Kingbright

T-1 (3mm) INFRARED EMITTING DIODE

Part Number: L-934F3BT

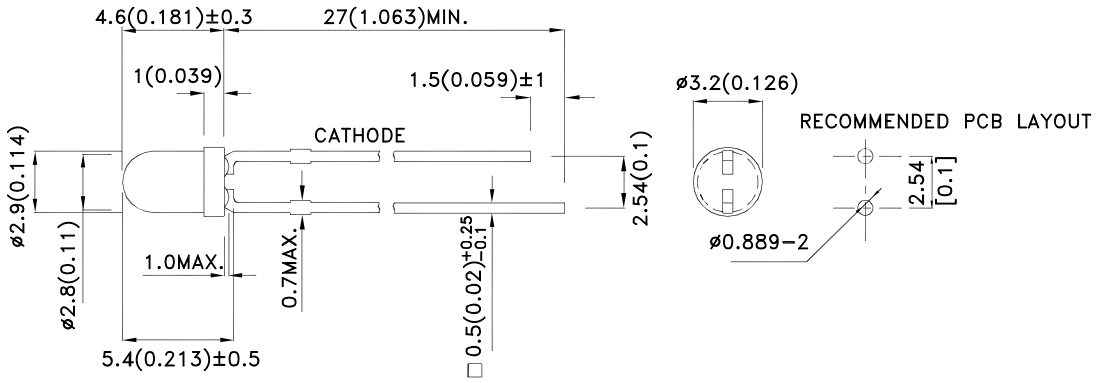
Features

- Mechanically and spectrally matched to the phototransistor.
- Blue transparent lens.
- RoHS compliant.

Description

F3 Made with Gallium Arsenide Infrared Emitting diodes.

Package Dimensions



Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25(0.01") unless otherwise noted.
3. Lead spacing is measured where the leads emerge from the package.
4. The specifications, characteristics and technical data described in the datasheet are subject to change without prior notice.

Selection Guide

Part No.	Dice	Lens Type	Po (mW/sr) [2] @ 20mA		Po (mW/sr) [2] @ 50mA		Viewing Angle [1]
			Min.	Typ.	Min.	Typ.	2θ1/2
L-934F3BT	F3 (GaAs)	Blue Transparent	5	10	18	32	34°
			*3	*8	*12	*25	

Notes:
1. θ1/2 is the angle from optical centerline where the luminous intensity is 1/2 of the optical peak value.
2. Radiant Intensity/ luminous flux: +/-15%.
*Radiant intensity value is traceable to the CIE127-2007 compliant national standards.

Electrical / Optical Characteristics at TA=25°C

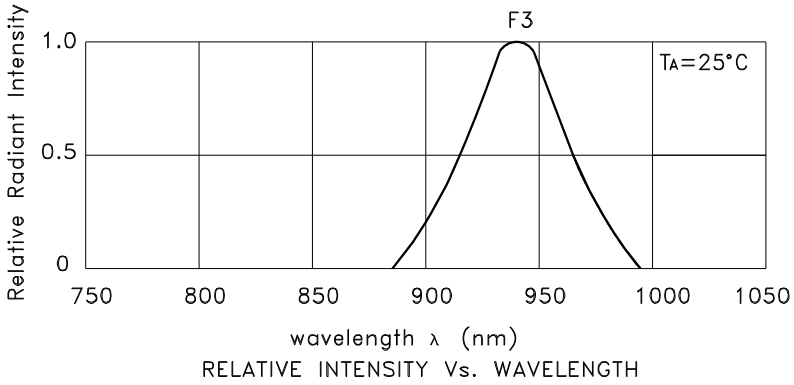
Parameter	P/N	Symbol	Typ.	Max.	Units	Test Conditions
Forward Voltage [1]	F3	V_F	1.2	1.6	V	I_F=20mA
Reverse Current	F3	I_R		10	uA	V_R = 5V
Capacitance	F3	C	90		pF	V_F=0V;f=1MHz
Peak Spectral Wavelength	F3	λP	940		nm	I_F=20mA
Spectral Bandwidth	F3	Δλ1/2	50		nm	I_F=20mA

Notes:
1. Forward Voltage: +/-0.1V.
2. Wavelength value is traceable to the CIE127-2007 compliant national standards.

Absolute Maximum Ratings at TA=25°C

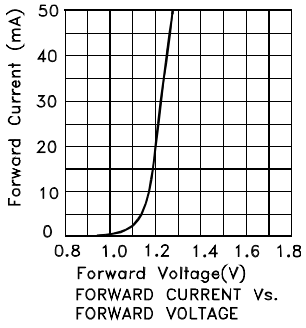
Parameter	Symbol	F3	Units
Power dissipation	P_D	80	mW
DC Forward Current	I_F	50	mA
Peak Forward Current [1]	i_{FS}	1.2	A
Reverse Voltage	V_R	5	V
Operating Temperature	T_A	-40 To +85	°C
Storage Temperature	T_{STG}	-40 To +85	°C
Lead Solder Temperature [2]	260°C For 3 Seconds		
Lead Solder Temperature [3]	260°C For 5 Seconds		

Notes:
1. 1/100 Duty Cycle, 10μs Pulse Width.
2. 2mm below package base.
3. 5mm below package base.

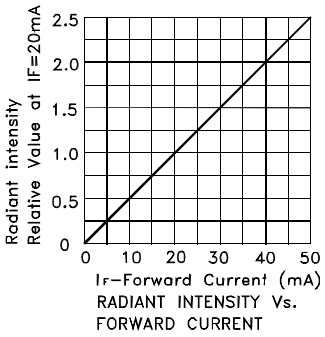


RELATIVE INTENSITY Vs. WAVELENGTH

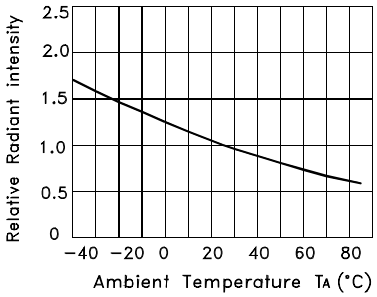
L-934F3BT



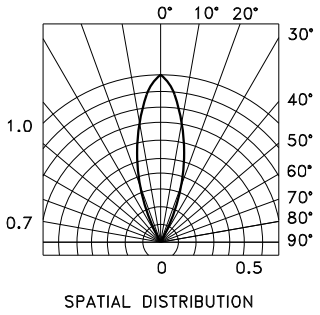
FORWARD CURRENT Vs.
FORWARD VOLTAGE



RADIANT INTENSITY Vs.
FORWARD CURRENT

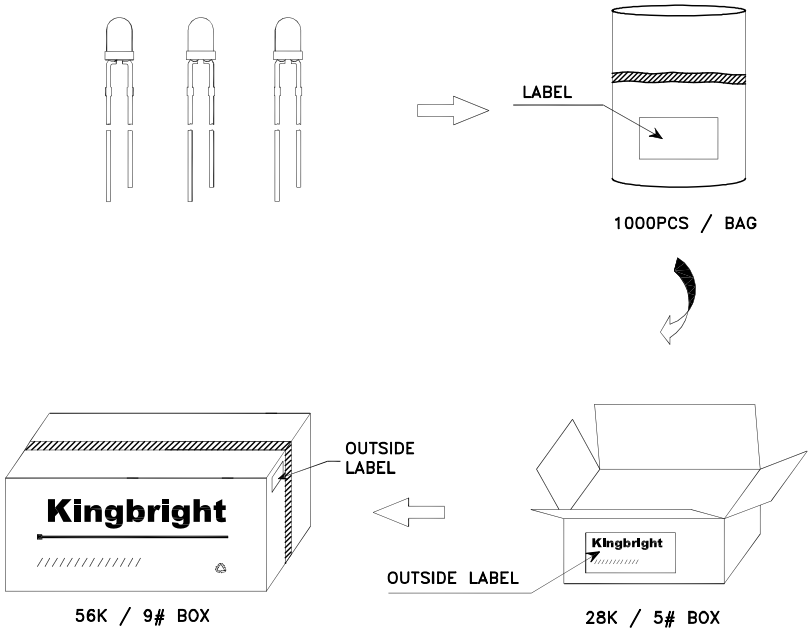


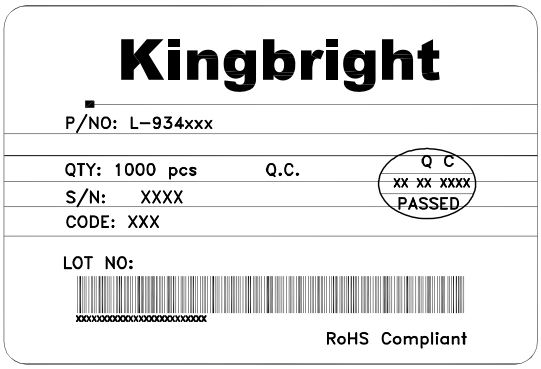
RADIANT INTENSITY Vs.
AMBIENT TEMPERATURE



SPATIAL DISTRIBUTION

PACKING & LABEL SPECIFICATIONS **L-934F3BT**





Terms and conditions for the usage of this document

1. The information included in this document reflects representative usage scenarios and is intended for technical reference only.
2. The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.
3. When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Kingbright will not be responsible for any subsequent issues.
4. The information in this document applies to typical usage in consumer electronics applications. If customer's application has special reliability requirements or have life-threatening liabilities, such as automotive or medical usage, please consult with Kingbright representative for further assistance.
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6. All design applications should refer to Kingbright application notes available at http://www.kingbright.com/application_notes

PRECAUTIONS

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. (Fig. 1)

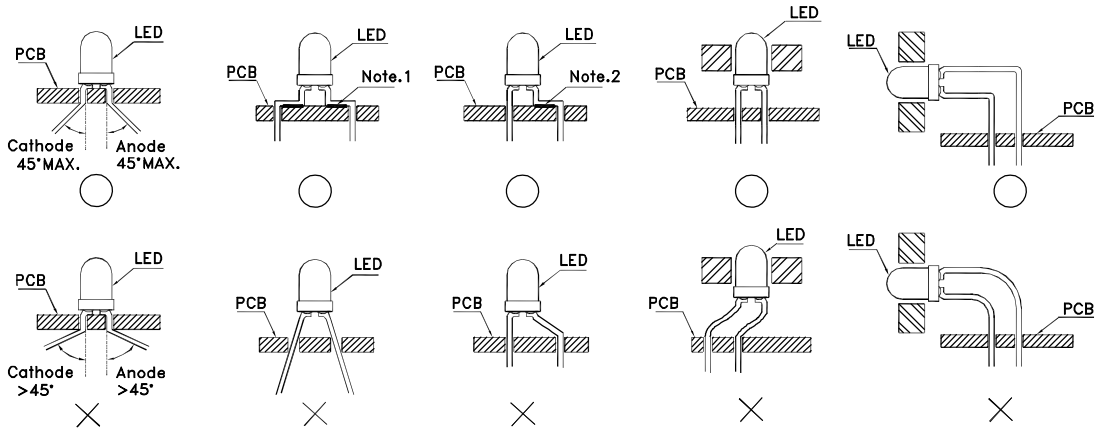


Fig.1

"○" Correct mounting method "×" Incorrect mounting method

2. When soldering wire to the LED, use individual heat-shrink tubing to insulate the exposed leads to prevent accidental contact short-circuit. (Fig.2)

3. Use stand-offs (Fig.3) or spacers (Fig.4) to securely position the LED above the PCB.

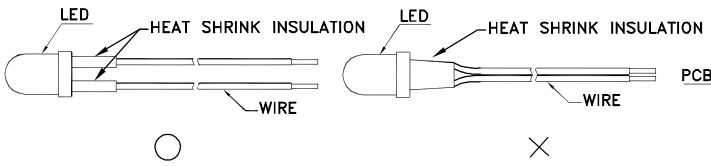


Fig. 2

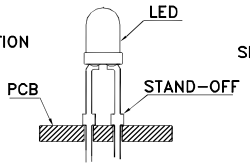


Fig. 3

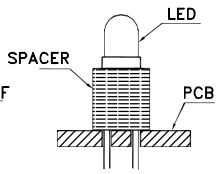


Fig. 4

4. Maintain a minimum of 3mm clearance between the base of the LED lens and the first lead bend. (Fig. 5 and 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. (Fig. 7)

6. Do not bend the leads more than twice. (Fig. 8)

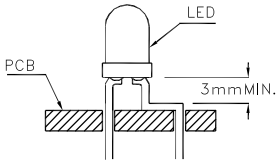


Fig. 5

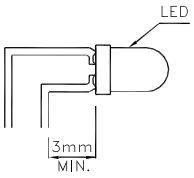


Fig. 6

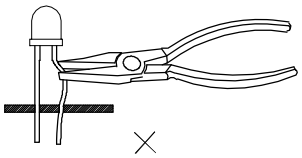


Fig. 7

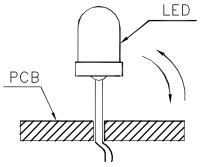
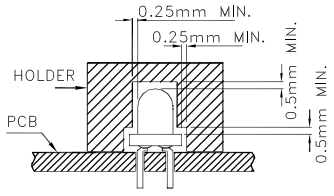
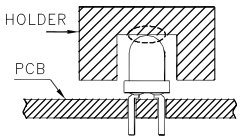


Fig. 8

7. During soldering, component covers and holders should leave clearance to avoid placing damaging stress on the LED during soldering.



○



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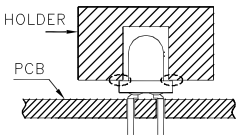
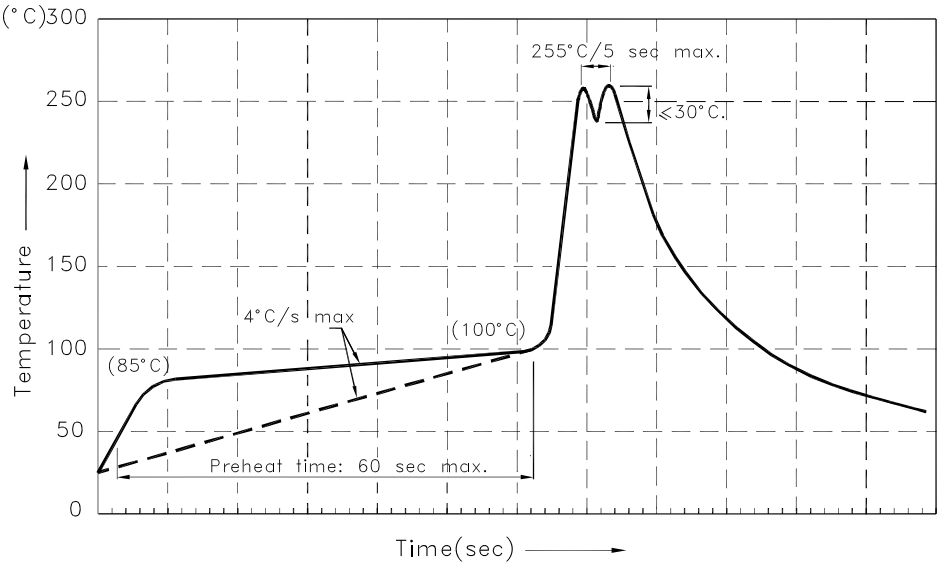


×

8. The tip of the soldering iron should never touch the lens epoxy.
9. Through-hole LEDs are incompatible with reflow soldering.
10. If the LED will undergo multiple soldering passes or face other processes where the part may be subjected to intense heat, please check with Kingbright for compatibility.
11. Recommended Wave Soldering Profiles:



Notes:

1. Recommend pre-heat temperature of 105°C or less (as measured with a thermocouple attached to the LED pins) prior to immersion in the solder wave with a maximum solder bath temperature of 260°C
2. Peak wave soldering temperature between 245°C ~ 255°C for 3 sec (5 sec max).
3. Do not apply stress to the epoxy resin while the temperature is above 85°C.
4. Fixtures should not incur stress on the component when mounting and during soldering process.
5. SAC 305 solder alloy is recommended.
6. No more than one wave soldering pass.

Kingbright

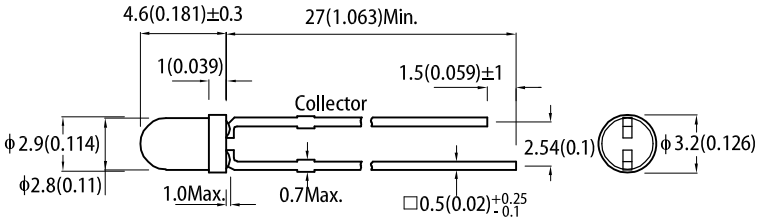
L-93DP3C
Phototransistor

DESCRIPTION
- Made with NPN silicon phototransistor chips

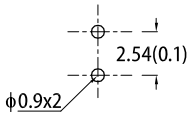
FEATURES
- Mechanically and spectrally matched to the infrared emitting LED lamp
- RoHS compliant

APPLICATIONS
- Infrared applied systems
- Optoelectronic switches
- Photodetector control circuits
- Sensor technology

PACKAGE DIMENSIONS



Recommended PCB Layout



Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25(0.01") unless otherwise noted.
3. Lead spacing is measured where the leads emerge from the package.
4. The specifications, characteristics and technical data described in the datasheet are subject to change without prior notice.

ABSOLUTE MAXIMUM RATINGS at T_A=25°C

Parameter	Max.Ratings	Units
Collector-to-Emitter Voltage	30	V
Emitter-to-Collector Voltage	5	V
Power Dissipation at (or below) 25°C Free Air Temperature	100	mW
Operating Temperature	-40 to +85	°C
Storage Temperature	-40 to +85	°C
Lead Soldering Temperature(>5mm for 5sec)	260	°C

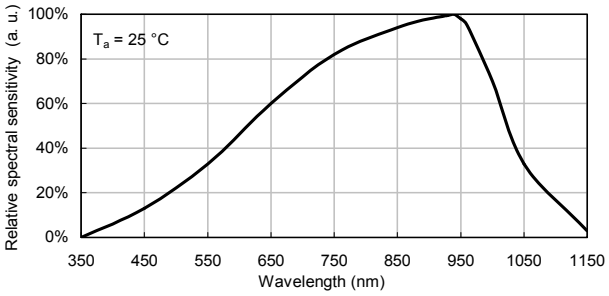
Note:
1. Relative humidity levels maintained between 40% and 60% in production area are recommended to avoid the build-up of static electricity – Ref JEDEC/JESD625-A and JEDEC/J-STD-033.

ELECTRICAL / OPTICAL CHARACTERISTICS at T_A=25°C

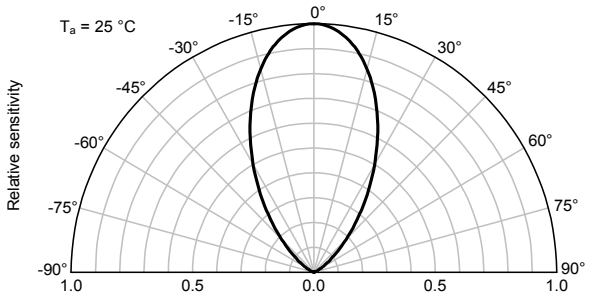
Parameter	Symbol	Min.	Typ.	Max.	Units	Test Conditions
Collector-to-Emitter Breakdown Voltage	$V_{BR\ CEO}$	30	-	-	V	I_C = 100μA Ee = 0mW/cm^2
Emitter-to-Collector Breakdown Voltage	$V_{BR\ ECO}$	5	-	-	V	I_E = 100μA Ee = 0mW/cm^2
Collector-to-Emitter Saturation Voltage	$V_{CE\ (SAT)}$	-	-	0.8	V	I_C = 2mA Ee = 20mW/cm^2
Collector Dark Current	I_{CEO}	-	-	100	nA	V_{CE} = 10V Ee = 0mW/cm^2
Rise Time(10% to 90%)	T_R	-	15	-	μS	V_{CE} = 5V IC = 1mA RL = 1000Ω
Fall Time(90% to 10%)	T_F	-	15	-	μS	
On State Collector Current	$I_{(ON)}$	0.2	0.6	-	mA	V_{CE} = 5V Ee = 1mW/cm^2 λ = 940nm
Range of spectral bandwidth	$\lambda_{0.1}$	420	-	1120	nm	-
Wavelength of peak sensitivity	λ_p	-	940	-	nm	-
Angle of half sensitivity	2θ1/2	-	60	-	deg	-

TECHNICAL DATA

RELATIVE SPECTRAL SENSITIVITY vs. WAVELENGTH

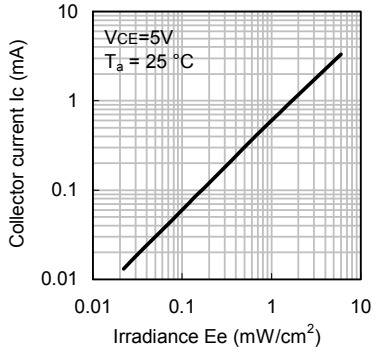


RELATIVE RADIANT SENSITIVITY vs. ANGULAR DISPLACEMENT

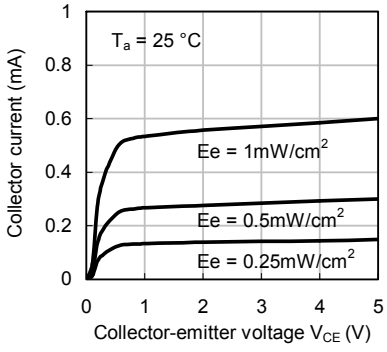


PHOTOTRANSISTOR

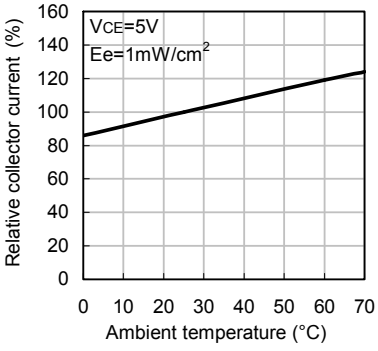
Collector Current vs. Irradiance



Collector Current vs. Collector-Emitter Voltage



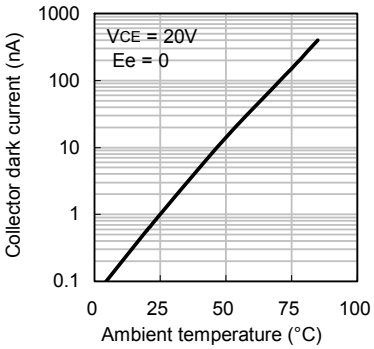
Relative Collector Current vs. Ambient Temperature



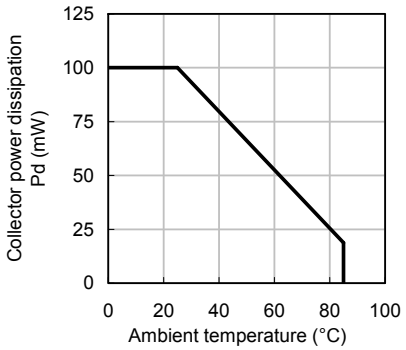
TECHNICAL DATA

PHOTOTRANSISTOR

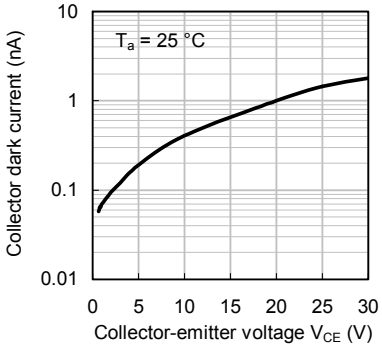
Collector Dark Current vs. Ambient Temperature



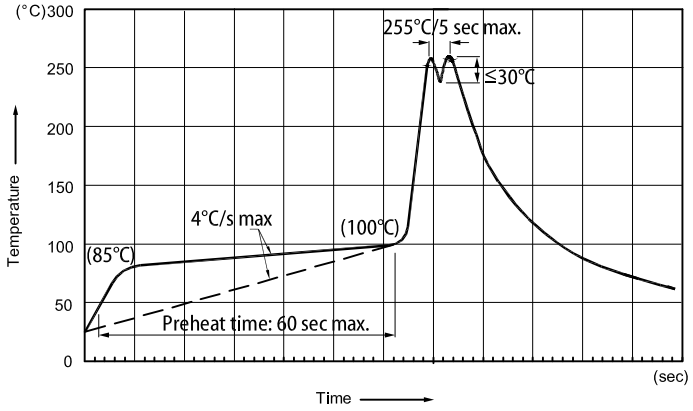
Collector Power Dissipation vs. Ambient Temperature



Collector Dark Current vs. Collector-Emitter Voltage

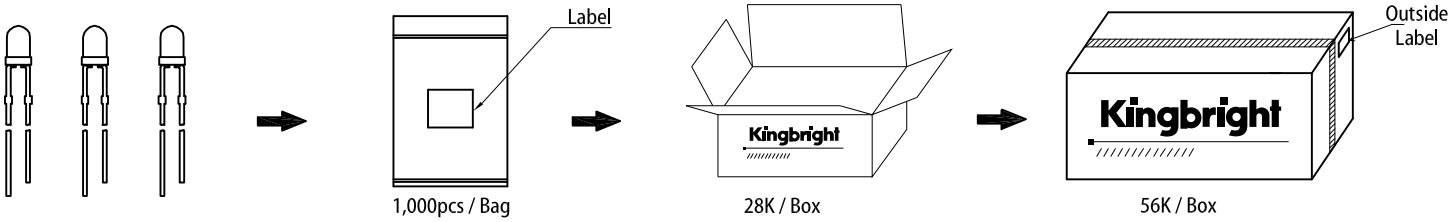


RECOMMENDED WAVE SOLDERING PROFILE



Notes:
1. *Recommend pre-heat temperature of 105°C or less (as measured with a thermocouple attached to the LED pins) prior to immersion in the solder wave with a maximum solder bath temperature of 260°C*
2. *Peak wave soldering temperature between 245°C ~ 255°C for 3 sec (5 sec max).*
3. *Do not apply stress to the epoxy resin while the temperature is above 85°C.*
4. *Fixtures should not incur stress on the component when mounting and during soldering process.*
5. *SAC 305 solder alloy is recommended.*
6. *No more than one wave soldering pass.*

PACKING & LABEL SPECIFICATIONS



Kingbright XXXXXXXXXX-XXXX

P/NO: XXXXXXXX

QTY: XXXXXpcs
S/N: XXXX
CODE: XX
COUNTRY: CN QC DATE: XXX XX XXXX PASSED
LOT NO:

XXXXXXXXXX-XXXX
(SP)XXXXXXXXXX RoHS Compliant

PRECAUTIONS

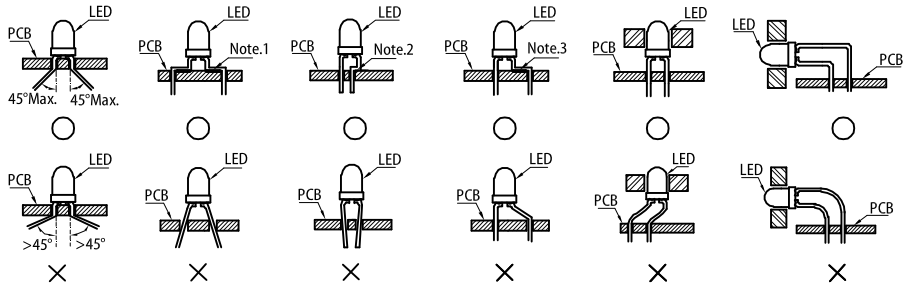
Storage conditions

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 ≤ 30°C and relative humidity < 60%.
3. Product in the original sealed package is recommended to be assembled within 72 hours of opening.
   Product in opened package for more than a week should be baked for 30 (+10/-0) hours at 85 ~ 100°C.

LED Mounting Method

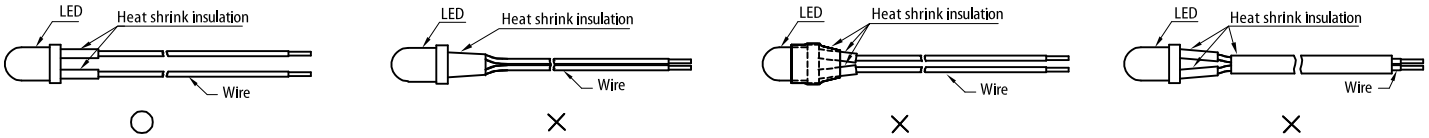
1. The lead pitch of the LED must match the pitch of the mounting holes on the PCB during component placement.
   Lead-forming may be required to insure the lead pitch matches the hole pitch.
   Refer to the figure below for proper lead forming procedures.

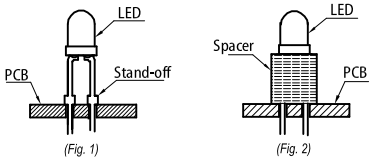
Note 1-3: Do not route PCB trace in the contact area between the leadframe and the PCB to prevent short-circuits.



" ○ " *Correct mounting method* " x " *Incorrect mounting method*

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.

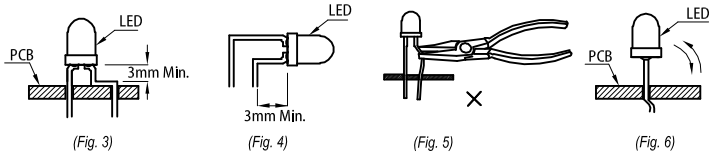


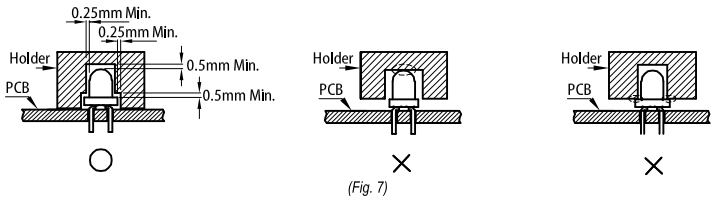


3. Use stand-offs *(Fig.1)* or spacers *(Fig.2)* to securely position the LED above the PCB.
4. Maintain a minimum of 3mm clearance between the base of the LED lens and the first lead bend *(Fig. 3 ,Fig. 4)*.
5. During lead forming, use tools or jigs to hold the leads securely so that the bending force 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. *(Fig. 5)*

Lead Forming Procedures

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





PRECAUTIONARY NOTES

1. The information included in this document reflects representative usage scenarios and is intended for technical reference only.
2. The part number, type, and specifications mentioned in this document are subject to future change and improvement without notice. Before production usage customer should refer to the latest datasheet for the updated specifications.
3. When using the products referenced in this document, please make sure the product is being operated within the environmental and electrical limits specified in the datasheet. If customer usage exceeds the specified limits, Kingbright will not be responsible for any subsequent issues.
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