9001 Series Over Current Detector

Recommended Mounting and Interface Notes

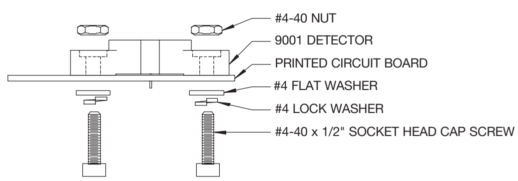
Introduction

The 9001 over current detector is designed to protect power electronic circuits by signaling when current in the circuit has exceeded the nominal detector trip point. It is intended to be mounted on a printed circuit board and provides an open collector output for connection to the circuit's control circuitry. In order to ensure that the detector operates reliably and accurately, the end user must mount and connect the detector properly in the circuit assembly. This note provides recommended guidelines for mounting and connecting the detector.

Recommended Mounting:

The 9001 is designed to be fixed to a printed circuit board (PCB) with two 4-40 machine screws using lock washers. These screws should be positioned with the heads below the PCB and the threads running through the PCB and the two 0.115" mounting holes of the detector. Lock and flat washers should be used as shown below (Figure 1).

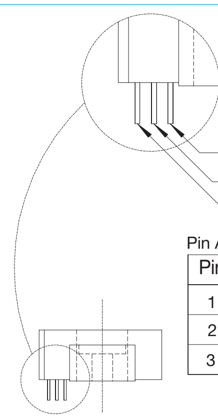
Figure 1



The detector body has two nests molded above the 0.115" holes designed to capture 4-40 nuts. If the application environment is harsh, in which high levels of vibration are expected, a thread locking adhesive should be applied to the mounting screw threads.

The output pins V_O (0), GND (-), and V_S (+) are shown in Figure 2 and are designed for soldering to through holes on a PCB. The conductor carrying the current to be sensed must pass through the aperture of the detector. If a wire is used, the wire can be soldered to a pad on the PCB located within the aperture of the detector. Another option is that the wire can be routed through the aperture and then through a clearance hole in the PCB to be terminated to another pad on the PCB or point within the assembly. In either case, care should be taken in the design to ensure that no significant force is exerted on the detector by the current conductor. A third is to use an optional busbar provided by E-T-A that routes the current through the aperture of the detector. The busbar is designed to straddle the detector and provides a simple means to route current on the PCB through the detector. In this case, a pad would be located on the PCB along the outer perimeter of the detector. A second pad would be located within the aperture.

Figure 2



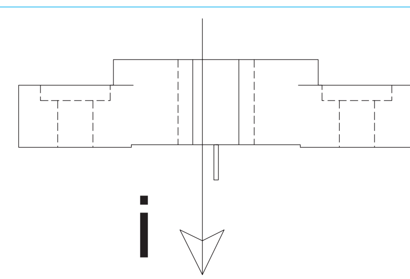
Pin Assignments

Pin	Desc.
1	V_O
2	GND
3	V_S

Electrical Interface:

There are two sets of connections which must be made with the detector. The "input" set of connections consists of routing the current to be sensed through the aperture of the detector. In addition to the notes listed under mounting, the correct sensed current polarity must be observed. Since the detector is unidirectional, the detector can only sense over currents of one polarity. The proper polarity is defined by viewing the detector as if it were mounted on the PCB. Positive current is defined as current which flows down through the aperture of the detector to the PCB (Figure 3). The detector will only trip if a positive current exceeds the trip point.

Figure 3



The output of the detector is not designed to directly interface with the power transistors in the power circuit. Typically, it will interface with the control logic circuit, and this circuit will decide when and for how long the power device should be turned off. The output set of connections is made via three pins labeled V_O, GND, and V_S on the datasheet. These pins are also labeled 0, -, and + on the top of the device. V_S and GND are power supply connections for the detector. The detector will operate with DC voltages of 3.8 to 24 VDC. However, since most power circuits generate significant noise, it is recommended to operate at a supply voltage which provides significant margin from either extreme. As shown in Figure 4, a 12 VDC supply is ideal. Additionally, a 0.1 μF AC decoupling capacitor (C) should be used to provide good noise decoupling to the supply pins. The output pin, V_O, is an open collector output capable of sinking 20 mA. The output is normally open and goes low when the detector trip point is exceeded. The typical interface will have a 5.1 kΩ pull up resistor (R) connected from the output to the supply voltage of the interface circuitry. A capacitor can be connected from GND to the output to maximize noise immunity. If a capacitor is used, its value should be minimized so that the output of the detector continues to switch quickly to provide maximum protection against over current events.

Figure 4