Current-Limit Switch Is Digitally Programmable

Current-limit switches are virtually ubiquitous in system controls. They provide a safe means for regulating the current delivered to a load circuit. The switches allow the load current to increase to a programmed limit but no higher. This application note illustrates the implementation of a digitally programmable current-limit switch using MAX890L a current-limited, high-side P-channel switch and MAX5160 digital potentiometer

Additional Information: Quick View Data Sheet for the MAX890L
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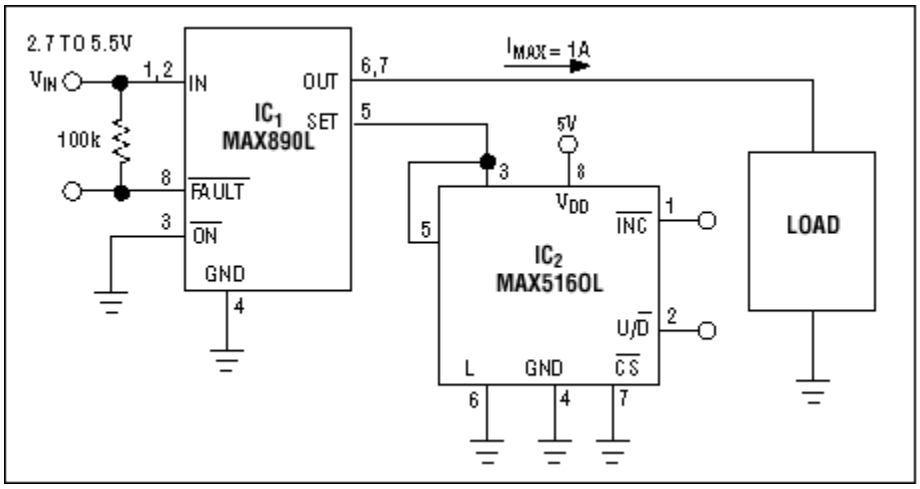
Current-limit switches are virtually ubiquitous in system controls. They provide a safe means for regulating the current delivered to a load circuit. The switches allow the load current to increase to a programmed limit but no higher. Typically, the current limit is a function of the voltage across an external resistor, produced by the current from a fixed source internal to the switch IC. This voltage serves as the reference for an internal current-limiting amplifier. By replacing the resistor with a digital potentiometer, you can easily program the current limit (see the figure below). IC_1 is a current-limit switch with a maximum programmable limit of 1A. The limit equals $1380/R_{SET}$, where R_{SET} is the resistance between pins 5 and 6 of IC_2. IC_2 is a 50kΩ digital potentiometer whose resistance is programmable in 32 equal increments. With $\overline{CS}$ held low, high-to-low transitions at $\overline{INC}$ (pin 1) increments IC_2's internal counter.



You can program a current limit to 1A in 32 equal increments by using a digital potentiometer.

These transitions increase the resistance between W and L when U/D is low and reduce it when U/D is high. IC_1 includes a thermal-shutdown capability that turns the load current completely off when the chip temperature exceeds 135°C. It restores the load current when the temperature cools by 10°C. If the short-circuit fault is still present, the switch cycles off and on, yielding a pulsed load current. An open-drain fault output (pin 8) switches low when the load demands current beyond the programmed limit, enabling an external system to monitor the condition of the current switch.

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