TECH NOTE

Temperature Control Range of the LDM-4409

PURPOSE

The LDM-4409 brochure states that a 25W heat load can be controlled over a temperature range of 10ºC to 85ºC, but this is only for short term experiments such as LIV testing. This technical note will look at longer term temperature control of the LDM-4409.

BACKGROUND

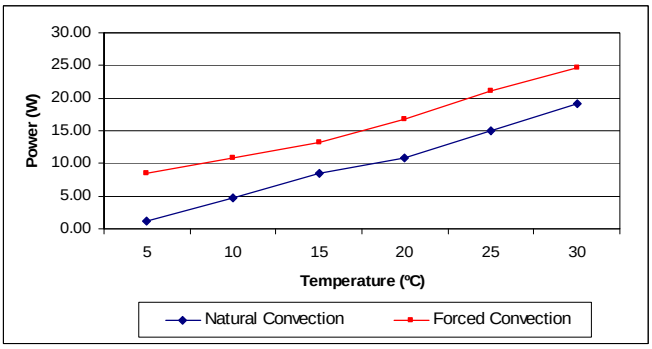
The LDM-4409 is a temperature controlled mounting fixture designed for C-Mount (Block) laser diodes with current input up to 10A. A 7.4A, 14.6V TE module is used behind the cold plate; the heat is then removed via a large finned heat sink and built-in 5V fan.

MEASUREMENT SETUP

Testing was performed in a typical laboratory environment at 20ºC. An LDX-3232 high compliance voltage laser diode driver was used to control a power resistor that was mounted to the cold plate. An LDT-5980 high power temperature controller was used to maintain temperature of the cold plate; temperature feedback was from a calibrated thermistor embedded in the LDM-4409 cold plate.

At each temperature a maximum thermal load was determined. For this technical note a maximum thermal load is defined as less then 0.5A of TEC current drift over 5 minutes. After each test the LDM-4409 was allowed time to return to room temperature in order to remove residual heat remaining in the heat sink. Using this testing method two tests were run one using natural convection (not using the built-in fan) and the other using forced convection (using built-in fan).

The following graph shows the results of the temperature control range test.



In order to use this data you will need to know a few specifications on your laser diode such as operating current (I), operating voltage (V), and efficiency (η) of the laser diode. By using the following equation you can calculate the amount of heat that the LDM-4409 will need to dissipate.

$$P_{\text{Heat Sink}} = (1-\eta)VI$$

Example: I = 8A, V = 2V, η = 0.3

$P_{\text{Heat Sink}}$ = 11.2W

By using the graph you could control the temperature down to 10ºC using forced convection and only down to 20ºC using natural convection.

CONCLUSION

This technical note is a guideline. Higher heat loads at lower temperatures maybe obtained but only over a limited time. For more information on thermoelectric temperature control of laser diodes please consult our Application and Technical section on our website at http://www.ilxlightwave.com/navpgs/app-tech-notes-white-papers.html.