Extra resistor helps regulator share load with transistor

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A pass transistor is used with an IC voltage-regulator circuit when the load current required is greater than the integrated circuit can handle. But the capability of the IC is then wasted because it has to furnish only a small base current to the transistor. The addition of a single resistor allows the IC to share the load with the pass transistor. By increasing the total output-current capability of the circuit, this simple change makes it possible to use a smaller transistor for a specified load.

In the schematic diagram shown as Fig. 1, resistor R_1 is added to a typical type-723 IC regulator circuit between the output terminal of the IC and the load. The extent to which the IC then shares the load current with the pass transistor is a function of the current level.

At low current levels, the IC carries the entire load, as shown by the graph in Fig. 2. However, the transistor begins to share the load when the current is high enough for the voltage across R_1 to exceed the base-to-emitter junction voltage, which is about 0.6 V for a silicon transistor. □

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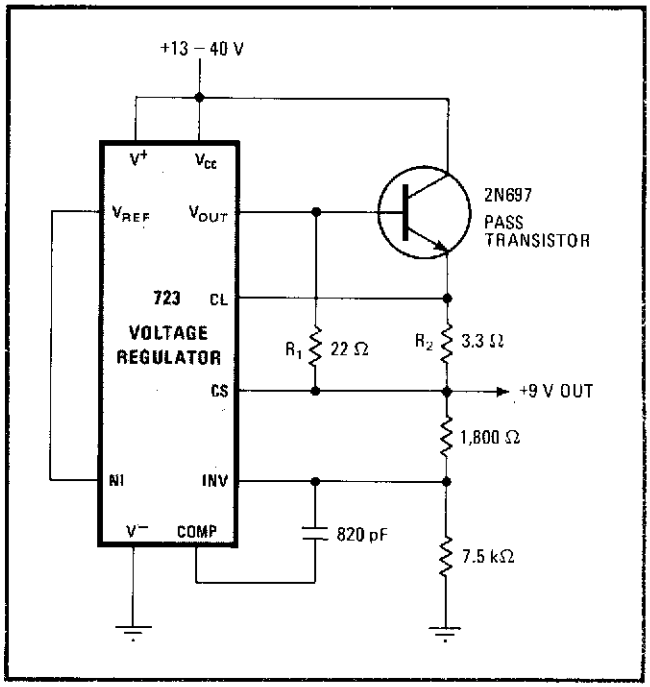
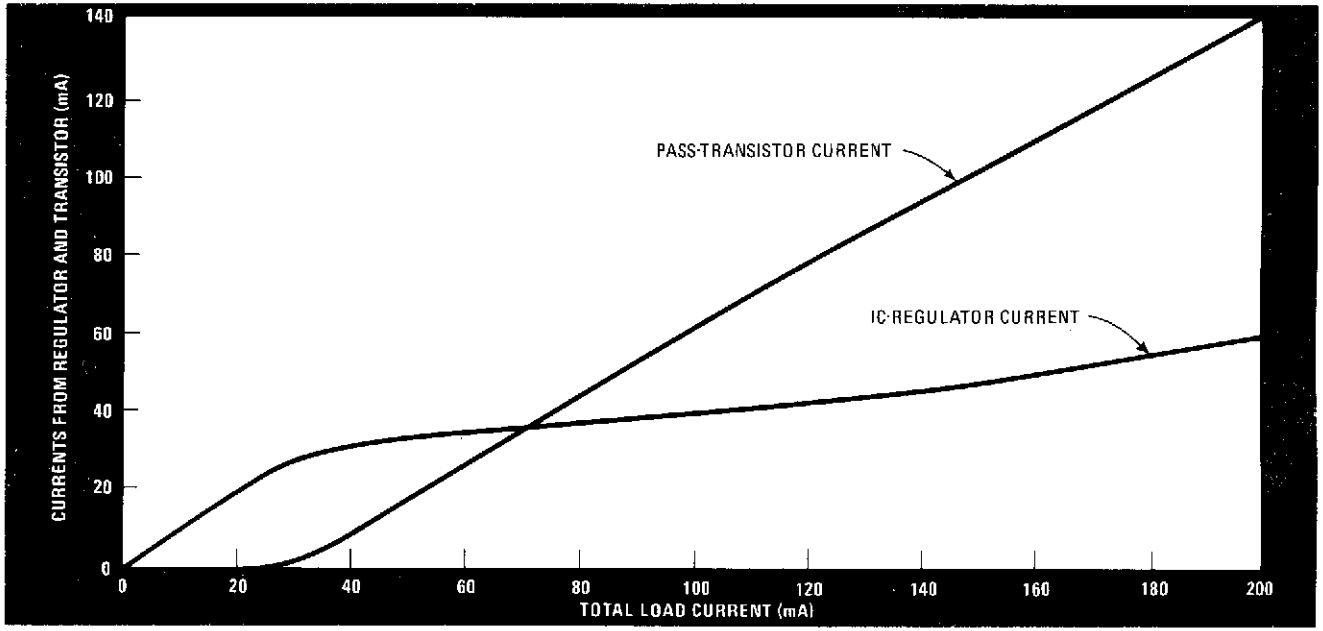


1. Add an R. . . . Resistor R_1 is added to voltage-regulator circuit so that the IC can deliver some of the load current in addition to driving the base of the external pass transistor.



2. . . . to share the load. Small load currents are drawn entirely from the integrated circuit. The pass transistor takes on an increasing base-to-emitter junction voltage. This arrangement permits a given circuit to deliver more current or use of a smaller pass transistor for a given load requirement. The total load current is the sum of the currents through resistors R_1 and R_2.