Kingbright

T-1 (3mm) CYLINDRICAL LED LAMP

Part Number: WP424QR51WT/D-AMT Cyan

ATTENTION
OBSERVE PRECAUTIONS
FOR HANDLING
ELECTROSTATIC
DISCHARGE
SENSITIVE
DEVICES

Features

- High reliability LED package.
- Cylindrical type.
- Low power consumption.
- Reliable and rugged.
- Long life - solid state reliability.
- Available on tape and reel.
- RoHS compliant.

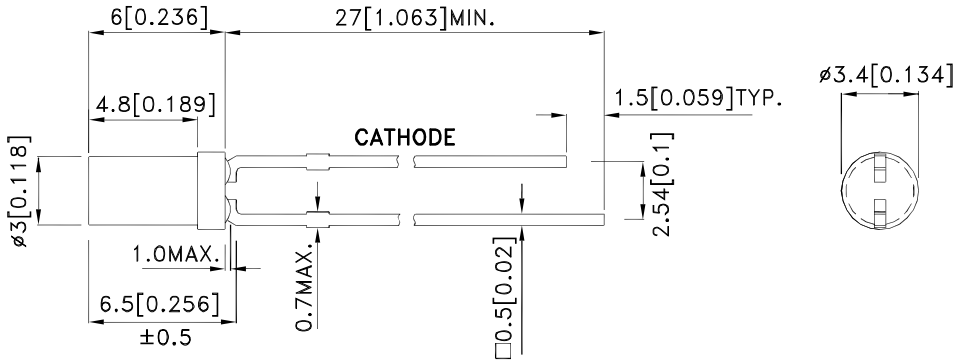
Description

The source color devices are made with InGaN Light Emitting Diode.
Static electricity and surge damage the LEDS.
It is recommended to use a wrist band or anti-electrostatic glove when handling the LEDs.
All devices, equipment and machinery must be electrically grounded.

Applications

- Traffic signaling.
- Backlighting (illuminated advertising , general lighting).
- Interior and exterior automotive lighting.
- Substitution of micro incandescent lamps.
- Reading lamps.
- Signal and symbol luminaire for orientation.
- Marker lights (e.g. Steps, exit ways, etc).
- Decorative and entertainment lighting.
- Indoor and outdoor commercial and residential architectural lighting.

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	Iv (mcd) [2] @ 20mA			Viewing Angle [1]
			Code.	Min.	Max.	2θ1/2
WP424QR51WT/D-AMT	Cyan (InGaN)	White Diffused	M	80	120	100°
			N	120	200	

Notes:
1. θ1/2 is the angle from optical centerline where the luminous intensity is 1/2 of the optical peak value.
2. Luminous intensity/ luminous Flux: +/-15%.

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Value	Unit
Power dissipation	P_D	120	mW
Reverse Voltage	V_R	5	V
Junction temperature	T_J	120	°C
Operating Temperature	Top	-40 To +100	°C
Storage Temperature	Tstg	-40 To +120	°C
DC Forward Current[1]	I_F	30	mA
Peak Forward Current [2]	I_{FM}	150	mA
Electrostatic Discharge Threshold (HBM)		250	V
Thermal Resistance (Junction/ambient) [1]	$R_{th\ j\text{-}a}$	350	°C/W
Lead Solder Temperature [3]		260°C For 3 Seconds	
Lead Solder Temperature [4]		260°C For 5 Seconds	

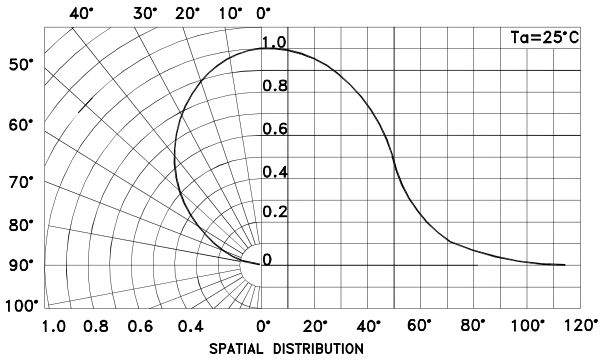
Notes:
1. Rth(j-a) Results from mounting on PC board FR4 (pad size≥16 mm^2 per pad),
2. 1/10 Duty Cycle, 0.1ms Pulse Width.
3. 2mm below package base.
4. 5mm below package base.

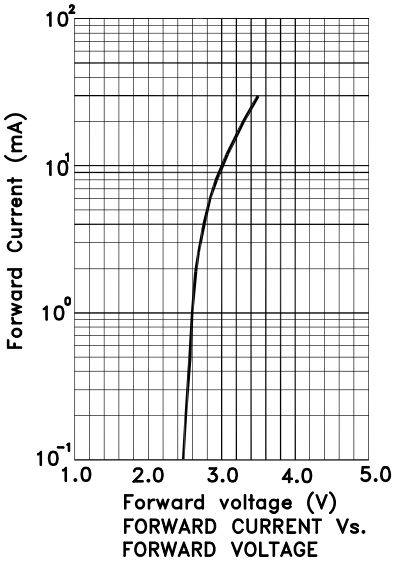
Electrical / Optical Characteristics at Ta=25°C

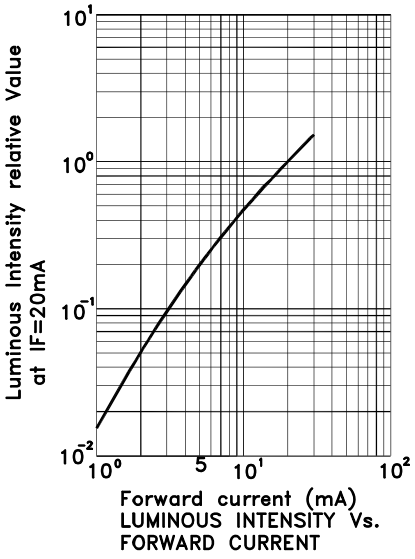
Parameter	Symbol	Value	Unit
Chromaticity coordinate x acc.to CIE1931 I_F=20mA [Typ.]	x [1]	0.19	
Chromaticity coordinate y acc.to CIE1931 I_F=20mA [Typ.]	y [1]	0.41	
Reverse Current (V_R = 5V) [Max.]	I_R	50	uA
Forward Voltage I_F=20mA [Min.]	V_F [2]	-	V
Forward Voltage I_F=20mA [Typ.]		3.3	
Forward Voltage I_F=20mA [Max.]		4.0	
Temperature coefficient of V_F I_F=20mA, -10° C≤ T≤100° C [Typ.]	TC_V	-2.5	mV/° C
Temperature coefficient of x I_F=20mA, -10° C≤ T≤100° C [Typ.]	TC_X	-0.1	10^{-3}/° C
Temperature coefficient of y I_F=20mA, -10° C≤ T≤100° C [Typ.]	TC_y	-0.2	10^{-3}/° C

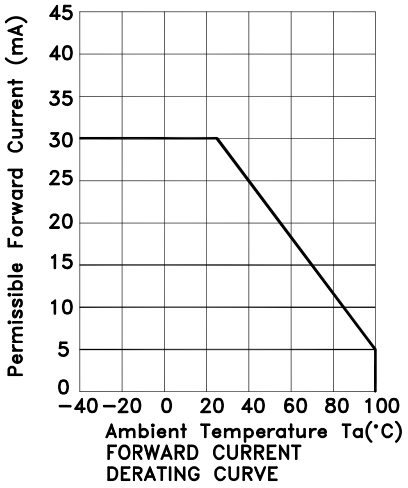
Notes:
1.Measurement tolerance of the chromaticity coordinates is ±0.02.
2.Forward Voltage: +/-0.1V.

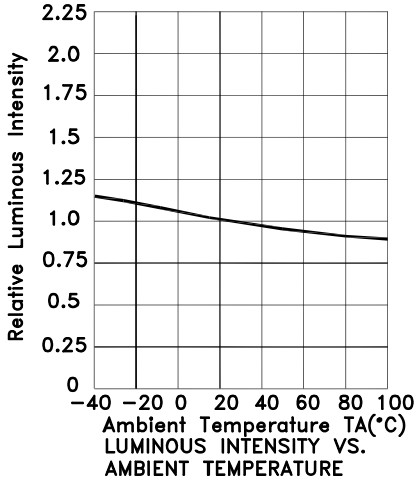
Cyan **WP424QR51WT/D-AMT**



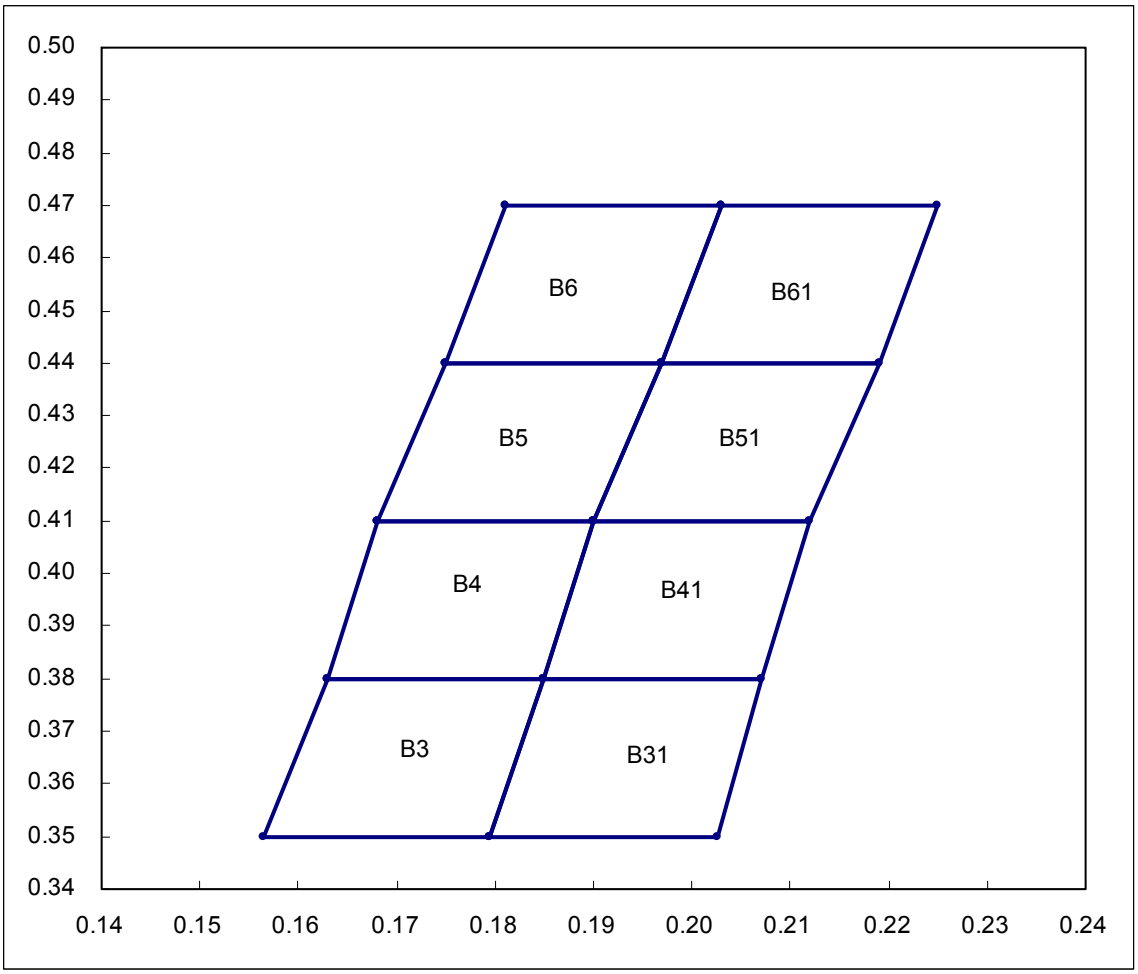








WP424QR51WT/D-AMT



B3				
X	0.1565	0.1795	0.1850	0.1630
Y	0.3500	0.3500	0.3800	0.3800

B31				
X	0.1795	0.1850	0.2070	0.2025
Y	0.3500	0.3800	0.3800	0.3500

B4				
X	0.1850	0.1630	0.1680	0.1900
Y	0.3800	0.3800	0.4100	0.4100

B41				
X	0.1850	0.2070	0.2120	0.1900
Y	0.3800	0.3800	0.4100	0.4100

B5				
X	0.1680	0.1900	0.1970	0.1750
Y	0.4100	0.4100	0.4400	0.4400

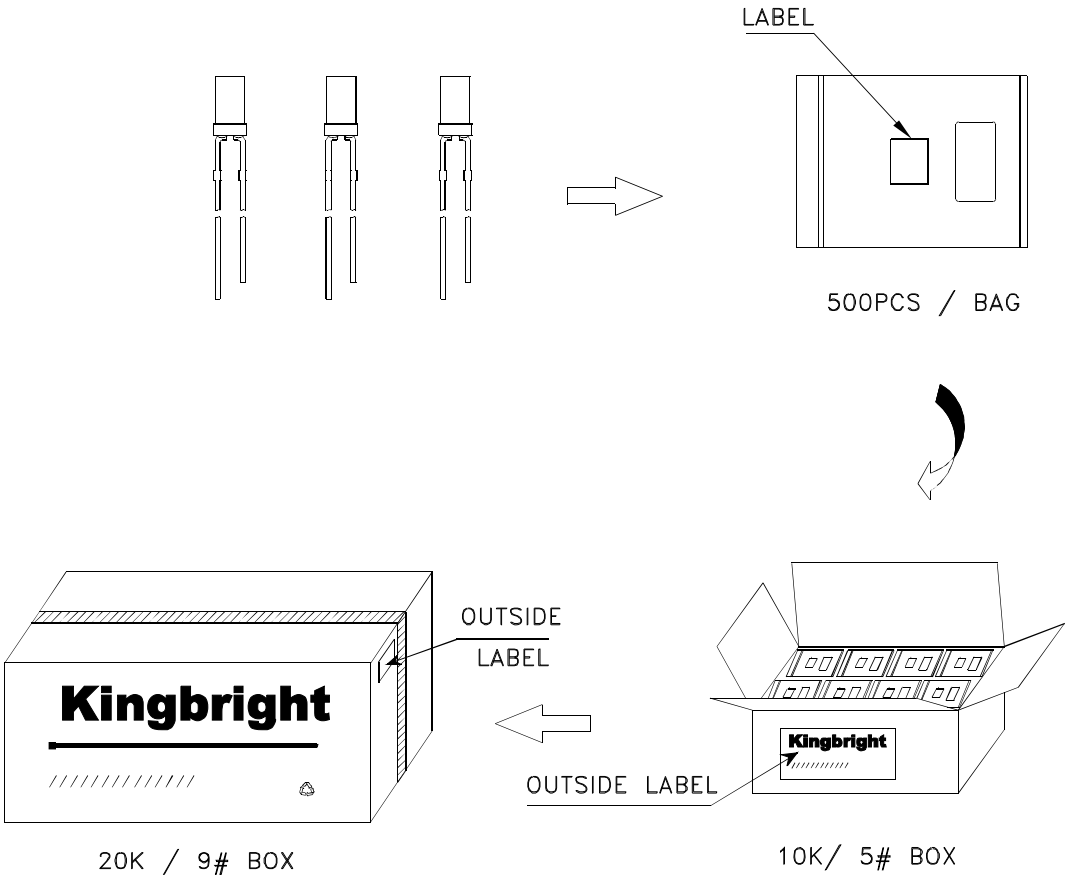
B51				
X	0.2120	0.1900	0.2190	0.1970
Y	0.4100	0.4100	0.4400	0.4400

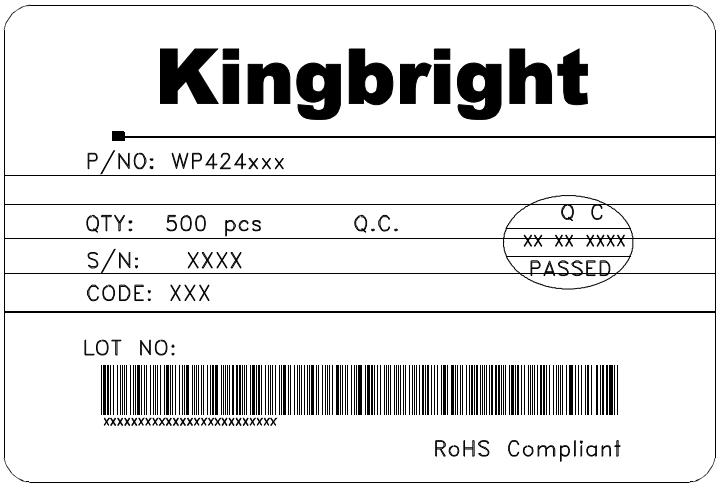
B6				
X	0.1970	0.1750	0.1810	0.2030
Y	0.4400	0.4400	0.4700	0.4700

B61				
X	0.2190	0.1970	0.2030	0.2250
Y	0.4400	0.4400	0.4700	0.4700

Notes:
Shipment may contain more than one chromaticity regions.
Orders for single chromaticity region are generally not accepted.
Measurement tolerance of the chromaticity coordinates is ±0.02.

PACKING & LABEL SPECIFICATIONS **WP424QR51WT/D-AMT**





Reliability Test Items And Conditions

The reliability of products shall be satisfied with items listed below

Lot Tolerance Percent Defective (LTPD) : 10%

No.	Test Item	Standards	Test Condition	Test Times / Cycles	Number of Damaged
1	Continuous operating test	-	Ta =25°C ,IF = maximum rated current*	1,000 h	0 / 22
2	High Temp. operating test	EIAJ ED-4701/100(101)	Ta = 100°C IF = maximum rated current*	1,000 h	0 / 22
3	Low Temp. operating test	-	Ta = -40°C, IF = maximum rated current*	1,000 h	0 / 22
4	High temp. storage test	EIAJ ED-4701/100(201)	Ta = maximum rated storage temperature	1,000 h	0 / 22
5	Low temp. storage test	EIAJ ED-4701/100(202)	Ta = -40°C	1,000 h	0 / 22
6	High temp. & humidity storage test	EIAJ ED-4701/100(103)	Ta = 60°C, RH = 90%	1,000 h	0 / 22
7	High temp. & humidity operating test	EIAJ ED-4701/100(102)	Ta = 60°C, RH = 90% IF = maximum rated current*	1,000 h	0 / 22
8	Soldering reliability test	EIAJ ED-4701/100(301)	Moisture soak : 30°C,70% RH, 72h Preheat : 150~180°C(120s max.) Soldering temp : 260°C(10s)	3 times	0 / 18
9	Thermal shock operating test	-	Ta = -40°C(15min) ~ 100°C(15min) IF = derated current at 100°C	1,000 cycles	0 / 22
10	Thermal shock test	-	Ta = -40°C(15min) ~ maximum rated storage temperature(15min)	1,000 cycles	0 / 22
11	Electric Static Discharge (ESD)	EIAJ ED-4701/100(304)	C = 100pF , R2 = 1.5KΩ V = 250V	Once each Polarity	0 / 22
12	Vibration test	-	a = 196m/s² , f = 100~2KHz , t = 48min for all xyz axes	4 times	0 / 22

* : Refer to forward current vs. derating curve diagram

Failure Criteria

Items	Symbols	Conditions	Failure Criteria
luminous Intensity	I_V	I_F = 20mA	Testing Min. Value <Spec.Min.Value x 0.5
Forward Voltage	V_F	I_F = 20mA	Testing Max. Value ≥Spec.Max.Value x 1.2
Reverse Current	I_R	V_R = Maximum Rated Reverse Voltage	Testing Max. Value ≥Spec.Max.Value x 2.5
High temp. storage test	-	-	Occurrence of notable decoloration, deformation and cracking

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.
(Fig. 1)

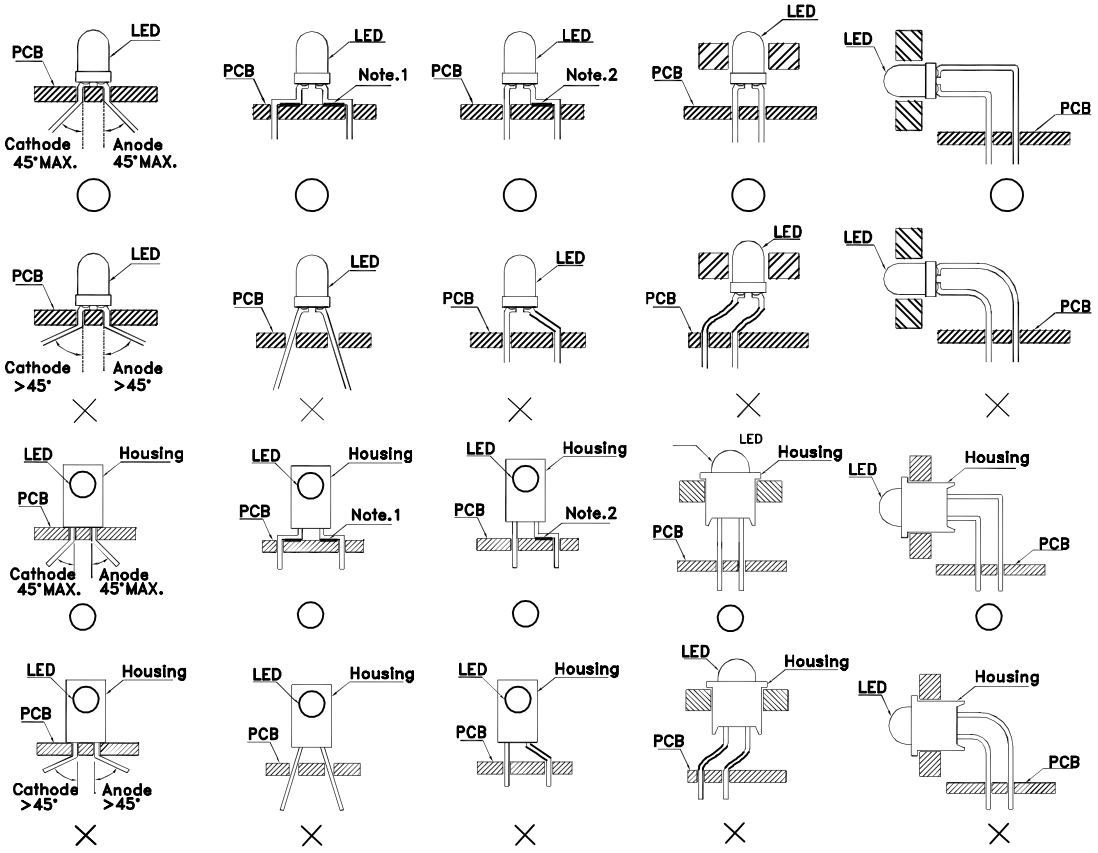


Fig.1

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

Note 1-2 : Do not route PCB trace in the contact area between the leadframe and the PCB to prevent short-circuits.

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.

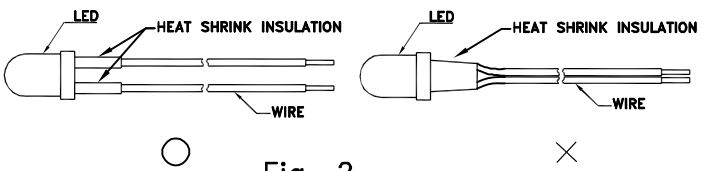


Fig. 2

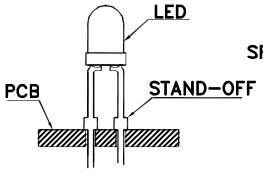


Fig. 3

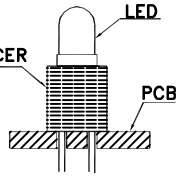


Fig. 4

LEAD FORMING PROCEDURES

1. Maintain a minimum of 2mm clearance between the base of the LED lens and the first lead bend. (Fig. 5 and 6)

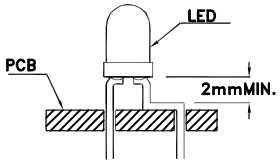


Fig. 5

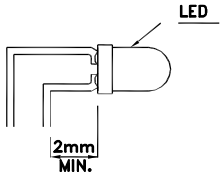


Fig. 6

2. Lead forming or bending must be performed before soldering, never during or after Soldering.
3. Do not stress the LED lens during lead–forming in order to fractures in the lens epoxy and damage the internal structures.
4. 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)
5. Do not bend the leads more than twice. (Fig. 8)
6. After soldering or other high–temperature assembly, allow the LED to cool down to 50°C before applying outside force (Fig. 9). In general, avoid placing excess force on the LED to avoid damage. For any questions please consult with Kingbright representative for proper handling procedures.

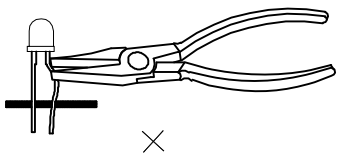


Fig. 7

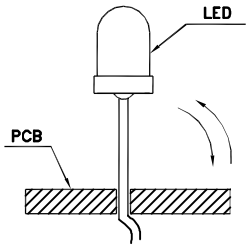


Fig. 8

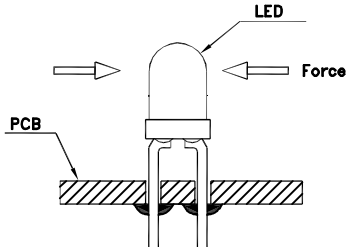
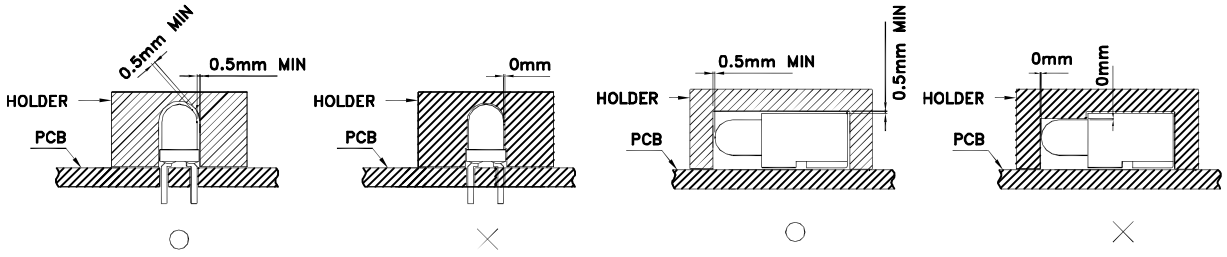


Fig. 9

7. No stress shall be applied on the LED during soldering to prevent damage.



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