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)

![Startup waveform](image)

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

![Output voltage ripple](image)
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 VOUT is shown in the figure below. The load regulation is plotted vs load current for VIN=12V and VID = [1000].

![Load Regulation Graph](image)

6 Efficiency
The efficiency of the converter is shown in the picture below at VIN=12V and VID = [1000].

![Efficiency Graph](image)

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:*

![Switching Waveform](image)
Full Load (20A):

Switch node jitter at full load (20A):
8 Vid Vs. VOUT

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

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

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

**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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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
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