Circuit Idea
20031101

Overpower or Overcurrent Protection Using Crowbar Circuit

Summary of the Idea

The circuit provides overpower protection (OPP) or overcurrent protection (OCP) by using an active pre-load circuit to trigger an existing crowbar circuit used for overvoltage protection (OVP).

Description

Consider a flyback power supply with two outputs: a 5 V, 2 A output and a 12 V, 3 A output. One of the critical specifications for this power supply is overpower protection (OPP) on the 5 V output when the 12 V output is at no-load or very light load. Both outputs of the power supply specify a ±5% regulation requirement.

Previous solutions included using either a sense resistor or a fuse. However, a sense resistor would hurt cross regulation while a fuse is expensive. A crowbar circuit is already utilized to provide overvoltage protection (OVP). The circuit shown in Figure 1 addresses OPP and regulation requirements at the same time and uses part of the crowbar circuit to achieve this.

Referring to Figure 1, R1 and VR1 form an active pre-load on the 12 V output, to address the 12 V regulation during light load on the 12 V output. During an overload condition on the 5 V output, the voltage across the 5 V output drops and the active pre-load sinks a large amount of current. The resulting voltage drop across R1 can be used to detect this large current which turns on Q1 and triggers the OPP circuit.

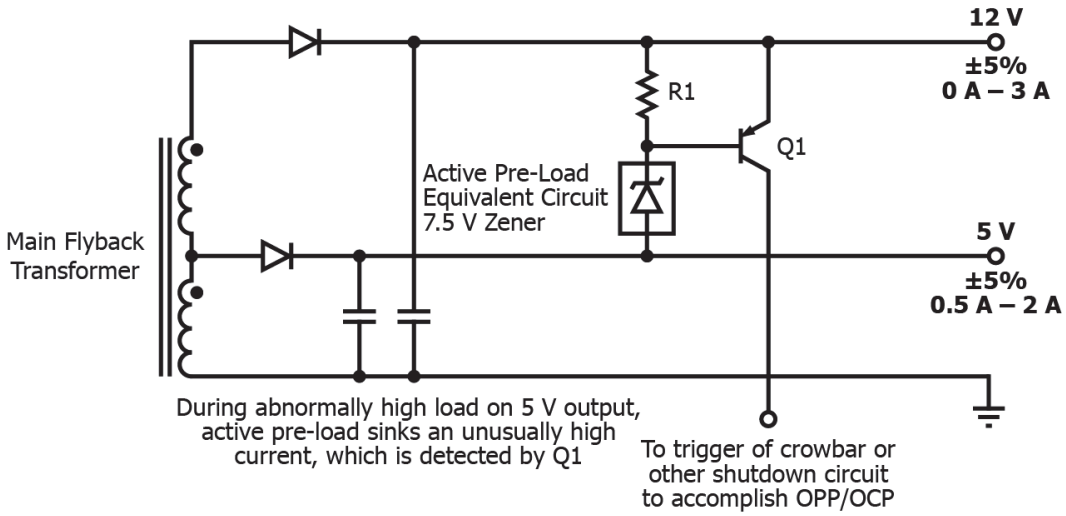

Figure 1. Active pre-load circuit which triggers an existing crowbar circuit during an overload condition.

World Headquarters 5245 Hellyer Avenue, San Jose, CA 95138, USA, Main: +1-408-414-9
Customer Service Phone: +1-408-414-9665, Fax: +1-408-414-9765, Email: info@power.com
On the Web www.power.com

Rev: 1; OCT 2017
20031101