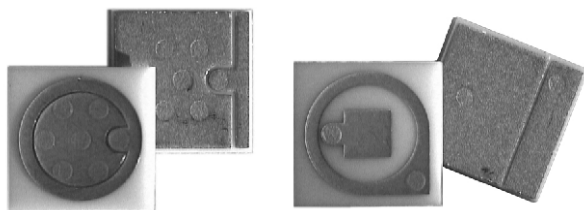


## Ceramic Submount for High Power LED



The LSUB series substrates are ceramic LED package bases designed to provide thermal management for high power (> 1 W) LED devices; the LSUB is designed to minimize the thermal resistance between the die junction and the package termination. The LSUB's enhanced thermal management enables a lower junction temperature and increased efficiency and reliability compared to other technologies. In addition to the increased brightness, the lower junction temperature results in better color uniformity.

The LSUB is available in two configurations; in the standard configuration the LED die is mounted directly over filled vias and an offset version where the filled via is located to the side of the die pad. The standard configuration is designed for the attach methods including conductive epoxies and thick solders (greater than 12  $\mu\text{m}$ ) while the offset configuration is designed for thin eutectic solder layers in the 2  $\mu\text{m}$  to 3  $\mu\text{m}$  range. An additional benefit of the standard configuration is the pad size is large enough to accommodate a parallel diode for ESD protection.

The LSUB is available singulated as individual die or in square arrays. Additional LED configurations and form factors available upon request.

### FEATURES

- Ultra-low thermal resistance
- Eutectic or epoxy LED die attach pads
- Surface-mounted component assembly

### APPLICATIONS

- High power LED for automotive, industrial and home applications
- High power laser diodes for industrial applications

### GENERAL SPECIFICATIONS

|                                              |                                     |
|----------------------------------------------|-------------------------------------|
| Substrate Material                           | Alumina 99.6 %, Alumina 96 % or AlN |
| Conductor Material                           | Copper                              |
| Conductor Thickness                          | 5 $\mu\text{m} \pm 10 \%$           |
| Substrate Thickness                          | 25 mil (0.635 mm)                   |
| LED Die Size                                 | 40 mil x 40 mil (1 mm x 1 mm)       |
| Operating Temperature ( $^{\circ}\text{C}$ ) | - 55 to + 125                       |
| Storage Temperature ( $^{\circ}\text{C}$ )   | - 55 to + 125                       |
| Die Bond Pad Metallization                   | Ni/Au or 80 %/20 % AuSn over Ni/Au  |

### TYPICAL THERMAL RESISTANCE <sup>(1)</sup> (K/W)

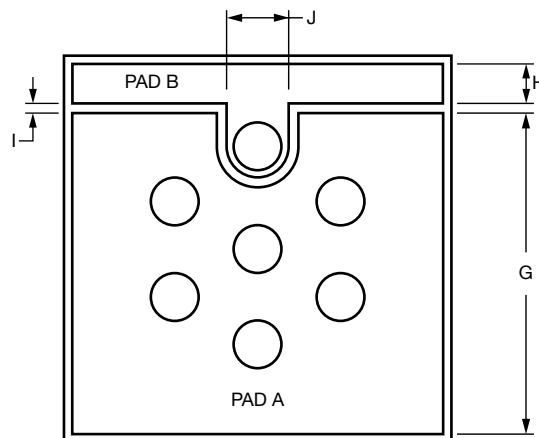
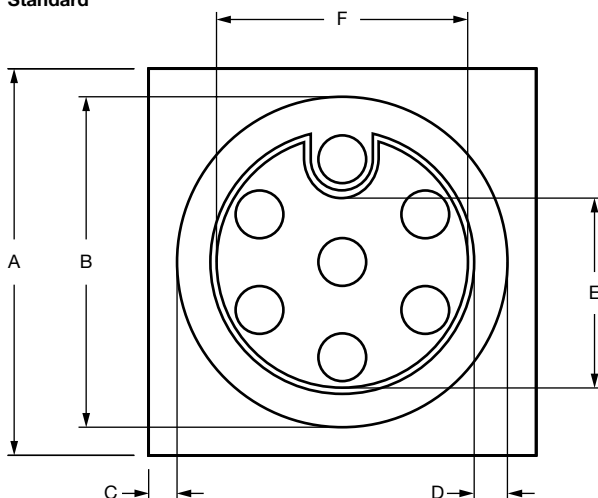
| SUBSTRATE        | STANDARD | OFFSET |
|------------------|----------|--------|
| AlN              | 3        | 5      |
| Alumina (99.6 %) | 6        | 8      |
| Alumina (96 %)   | 10       | 12     |

#### Note

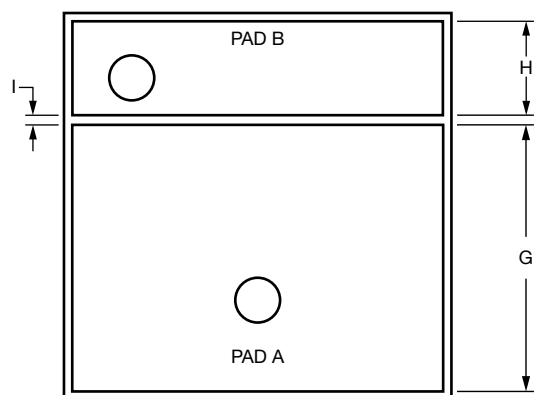
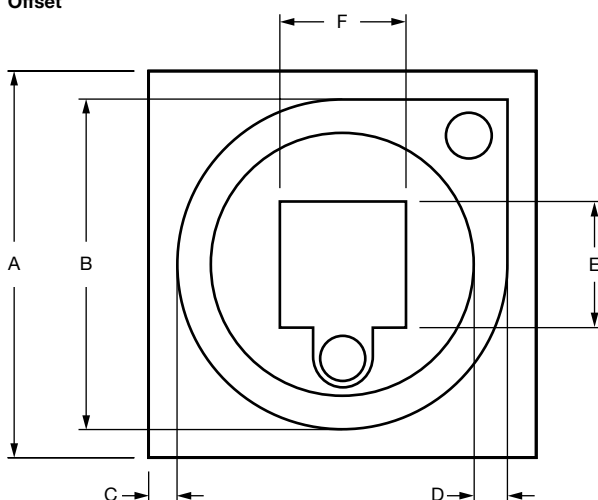
<sup>(1)</sup> Thermal resistance between die pad and package termination (anode)

# DIMENSIONS

Standard



Offset



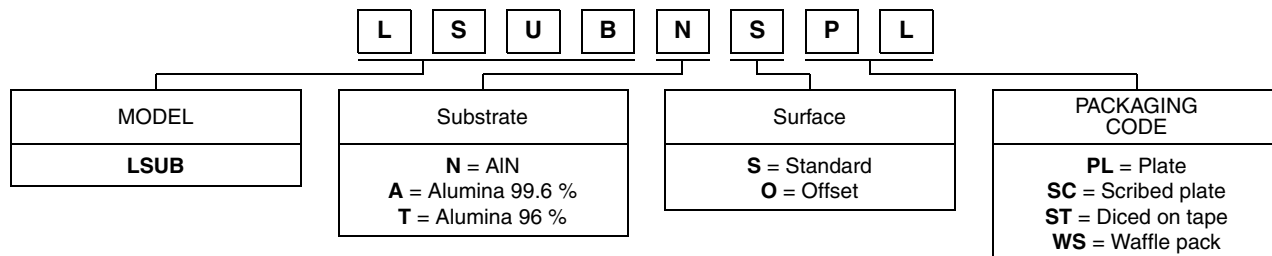
## DIMENSIONS in inches (millimeters)

| DIMENSION | STANDARD      | OFFSET        |
|-----------|---------------|---------------|
| A         | 0.138 (3.500) | 0.138 (3.500) |
| B         | 0.118 (3.000) | 0.118 (3.000) |
| C         | 0.010 (0.254) | 0.010 (0.254) |
| D         | 0.012 (0.300) | 0.012 (0.300) |
| E         | 0.068 (1.727) | 0.045 (1.143) |
| F         | 0.090 (2.286) | 0.045 (1.143) |
| G         | 0.114 (2.896) | 0.095 (2.413) |
| H         | 0.014 (0.356) | 0.033 (0.838) |
| I         | 0.003 (0.076) | 0.003 (0.076) |
| J         | 0.016 (0.406) | n/a           |

## GLOBAL PART NUMBER INFORMATION

Global Part Number: **LSUBNSPL**

Global Part Number Description: **LSUB**, AIN, standard, plate



## LAYOUT CONSIDERATIONS

The thermal performance of the LSUB package is strongly influenced by PCB layout. The package ensures that heat flows from the die junction to the package termination (anode); however, the heat must be carried from the termination by the PCB layout. Special consideration must be given to insure minimal thermal resistance between the package termination and the ambient. The following guidelines should be considered.

- The filled vias in the standard configuration can be up to 0.5 mils lower than the surrounding surface, when mounting dies on top of these vias care should be taken to use an attachment method capable of overcoming this surface profile.
- The traces that carry current to and from the component also carry the heat away from the component. These traces should be made as wide and thick as possible to help spread the heat on the PCB.
- The LED die should be kept as far as possible from other hot components such as DC circuitry, FETs and inductors.
- Heat sink elements are to be positioned as closely as possible to the LED package.



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