

Research Title A Study of Stability and Response in D.C.

Power Supply

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Abstract

The temperature stability of a constant voltage power supply depends on the stability of its reference voltage. In this work voltage references are studied and built to have a low temperature coefficient. A switching load that had already been tested was used to test the time response of the power supply. The difference in speeds of the error amplifier and transistor effects the response. The reference circuit built that gave the lowest temperature coefficient uses a LM336 reference voltage integrated circuit, and a LM308H buffer. A constant voltage power supply was built in which the output voltage varies from 0-50 volts and with a maximum current of 2 amperes by using this reference circuit and a LM 318 as an error amplifier. For a temperature variation of from 30-60 degrees centigrade the output voltage changes less than 90 millivolts at an output voltage of 30 volts and less than 40 millivolts at output vol-

tage of 9.0 volts. The time response to load current variations of 1 ampere was found to be as follows :

$$t_{r1} \text{ (No-load to full-load recovery time)} \leq 0.1 \text{ ns.}$$

$$V_{p1} \text{ (No-load to full-load transient peak)} \leq 35 \text{ mV.}$$

$$t_{r2} \text{ (Full-load to no-load recovery time)} \leq 0.5 \text{ ns.}$$

$$V_{p2} \text{ (Full-load to no-load transient peak)} \leq 65 \text{ mV.}$$

$$V_{reg} \text{ (Regulating voltage)} \leq 30 \text{ mV}_{pp}.$$