

# NASA TECH BRIEF

## Marshall Space Flight Center

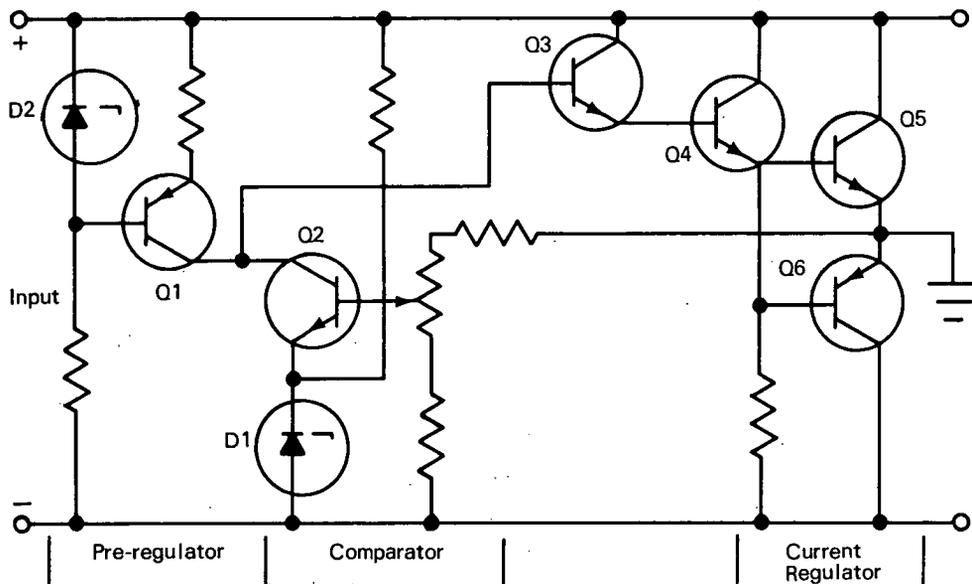


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### Voltage Regulator Dissipates Minimal Power and Functions as a Voltage Divider

The simple circuit shown in the schematic provides a regulated voltage output from an input power supply and functions as a voltage divider. In contrast to prior devices, only a minimum amount of

power is required for the voltage division, and this power is not required continuously. The only power loss, except for regulating purposes, is that required to provide for imbalances in load current requirements. For balanced loads, only leakage current flows through the regulating transistors.



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The circuit consists of pre-regulator, comparator, driver, and current regulator stages. The pre-regulator stage generates a constant current which is fed to the comparison stage where the output voltage is compared with a zener reference. Output voltage variations cause the collector of Q1 to change

since its base is fed a constant current. The voltage on the collector is applied to the base of the first transistor in the driver stage, which is a high current gain emitter follower. The output of this stage is then fed to the bases of Q5 and Q6 in the current regulator. Since the bases and emitters of Q5 and Q6 are coupled together, only one can be on at a time. The transistor will allow leakage current to flow, but cannot pass larger amounts of current. The common emitter follower adjusts the base voltage of both transistors so that, as the emitter current is increased or decreased, the appropriate transistor will turn on and regulate the current to maintain a constant voltage, as determined by the difference in current requirements between positive to center and center to negative. Thus, if the current is bal-

(continued overleaf)

anced, no matter how large it is, the only current carried by the current regulator transistors is the leakage current. If the load is totally unbalanced, the required transistor will turn on and carry the load current.

**Note:**

Requests for further information may be directed to:

Technology Utilization Officer  
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Reference: TSP71-10367

**Patent status:**

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