



Data Sheet

PN:503FIRC-98L14I100



5mm through-hole LED IR LED-980nm



ATTENTION

OBSERVE PRECAUTIONS FOR HANDLING
ELECTROSTATIC DISCHARGE
SENSITIVE DEVICES

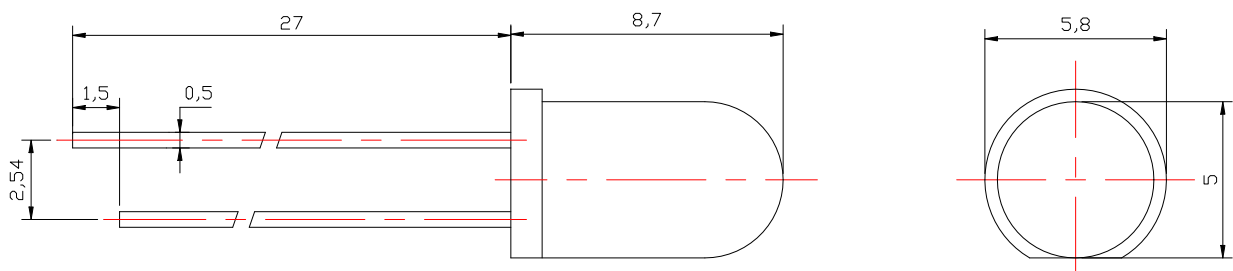
Features

- Dimensions: $\phi 5\text{mm} \times \text{H}8.7\text{mm}$
- Color :980nm IR LED
 - Lens: Water Clear Epoxy
 - Chip Material: AlGaAs/AlGaAs
 - Chip Dimension: $355\mu\text{m} \times 355\mu\text{m}$
 - Number of Chips: 1pcs
 - High reliability, High radiant intensity
 - Low forward voltage
 - Meet ROHS, Green Product

Applications

- Automotive
- Data Communication
- Surveillance

Package Dimensions



Notes:

1. All dimensions are in millimeters ;
2. Tolerance is ± 0.10 mm unless otherwise noted.
3. The short pin is cathode.

Absolute Maximum Ratings (Tc=25°C)

Parameter	Symbol	Rating	Unit
Power Dissipation	Pd	200	mW
Pulse Forward Current	IFP	500	mA
Forward Current	IF	≤150	mA
Reverse Voltage	VR	5	V
Junction Temperature	Tj	115	°C
Operating Temperature	Topr	-40 ~ +80	°C
Storage Temperature Range	Tstg	-40 ~ +100	°C
Soldering Temperature	Tsol	260	°C
Electro-Static-Discharge(HBM)	ESD	2000	V
Service life under normal conditions	Time	60000	H
Warranty	Time	2	Years
Antistatic bag	Piece	1000	Bag

*Pulse Forward Current Condition:Duty 1% and Pulse Width=10us.

*Soldering Condition:Soldering condition must be completed with 3 seconds at 260°C

Electrical Optical Characteristics(Tc=25°C)

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Forward Voltage	VF	1.0	1.2	1.3	V	IF=20mA
		1.1		1.4		IF=50mA
		1.2	1.4	1.6		IF=100mA
				≤2.0		IF=150mA
Radiant Intensity	IE	80		120	mW/sr	IF=20mA
		240		300		IF=50mA
			550			IF=100mA
Total Radiated Power	PO		30		mw	IF=50mA
			200			IF=100mA
Peak Wavelength	λP	970	980	990	nm	IF=50mA
Half Width	Δλ		50		nm	IF=50mA
Viewing Half Angle	θ1/2		±10		deg	IF=50mA
Reverse Current	IR			5	uA	VR=5V
Rise Time	tr		15		ns	IF=50mA
Fall Time	tf		15		ns	IF=50mA

*Luminous Intensity is measured by ZWL600.

*θ1/2 is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

Bin code definition**● IE Rank@IF=20mA**

Rank	Min	Max	Unit
I1	80	100	mw/sr
I2	100	120	

*Tolerance::±15%

● VF Rank@IF=20mA

Rank	Min	Max	Unit
V1	1.0	1.1	V
V2	1.1	1.2	
V3	1.2	1.3	

*Tolerance::±15%

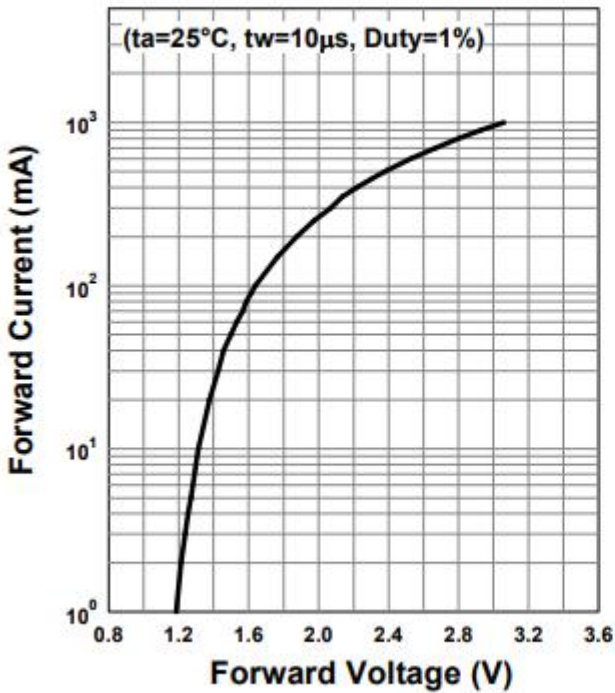
● WP Rank@IF=20mA

Rank	Min	Max	Unit
W1	970	980	nm
W2	980	990	

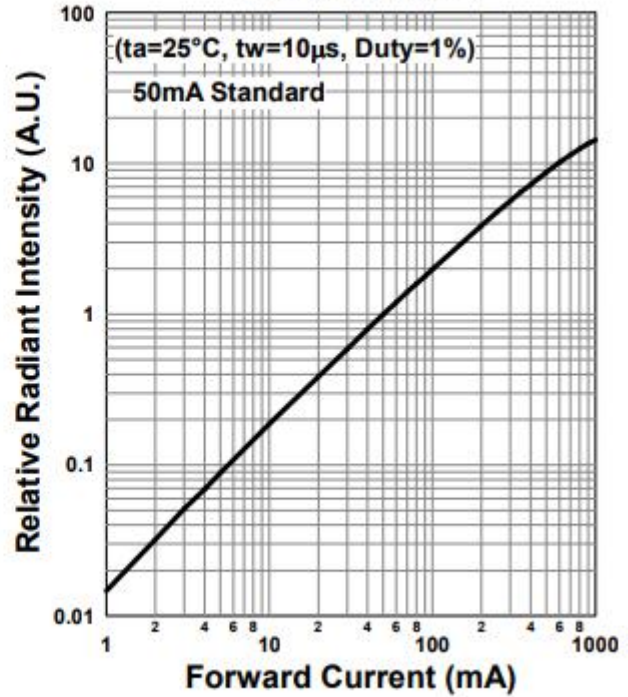
*Tolerance::±15%

Typical Electrical-Optical Characteristics Curves

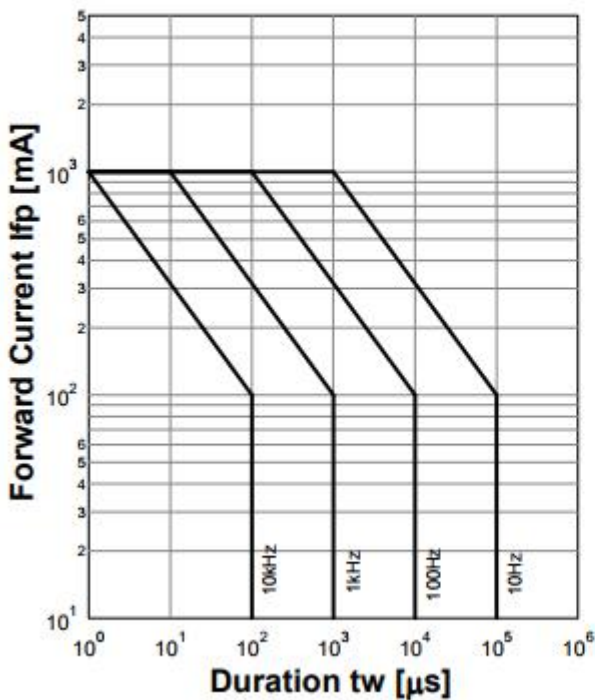
Forward Current - Forward Voltage



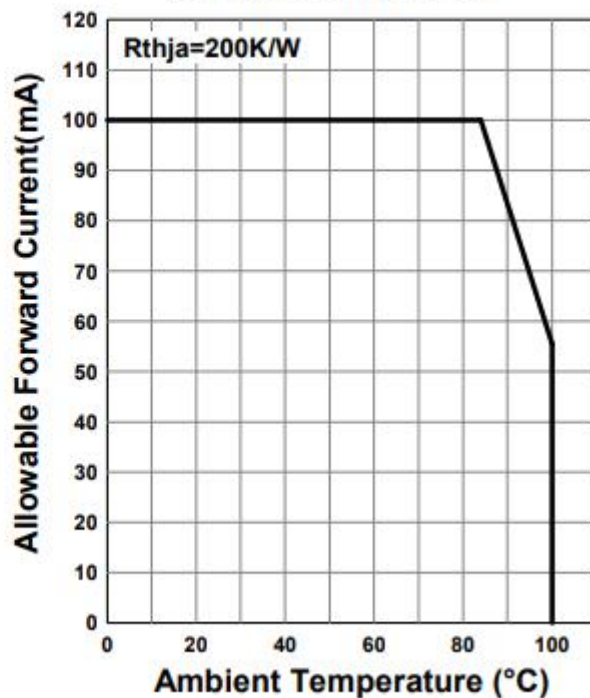
Relative Radiant Intensity - Forward Current



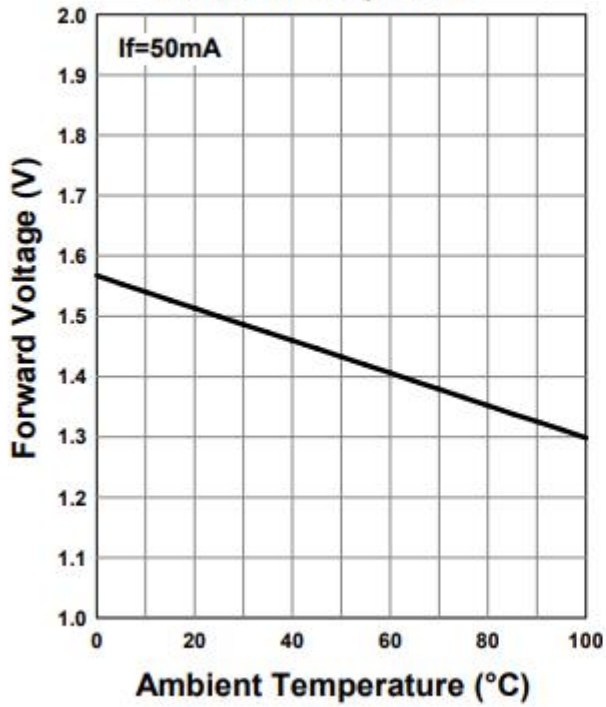
Forward Current - Pulse Duration



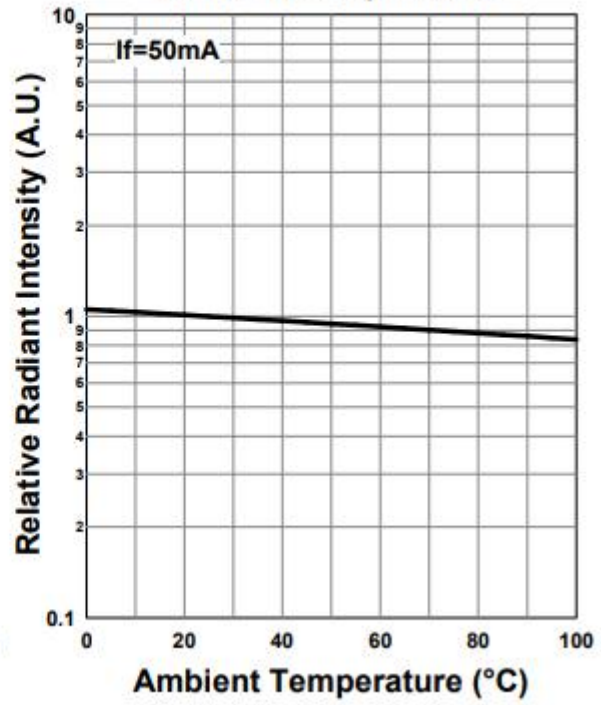
Allowable Forward Current - Ambient Temperature



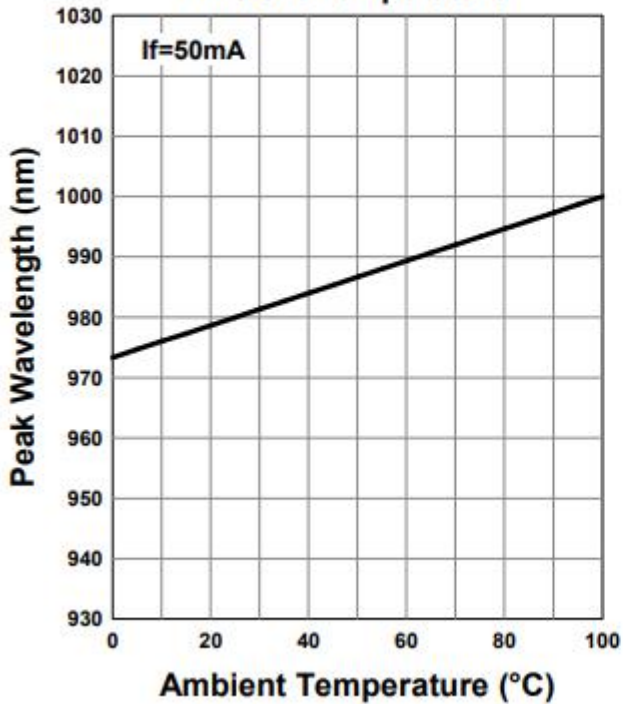
Forward Voltage - Ambient Temperature

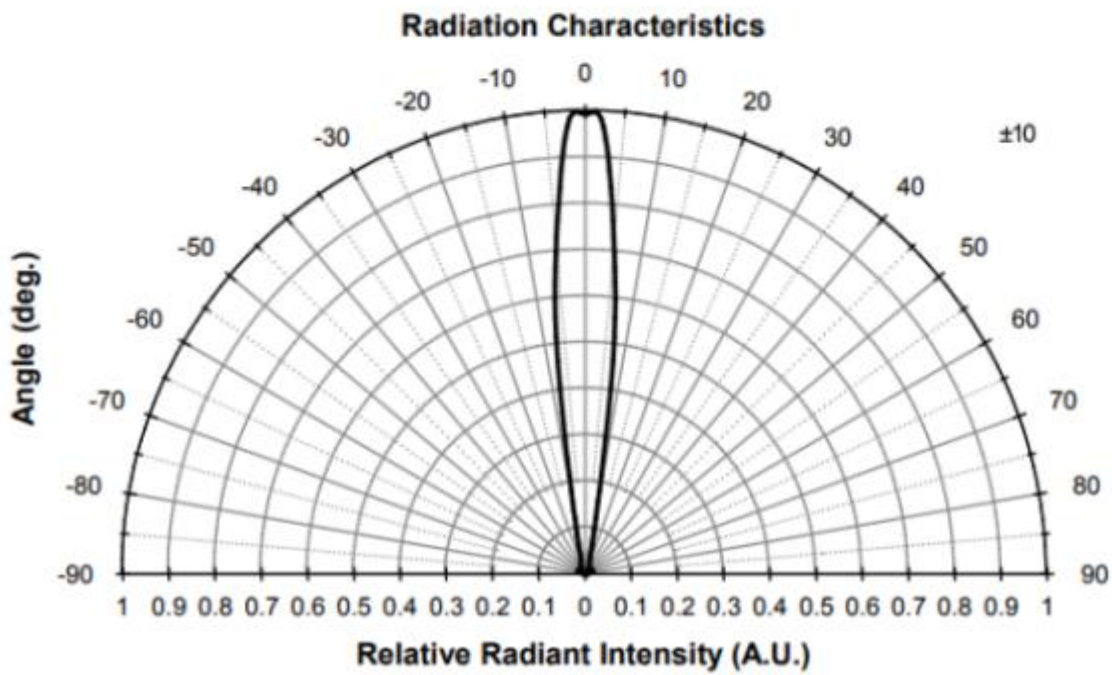
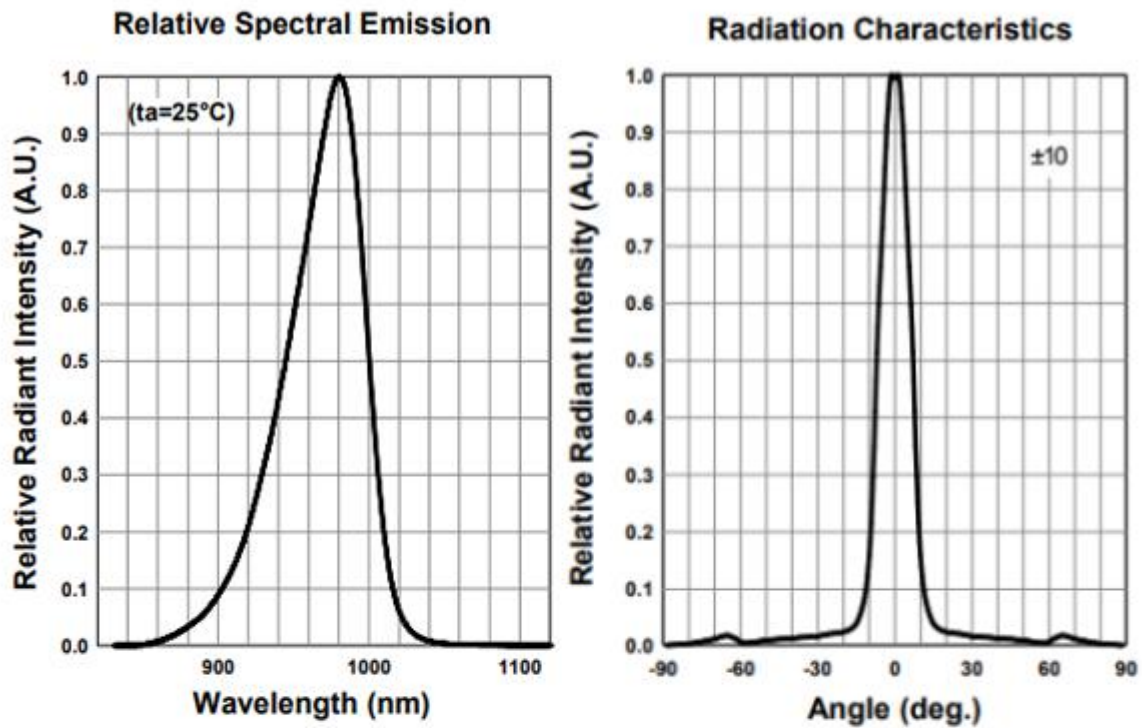


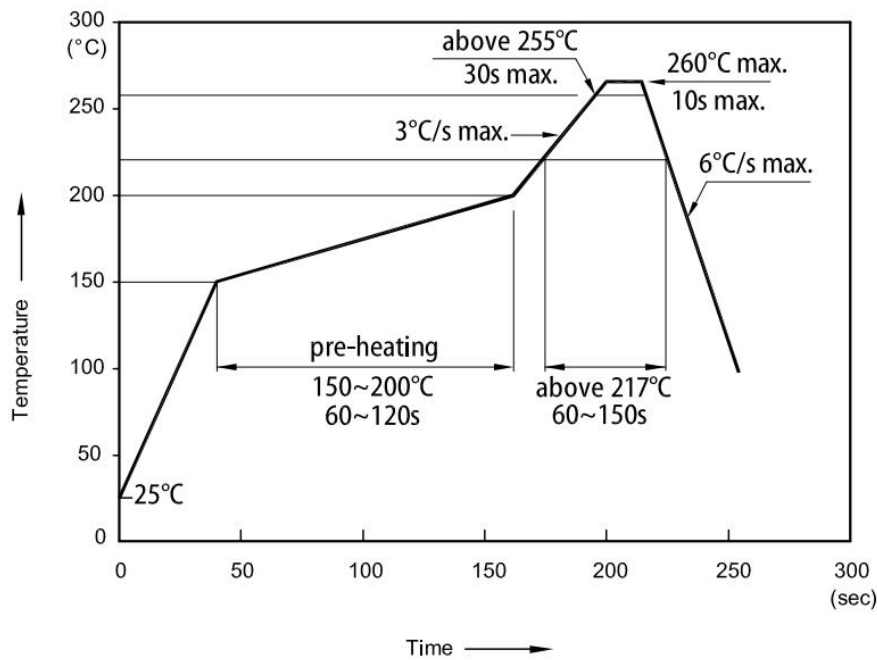
Relative Radiant Intensity - Ambient Temperature



Peak Wavelength - Ambient Temperature





Reflow soldering profile for LEAD-FREE SMD process**Notes:**

1. Don't cause stress to the LEDs while it is exposed to high temperature.
2. The maximum number of reflow soldering passes is 2 times
3. Reflow soldering is recommended. Other soldering methods are not recommended as they might cause damage to the product

Reliability Test Items and Conditions

Test Item	Reference	Test Conditions	Time	Quantity	Criterion
Thermal Shock	JIS-C7021 A-4	100°C±5°C 15min ↓ ↑ -40°C±5°C 15min	200cycles	22	0/22
High Temperature Storage	JEITA ED- 4701 200 201	Ta=100°C	1000h	22	0/22
Low Temperature Storage	JEITA ED- 4701 200 202	Ta=-40°C	1000h	22	0/22
High Temperature High Humidity Storage	JIS-C7021 B-11	Ta=85°C, RH=85%	1000h	22	0/22
Resistance to Soldering Heat	GB/T 4937	Tsol*=(260±5)°C 10secs.	2times	22	0/22
Life Test	JESD22-A108	Ta=25°C±5°C IF=5mA	1000h	22	0/22
High Temperature Life Test	JESD22-A108	Ts=55°C±5°C	1000h	22	0/22

*Note:Tsol-Temperature of tin liquid

Criteria for Judging the Damage

Item	Symbol	Test Condition	Failure Criteria	
			MIN	MAX
Forward Voltage	VF (V)	IF=100mA	---	U.S.L*1.1
Reverse Current	IR (uA)	VR=5V	---	5uA
Luminous Intensity	IV (mcd)	IF=100mA	L.S.L*0.7	---

*Note:1.USL:Upper Specification Level

2.LSL:Lower Specification Level

Cautions

Storage conditions

- 1, avoid continued exposure to the condensing moisture environment and keep the product away from rapid transitions in ambient temperature.
- 2, LEDs should be stored with temperature $\leq 30^{\circ}\text{C}$ and relative humidity $< 60\%$
- 3, Product in the original sealed package is recommended to be assembled within 72 hours of opening
- 4, Product in opened package for more than a week should be baked for 6-8 hours at $85-10^{\circ}\text{C}$

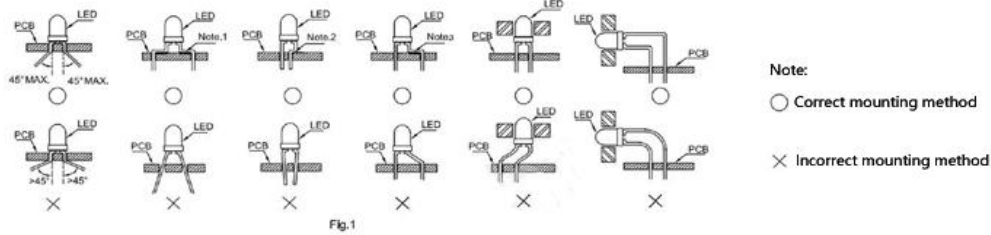
LED MOUNTING METHOD

- 1, The lead pitch of the LED must match the pitch of the mounting holes on the PCB during component placement.

Lead-forming may be required to insure the lead pitch matches the hole pitch.

Refer to the figure below for proper lead forming procedures.

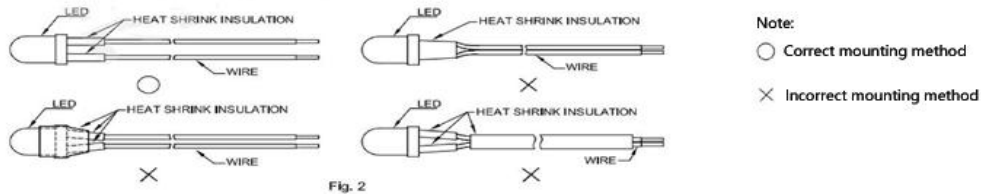
Do not route PCB trace in the contact area between the leadframe and the PCB to prevent short-circuits



- 2, When soldering wires to the LED, each wire joint should be separately insulated with heat-shrink tube to prevent short-circuit contact.

Do not bundle both wires in one heat shrink tube to avoid pinching the LED leads.

Pinching stress on the LED leads may damage the internal structures and cause failure.



- 3, Use stand-offs (Fig.3) or spacers (Fig.4) to securely position the LED above the PCB.
- 4, Maintain a minimum of 3mm clearance between the base of the LED lens and the first lead bend (Fig. 5, Fig. 6).
- 5, During lead forming, use tools or jigs to hold the leads securely so that the bending force will not be transmitted to the LED lens and its internal structures. Do not perform lead forming once the component has been mounted onto the PCB.



Lead Forming Procedures

- 1, Lead Forming Procedures
- 2, Do not bend the leads more than twice. (Fig. 7)
- 3, During soldering, component covers and holders should leave clearance to avoid placing damaging stress on the LED during soldering. (Fig. 8)
- 4, The tip of the soldering iron should never touch the lens epoxy.
- 5, Through-hole LEDs are incompatible with reflow soldering.
- 6, If the LED will undergo multiple soldering passes or face other processes where the part may be subjected to intense heat, please check with Bestsmid for compatibility.

