

SIMPLE SMOKE DETECTOR

■ PRADEEP G.

This simple smoke detector is highly sensitive but inexpensive. It uses a Darlington-pair amplifier employing two npn transistors and an infrared photo-interrupter module as the sensor. The circuit gives audio-visual alarm whenever thick smoke is present in the environment.

The photo-interrupter module (H21A1) consists of a gallium-arsenide infrared LED coupled to a silicon

phototransistor in a plastic housing. The slot (gap) between the infrared diode and the transistor (see Fig. 1) allows interruption of the signal with smoke, switching the module output from 'on' to 'off' state.

The circuit of the smoke detector is shown in Fig. 2.

When the smoke enters the gap, the IR rays falling on the photo-transis-

tor are obstructed. As a result, the phototransistor stops conducting and the Darlington-pair transistors conduct to activate the buzzer and light up LED1.

When the smoke in the gap is cleared, light from the IR LED falls on the phototransistor and it starts conducting. As a result, Darlington-pair transistors stop conducting and the buzzer and LED1 turn off.

For maximum sensitivity, adjust presets VR1 and VR2. VR1 is used to control the sensitivity of the photo-interrupter module, while VR2 is used to control the sensitivity of Darlington-pair transistors. ●

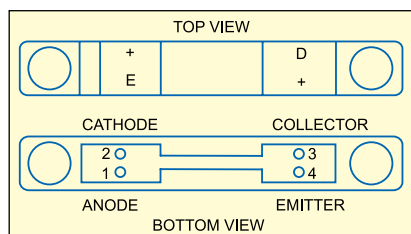


Fig. 1: Top and bottom views of the photo-interrupter module (H21A1)

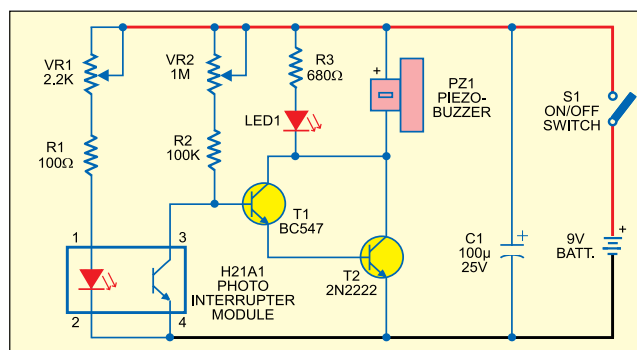


Fig. 2: Schematic of the smoke detector