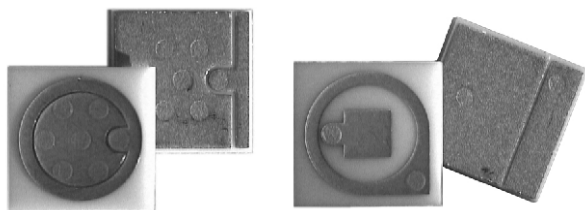


## Ceramic Submount for High Power LED



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)

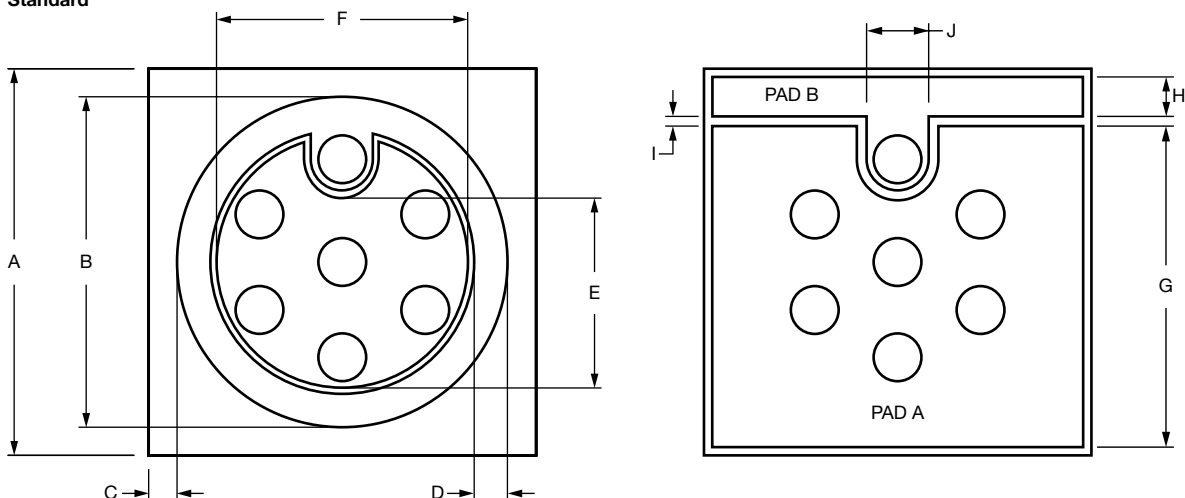
SUBSTRATE	STANDARD	OFFSET
AlN	3	5
Alumina (99.6 %)	6	8
Alumina (96 %)	10	12

#### Note

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

# DIMENSIONS

Standard



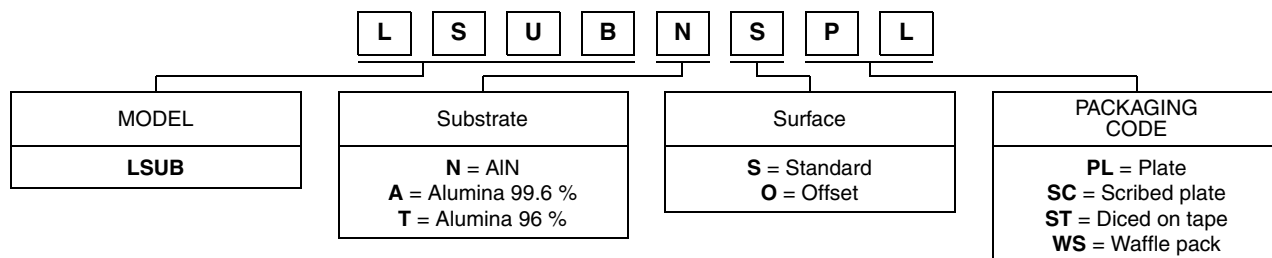
Offset

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.



## Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.