MPLAB® PICkit 4 VPP Overshoot Modification

Symptom: During programming of some PIC devices that use High Voltage VPP latch-up can occur and the device can consume more current than is typically required.

The latch-up is due to the device experiencing voltage overshoot conditions on the VPP pin as the device data sheet indicates. The overshoot signature will vary depending on device, voltage, package, cable inductance, or any other capacitance and resistor loading on the VPP pin.

Problem:
Some PIC16/18 devices have options to use high voltage on VPP or NMCLR to program the device. On some devices, the VPP/NMCLR pin has special ESD protection. Overshoot on the pin can result in a reset condition or current consumption outside of the specification. To avoid this situation, the data sheets for these devices recommend the use of an RCR network with a pull-up, a power up charge capacitor and a series resistor configuration into VPP. A series resistor of 470 ohms is used to dampen any overshoot and to limit current into VPP/NMCLR.

Solution:
To avoid the need of the RCR network and its effects, assembly #10-10094R1, PCB #04-10441 REV 3 requires slew rate control of the VPP load switch to smooth out fast edges which may cause overshoot under certain conditions.

The schematic and rework for this change is shown in the figures below.
R142 is added between the gate of Q3 or pin 1, and the drain of Q4 or pin 3.
R142 can be soldered directly to the drain of Q4. However, the gate of Q3 must be isolated by cutting the existing trace running between both components as indicated below. A wire can connect the gate of Q3 with the end of the R142 resistor.

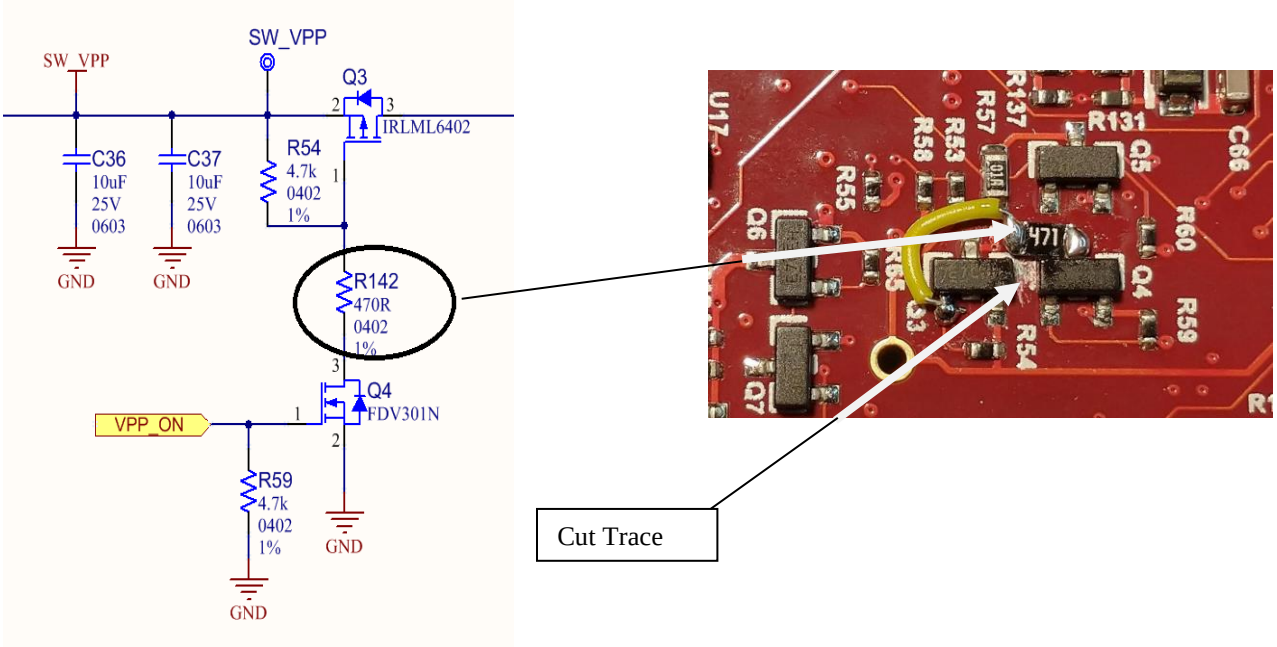

Figure 1