Test Data
For PMP9386
3/24/2014

TEXAS INSTRUMENTS
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1. Design Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vin Minimum</td>
<td>14VDC</td>
</tr>
<tr>
<td>Vin Maximum</td>
<td>15.5VDC</td>
</tr>
<tr>
<td>Vout</td>
<td>24VDC</td>
</tr>
<tr>
<td>Iout</td>
<td>8A Max.</td>
</tr>
<tr>
<td>Approximate Switching Frequency</td>
<td>125KHz per Phase (250KHz Effective)</td>
</tr>
</tbody>
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2. Circuit Description

PMP9386 is a Dual-Phase Synchronous Boost Converter which accepts an input voltage of 14Vin to 15.5Vin and provides an output of 24Vout capable of supplying a maximum of 8A of current to the load. This design was built on the PMP9309 REVC PCB (4-layered board; 2 oz. Copper on Top and Bottom layers, 1 oz. Copper on two inner layers). Design uses two LM5122 Synchronous Boost controllers and CSD18531Q5A FETs. All tests in this report were performed at the highest input current condition of 14Vin.
3. PMP9386 Board Photos

Board Dimensions: 7” x 6.5”

Board Photo (Top)
4. Thermal Data

IR thermal image taken at steady state with 14Vin and 8A load (no airflow)
5. Efficiency

5.1 Efficiency Chart

![Efficiency Chart](image)

5.2 Efficiency Data

<table>
<thead>
<tr>
<th>Vin (V)</th>
<th>Iin (A)</th>
<th>Vout (V)</th>
<th>Iout (A)</th>
<th>Pin (W)</th>
<th>Pout (W)</th>
<th>Efficiency (%)</th>
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<tr>
<td>14.081</td>
<td>1.457</td>
<td>24.201</td>
<td>0.7988</td>
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<td>14.056</td>
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<td>40.20016</td>
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<td>14.031</td>
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<td>99.10422</td>
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<td>97.6</td>
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<td>198.4895</td>
<td>193.3708</td>
<td>97.4</td>
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6 Waveforms

6.1 Load Transient Response

Load Transient Response at 14Vin and 50%-to-100% (4A-to-8A) Load Step
6.2 Startup

Startup into No Load at 14Vin
Startup into Full (8A) Load at 14Vin
6.3 Output Voltage Ripple and Switch Node Voltage

Switch Node Voltage and Output Voltage Ripple at 14Vin and No Load (Vripple ≈ 130mVp-p)
Switch Node Voltage and Output Voltage Ripple at 14Vin and Full (8A) Load (Vripple = 700mVp-p)
7 Loop Frequency Response

Loop Frequency Response at 14Vin and Full (8A) Load

(Phase Margin = 65 degrees; Gain Margin = -8 dB; Cutoff Frequency ≈ 8KHz)
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