

Switched load checks power supply response

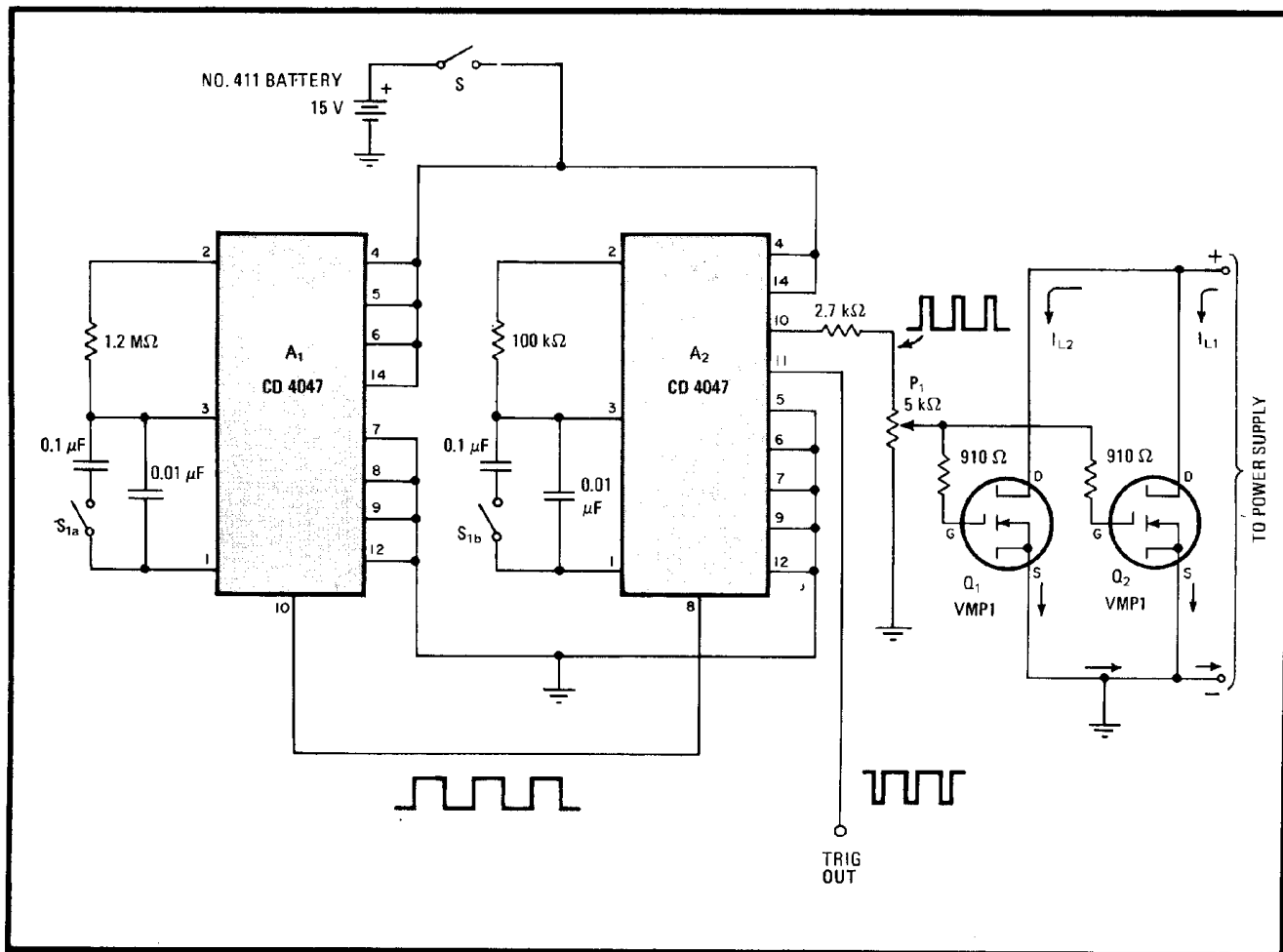
by William M. Polivka
Department of Engineering, California Institute of Technology, Pasadena

The transient response of a power supply is easily checked with the aid of this pulse loader, which periodically places a short circuit across the supply's output in order to simulate sudden load changes. Using complementary-MOS integrated circuits and V-groove MOS power transistors, the compact, self-contained unit runs on a battery, so that it presents no ground-loop problems to the supply under test.

As shown in the circuit for the pulsed load, astable

multivibrator A_1 and one-shot A_2 set respectively the frequency and the width of the pulses that switch on load transistors Q_1 and Q_2 . S_1 selects either of two combinations of frequency and width—in this case, 2 hertz at 25 milliseconds or 20 Hz at 2.5 ms. Note that a low duty cycle is required to reduce heat dissipation in Q_1 and Q_2 . A trigger signal for driving an oscilloscope or other instrument to observe the supply's response appears at pin 11 of A_2 .

Potentiometer P_1 sets the point at which Q_1 and Q_2 fire, so that the magnitude of the pulsed supply current passing through the load transistors can be selected from zero to the maximum capability of the V-MOS devices. Each field-effect transistor handles 2 amperes at 12 volts, values that derate to 400 milliamperes at 60 V. Moreover, an increase in supply loading may be attained simply by adding transistors in shunt at the output of the unit, as required. □



Load dynamics. Low-cost tester, with aid of scope, finds transient response of power supply by ordering periodic increase in supply current to simulate load changes. A_1 and A_2 set frequency and width of switching waveform. $Q_1 - Q_2$ sink current proportional to setting of P_1 .