



PMP10778 TPS53819A Test Report

12/3/2014

The following test report is for the PMP10884 TPS53819A:

VIN = 12V

VOUT = 1V @ 20A

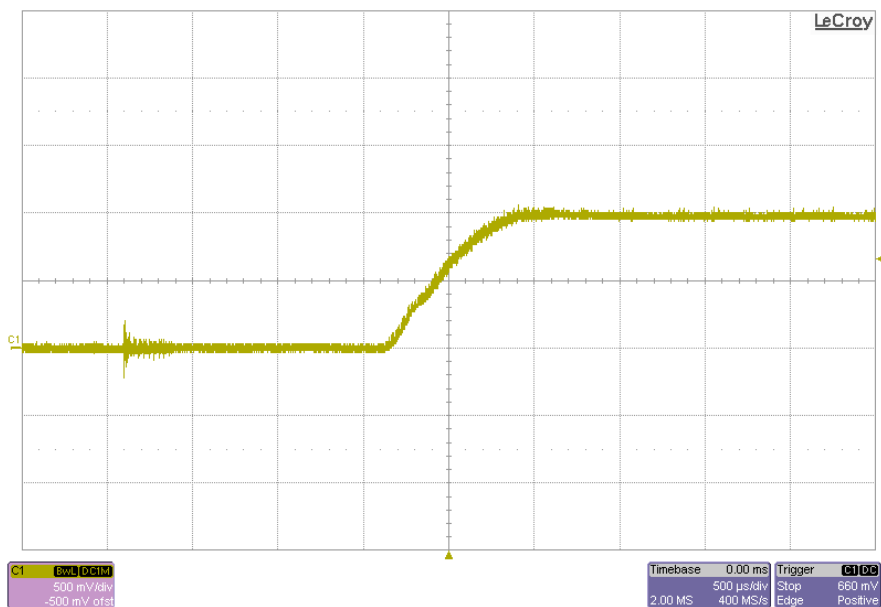
The tests performed were as follows:

1. Startup (No load)
2. Shutdown (10 Ω Load)
3. Output Voltage Ripple
4. Load Transient
5. Load Regulation
6. Efficiency
7. Switching Waveform
8. PMBus Voltage Scaling
9. Thermal Profile
10. EVM Photo

1 Startup

The picture below shows the startup waveform. The input voltage is 12V, the output is not loaded.

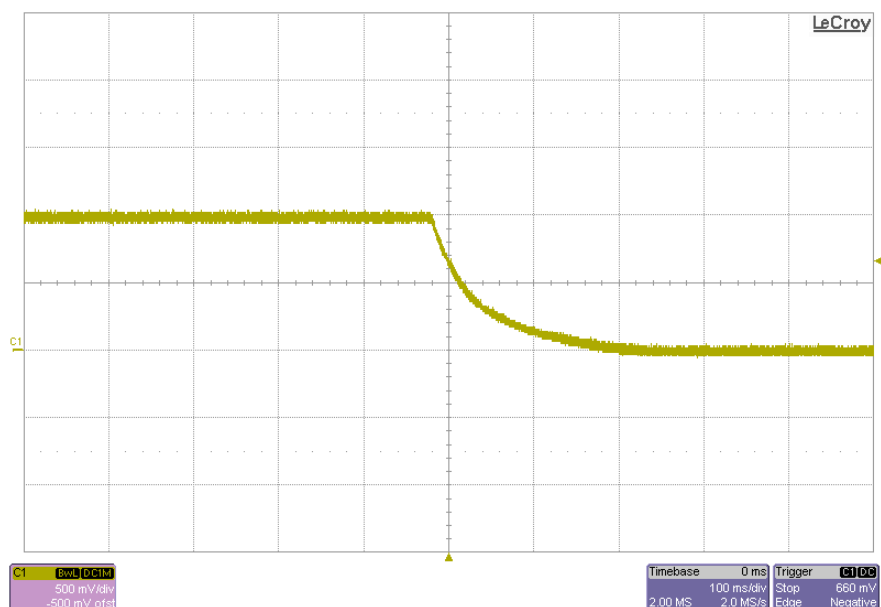
Channel 1 (yellow): VOUT (500mV/div)



2 Shutdown

The picture below shows the startup waveform. The input voltage is 12V, the output is loaded to a 10 Ω load.

Channel 1 (yellow): VOUT (500mV/div)



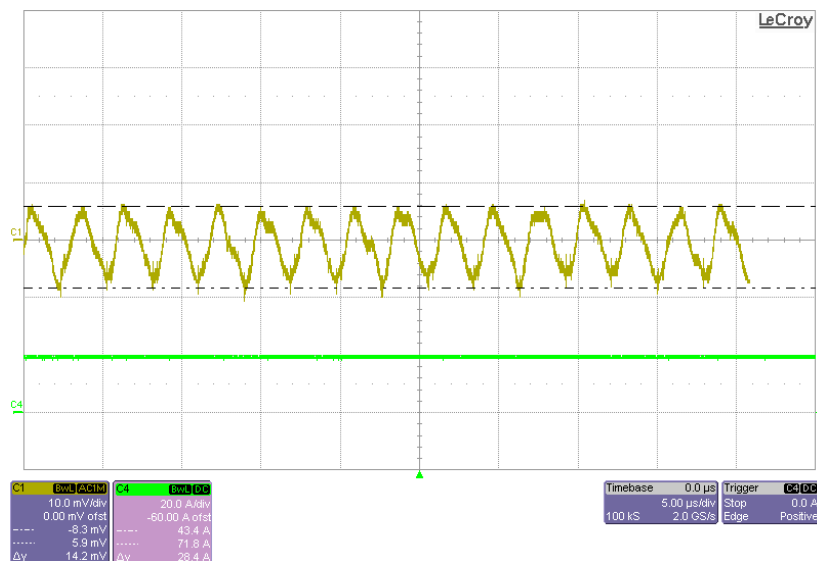
3 Output Voltage Ripple

The output voltage ripple for VOUT is shown in the figure below. The input is 12V. The output is fully loaded to 20A. Ripple is $< \pm 8\text{mV}$

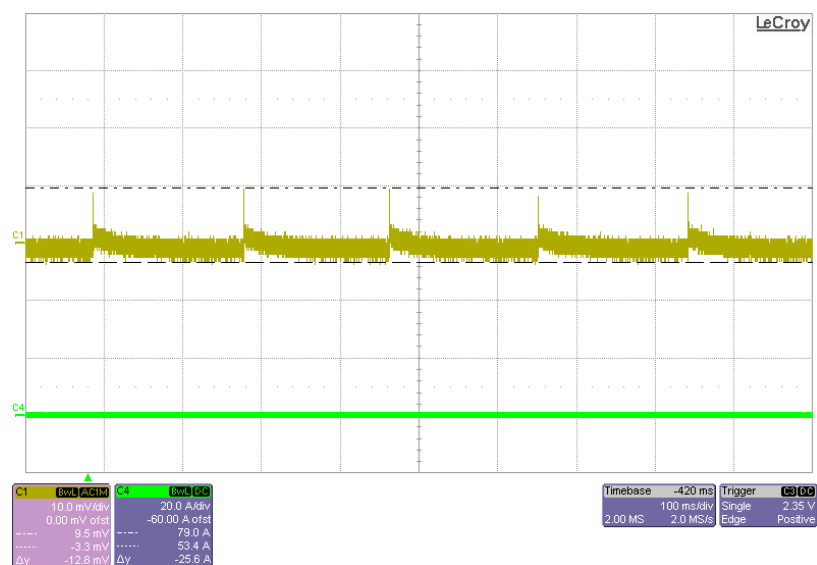
Channel 1 (yellow): VOUT (10mV/div)

Channel 4 (green): Output Current (20A/div)

Full Load:



No Load:

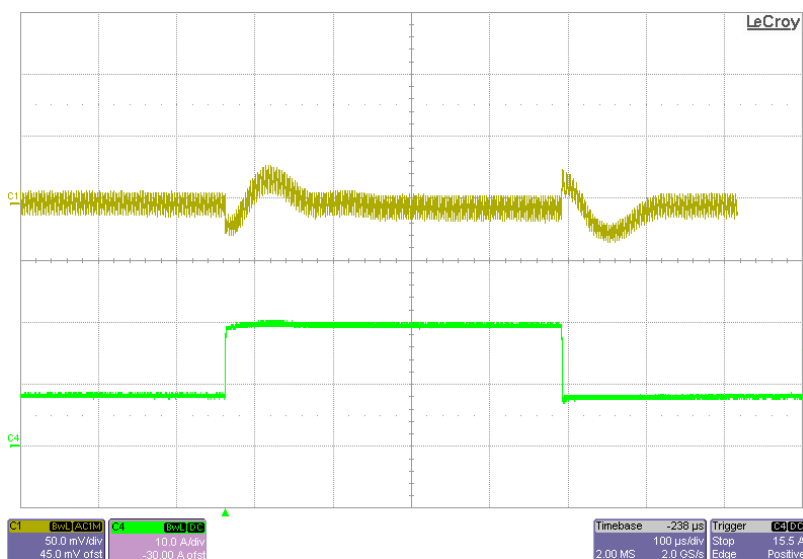


4 Load Transient

The transient response is shown in the figure below. The input voltage is 12V. The current is pulsed from 8A to 20A at 20A/us rise load slew. Output voltage change is $< \pm 30\text{mV}$.

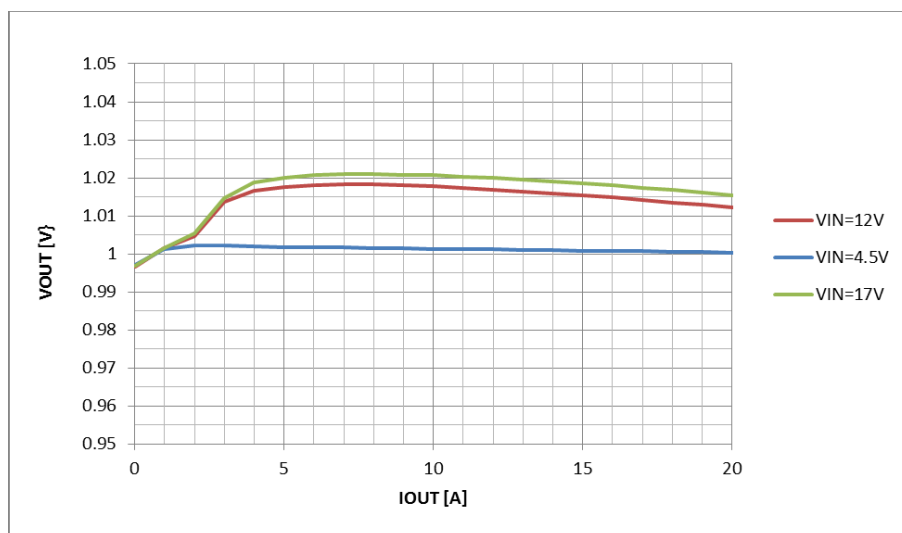
Channel 1 (yellow): VOUT output (50mV/div)

Channel 4 (green): Output Current (10A/div)



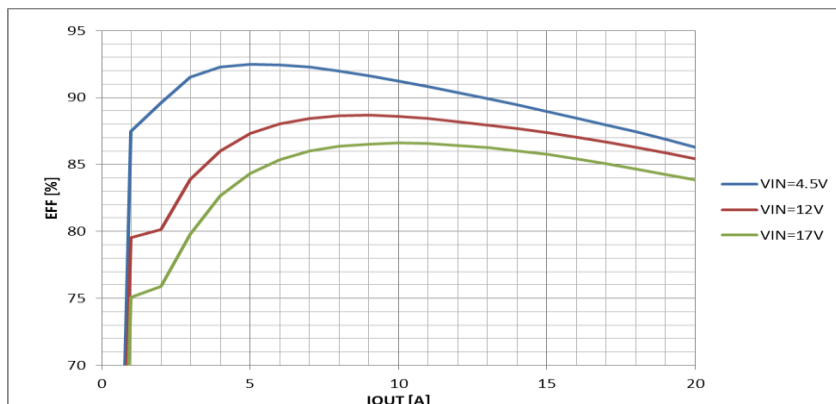
5 Load Regulation

A plot of the load regulation at VOUT is shown in the figure below. The load regulation is plotted vs load current for VIN=4.5, 12, & 17V.



6 Efficiency

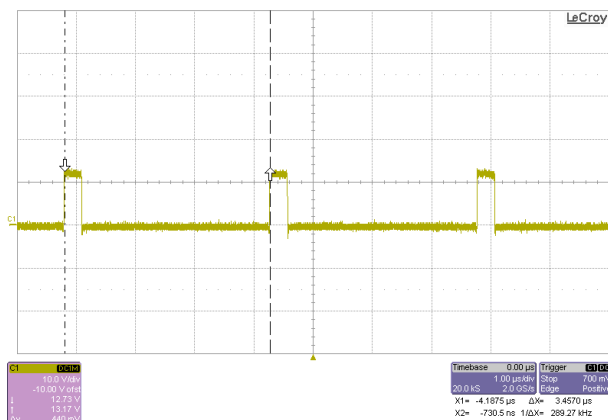
The efficiency of the converter is shown in the pictures below at VIN=4.5, 12, & 17V.



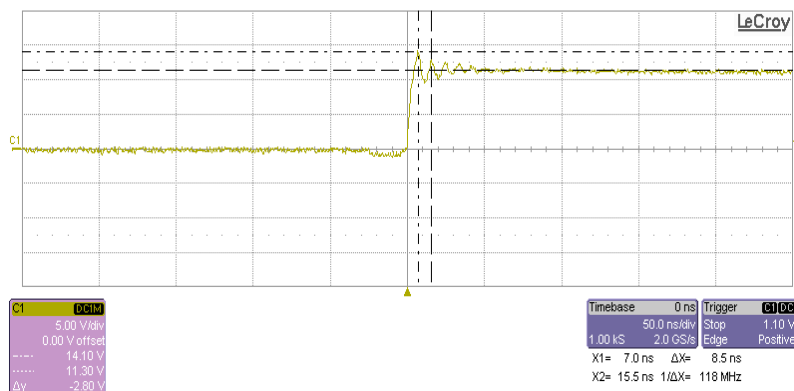
7 Switching Waveform

The waveform below shows the switch nodes. The input is 12V.

Channel 1 (yellow): SW pin output (10V/div)



Channel 1 (yellow): SW pin output (5V/div)



8 PMBus Voltage Scaling

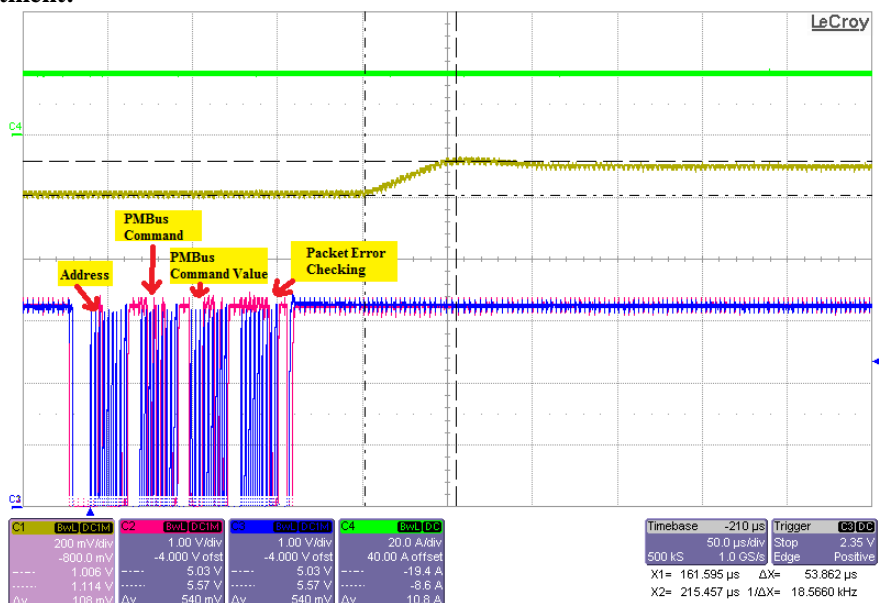
Channel 1 (Yellow): VOUT output (200mV/div)

Channel 1 (Pink): SDA pin output (1V/div)

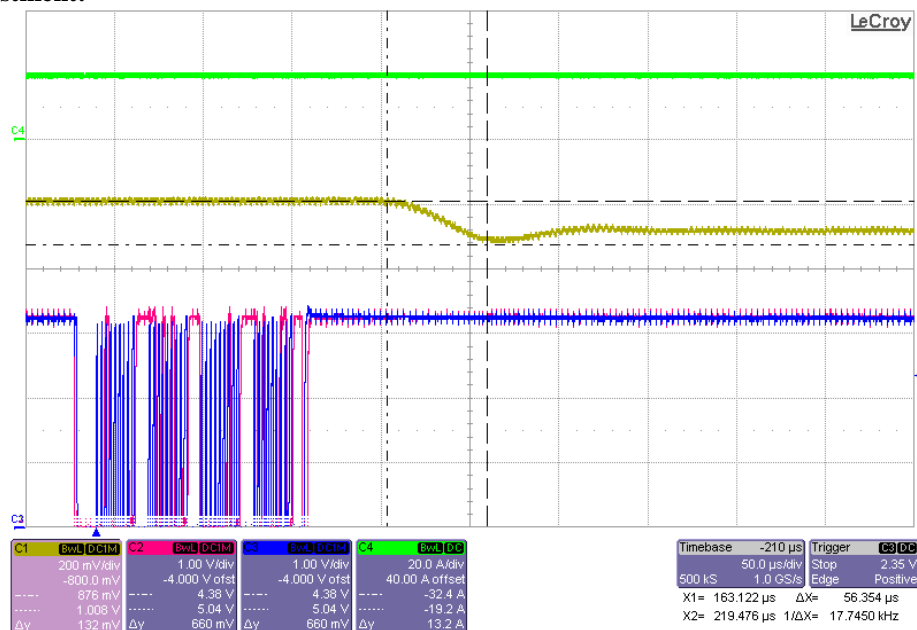
Channel 1 (Blue): SCL pin output (1V/div)

Channel 1 (Green): IOUT output (20V/div)

VOUT +9% Adjustment:



VOUT -9% Adjustment:



Fusion GUI Setup:

Fusion Digital Power Designer - TPS53819A/TPS53915 @ Address 16d - Texas Instruments

File Device Tools Help TPS53819A/TPS53915 @ Address 16d - Rail #1

Configure

Write to Hardware

☒ Auto write on rail or device change

Discard Changes

Store Config to NVM

Restore NVM Config

Clear Restore Notices

General All Config

ON_OFF_CONFIG

☒ EN Pin Only
The device ignores the on/off portion of the OPERATION command from serial bus. Power is converted when the EN pin is active.

☐ OPERATION Only
The device ignores the EN pin. Power is converted when the on/off portion of the OPERATION command is on.

☐ Both EN Pin & OPERATION
The EN pin must be active and the on/off portion of the OPERATION command on for the device to convert power.

MODE_SOFT_START_CONFIG

Soft Start Time: 1 ms

Under-Voltage Mode: ☒ Hiccup after UV
☐ Latch-off after UV

Conduction Mode: ☒ DCM
(For TPS53819A only) ☐ FCCM

DELAY_CONTROL

Power Good Delay Time: 1.024 ms

Power-On Delay Time: 1.124 ms

VOUT_ADJUSTMENT

Vout Adjustment: 9.00%

VOUT_MARGIN

Vout Margin High: 5.70%

Vout Margin Low: -5.20%

UVLO_THRESHOLD

VIN Turn-On UVLO Threshold: 4.25 V

FREQUENCY_CONFIG: TPS53819A (TPS5391x)

Switching Frequency: 425kHz (400kHz)

MANUFACTURER_INFO

7	6	5	4	3	2	1	0
0	0	0	0	0	0	0	0

WRITE_PROTECT

☐ Disable all writes except to the WRITE_PROTECT command

☐ Disable all writes except to the WRITE_PROTECT, OPERATION and PAGE commands

☐ Disable all writes except to the WRITE_PROTECT, OPERATION, PAGE, ON_OFF_CONFIG and VOUT_COMMAND commands

☒ Enable writes to all commands

Tips & Hints

ON_OFF_CONFIG [0x02]
Configures the combination of CONTROL pin input and serial bus commands needed to turn the unit on and off. This includes how the unit responds when power is applied.

PMBus Log

09:12:44.787: TPS53819A/TPS53915 @ 16d: VOUT_ADJUSTMENT [MFR 04,0xD4]: wrote VOA:-9.00% [00010b] [0x02] to RAM

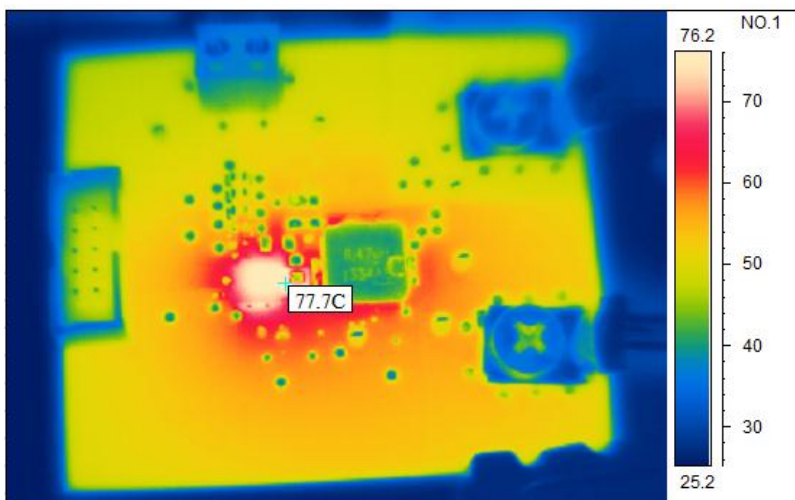
09:14:18.600: TPS53819A/TPS53915 @ 16d: VOUT_ADJUSTMENT [MFR 04,0xD4]: wrote VOA:0.00% [100000b] [0x10] to RAM

09:14:32.550: TPS53819A/TPS53915 @ 16d: VOUT_ADJUSTMENT [MFR 04,0xD4]: wrote VOA:9.00% [111101b] [0x1D] to RAM

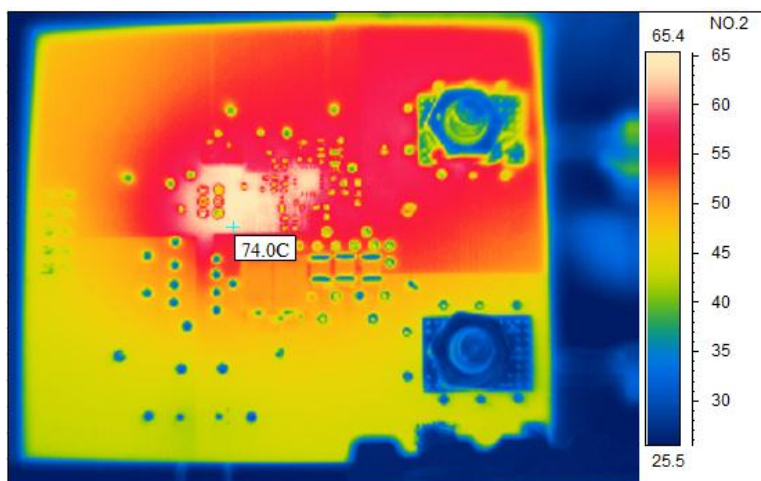
Fusion Digital Power Designer v1.9.18 [2014-02-20] TPS53819A/TPS53915 @ Address 16d USB Adapter v1.0.11 [PEC; 400 kHz; Alert: Open Drain; Clac] TEXAS INSTRUMENTS | fusion digital power

9 Thermal Profile

The figure below shows the thermal profile of the board at full load and $V_{in} = 12V$.

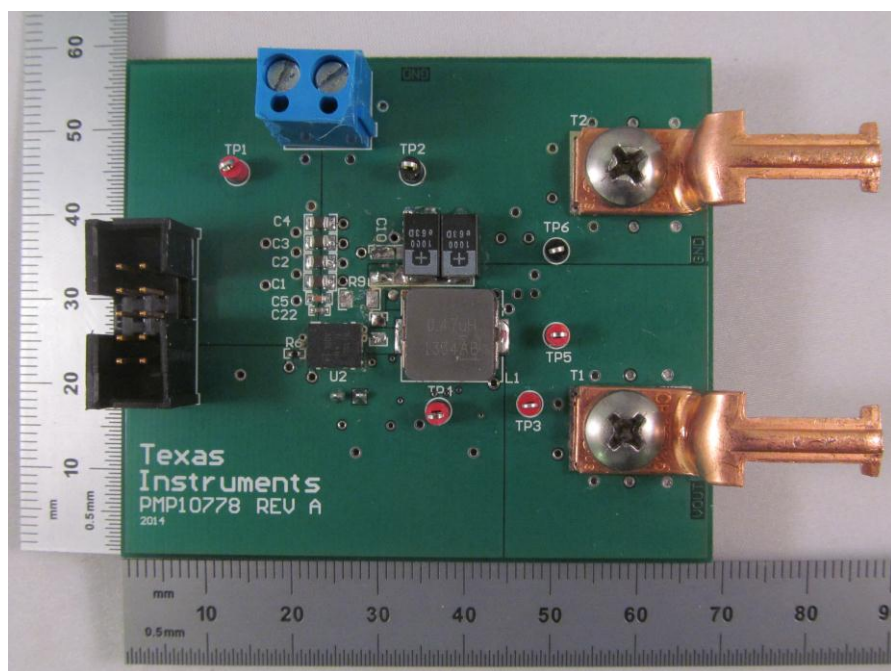


Front of Board

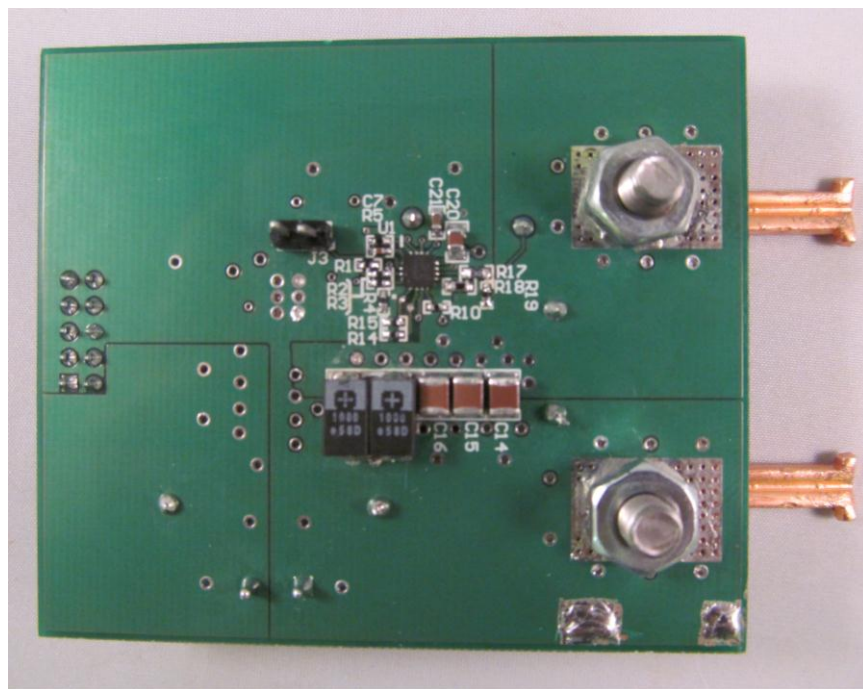


Back of Board

10 EVM Photo



Front of Board



Back of Board

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