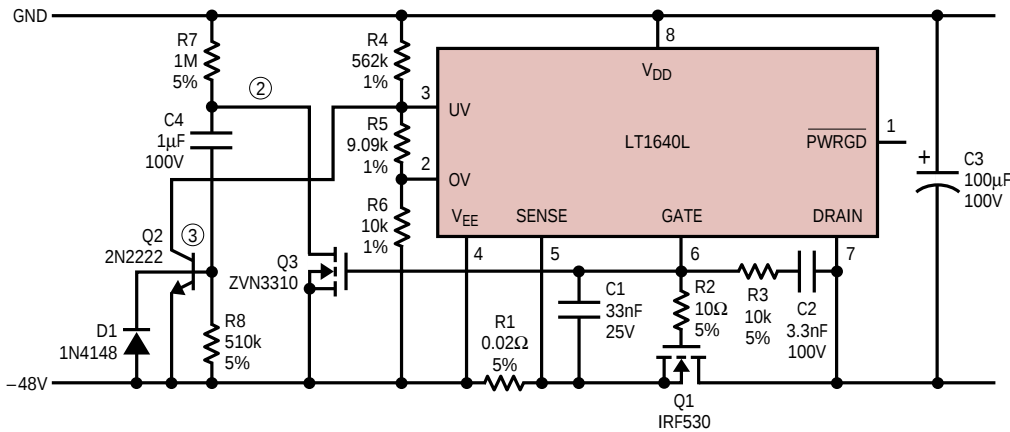


-48V Electronic Circuit Breaker Automatically Resets After Current Faults

As supply voltages for PC boards continue to drop to 3.3V and lower, it becomes difficult to minimize the voltage drop through distributed power systems. One solution is to distribute power at a high voltage, typically 48V, and then step down to the final desired value on each board. Most 48V power modules require an input bypass capacitor, typically hundreds of microfarads. If the board is hot-plugged into a live 48V line, huge inrush currents can result, permanently damaging the board's components. The **LT1640** Negative Voltage Hot Swap Controller features an electronic circuit-breaker function that protects against short circuits or excessive supply currents and automatically resets the circuit breaker after the fault is corrected.

The sense resistor, R1, between the V_{EE} and SENSE pins trips the circuit breaker in the **LT1640** whenever the voltage across R1 is greater than 50mV for more than 3 μ s. Transistors Q2 and Q3, along with R7, R8, C4 and D1, form a one-shot circuit. Before a short occurs, the GATE pin is pulled high and Q3 is turned on, pulling node 2 to V_{EE} . Resistor R8 turns off Q2. When a short occurs, the GATE pin is pulled low or Q3 turns off. Node 2 starts to charge C4, and Q2 turns on, pulling the UV pin low and resetting the circuit breaker. As soon as C4 is fully charged, R8 turns off Q2, UV goes high and the voltage on the GATE starts to increase. Q3 turns back on and quickly pulls the node 2 back to V_{EE} . Diode D1 clamps node 3 one diode drop below V_{EE} . The duty cycle is set to 10% to prevent Q1 from overheating.

This Circuit Resets the Circuit Breaker After a Current Fault



Waveforms of Circuit

