SST-10-IRD-850nm

Dual Junction Surface Mount Series

Infrared LED

Features

- High Power Infrared LED with typical 850nm centroid wavelength
- 50, 90 and 130-degree viewing angle
- Operation at up to 1.5A CW and 5A pulse
- Built-in ESD protection
- Low Thermal Resistance
- Suitable for all SMT Assembly Methods
- RoHS and REACh compliant

Applications

- Surveillance Systems / CCTV
- Iris and Face Recognition
- License Plate Scanning
- Automotive Sensing
- Machine Vision
- Night Vision
Understanding Luminus SST-10-IRD-850nm LED Test Specifications

Every Luminus LED is fully tested to ensure it meets the high quality standards customers have come to expect from Luminus products.

Testing Temperature
Luminus SST-10-IRD-850nm LEDs are tested and binned at 25°C junction temperature. Temperature curves are provided to allow users to scale the data for actual operating temperature conditions.

Technology Overview

Luminus SST-10-IRD-850nm LEDs benefit from innovations in device technology, chip packaging and thermal management. This suite of technologies give engineers and system designers the freedom to develop solutions both high in power and efficiency.

Reliability
Luminus SST-10-IRD-850nm LEDs have passed a rigorous suite of environmental and mechanical stress tests, including mechanical shock, vibration, temperature cycling and humidity. They are fully qualified for use in a wide range of high performance and high efficacy applications.

REACH & RoHS Compliance
The Luminus SST-10-IRD-850nm LED is compliant to the Restriction of Hazardous Substances Directive or RoHS. The restricted materials including lead, mercury cadmium hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ether (PBDE) are not used.
# Product Ordering and Shipping Part Number Nomenclature

All SST-10-IRD-850nm products are packaged and labeled with part numbers as outlined in below. When shipped, each reel will contain only a single flux wavelength and Vf bin. The part number designation is as follows:

<table>
<thead>
<tr>
<th>Products</th>
<th>Ordering Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SST-10-IRD</td>
<td>SST-10-IRD-B##-F###</td>
<td>SST-10 dual junction surface mount infrared LED</td>
</tr>
</tbody>
</table>

**Product Family**  
- **SST - Ceramic Surface Mount package w/ encapsulation**
  - **Chip Area**: 10: 1.0 mm²
  - **Color Code**: IRD = Dual Junction Infrared
  - **Package Configuration**: B50 - 50 deg Beam Angle  
  B90 - 90 deg Beam Angle  
  B130 - 130 deg Beam Angle  
  Ceramic 3.45mm x 3.45mm  
  See Pages 8-10 for Detailed Drawings

**Peak Wavelength**  
- **Minimum Flux Bin (mW)**  
- **Lens Angle**: 50, 90, 130
- **Ordering Part Number**

<table>
<thead>
<tr>
<th>Peak Wavelength</th>
<th>Minimum Flux Bin (mW)</th>
<th>Lens Angle</th>
<th>Ordering Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>850</td>
<td>505</td>
<td>50</td>
<td>SST-10-IRD-B50-T850</td>
</tr>
<tr>
<td></td>
<td>505</td>
<td>90</td>
<td>SST-10-IRD-B90-T850</td>
</tr>
<tr>
<td></td>
<td>535</td>
<td>130</td>
<td>SST-10-IRD-B130-U850</td>
</tr>
</tbody>
</table>

**Flux Bins**

<table>
<thead>
<tr>
<th>Bin Code</th>
<th>Radiometric Power at 350mA, t_p=20ms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum Flux (mW)</td>
</tr>
<tr>
<td>T</td>
<td>505</td>
</tr>
<tr>
<td>U</td>
<td>535</td>
</tr>
<tr>
<td>V</td>
<td>565</td>
</tr>
<tr>
<td>W</td>
<td>595</td>
</tr>
<tr>
<td>X</td>
<td>625</td>
</tr>
</tbody>
</table>

**Wavelength Bins**

<table>
<thead>
<tr>
<th>Bin Code</th>
<th>Minimum Peak Wavelength (nm)</th>
<th>Maximum Peak Wavelength (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>850</td>
<td>840</td>
<td>870</td>
</tr>
</tbody>
</table>
### Optical and Electrical Characteristics

#### Parameter | Symbol | Package Type | Unit
--- | --- | --- | ---
Forward Current | $I_f$ | 350 | mA
Output Power Typical | $P_O$ | 550 | 580 | mW
Output Power at 1.0A, t = 20ms (typ.) | $P_{O_{1.0A}}$ | 1,500 | 1,600 | mW
Radiant Intensity at 1.0A, t = 20ms (typ.) | $\phi_e$ | 1300 | 790 | 450 | mW/sr
Minimum Forward Voltage | $V_{f_{\text{min}}}$ | 2.8 | V
Forward Voltage Typical | $V_f$ | 3.0 | V
Maximum Forward Voltage | $V_{f_{\text{max}}}$ | 3.4 | V
Viewing Angle | $2\theta_{1/2}$ | 50 | 90 | 130 | deg
Peak Wavelength Typical | $\lambda_p$ | 850 | nm
Centroid Wavelength Typical | $\lambda_c$ | 860 | nm
FWHM Typical | $\Delta\lambda_{1/2}$ | 30 | nm
Temperature Coefficient of Forward Voltage | $T_{C_{V_{f}}}$ | -3.0 | mV/°C
Temperature Coefficient of Radiometric Power | $T_{C_{P_O}}$ | -0.2 | %/°C
Temperature Coefficient of Wavelength | $T_{C_{\lambda}}$ | 0.3 | nm/°C
Thermal Resistance (Electrical) | $R_{TH}$ | 5.3 | °C/W

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Note 1:  Binning based on operation at a current of 350mA, 20ms single pulse and a constant junction temperature of $T_j = 25$°C. Parts are binned and shipped in 0.2V $V_f$ increments.
Optical and Electrical Characteristics

Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Rating</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Current(^3,4)</td>
<td>I</td>
<td>1.5</td>
<td>A</td>
</tr>
<tr>
<td>Power Dissipation</td>
<td>PD</td>
<td>6</td>
<td>W</td>
</tr>
<tr>
<td>Reverse Voltage</td>
<td>VR</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>T(_{STG})</td>
<td>-40~100</td>
<td>°C</td>
</tr>
<tr>
<td>Junction Temperature(^3,4)</td>
<td>T(_J)</td>
<td>115 °C</td>
<td>°C</td>
</tr>
<tr>
<td>Soldering Temperature</td>
<td>T(_{SLD})</td>
<td>JEDEC 020 , 260 °C</td>
<td></td>
</tr>
<tr>
<td>ESD Sensitivity (HBM)</td>
<td>V(_B)</td>
<td>6000</td>
<td>V</td>
</tr>
</tbody>
</table>

Note 2: To prevent damage refer to operating conditions and derating curves for appropriate maximum operating conditions

Note 3: Luminus SST-10-IRD-850nm LEDs are designed for operation up to an absolute maximum forward drive current as specified above. Product lifetime data is specified at typical forward drive currents. Sustained operation at absolute maximum currents will result in a reduction of device lifetime compared to typical forward drive currents. Actual device lifetimes will also depend on junction temperature.

Note 4: Maximum operating case temperature combined with maximum drive current defines the total maximum operating condition for the device. To prevent damage, please operate devices within specified conditions.

Note 5: Caution must be taken not to stare at the light emitted from these LEDs. Under special circumstances, the high intensity could damage the eye.
Optical and Electrical Characteristics

Relative Output Flux vs. Forward Current

Relative Output Flux vs. Temperature

Relative Forward Voltage vs. Forward Current

Relative Forward Voltage vs. Temperature

Relative Peak Wavelength vs. Forward Current

Relative Peak Wavelength vs. Temperature
Optical and Electrical Characteristics

Typical Polar Radiation Plot - B50

Typical Polar Radiation Plot - B90

Typical Polar Radiation Plot - B130

Permissible Pulse Handling Capability

Typical Spectrum
Mechanical Dimensions - B50 Package

FRONT VIEW

SIDE VIEW

BACK VIEW

Recommended PCB Solder Pad
Mechanical Dimensions - B90 Package

CENTER OF DIE EMITTING AREA

CENTER OF ZENER DIODE

BACK OF SUBSTRATE TO TOP OF DIE EMITTING AREA

ANODE
THERMAL PAD (NEUTRAL)
CATHODE

SECTION E-E

RECOMMENDED SOLDER PAD LAYOUT
**Mechanical Dimensions - B130 Package**

- **DIE EMITTING AREA**: 3.45±.20 [.136±.008] M
- **CENTER OF DIE EMITTING AREA**: 1.0 [.041] [0.006]
- **BACK OF SUBSTRATE TO TOP OF DIE EMITTING AREA**: 1.90±.13 [.075±.005]
- **SECTION E-E**: 2.7 [.106] [.38 [.015]]

**Recommended Solder Pad Layout**
Tape and Reel - B50 and B90 Packages

NOTES:
1. FINAL TAPE AND REEL PACKAGING MUST MEET THE REQUIREMENTS OF JEDEC-STD-033, LEVEL 2A.
2. LEAVE 304.8mm (12.00 in) OF TAPE EMPTY FOR LEAD IN (38 EMPTY POCKETS).
3. LEAVE 457.2mm (18.00 in) OF TAPE EMPTY FOR TRAILER (57 EMPTY POCKETS).
4. MUST COMPLY TO EIA-481-C-2003
Tape and Reel - B130 Package

NOTES:
1. FINAL TAPE AND REEL PACKAGING MUST MEET THE REQUIREMENTS OF JEDEC-STD-033, LEVEL 2A.
2. LEAVE 304.8mm (12.00 in) OF TAPE EMPTY FOR LEAD IN (38 EMPTY POCKETS).
3. LEAVE 457.2mm (18.00 in) OF TAPE EMPTY FOR TRAILER (57 EMPTY POCKETS).
4. MUST COMPLY TO EIA-481-C-2003
Reel Packaging

500 parts per reel for B50/B90 Packages - 1,000 parts per reel for B130 Package

Reel Label

Luminus Internal Part Number

Bin

Customer Part Number Root

Lot ID and Reel ID (for Luminus internal use)
Shipping Label

Luminus Ordering Part Number
Bin
Customer ID
Lot ID and Reel ID (for Luminus internal use)

Box Packaging Information

Label: contains the type, Lot #, Quality, Product parameters

*Capacity 5 reels per box

Label: contains the type, Lot #, Quality, Product parameters

*Capacity 10 reels per box
## Soldering Profile

<table>
<thead>
<tr>
<th>Profile Feature</th>
<th>Sn-Pb Eutectic Assembly</th>
<th>Pb-Free Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat &amp; Soak</td>
<td>100 °C</td>
<td>150 °C</td>
</tr>
<tr>
<td>Temperature min (Tsmin)</td>
<td>150 °C</td>
<td>200 °C</td>
</tr>
<tr>
<td>Temperature max (Tmax)</td>
<td>183 °C</td>
<td>217 °C</td>
</tr>
<tr>
<td>Time (Tsmin to Tmax) (ts)</td>
<td>60-120 seconds</td>
<td>60-120 seconds</td>
</tr>
<tr>
<td>Average ramp-up rate (Tmax to Tp)</td>
<td>3 °C/second max</td>
<td>3 °C/second max</td>
</tr>
<tr>
<td>Liquidous temperature (TL)</td>
<td>230 °C ~ 235 °C</td>
<td>255 °C ~ 260 °C</td>
</tr>
<tr>
<td>Time at liquidous (TL)</td>
<td>60-150 seconds</td>
<td>60-150 seconds</td>
</tr>
<tr>
<td>Peak package body temperature (Tp)*</td>
<td>235 °C</td>
<td>260 °C</td>
</tr>
<tr>
<td>Classification temperature (Tc)</td>
<td>20 seconds</td>
<td>30 seconds</td>
</tr>
<tr>
<td>Time (tp) within 5 °C of the specified</td>
<td>235 °C</td>
<td>260 °C</td>
</tr>
<tr>
<td>classification temperature (Tc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average ramp-down rate (Tp to Tmax)</td>
<td>6 °C/second max</td>
<td>6 °C/second max</td>
</tr>
<tr>
<td>Time 25 °C to peak temperature</td>
<td>6 minutes max</td>
<td>8 minutes max</td>
</tr>
</tbody>
</table>

* Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.

** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum.
Precautions for Use

Storage:

1. Before opening the package
The LEDs should be kept at <40 & <90%RH. The LEDs should be used within a year. When storing the LEDs, moisture proof package with absorbent material (silica gel) is recommended.

2. After opening the package
The LEDs should be kept at ≤ 30 & ≤ 60%RH. The LEDs should be soldered within 168 hours (7 days) after opening the moisture proof package.
If unused LEDs remain, they should be stored in moisture proof packages, such as sealed containers with moisture proof package within absorbent material (silica gel). It is also recommended to return the unused LEDs to the original moisture proof package and to seal the moisture proof package again.
If the moisture absorbent material (silica gel) vapors or expires the expiration date, baking treatment should be performed by using the following conditions: 60 °C for 20 hours.
The LEDs electrode and leadframe comprise a silver plated copper alloy. The silver surface may be affected by environments. Please avoid conditions which may cause the LEDs being corroded or discolored. The corrosion or discoloration might lower solderability or affect optical characteristics.
Please avoid rapid transition in ambient temperature, especially in high humidity environments where condensation can occur.

Static Electricity:

1. The products are sensitive to static electricity, and care should be taken when handling them.

2. Static electricity or surge voltage will damage the LEDs. It is recommended to wear a anti-electrostatic wristband or an anti-electrostatic gloves when handling the LEDs.

3. All devices, equipment and machinery must be properly grounded. It is recommended that measures be taken against surge voltage to the equipment that mounts the LEDs.
## History of Changes

<table>
<thead>
<tr>
<th>Rev</th>
<th>Date</th>
<th>Description of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>12/14/2018</td>
<td>Initial Release</td>
</tr>
</tbody>
</table>

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