TECH NOTE

# Temperature Controlled Mini-DIL Mount

## PURPOSE

This technical note details results of preliminary temperature range and ramp testing on a special modification of the LDM-4982 mount.

This mount is designed for increasingly popular high power mini-DIL packages. The laser chip is capable of quite high power output, dissipating as much as 1.4W (electrical) and needs adequate heat sinking to perform at rated power. Some mini-DIL (8-pin) packages are equipped with an internal thermistor.

The mount is based on the LDM-4982 chassis, which is equipped with a 14-pin ZIF socket for DIL and mini-DIL lasers. Although the 4982 mount has a heat sink built in to the pedistal, the ZIF socket is plastic and does not afford any heat sinking when a mini-DIL package is mounted. The special mount incorporates a redesigned heat sink with a “diving board” projecting over the center of the ZIF socket.

The new mount is shown in Figure 1. Notice the “diving board” over the ZIF socket is wrapped in thermally conductive / electrically insulative tape, and is the thermal connection between the laser package and the TEC in the mount. A 10k thermistor is epoxied in a recess in the underside of the diving board, and is referred to as the “external thermistor”.

## MEASUREMENT SETUP

An ILX Lightwave LDC-3916374 controller module was used to drive the laser and monitor one of the thermistors. An LDC-3916558 TEC module was used to monitor the internal thermistor and drive the TEC module in the mount. A total of six tests were run on the prototype part at temperatures from -5°C to +85°C. The results from those tests are shown in this report. The first set of tests monitored the laser temperature but used the thermistor in the diving board to regulate the temperature. The second set of tests regulated the temperature based on the thermistor in the laser package.

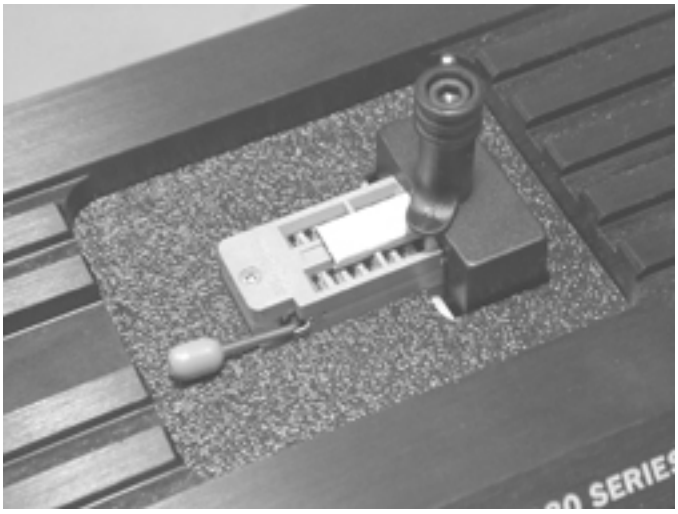

Figure 1 – Cooled Mini-DIL Mount Socket

Three graphs are shown; in all cases, the temperatures shown in the graphs are from the laser internal thermistor. Each test was run twice; once with the TEC controller referencing the external thermistor and again wit hthe controller referencing the laser internal thermistor. In some cases, there are significant differences in performance depending on which thermistor is used as the reference. For these tests, the current limit is 3A and the gain is set to 40. The laser was driven at 25 mA to have some heat dissipation from the load.

## RESULTS

Figure 2 shows the results of the initial ramp down from 25°C to -5°C. Note that the final laser temperature is shifted by about +2°C if the controller is referenced to the external thermistor.

Figure 3 shows the ramp up from -5°C to 75°C. The chip temperature stabilized after approximately 210 seconds.

Figure 4 shows the ramp down from 75°C to 25°C. The temperature stabilized in approximately 160 seconds.

Finally, the temeprature was cycled from -5°C to 85°C approximately 10 times, and the thermal pad inspected for delamination or signs of degradation. No signs of damage or degradation were noted after the ten cycles were complete.

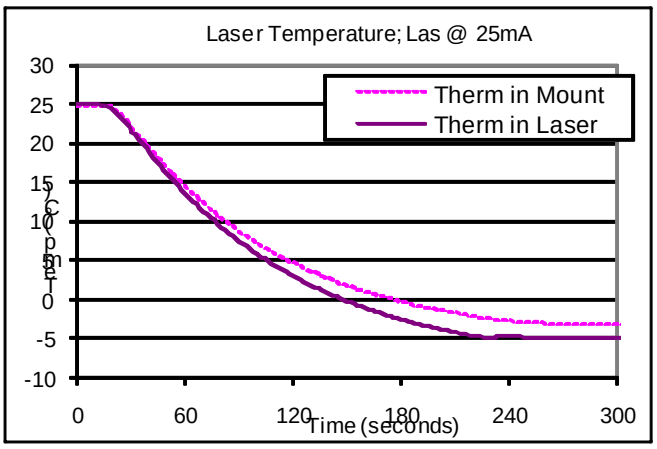


Figure 2 – Initial Ramp Down from 25°C to -5°C

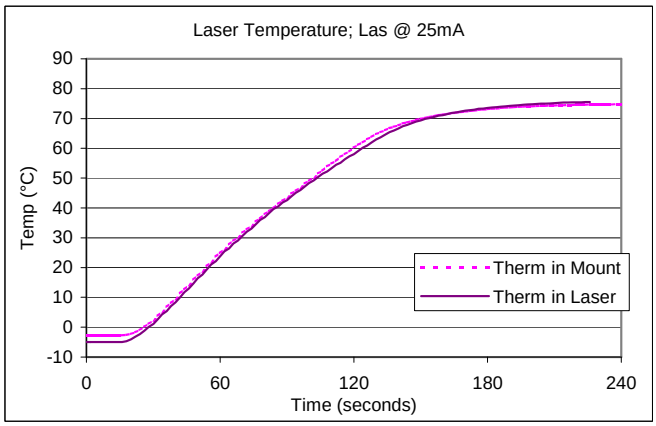


Figure 3 – Initial Ramp Up from -5°C to 75°C

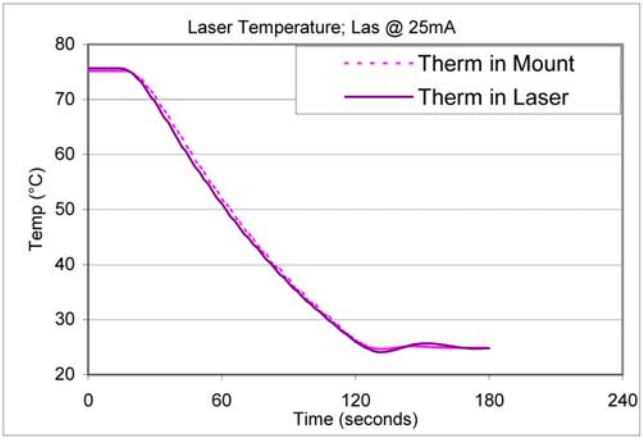


Figure 4 – Initial Ramp Down from 75°C to 25°C