

## TEC Based Thermostat System for High-power Semiconductor Laser

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### Abstract

Since TEC has the disadvantage of limited power and low efficiency, the cooling effect is not as effective as expected when used to control the temperature of high -power laser diodes. In this paper, theories and principles of selecting TEC according to the thermal load of LD were determined and methods of designing high-power heat sink were set out by theoretical research, software simulation and experimentation. Experimental result revealed that the system designed with the method could successfully control the temperature of a 30 W LD when the target temperature was between 20-40 t and ambient temperature was -40-55 t .The temperature accuracy was 0.5 t. This result shows that the method can increase the system efficiency and it helps when designing high-power LD temperature controlling system.

Key words : Heat sink; LD; Semiconductor cooler; Simulation