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IMPORTANT

A225 INPUT AND OUTPUT PROTECTION

This note is intended as a guide in the use of the A225 to prevent damage due to overstress of input or output circuitry.

INPUT PROTECTION

Input protection is discussed on page 3 of the A225 specifications. Please read this section carefully. The A225 input connects directly to the gate of a sensitive field effect transistor (FET). In general, any large, rapid change in voltage in the detector circuit can cause excessive input currents to flow and must be avoided. Such transients can be caused by the breakdown of the detector or the coupling or filter capacitor. Also, raising or lowering the detector bias voltage too quickly can have the same effect. The following procedures should be followed to ensure safe operation of the unit:

1. Check the circuit for potential break down problems, such as inadequate capacitor or detector voltage ratings and areas where corona discharge or direct shorts might occur.
2. Make sure that detector bias is applied slowly enough that excessive currents will not flow through the coupling capacitor into the input. This can be achieved by using a filter with a sufficiently long time constant.
3. If noise considerations permit, use a protection network at the input as described in the specification sheet. Use fast, low capacitance diodes. The Siliconix PAD-1 diode is a JFET connected as a diode and works well in this application. Use a series resistor if possible.
4. To minimize the energy which can be dissipated at the input in the event of a breakdown, do not use a coupling capacitor of much larger value than necessary. 1 nF is adequate in many applications.

In order to maximize pulse drive capability, the output of the A225 is not current limited. This is not normally a matter of concern because external capacitive coupling protects the output state from excessive current flow in the event of a short or an attempt to drive a low impedance load, such as a terminated 50 ohm line. Such capacitive coupling normally must be used anyway between the A225 and subsequent circuitry to remove the D.C. component from the output signal. The A225 output may be damaged by shorting to ground or connection to a low impedance node of the circuit. The following guidelines should help prevent such damage:

1. Place the output coupling capacitor close to Pin 8 so the direct output has minimum exposure to accidental shorts.
2. If it is desired to use the direct output, without capacitive coupling, place a 100 ohm resistor in series with the output close to Pin 8. This will prevent damage in the event of a short.
3. If connection is made directly to Pin 8 (for example, to view the direct output with an oscilloscope), take care to avoid shorts.
4. When using the PC25, the direct output is available at a post (“OUTPUT”). Care should be exercised to prevent shorts, and capacitive coupling should be used to connect to external circuitry.