

## Inverters and Comparators

**Aim:** To study inverter and comparator circuits using transistor and op-amp circuits.

### 1. Inverter

Set up the transistor inverter circuit shown in Fig. 10.1 using the given NPN transistor, and connect the output  $V_o$  and the input voltage  $V_i$  to channels 1 and 2 of the CRO respectively. Verify the basic inverter operation by applying  $V_i = 5V$  P-P square wave from FG and observe the corresponding waveform at  $V_o$ .

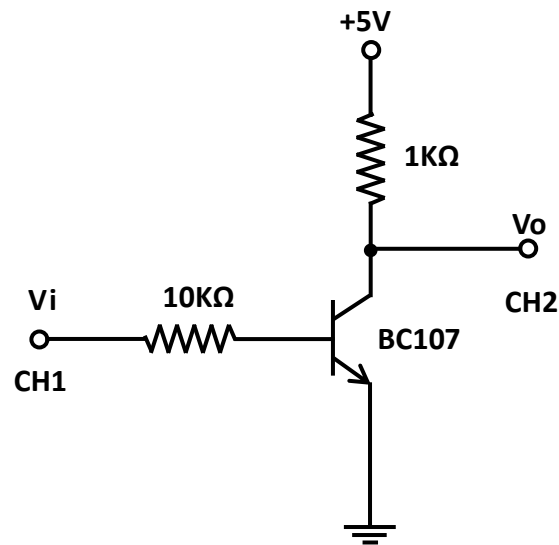


Fig. 10.1: Transistor as inverter

## 2. Comparator

Connect inverting and noninverting comparator circuits using op-amps as shown in Figs. 10.2 and 10.3 respectively and plot input and output curves.

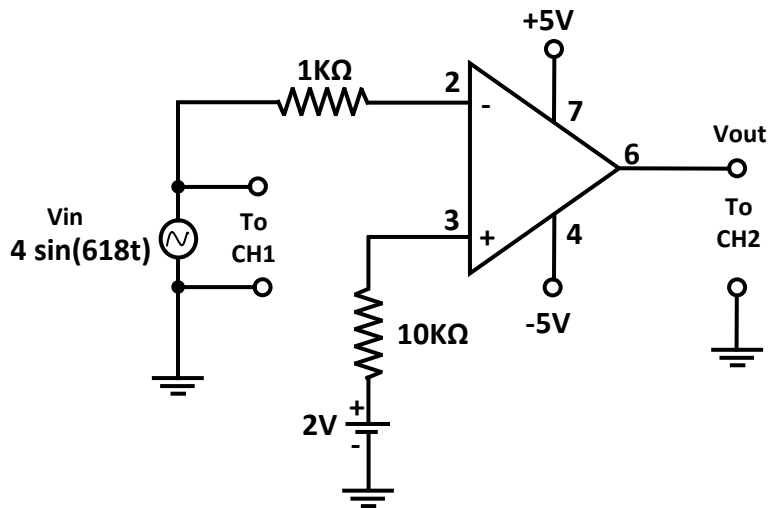


Fig. 10.2: Inverting comparator

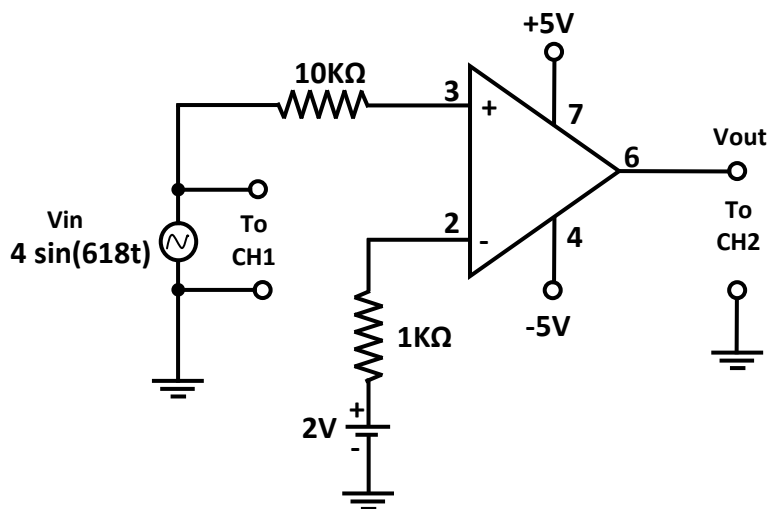


Fig. 10.3: Noninverting comparator

### 3. Three level LED indicator

Connect the circuit to realize a three level LED indicator as shown in Fig. 10.4. By appropriately designing the supply voltages and resistors, the circuit can glow one LED at a time. By varying the  $V_{in}$  voltage from 0V to 9V and note down the status of each LED in the form of table.

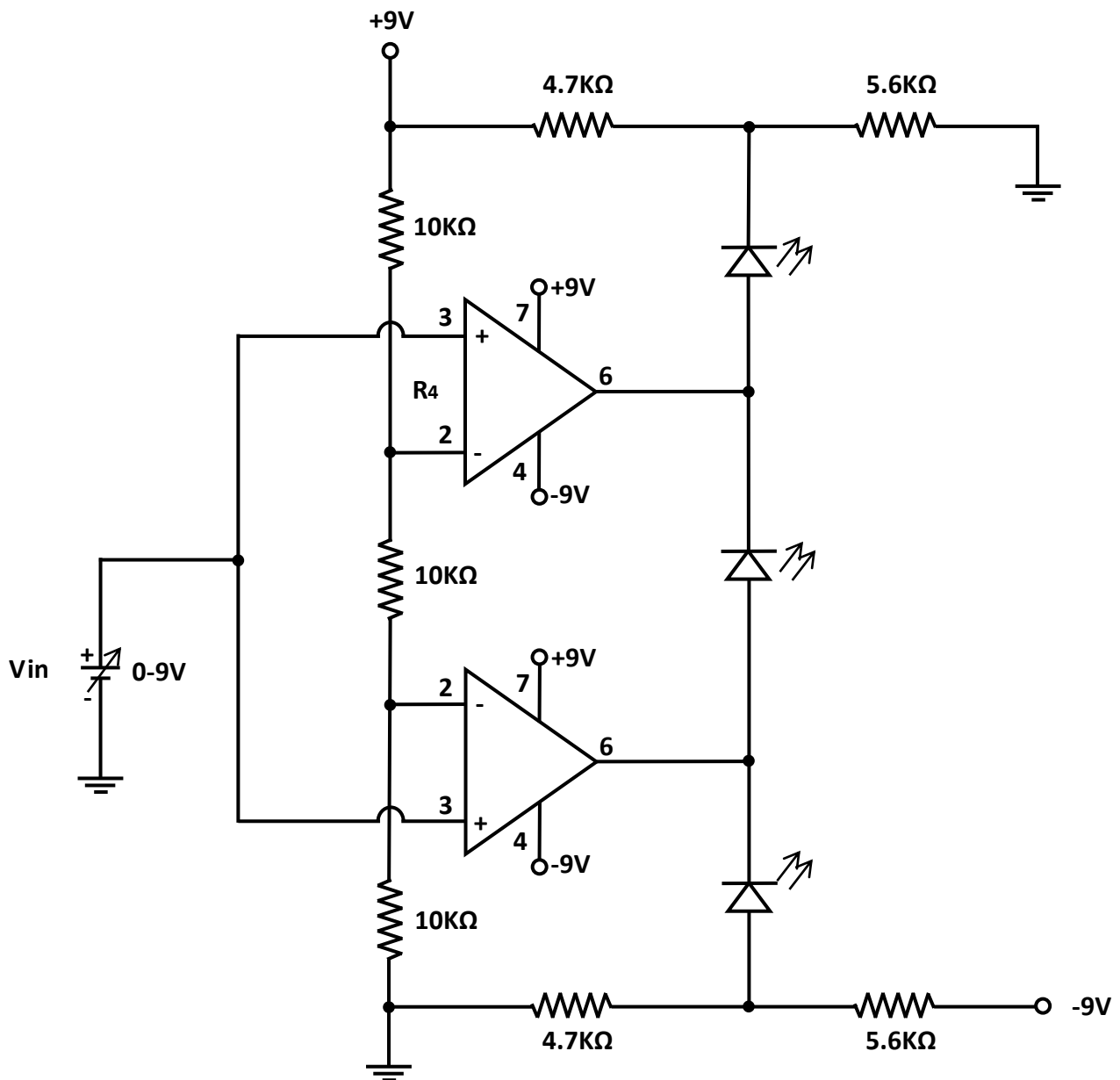


Fig. 10.4: Three level LED indicator