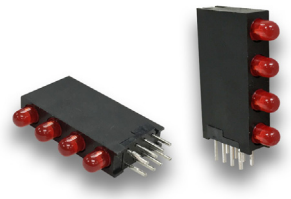
Kingbright



WP934SB/4ID

T-1 (3mm) Quad-Level Circuit Board Indicator

DESCRIPTION

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

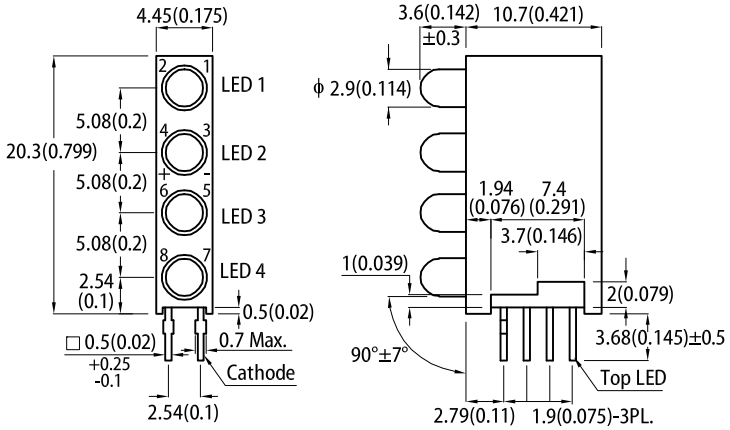
FEATURES

- Quad-level design, save board space
- Different color combination available
- Black case enhances contrast
- Housing UL rating: 94V-0
- Housing material: Type 66 nylon
- Halogen-free
- RoHS compliant

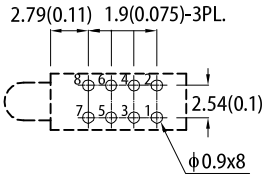
APPLICATIONS

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

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.

SELECTION GUIDE

Part Number	Emitting Color (Material)	Lens Type	Iv (mcd) @ 10mA [2]		Viewing Angle [1]
			Min.	Typ.	2θ1/2
WP934SB/4ID	High Efficiency Red (GaAsP/GaP)	Red Diffused	20	50	50°
			*12	*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.*

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ELECTRICAL / OPTICAL CHARACTERISTICS at T_A=25°C

Parameter	Symbol	Emitting Color	Value		Unit
			Typ.	Max.	
Wavelength at Peak Emission I_F = 10mA	λ_{peak}	High Efficiency Red	627	-	nm
Dominant Wavelength I_F = 10mA	λ_{dom} [1]	High Efficiency Red	617	-	nm
Spectral Bandwidth at 50% Φ REL MAX I_F = 10mA	Δλ	High Efficiency Red	45	-	nm
Forward Voltage I_F = 10mA	V_F [2]	High Efficiency Red	1.9	2.3	V
Reverse Current (V_R = 5V)	I_R	High Efficiency Red	-	10	μA
Temperature Coefficient of λ_{peak} I_F = 10mA, -10°C ≤ T ≤ 85°C	$TC_{\lambda peak}$	High Efficiency Red	0.13	-	nm/°C
Temperature Coefficient of λ_{dom} I_F = 10mA, -10°C ≤ T ≤ 85°C	$TC_{\lambda dom}$	High Efficiency Red	0.06	-	nm/°C
Temperature Coefficient of V_F I_F = 10mA, -10°C ≤ T ≤ 85°C	TC_V	High Efficiency Red	-1.9	-	mV/°C

Notes:
1. The dominant wavelength (λd) above is the setup value of the sorting machine. (Tolerance λd : ±1nm.)
2. Forward voltage: ±0.1V.
3. Wavelength value is traceable to CIE127-2007 standards.
4. 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°C

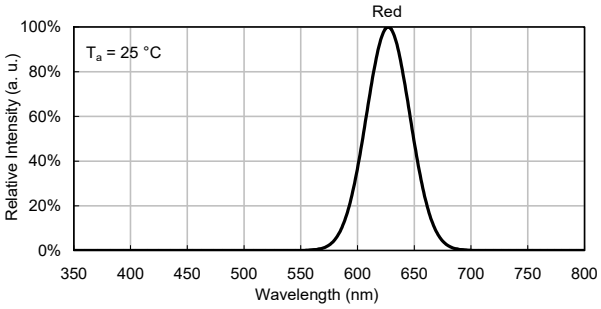
Parameter	Symbol	Value	Unit
Power Dissipation	P_D	75	mW
Reverse Voltage	V_R	5	V
Junction Temperature	T_j	125	°C
Operating Temperature	T_{op}	-40 to +85	°C
Storage Temperature	T_{stg}	-40 to +85	°C
DC Forward Current	I_F	30	mA
Peak Forward Current	I_{FP} [1]	160	mA
Electrostatic Discharge Threshold (HBM)	-	8000	V
Thermal Resistance (Junction / Ambient)	$R_{th\ JA}$ [2]	680	°C/W
Thermal Resistance (Junction / Solder point)	$R_{th\ JS}$ [2]	450	°C/W
Lead Solder Temperature [3]		260°C For 3 Seconds	
Lead Solder Temperature [4]		260°C For 5 Seconds	

Notes:
1. 1/10 Duty Cycle, 0.1ms Pulse Width.
2. $R_{th\ JA}$,$R_{th\ JS}$ Results from mounting on PC board FR4 (pad size ≥ 16 mm^2 per pad).
3. 2mm below package base.
4. 5mm below package base.
5. 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.

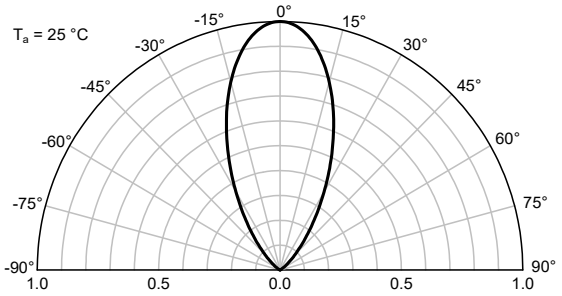
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TECHNICAL DATA

RELATIVE INTENSITY vs. WAVELENGTH

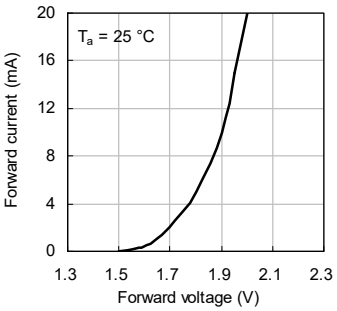


SPATIAL DISTRIBUTION

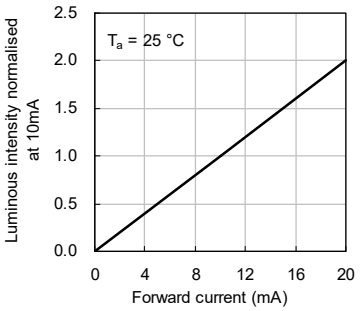


HIGH EFFICIENCY RED

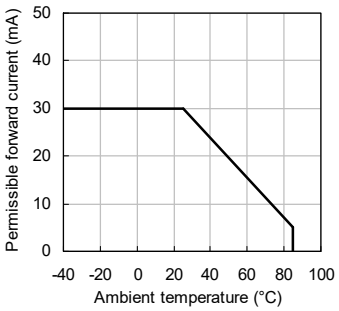
Forward Current vs. Forward Voltage



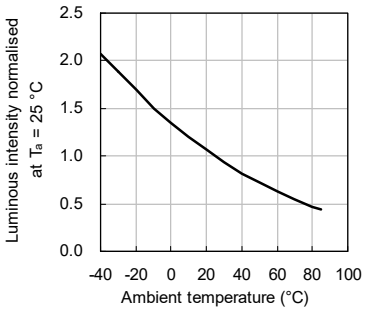
Luminous Intensity vs. Forward Current



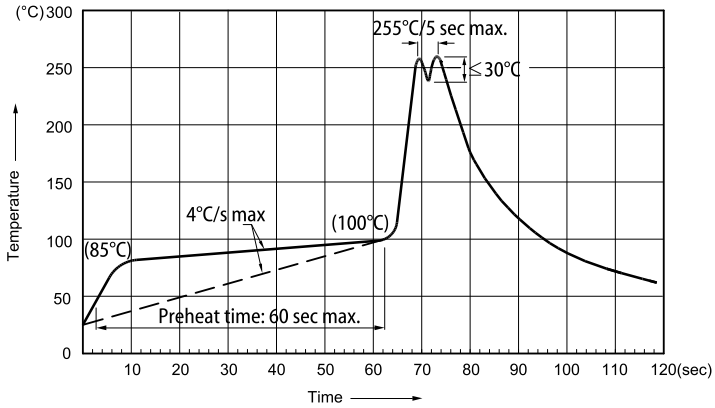
Forward Current Derating Curve



Luminous Intensity vs. Ambient Temperature



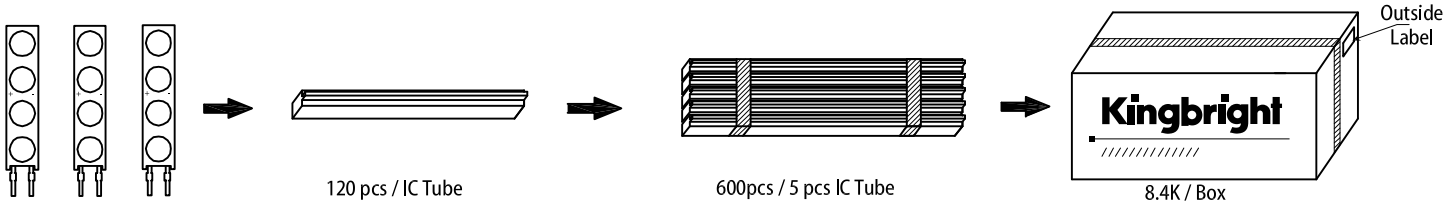
RECOMMENDED WAVE SOLDERING PROFILE



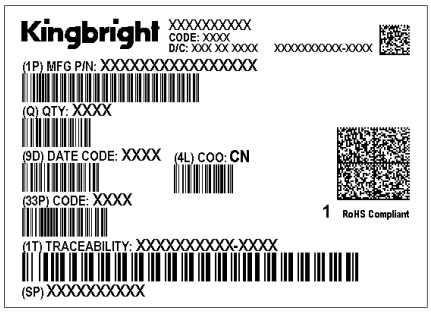
Notes:

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



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PRECAUTIONS

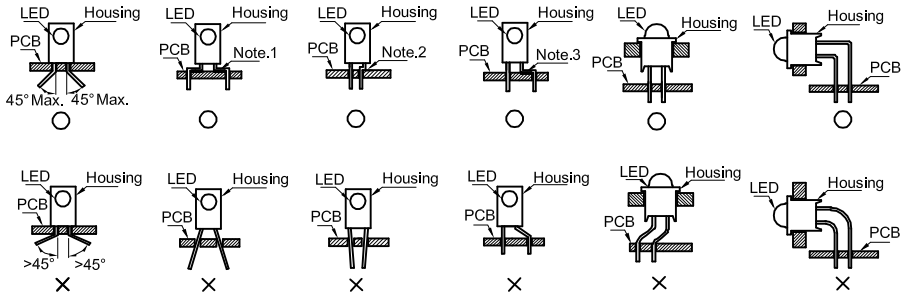
Storage Conditions

1. Avoid continued exposure to the condensing moisture environment and keep the product away from rapid transitions in ambient temperature.
2. The LEDs should be stored at temperature <30°C and relative humidity <70%. If the packaging is opened but not used within three months, the unused LEDs should be stored in a sealed container with nitrogen atmosphere and moisture absorbent material.

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.

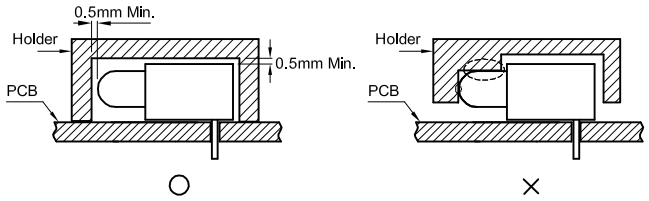
Note 1-3: Do not route PCB trace in the contact area between the leadframe and the PCB to prevent short-circuits.



" ○ " 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.
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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