APPLICATION NOTE AN1001
Heat Sinking High Current Solid State Controls

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Infitec offers several types of solid state output time delay relays and phase control units with output ratings up to 25 Amperes. When using these devices it is usually necessary to mount the devices to a heat sink.

Infitec devices with the high current outputs are specified at a 65 degree C maximum operating temperature. This allows the device heat sink plate temperature to rise to a maximum of 85 degrees C.

When using these devices at more than a few amperes or at higher ambient temperatures, it is necessary to add an additional heat sink to insure the maximum heat sink plate temperature of 85 degree C is not exceeded.

Calculating the proper Heat Sink Size

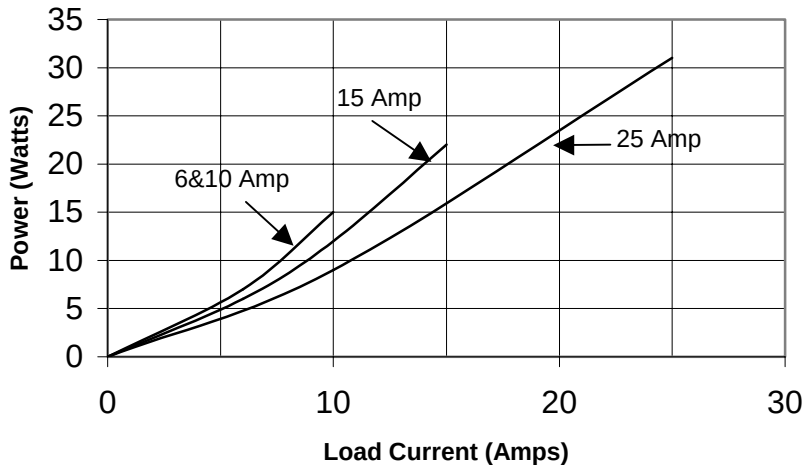
A) Calculate the Heat Sink thermal resistance:

1. Determine the maximum load current for the application.
2. From Figure 1, determine the power (P) dissipated by the device.
3. Determine the maximum ambient temperature (T) in degrees C for the application.*
4. The heat sink should have a thermal resistance of less than:

Thermal resistance (R) <= (85-T) / P (degrees C per watt)

5. The heat sink:
   a. If R is greater than 18 no additional heat sink is required.
   b. If R is between 8 and 18, a flat aluminum plate of 3 to 5 square inches per amp of load current should be adequate. (use the 5 multiplier for higher ambient temperatures.)
   c. If R is less than 8, an extruded heat sink of less than the value calculated above will prove to be the most convenient. Several manufacturers have a wide variety available to meet your needs. Wakefield Engineering and Aavid/Thermaloy are among the most prominent.
   d. The above is an estimate. Temperature measurements on the unit should be used to verify the heat sink design.
6. A thermal compound must be used between the mounting base and the heat sink.

Figure 1. Maximum Power Dissipation



* Temperature Conversions: C=(F-32)/1.8 or F=(1.8*C)+32