Applied Diamond, Inc

# Heat Sink—Case Study Brief

**Application**- Energy distribution for laser diode submount

**Problem**- The company had used AlN as a heat sink in their other laser projects, which produced thermal conductivity of <100w/mk

The new product was designed with diamond to provide a greater level of thermal conductivity

The level of thermal conductivity necessary was not known, but some diamond did not enable the laser to maintain pulse over a wide range. There was a loss of optical power at the end of the pulse due too the heat-pulse droop

**Solution** – Applied Diamond, Inc. provided samples of metalized diamond heat sinks with ranges of thermal conductivity:

700 w/mK
1000 w/mk
1800 w/mk

The customer selected the heat sink that best met their needs and provided the highest value for their specific application, 1000 w/mK. The diamond enables the heat to stay away from the chip.

**Finding**- CVD Diamond can be grown to have varying levels of thermal conductivity. The effectiveness of the thermal protection is based on a variety of factors including diamond growth rate, as well as metallization and the effectiveness of the ground.

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