Submicrosecond Power-Switching Test Circuit
Switching time is ≤300 ns.

Marshall Space Flight Center, Alabama

A circuit that changes an electrical load in a switching time shorter than 0.3 microsecond has been devised. This circuit can be used in testing the regulation characteristics of power-supply circuits — especially switching power-converter circuits that are supposed to be able to provide acceptably high degrees of regulation in response to rapid load transients.

The combination of this power-switching circuit and a known passive constant load could be an attractive alternative to a typical commercially available load-bank circuit that is supposed to be able to provide acceptably high degrees of regulation in response to rapid load transients.

The combination of this power-switching circuit and a known passive constant load could be an attractive alternative to a typical commercially available load-bank circuit. The switching time of this circuit is less than 0.3 microsecond has been devised. This circuit can accept any of three control inputs — which one depending on the test that one seeks to perform: a repetitive waveform from a signal generator, momentary closure of a push-button switch, or closure or opening of a manually operated on/off switch. In the case of a signal generator, one can adjust the frequency and duty cycle as needed to obtain the desired AC power-supply response, which one could display on an oscilloscope. Momentary switch closure could be useful for obtaining (and, if desired, displaying on an oscilloscope set to trigger on an event) the response of a power supply to a single load transient. The on/off switch can be used to switch between load states in which static-load regulation measurements are performed.

This was done by Eric N. Folk of Jacobs Sverdrup Technology, Inc. for Marshall Space Flight Center. For further information, contact Sammy Nabors, MSFC Commercialization Assistance Lead, at sammy.a.nabors@nasa.gov. Refer to MSN-31811-1.

This Power-Switching Test Circuit, in combination with the switched passive load, could be an attractive alternative to a typical commercially available load-bank circuit.