

will disconnect the load when the LT1304 is shut down. Although R_{SENSE} lowers the efficiency near full load, the additional circuitry has essentially no effect on the excellent light load efficiency of the LT1304.

Short-Circuit Protection at Higher Power

At higher currents, low $R_{DS(ON)}$ transistors and low voltage current sensing are necessary to maintain high efficiency and manageable power dissipation. The LTC1153 circuit breaker IC drives an external high side N-channel FET and will turn off the FET when the voltage across a current sense resistor exceeds 100mV. Trip delay and reset times can be adjusted with external components.

The LT1270 boost converter can generate 2A at 12V from a 5V input (Figure 3). Protection against a shorted output is provided with an LTC1153 programmed to trip

at 2.5A. At start-up, the LTC1153 drives the gate of Q1 through a filter (R1 and C1). This limits dV/dt at the output, controlling the inrush current to the capacitive load. When the LTC1153 senses a voltage drop across R_{SENSE} exceeding 100mV, the gate of Q1 is grounded through diode D1. The FET will remain off for a period determined by the capacitor tied to the C_T pin. With this reset period set longer than the trip delay (60 μ s max) and the turn-on time of Q1 (~R1 C1), the average output current will be much lower than the peak current; this keeps power dissipation of the FET and the load at a safe level. An open collector at the STATUS pin of LTC1153 indicates the state of the circuit breaker. The output can be disconnected by setting the IN pin low. The LTC1153 operates from 4.5V to 18V and is available in an 8-lead PDIP or SO.

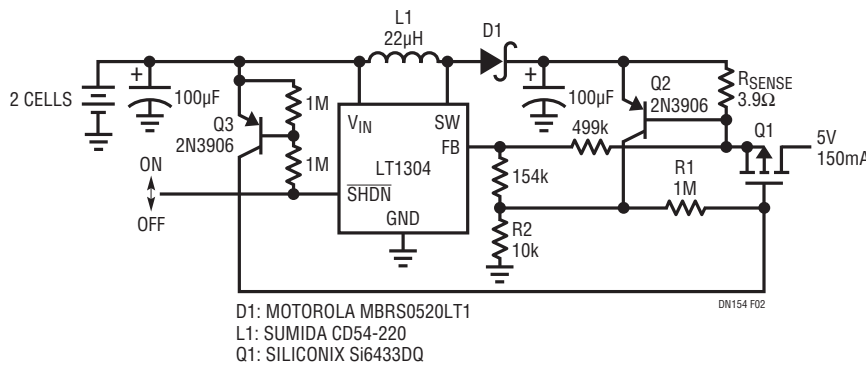


Figure 2. Current Limited Boost Converter with Load Disconnect

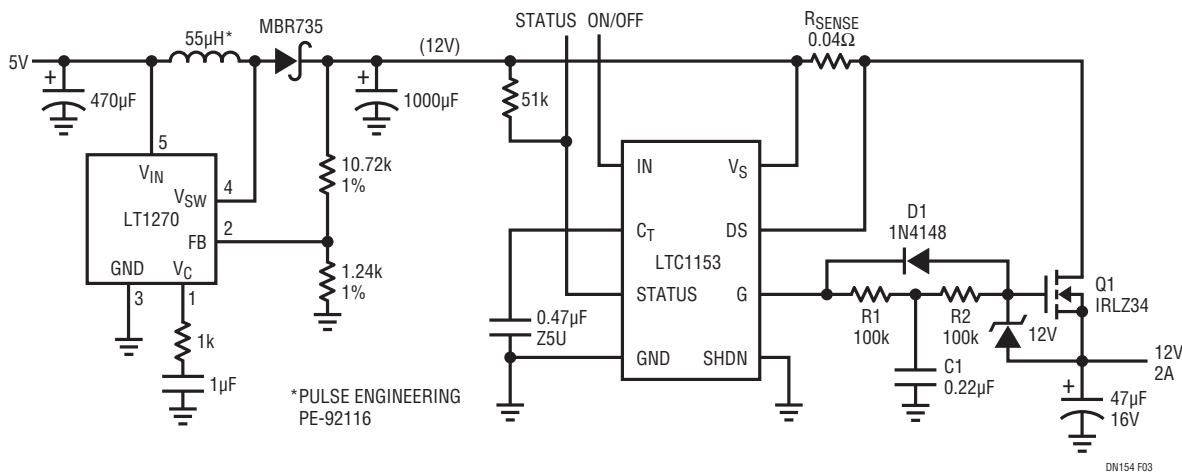


Figure 3. 2A/12V Step-Up Regulator with Circuit Breaker (Post Regulator), Breaker Status Feedback and Ramped Output

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