

# Regulated power supply is adjustable from 0 to 38 V

by Frank P. Miles  
Rochester, N. Y.

Through careful biasing of the error-sensing and the output driver for a 723C voltage regulator, a power supply that is variable from 0 to 38 volts can be designed. The stability of the circuit over both time and temperature is excellent, depending only on the internal reference of the chip and being essentially independent of output level. And finally, the circuit requires few com-

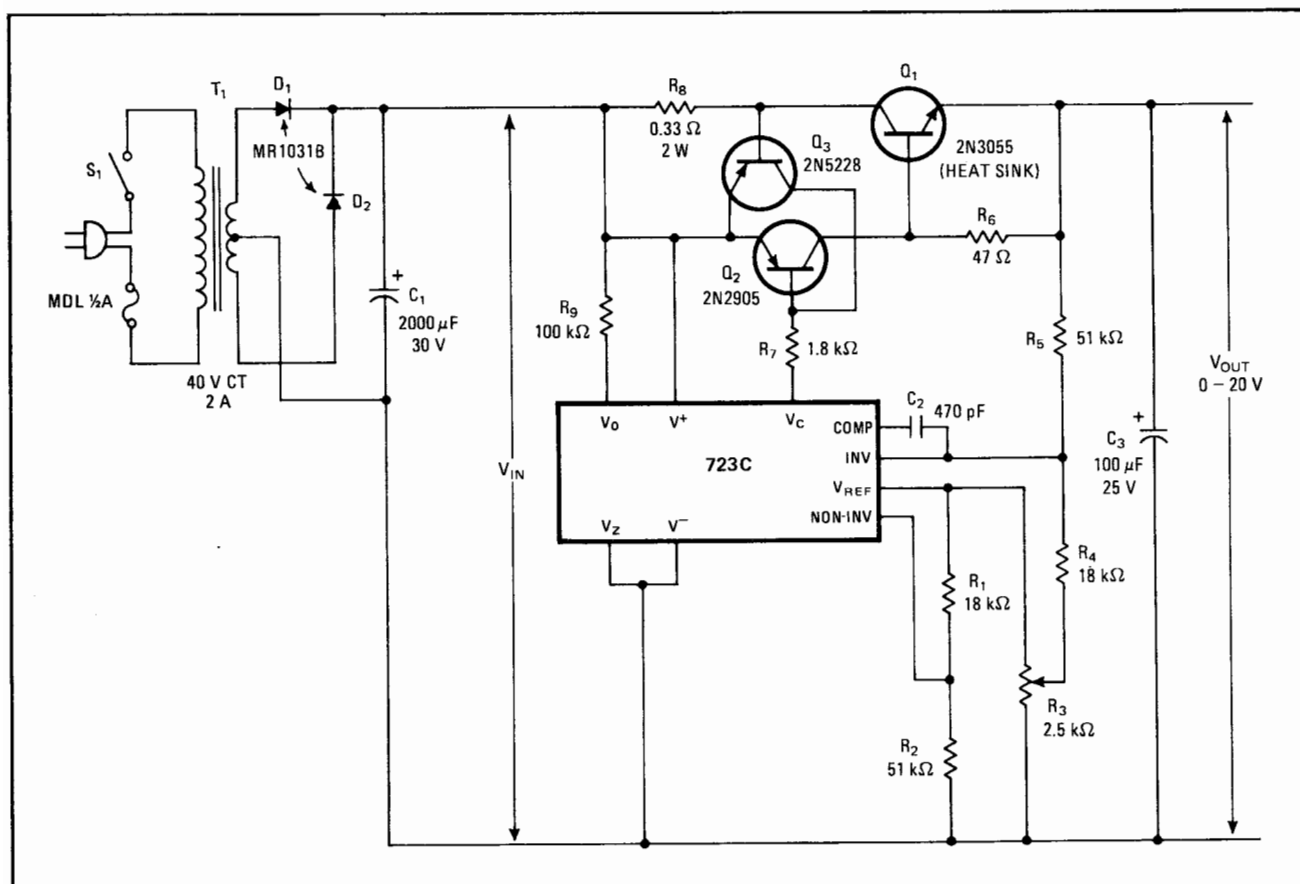
ponents; most notably, it requires no zener diodes external to the 723C.

The schematic shows how simple it is to custom-design the supply.  $R_3$  is a 2.5-kilohm potentiometer, chosen to keep the reference current below 5 milliamperes.  $R_1 = R_4$  and  $R_2 = R_5$  for best bias stability and output-range swing. The leakage-limiting resistor  $R_6$  has a value of 47 ohms; it increases the safe operating area of  $Q_1$ .

The maximum output voltage is given by

$$V_{OUT(max)} = (R_2/R_1)V_{REF}$$

where the reference voltage  $V_{REF}$ , a characteristic of the 723C, is typically 7.15 v. Resistor  $R_1$  is picked to be high enough to minimize loading of  $R_3$ , but small enough to avoid bias-current problems at the error-am-



**Regulated power supply.** Setting of  $R_3$  gives output voltage as low as 0 V, or as high as  $V_{IN}$  minus small drop across  $Q_1$ . Value of  $V_{IN}$  must not exceed 40-V limit of the 723C. Components shown here are for 0–20-V, 2-A supply.