

## VOLTAGE/POLARITY PROTECTION CIRCUIT

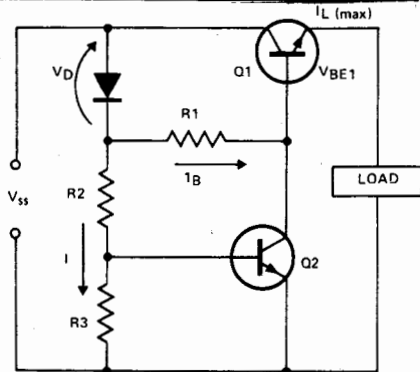
Many circuit, i.e., car radios, can be destroyed if improper voltage or polarity is applied. A simple yet effective technique using only two transistors avoids this possibility.

The circuit shown prevents accidental destruction of a load circuit caused by incorrect supply voltage or polarity. This is accomplished without shorting the supply as in SCR and zener protectors. Under normal supply voltage, Q1 is on and Q2 is off provided that:

$$R_1 \leq \frac{\beta_1 [V_D + V_{BE1}]}{I_L(\max)}$$

$$I \gg \frac{I_L(\max)}{\beta_1 \beta_2}$$

$$R_3 \leq \frac{V_{BE2}}{I}$$



NO COMPONENTS VALUES ARE SHOWN DUE TO THE NUMEROUS CIRCUIT APPLICATIONS POSSIBLE

$$R_2 = (V - V_D)I - R_3$$

In case the supply voltage exceeds  $V$ , Q2 turns on, diverting the base current  $I_B$  to ground thus turning off Q1. In the case of wrong polarity, Q1 does not turn on due to the absence of base current  $I_B$  which is blocked by diodes  $D$ .