PMP5832 Test Report

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Operating Parameters

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<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_{in}</td>
<td>26</td>
<td>28</td>
<td>30</td>
<td>V</td>
</tr>
<tr>
<td>V_{out}</td>
<td>1.05</td>
<td>5</td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>I_{out}</td>
<td>2</td>
<td>3</td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>F_{switching}</td>
<td>500</td>
<td>1000</td>
<td></td>
<td>kHz</td>
</tr>
</tbody>
</table>
1 PMP5832 Board Image
2 Block Diagram

28V

TPS40055
250 kHz

5V @ 8A

TPS54319
1 MHz

1.05V @ 2A

1.5V @ 3A

TPS54319
1 MHz

1.2V @ 3A

TPS54319
1 MHz

1.8V @ 2A

TPS54319
500 kHz

3.3V @ 10A

1.05V @ 2A

1.5V @ 3A

1.2V @ 3A

1.8V @ 2A

2.5V @ 2A
### 3 TPS40055 – 5.0V Output

#### 3.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop Bandwidth</td>
<td>V\textsubscript{in}=28V, I\textsubscript{out}=8A</td>
<td>31.92</td>
<td>kHz</td>
<td>kHz</td>
<td></td>
</tr>
<tr>
<td>Phase Margin</td>
<td>V\textsubscript{in}=28V, I\textsubscript{out}=8A</td>
<td>74.37</td>
<td>°</td>
<td>°</td>
<td></td>
</tr>
<tr>
<td>Output Voltage Ripple</td>
<td>I\textsubscript{out}=8A</td>
<td>15.5</td>
<td>mV</td>
<td>mV</td>
<td></td>
</tr>
<tr>
<td>Maximum Efficiency</td>
<td></td>
<td>90.6</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Load Regulation</td>
<td>V\textsubscript{in}=28V, I\textsubscript{out}=0A to 8A</td>
<td>0.5</td>
<td>%</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Switching Frequency</td>
<td></td>
<td>264</td>
<td>kHz</td>
<td>kHz</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Start-up Waveform

\[ V_{in} = 28V, V_{out} = 5V, I_{out} = 100mA \]

3.3 Switch Node

\[ V_{in} = 28V, V_{out} = 5V, I_{out} = 8A \]
3.4 Output Voltage Ripple

$V_{in} = 28\text{V}$, $V_{out} = 5\text{V}$, $I_{out} = 8\text{A}$
3.5 Loop Response

\[ \text{Phase margin} = 74.37 \text{ @ } 31.92 \text{ kHz} \]

3.6 Transient Response

\[ \text{Phase margin} = 74.37 \text{ @ } 31.92 \text{ kHz} \]
3.7 Efficiency

$V_{\text{out}} = 5\, \text{V}$, $I_{\text{out}} = 0\, \text{A}$ to $8\, \text{A}$
3.8 Load Regulation

\[ V_{\text{out}} = 5V, \quad I_{\text{out}} = 0A \text{ to } 8A \]

Output Voltage vs. Output Current

4. TPS40055 – 3.3V Output

4.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop Bandwidth</td>
<td>( V_{\text{in}}=28V, \quad I_{\text{out}}=10A )</td>
<td>21.96</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>Phase Margin</td>
<td>( V_{\text{in}}=28V, \quad I_{\text{out}}=10A )</td>
<td>62.03</td>
<td></td>
<td></td>
<td>(^\circ)</td>
</tr>
<tr>
<td>Output Voltage Ripple</td>
<td>( I_{\text{out}}=10A )</td>
<td>11.9</td>
<td></td>
<td></td>
<td>mV</td>
</tr>
<tr>
<td>Maximum Efficiency</td>
<td></td>
<td>87.6</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>( V_{\text{in}}=28V, \quad I_{\text{out}}=0A \text{ to } 10A )</td>
<td>0.8</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Switching Frequency</td>
<td></td>
<td>268</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
</tbody>
</table>
4.2 **Startup Waveform**

\[ V_{in} = 28V, V_{out} = 3.3V, I_{out} = 150A \]

4.3 **Switch Node**

\[ V_{in} = 28V, V_{out} = 3.3V, I_{out} = 10A \]
4.4 Output Voltage Ripple

\[ V_{\text{in}} = 28\, \text{V}, \quad V_{\text{out}} = 3.3\, \text{V}, \quad I_{\text{out}} = 10\, \text{A} \]
4.5 Loop Response

\[ V_{in} = 28\text{V}, V_{out} = 3.3\text{V}, I_{out} = 10\text{A} \]

Phase Margin = 62.03 @ 21.96k

4.6 Transient Response

\[ V_{in} = 28\text{V}, V_{out} = 3.3\text{V}, I_{out} = 5\text{A} \text{ to } 10\text{A} \]
### 4.7 Efficiency

\[ V_{\text{in}} = 28V, \ V_{\text{out}} = 3.3V, \ I_{\text{out}} = 0A \text{ to } 10A \]

![Efficiency vs. Output Current](image)

The efficiency chart shows the efficiency (%) vs. output current (A) for different input voltages. The chart indicates that the efficiency remains high across a wide range of output currents, with slight variations depending on the input voltage level.
4.8 Load Regulation

\[ V_{in} = 28V, V_{out} = 3.3V, I_{out} = 0A \text{ to } 10A \]

![Output Voltage vs. Output Current](image)

5 TPS54319 – 1.05V Output

5.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop Bandwidth</td>
<td>( V_{in}=5V, I_{out}=2A )</td>
<td>29.65</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>Phase Margin</td>
<td>( V_{in}=5V, I_{out}=2A )</td>
<td>62.05</td>
<td></td>
<td></td>
<td>°</td>
</tr>
<tr>
<td>Output Voltage Ripple</td>
<td>( I_{out}=2A )</td>
<td>4.6</td>
<td></td>
<td></td>
<td>mV</td>
</tr>
<tr>
<td>Maximum Efficiency</td>
<td></td>
<td>90.7</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>( V_{in}=5V, I_{out}=0A \text{ to } 2A )</td>
<td>0.2</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Switching Frequency</td>
<td></td>
<td>941</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
</tbody>
</table>
5.2 **Startup Waveform**

$V_{in} = 5\, \text{V}, V_{out} = 1.05\, \text{V}, I_{out} = 100\, \text{mA}$

5.3 **Switch Node**

$V_{in} = 5\, \text{V}, V_{out} = 1.05\, \text{V}, I_{out} = 2\, \text{A}$
5.4 Output Voltage Ripple

\( V_{in} = 5V, \ V_{out} = 1.05V, \ I_{out} = 2A \)
5.5 *Loop Response*

\[ V_{in} = 5V, V_{out} = 1.05V, I_{out} = 2A \]

Phase Margin = 62.05 @ 29.65

5.6 *Transient Response*

\[ V_{in} = 5V, V_{out} = 1.05V, I_{out} = 1A \text{ to } 2A \]
5.7 Efficiency

\[ V_{in} = 5V, V_{out} = 1.05V \]

Efficiency vs. Output Current

![Graph showing efficiency vs. output current]
5.8 Load Regulation

\[ V_{\text{in}} = 5V, V_{\text{out}} = 1.05V \]

![Output Voltage vs. Output Current](image)

6 TPS54319 – 1.5V Output

6.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop Bandwidth</td>
<td>(V_{\text{in}}=5V, I_{\text{out}}=3A)</td>
<td>22.13</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>Phase Margin</td>
<td>(V_{\text{in}}=5V, I_{\text{out}}=3A)</td>
<td>62.85</td>
<td></td>
<td></td>
<td>°</td>
</tr>
<tr>
<td>Output Voltage Ripple</td>
<td>(I_{\text{out}}=3A)</td>
<td>3.6</td>
<td></td>
<td></td>
<td>mV</td>
</tr>
<tr>
<td>Maximum Efficiency</td>
<td></td>
<td>93.2</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>(V_{\text{in}}=5V, I_{\text{out}}=0) to 3A</td>
<td>0.6</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Switching Frequency</td>
<td></td>
<td>943</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
</tbody>
</table>
6.2 Startup Waveform

\[ V_{in} = 5V, V_{out} = 1.5V, I_{out} = 150mA \]

6.3 Switch Node

\[ V_{in} = 5V, V_{out} = 1.5V, I_{out} = 3A \]
6.4 **Output Voltage Ripple**

$V_{in} = 5V$, $V_{out} = 1.5V$, $I_{out} = 3A$
6.5 Loop Response

\[ V_{in} = 5V, \ V_{out} = 1.5V, \ I_{out} = 3A \]

Phase Margin = 62.85 @ 22.13 kHz

6.6 Load Transient

\[ V_{in} = 5V, \ V_{out} = 1.5V, \ I_{out} = 1.5A \text{ to } 3A \]
6.7 **Efficiency**

\[ V_{in} = 5V, \ V_{out} = 1.5V \]

**Efficiency vs. Output Current**

![Graph showing efficiency vs. output current](image-url)
6.8 Load Regulation

\[ V_{in} = 5V, V_{out} = 1.5V \]

![Output Voltage vs. Output Current](image)

7 TPS54319 – 1.2V Output

7.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop Bandwidth</td>
<td>( V_{in}=3.3V , I_{out}=3A )</td>
<td>25.69</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>Phase Margin</td>
<td>( V_{in}=3.3V , I_{out}=3A )</td>
<td>56.45</td>
<td></td>
<td></td>
<td>°</td>
</tr>
<tr>
<td>Output Voltage Ripple</td>
<td>( I_{out}=3A )</td>
<td>2.7</td>
<td></td>
<td></td>
<td>mV</td>
</tr>
<tr>
<td>Maximum Efficiency</td>
<td></td>
<td>93.1</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>( V_{in}=3.3V, I_{out}= 0A to 3A )</td>
<td>0.6</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Switching Frequency</td>
<td></td>
<td>928</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
</tbody>
</table>
7.2 Startup Waveform

\[ V_{\text{in}} = 3.3V, \quad V_{\text{out}} = 1.2V, \quad I_{\text{out}} = 150mA \]

7.3 Switch Node

\[ V_{\text{in}} = 3.3V, \quad V_{\text{out}} = 1.2V, \quad I_{\text{out}} = 3A \]
7.4 Output Voltage Ripple

$V_{in} = 3.3\text{V}, V_{out} = 1.2\text{V}, I_{out} = 3\text{A}$
7.5 Loop Response

\[ V_{in} = 3.3V, \ V_{out} = 1.2V, \ I_{out} = 3A \]

Phase Margin = 56.45 @ 25.69 kHz

7.6 Load Transient

\[ V_{in} = 3.3V, \ V_{out} = 1.2V, \ I_{out} = 1.5A \text{ to } 3A \]
7.7 Efficiency

\[ V_{in} = 3.3\text{V}, \quad V_{out} = 1.2\text{V} \]
7.8 Load Regulation

$V_{\text{in}} = 3.3\, \text{V}, \, V_{\text{out}} = 1.2\, \text{V}$

![Output Voltage vs. Output Current](image)

8 TPS54319 – 1.8V Output

8.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop Bandwidth</td>
<td>$V_{\text{in}}=3.3, \text{V}, , I_{\text{out}}=2, \text{A}$</td>
<td>27.49</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>Phase Margin</td>
<td>$V_{\text{in}}=3.3, \text{V}, , I_{\text{out}}=2, \text{A}$</td>
<td>60.1</td>
<td></td>
<td></td>
<td>$^\circ$</td>
</tr>
<tr>
<td>Output Voltage Ripple</td>
<td>$I_{\text{out}}=2, \text{A}$</td>
<td>2.3</td>
<td></td>
<td></td>
<td>mV</td>
</tr>
<tr>
<td>Maximum Efficiency</td>
<td></td>
<td>95.5</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>$V_{\text{in}}=3.3, \text{V}, , I_{\text{out}}=0, \text{A} \text{ to } 2, \text{A}$</td>
<td>0.8</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Switching Frequency</td>
<td></td>
<td>932</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
</tbody>
</table>
8.2 Startup Waveform

\( V_{in} = 3.3\text{V}, V_{out} = 1.8\text{V}, I_{out} = 150\text{mA} \)

8.3 Switch Node

\( V_{in} = 3.3\text{V}, V_{out} = 1.8\text{V}, I_{out} = 2\text{A} \)
8.4 Output Voltage Ripple

\[ V_{in} = 3.3\, V, \quad V_{out} = 1.8\, V, \quad I_{out} = 2\, A \]
8.5 *Loop Response*

\[ V_{in} = 3.3V, \ V_{out} = 1.8V, \ I_{out} = 2A \]

Phase Margin = 60.1 @ 27.49 kHz

8.6 *Load Transient*

\[ V_{in} = 3.3V, \ V_{out} = 1.8V, \ I_{out} = 1A \text{ to } 2A \]
8.7 Efficiency

\[ V_{in} = 3.3V, V_{out} = 1.8V \]
8.8 Load Regulation

\[ V_{in} = 3.3V, \ V_{out} = 1.8V \]

Output Voltage vs. Output Current

9 TPS54319 – 2.5V Output

9.1 Performance Summary

Performance parameters below represent data obtained from the PMP5832 design; changes to the design, component selection or layout may result in varied performance.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Test Conditions</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop Bandwidth</td>
<td>[ V_{in}=3.3V, \ I_{out}=2A ]</td>
<td>33.88</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
<tr>
<td>Phase Margin</td>
<td>[ V_{in}=3.3V, \ I_{out}=2A ]</td>
<td>51.89</td>
<td></td>
<td></td>
<td>°</td>
</tr>
<tr>
<td>Output Voltage Ripple</td>
<td>[ I_{out}=2A ]</td>
<td>2.7</td>
<td></td>
<td></td>
<td>mV</td>
</tr>
<tr>
<td>Maximum Efficiency</td>
<td></td>
<td>97.4</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Load Regulation</td>
<td>[ V_{in}=3.3V, \ I_{out} = 0A to 2A ]</td>
<td>0.2</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Switching Frequency</td>
<td></td>
<td>463</td>
<td></td>
<td></td>
<td>kHz</td>
</tr>
</tbody>
</table>
9.2 Startup Waveform

$V_{in} = 3.3\text{V}, V_{out} = 2.5\text{V}, I_{out} = 150\text{mA}$

9.3 Switch Node

$V_{in} = 3.3\text{V}, V_{out} = 2.5\text{V}, I_{out} = 2\text{A}$
9.4 **Output Voltage Ripple**

\[ V_{\text{in}} = 3.3\text{V}, \ V_{\text{out}} = 2.5\text{V}, \ I_{\text{out}} = 2\text{A} \]
9.5 Loop Response

\[ V_{in} = 3.3V, \ V_{out} = 2.5V, \ I_{out} = 2A \]

Phase Margin = 51.89 @ 33.88 kHz

9.6 Load Transient

\[ V_{in} = 3.3V, \ V_{out} = 2.5V, \ I_{out} = 1A \text{ to } 2A \]
9.7 Efficiency

$V_{in} = 3.3V$, $V_{out} = 2.5V$
9.8 Load Regulation

$V_{in} = 3.3V$, $V_{out} = 2.5V$

Output Voltage vs. Output Current

![Graph showing output voltage regulation](image-url)
10 Thermal Image

3.3V, 1.2V @ 3A, 1.8V @ 2A, 2.5V @ 2A after 2 hours
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