

L-1503EB/111YD

T-1 3/4 (5mm) Bi-Level Circuit Board Indicator

DESCRIPTIONS

- The High Efficiency Red source color devices are made with Gallium Arsenide Phosphide on Gallium Phosphide Orange Light Emitting Diode
- The Yellow source color devices are made with Gallium Arsenide Phosphide on Gallium Phosphide Yellow Light Emitting Diode

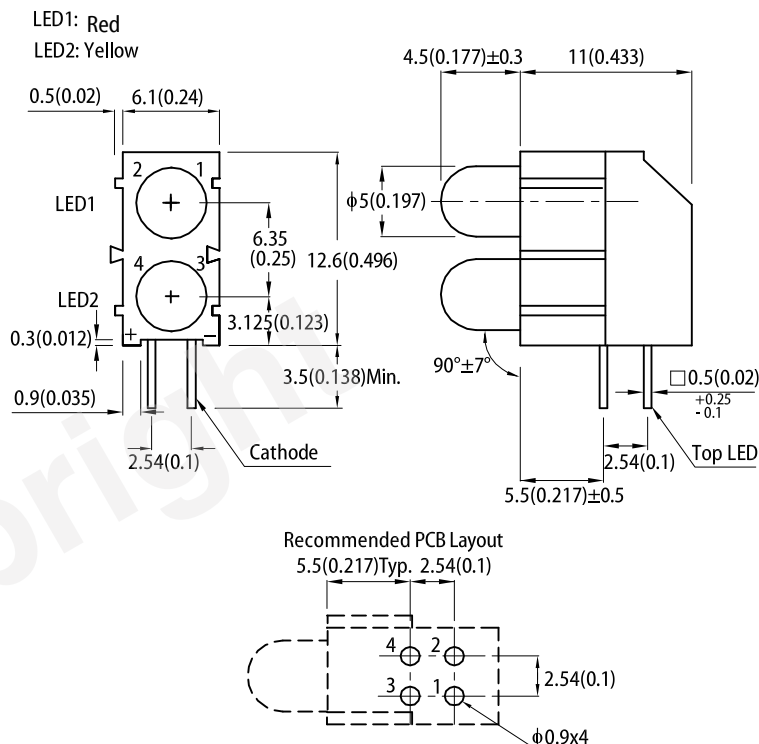
FEATURES

- Pre-trimmed leads for pc board mounting
- Stackable units
- Colors can be mixed in a single housing
- Black case enhances contrast
- High reliability-life measured in years
- Housing UL rating: 94V-0
- Housing material: Type 66 nylon
- RoHS compliant

APPLICATIONS

- Status indicator
- Illuminator
- Signage applications
- Decorative and entertainment lighting
- Commercial and residential architectural lighting

PACKAGE DIMENSIONS



SELECTION GUIDE

Part Number	Emitting Color (Material)	Lens Type	Iv (mcd) @ 10mA ^[2]		Viewing Angle ^[1]
			Min.	Typ.	2θ1/2
L-1503EB/111YD	■ High Efficiency Red (GaAsP/GaP)	Red Diffused	50	120	30°
			*30	*70	
	■ Yellow (GaAsP/GaP)	Yellow Diffused	15	30	30°
			*15	*30	

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%.
* Luminous intensity value is traceable to CIE127-2007 standards.

ELECTRICAL / OPTICAL CHARACTERISTICS at $T_A=25^{\circ}\text{C}$

Parameter	Symbol	Emitting Color	Value		Unit
			Typ.	Max.	
Wavelength at Peak Emission $I_F = 10\text{mA}$	λ_{peak}	High Efficiency Red Yellow	627 590	-	nm
Dominant Wavelength $I_F = 10\text{mA}$	λ_{dom} [1]	High Efficiency Red Yellow	617 588	-	nm
Spectral Bandwidth at 50% Φ REL MAX $I_F = 10\text{mA}$	$\Delta\lambda$	High Efficiency Red Yellow	45 35	-	nm
Capacitance	C	High Efficiency Red Yellow	15 20	-	pF
Forward Voltage $I_F = 10\text{mA}$	V_F [2]	High Efficiency Red Yellow	1.9 1.95	2.3 2.4	V
Reverse Current ($V_R = 5\text{V}$)	I_R	High Efficiency Red Yellow	-	10 10	μA
Temperature Coefficient of λ_{peak} $I_F = 10\text{mA}$, $-10^{\circ}\text{C} \leq T \leq 85^{\circ}\text{C}$	$\text{TC}_{\lambda_{\text{peak}}}$	High Efficiency Red Yellow	0.13 0.12	-	$\text{nm}/^{\circ}\text{C}$
Temperature Coefficient of λ_{dom} $I_F = 10\text{mA}$, $-10^{\circ}\text{C} \leq T \leq 85^{\circ}\text{C}$	$\text{TC}_{\lambda_{\text{dom}}}$	High Efficiency Red Yellow	0.06 0.07	-	$\text{nm}/^{\circ}\text{C}$
Temperature Coefficient of V_F $I_F = 10\text{mA}$, $-10^{\circ}\text{C} \leq T \leq 85^{\circ}\text{C}$	TC_V	High Efficiency Red Yellow	-1.9 -2.0	-	$\text{mV}/^{\circ}\text{C}$

Notes:

- The dominant wavelength (λ_d) above is the setup value of the sorting machine. (Tolerance $\lambda_d : \pm 1\text{nm}$.)
- Forward voltage: $\pm 0.1\text{V}$.
- Wavelength value is traceable to CIE127-2007 standards.
- Excess driving current and / or operating temperature higher than recommended conditions may result in severe light degradation or premature failure.

ABSOLUTE MAXIMUM RATINGS at $T_A=25^{\circ}\text{C}$

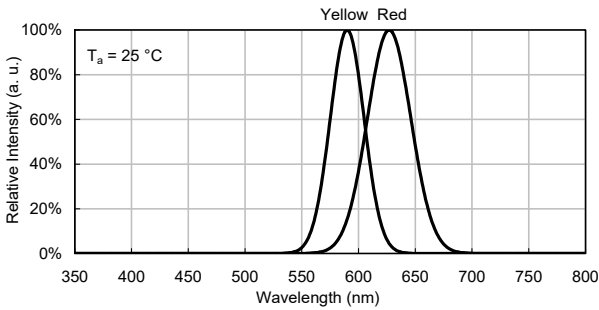
Parameter	Symbol	Value		Unit
		High Efficiency Red	Yellow	
Power Dissipation	P_D	75	75	mW
Reverse Voltage	V_R	5		V
Junction Temperature	T_j	125	110	$^{\circ}\text{C}$
Operating Temperature	T_{op}	-40 to +85		$^{\circ}\text{C}$
Storage Temperature	T_{stg}	-40 to +85		$^{\circ}\text{C}$
DC Forward Current	I_F	30	30	mA
Peak Forward Current	I_{FP} [1]	160	140	mA
Electrostatic Discharge Threshold (HBM)	-	8000	8000	V
Thermal Resistance (Junction / Ambient)	$R_{\text{th JA}}$ [2]	490	600	$^{\circ}\text{C}/\text{W}$
Thermal Resistance (Junction / Solder point)	$R_{\text{th JS}}$ [2]	230	420	$^{\circ}\text{C}/\text{W}$
Lead Solder Temperature [3]		260 $^{\circ}\text{C}$ For 3 Seconds		
Lead Solder Temperature [4]		260 $^{\circ}\text{C}$ For 5 Seconds		

Notes:

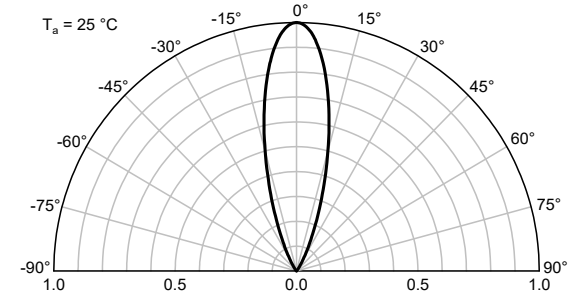
- 1/10 Duty Cycle, 0.1ms Pulse Width.
- $R_{\text{th JA}}$, $R_{\text{th JS}}$ Results from mounting on PC board FR4 (pad size $\geq 16\text{mm}^2$ per pad).
- 2mm below package base.
- 5mm below package base.
- Relative humidity levels maintained between 40% and 60% in production area are recommended to avoid the build-up of static electricity – Ref JEDEC/JESD625-A and JEDEC/J-STD-033.

TECHNICAL DATA

RELATIVE INTENSITY vs. WAVELENGTH

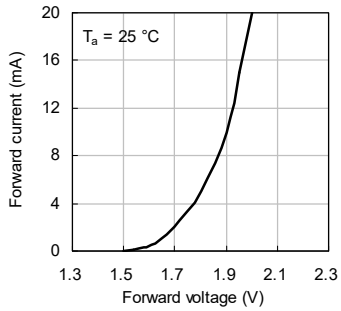


SPATIAL DISTRIBUTION

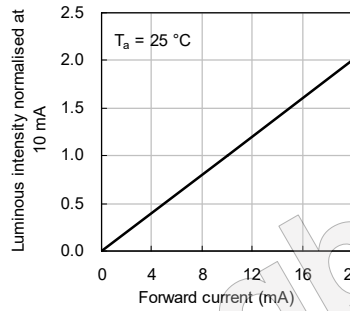


HIGH EFFICIENCY RED

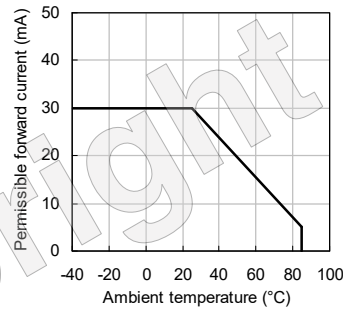
Forward Current vs. Forward Voltage



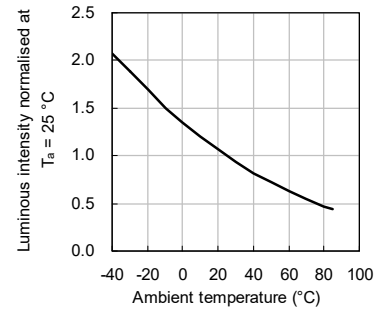
Luminous Intensity vs. Forward Current



Forward Current Derating Curve

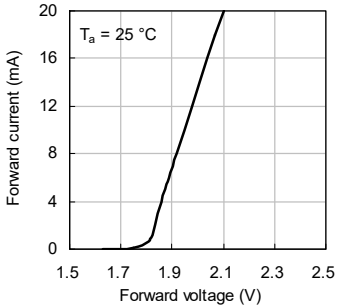


Luminous Intensity vs. Ambient Temperature

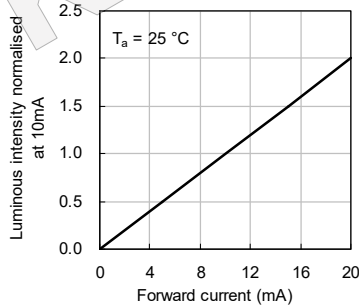


YELLOW

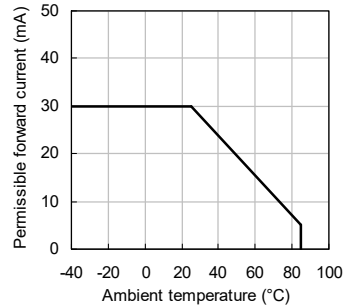
Forward Current vs. Forward Voltage



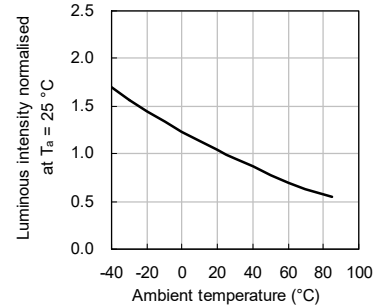
Luminous Intensity vs. Forward Current



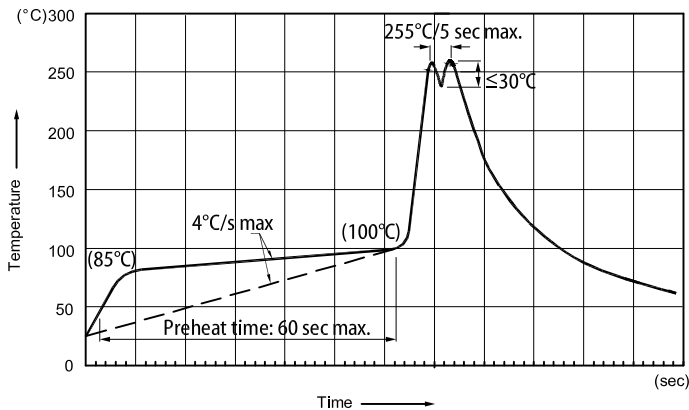
Forward Current Derating Curve



Luminous Intensity vs. Ambient Temperature



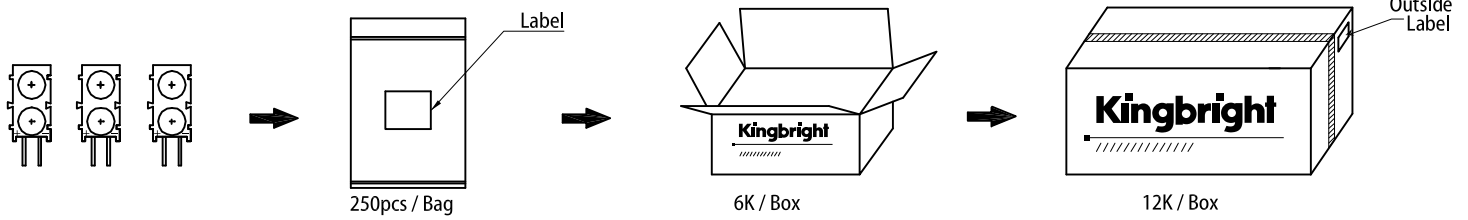
RECOMMENDED WAVE SOLDERING PROFILE



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



PRECAUTIONS

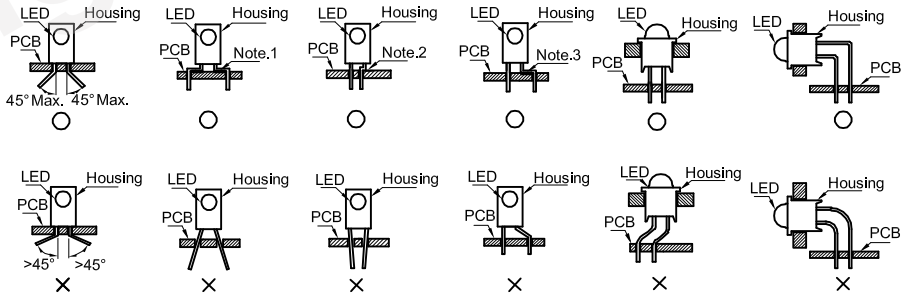
Storage Conditions

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 $\leq 30^{\circ}\text{C}$ and relative humidity $< 60\%$.
3. Product in the original sealed package is recommended to be assembled within 72 hours of opening.
Product in opened package for more than a week should be baked for 30 (+10/-0) hours at $85 \sim 100^{\circ}\text{C}$.

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.

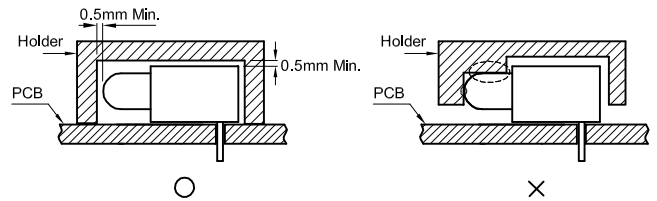
Note 1-3: Do not route PCB trace in the contact area between the leadframe and the PCB to prevent short-circuits.



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

Lead Forming Procedures

1. During soldering, component covers and holders should leave clearance to avoid placing damaging stress on the LED during soldering.
2. The tip of the soldering iron should never touch the lens epoxy.
3. Through-hole LEDs are incompatible with reflow soldering.
4. 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.
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