Test Data
For PMP7919
2/20/2013
### Test Report PMP7919

<table>
<thead>
<tr>
<th><strong>Vin</strong></th>
<th>5.5V – 16V (change input/output caps and FETs if need to handle load dump)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vout</strong></td>
<td>11.84V</td>
</tr>
<tr>
<td><strong>Iout Max</strong></td>
<td>15A</td>
</tr>
<tr>
<td><strong>Fsw</strong></td>
<td>450kHz per phase</td>
</tr>
</tbody>
</table>

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**FABRICATION**

Board Dimensions: 4” x 3”

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![Top Side](image-url)
Note: Q1 to Q8 are BSC050NE2LS
Thermal Image #1...

Vin = 9.5V
Iout = 15A

FETs... CSD16415’s
25V
Rds_on = 1.5mΩ (Vgs=4.5V)
Qg = 21nC (Vgs=4.5V)

Comments...Board was on for 3 minutes at Vin 9.5 volts at max load 15A. (Notice Q3 and Q4 approaching 91°C)
**Thermal Image #2...**

Vin = 13V  
Iout = 15A  
FETs... CSD16415’s  
25V  
Rds_on= 1.5mΩ (Vgs=4.5V)  
Qg = 21nC (Vgs=4.5V)

Comments... Notice Board is absorbing most of the heat on high side
Thermal Image #3...

Vin = 10V
I_{out} = 15A
FETs...BSC050NE2LS’s
25V
R_{ds\_on} = 3\,\text{m}\Omega
Q_{g} = 10.4\,\text{nC}

Comments...
Thermal Image #4...

Vin = 10.5V
Iout = 15A
FETs...
V
Rds_on= mΩ
Qg = nC

Comments...

Vin 10.5 Volts load is at 15A with the 40V FET’s (CSD16413Q5A) All 8 of them. Max Temp is 72C.
Thermal Image #5...

Vin = 10V
Iout = 15A
FETs...

V
Rds_on= mΩ
Qg = nC

Comments...

Vin 10.5 Volts load is at 15A with the 40V FET’s (CSD16413Q5A) Q4 and Q8 are removed. Max Temp is 77C.
**Efficiency Curve** with original FETs CSD16415

![Efficiency Curve](image)

**Efficiency Curve Data**

<table>
<thead>
<tr>
<th>Vin</th>
<th>lin</th>
<th>Vout</th>
<th>Iout</th>
<th>Pin</th>
<th>Pout</th>
<th>Ploss</th>
<th>EFF</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.5</td>
<td>2.4</td>
<td>11.84</td>
<td>1.65</td>
<td>22.8</td>
<td>19.536</td>
<td>3.264</td>
<td>0.85684</td>
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<tr>
<td>9.5</td>
<td>4.36</td>
<td>11.84</td>
<td>3.15</td>
<td>41.42</td>
<td>37.296</td>
<td>4.124</td>
<td>0.90043</td>
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<tr>
<td>9.5</td>
<td>6.35</td>
<td>11.847</td>
<td>4.65</td>
<td>60.325</td>
<td>55.08855</td>
<td>5.23645</td>
<td>0.91320</td>
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<tr>
<td>9.5</td>
<td>8.292</td>
<td>11.846</td>
<td>6.15</td>
<td>78.774</td>
<td>72.8529</td>
<td>5.9211</td>
<td>0.92483</td>
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<tr>
<td>9.5</td>
<td>10.24</td>
<td>11.844</td>
<td>7.65</td>
<td>97.28</td>
<td>90.6066</td>
<td>6.6734</td>
<td>0.93140</td>
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<tr>
<td>9.5</td>
<td>12.204</td>
<td>11.843</td>
<td>9.18</td>
<td>115.938</td>
<td>108.7187</td>
<td>7.21926</td>
<td>0.93773</td>
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<tr>
<td>9.5</td>
<td>14.165</td>
<td>11.842</td>
<td>10.65</td>
<td>134.5675</td>
<td>126.1173</td>
<td>8.4502</td>
<td>0.93720</td>
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<tr>
<td>9.5</td>
<td>16.14</td>
<td>11.841</td>
<td>12.15</td>
<td>153.33</td>
<td>143.8682</td>
<td>9.46185</td>
<td>0.93829</td>
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<tr>
<td>9.5</td>
<td>18.13</td>
<td>11.84</td>
<td>13.68</td>
<td>172.235</td>
<td>161.9712</td>
<td>10.2638</td>
<td>0.94041</td>
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<tr>
<td>9.5</td>
<td>20.118</td>
<td>11.839</td>
<td>15.18</td>
<td>191.121</td>
<td>179.716</td>
<td>11.40498</td>
<td>0.94033</td>
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</tbody>
</table>
Current Sharing #1

Vin = 9.5Vin
Iout = 15A
Channel 1 =
Channel 2 =
Channel 3 =

Comments... CH1 Current average is 10.2A
Current Sharing #2

Vin = 9.5V
Iout = 15A
Channel 1 =
Channel 2 =
Channel 3 =

Comments... CH2 Current average is 10.1A, Current Sharing between the 2 phases is +/- .5%
**Input Line Transient #1**

Vin = 13.2V down to 5.5V (2.7ms) then up to 9V (700ms)
Iout = 15A

Comments...No extra output capacitor, Deviation from Vout (right side of perturbation) 1.1V.
Recommend setting vout to 11.6V and above to clear the 10.5V Vout min level
Input Line Transient #2

Vin = 13.2V down to 5.5V (2.7ms) then up to 9V (700ms)
Iout = 7.5A
Comments...No extra output capacitor, Deviation from Vout (right side of perturbation) 1.17V.

Input Line Transient #3
Vin = 13.2V down to 5.5V (2.7ms) then up to 9V (700ms)
Iout = 3.5A
Comments...No extra output capacitor, Deviation from Vout (right side of perturbation) 670mV.

**Input Line Transient #4**
Vin = 13.2V down to 5.5V (2.7ms) then up to 9V (700ms)
Iout = 3.5A
Comments...1,000μF added to output cap, Deviation from Vout (right side of perturbation) 1.0V. Recommend setting Vout to 11.5V and above to clear the 10.5V Vout min level

Input Line Transient #5
Vin = 13.2V down to 5.5V (2.7ms) then up to 9V (700ms)
Iout = 3.5A
Comments...2,000\mu F added to output cap, Deviation from Vout (right side of perturbation) 1.0V. Recommend setting Vout to 11.5V and above to clear the 10.5V Vout min level

**Output Voltage Ripple #1**

Vin = 9.5V
Iout = 15A
Channel 1 =
Test Report PMP7919

Channel 3 = [Graph Image]
Channel 4 = [Graph Image]

Comments... 790mVpk-pk ripple, CH2 Current average is 10.1A, Current Sharing between the 2 phases is +/- .5%

Load Transient #1

Vin = 9.5V
Iout = 7.5A to 15A (100mA/μs, 1kHz, 50% duty cycle)
Channel 3 = Output voltage
**Startup Waveforms #1**

Vin = 9.5V

Iout = No Load

Channel 1 = Switch node of phase 1 ()
Channel 2 = Switch node of phase 2 ()
Channel 3 = Vout
Comments…

**Startup Waveforms #2**

Vin = 9.5V
Iout = 15A (Full load)
Channel 1 = Switch node of phase 1 ()
Channel 2 = Switch node of phase 2 ()
Channel 3 = Vout

Comments...

Startup Waveforms #3

Vin = 13V
Iout = No Load
Channel 1 = Vin
Channel 2 = Switch node of phase 2 ()
Channel 3 = Switch node of phase 2
Channel 4 = Vout
Comments...

Startup Waveforms #4
Vin = 13V
Iout = 15A
Channel 1 = Vin
Channel 2 = Switch node of phase 2
Channel 3 = Switch node of phase 2
Channel 4 = Vout
Comments...

**Startup Waveforms #5**

Vin = 12V
Iout = No Load
Channel 1 = Vin
Channel 2 = Switch node of phase 2
Channel 3 = Switch node of phase 2 ()
Channel 4 = Vout
Comments...

Startup Waveforms #6
Vin = 12V
Iout = 15A
Channel 1 = Vin
Channel 2 = Switch node of phase 2 ()
Channel 3 = Switch node of phase 2
Channel 4 = Vout
Comments...

Startup Waveforms #7

Vin = 11V
Iout = No Load
Channel 1 = Vin
Channel 2 = Switch node of phase 2
Channel 3 = Switch node of phase 2
Channel 4 = Vout
Comments...

**Startup Waveforms #8**

Vin = 11V
Iout = 15A
Channel 1 = Vin
Channel 2 = Switch node of phase 2
Channel 3 = Switch node of phase 2
Channel 4 = Vout
Comments...
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