SST-10-IRD-810nm
Dual Junction Surface Mount Series
Infrared LED

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Features
- High Power Infrared LED with typical 810nm centroid wavelength
- 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-810nm 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-810nm 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-810nm 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-810nm 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-810nm 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-810nm 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>Bin Code</th>
<th>Minimum Peak Wavelength (nm)</th>
<th>Maximum Peak Wavelength (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>800</td>
<td>830</td>
</tr>
<tr>
<td>T</td>
<td>505</td>
<td>535</td>
</tr>
<tr>
<td>U</td>
<td>535</td>
<td>565</td>
</tr>
<tr>
<td>V</td>
<td>565</td>
<td>595</td>
</tr>
</tbody>
</table>

Ordering and Description:

<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>

### SST Product Datasheet

#### Peak Wavelength

<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>810</td>
<td>475</td>
<td>90</td>
<td>SST-10-IRD-B90-S810</td>
</tr>
<tr>
<td></td>
<td>475</td>
<td>130</td>
<td>SST-10-IRD-B130-S810</td>
</tr>
</tbody>
</table>

#### Flux Bins

<table>
<thead>
<tr>
<th>Bin Code</th>
<th>Minimum Flux (mW)</th>
<th>Maximum Flux (mW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
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<td>505</td>
</tr>
<tr>
<td>T</td>
<td>505</td>
<td>535</td>
</tr>
<tr>
<td>U</td>
<td>535</td>
<td>565</td>
</tr>
<tr>
<td>V</td>
<td>565</td>
<td>595</td>
</tr>
</tbody>
</table>

#### Wavelength Bins

<table>
<thead>
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<th>Bin Code</th>
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<tbody>
<tr>
<td>810</td>
<td>800</td>
<td>830</td>
</tr>
</tbody>
</table>
Optical and Electrical Characteristics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Package Type</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Current</td>
<td>$I_f$</td>
<td>B90, B130</td>
<td>mA</td>
</tr>
<tr>
<td>Output Power Typical</td>
<td>$P_{O}$</td>
<td>B90, B130</td>
<td>mW</td>
</tr>
<tr>
<td>Output Power at 1.0A, $t=20ms$ (typ.)</td>
<td>$P_{O,1.0A}$</td>
<td>B90, B130</td>
<td>mW</td>
</tr>
<tr>
<td>Radiant Intensity at 1.0A, $t=20ms$ (typ.)</td>
<td>$\phi_e$</td>
<td>B90, B130</td>
<td>mW/sr</td>
</tr>
<tr>
<td>Minimum Forward Voltage(^1)</td>
<td>$V_{f,min}$</td>
<td>B90, B130</td>
<td>V</td>
</tr>
<tr>
<td>Forward Voltage Typical</td>
<td>$V_f$</td>
<td>B90, B130</td>
<td>V</td>
</tr>
<tr>
<td>Maximum Forward Voltage(^1)</td>
<td>$V_{f,max}$</td>
<td>B90, B130</td>
<td>V</td>
</tr>
<tr>
<td>Viewing Angle</td>
<td>$2\phi_{1/2}$</td>
<td>B90, B130</td>
<td>deg</td>
</tr>
<tr>
<td>Peak Wavelength Typical</td>
<td>$\lambda_p$</td>
<td>B90, B130</td>
<td>nm</td>
</tr>
<tr>
<td>Centroid Wavelength Typical</td>
<td>$\lambda_c$</td>
<td>B90, B130</td>
<td>nm</td>
</tr>
<tr>
<td>FWHM Typical</td>
<td>$\Delta\lambda_{1/2}$</td>
<td>B90, B130</td>
<td>nm</td>
</tr>
<tr>
<td>Temperature Coefficient of Forward voltage</td>
<td>$T_{C_V}$</td>
<td>B90, B130</td>
<td>mV/°C</td>
</tr>
<tr>
<td>Temperature Coefficient of Radiometric Power</td>
<td>$T_{C_P}$</td>
<td>B90, B130</td>
<td>%/°C</td>
</tr>
<tr>
<td>Temperature Coefficient of Wavelength</td>
<td>$T_{C_\lambda}$</td>
<td>B90, B130</td>
<td>nm/°C</td>
</tr>
<tr>
<td>Thermal Resistance (Electrical)</td>
<td>$R_{TH}$</td>
<td>B90, B130</td>
<td>°C/W</td>
</tr>
</tbody>
</table>

Note 1: Binning based on operation at a current of 350mA, 20ms single pulse and a constant junction temperature of $T_j = 25^\circ$C. Parts are binned and shipped in 0.2V $V_f$ increments.
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(^1,4)</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>TSTG</td>
<td>-40~100°C</td>
<td></td>
</tr>
<tr>
<td>Junction Temperature(^3,4)</td>
<td>TJ</td>
<td>115 °C</td>
<td></td>
</tr>
<tr>
<td>Soldering Temperature</td>
<td>TSLD</td>
<td>JEDEC 020, 260 °C</td>
<td></td>
</tr>
<tr>
<td>ESD Sensitivity (HBM)</td>
<td>VB</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-810nm 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**

- Graph showing relative output flux as a function of forward current (I_f).

**Relative Output Flux vs. Temperature**

- Graph showing relative output flux as a function of temperature (T_j).

**Relative Forward Voltage vs. Forward Current**

- Graph showing relative forward voltage as a function of forward current (I_f).

**Relative Forward Voltage vs. Temperature**

- Graph showing relative forward voltage as a function of temperature (T_j).

**Relative Peak Wavelength vs. Forward Current**

- Graph showing relative peak wavelength as a function of forward current (I_f).

**Relative Peak Wavelength vs. Temperature**

- Graph showing relative peak wavelength as a function of temperature (T_j).
Optical and Electrical Characteristics

Typical Polar Radiation Plot - B90

Typical Polar Radiation Plot - B130

Typical Spectrum

Permissible Pulse Handling Capability

Relative Intensity

Wavelength (nm)

$I_f(A)$

$t_p(s)$

\[ D = 0.005 \]

\[ D = 0.01 \]

\[ D = 0.02 \]

\[ D = 0.05 \]

\[ D = 0.1 \]

\[ D = 0.2 \]

\[ D = 0.5 \]

\[ D = 1 \]
Mechanical Dimensions - B90 Package

- CENTER OF DIE EMITTING AREA:
  - Diameter: 3.45 ± 0.20
  - Tolerance: 0.008
  - Tolerance: 0.000

- CENTER OF ZENER DIODE:
  - Diameter: 0.30 ± 0.012
  - Tolerance: 0.000

- BACK OF SUBSTRATE TO TOP OF DIE EMITTING AREA:
  - Distance: 2.15 ± 0.085
  - Tolerance: 0.008

- SECTION E-E:
  - ANODE:
    - Diameter: 2.7 ± 0.106
    - Tolerance: 0.067
    - Tolerance: 0.106
  - THERMAL PAD (NEUTRAL):
    - Diameter: 1.7 ± 0.039
    - Tolerance: 0.000
  - CATHODE:
    - Diameter: 1.0 ± 0.039
    - Tolerance: 0.067
    - Tolerance: 0.106

- RECOMMENDED SOLDER PAD LAYOUT:
  - 8 pads

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Mechanical Dimensions - B130 Package

- **Center of Die Emitting Area**: 
  - A: 1.18 ± 0.028
  - B: 1.38 ± 0.03

- **Back of Substrate to Top of Die Emitting Area**: 
  - 1.90 ± 0.075

- **Recommended Solder Pad Layout**:

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Tape and Reel - B90 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 (36 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

*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>60-120 seconds</td>
<td>60-120 seconds</td>
</tr>
<tr>
<td>Time (Tsmin to Tmax) (ts)</td>
<td></td>
<td></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>183 °C</td>
<td>217 °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>230 °C ~235 °C</td>
<td>255 °C ~260 °C</td>
</tr>
<tr>
<td>Classification temperature (Tc)</td>
<td>235 °C</td>
<td>260 °C</td>
</tr>
<tr>
<td>Time (tp) within 5 °C of the specified classification temperature (Tc)</td>
<td>20 seconds</td>
<td>30 seconds</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 an 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.
<table>
<thead>
<tr>
<th>Rev</th>
<th>Date</th>
<th>Description of Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>01/01/2019</td>
<td>Initial Release</td>
</tr>
<tr>
<td>02</td>
<td>11/15/2019</td>
<td>Updated typical spectrum on page 7</td>
</tr>
</tbody>
</table>

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