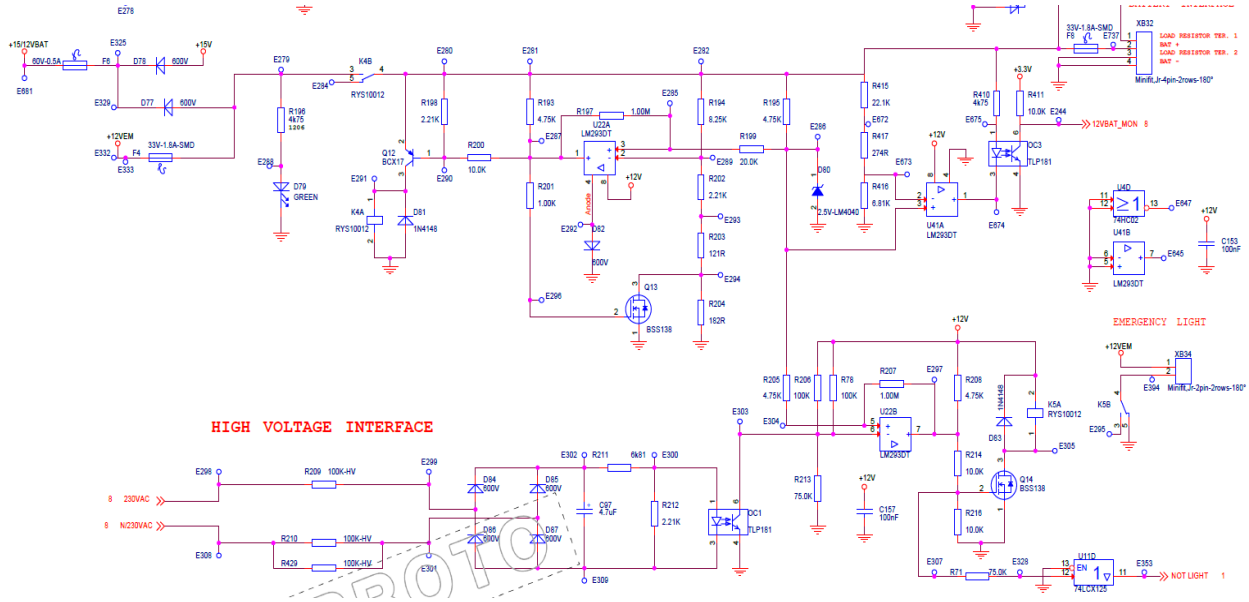
Circuit Diagram with LM293D:



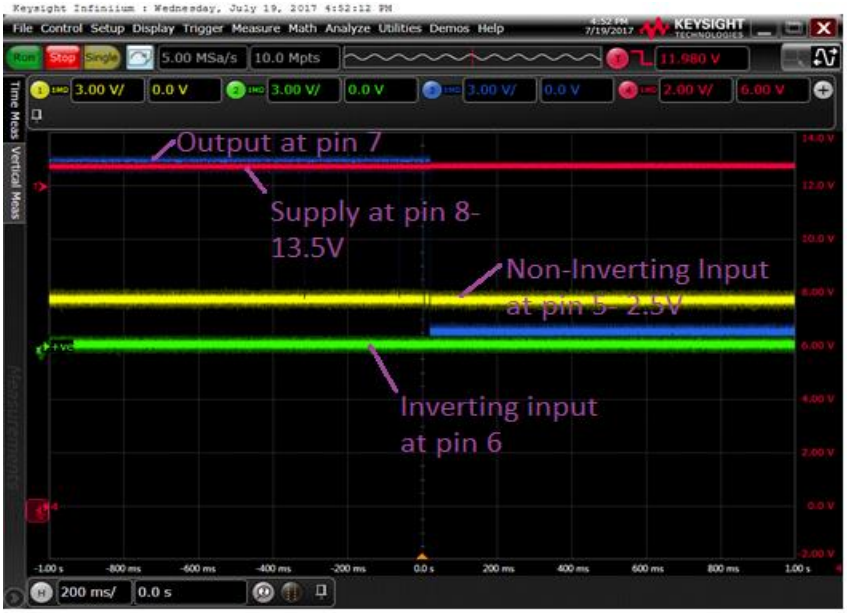
Problem Description:

Expected output→ Whenever the comparator U22B pin 6 is low (reference at pin 5 is always at 2.5V if battery is healthy), the output of the comparator should be low. This enables the relay K5 to be in ON position (energized).

Problematic Output→ In some PCBAs, the comparator U22B output (pin 7) automatically goes LOW, though the input at pin 6 is HIGH. This automatically triggers the relay to be OFF (de-energized) & after sometime (at random frequency) the comparator output automatically switches to HIGH state & the relay is ON.

Even during normal conditions, if we touch the probe at input pin 6, the output goes to LOW state & revert back to HIGH state after touching the probe again on pin 6. The waveforms during the problem simulated condition is shown below. There is no interruption observed at power supply pin8 input.

Waveform during problem condition:



Waveform during normal condition:

Analysis Observation 1:

- ➔ Interchanged the LM293D chip between normal board & problematic board
- ➔ No problem observed in both boards

Analysis Observation 2:

- ➔ In one of the problematic board, the chip is de-soldered & soldered again and found that its working without issue

Analysis Observation 3:

- ➔ In another problematic board, the chip is de-soldered & soldered again and found that the problem still persists