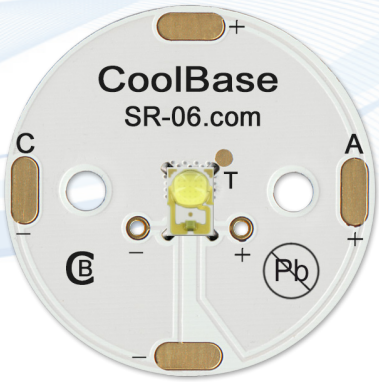
SR-06 Rebel 25mm Round LED Assembly

Overview



The SR-06 high brightness LED lighting assembly features a single Rebel LED soldered to our 25mm Round CoolBase. The FR4 CoolBase features a highly efficient thermal design that matches or outperforms* standard aluminium MCPCB bases.

The FR4 CoolBase is fully electrically isolated so that thermal interface materials do not need to be electrically insulative.

The round design is not only compatible with most flush mounted lenses, but will also accommodate the Carclo 104 & 106 series of hemispherical, ultra-wide angle “bubble” optics.

Connections to the base can be soldered using standard bench top tools and hand soldering techniques, making it easy to integrate into fixtures or for use in OEM/MRO applications.

SR-06 25mm Round assemblies can be ordered directly from our website at www.luxeonstar.com/sr-06.

Features:

- Fully compatible with Carclo 104 & 106 bubble optics
- Super efficient base design that matches or outperforms aluminium MCPCB bases
- Available with all currently produced Rebel LEDs
- RoHS compliant
- Pb free reflow soldered
- Extremely low thermal resistance
- Can be mounted with thermal tape

Construction

The base of this assembly uses a specially designed 1.6mm, thermally conductive FR4 PCB that provides an unprecedented thermal conductivity rate of 1.5°C/W, which directly translates into:

- **Longer LED life**
- **Better color stability**
- **Reduced cooling requirements**

Assembly Specifications

Parameter	Value
Base Type	1.6mm FR4 PCB
Base Thermal Performance (Not including LED)	1.5°C/W
Finishing	Immersion Gold
Solder Mask Color	White
Solder Paste	AIM NC-258 No-Clean, Lead-Free
Max Operating Temperature (FR4 Base)[1]	95°C
Overall Dimensions (mm)	25D x 3.6H
Weight	2.7g

1. For maximum life, the FR4 board temperature must be kept below this value.
* Results will vary depending on the quality of the dielectric material used in the MCPCB base.

Quadica Developments Inc.
47 6th Concession Rd.
Brantford, Ontario N3T 5L7
Canada
Em: service@luxeonstar.com
Ph: 1-347-223-5077

For technical questions, please contact us by email at service@luxeonstar.com
The latest version of this document can always be downloaded from our website at www.luxeonstar.com/sr-06.pdf

Document ID: SR-06
Revision: Feb 10, 2015

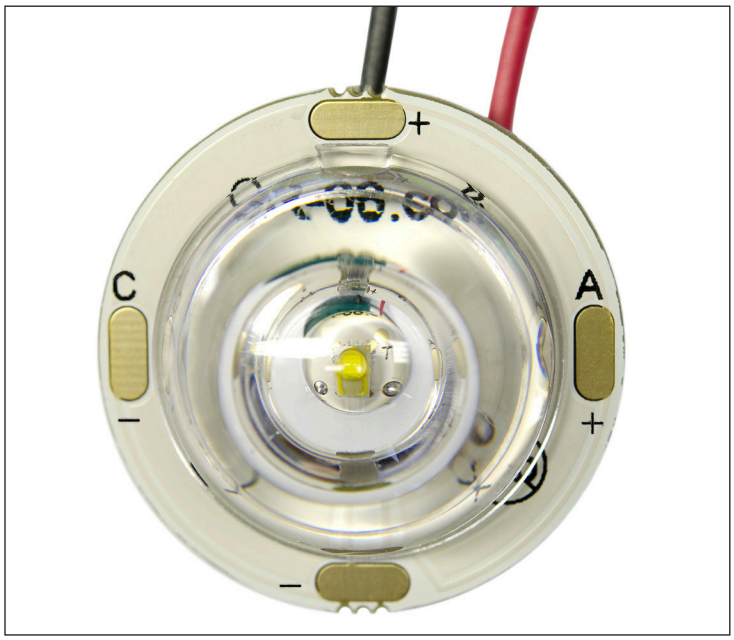
Power Drivers

The choice of power driver will depend on the LEDs that are mounted to the base, the number of LEDs being powered and how they are connected, the input voltage source and the drive current. We offer a complete selection of compatible low and high voltage current regulating drivers on our website at www.luxeonstar.com/drivers.

Secondary Optics

The SR-06 assembly has been specifically designed to accommodate all of the Carclo 104 & 106 series of hemispherical, ultra-wide angle “bubble” optics including:

- Carclo 10403 - 120° 20mm Surface Mounted Bubble Optic
- Carclo 10406 - 130° 20mm Surface Mounted Bubble Optic
- Carclo 10620 - 180° 20mm Surface Mounted Hemispherical Bubble Optic
- Carclo 10628 - 120° 20mm Surface Mounted Bubble Downlight Optic



Mounted Carclo Bubble Optic

Image 1

The assembly is also compatible with most flush mounted optics including:

- Dialite OPC1 reflectors
- Carclo 20mm Flat Bottom Holder optics

Quadica Developments Inc.
47 6th Concession Rd.
Brantford, Ontario N3T 5L7
Canada
Em: service@luxeonstar.com
Ph: 1-347-223-5077

Mounting & Cooling

Use of this assembly requires careful attention to mounting and cooling to ensure that the junction temperature of the LED is kept well below the maximum rating as specified in the LED documentation published by Philips Lumileds.

For optimal cooling, we recommend that the assembly be mounted to a suitable heat sink (aluminum or copper) that is exposed to open air using a thermal interface material such as our Bond-Ply© 100 pressure sensitive thermal tape or Arctic Silver™ Thermal Adhesive. The bottom of the LED assembly is electrically neutral, so it is not necessary to electrically isolate the LED base from the cooling surface.

You need to confirm that the assembly is being adequately cooled by testing the temperature of the LED as described in the Measuring LED Junction Temperature section of this document.

Failure to ensure that the LED junction temperature is kept below it's maximum temperature rating will result in poor color rendering, early degradation of light output, and premature LED failure!

Wiring

The assembly can be connected to using 26 AWG hookup wire inserted through the bottom and soldered to the top pads. (Image 1) It can also be connected to using any suitably sized wire to the top pads around the perimeter of the base. (Image 7)

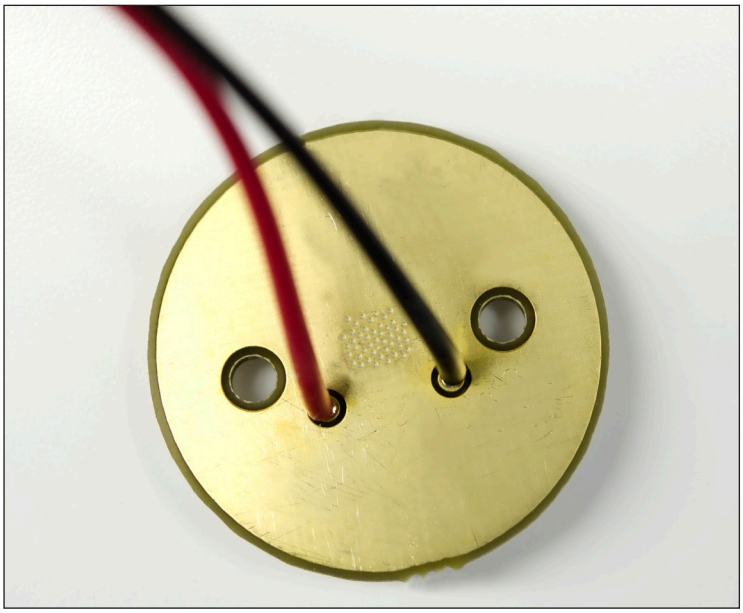


Image 2

Quadica Developments Inc.
47 6th Concession Rd.
Brantford, Ontario N3T 5L7
Canada
Em: service@luxeonstar.com
Ph: 1-347-223-5077

Measuring LED Junction Temperature

The SR-06 assembly includes a temperature test point to make it easy to determine the LED junction temperature using the following procedure.

Required Tools

- Digital Multimeter
- Temperature measurement meter
- Thermocouple or thermistor with kapton tape and/or thermal adhesive epoxy

  - or -
- Hand held temperature measurement probe with a tip that is smaller than the temperature test pad on the LED assembly.

Test Procedure

1. Enter the LED Typical Thermal Resistance Junction to Thermal Pad (°C/W) $R\theta_{J-C}$ value from the Rebel LED datasheet into box **B** in the formula on page 6 of this document.
2. Ideally the temperature should be tested with the LED assembly mounted in the location where it will be operated.

   If the assembly will be in a difficult to reach location, then you will need to attach a thermocouple or thermistor to the assembly using kapton tape or Arctic Silver™ Thermal Adhesive epoxy so that the tip of the sensor is in direct contact with the temperature measurement point as shown in image 3. Be sure to allow the adhesive to fully cure and cool before testing. If the assembly is easily accessible, then you can use a hand held temperature probe to measure the test point temperature.

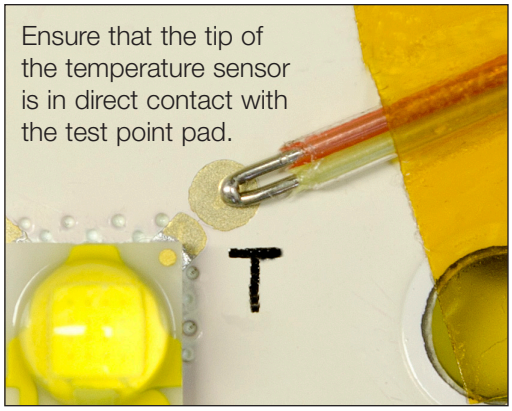


Image 3

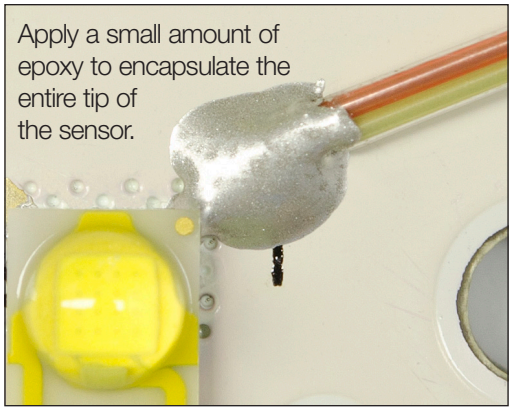


Image 4

Quadica Developments Inc.
47 6th Concession Rd.
Brantford, Ontario N3T 5L7
Canada
Em: service@luxeonstar.com
Ph: 1-347-223-5077

3. If you are measuring the temperature with a hand held probe, hold the probe onto the temperature test point for at least 1 minute after the LED assembly has reached its stable operating temperature. (Image 5) Applying a small amount of OMEGATHERM© 201 High Thermal Conductivity Paste, or heat sink thermal grease to the pad and probe tip will help to ensure you get an accurate reading. (Image 6)

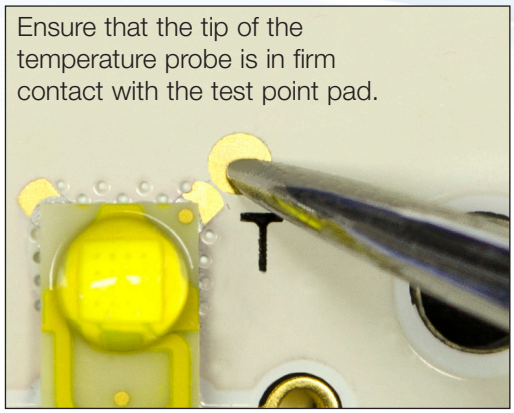


Image 5

Image 6

4. Power up the LED assembly and allow the temperature to stabilize for at least 5 minutes.
5. After the temperature measurement has stabilized, note the test point temperature and enter it in box **A** on page 6.
6. Measure the voltage across the LED (image 7) and note it in box **C**.

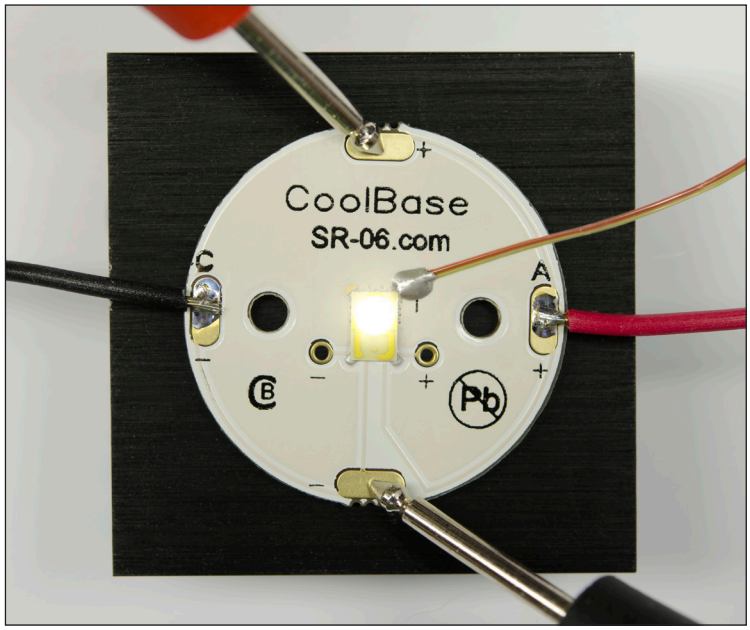


Image 7

Quadica Developments Inc.
47 6th Concession Rd.
Brantford, Ontario N3T 5L7
Canada
Em: service@luxeonstar.com
Ph: 1-347-223-5077

7. Enter the current you are powering the LED at in box **D**.
8. Evaluate the completed formula to determine the junction temperature of the LED.

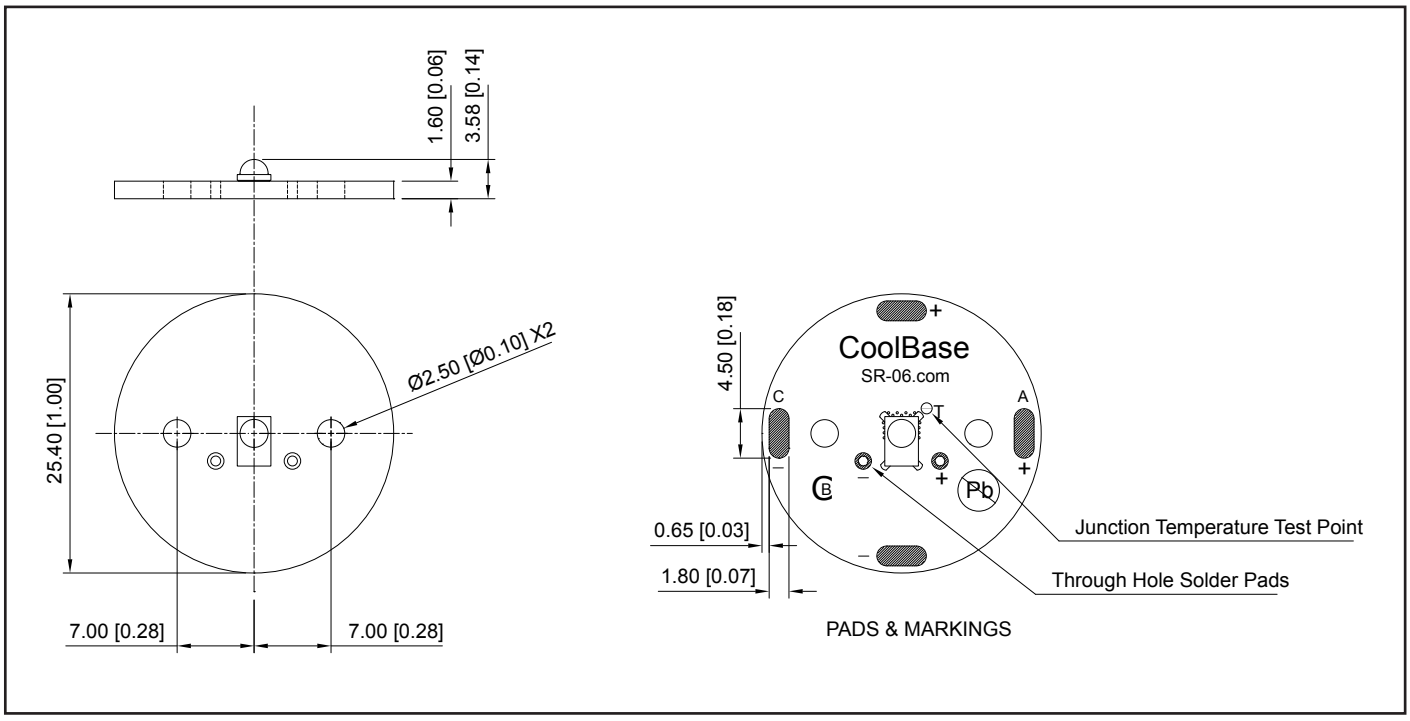
$$\boxed{A} + (1.5 + \boxed{B}) \times (\boxed{C} \times \boxed{D}) = \boxed{}^{*}$$

A		B		C		D		
Test Point Temperature °C		$\Psi_{J\text{-}S}$ °C/W		$R\theta_{J\text{-}C}$		LED Forward Voltage V_f	LED Forward Current I_f	LED Junction Temperature °C

* For maximum LED life, color stability and reliability, the calculated junction temperature must always be at or below the temperature shown in the Max Rec1 Junction Temp °C column of the specification table on page 7 of this document.

More information about this junction measurement technique can be found in the LUXEON LED Thermal Measurement Application Brief (AB33) published by Philips Lumileds.

Assembly Drawing



Quadica Developments Inc.
47 6th Concession Rd.
Brantford, Ontario N3T 5L7
Canada
Em: service@luxeonstar.com
Ph: 1-347-223-5077

Safety:

The LED mounted onto this assembly will produce a highly intense point of light. Do not stare directly at the LED for any length of time.

Restricted Use:

All products produced or sold by Quadica Developments Inc. are not certified for use as critical components in life support devices, systems, nor in medical operating room or life rescue equipment. A critical component is any component of a life support device, system or medical/rescue equipment whose failure to perform can be reasonably expected to cause failure or malfunction of the life support device, system or medical operating room/life rescue equipment.

Disclaimer:

Although QUADICA DEVELOPMENTS INC. has attempted to provide the most accurate information and services data (hereinafter “Data”), the Data is provided “as is” and may contain errors. The entire risk of use of the data shall be with the user. QUADICA DEVELOPMENTS INC. makes no warranty, express or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, regarding the contents or correctness of the Data provided or the ability of the Data to meet the user’s needs or expectations. QUADICA DEVELOPMENTS INC. reserves the right to make changes and corrections without notice.

You as the user agree to this disclaimer and the user agreement with the download or use of the provided Data. In no event shall QUADICA DEVELOPMENTS INC. be liable for any direct, indirect, special, incidental, exemplary, or consequential damages arising out of or related to the use of the Data, however caused, regardless of theory of liability, and whether or not QUADICA DEVELOPMENTS INC. has been advised of the possibility of such damage. This limitation shall apply notwithstanding any failure of essential purpose or any exclusive remedy.

Quadica Developments Inc.
47 6th Concession Rd.
Brantford, Ontario N3T 5L7
Canada
Em: service@luxeonstar.com
Ph: 1-347-223-5077