



## PMP10488 TPS53355 Test Report

**11/10/2014**

The following test report is for the PMP10488 TPS53355:

VIN = 10V – 14V

VOUT = 0.667V at [0000]VID @ 20A

The tests performed were as follows:

1. Startup
2. Output Voltage Ripple
3. Load Transient
4. VID Transients
5. Load Regulation
6. Efficiency
7. Switching Waveform
8. Thermal Profile
9. EVM Photo

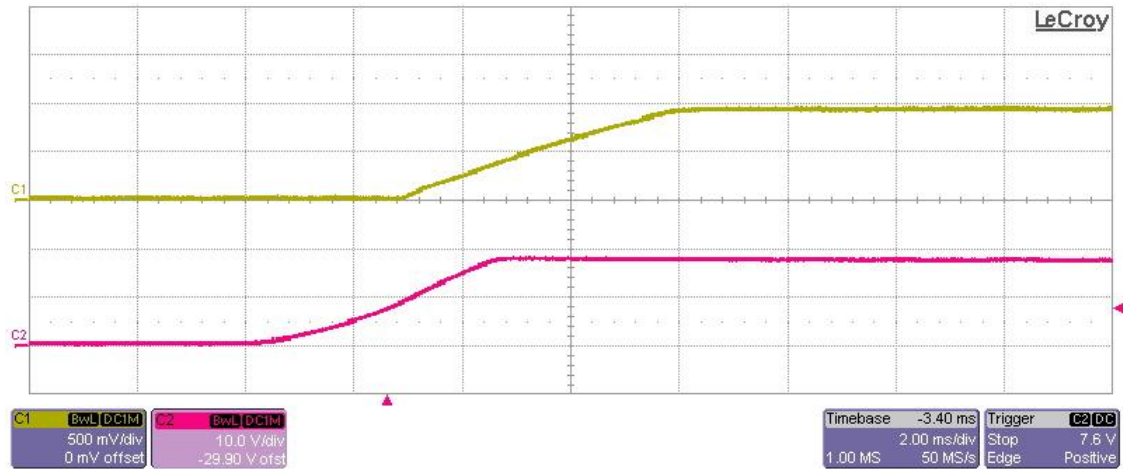
Max Load (PGOOD goes to 0V): 26A

## 1 Startup

The picture below shows the startup waveform. The input voltage is 14V, the output is not loaded. The time-base is set to 2ms/division.

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

Channel 2 (pink): VIN (10V/div)



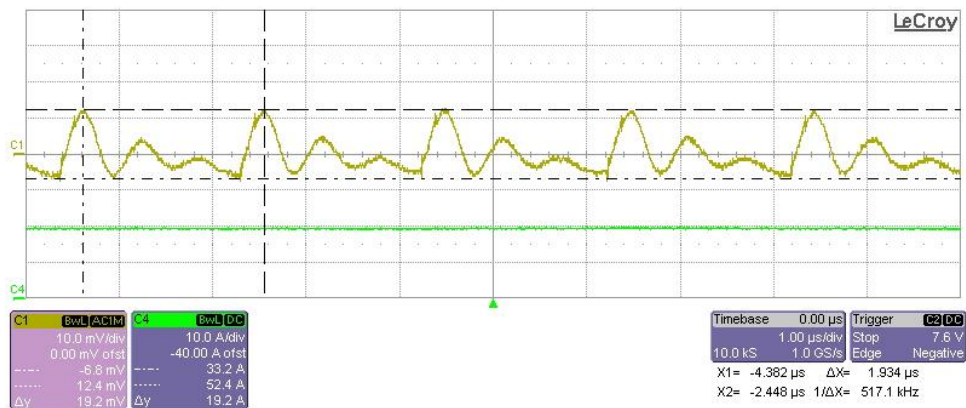
## 2 Output Voltage Ripple

The output voltage ripple for VOUT is shown in the figure below. The input is 14V. The output is fully loaded to 20A.

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

Channel 4 (green): VIN (10A/div)

Output voltage ripple = 19.2mV

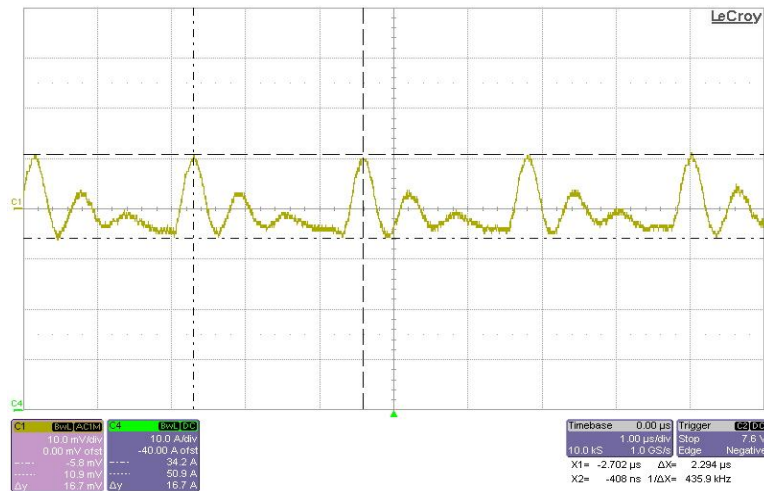


*No Load:*

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

Channel 4 (green): VIN (10A/ div)

Output voltage ripple = 16.7mV

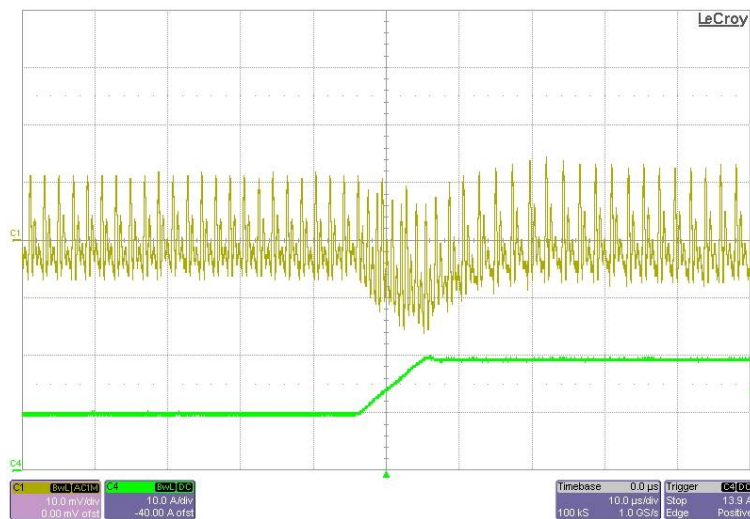


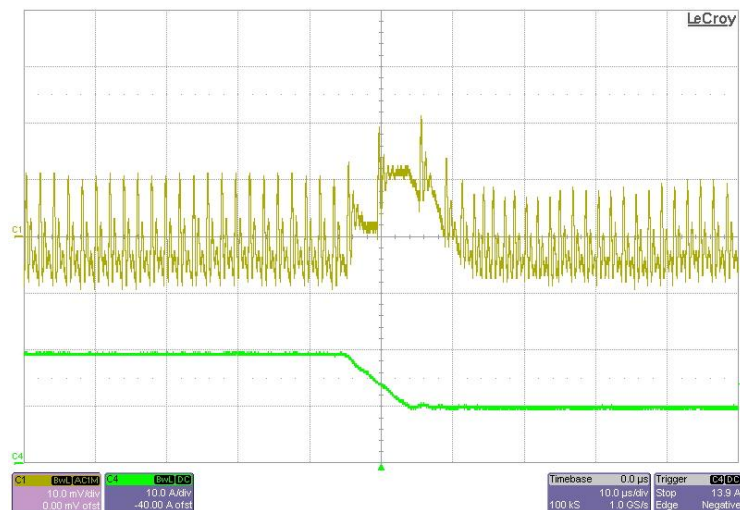
### 3 Load Transient

The transient response is shown in the figure below. The input voltage is 14V. The current is pulsed from 10A to 20A.

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

Channel 4 (green): Output Current (500mA/div)





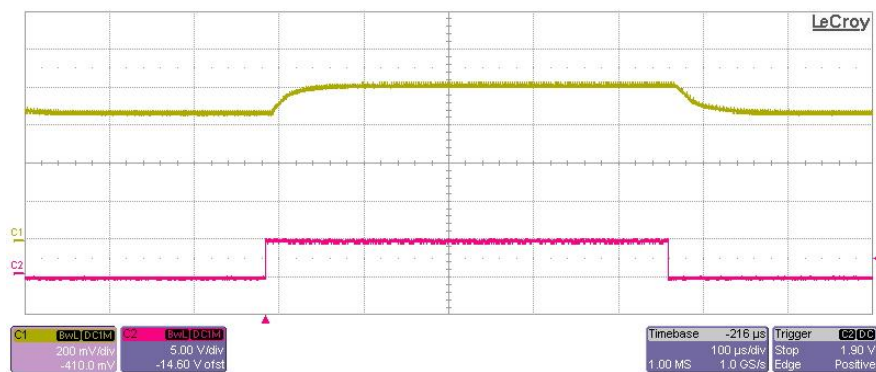
## 4 VID Transients

The transient response for switching between VID = [0000] to VIN = [1000] is shown in the figure below. The input voltage is 14V.

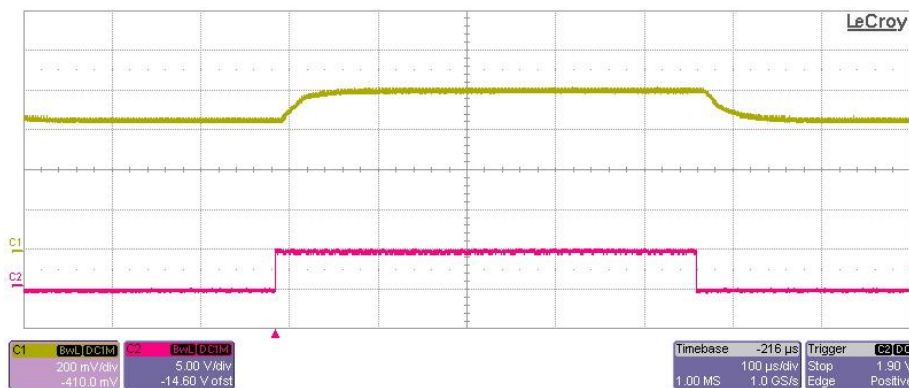
Channel 1 (yellow): VOUT output (200mV/div)

Channel 2 (pink): VID Most Significant Bit (5V/div)

*No Load:*

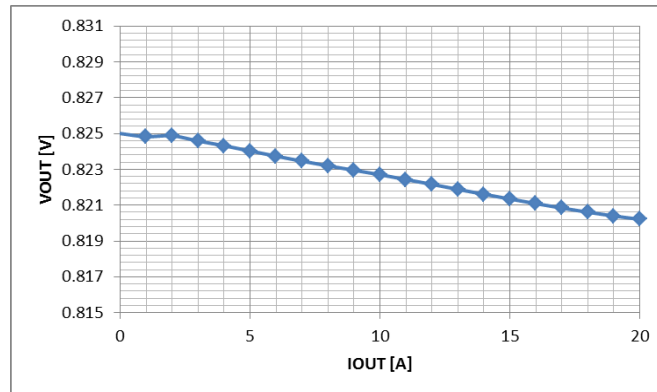


*Full Load (20A):*



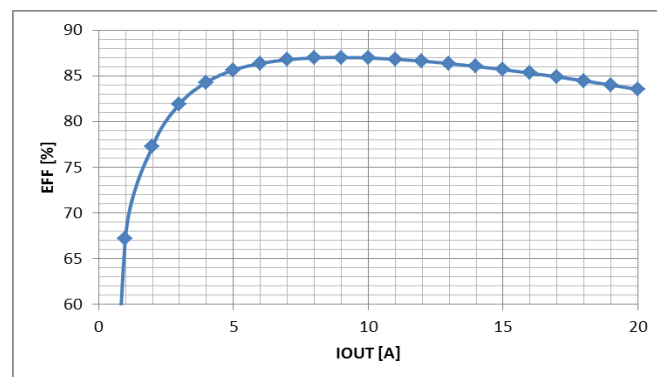
## 5 Load Regulation

A plot of the load regulation at  $V_{OUT}$  is shown in the figure below. The load regulation is plotted vs load current for  $V_{IN}=12V$  and  $V_{ID} = [1000]$ .



## 6 Efficiency

The efficiency of the converter is shown in the picture below at  $V_{IN}=12V$  and  $V_{ID} = [1000]$ .



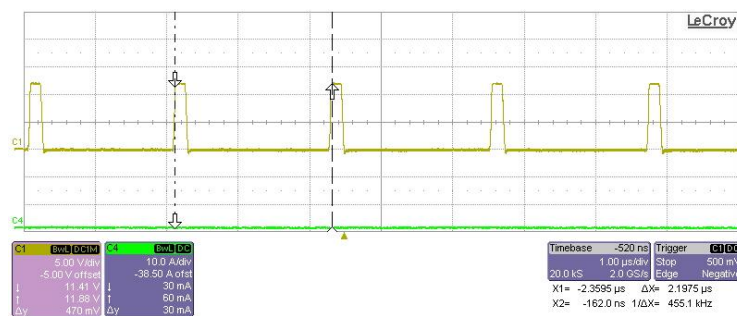
## 7 Switching Waveform

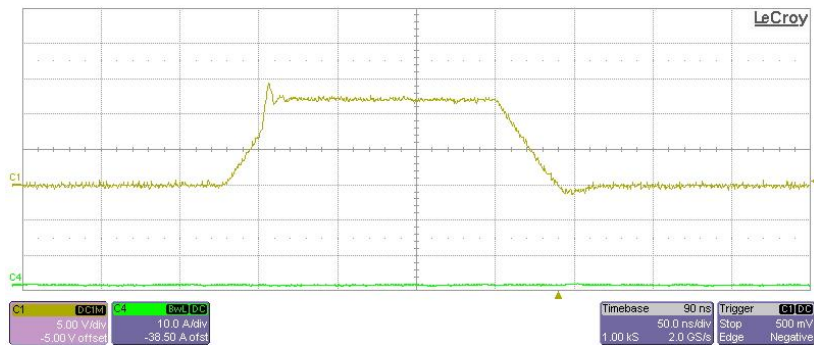
The waveform below shows the switch node. The input is 14V.

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

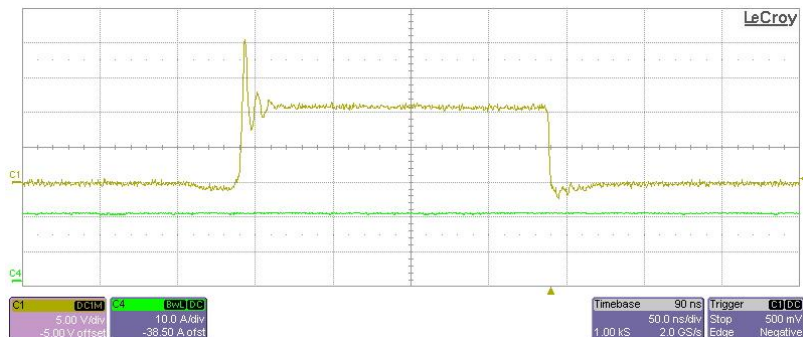
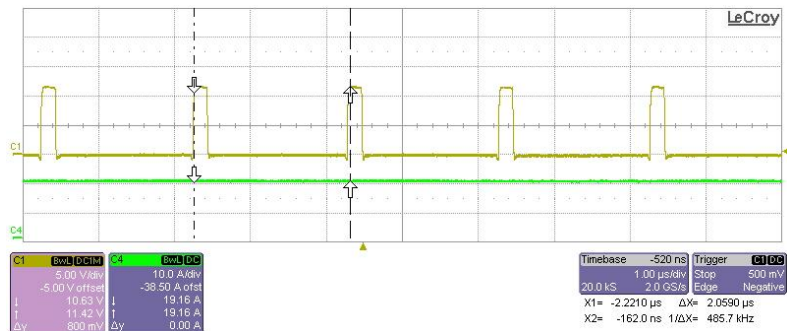
Channel 4 (green): Output Current (10A/div)

No Load:

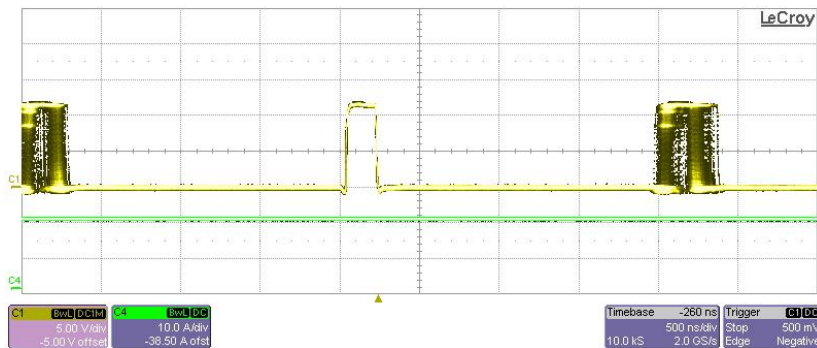




Full Load (20A):



Switch node jitter at full load (20A):

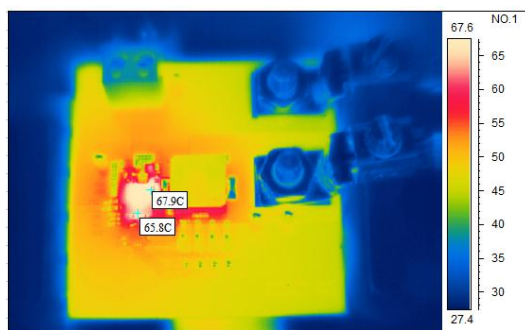


## 8 Vid Vs. VOUT

VID	VOUT @ 0A	VOUT @ 5A	VOUT @ 10A	VOUT @ 20A
0000	0.6746V	0.6707	0.6695	0.6677V
0001	0.6937V	0.6897	0.6884	0.6865V
0010	0.7123V	0.7090	0.7077	0.7052V
0011	0.7311V	0.7279	0.7265	0.7231V
0100	0.7501V	0.7473	0.7459	0.7432V
0101	0.7691V	0.7662	0.7649	0.7623V
0110	0.7883V	0.7856	0.7842	0.7816V
0111	0.8071V	0.8045	0.8071	0.8004V
1000	0.8264V	0.8238	0.8224	0.8198V
1001	0.8453V	0.8529	0.8414	0.8387V
1010	0.8647V	0.8623	0.8609	0.8581V
1011	0.8837V	0.8814	0.8800	0.8771V
1100	0.9030V	0.9008	0.8993	0.8965V
1101	0.9220V	0.9198	0.9184	0.9154V
1110	0.9413V	0.9391	0.9376	0.9348V
1111	0.9605V	0.9582	0.9567	0.9542V

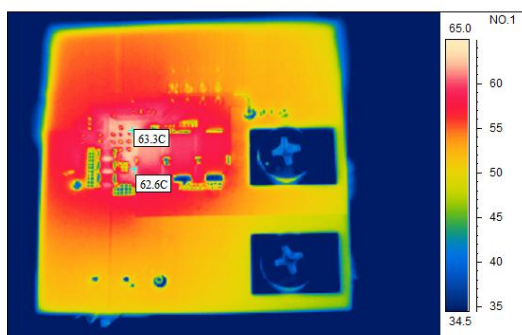
## 9 Thermal Profile

The figure below shows the thermal profile of the board at full load.



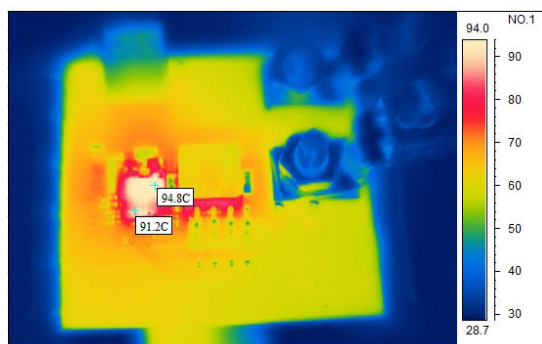
Front of Board (IC Case)  
Max Temp = 67.9°C



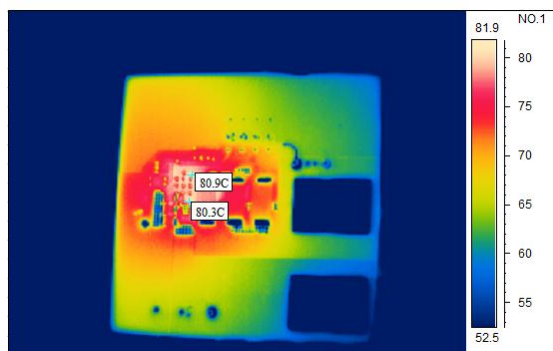


Back of Board (IC Case)  
Max Temp = 63.3°C

The figure below shows the thermal profile of the board at 25A (Max Load = 30A).



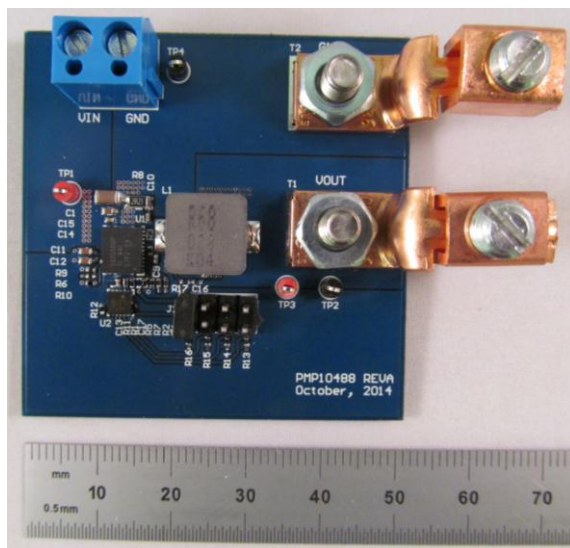
Front of Board (IC Case)  
Max Temp = 94.8°C



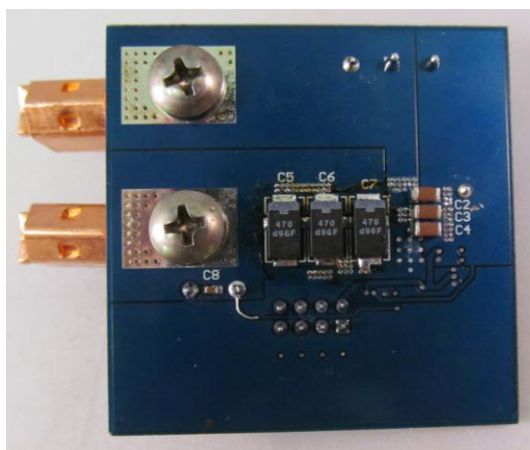
Back of Board (IC Case)  
Max Temp = 80.9°C



## 10 EVM Photo



Front of Board



Back of Board

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