VCSEL Standard Product Packaging Options

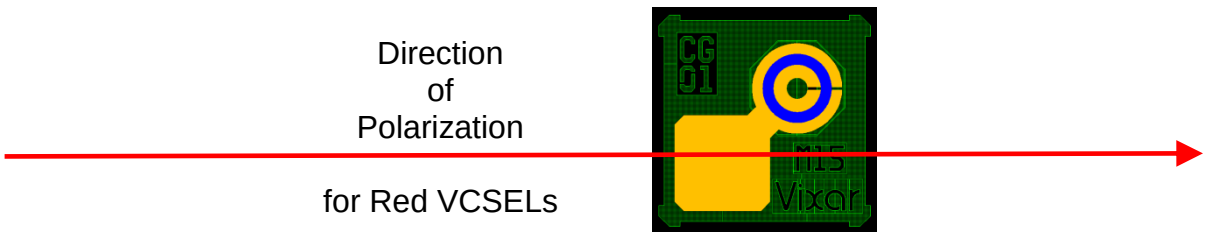
Package Designator	Package Type
A	Bare Die, No Package
B	TO-46 4L (non-hermetic)
G	TO-46 4L (hermetic)
BC	TO-46 6L TEC (non-hermetic)
GC	TO-46 6L TEC (hermetic)
D	PLCC2 3020
K	PLCC2 2835
O	PLCC2 5052
R	Die on Tape Ring
Z	Custom Package

General Notes for Vixar Packages:

1. Vixar's VCSELs are very sensitive to Electrical Over Stress (EOS) events (which include ESD). VCSELs can be damaged with EOS events of 200V or less (IEC61000-4-2, human body contact model). For applications that require additional protection against EOS events, Vixar can include a bi-directional back-to-back ESD protection diode that protects the VCSEL against ESD events of 1 KV or higher. Contact Vixar for details regarding ESD protection options for your application.

2. Package Designation A is for bare die. Vixar's single aperture die are qualified for die attachment processes using silver filled conductive epoxies or adhesives. For high power arrays Vixar uses lead free solder for die attachment to special packages. (See note 6 for special considerations with regard to polarization.)

3. Vixar's VCSELs emit a linearly polarized diverging beam. Vixar sends documentation with each shipment that indicates the direction of polarization with respect to the package. For example "red" VCSELs (wavelengths from 670 nm to 690 nm) the direction of polarization with respect to the die is as follows:



4. Vixar's 795 nm & 895 nm VCSELs also emit a linear polarized beam. Contact Vixar for details regarding the direction of polarization for these devices. Polarization of these devices can be impacted by die attach process (see Note 5) and encapsulants (see Note 8).

5. Vixar's "red" VCSELs (wavelengths from 670 nm to 690 nm) can be die attached using conductive epoxy with curing temperatures up to 175°C without impacting the polarization state. However, when curing 795 nm &

895 nm die, Vixar recommends using Epotek H20E epoxy cured at 85°C for 3 hours since higher temperatures and/or faster cure times induce stresses that affect polarization.

6. Package Designation B is for a standard TO-46 package with 4 leads. For small prototype orders these are assembled at Vixar's lab and the window caps or lids are attached in air using an epoxy. Thus these are not hermetic and should not be used for any long term reliability or environmental stress testing. For larger production volumes, the TO-46 packaged devices are sealed in nitrogen and tested for hermeticity. The TO-46 package is a proven solution that is robust.

7. Package Designation D is for a Plastic Leadless Chip Carrier (PLCC2) type package. This is manufactured in very high volumes (e.g., for packaging LEDs) and are therefore very low cost packages when assembled in high volumes. The open cavity of the package is filled with a clear optical chip encapsulant material to protect the VCSEL die and wire bond. These packages are not recommended for 795 nm or 895 nm devices (see Note 5).

8. Vixar uses an optical encapsulation material for the PLCC packages. Since the PLCC is a surface mount type package, it is typically solder reflowed to a PCB (or flex circuit) using industry standard solder processes. When using the higher temperature Pb-free (RoHS compliant) SnAgCu (SAC) solder processes with peak reflow temperatures of 250 ^{o}C, industry standard IPC JEDEC J-STD 033B should be followed for moisture sensitive packages (see note 10). Vixar has qualified the PLCC2 package for SAC reflow, including the optical encapsulant. Contact Vixar to discuss the details of the application and processing of the PLCC packages.

9. The PLCC plastic package is Class 3A moisture/reflow sensitive parts per IPCJEDEC J-STD-033B. Vixar requires that these parts be pre-baked at 125 °C for 12 hours prior to solder reflow. After pre-baking, they should be solder-reflowed to the PCB/Flex within 72 hours, provided that they are stored at ≤30°C/60% relative humidity. An exception is when PLCC2 packages are ordered at minimum order quantities of 3K pcs. In this case the packages are shipped on tape in reel form and sealed in a moisture barrier bag (MBB) with desiccant. After removal from the MBB the packages should be solder reflowed to the board within 72 hrs, otherwise the packages should be baked.

10. Package Designation BC is a TO-46 package that incorporates an internal TE-Cooler for either temperature stabilization (or wavelength stabilization) or temperature sweep (wavelength sweep) applications. This package is a proven hermetic package and an ESD protection diode can be included, in addition to the thermistor and TEC components. However, the electrical isolation between TEC, laser, and thermistor is compromised (i.e. fewer leads requires that electrical connections share leads).

2950 Xenium Lane, Suite 104
Plymouth, MN 55441
763-746-8045
email:info@vixarinc.com
website: www.vixarinc.com