



**Pb-free
HEAT**

STANLEY

1107L 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 3.6 x 2.8 x 1.9mm(L x W x H) • Wide operation temperature range Storage Temperature : 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... • Spatial distribution characteristics. (2 θ 1/2 : 120deg) • Through heat dissipation design, a maximum forward current of $I_F=70mA$ is made possible, and a high luminosity is then possible. • Lead-free soldering compatible • RoHS compliant		
Dominant wavelength	Yellow	: 589nm (VFY)	
	Orange	: 606nm (VFA)	
	Red	: 615nm (VFV) , 628nm (VFR)	
Spatial distribution	120 deg.		
Die materials	AlGaInP		
Optical efficiency	VFY : 14.3lm/W	VFA : 14.3lm/W	
	VFV : 14.3lm/W	VFR : 12.9lm/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	2kV (HBM)		

Recommended Applications

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



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(Ta=25°C)

Color Variations and Luminous Intensity

Part No.	Material	Emitted Color	Lens Color	Dominant Wavelength λd (nm)		Luminous Intensity I_v (mcd)			Luminous Flux ϕ_v (mlm)	
				TYP.	I_F	MIN.	MAX.	I_F	TYP.	I_F
VFY1107L	AlGaInP	Yellow	Water Clear	589	50	270	820	50	1,500	50
VFA1107L	AlGaInP	Orange		606	50	390	1,000	50	1,500	50
VFV1107L	AlGaInP	Red		615	50	390	1,200	50	1,500	50
VFR1107L	AlGaInP	Red		628	50	220	680	50	1,350	50

※Note : The luminous intensity(I_v) and dominant wavelength (λd) above are the setup values of the sorting machine.
(Tolerance : I_v ... $\pm 11\%$, λd ... $\pm 1\text{nm}$)

Absolute Maximum Ratings

Item	Symbol	Absolute Maximum Ratings				Unit
		VFY	VFA	VFV	VFR	
Power Dissipation	P_d	196	196	196	196	mW
Forward Current	I_F	70	70	70	70	mA
Pulse Forward Current ※1	I_{FRM}	100	100	100	100	mA
Derating (Ta=65°C or higher)	ΔI_F	1.27	1.27	1.27	1.27	mA/°C
	ΔI_{FRM}	1.82	1.82	1.82	1.82	mA/°C
Reverse Voltage	V_R	5	5	5	5	V
Operating Temperature	T_{opr}	-40~+100				°C
Storage Temperature	T_{stg}	-40~+120				°C

※1 I_{FRM} Measurement condition : Pulse Width $\leq 1\text{ms.}$, Duty $\leq 1/10$.

Thermal Characteristics

Item	Symbol	Ratings				Unit
		VFY	VFA	VFV	VFR	
Junction Temperature (MAX.)	T_j	120	120	120	120	°C
Thermal Resistance (TYP.) (Junction/ ambient)	$R_{(th\ j-a)}$	260	260	260	260	°C/W
Thermal Resistance (TYP.) (Junction/ Solder Point)	$R_{(th\ j-s)}$	134	134	134	134	°C/W

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

Electro-Optical Characteristics

Item		Symbol	Characteristic Rating					Unit
	Conditions			VFY	VFA	VFV	VFR	
Forward Voltage	I _F =50mA	V _F	TYP.	2.1	2.1	2.1	2.1	V
			MAX.	2.6	2.6	2.6	2.6	
Reverse Current	V _R =5V	I _R	MAX.	100	100	100	100	μ A
Peak Wavelength	I _F =50mA	λ _p	TYP.	594	613	626	638	nm
Dominant Wavelength	I _F =50mA	λ _d	TYP.	589	606	615	628	nm
Spectral Line Half Width	I _F =50mA	Δλ	TYP.	15	15	15	19	nm
Half Intensity Angle	I _F =50mA	2 θ 1/2	TYP.	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

Standard Chart(Unit: mcd)

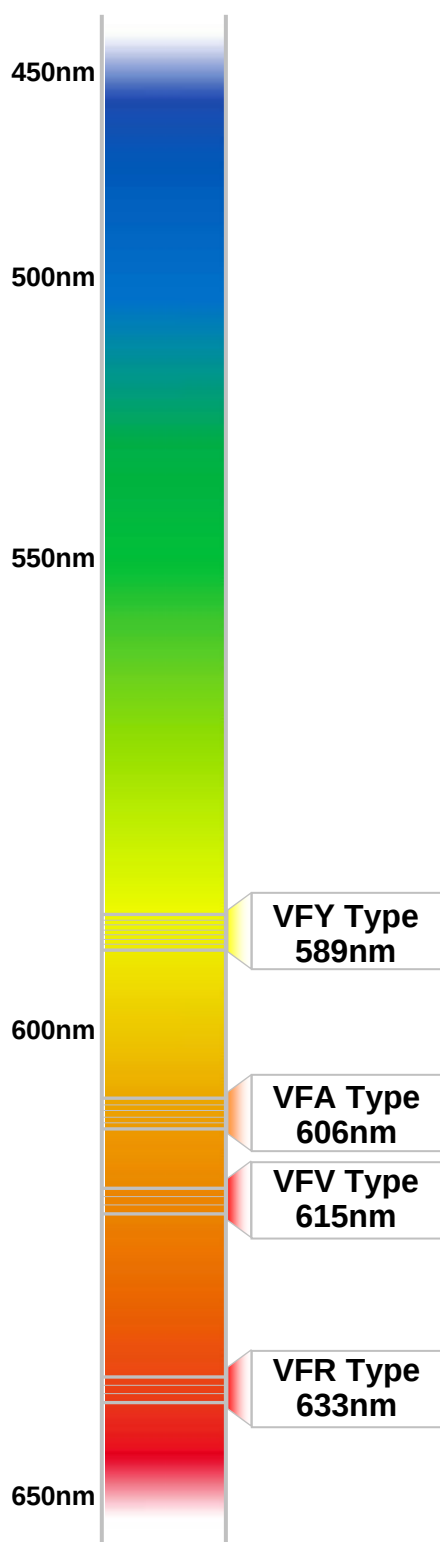
Rank	I _V (mcd)		VFY	VFA	VFV	VFR
	MIN.	MAX.	I _F =50mA			
B2	12	15				
B3	15	18				
B4	18	22				
B5	22	27				
B6	27	33				
B7	33	39				
B8	39	47				
B9	47	56				
BX	56	68				
BY	68	82				
BZ	82	100				
C1	100	120				
C2	120	150				
C3	150	180				
C4	180	220				
C5	220	270				C5
C6	270	330	C6			
C7	330	390				
C8	390	470		C8	C8	
C9	470	560				
CX	560	680				CX
CY	680	820	CY			
CZ	820	1,000		CZ		
D1	1,000	1,200			D1	
D2	1,200	1,500				
D3	1,500	1,800				
D4	1,800	2,200				
D5	2,200	2,700				

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

Color Tone Groups (λ d)

(unit: nm)

Tolerance: +/-1nm



VFY Type (I_F=50mA)

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

VFA Type (I_F=50mA)

	C	D	E
MIN.	603.0	606.0	609.0
MAX.	606.0	609.0	612.0

VFV Type (I_F=50mA)

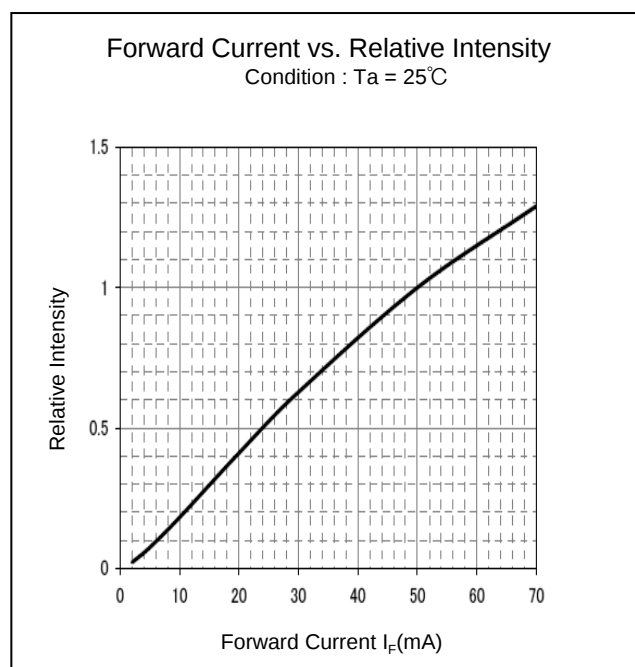
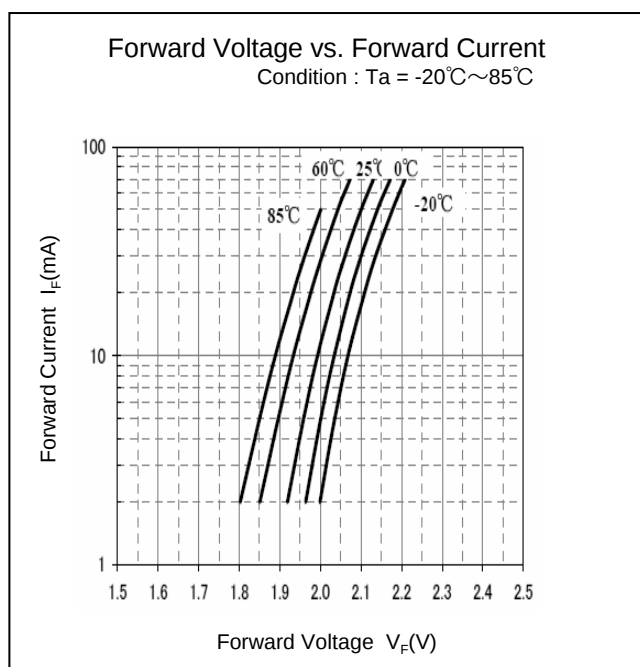
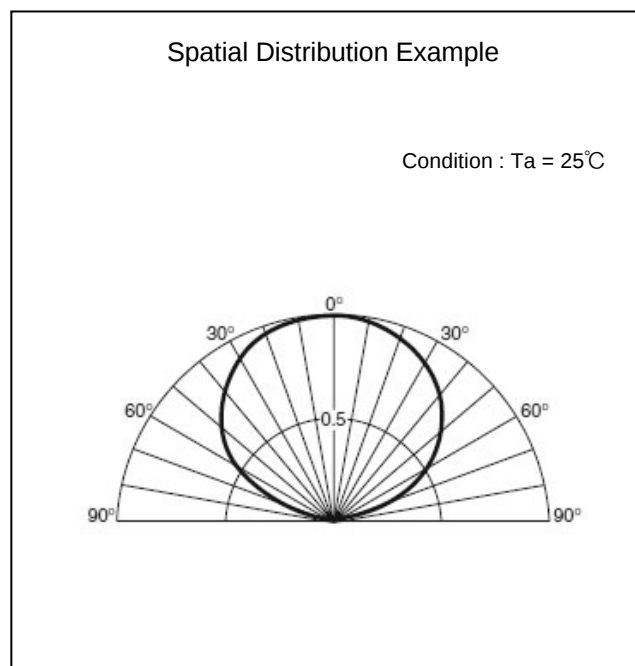
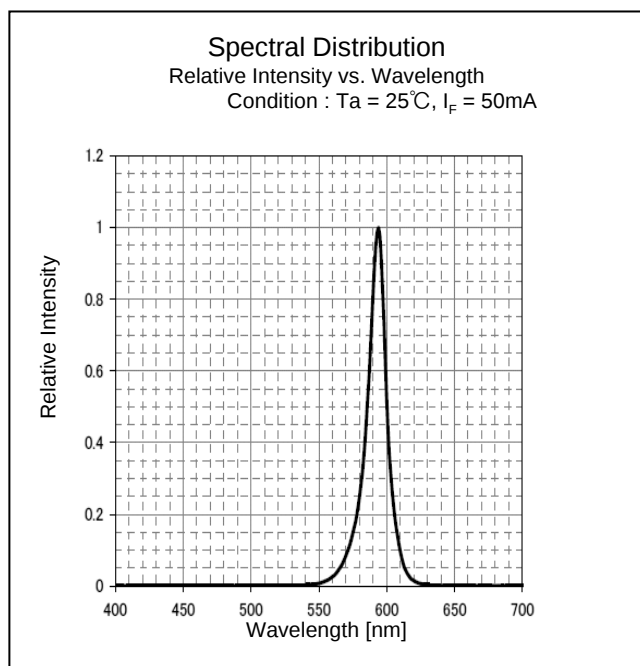
	B	C	D
MIN.	613.0	616.0	619.0
MAX.	616.0	619.0	622.0

VFR Type (I_F=50mA)

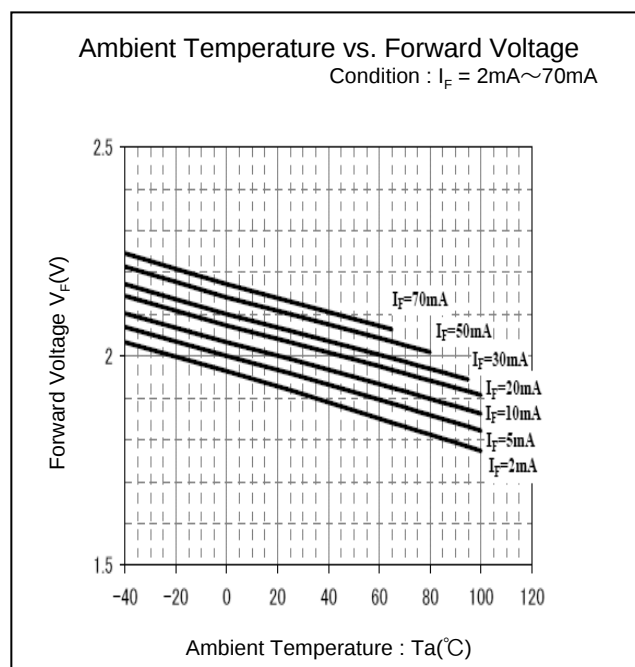
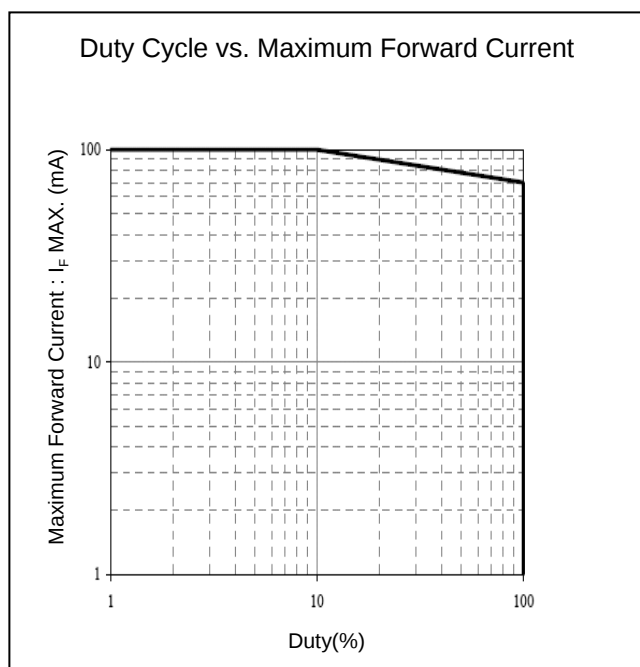
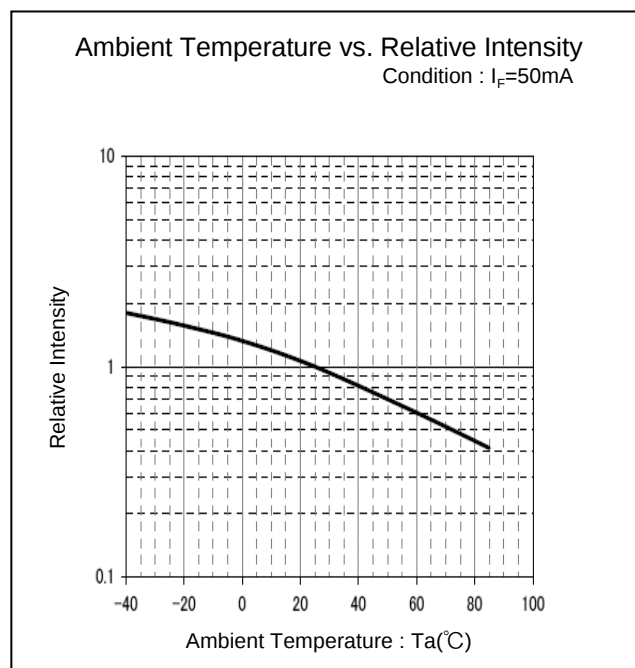
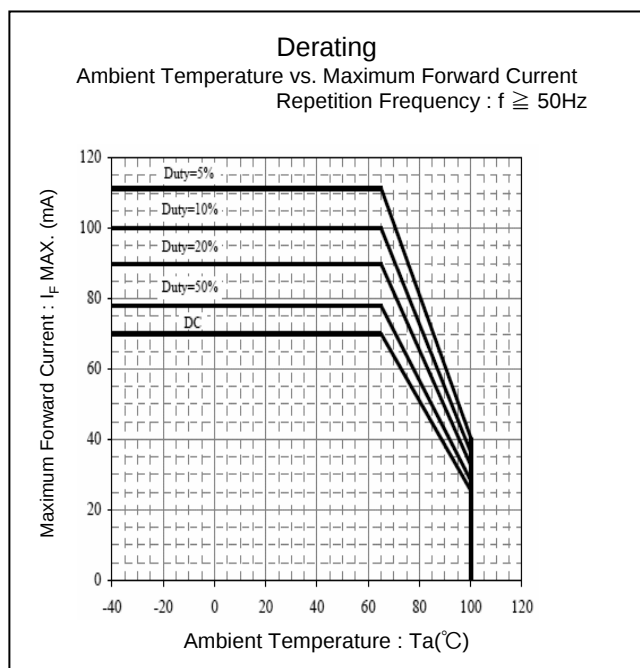
	A	B	C
MIN.	620.0	626.0	632.0
MAX.	626.0	632.0	638.0

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

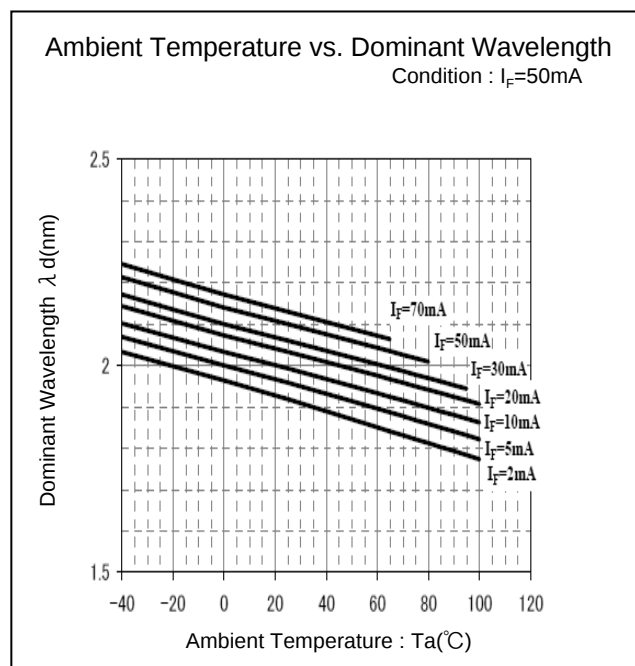
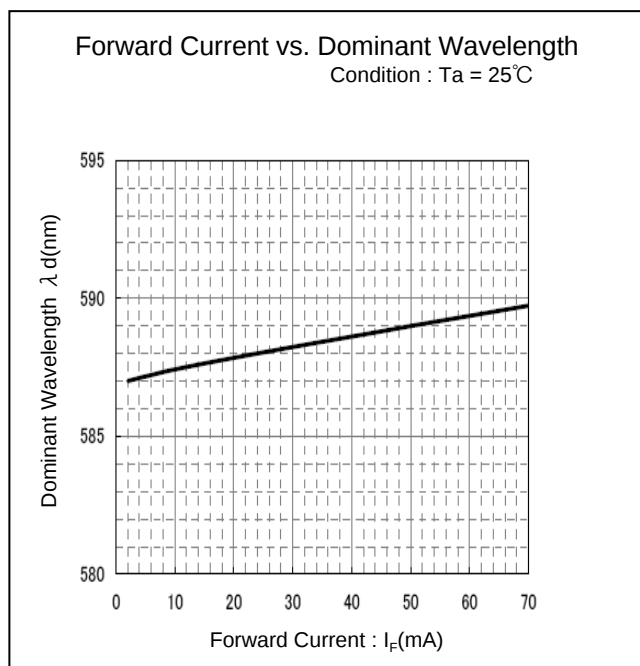
Characteristic Graph (VFY)



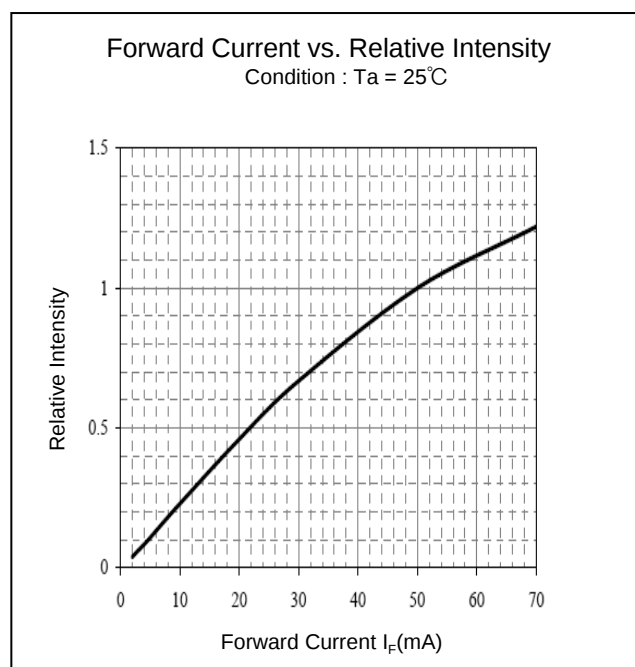
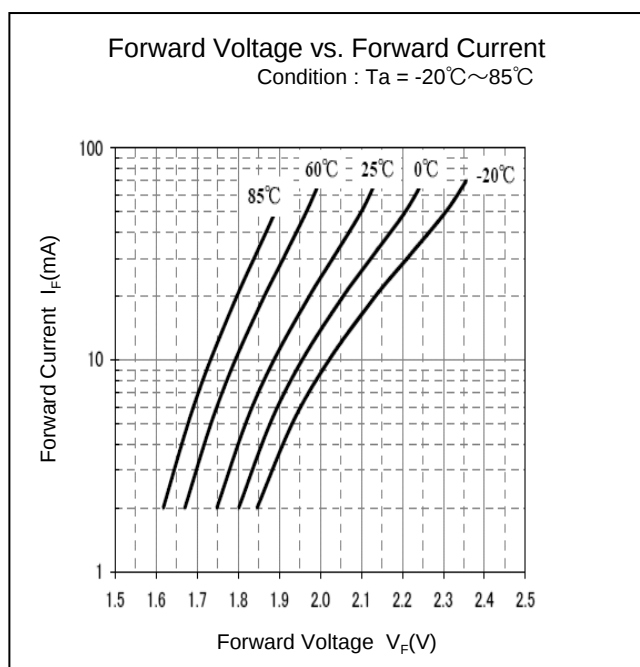
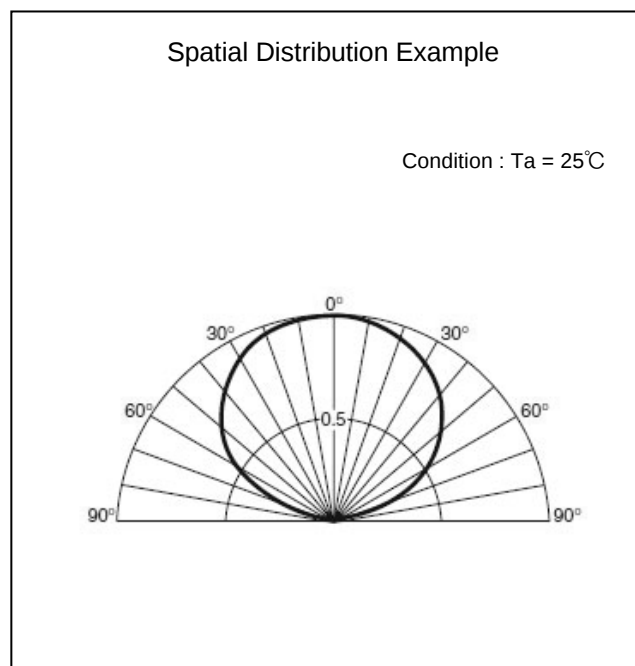
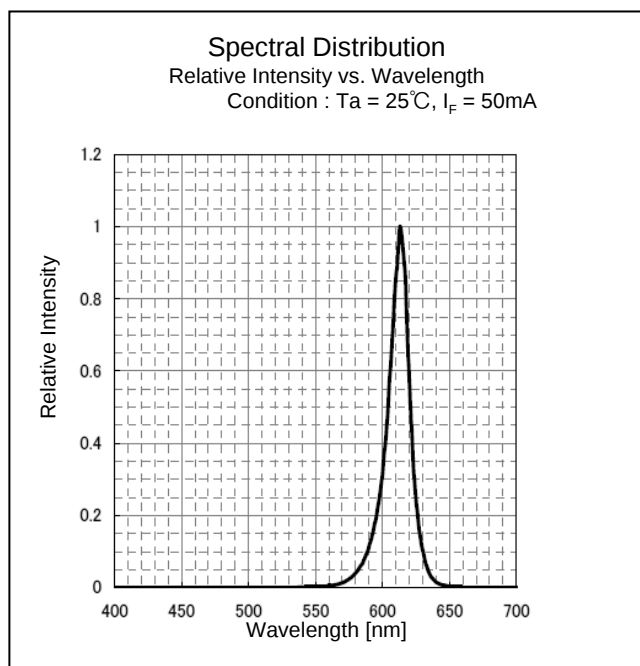
Characteristic Graph (VFY)



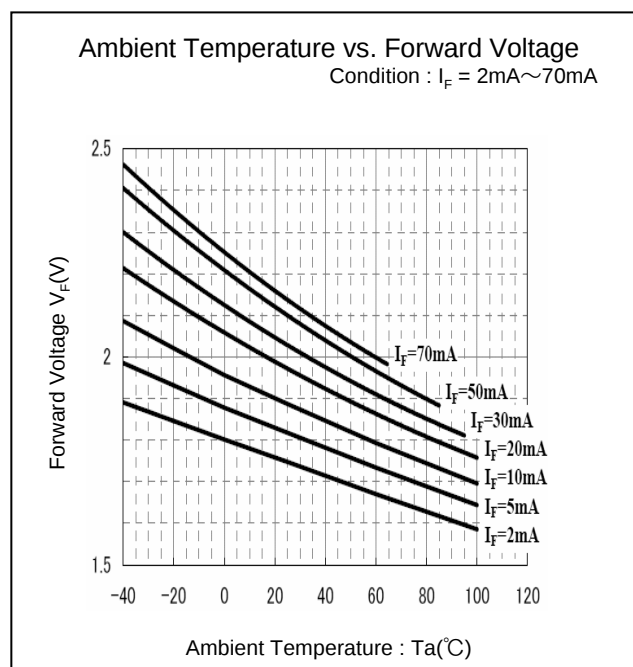
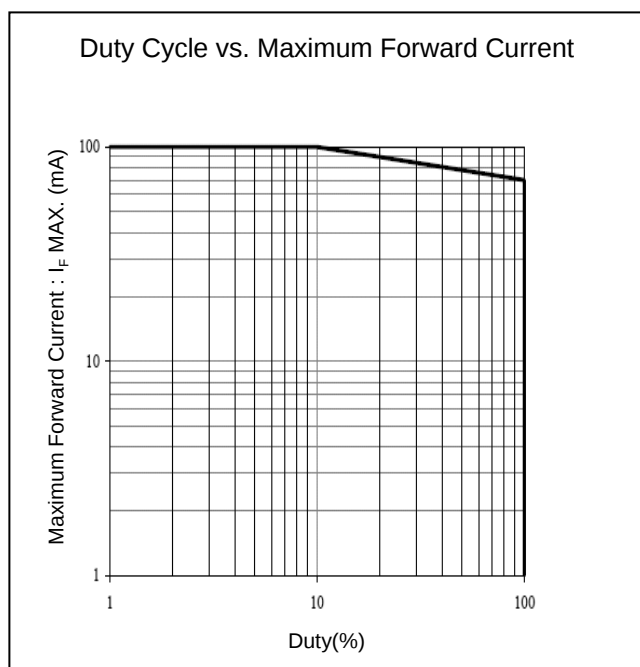
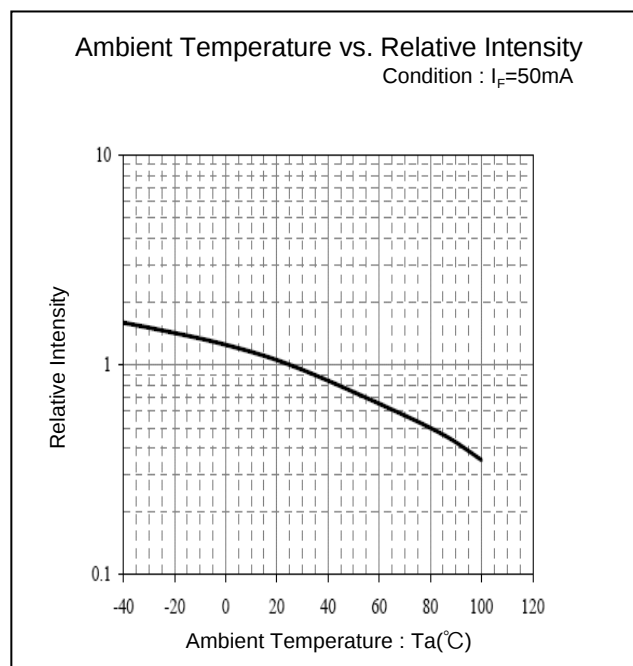
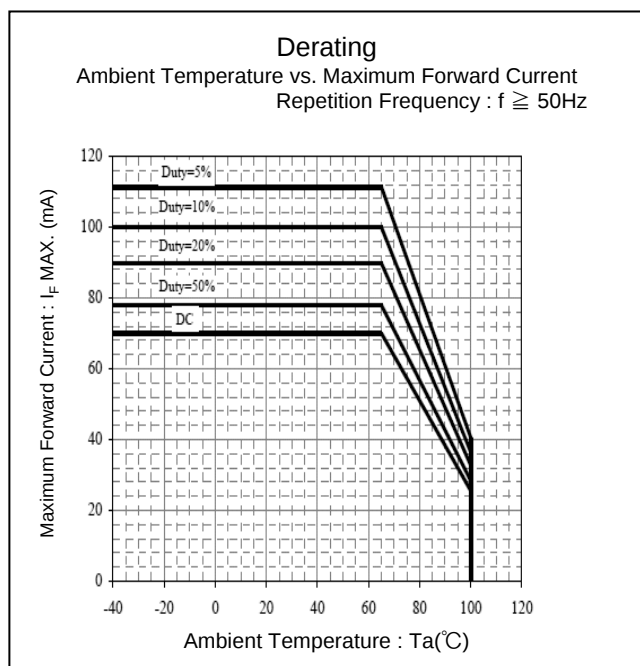
Characteristic Graph (VFY)



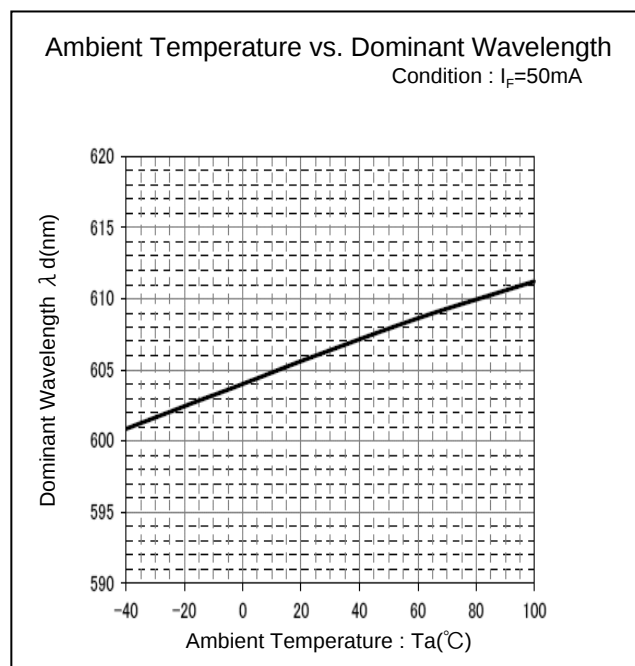
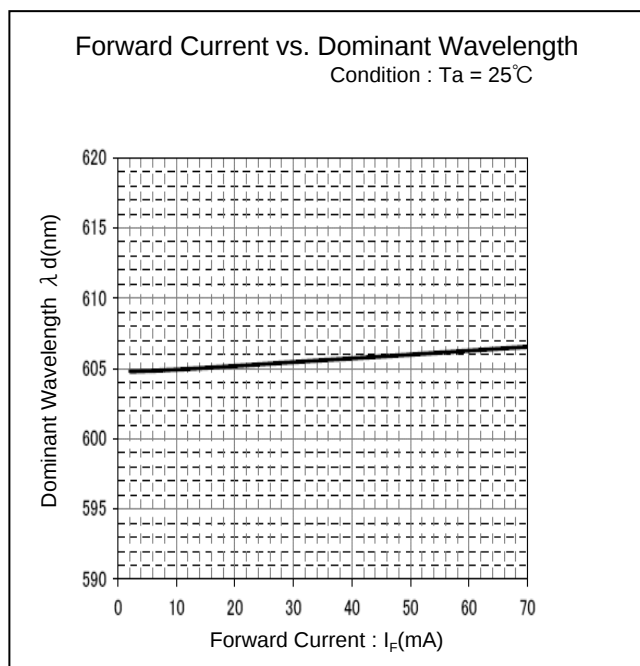
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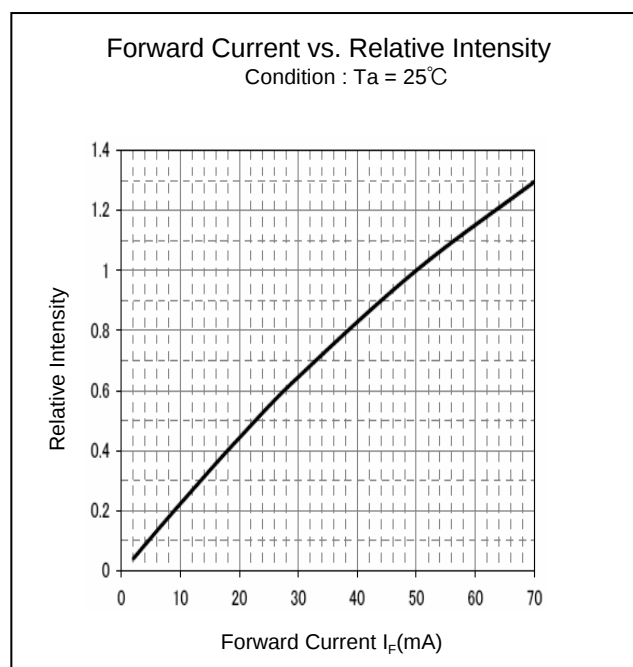
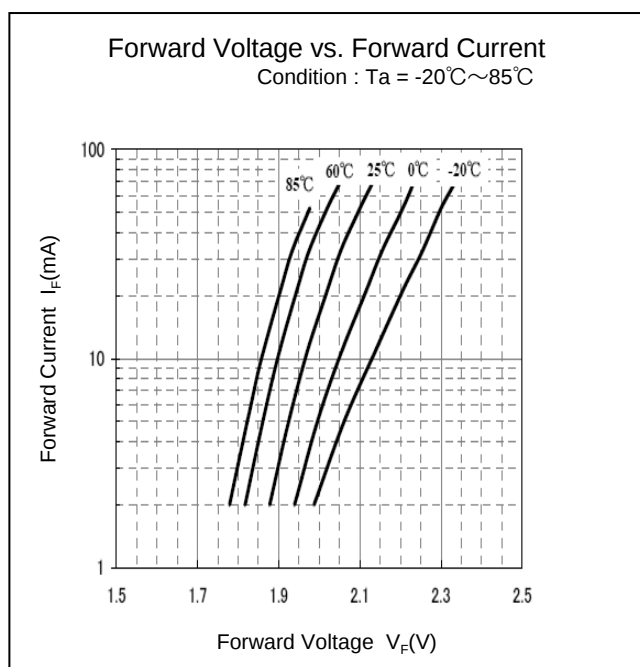
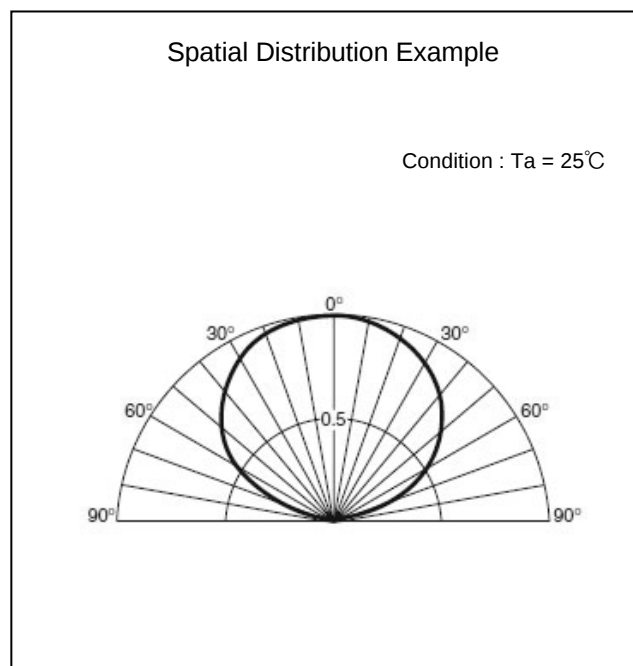
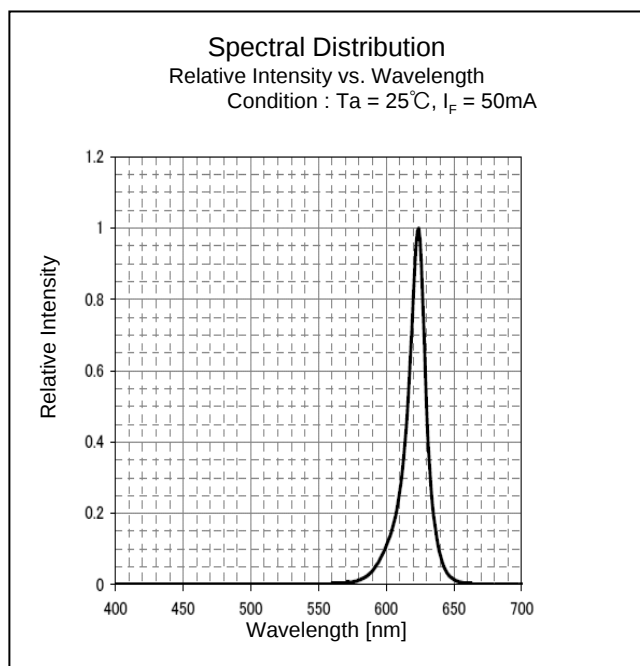
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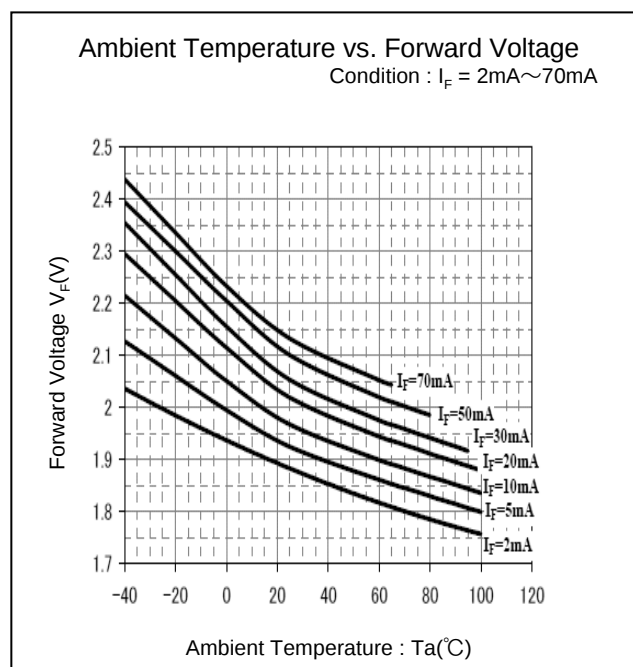
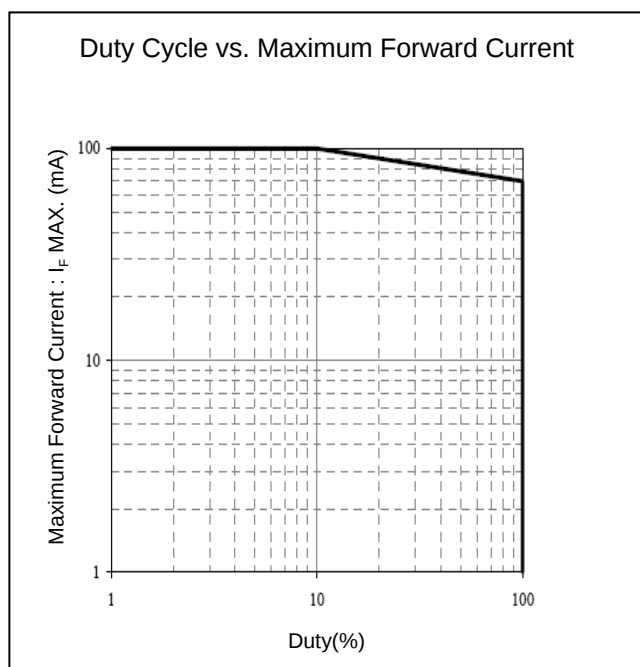
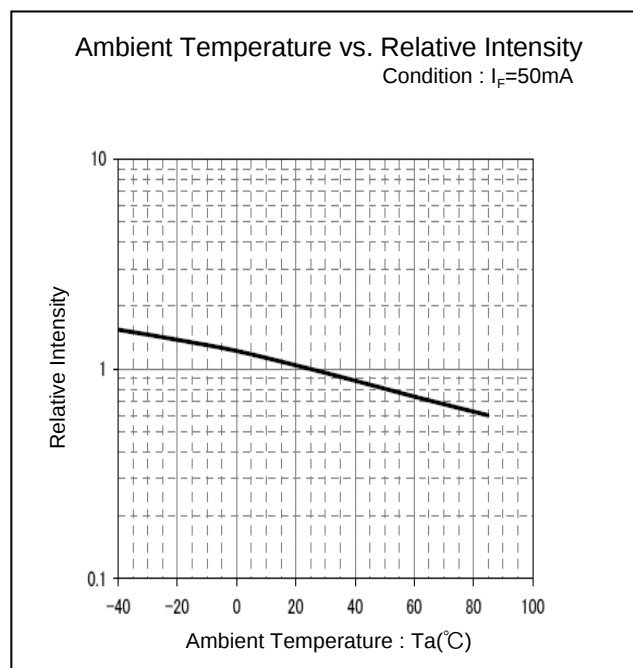
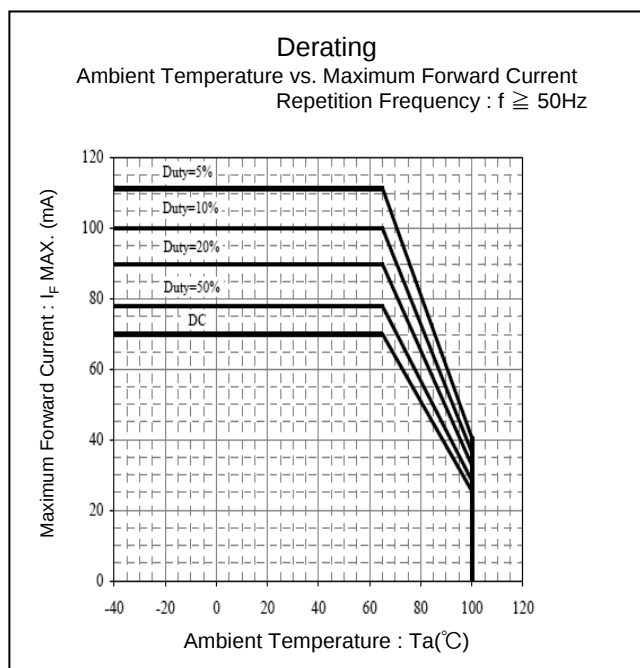
Characteristic Graph (VFA)



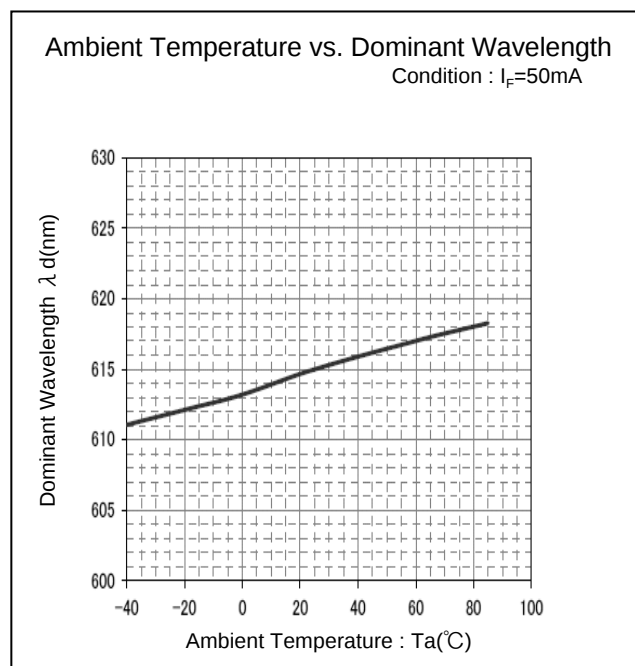
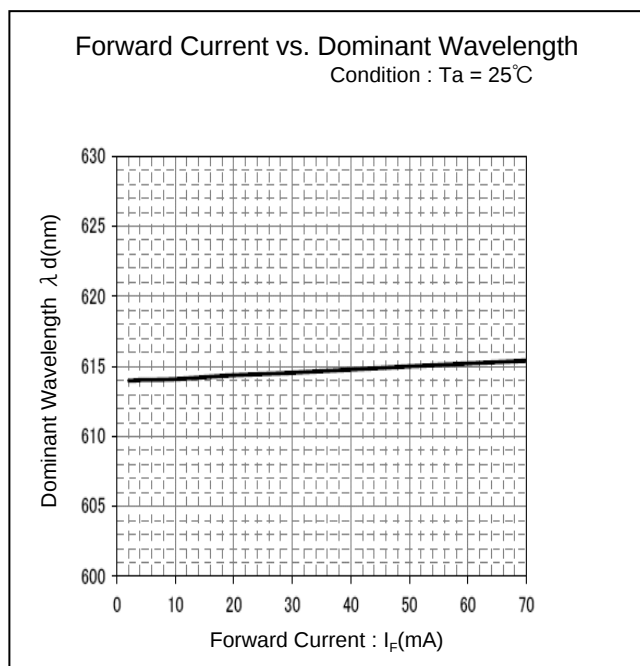
Characteristic Graph (VFV)



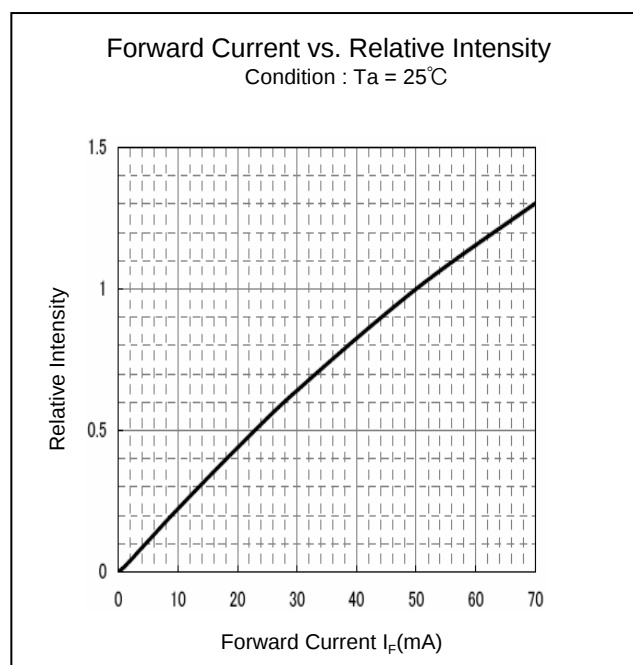
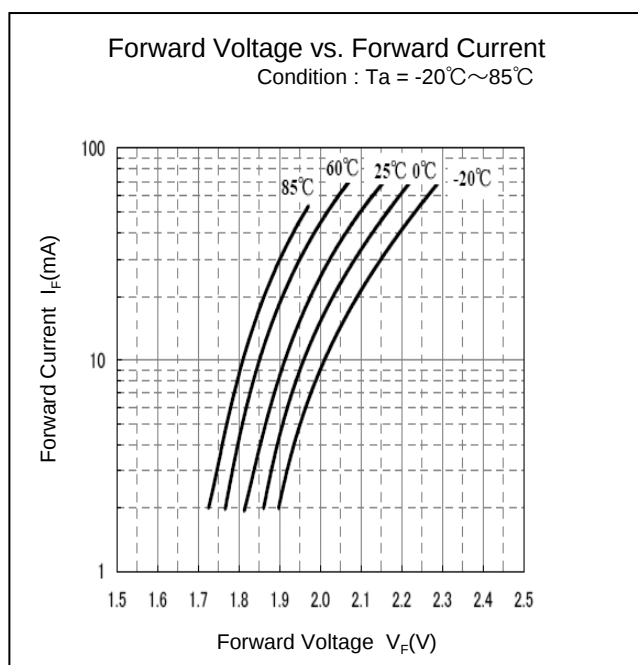
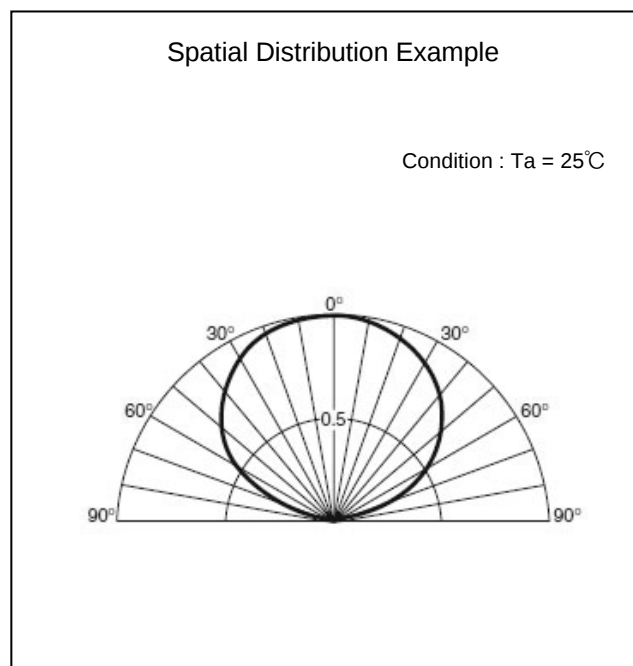
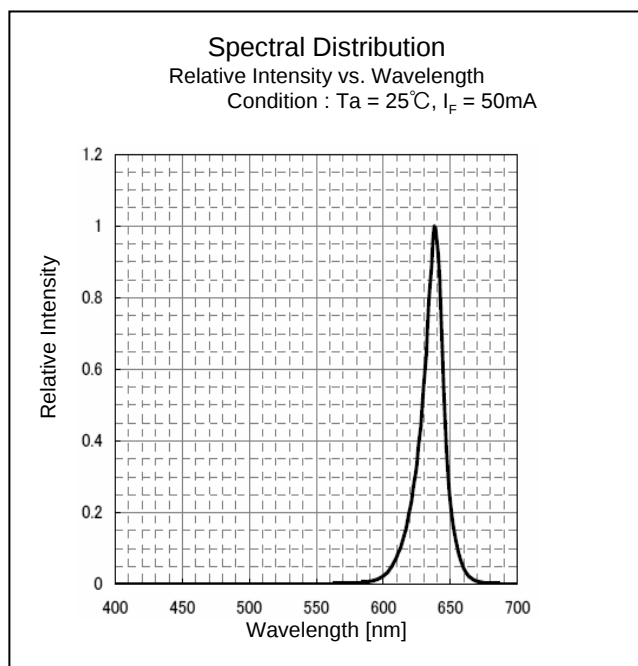
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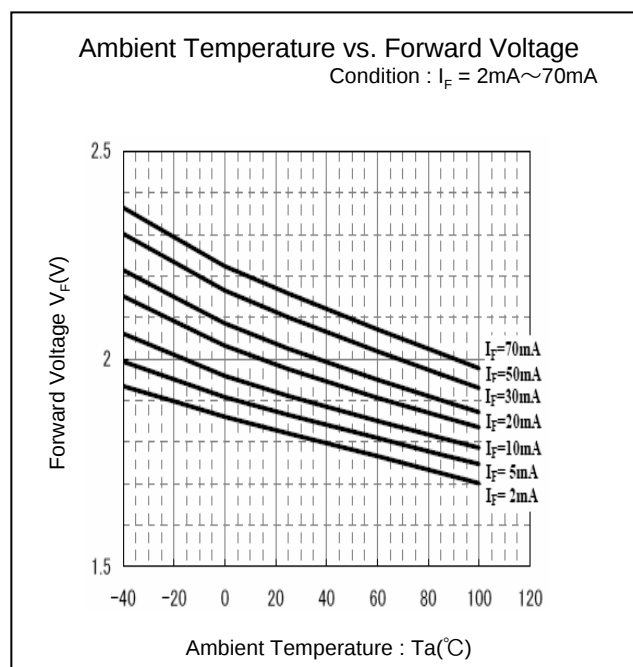
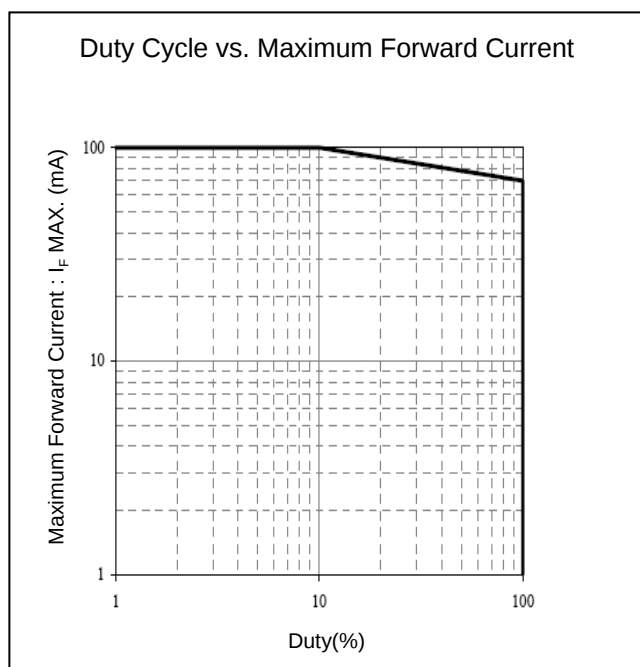
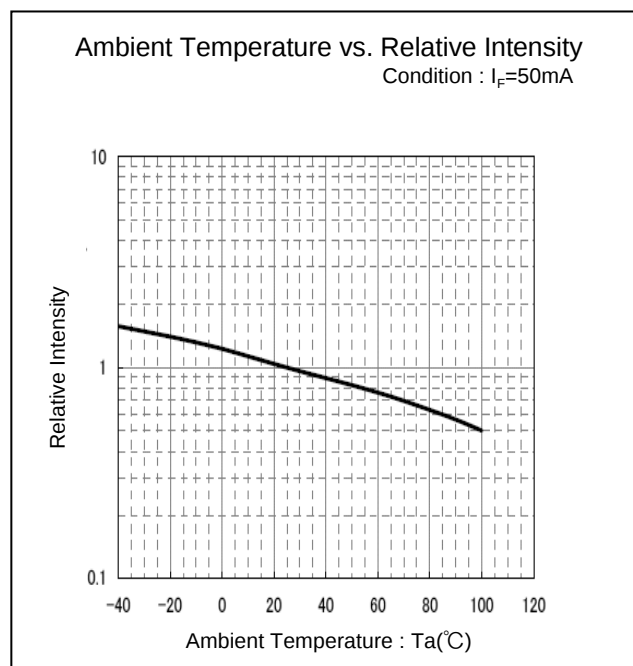
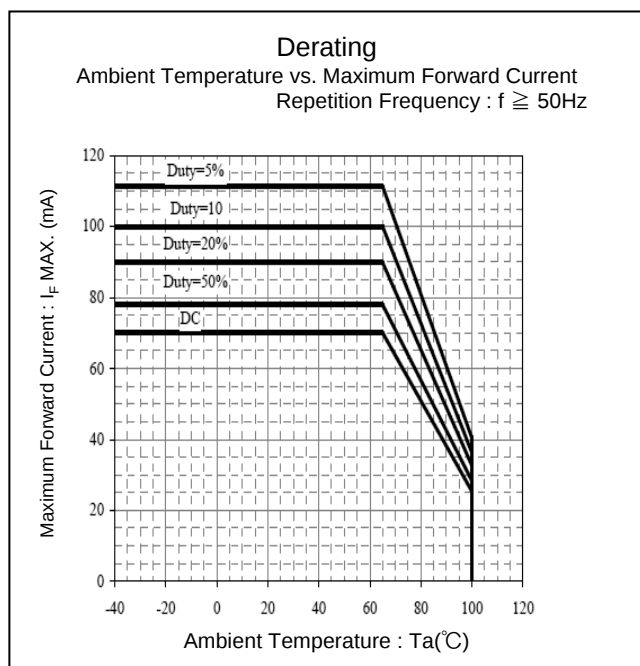
Characteristic Graph (VFV)



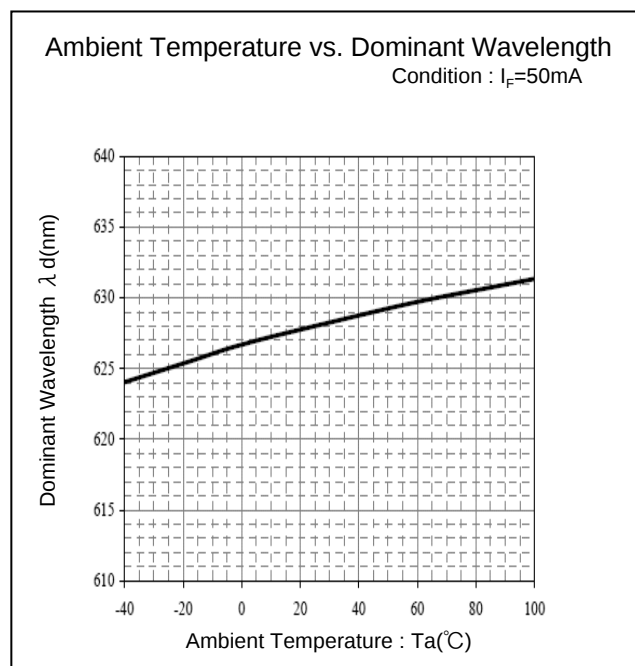
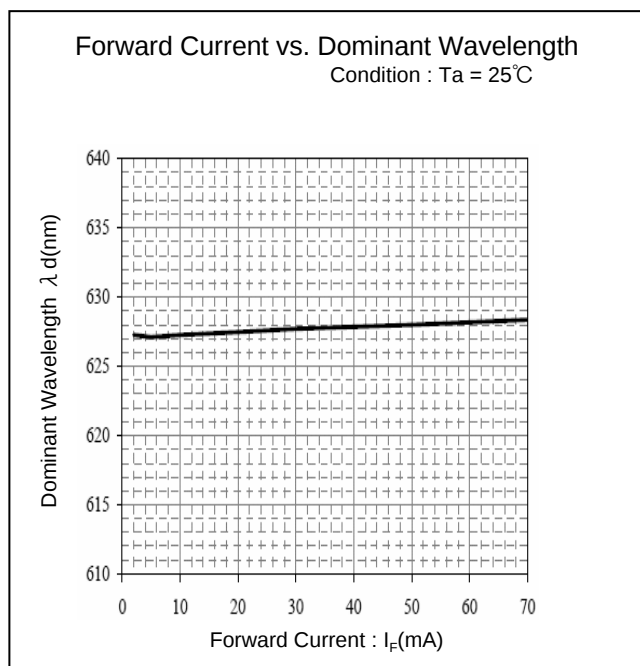
Characteristic Graph (VFR)



Characteristic Graph (VFR)



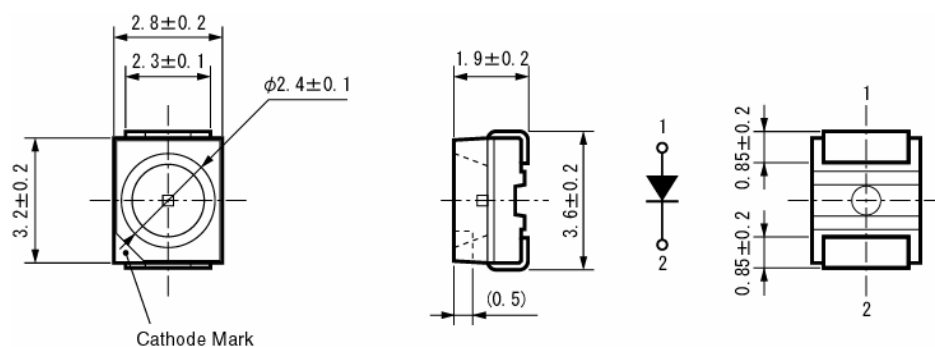
Characteristic Graph (VFR)



Package Dimensions

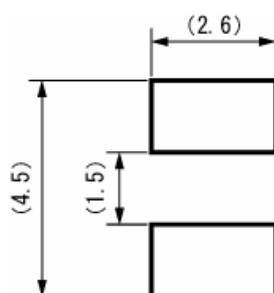
(Unit: mm)

Weight: (39.5)mg



Recommended Soldering Pattern

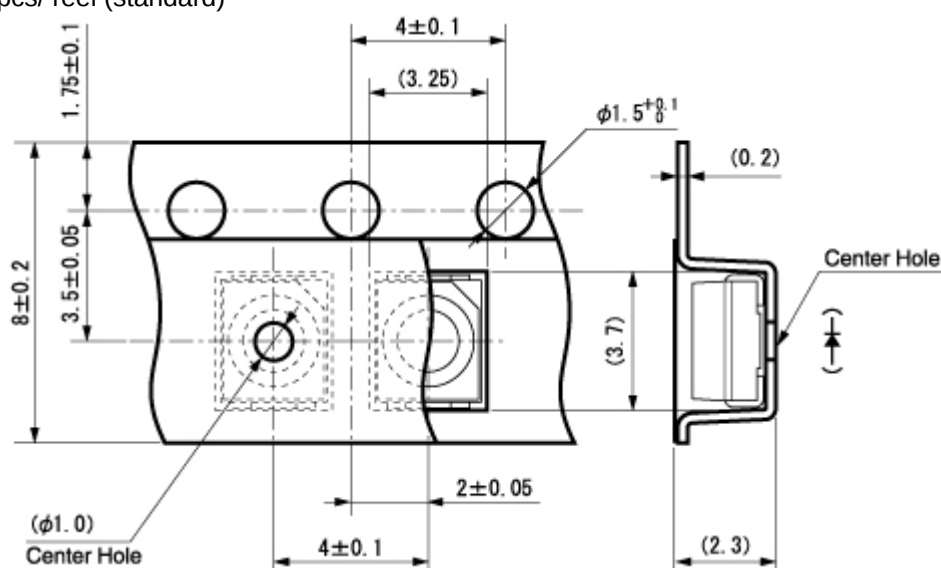
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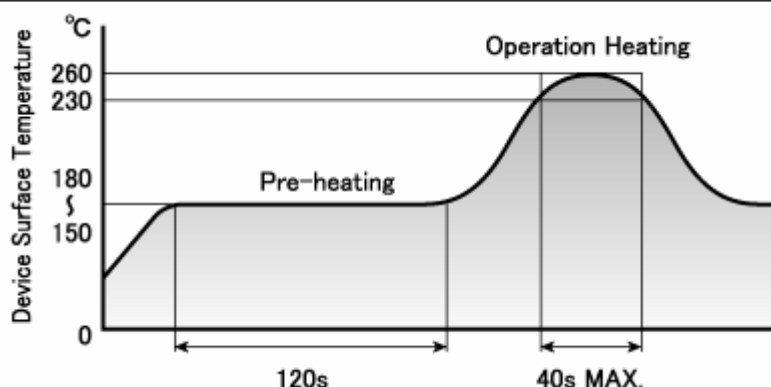
Taping Specification

(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. (6°C maximum)

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	BAJED- 4701/100(101)	Ta = 25°C, I _F = Maximum Rated Current	1,000 h	0/20
High Temp. Operating Life	BAJED- 4701/100(101)	Ta = Maximum Rated Operating Temperature, I _F = Derating Value	1,000 h	0/20
Low Temp. Operating Life	BAJED- 4701/100(101)	Ta = -40°C, I _F = Maximum Rated Current	1,000 h	0/20
Wet High Temp. Operating Life	BAJED- 4701/100(102)	Ta = 60°C, 90%, I _F = Maximum Rated Current	1,000 h	0/20
Wet High Temp. Storage Life	BAJED- 4701/100(103)	Ta = 60°C, 90%	1,000 h	0/20
Thermal Shock	BAJED- 4701/100(105)	Ta = -40°C ~ Maximum Rated Storage Temperature (each 15min.)	1,000 cycles	0/20
Thermal Shock Operating	BAJED- 4701/100(105)	Ta = -40°C(off) ~ 85°C (I _F = Derating Value on), (each 15min.)	1,000 cycles	0/20
High Temp. Storage Life	BAJED- 4701/200(201)	Ta = Maximum Rated Storage Temperature	1,000 h	0/20
Low Temp. Storage Life	BAJED- 4701/200(202)	Ta = Minimum Rated Storage Temperature	1,000 h	0/20
Cycled Temp. Humidity Life	BAJED- 4701/200(203)	Ta = -30°C(2h) ~ 80°C, 95%(2h), 8h/cycle, I _F = Derating Value, 5min on-off	30 cycles	0/20
Resistance to Reflow Soldering	BAJED- 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}	BAJED- 4701/300(304)	C = 100pF, R ₂ = 1.5KΩ, ±2,000V	once each polarity	0/10
Vibration, Variable Frequency	BAJED- 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	I _V	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

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