



**Pb-free
HEAT**



1102W Series

Single color Inner-lens Type
(High Reliability type, V-Series)

Product features

Package	3216 fixed Inner-lens type, Water clear epoxy
Product features	<ul style="list-style-type: none"> ▪ Outer Dimension 3.2 x 1.6 x 1.5mm(L x W x H) ▪ Wide operation temperature range. Storage Temperature : InGaN : -40°C~110°C : AlGaInP : -40°C~120°C Operating Temperature : -40°C~100°C 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... ▪ Shape resin into an inner lens to make high luminosity possible. ▪ Corresponding to reflow soldering, dip soldering, and manual soldering. ▪ No lead package and 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 : 626nm (VFR)
Spatial distribution	VUB,VUG : 50deg. VYBG,VYPY,VFY,VFA,VFR : 60 deg.
Die materials	VUB,VUG : InGaN VYBG, VYPY, VFY, VFA, VFR :AlGaInP
Optical efficiency	VUB : 13.3 lm/W VFY : 13.2 lm/W VUG : 30.3 lm/W VFA : 13.2 lm/W VYBG : 1.2 lm/W VFR : 13.2 lm/W VYPY : 3.8 lm/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, dip soldering, and manual soldering.
Taping dimensions	2,500pcs(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...

Color Variations and Luminous Intensity

(T=25°C)

Part No.	Material	Emitted Color	Lens Color	Dominant Wavelength		Luminous Intensity			Luminous Flux	
				λ_d (nm)		I_v (mcd)			Φ_v (lm)	
				TYP.	I_F	MIN.	MAX.	I_F	TYP.	I_F
VUB1102W	InGaN	Blue	Water Clear	470	10	47	180	10	440	10
VUG1102W	InGaN	Green		530	10	150	560	10	1,000	10
VYBG1102W	AlGaInP			562	20	15	68	20	50	20
VYPY1102W	AlGaInP	Yellow Green		572	20	47	180	20	160	20
VFY1102W	AlGaInP	Yellow		590	20	120	470	20	500	20
VFA1102W	AlGaInP	Orange		605	20	120	390	20	500	20
VFR1102W	AlGaInP	Red		626	20	120	470	20	500	20

※ Note : The luminous intensity(I_v) and dominant wavelength(λ_d) above are the setup values of the sorting machine.

(Tolerance : I_v ... $\pm 10\%$, λ_d ... ± 1 nm)

Absolute Maximum Ratings

(T_a=25°C)

Item	Symbol	Absolute Maximum Ratings							Unit
		VUB	VUG	VYBG	VYPY	VFY	VFA	VFR	
Power Dissipation	P _d	84	84	81	81	78	78	78	mW
Forward Current	I _F	20	20	30	30	30	30	30	mA
Pulse Forward Current ※1	I _{FRM}	48	48	100	100	100	100	100	mA
Derating (T _a =75°C or higher)	ΔI _F	0.40 ※2	0.40 ※2	1.0	1.0	1.0	1.0	1.0	mA/°C
	ΔI _{FRM}	0.96 ※2	0.96 ※2	3.33	3.33	3.33	3.33	3.33	mA/°C
Reverse Voltage	V _R	5	5	5	5	5	5	5	V
Operating Temperature	T _{opr}	-40 ~ +100							°C
Storage Temperature	T _{stg}	-40 ~ +110		-40 ~ +120					°C

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

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

Thermal Characteristics

Item	Symbol	Ratings							Unit
		VUB	VUG	VYBG	VYPY	VFY	VFA	VFR	
Junction Temperature (MAX.)	T _j	110	110	120	120	120	120	120	°C
Thermal Resistance (TYP.) (Junction/ ambient)	R _(thj-a)	600	600	700	650	650	650	650	°C/W

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

Electro-Optical Characteristics (VUB,VUG)

(T_a=25°C)

Item	Conditions	Symbol	Characteristic Ratings		Unit	
			VUB	VUG		
Forward Voltage	I _F =10mA	V _F	TYP.	3.3	3.3	V
			MAX.	3.8	3.8	
Reverse Current	V _R =5V	I _R	MAX.	100	100	μA
Peak Wavelength	I _F =10mA	λ _p	TYP.	465	530	nm
Dominant Wavelength	I _F =10mA	λ _d	TYP.	470	525	nm
Spectral Line Half Width	I _F =10mA	Δλ	TYP.	26	35	nm
Half Intensity Angle	I _F =10mA	2θ _{1/2}	TYP.	50	50	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, VFR)

(T_a=25°C)

Item	Conditions	Symbol	Characteristic Rating					Unit	
			VYBG	VYPY	VFY	VFA	VFR		
Forward Voltage	I _F =20mA	V _F	TYP.	2.1	2.1	1.9	1.9	1.9	V
			MAX.	2.5	2.5	2.4	2.4	2.4	
Reverse Current	V _R =5V	I _R	MAX.	100	100	100	100	100	μA
Peak Wavelength	I _F =20mA	λ _p	TYP.	565	572	592	609	635	nm
Dominant Wavelength	I _F =20mA	λ _d	TYP.	562	572	590	605	626	nm
Spectral Line Half Width	I _F =20mA	Δλ	TYP.	15	15	15	15	15	nm
Half Intensity Angle	I _F =20mA	2θ _{1/2}	TYP.	60	60	60	60	60	deg.

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

Luminous Intensity Rank

(T_a=25°C)

Standard Chart (Unit: mcd)

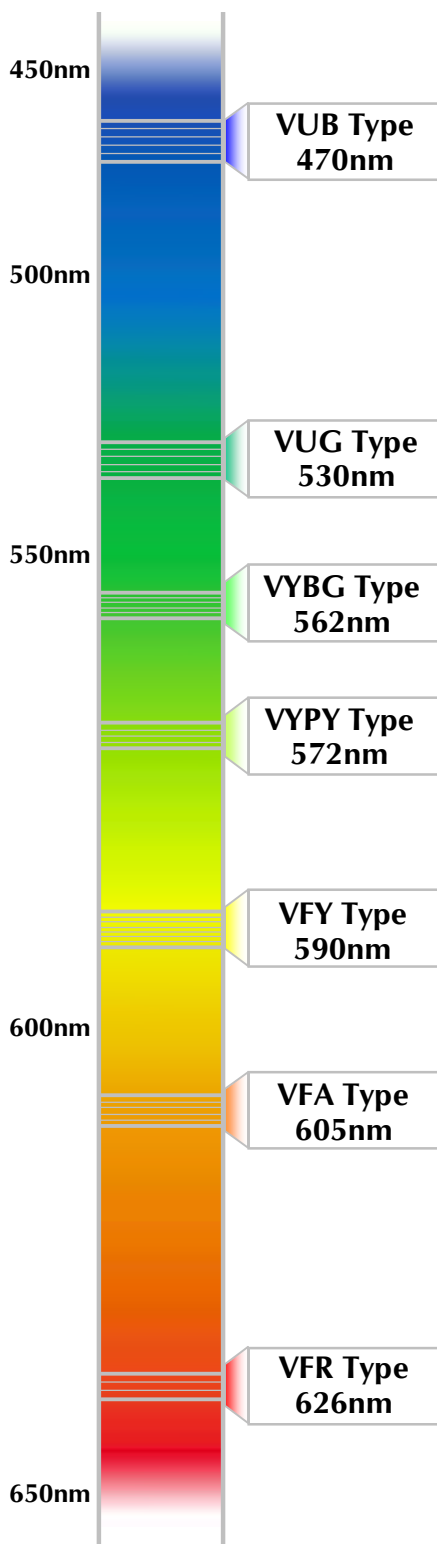
B1	10	12						
B2	12	15						
B3	15	18			B3			
B4	18	22						
B5	22	27						
B6	27	33						
B7	33	39						
B8	39	47						
B9	47	56	B9			B9		
BX	56	68			BX			
BY	68	82						
BZ	82	100						
C1	100	120	C3			C3		
C2	120	150				C2	C2	C2
C3	150	180		C3		C3		
C4	180	220						
C5	220	270						
C6	270	330						
C7	330	390					C7	
C8	390	470				C8		C8
C9	470	560		C9				
CX	560	680						
CY	680	820						
CZ	820	1,000						
D1	1,000	1,200						
D2	1,200	1,500						
D3	1,500	1,800						
D4	1,800	2,200						

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

Color Tone Groups (λd)

($T_F=25^\circ\text{C}$)

(unit: nm)
Tolerance: +/-1nm



VUB Type ($I_F=10\text{mA}$)

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

VUG Type ($I_F=10\text{mA}$)

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

VYBG Type ($I_F=20\text{mA}$)

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

VYPY Type ($I_F=20\text{mA}$)

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

VFY Type ($I_F=20\text{mA}$)

	C	D	E	F
MIN.	583.0	586.0	589.0	592.0
MAX.	586.0	589.0	592.0	595.0

VFA Type ($I_F=20\text{mA}$)

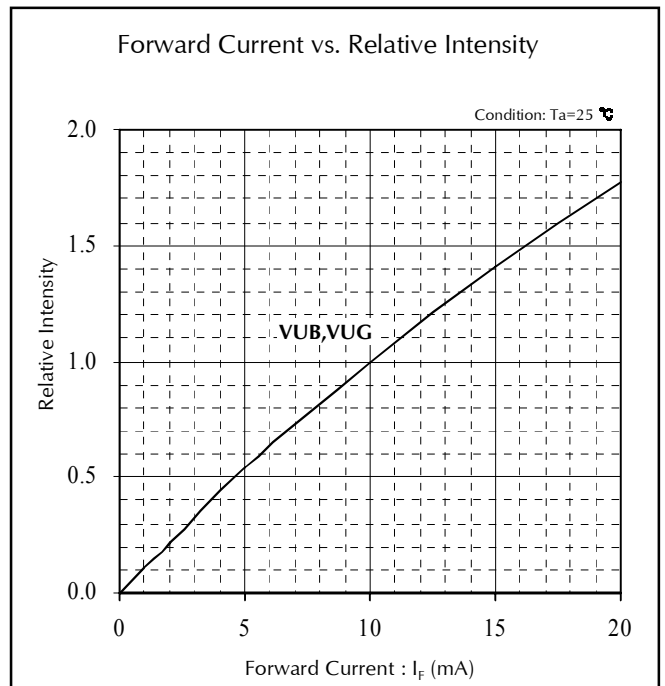
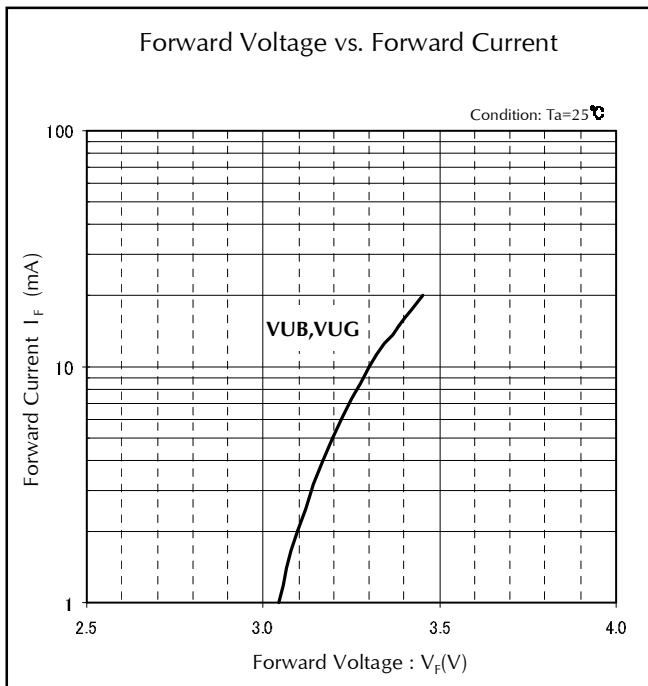
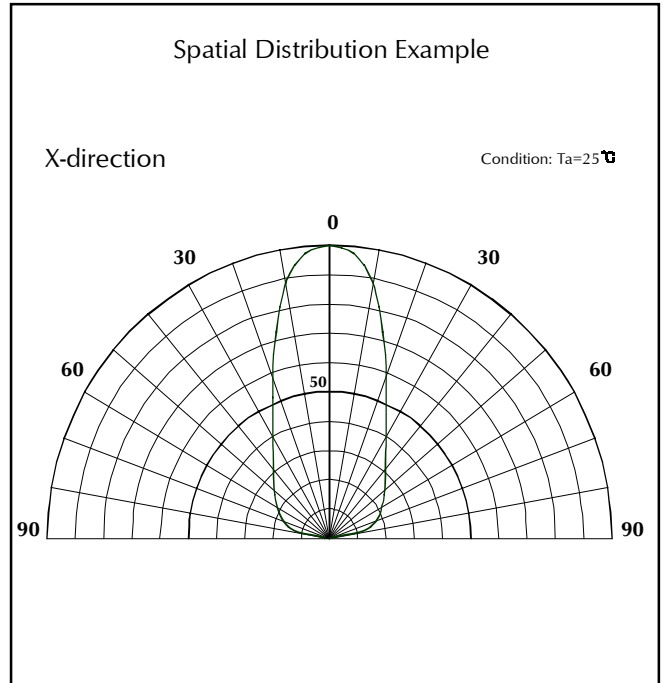
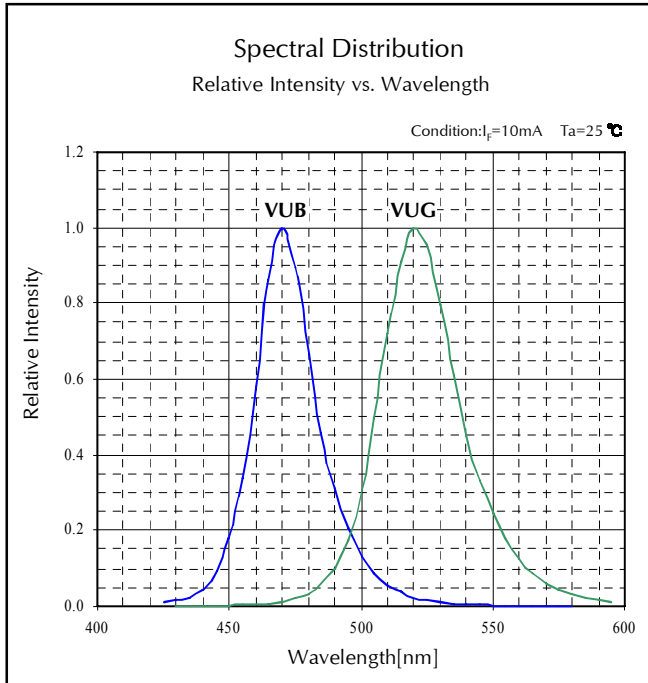
	A	B	C	D
MIN.	597.0	600.0	603.0	606.0
MAX.	600.0	603.0	606.0	609.0

VFR Type ($I_F=20\text{mA}$)

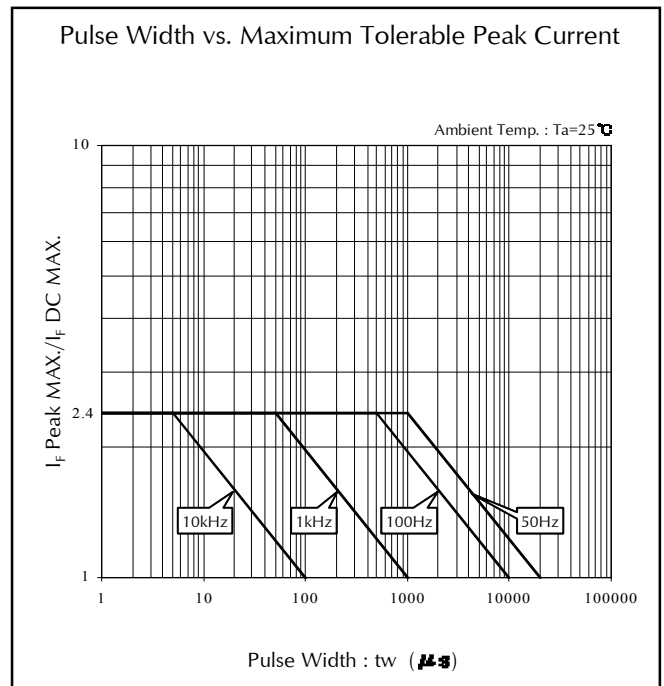
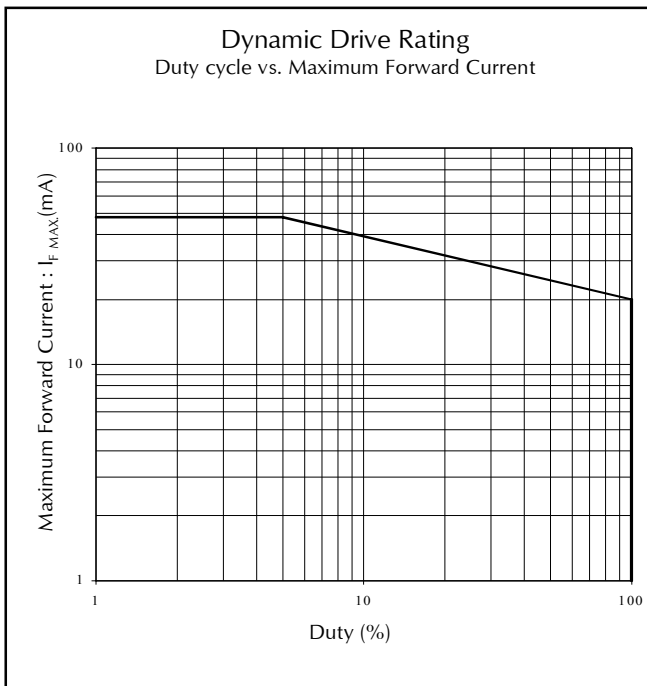
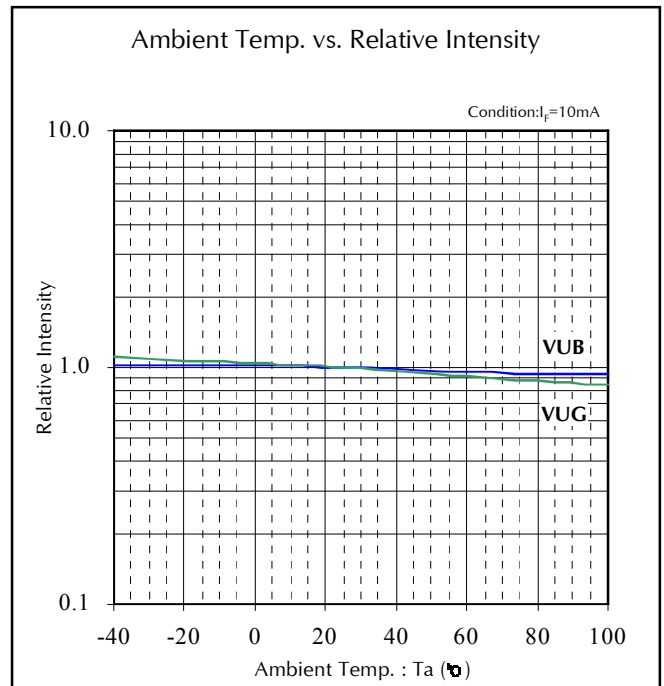
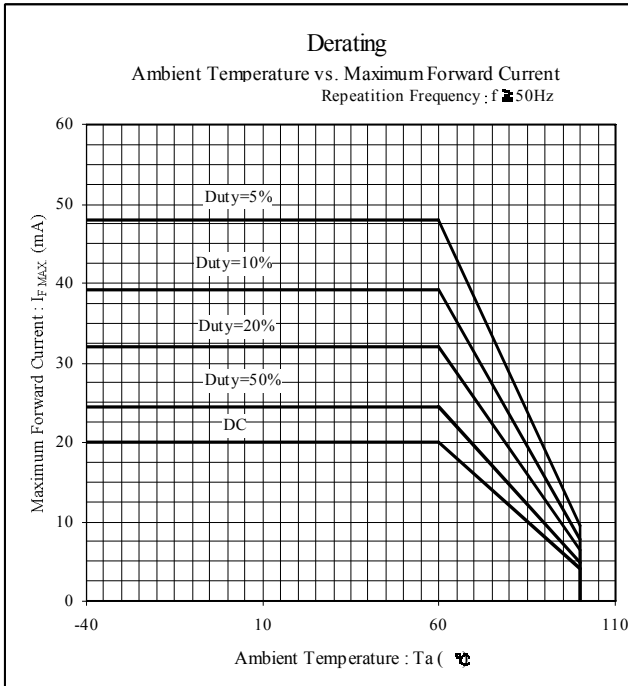
	A	B	C
MIN.	620.0	626.0	632.0
MAX.	626.0	632.0	638.0

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

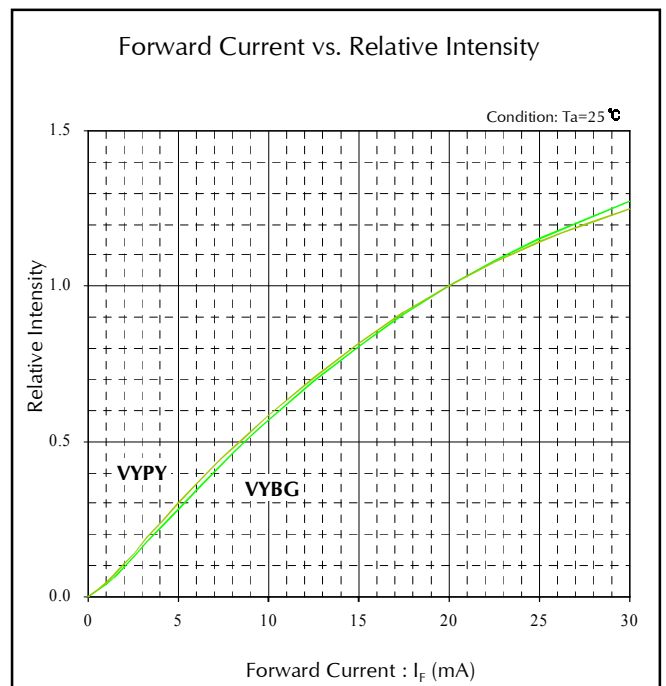
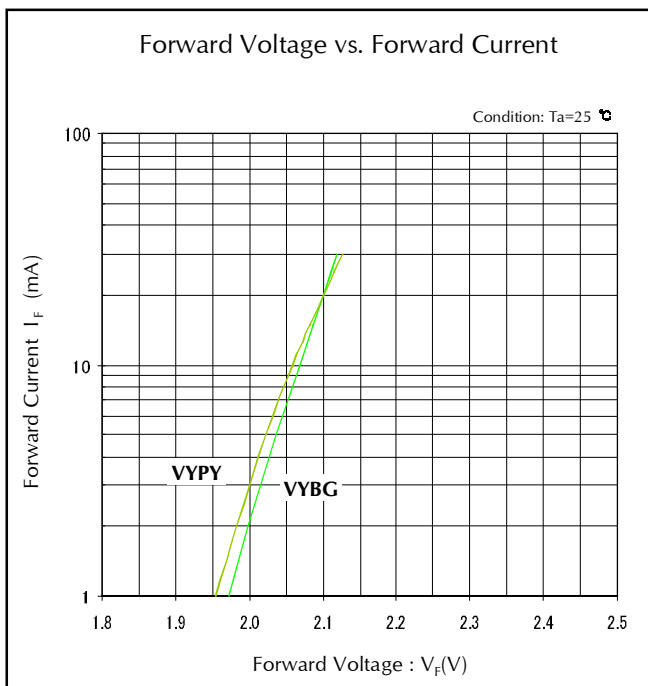
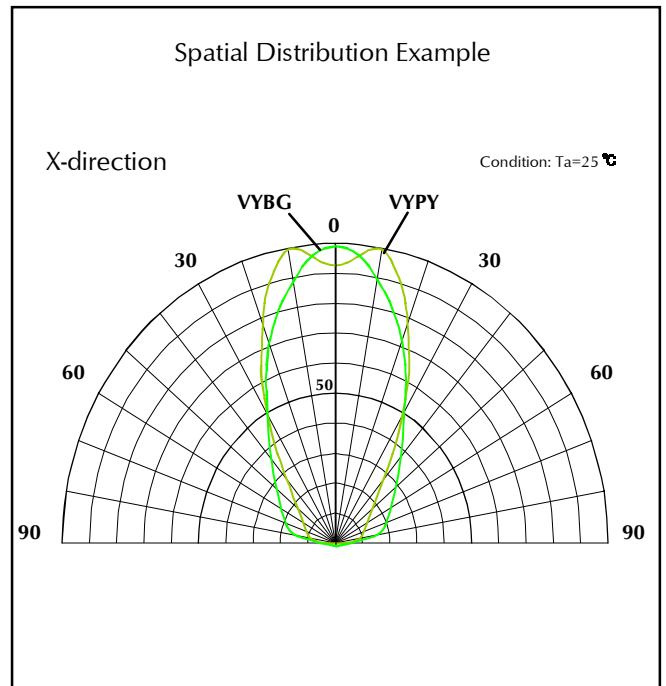
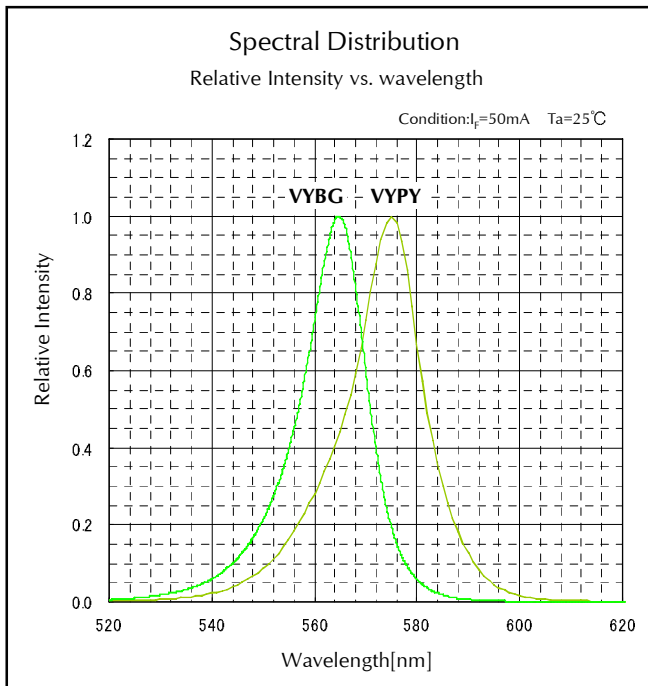
Characteristics Chart (VUB,VUG)



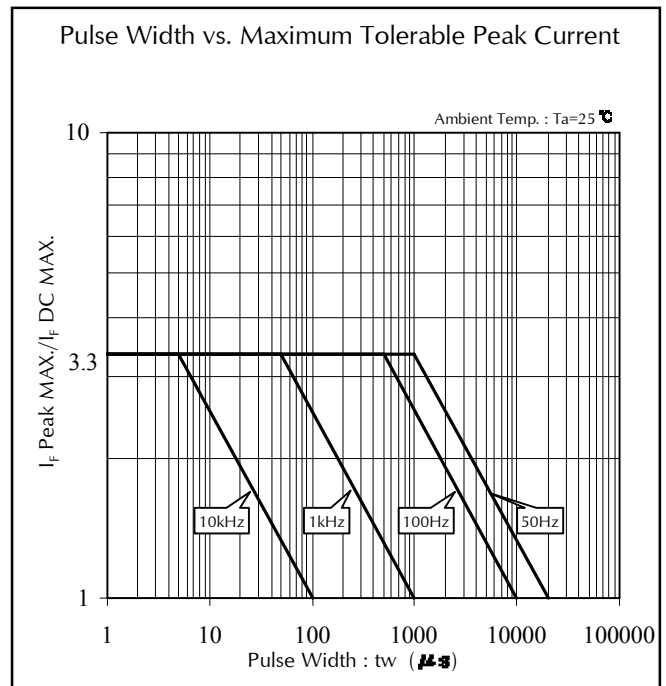
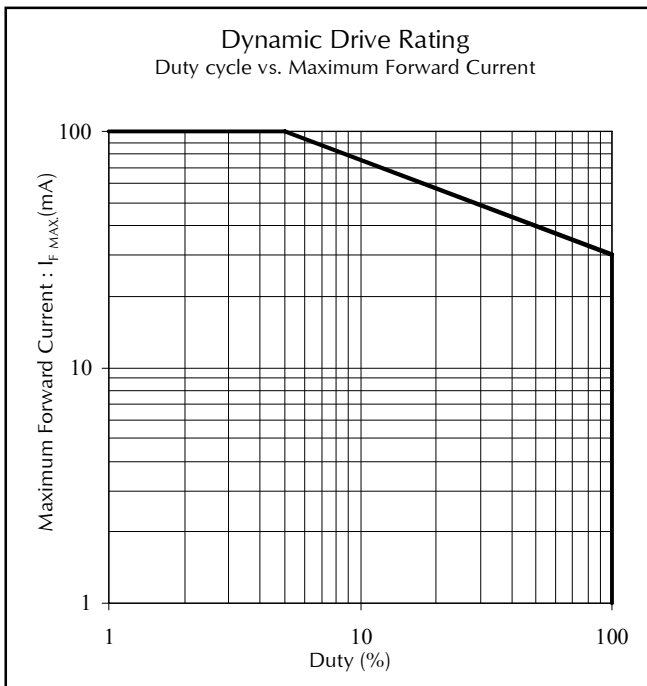
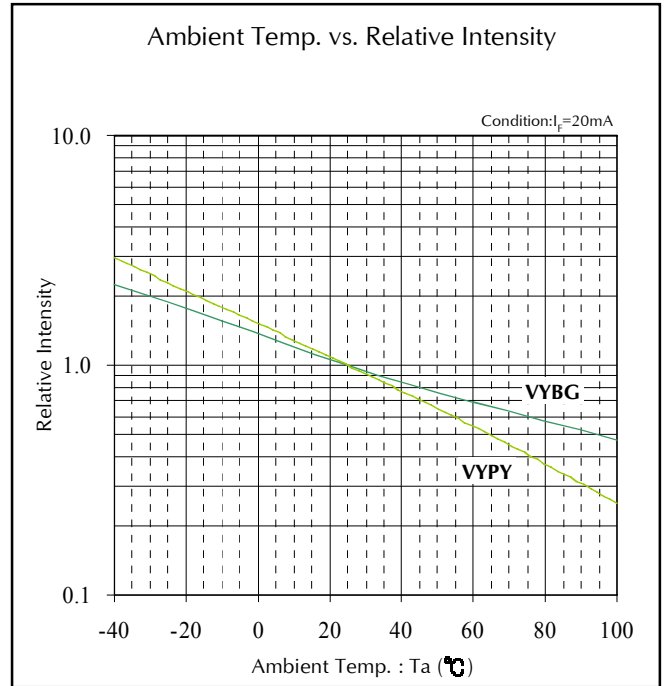
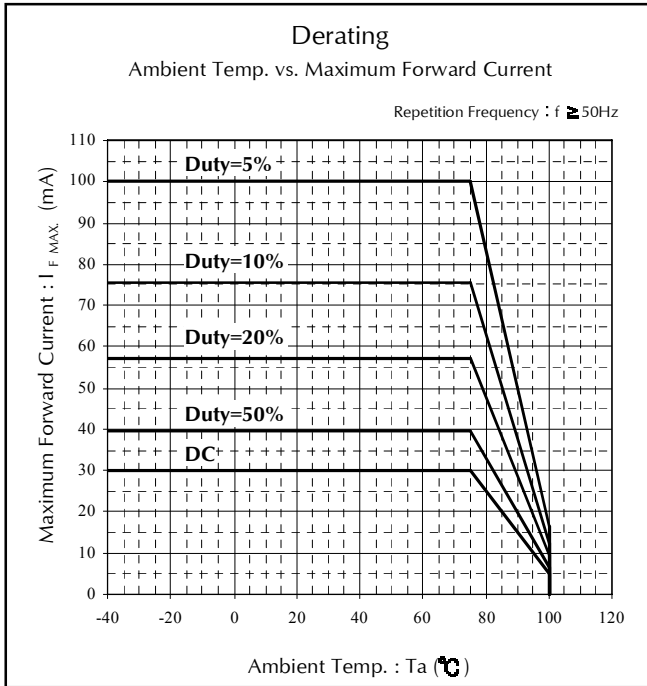
Characteristics Chart (VUB,VUG)



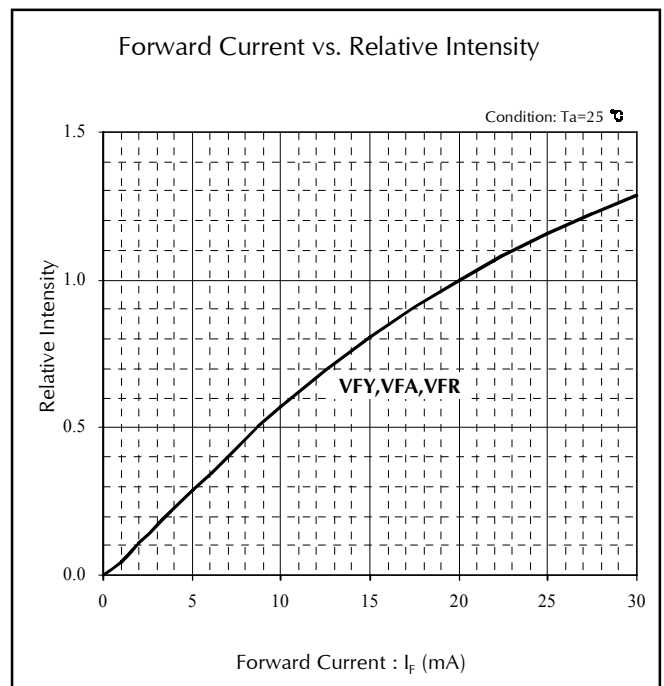
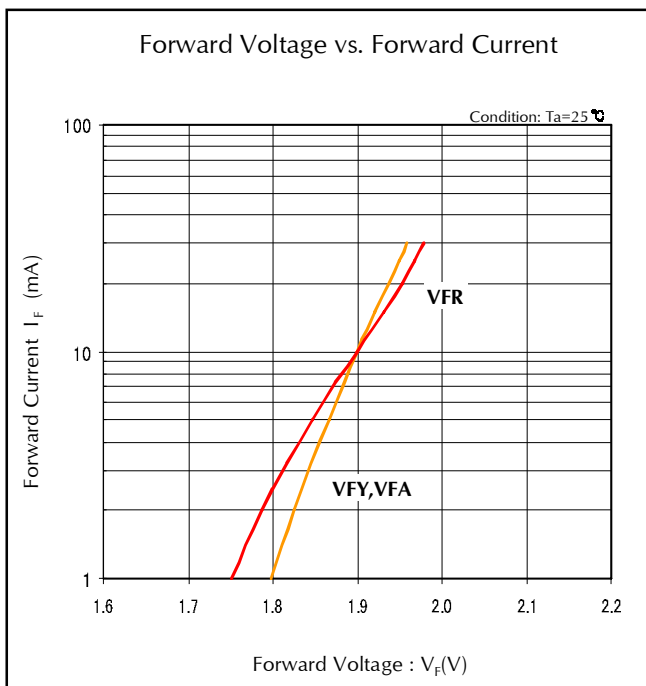
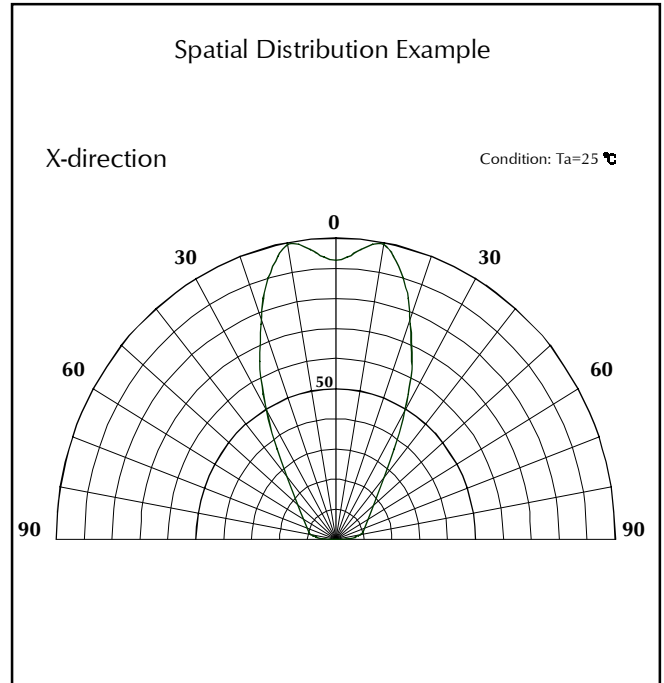
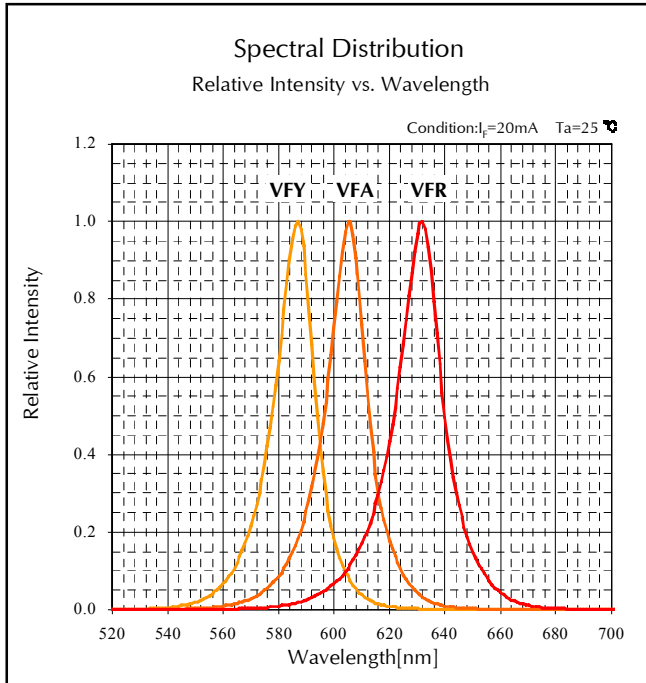
Characteristics Chart (VYBG, VYPY)



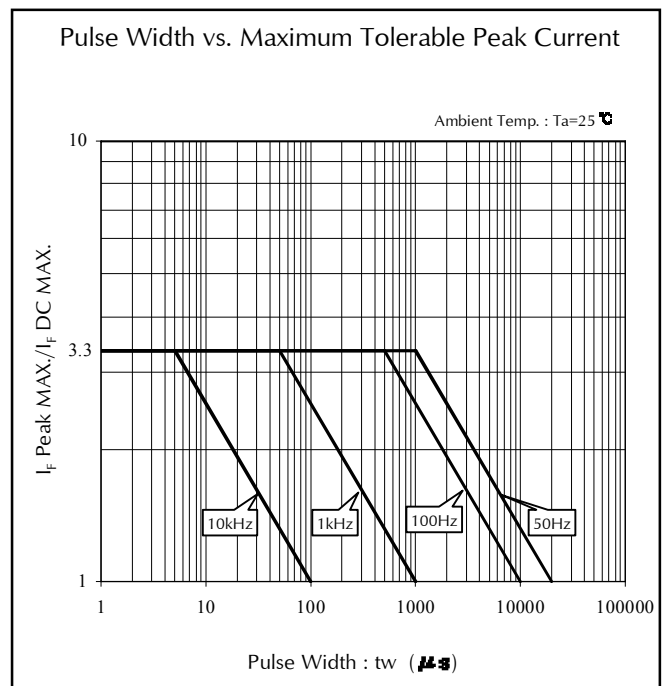
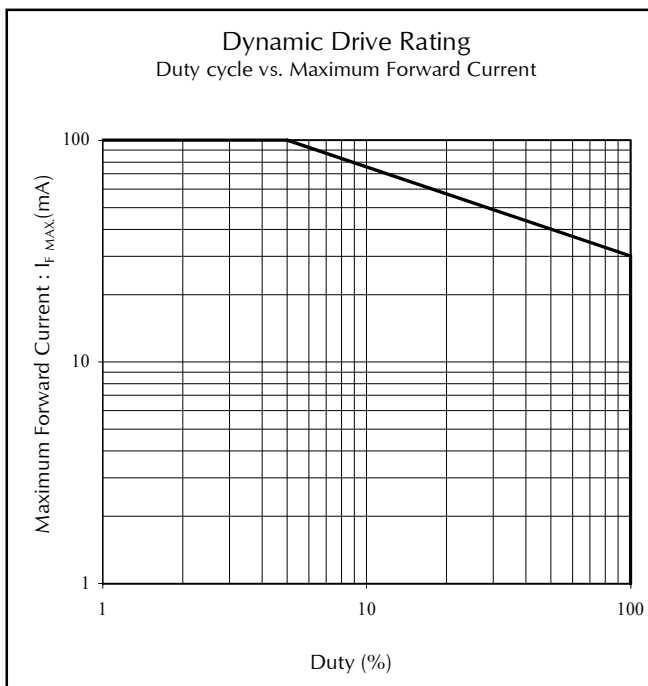
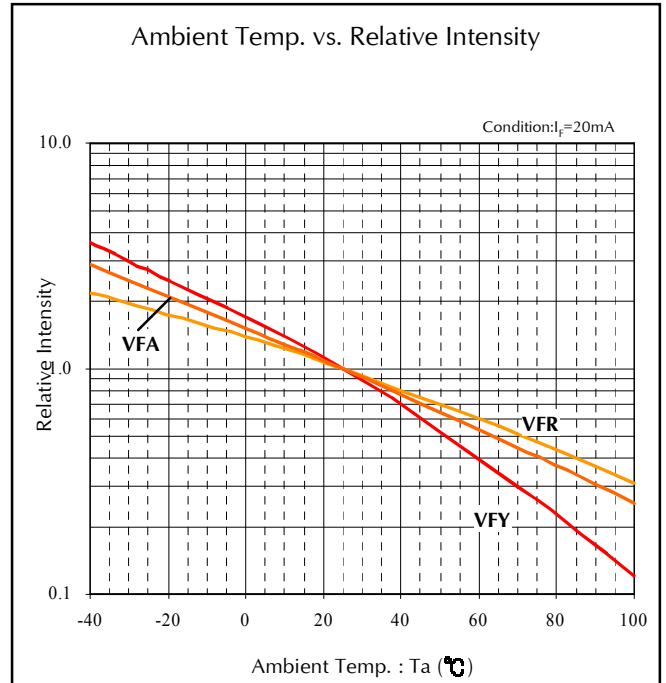
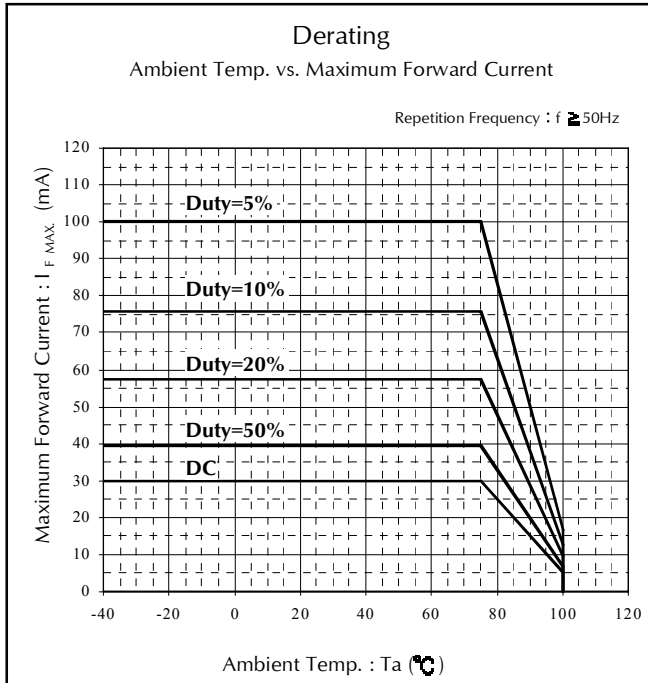
Characteristics Chart (VYBG, VYPY)



Characteristics Chart (VFY, VFA, VFR)



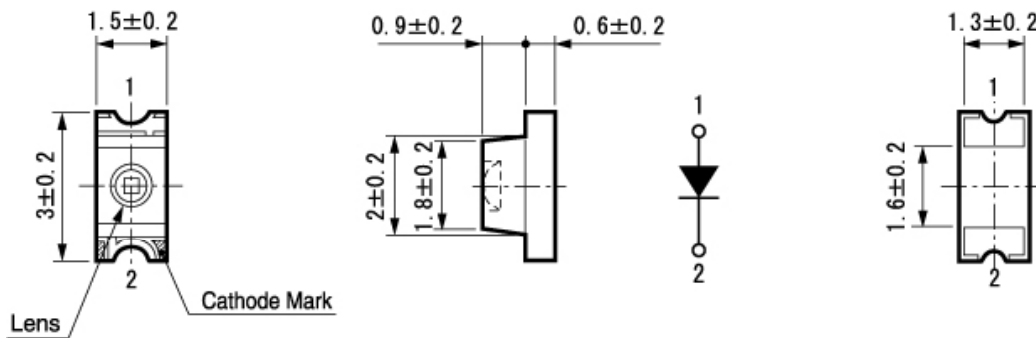
Characteristics Chart (VFY, VFA, VFR)



Package Dimensions

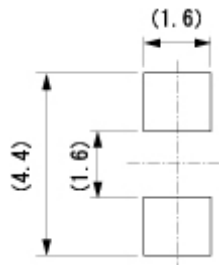
(Unit: mm)

Weight: (7.80)mg



Recommended Soldering Pattern

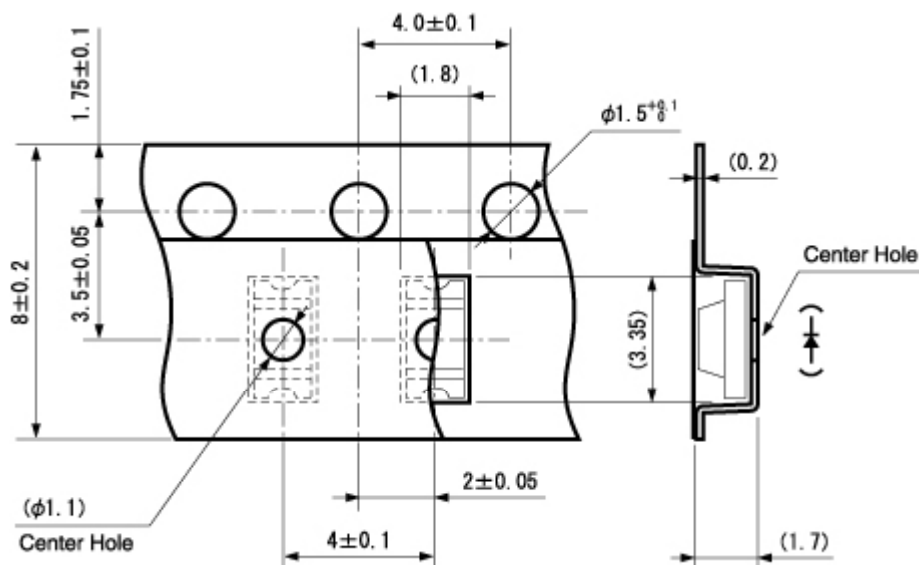
(Unit: mm)



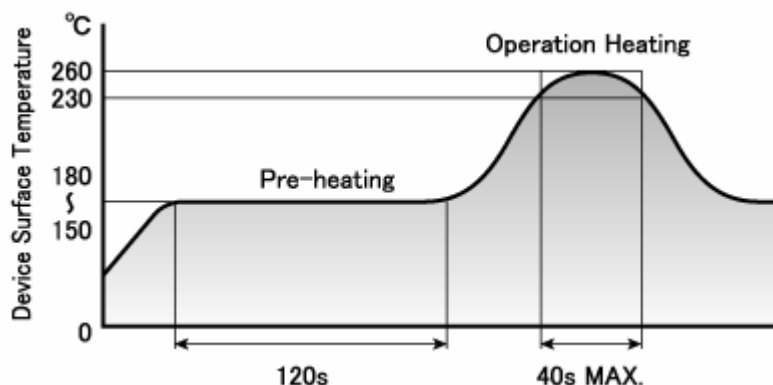
Taping Specification

(Unit: mm)

Quantity: 2,500pcs/ 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. (6°C maximum)

TTW (Through The Wave) soldering Conditions

Pre-heating	120 °C (MAX.) 60 s (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.	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)	2 times	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	V _F	If 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

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 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.
- 6) 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.
- 7) No part of this data sheet may be reprinted or reproduced without prior written permission from Stanley Electric Co., Ltd.
- 8) The most updated edition of this data sheet can be obtained from the address below:
<http://www.stanley-components.com>