Test Data
For PMP10737
08/17/2015

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1. Design Specifications

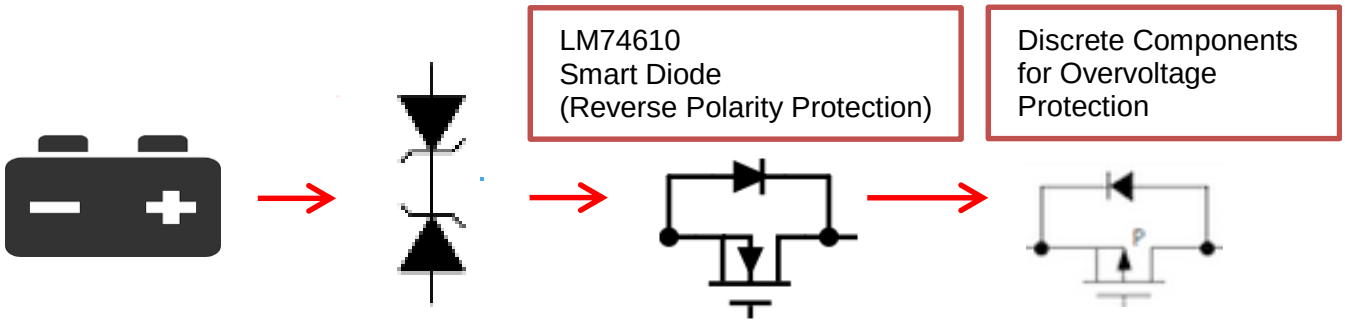
Vin Minimum	**7VDC**
Vin Maximum	**35 VDC(OVP at 25V)**
Vout1	**12V**
Iout 1	**1A**
Vout2	**12V**
Iout 2	**5A**
Protection	**Input Overvoltage and Reverse Polarity**

2. Circuit Description and PCB details

PMP10737 is a reference design that provides protection from reverse voltage (Smart Diode) and overvoltage using discrete components.

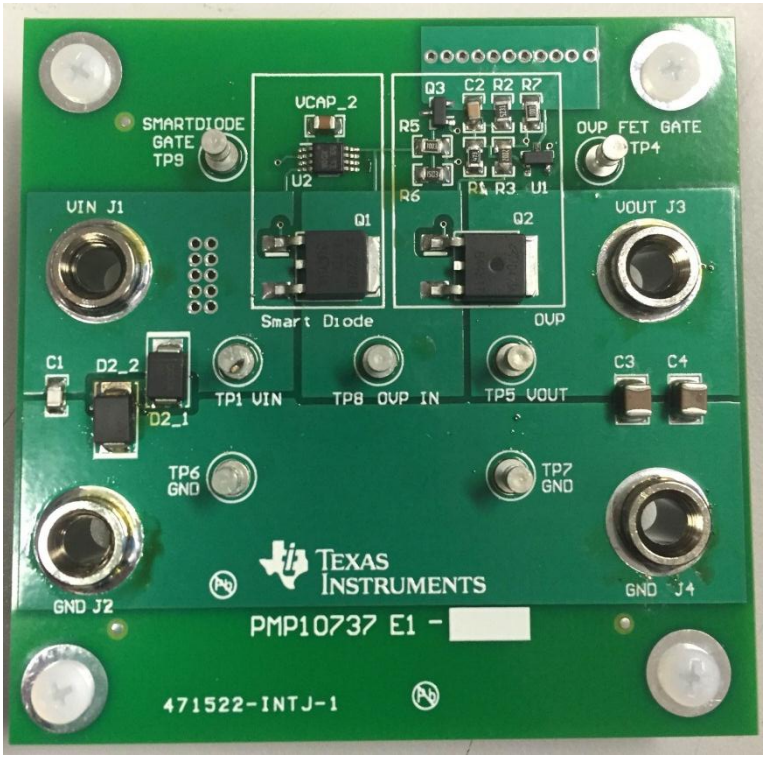
Input voltage range is between 7V to 35V with OVP at 25V.

LM74610 is used for Battery reverse protection which utilizes a charge pump to drive an N-channel FET to provide a resistive path for the bypass current to flow.

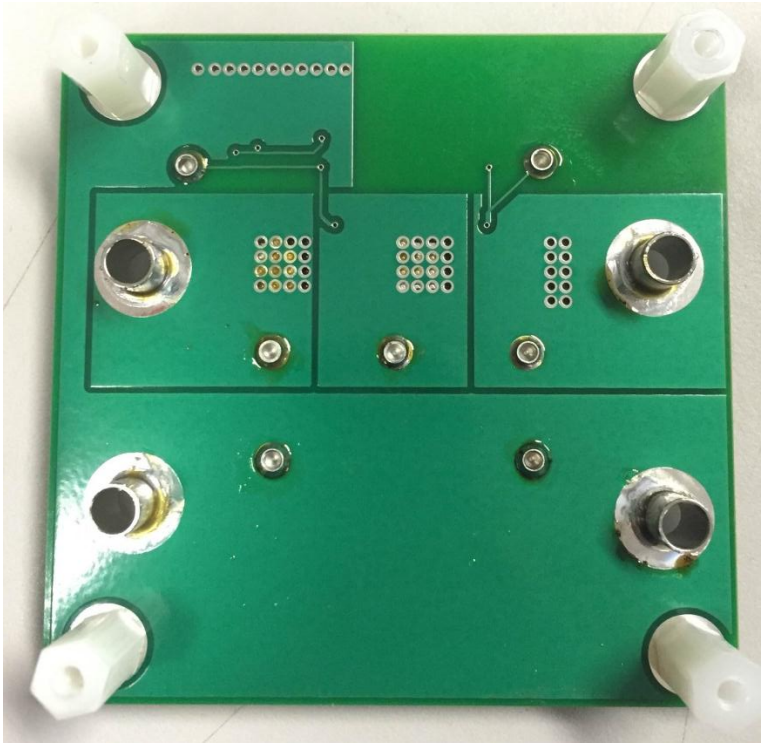


The Board dimension of PMP10737 PCB is 2735mil * 2700mil. Two layer PCB was used for the design.

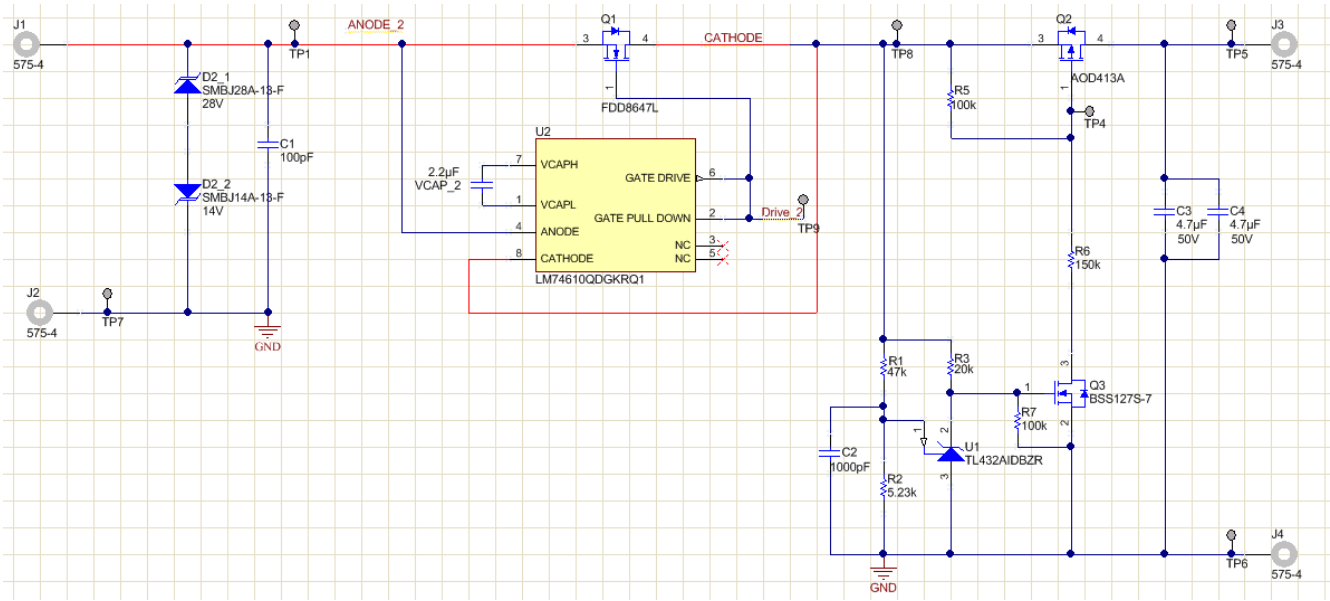
3. PMP10737 Board Photos and Schematic



Board Photo (Top)

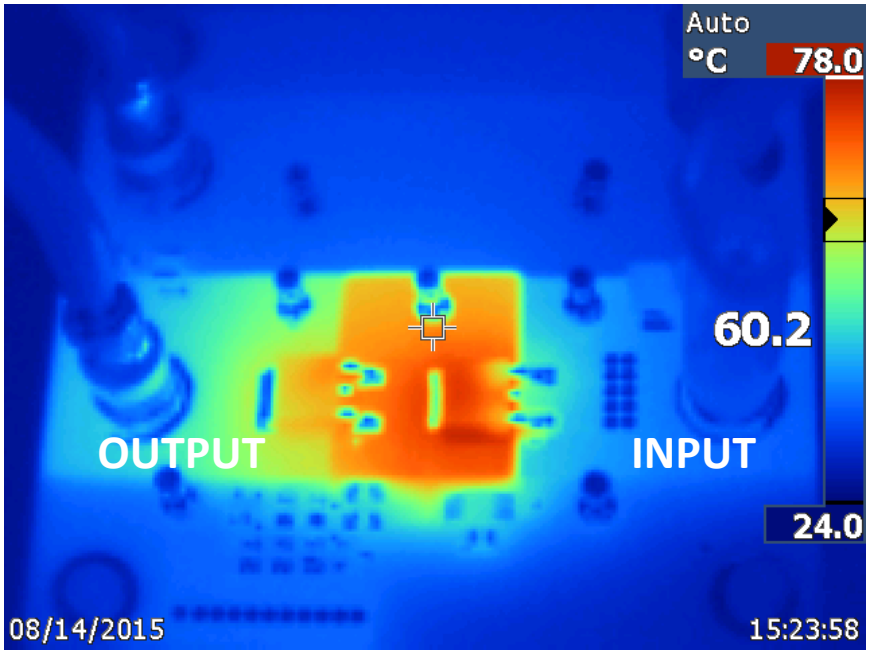


Board Photo (Bottom)

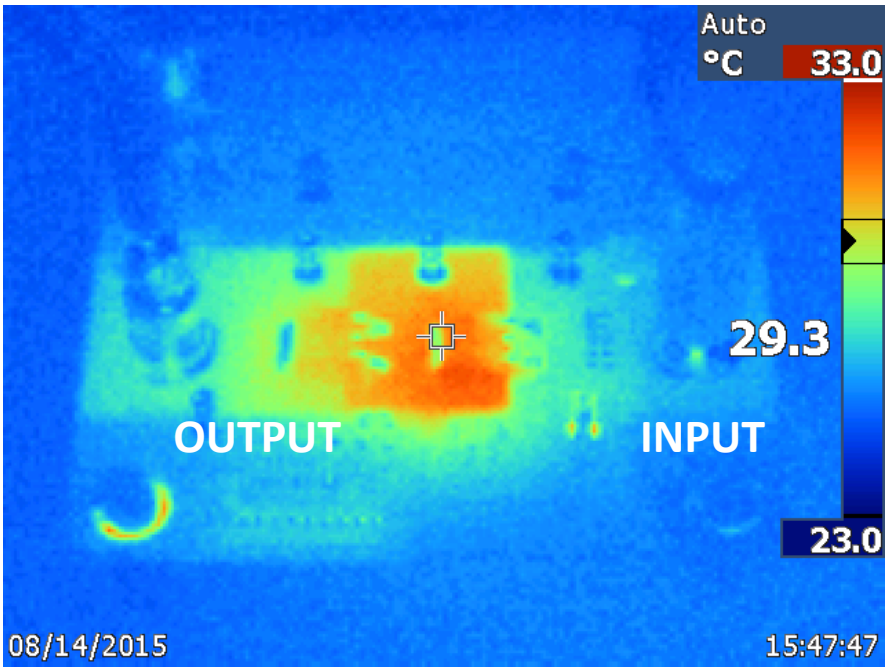


NOTE: TVS diodes are placed in both directions to protect the circuitry from high voltage transients.

4. Thermal Data



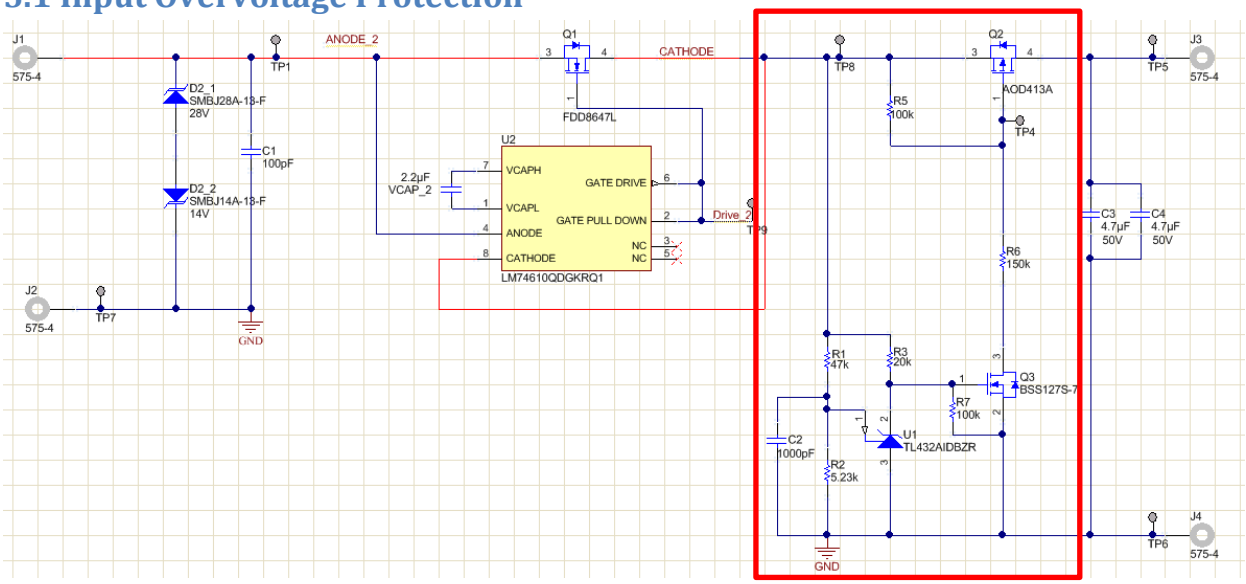
IR thermal image taken at steady state with 12Vin and 5A load current.



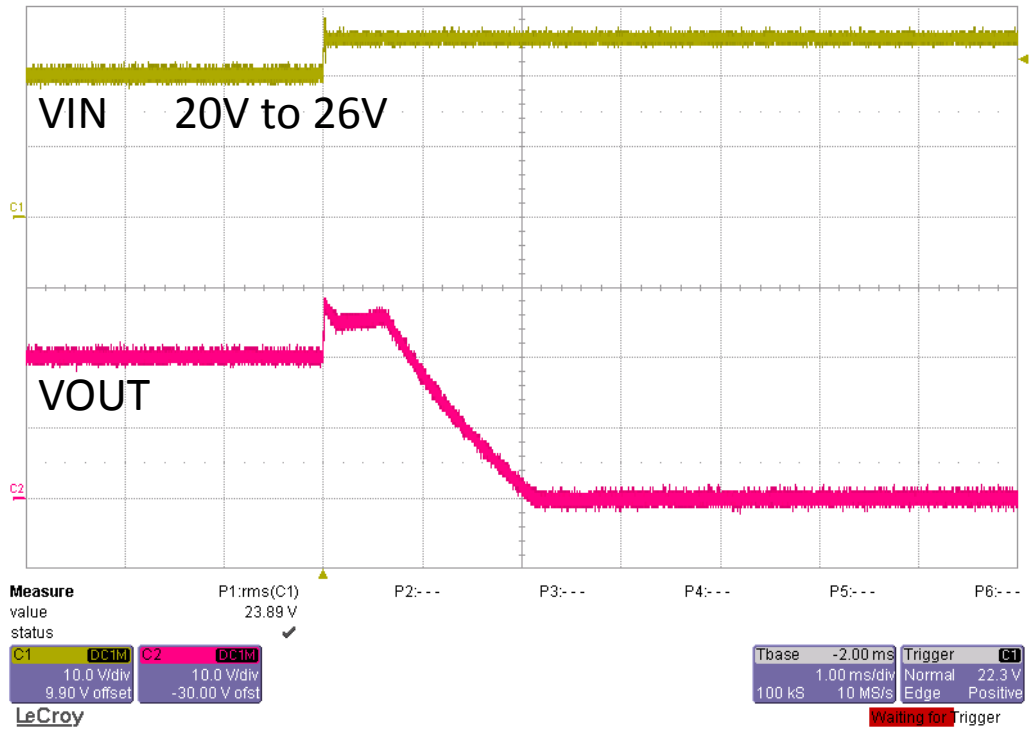
IR thermal image taken at steady state with 12Vin and 1A load current.

5. Waveforms

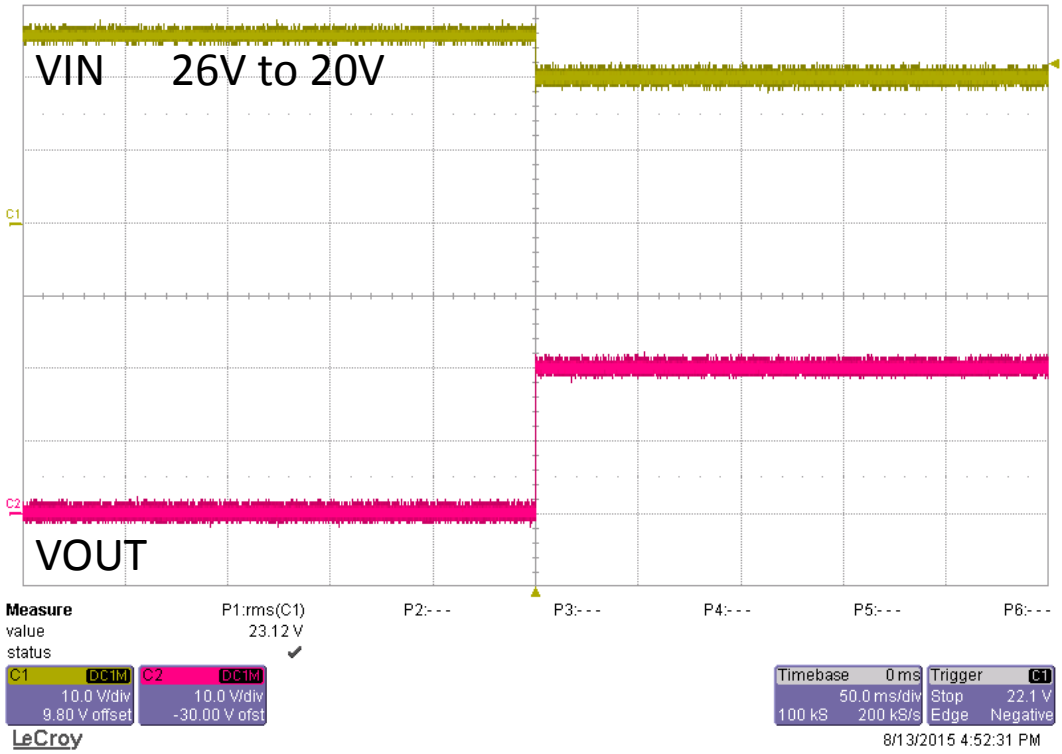
5.1 Input Overvoltage Protection



Discrete components are used for overvoltage protection. When the shunt regulator (U1) senses a voltage higher than 2.5V at R2, its output will go low which stops driving the N-channel FET (Q3). Q3 then acts as an open which ties the gate and source of the P-channel FET (Q2) together. The gate will not be driven which then prevents an output voltage. A timing capacitor (C2) is placed in parallel with R2 to prevent the circuit from outputting 0V when there are quick high voltage surges.

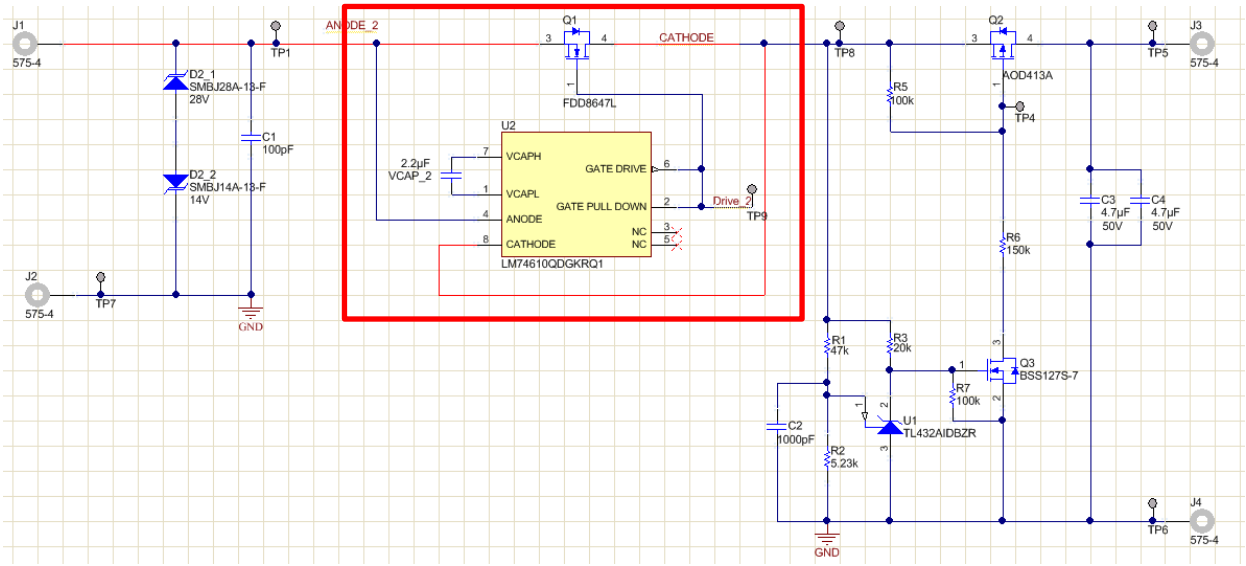


Transition to overvoltage condition. Protection at 25V.

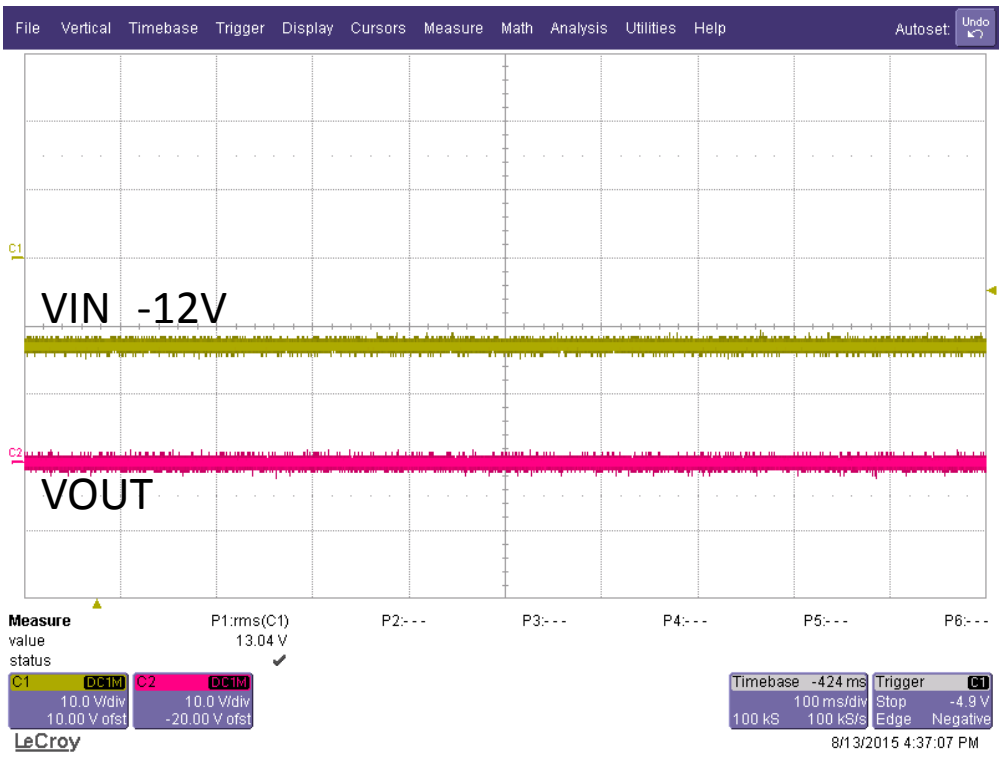


Transition from overvoltage to normal condition

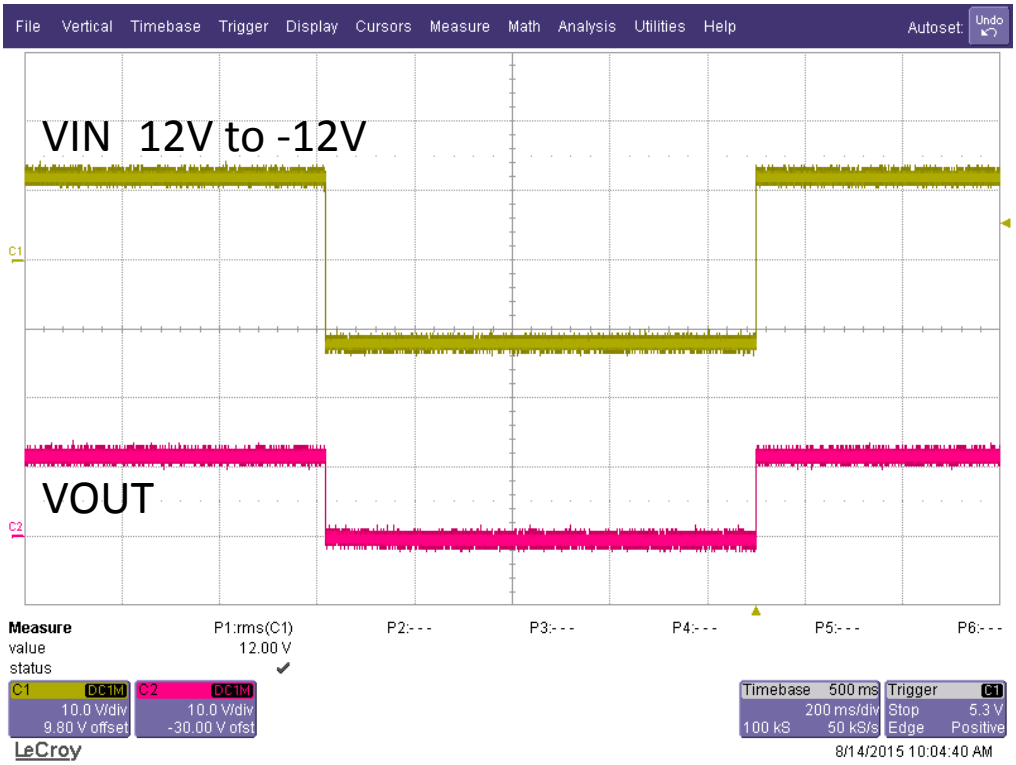
5.2 Reverse Protection- Smart Diode



The LM74610 Smart Diode is placed before the overvoltage protection for reverse battery protection. For more information on the LM74610 functional and electrical characteristics, see the LM74610 Smart Diode Controller data sheet (LM74610).



Continuous Reverse Voltage at Input



Transition to Reverse Voltage at Input

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