

## Brilliant Light!

BL-2000 SERIES

### RED LED LIGHT ENGINE

Light Emitting Diodes (LEDs) offer many advantages over traditional incandescent lamps. Lamina's innovative LED arrays provide a revolutionary improvement in the LED market by creating the highest density packaging of discrete LED die. Developed using Lamina's multilayer Low Temperature Co-Fired Ceramic on Metal (LTCC-M) technology, Lamina LED array packages feature:

- SUPERIOR THERMAL PERFORMANCE
- SMALL SIZE
- OPTIMAL LIGHT EXTRACTION
- HIGH FLUX DENSITY

Thermal performance is the key to achieving high luminous densities, high reliability and long life. Lamina's LTCC-M packaging allows LED devices (die) to be mounted directly to an engineered metal core without submounts. This creates the optimum thermal path to conduct heat away from the LED device. The result is that multiple devices can be located in close proximity while maintaining target LED junction temperatures.

Standard arrays are available in several different colors and light intensity outputs. These arrays can be mounted together to create strips of light or larger arrays. Terminals are supplied with a solderable surface finish to enable users to connect arrays to driver circuitry or other arrays in a series or parallel circuit.



### Typical Applications

#### TASK LIGHTING

#### SIGNAGE & CHANNEL LETTERS

#### ARCHITECTURAL LIGHTING

- DECORATIVE AND MINI-ACCENT
- COVE AND UNDER-SHELF
- GARDEN AND PATHWAY
- STEP LIGHTS

#### AUTOMOTIVE

- INTERIOR
- DASHBOARD BACKLIGHT
- CHMSL

#### LCD BACKLIGHT

- COMPUTER DISPLAYS
- HEADS UP DISPLAYS

#### SIGNALS

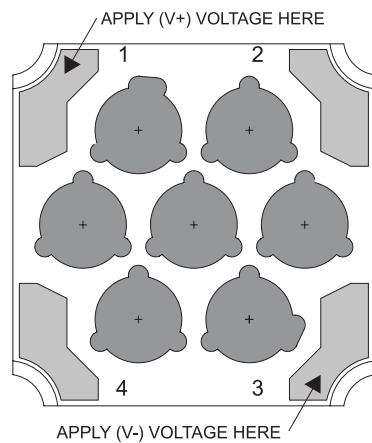
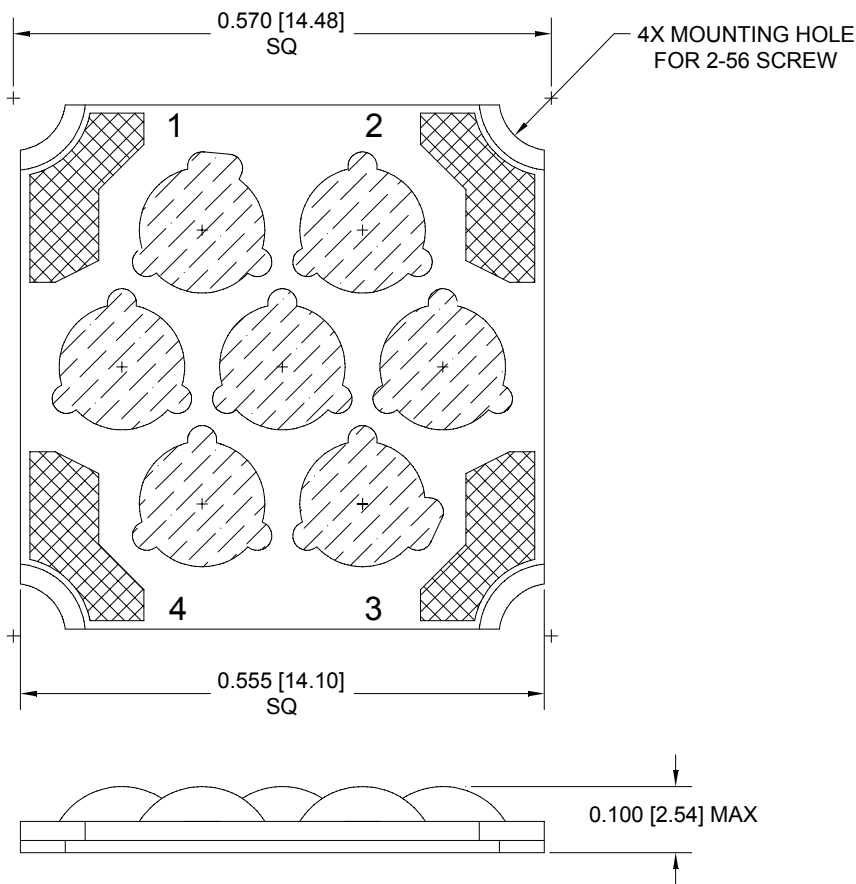
- AIRFIELD TAXIWAY
- TRAFFIC
- SECURITY
- BEACONS
- RAIL



Lamina Ceramics, 120 Hancock Lane, Westampton, NJ 08060  
1-800-808-LTCC (5822) [www.laminaceramics.com](http://www.laminaceramics.com)

To see how you can realize all these design benefits, to request a sample, or to speak with an engineer about your design, contact Lamina Ceramics at 800.808.LTCC (5822) or visit [laminaceramics.com](http://laminaceramics.com).

## Mechanical Specifications



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## Notes

### OPTICAL RECOMMENDATIONS

Lamina's BL Series Light Engines project a Lambertian radiation pattern, with projection angles built into the package cavity at approximately 150°. It will be necessary for users to create an optical reflector and lens structure that meet their light dispersion requirements. Please contact Lamina Application Engineering for support with your optical needs.

### HEAT SINK RECOMMENDATIONS

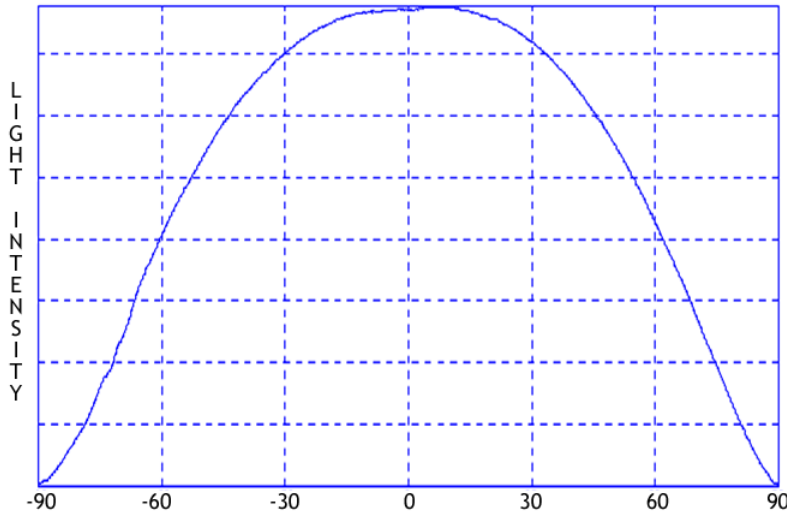
Lamina's BL Series Light Engines are created with a heat spreader fabricated into the ceramic package. This heat spreader provides the most efficient thermal path from the die junction to the heat sink. The operational die junction temperature must not be allowed to exceed 125°C and should ideally be maintained as close to 25°C as possible. With increasing power levels, die junction temperature will rise and light output efficiency will drop. These variables must be taken into consideration when selecting a light engine for your application. Please contact Lamina Application Engineering for support with your thermal management needs.

## Technical Data

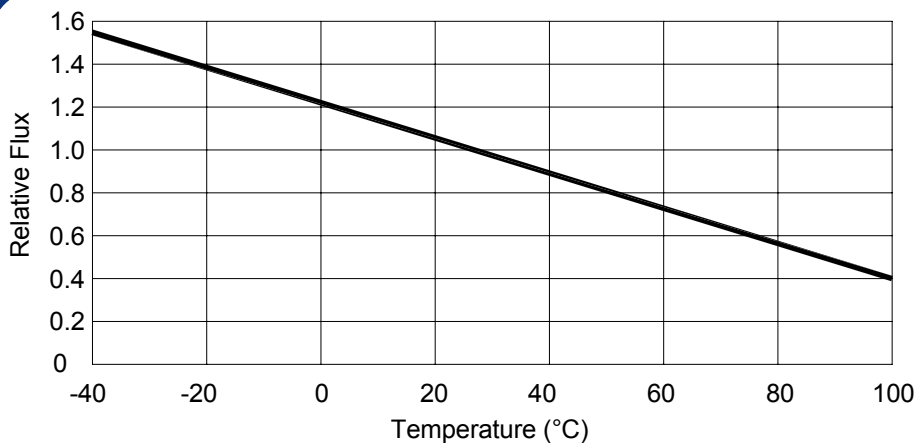
| Part # BL-21A0-0121 | Symbol    | Min | Typical | Max | Unit |
|---------------------|-----------|-----|---------|-----|------|
| Wavelength          | $\lambda$ | 613 | -       | 623 | nm   |
| Voltage*            | $V_F$     | -   | 6.69    | -   | V    |
| Drive Current       | $I_F$     | -   | 2.80    | -   | A    |
| Power*              | P         | -   | 18.73   | -   | W    |
| Luminous Flux*      | $\Phi_V$  | 168 | 348     | -   | lm   |
| Thermal Resistance  | $T_R$     | -   | 2.25    | 3   | °C/W |

\*Note 1. Optical and Electrical specifications are given for the specified drive current at a 25°C junction temperature.

## Typical Beam Pattern



## Luminous Flux with Junction Temperature



## Notes

### ATTACHMENT RECOMMENDATIONS

Lamina's BL Series Light Engines are configured with solder pads compatible with Sn63 or Sn62 solder. As with many electrical devices, non-acid RMA type solder flux should be used to prepare the solder pads before application of solder. If attachment is performed with a soldering iron, care must be taken to minimize heat transfer to the die and minimize leaching of the solderable pads.

### ASSEMBLY RECOMMENDATIONS

Lamina's BL Series Light Engines, are designed for attachment to heatsinks with conductive epoxy or screw down for flange mount devices with thermal grease in the joint. In limited cases, thermal transfer tape can be used, but will generally result in higher than desired thermal resistance creating excessive heat and reducing light output and die life.



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