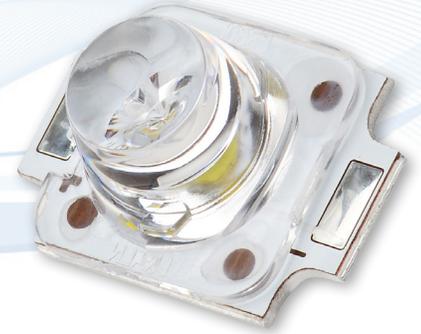


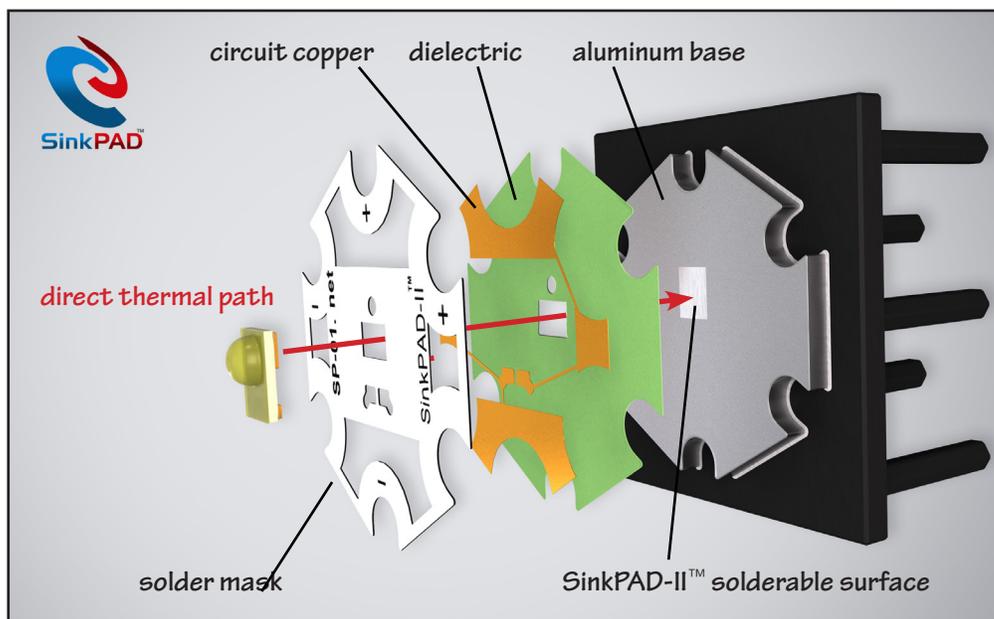
The SP-04 high brightness (HB) LED side emitting LED assembly features a single Rebel LED soldered to a SinkPAD-II™ board with a [Fraen F360L-3C-S](#) side emitting optic fastened to the base with Loctite 460 adhesive.

The SinkPAD-II™ features second-generation technology that minimizes thermal resistance by **eliminating the dielectric layer so that the LED thermal pad is soldered directly to the aluminum base**. This ensures the lowest possible LED junction temperature, resulting in increased LED life, lumens output and overall reliability.



Features

SinkPAD-II™ Technology



- Replacement option for the original Luxeon side emitting LEDs that are no longer manufactured by Philips Lumileds
- Available with all currently produced Rebel LEDs
- **Direct Thermal Path** technology for ultimate cooling efficiency.
- Extremely low thermal resistance of **0.4 °C/W** from the LED thermal pad to the bottom of the aluminum base.
- Reduced LED junction temperature
- Can be mounted with thermal tape, epoxy or mechanical fasteners
- **RoHS compliant**
- **Pb free** reflow soldered
- **UL Approved** MCPCB

Benefits

- Maximum LED life
- Maximum lumens output
- Improved color rendering and stability
- Reduced cooling requirements means a smaller heat sink
- Create more densely packed LED designs
- Same light output with fewer LEDs means reduced cost

Assembly Specifications

Parameter	Value
Base Type	0.8mm SinkPAD-II™ Aluminum
Thermal Performance $R\theta_{C-B}$ See the thermal model on page 8	0.4 °C/W
Pad Finish	Lead Free HASL
Solder Mask Color	White
Solder Paste	AIM NC-258 No-Clean, Lead-Free
Max Operating Temperature (Aluminum Base) ¹	120°C
Overall Dimensions (mm)	15.6L x 11W x 7.34H
Weight	0.4g

1. For maximum life, the aluminum board temperature must be kept below this value.
For LED specifications, please refer to the Philips Lumileds Rebel LED datasheet.

Eliminating the dielectric layer

between the LED thermal pad and the aluminum base means that the SinkPAD-II™ can easily outperform even the best MCPCB boards available.

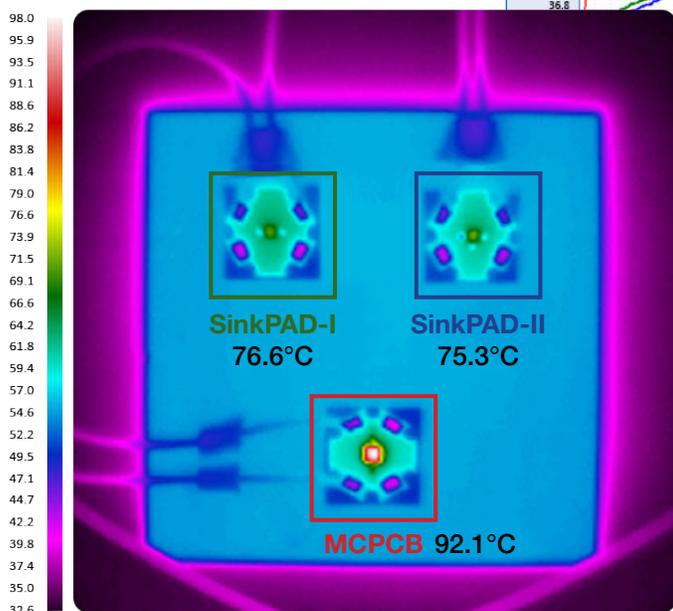
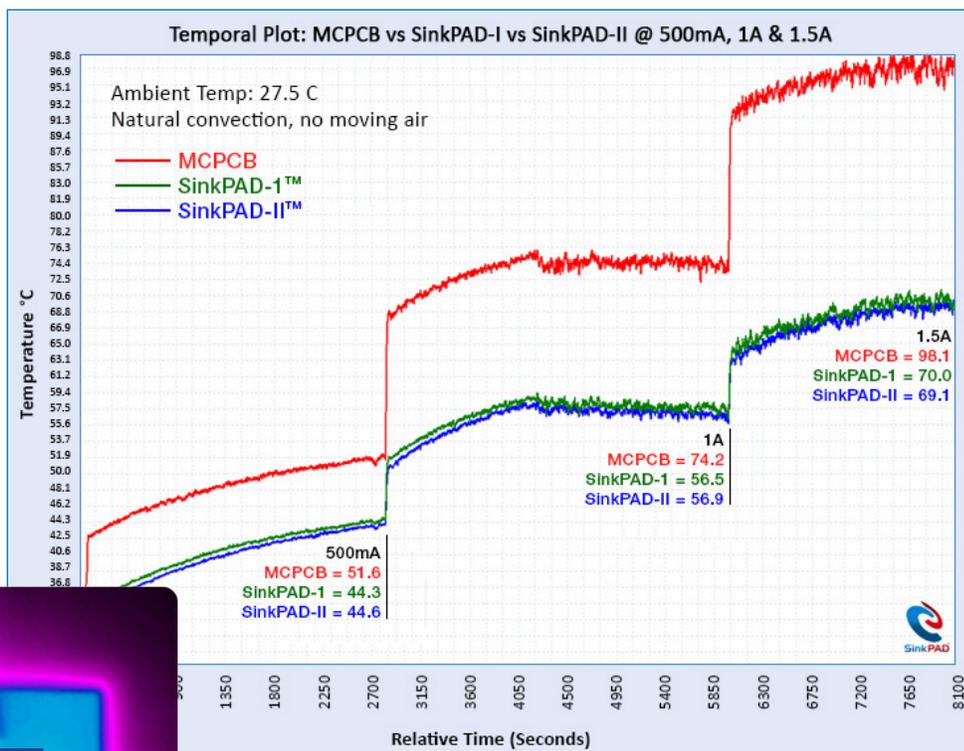


Image 2

Image 1

HB LEDs radiate minimal heat around the LED. Instead, all generated heat must be conducted away from the LED through the thermal pad on the bottom. By soldering the LED thermal pad directly to the aluminum base, a **Direct Thermal Path** is established that efficiently conducts the heat to the cooling surface.

Power Drivers

The choice of power driver will depend on the Rebel LED that is mounted to the base, desired lumens output, the number of LEDs being powered, the input voltage source, and the drive current. For help with selecting and using LED power drivers, visit our online support center at www.luxeonstar.com/support.

We offer a complete selection of compatible low and high voltage current regulating drivers on our website at www.luxeonstar.com/drivers.

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 finned heat sink (aluminum or copper) that is exposed to open air. The assembly can be mounted to the heat sink in one of three ways:

- [through pressure sensitive, thermally conductive tape](#)
- [by a thermally conductive adhesive](#)

The bottom of the LED assembly is electrically neutral, so it is not necessary to electrically isolate the base from the cooling surface.



Bottom View

LED Mounting Using Pressure Sensitive Thermal Tape

Pressure sensitive thermal tape such as our [pre-cut Bond-Ply® 100 tape](#) makes it easy to fasten the base directly to a heat sink without the need for screws, clip mounts, or fasteners. However in order to ensure a sound thermal bond, it is very important that the tape be used correctly. This includes:

- Ensuring that all mating surfaces are clean, totally flat, and free of voids
- Sizing and positioning the tape so that all mating surfaces are covered
- Applying a minimum of 10 PSI of even pressure between the LED and heat sink for at least 30 seconds

If pressure sensitive thermal tape is used correctly, there is no need to use any additional mechanical fasteners.

LED Mounting Using Thermally Conductive Adhesive

Thermally conductive adhesive such as [Arctic Silver™ Thermal Adhesive](#) requires a bit more effort to use than thermal tape, but offers a permanent bond, wider operating temperature range, and higher reliability, especially in environments where the assembly will be subjected to mechanical shock and vibration.

To create a thermally efficient and reliable bond:

- Ensure that all mating surfaces are clean and free of any grease or oil
- Use just enough epoxy to create as thin a bond line as possible
- Apply as much pressure as possible between the LED and heat sink for at least 30 seconds, and then maintain pressure using a clamp or weight until the epoxy has set

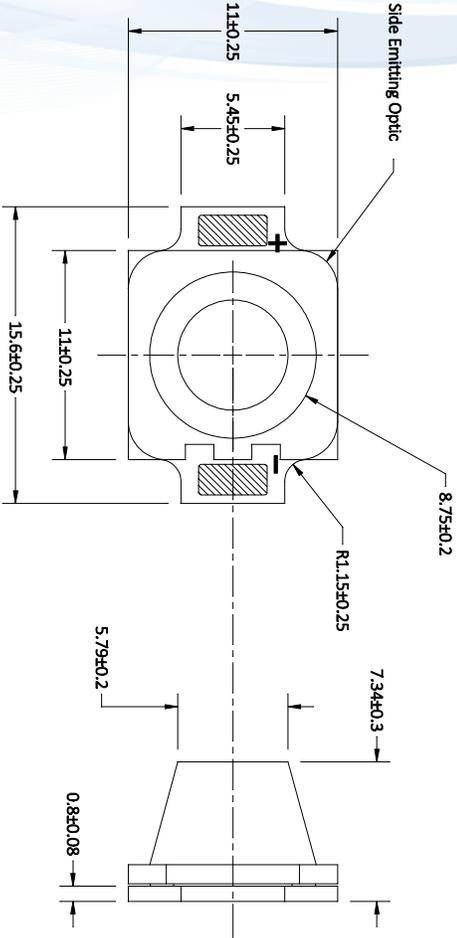
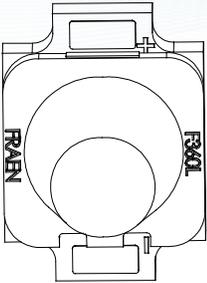
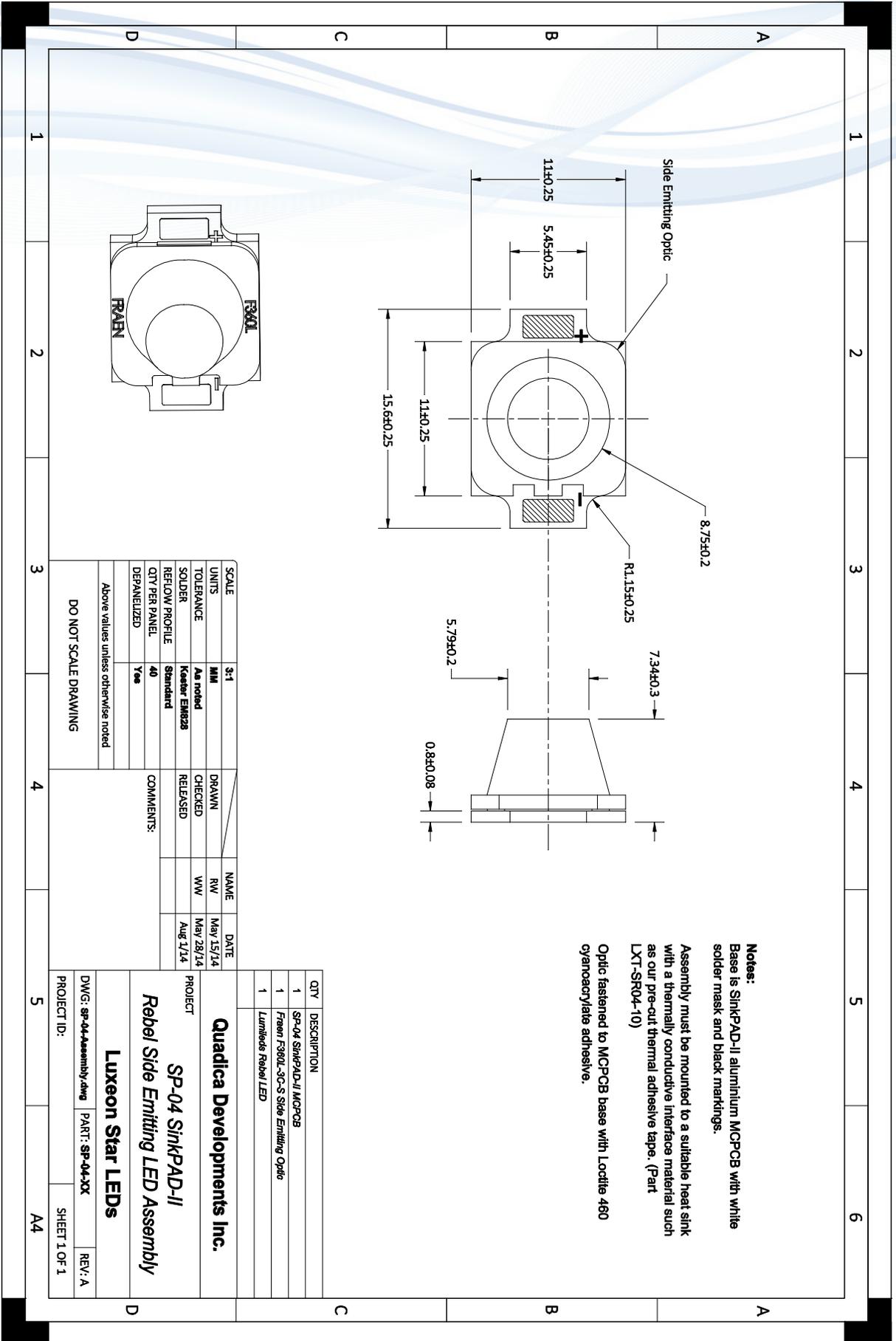
A video that demonstrates how to properly use the Arctic Silver Thermal Adhesive and a thermal press is available at www.luxeonstar.com/using-arctic-silver.

Measuring LED Junction Temperature

As the optic on the SP-04 assembly does not allow you to access the temperature test point, you will need to use a similarly sized surrogate LED assembly to get a close approximation of the LED junction temperature when operated under identical conditions.

An [SP-05 LED assembly](#) would be a good surrogate candidate as it is about the same size as the SP-04 with a single LED mounted in the center of the assembly. For detailed instructions on how to determine the LED junction temperature, refer to the datasheet for the selected surrogate LED.

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



Notes:
 Base is SinkPAD-II aluminum MCPCB with white solder mask and black markings.
 Assembly must be mounted to a suitable heat sink with a thermally conductive interface material such as our pre-cut thermal adhesive tape. (Part LXT-SR04-10)
 Optic fastened to MCPCB base with Loctite 460 cyanoacrylate adhesive.

SCALE	3:1	NAME		DATE	
UNITS	MM	DRAWN	RW	MAY 15/14	
TOLERANCE	As noted	CHECKED	WW	MAY 28/14	
SOLDER	Keeler EMB28	RELEASED		AUG 1/14	
REFLOW PROFILE	Standard	COMMENTS:			
QTY PER PANEL	40				
DEPANELIZED	Yes				
Above values unless otherwise noted					
DO NOT SCALE DRAWING					

QTY	DESCRIPTION
1	SP-04 SinkPAD-II MCPCB
1	Fraen F390L-SC-S Side Emitting Optic
1	Lumileds Rebel LED

Quadica Developments Inc.

PROJECT: **SP-04 SinkPAD-II Rebel Side Emitting LED Assembly**

Luxeon Star LEDs

DWG: SP-04-Assembly.dwg PART: SP-04-XX REV: A

PROJECT ID: SHEET 1 OF 1

You can download the full sized drawing from www.luxeonstar.com/sp-04-assembly.pdf

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:

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