

CPU Protection

Application Overview

In series with the Central Processing Unit (CPU), in some applications, is a Voltage Regulator Module (VRM). A VRM DC-DC converter supplies the required voltage and current to a processor.

Problem/Solution

The VRM design approach removes cable inductance from the distribution and reduces board inductance. A load-change transient occurs when coming out of or entering a low power mode. For some CPUs this load-change transient can be on the order of 13A. These are not only quick changes in current demand, but also long-lasting average current requirements. Even during normal operation the current demand can still change by as much as 7A as activity levels change within the processor component. Maintaining voltage tolerance during these changes in current requires high-density bulk capacitors with low Effective Series Resistance (ESR). These high-current immediate demands on the circuits can cause components to fail. Circuit protection prevents the VRM from damaging the CPU in the event of a VRM fault. If the VRM fails, the processor tries to pull too much power. A PolySwitch device can be placed on the input pins to the VRMs that supply power to the processors, therefore protecting the processors. If there is a failure, only the VRM needs to be replaced, rather than the more expensive CPU.

Device Selection

Up to 12V and several amps are applied to the circuit. The RGE series, typically the RGE600–RGE900, is used in this application.

Figure 1. Typical Schematic

