

SPECIFICATION FOR APPROVAL

COMMODITY: 4.80mm Round Full Color Blinking LED

DEVICE NUMBER: DL-F48RGBC-B1

CUSTOMER APPROVEDBY	DATE

Double Light

◆ Features:

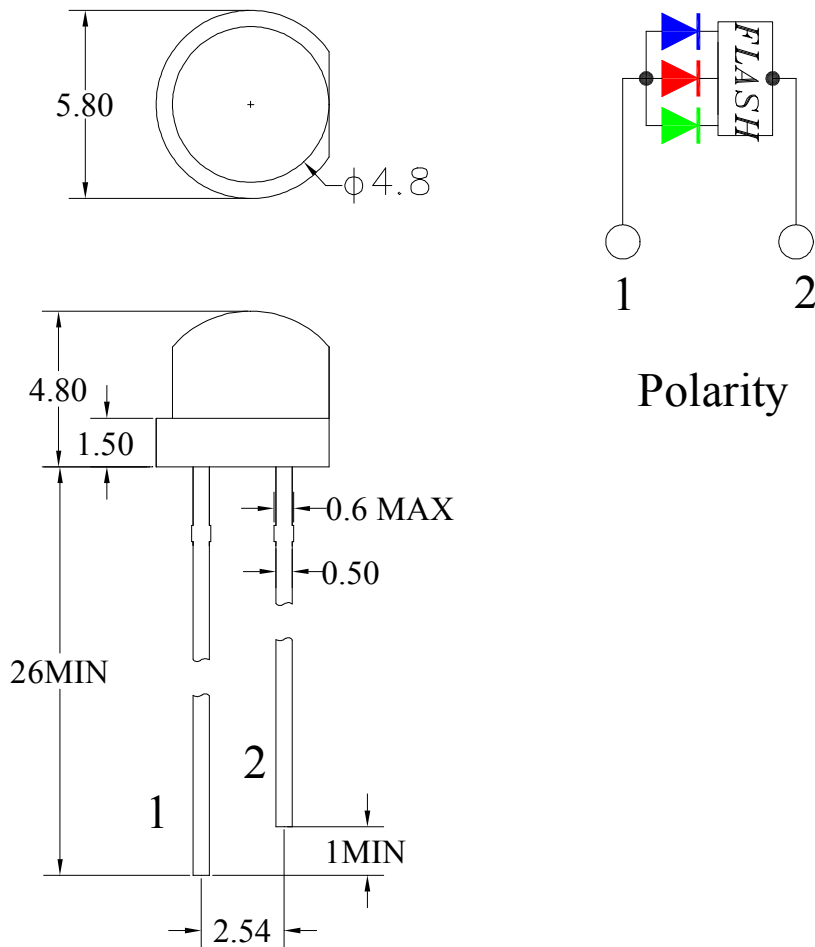
1. Single lamp with 3 original colors (red, green and blue).
2. Designed for bonding with LED chip.
3. Triple chips embedded.
4. Multiple colors compose full spectrums.
5. Electricity control IC embedded.
6. Lens size with 5mm / 8mm / 10mm options.
7. High intensity.
8. Viewing Angles: 90°.
9. Fancy, fun, hottest in the market.
10. Operating voltage range: 3.00~5.00V DC.
11. Blinking frequency: 0.07Hz ($V_{DD}=4.50V$).
12. Frequency tolerance: $\pm 20\%$.
13. The product itself will remain within RoHS compliant Version.

◆ Applications:

1. The Hyper Red source color devices are made with AlGaInP on GaAs substrate Light Emitting Diode.
2. The Pure Green source color devices are made with InGaN on Sapphire substrate Light Emitting Diode.
3. The Blue source color devices are made with InGaN on Sapphire substrate Light Emitting Diode.

Double Light

◆ Package dimensions:



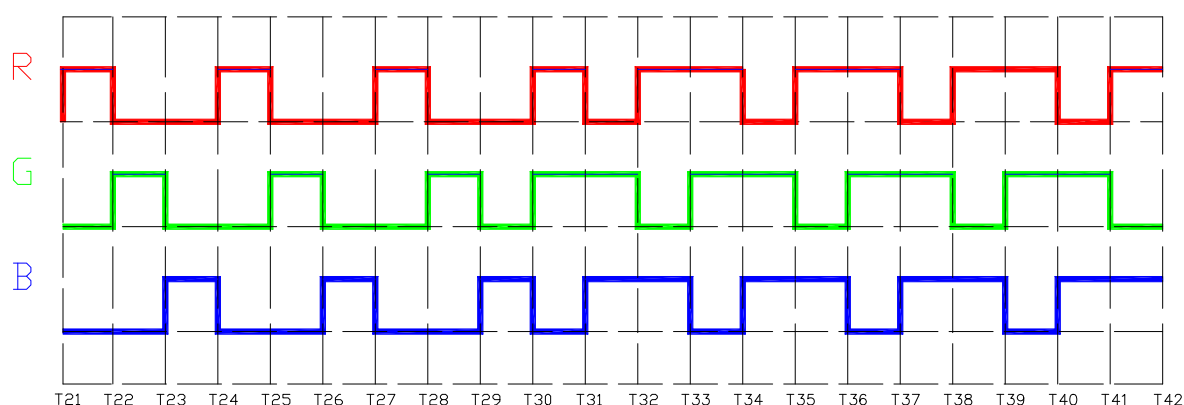
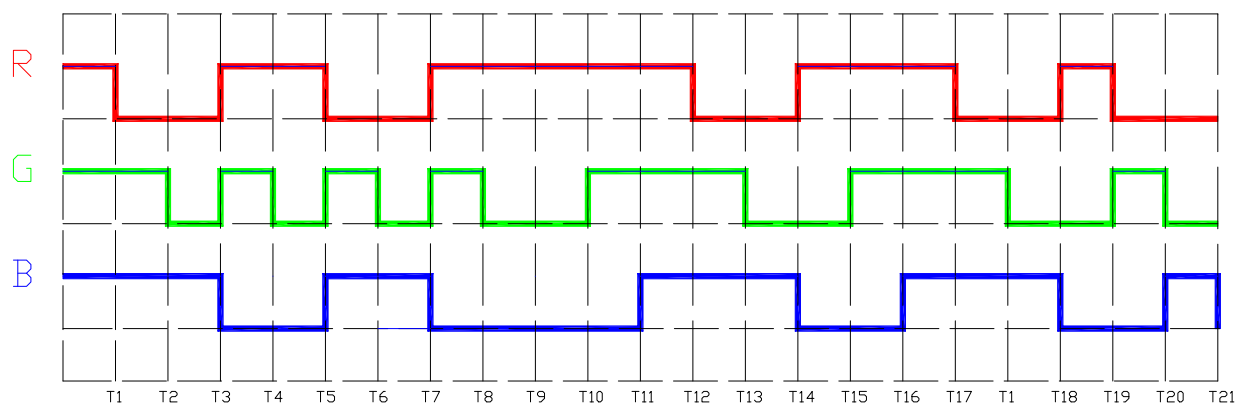
Part No.	Chip Material		Lens Color	Source Color
DL-F48RGBC-B1	R	AlGaInP	Water Clear	Hyper Red
	G	InGaN		Pure Green
	B	InGaN		Blue

Notes:

1. All dimensions are in millimeters (inches).
2. Tolerance is $\pm 0.25\text{mm}$ (.010") unless otherwise noted.
3. Protruded resin under flange is 1.00mm (.039") max.
4. Specifications are subject to change without notice.

◆ Flash Diagram of One Cycle Time:

Double Light



◆ Absolute Maximum Ratings at Ta=25°C

Parameters	Symbol	Max.	Unit
Power Dissipation (Per Chip)	PD	200	mW
Peak Forward Current (1/10 Duty Cycle, 0.1ms Pulse Width)	IFP	100	mA
Forward Current	IF	40	mA
Derating Linear From 50°C		0.4	mA/°C
Reverse Voltage	VR	5	V
Electrostatic Discharge (HBM)	ESD	1000	V
Operating Temperature Range	Topr	-40°C to +85°C	
Storage Temperature Range	Tstg	-40°C to +100°C	
Lead Soldering Temperature [4mm (.157") From Body]	Tsld	260°C for 5 Seconds	

◆ Electrical Optical Characteristics at Ta=25°C

Double Light

Parameters	Symbol	Emitting Color	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity *	IV	Hyper Red	---	200	---	mcd	V _{DD} =4.50V (Note 1)
		Pure Green	---	350	---		
		Blue	---	150	---		
Viewing angle	2θ _{1/2}	---	---	90	---	Deg	V _{DD} =4.50V (Note 2)
Peak Emission Wavelength	λ _p	Hyper Red	---	632	---	nm	V _{DD} =4.50V
		Pure Green	---	520	---		
		Blue	---	468	---		
Dominant Wavelength	λ _d	Hyper Red	---	624	---	nm	V _{DD} =4.50V (Note 3)
		Pure Green	---	525	---		
		Blue	---	470	---		
Spectral Line Half-Width	Δλ	Hyper Red	---	20	---	nm	IF=20mA (Per Chip)
		Pure Green	---	35	---		
		Blue	---	25	---		
Blinking Frequency	F	---	---	0.07	---	Hz	V _{DD} =4.50V
Frequency tolerance	Fled	---	---	±20%	---	Hz	V _{DD} =4.50V
Turn On Time	Duty	---	---	1/20	ms		V _{DD} =4.50V
Operating Voltage	V _F	---	3.00	4.50	5.00	V	
Reverse Current	I _R	---	---	---	50	μA	V _R =5V

Notes:

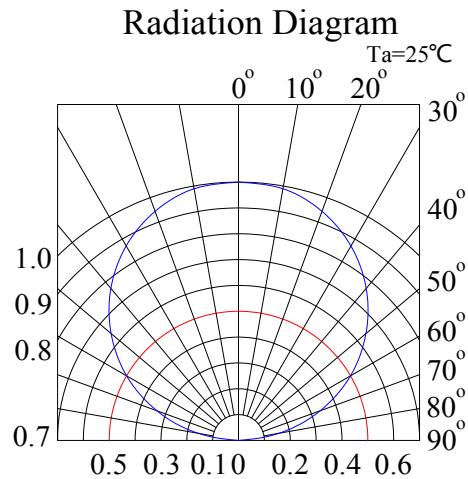
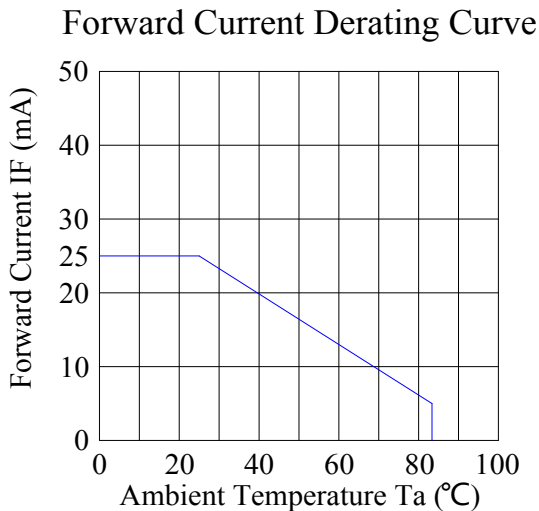
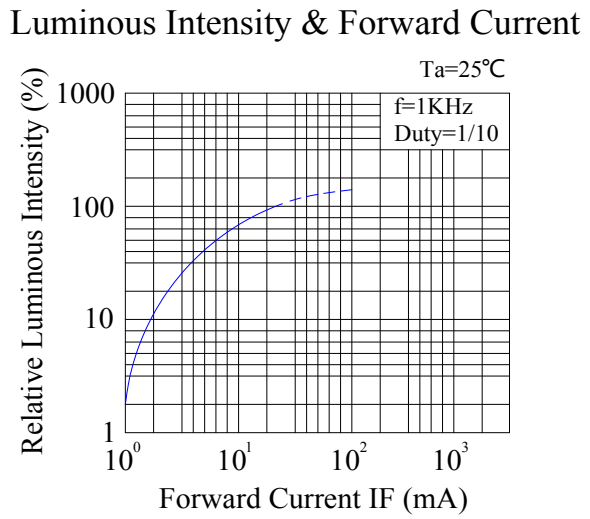
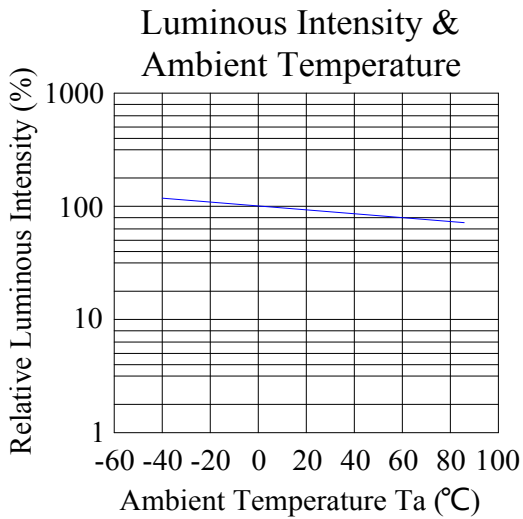
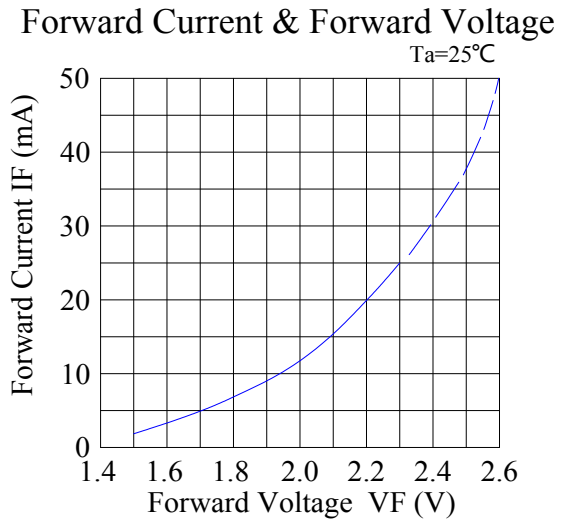
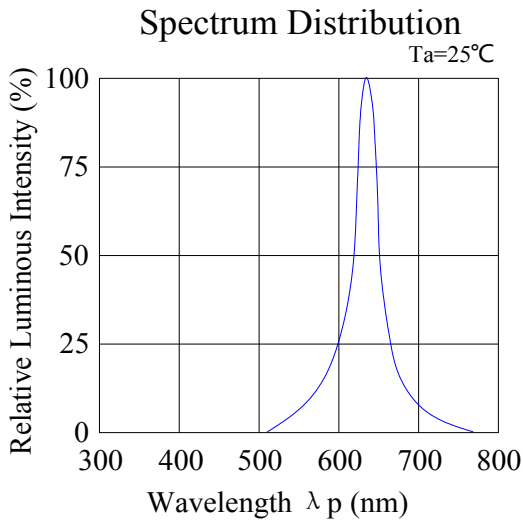
- Luminous Intensity is measured with a light sensor and filter combination that approximates the CIE eye-response curve.
- θ_{1/2} is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
- The dominant wavelength (λ_d) is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.
- All specs and applications shown above subject to change without prior notice.

◆ Typical Electrical - Optical Characteristics Curves

Double Light

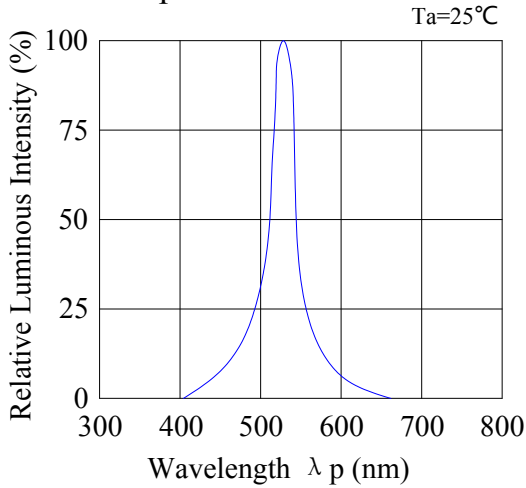
(25°C Ambient Temperature Unless Otherwise Noted)

Ultra Red:

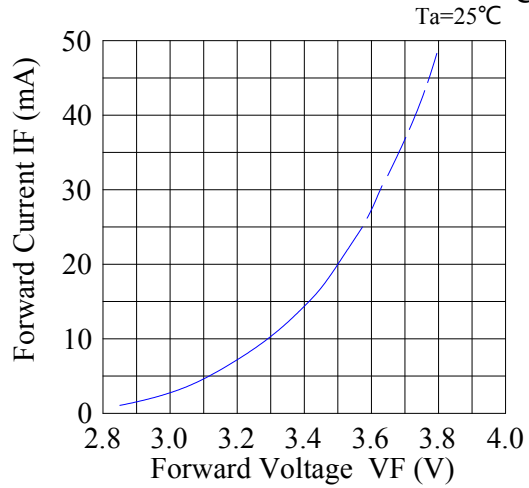


Pure Green:

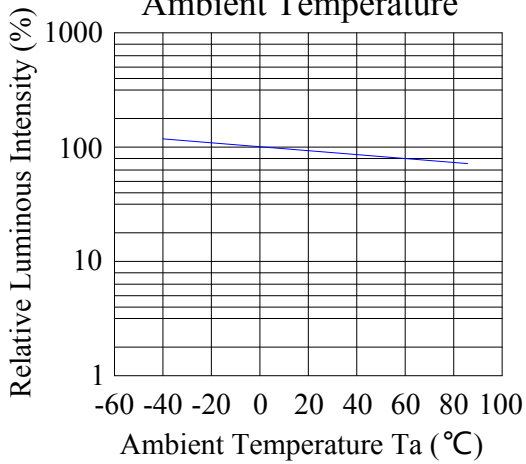
Spectrum Distribution



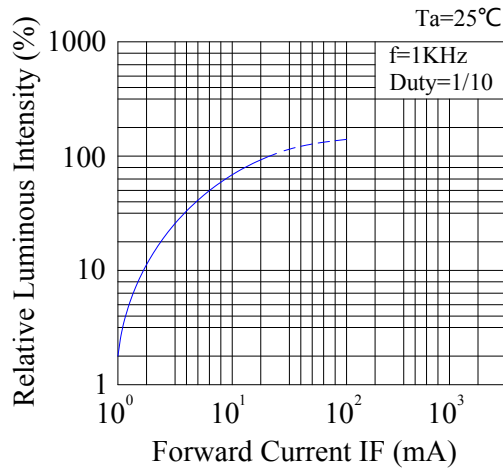
Forward Current & Forward Voltage



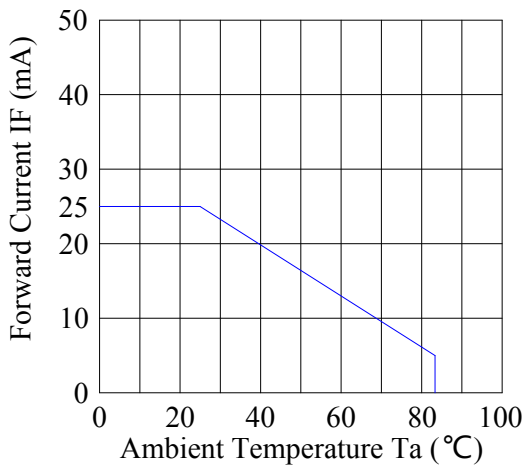
Luminous Intensity & Ambient Temperature



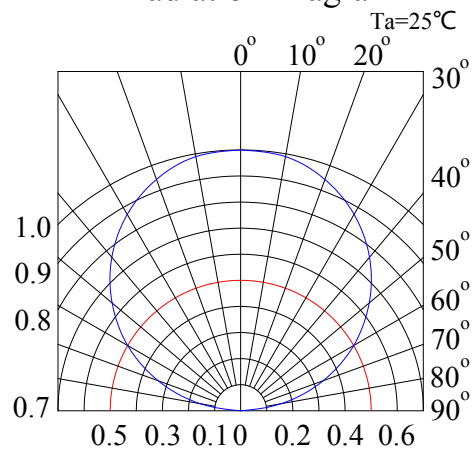
Luminous Intensity & Forward Current



Forward Current Derating Curve



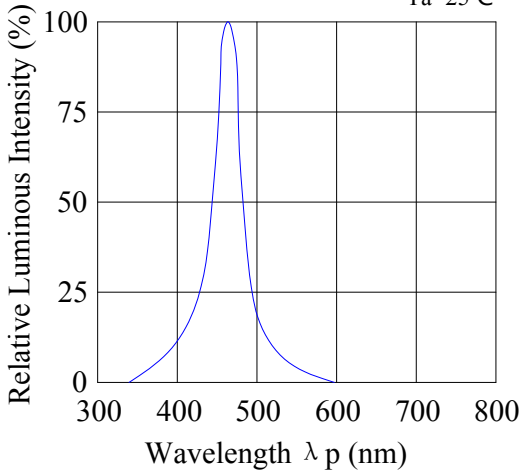
Radiation Diagram



Blue:

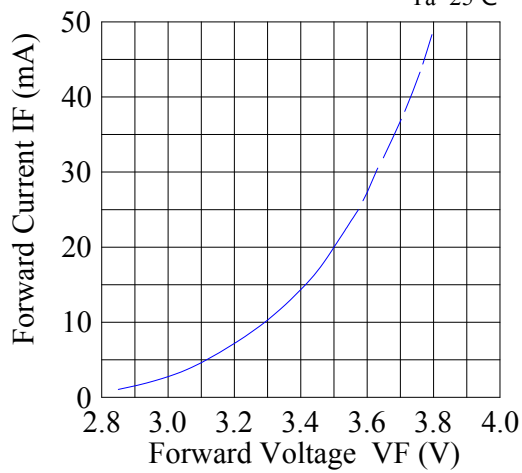
Spectrum Distribution

Ta=25°C

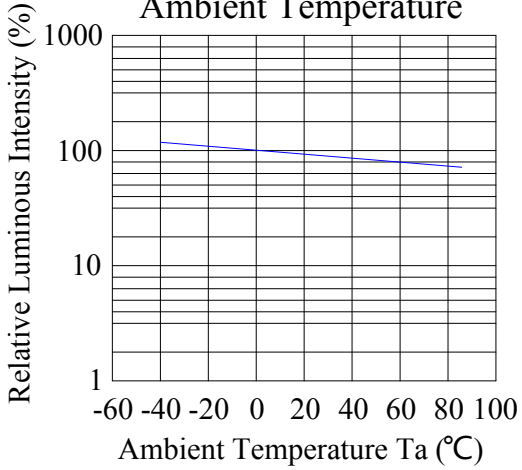


Forward Current & Forward Voltage

Ta=25°C

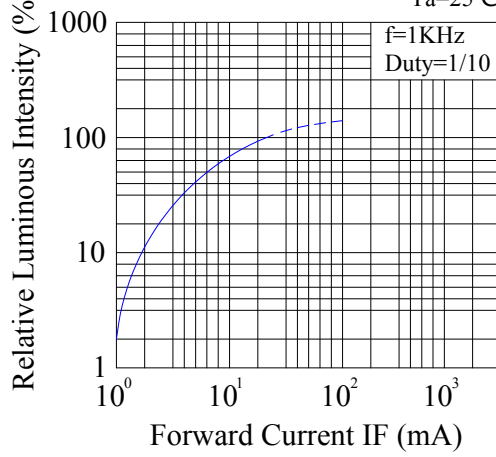


Luminous Intensity & Ambient Temperature

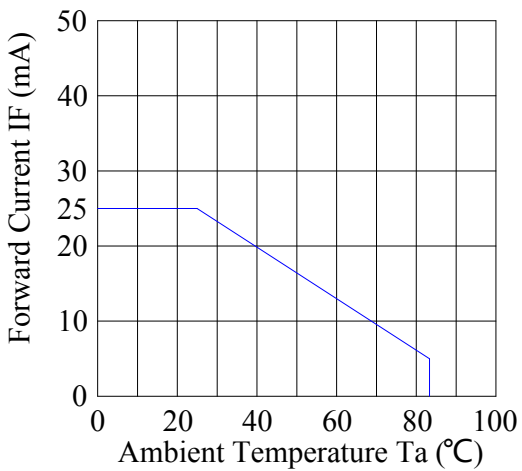


Luminous Intensity & Forward Current

Ta=25°C

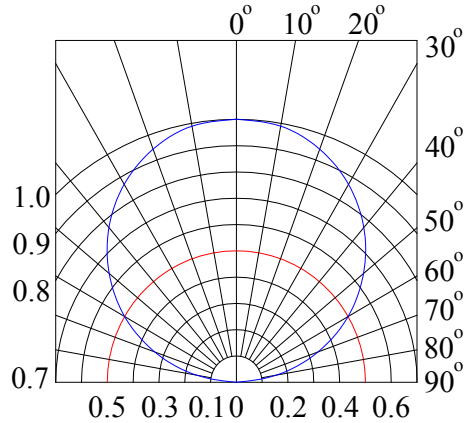


Forward Current Derating Curve



Radiation Diagram

Ta=25°C



◆ Reliability Test

Double Light

Classification	Test Item	Reference Standard	Test Conditions	Result
Endurance Test	Operation Life	MIL-STD-750:1026 MIL-STD-883:1005 JIS-C-7021 :B-1	Connect with a power $I_f=20\text{mA}$ T_a =Under room temperature Test time=1,000hrs	0/20
	High Temperature High Humidity Storage	MIL-STD-202:103B JIS-C-7021 :B-11	$T_a=+65^\circ\text{C}\pm 5^\circ\text{C}$ RH=90%-95% Test time=240hrs	0/20
	High Temperature Storage	MIL-STD-883:1008 JIS-C-7021 :B-10	High $T_a=85^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/20
	Low Temperature Storage	JIS-C-7021 :B-12	Low $T_a=-35^\circ\text{C}\pm 5^\circ\text{C}$ Test time=1,000hrs	0/20
Environmental Test	Temperature Cycling	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1010 JIS-C-7021 :A-4	$-35^\circ\text{C} \sim +25^\circ\text{C} \sim +85^\circ\text{C} \sim +25^\circ\text{C}$ 60min 20min 60min 20min Test Time=5cycle	0/20
	Thermal Shock	MIL-STD-202:107D MIL-STD-750:1051 MIL-STD-883:1011	$35^\circ\text{C}\pm 5^\circ\text{C} \sim +85^\circ\text{C}\pm 5^\circ\text{C}$ 20min 20min Test Time=10cycle	0/20
	Solder Resistance	MIL-STD-202:201A MIL-STD-750:2031 JIS-C-7021 :A-1	Preheating: $140^\circ\text{C}-160^\circ\text{C}$, within 2 minutes. Operation heating: 235°C (Max.), within 10seconds (Max.)	0/20

◆ Judgment criteria of failure for the reliability

Measuring items	Symbol	Measuring conditions	Judgment criteria for failure
Forward voltage	V_F (V)	$I_F=20\text{mA}$	Over $U_x1.2$
Reverse current	I_R (μA)	$V_R=5\text{V}$	Over U_x2
Luminous intensity	I_v (mcd)	$I_F=20\text{mA}$	Below $SX0.5$

Notes:

- U means the upper limit of specified characteristics. S means initial value.
- Measurement shall be taken between 2 hours and after the test pieces have been returned to normal ambient conditions after completion of each test.

◆ Soldering:

Double Light

1. Manual of Soldering

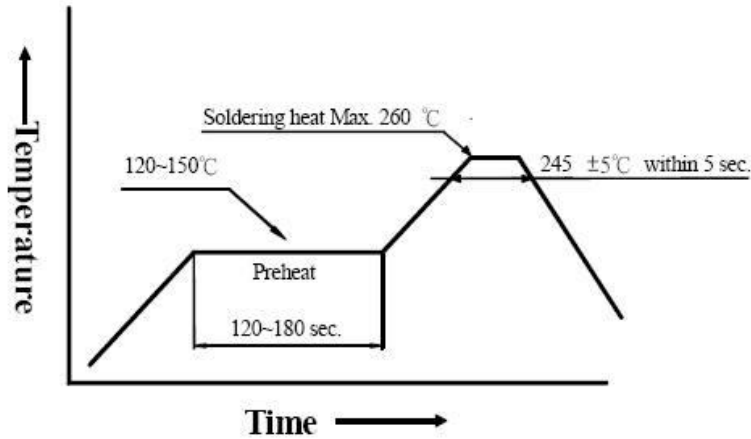
The temperature of the iron tip should not be higher than 300°C (572°F) and Soldering within 3 seconds per solder-land is to be observed.

2. Reflow Soldering

Preheating: 140°C~160°C±5°C, within 2 minutes.

Operation heating: 235°C (Max.) within 10 seconds (Max)

Gradual Cooling (Avoid quenching).

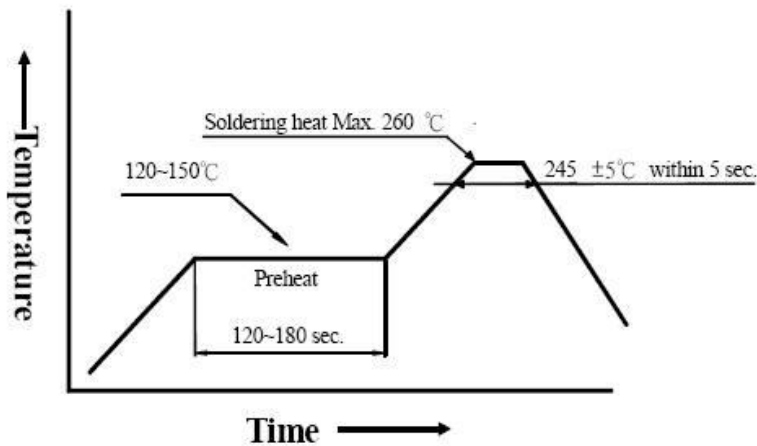


3. DIP soldering (Wave Soldering):

Preheating: 120°C~150°C, within 120~180 sec.

Operation heating: 245°C±5°C within 5 sec. 260°C (Max)

Gradual Cooling (Avoid quenching).



◆ Handling :

Care must be taken not to cause to the epoxy resin portion of LEDs while it is exposed to high temperature. Care must be taken not rub the epoxy resin portion of LEDs with hard or sharp article such as the sand blast and the metal hook.

◆ Notes for designing:

Double Light

Care must be taken to provide the current limiting resistor in the circuit so as to drive the LEDs within the rated figures. Also, caution should be taken not to overload LEDs with instantaneous voltage at the turning ON and OFF of the circuit.

When using the pulse drive care must be taken to keep the average current within the rated figures. Also, the circuit should be designed so as to be subjected to reverse voltage when turning off the LEDs.

◆ Storage:

In order to avoid the absorption of moisture, it is recommended to solder LEDs as soon as possible after unpacking the sealed envelope.

If the envelope is still packed, to store it in the environment as following:

- 1) Temperature : 5°C-30°C (41°F), Humidity : RH 60% Max.
- 2) After this bag is opened, devices that will be applied to infrared reflow, vapor-phase reflow, or equivalent soldering process must be:
 - a) Completed within 24 hours.
 - b) Stored at less than 30% RH.
- 3) Devices require baking before mounting, if (2) a or (2) b is not met.
- 4) If baking is required, devices must be baked under below conditions: 12 hours at 60°C±3°C.

◆ Package and Label of Products:

Products are packed in one bag of 500pcs (one taping reel) and a label is attached on each bag.