

5mm Round Standard T-1 3/4 Type Full Color
Blinking LED
Technical Data Sheet

Part No.: LL-F506RGBC2E-F1

Features:

- ◇ Single lamp with 3 original colors (red, green and blue).
- ◇ Designed for bonding with LED chip.
- ◇ Triple chips embedded.
- ◇ Multiple colors compose full spectrums.
- ◇ Electricity control IC embedded.
- ◇ Lens size with 3mm / 5mm / 8mm / 10mm options.
- ◇ High intensity.
- ◇ Viewing Angles: 60°.
- ◇ Fancy, fun, hottest in the market.
- ◇ Operating voltage range: 5V DC.
- ◇ Blinking frequency: 0.25Hz ($V_{DD}=4.5V$).
- ◇ Frequency tolerance: $\pm 20\%$.
- ◇ The product itself will remain within RoHS compliant Version.

Descriptions:

- ◇ The Ultra Red source color devices are made with AlGaInP on GaAs substrate Light Emitting Diode.
- ◇ The Pure Green source color devices are made with InGaN on Sapphire substrate Light Emitting Diode.
- ◇ The Blue source color devices are made with InGaN on Sapphire substrate Light Emitting Diode.

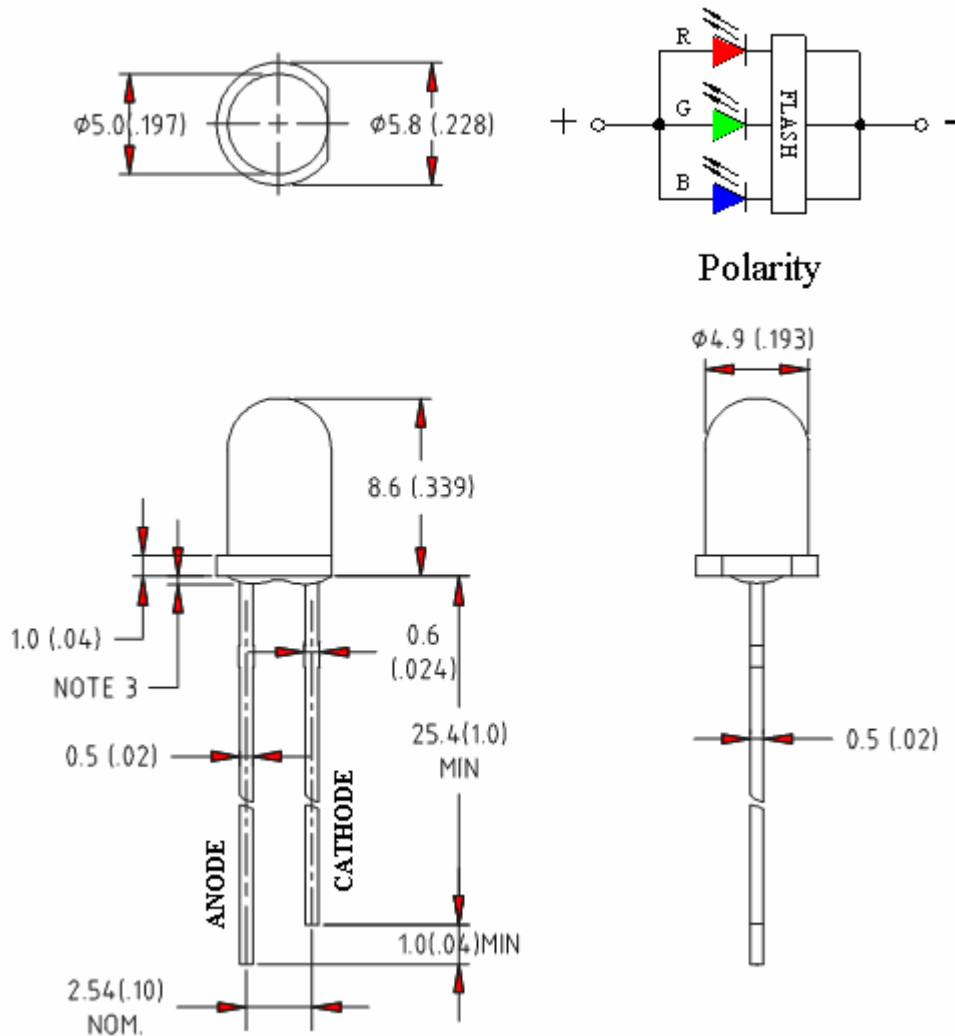
Benefits:

- ◇ New trend creations.
- ◇ Low energy consumptions.
- ◇ Low maintenance costs.
- ◇ High application design flexibility.
- ◇ High reliability.

Applications:

- ◇ Status indicators.
- ◇ Commercial use.
- ◇ Advertising Signs.
- ◇ Toys / sports utilities.
- ◇ Miniature key chains.
- ◇ Effect Lights.
- ◇ Display / decoration lights.
- ◇ Electronic displays and signals.
- ◇ Interior decoration lights.
- ◇ Indicator lights.
- ◇ Solar energy lights / garden lights.
- ◇ Monitor.
- ◇ Telephone.
- ◇ Computer.
- ◇ Circuit board.

Package Dimension:



Part No.	Chip Material		Lens Color	Source Color
LL-F506RGBC2E-F1	R	AlGaInP	Water Clear	Ultra Red
	G	InGaN		Pure Green
	B	InGaN		Blue

Notes:

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

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	400	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

Parameters	Symbol	Emitting Color	Min.	Typ.	Max.	Unit	Test Condition
Luminous Intensity (Note 1)*	IV	Red	---	1200	---	mcd	V _{DD} =4.5V
		Green	---	2000	---		
		Blue	---	1300	---		
Viewing angle	2θ _{1/2}	---	---	60	---	Deg	V _{DD} =4.5V (Note 2)
Peak Emission Wavelength	λ _p	Red	---	630	---	nm	V _{DD} =4.5V
		Green	---	520	---		
		Blue	---	468	---		
Dominant Wavelength	λ _d	Red	---	625	---	nm	V _{DD} =4.5V (Note 3)
		Green	---	525	---		
		Blue	---	470	---		
Spectral Line Half-Width	Δλ	Red	---	20	---	nm	IF=20mA (Per Chip)
		Green	---	30	---		
		Blue	---	25	---		
Blinking Frequency	F	---	---	0.25	---	Hz	V _{DD} =4.5V
Frequency tolerance	Fled	---	---	±20%	---	Hz	V _{DD} =4.5V
Turn On Time	Duty	---	---	1/20	ms		V _{DD} =4.5V
Operating Voltage	V _F	---	2.00	4.50	5.00	V	
Reverse Current	I _R	---	---	---	50	μA	V _R =5V

Notes:

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

Examples of color shift sections (control mechanisms) at $V_F=4.5V \pm 0.2V$:

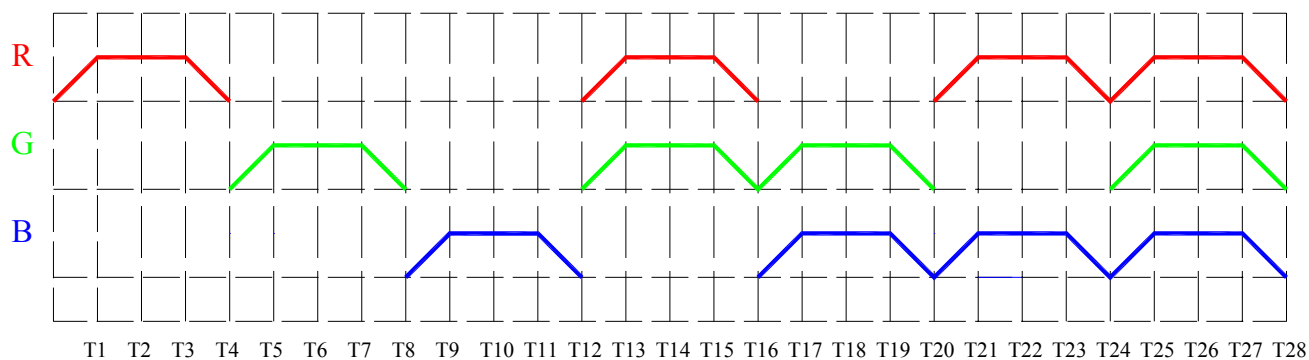
F1: 7 Colors On & Off (4 sec)		
R	G	B
◇	×	×
×	◇	×
×	×	◇
◇	◇	×
×	◇	◇
◇	×	◇
◇	◇	◇

Notes:

◇=Slow fade, Light On then Off.

×=Light Off.

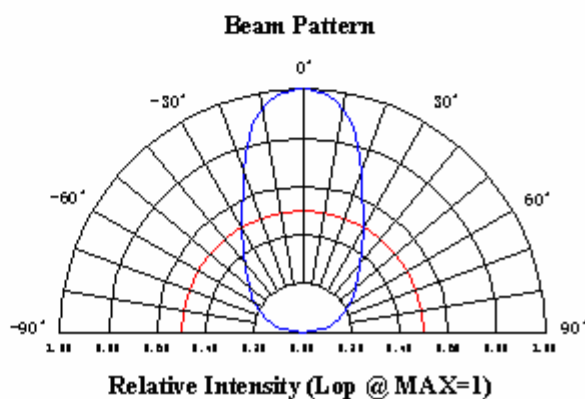
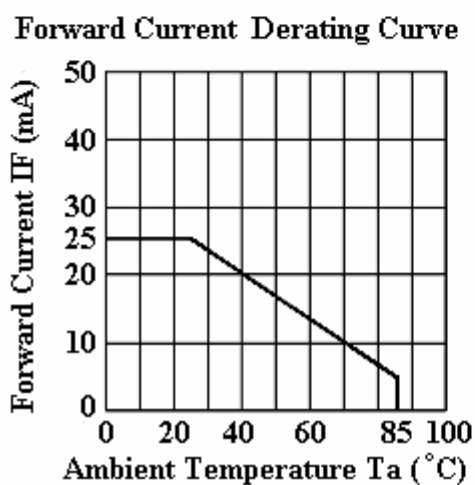
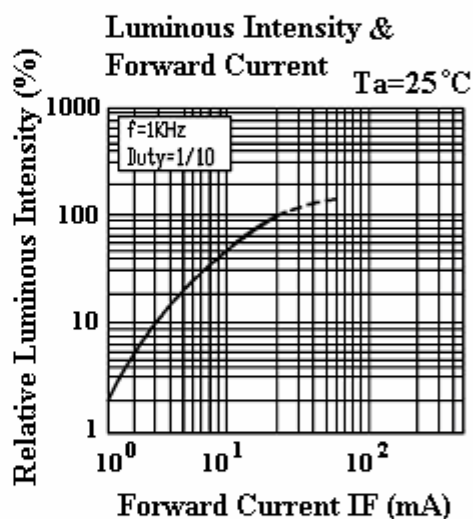
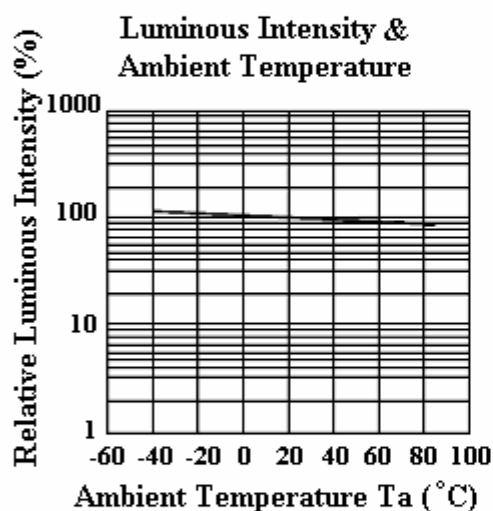
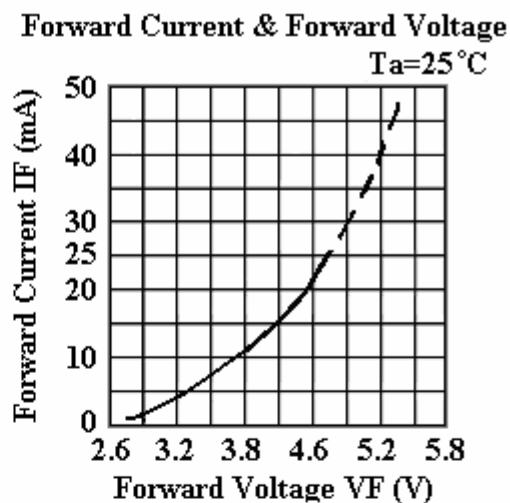
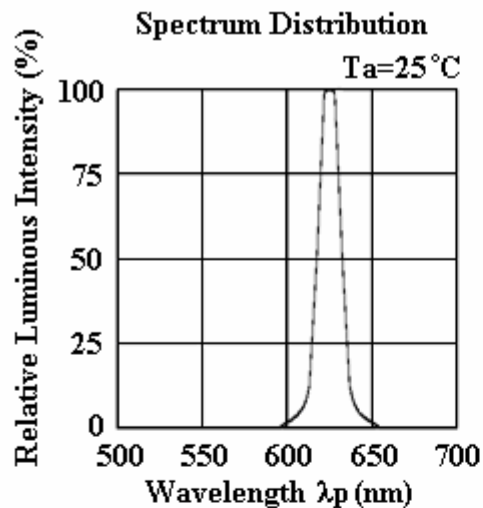
Flash Diagram:



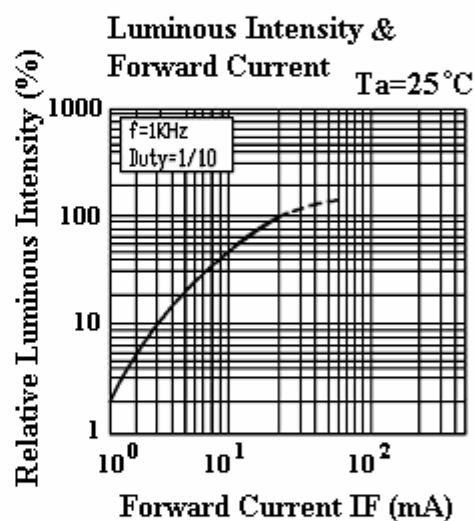
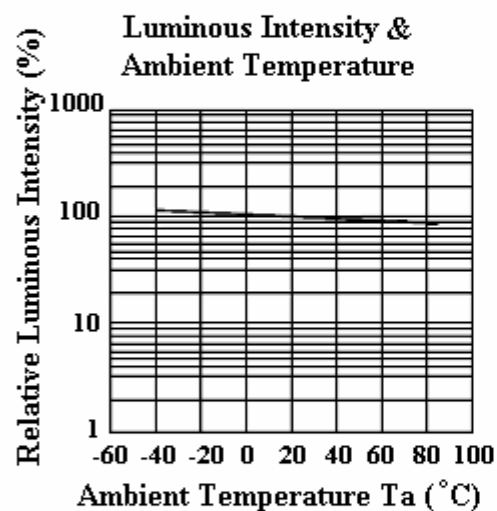
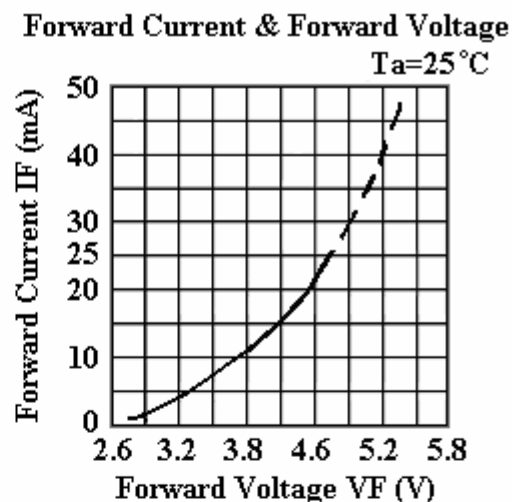
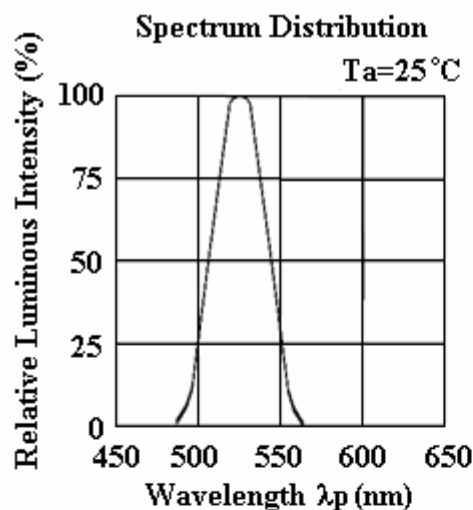
Typical Electrical / Optical Characteristics Curves

(25°C Ambient Temperature Unless Otherwise Noted)

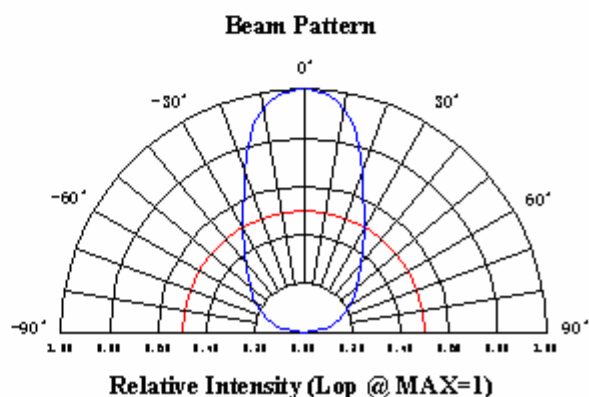
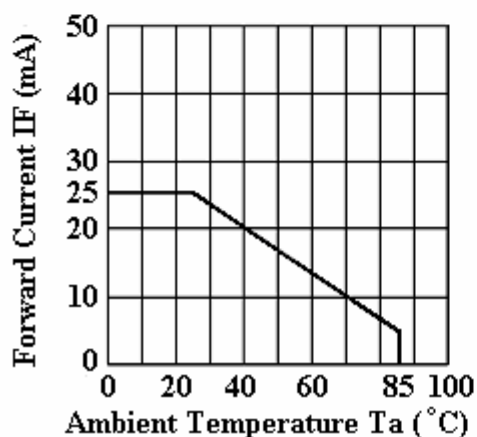
Red:



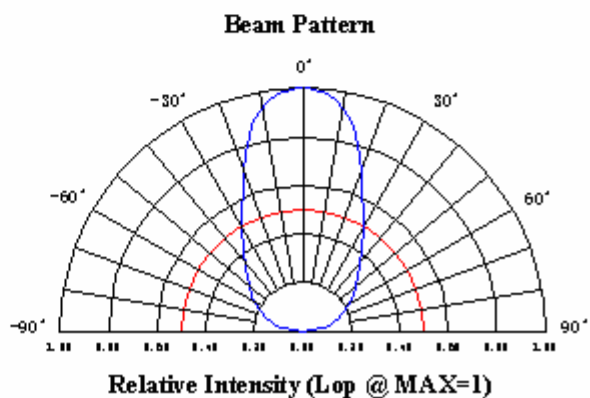
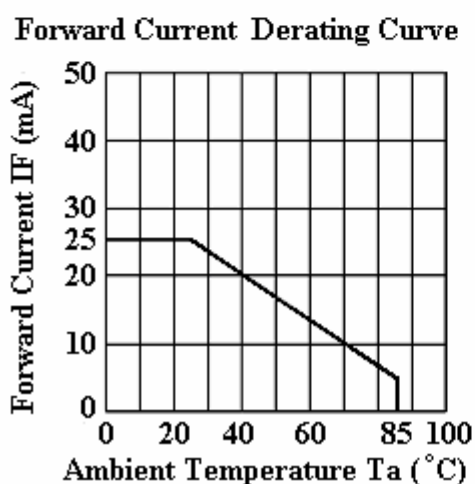
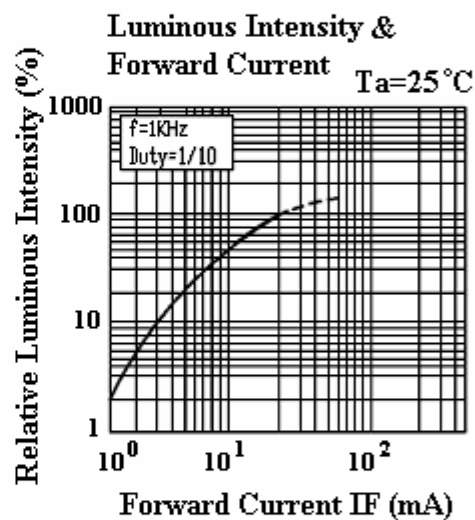
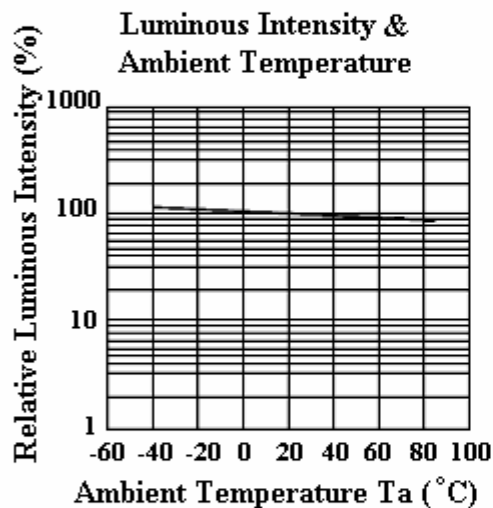
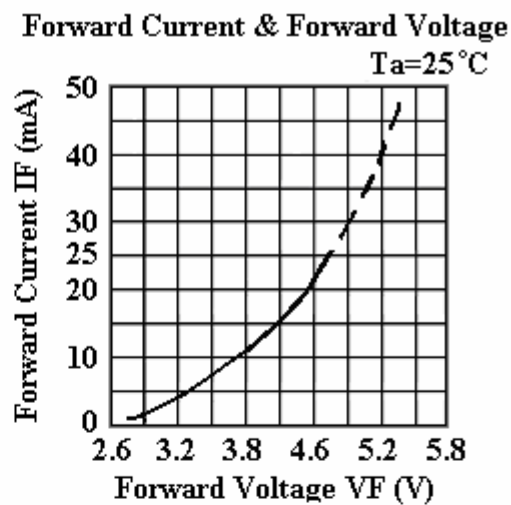
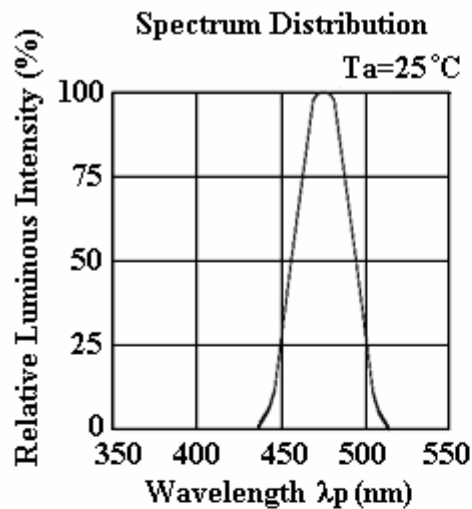
Green:



Forward Current Derating Curve



Blue:



Reliability Test Items And Conditions:

The reliability of products shall be satisfied with items listed below:

Confidence level: 90%.

LTPD: 10%.

1) Test Items and Results:

Test Item	Standard Test Method	Test Conditions	Note	Number of Damaged
Resistance to Soldering Heat	JEITA ED-4701 300 302	Tsld=260±5℃, 10sec 3mm from the base of the epoxy bulb	1 time	0/100
Solder ability	JEITA ED-4701 300 303	Tsld=235±5℃, 5sec(using flux)	1time over 95%	0/100
Thermal Shock	JEITA ED-4701 300 307	0℃~100℃ 15sec, 15sec	100 cycles	0/100
Temperature Cycle	JEITA ED-4701 100 105	-40℃~25℃~100℃~25℃ 30min,5min,30min,5min	100 cycles	0/100
Moisture Resistance Cycle	JEITA ED-4701 200 203	25℃~65℃~-10℃ 90%RH 24hrs/1cycle	10 cycles	0/100
High Temperature Storage	JEITA ED-4701 200 201	Ta=100℃	1000hrs	0/100
Terminal Strength (Pull test)	JEITA ED-4701 400 401	Load 10N (1kgf) 10±1sec	No noticeable damage	0/100
Terminal Strength (bending test)	JEITA ED-4701 400 401	Load 5N (0.5kgf) 0°~90°~0° bend 2 times	No noticeable damage	0/100
Temperature Humidity Storage	JEITA ED-4701 100 103	Ta=60℃, RH=90%	1000hrs	0/100
Low Temperature Storage	JEITA ED-4701 200 202	Ta=-40℃	1000hrs	0/100
Steady State Operating Life		Ta=25℃, IF=30mA	1000hrs	0/100
Steady State Operating Life of High Humidity Heat		Ta=60℃, RH=90%, IF=30mA	500hrs	0/100
Steady State Operating Life of Low Temperature		Ta=-30℃, IF=20mA	1000hrs	0/100

2) Criteria For Judging The Damage:

Item	Symbol	Test Conditions	Criteria for Judgment	
			Min	Max
Forward Voltage	VF	IF=20mA	---	F.V.*)×1.1
Reverse Current	IR	VR=5V	---	F.V.*)×2.0
Luminous Intensity	IV	IF=20mA	F.V.*)×0.7	---

*) F.V.: First Value.

Please read the following notes before using the datasheets:**1. Over-current-proof**

Customer must apply resistors for protection, otherwise slight voltage shift will cause big current change (Burn out will happen).

2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

2.2 Before opening the package, the LEDs should be kept at 30°C or less and 90%RH or less.

2.3 The LEDs should be used within a year.

2.4 After opening the package, the LEDs should be kept at 30°C or less and 70%RH or less.

2.5 The LEDs should be used within 168 hours (7 days) after opening the package.

3. Soldering Condition

3.1 Pb-free solder temperature profile.

3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the LEDs during heating.

3.4 After soldering, do not warp the circuit board.

4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 260°C for 5 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

5. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.

6. Caution in ESD

Static Electricity and surge damages the LED. It is recommend to use a wrist band or anti-electrostatic glove when handling the LED. All devices equipment and machinery must be properly grounded.

7. Propose operation method:

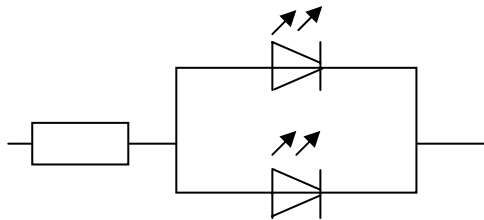
7.1 The DC drive current of LED should be between 10 to 20mA no matter for single LED or multiple LEDs.

7.2 Drive circuit:

A. series connection



B. parallel way



7.3 The pulse will destroy the fixed inner connection of LED, so the circuit must be designed carefully. When circuit open or close, LED will not be assaulted over-pressed (over-flow).

7.4 In order to ensure intensity uniformity on multiple LEDs connected in parallel in an application, we should know well about the drive method and condition of the application. If there is no special requirement from customer, we will ensure the uniformity of LEDs at 20mA binning.

7.5 If want to have the uniform luminance and color, please use the same binning current with our company. And avoid using intermix to cause the differences of luminance and color.