

APPLICATION NOTE 2765

Flexible Fault Protection

A flexible circuit is shown that limits current or removes power in response to a command from the user or other fault-indicating signal. It accommodates manual-reset (MR), over-temperature, and protection in hot-swap applications. Residing on either the backplane/host side or the removable-card/remote-device side of the backplane connectors, it guards against start-up faults when a card or board is inserted into a rack or host with the main power supply turned on.

Many applications require the capability to automatically disconnect power from an operating circuit. Such applications include thermal shutdown of high-voltage power supplies in radar and X-ray systems, shutdown to limit inrush current during power-up or hot-swapping of pc cards, and shutdown to ensure that a card is properly seated before power is applied. In general, a power fault system will keep the power off following the system fault, until it is deliberately reset.

Figure 1 is a flexible circuit that limits current or removes power in response to a command from the user or other fault-indicating signal. It accommodates manual-reset (MR), over-temperature, and interlock-switch inputs. U1, for instance, is a circuit-breaker IC designed to offer protection in hot-swap applications. Residing on either the backplane/host side or the removable-card/remote-device side of the backplane connectors, it guards against start-up faults when a card or board is inserted into a rack or host with the main power supply turned on.

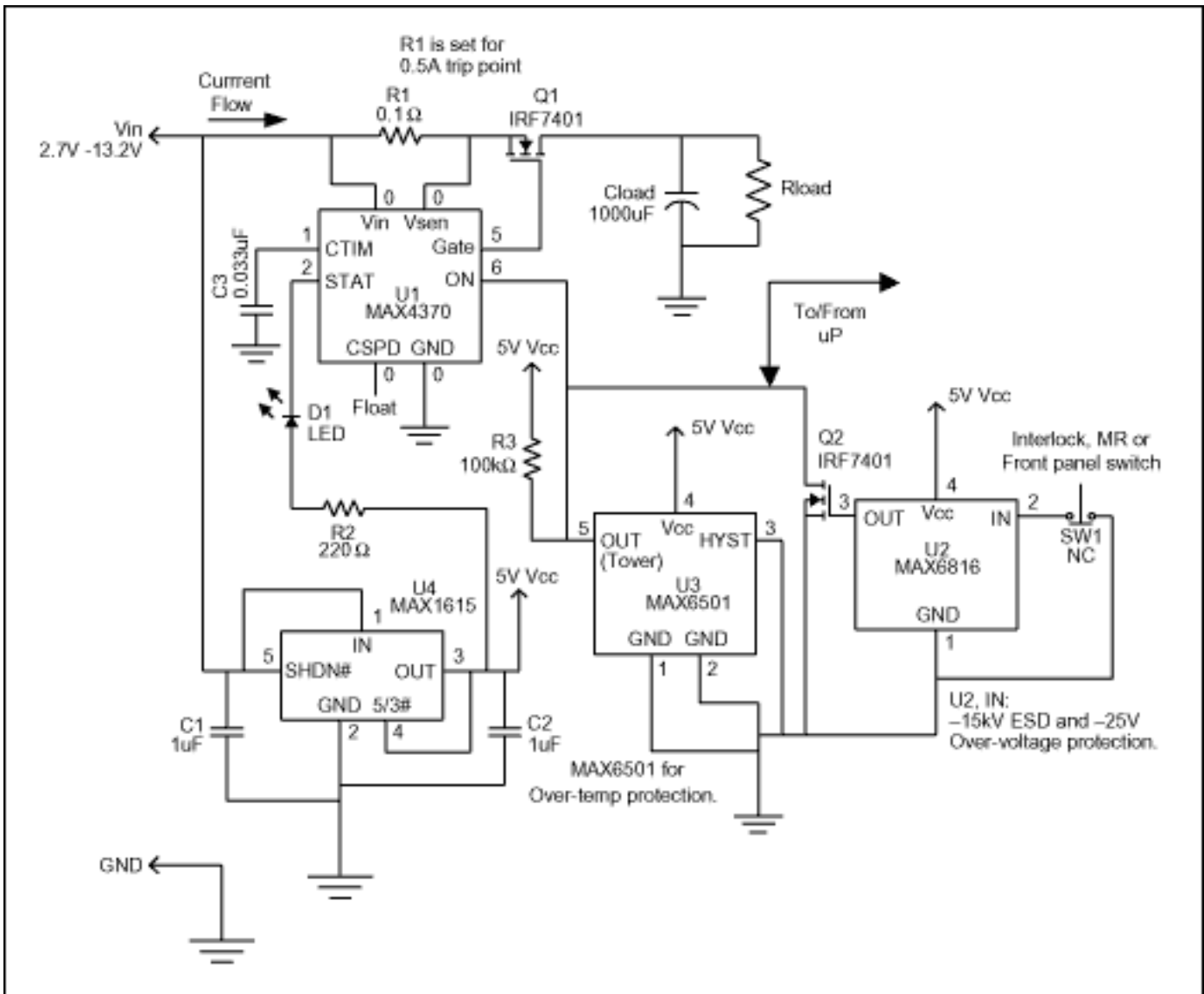


Figure 1. This circuit provides general over-current and over-temperature protection.

Two main fault conditions are possible. Discharged filter capacitors on the card or remote device can provide a low impedance to ground that momentarily collapses the host power supply. Or, a card only partially seated in its connector can generate erroneous data. U1 prevents the first condition by regulating inrush current during a programmable start-up period, allowing the system to stabilize safely. During normal operation, two internal comparators provide short-circuit and over-current protection (DualSpeed/BiLevel capability). The second condition is handled by routing U1's current output (ON) through two pins at the outer edges of the card (**Figure 2**).

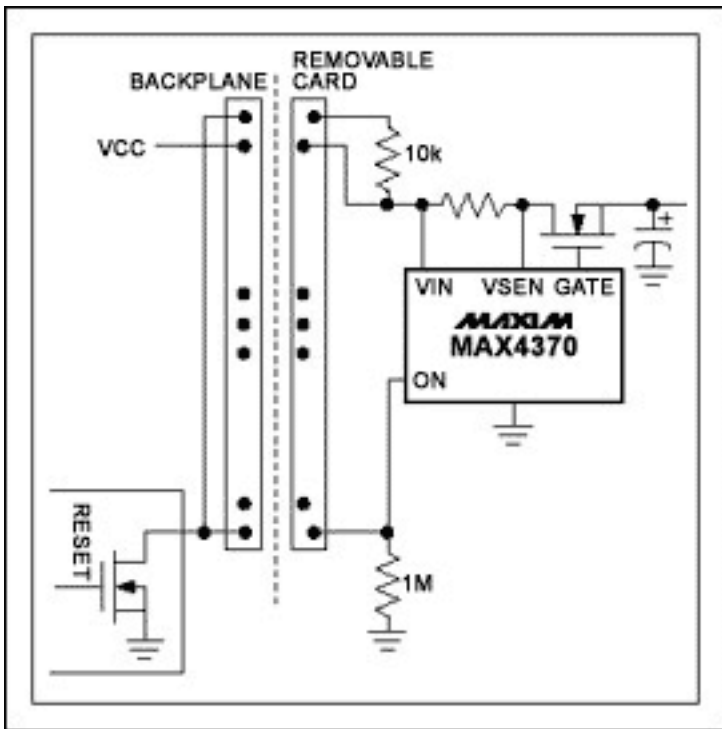


Figure 2a.

disconnect signal when the circuit temperature becomes critical. A low-power linear regulator (U4) provides 5V to the low-voltage components U2 and U3, but U4 is not meant to provide system power to the load.

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