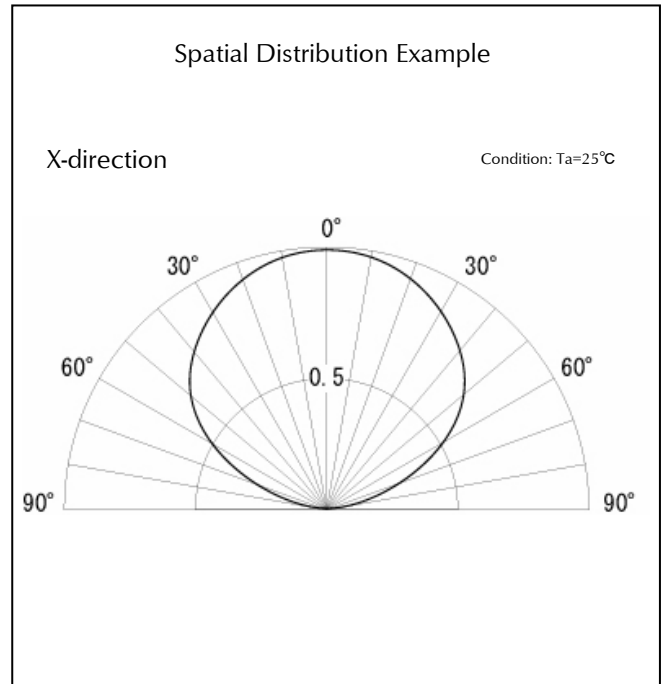
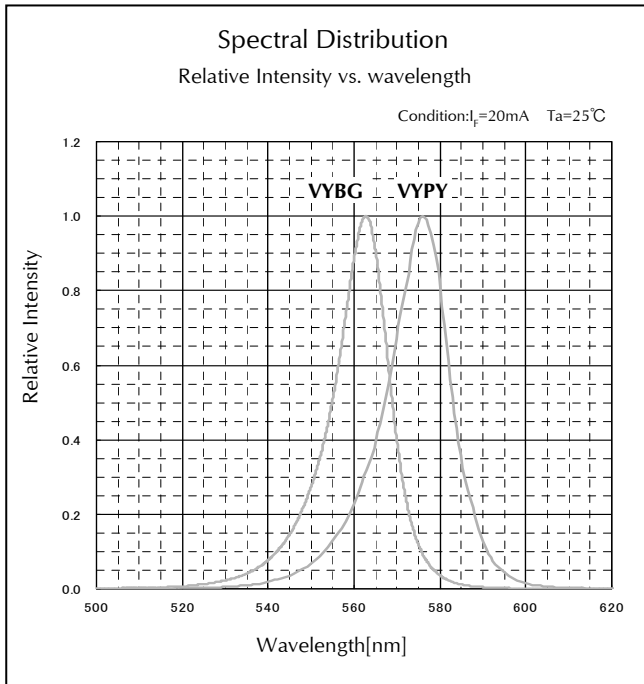
Characteristic Graph (VUB,VUG)



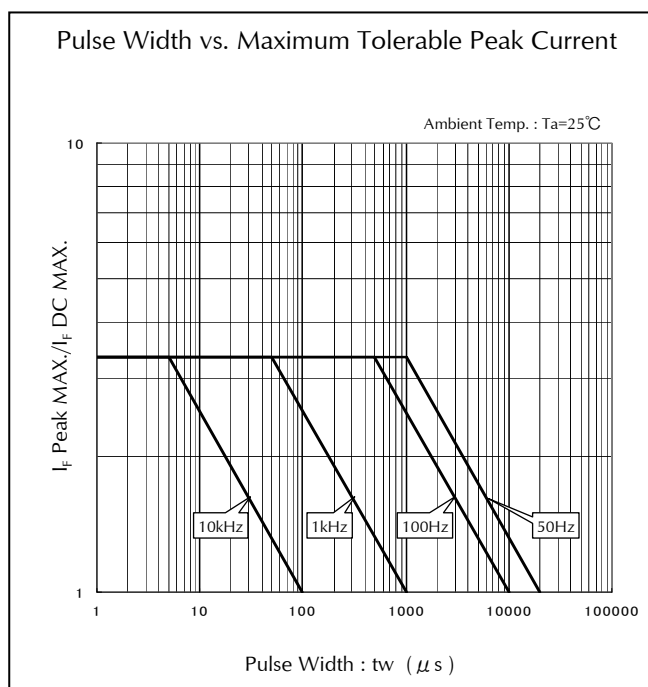
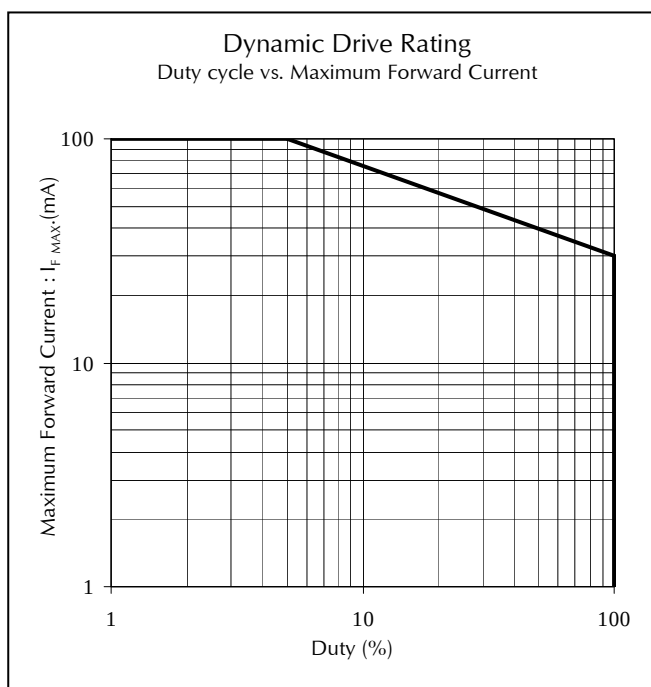
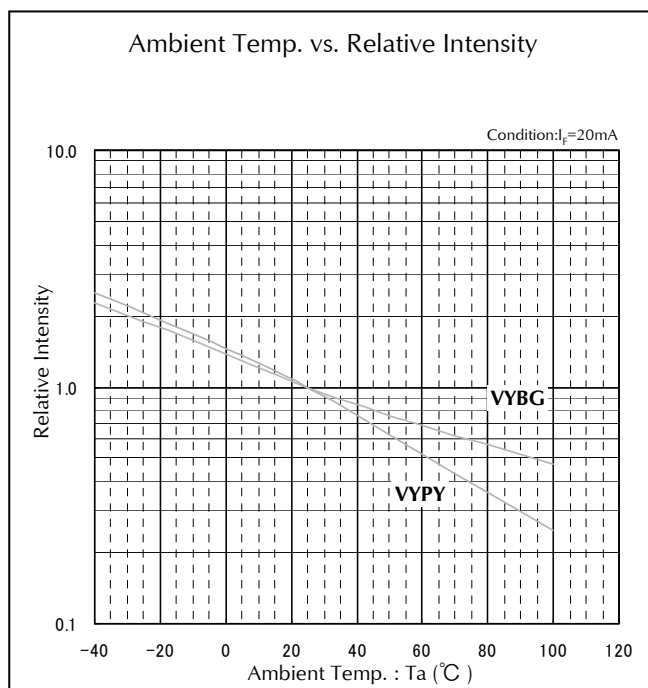
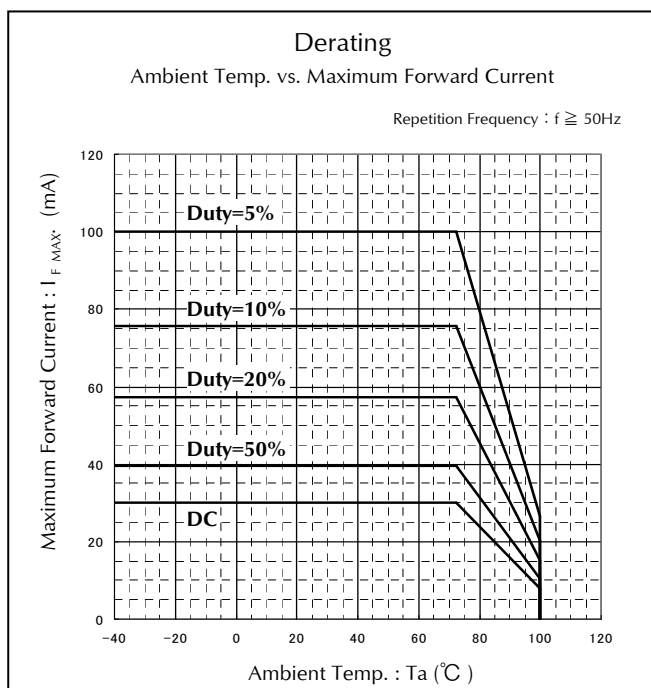
Characteristics Chart(VUB,VUG)



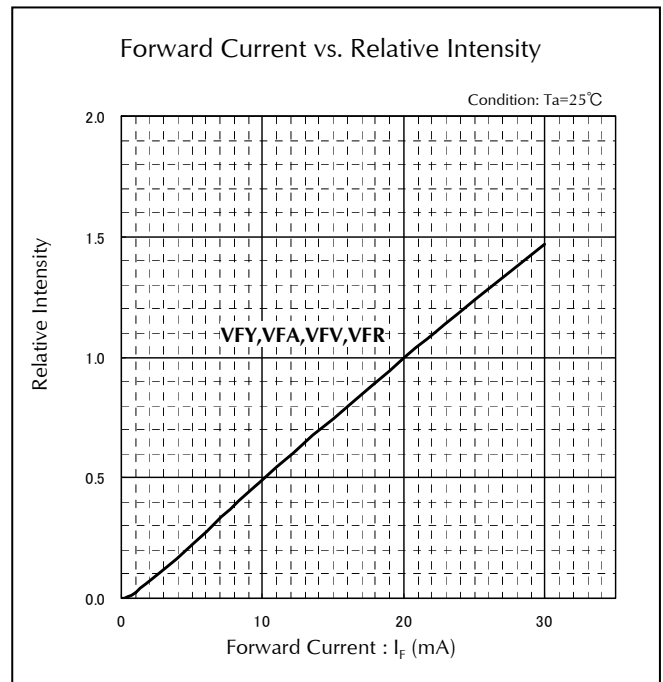
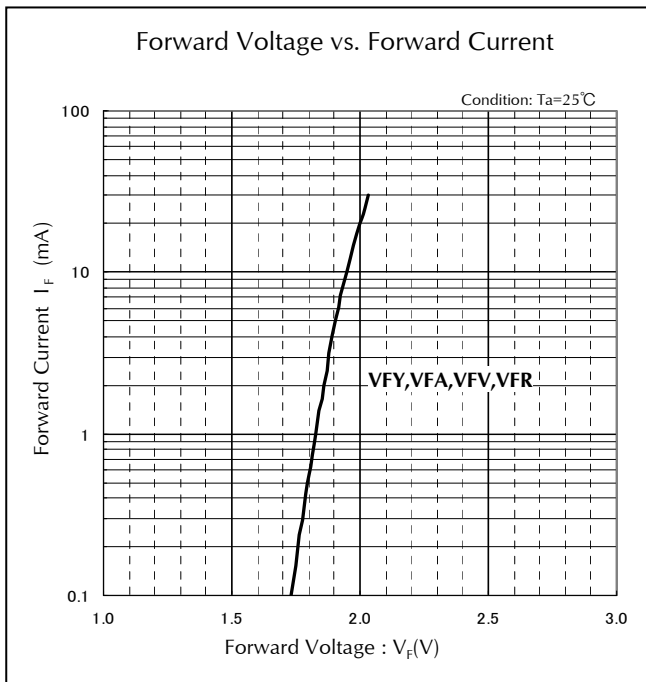
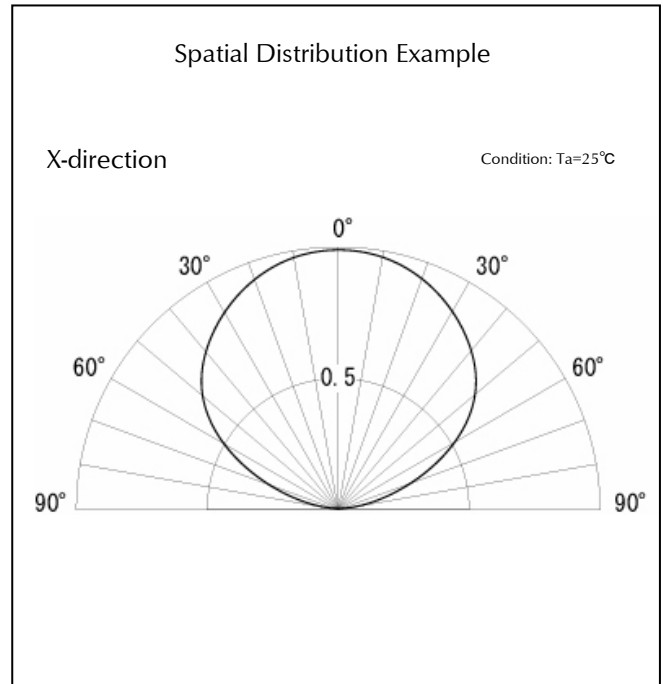
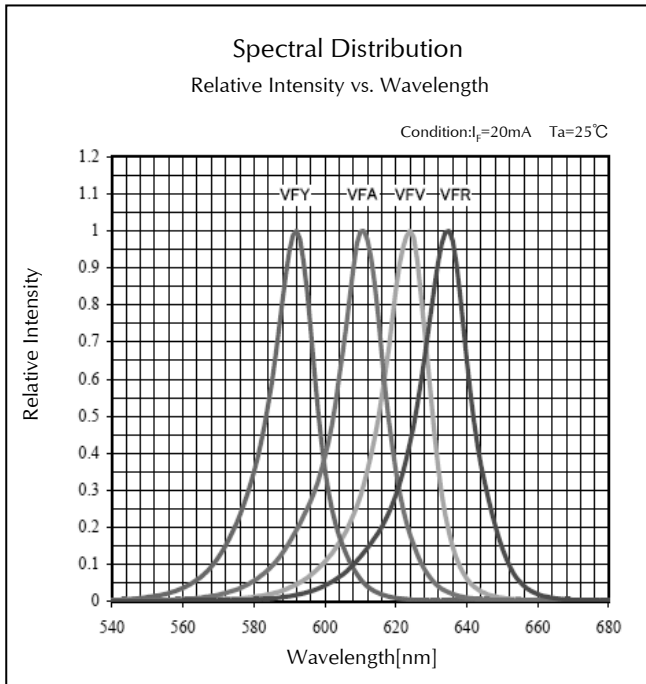
Characteristics Chart(VYBG,VYPY)



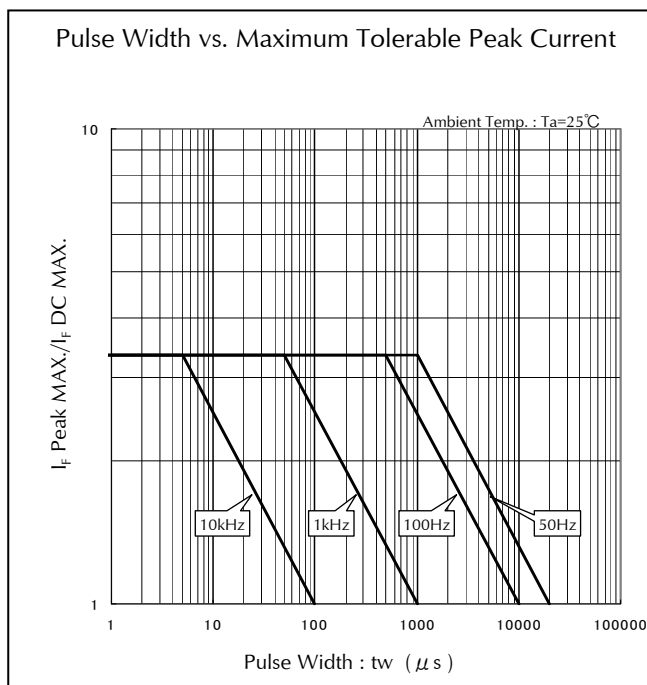
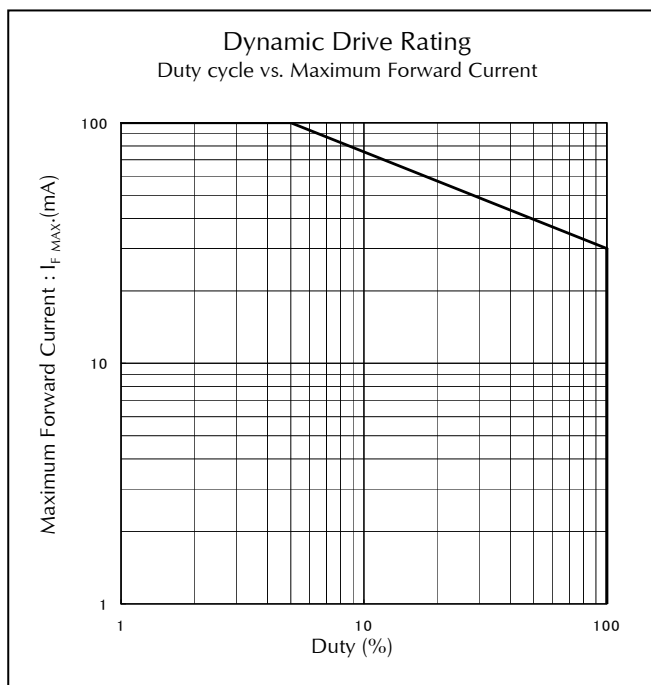
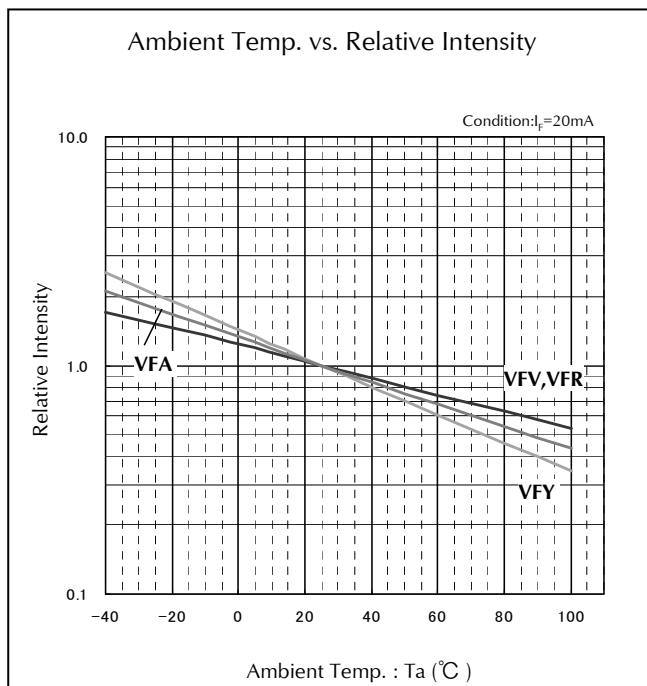
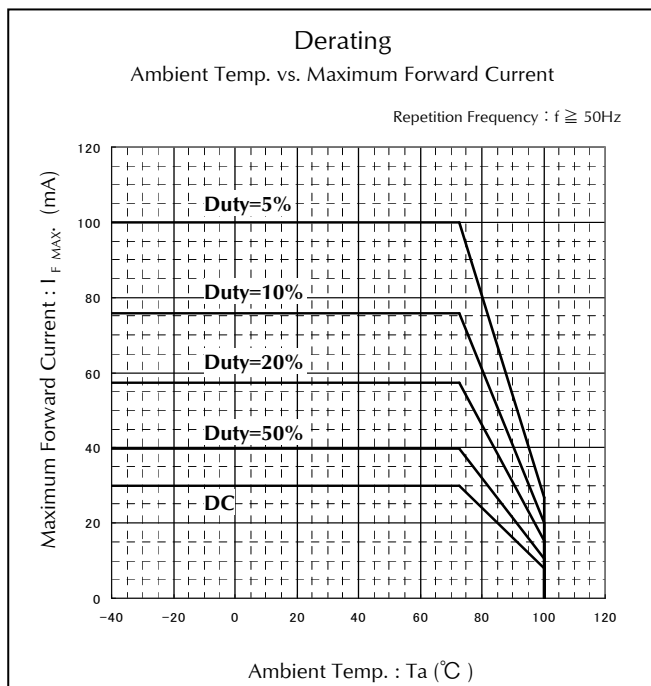
Characteristics Chart(VYBG,VYPY)



Characteristics Chart (VFY,VFA,VFV,VFR)



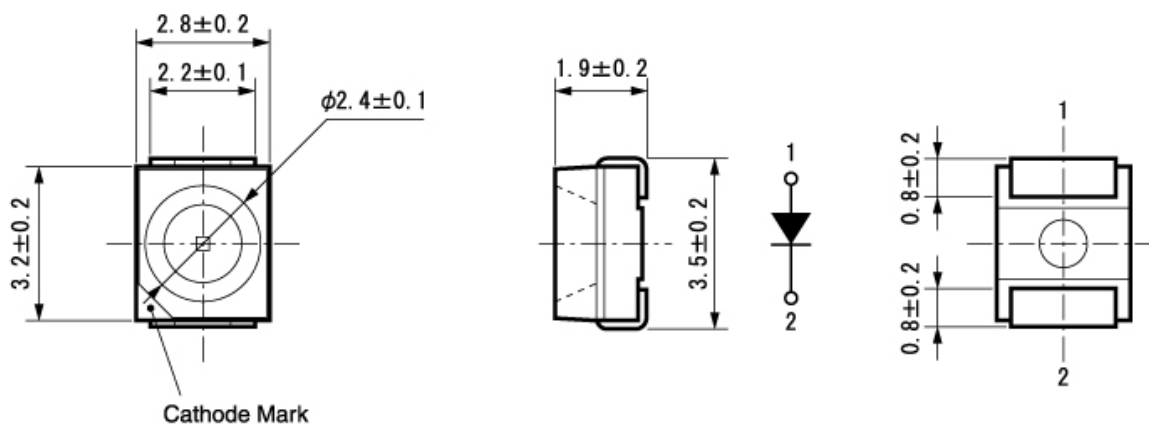
Characteristics Chart (VFY, VFA, VFV, VFR)



Package Dimensions

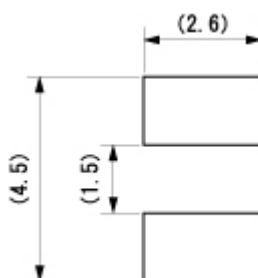
(Unit: mm)

Weight: (36.30)mg



Recommended Soldering Pattern

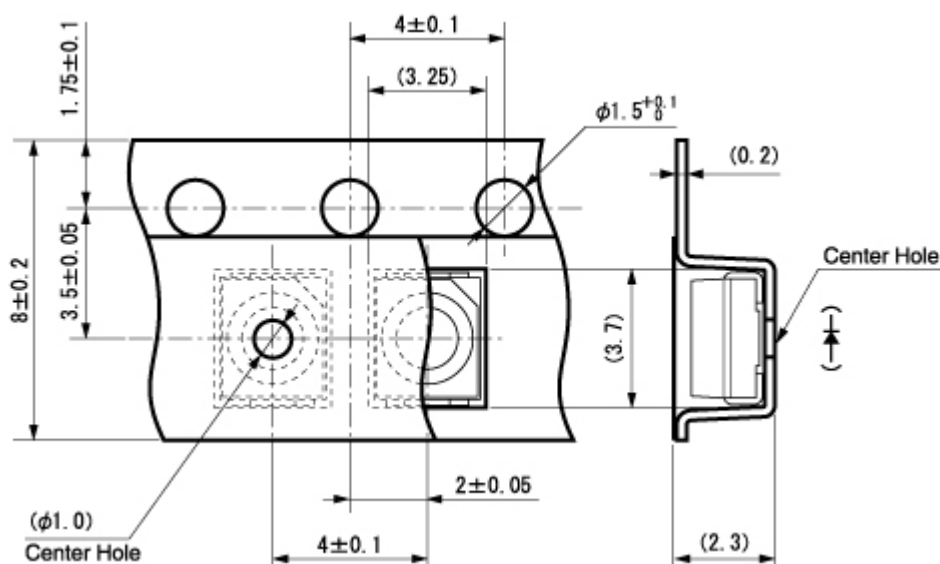
(Unit: mm)



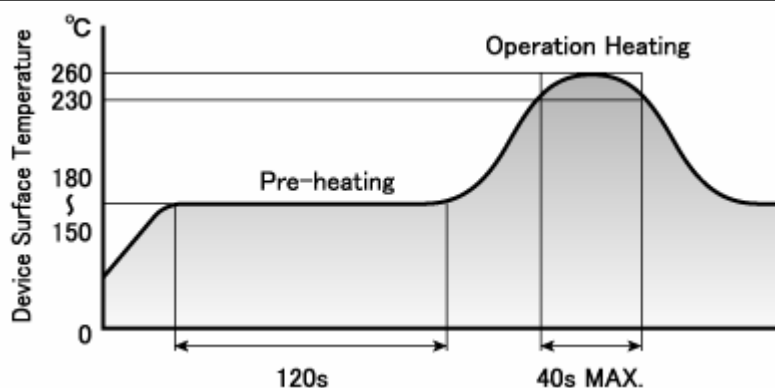
Taping Specification

(Unit: mm)

Quantity: 2,000pcs/ reel (standard)



Reflow Soldering Conditions



- 1) The above profile temperature gives the maximum temperature of the LED resin surface. Please set the temperature so as to avoid exceeding this range.
- 2) Total times of reflow soldering process shall be no more than 2 times. When the second reflow soldering process is performed, intervals between the first and second reflow should be short as possible (while allowing some time for the component to return to normal temperature after the first reflow) in order to prevent the LED from absorbing moisture.
- 3) Temperature fluctuation to the LED during the pre-heating process shall be minimized.

Manual Soldering Conditions

Iron tip temp. 350 °C (MAX.)

Soldering time and frequency 3 s (MAX.)
1 time (MAX.)

Reliability Testing Result

Reliability Testing Result	Applicable Standard	Testing Conditions	Duration	Failure
Room Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = 25°C, If = Maximum Rated Current	1,000 h	0/20
High Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = Maximum Rated Operating Temperature, If = Derating Value	1,000 h	0/20
Low Temp. Operating Life	EIAJ ED-4701/100(101)	Ta = -40°C, If = Maximum Rated Current	1,000 h	0/20
Wet High Temp. Operating Life	EIAJ ED-4701/100(102)	Ta = 60°C, 90%, If = Maximum Rated Current	1,000 h	0/20
Wet High Temp. Storage Life	EIAJ ED-4701/100(103)	Ta = 60°C, 90%	1,000 h	0/20
Thermal Shock	EIAJ ED-4701/100(105)	Ta = -40°C ~ Maximum Rated Storage Temperature (each 15min.)	1,000 cycles	0/20
Thermal Shock Operating	EIAJ ED-4701/100(105)	Ta = -40°C(off) ~ 85°C (If = Derating Value on), (each 15min.)	1,000 cycles	0/20
High Temp. Storage Life	EIAJ ED-4701/200(201)	Ta = Maximum Rated Storage Temperature	1,000 h	0/20
Low Temp. Storage Life	EIAJ ED-4701/200(202)	Ta = Minimum Rated Storage Temperature	1,000 h	0/20
Cycled Temp. Humidity Life	EIAJ ED-4701/200(203)	Ta = -30°C(2h) ~ 80°C, 95%(2h), 8h/cycle, If = Derating Value, 5min on-off	30 cycles	0/20
Resistance to Reflow Soldering	EIAJ ED-4701/300(301)	Moisture Soak : 30°C, 70%, 72h Preheat : 150 ~ 180°C(120s Max.) Soldering Temp. : 260°C(5s)	Twice	0/20
Electric Static Discharge (ESD) ^{※1}	EIAJ ED-4701/300(304)	C = 100pF, R2 = 1.5KΩ, ±2,000V	once each polarity	0/10
Vibration, Variable Frequency	EIAJ ED-4701/400(403)	98.1m/s ² (10G), 100 ~ 2KHz, 20min, XYZ each direction	2 h	0/10

※1 Reference test

Failure Criteria

Items	Symbols	Conditions	Failure criteria
Luminous Intensity	Iv	If Value of each product Luminous Intensity	Testing Min. Value < Spec. Min. Value x 0.5
Forward Voltage	Vf	If Value of each product Forward Voltage	Testing Max. Value ≥ Spec. Max. Value x 1.2
Reverse Current	Ir	VR = 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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