1  Startup

Input voltage  = 85VAC
Load current 12Vout  = 2.5A
Load current 8.5Vout = 0.05A
Input voltage = 230VAC
Load current 12Vout = 2.5A
Load current 8.5Vout = 0.05A

Input voltage = 230VAC
Load current 12Vout = 0A
Load current 8.5Vout = 0A
2 Shutdown

Input voltage = 230VAC
Load current 12Vout = 2.5A
Load current 8.5Vout = 0.05A
3 Efficiency

![Efficiency Graph](image)

4 Load regulation

![Load Regulation Graph](image)
5 Control Loop Frequency Response

Output power = 30W
Input voltage = 120VDC
Phase margin = 68°
Bandwidth = 1.0kHz

Output power = 30W
Input voltage = 325VDC
Phase margin = 53°
Bandwidth = 2.0kHz

Output power = 30W
Input voltage = 390VDC
Phase margin = 70°
Bandwidth = 1.2kHz
6 Switch Node

Input voltage = 390VDC
Load current 12Vout = 2.5A
Load current 8.5Vout = 0.05A

Input voltage = 85VDC
Load current 12Vout = 2.5A
Load current 8.5Vout = 0.05A
7  Switch Node secondary side (12Vout)

Input voltage = 85VDC
Load current 12Vout = 2.5A

Input voltage = 390VDC
Load current 12Vout = 2.5A
8 Output ripple voltage (12Vout)

Input voltage = 230VAC
Load current 12Vout = 2.5A
Load current 8.5Vout = 0.05A
9  Load Transients (12Vout)

Input voltage  = 85VAC
Load current 12Vout  = 1Ato2.5A

Input voltage  = 230VAC
Load current 12Vout  = 1Ato2.5A
Input voltage = 265VAC
Load current 12Vout = 1A to 2.5A
10 Thermal Analysis

The images below show the infrared images taken from the FlexCam after 15min at 18.5W output power.

Input voltage = 230VAC
Output power = 18.5W
Ambient temperature = 25°C
No heatsink, no airflow

<table>
<thead>
<tr>
<th>Name</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosfet Q1</td>
<td>64.6°C</td>
</tr>
<tr>
<td>Resistor R3</td>
<td>72.3°C</td>
</tr>
<tr>
<td>Transformer T1</td>
<td>40.8°C</td>
</tr>
<tr>
<td>Diode D3</td>
<td>47.1°C</td>
</tr>
</tbody>
</table>

Input voltage = 120VAC
Output power = 18.5W
Ambient temperature = 25°C
No heatsink, no airflow

<table>
<thead>
<tr>
<th>Name</th>
<th>Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosfet Q1</td>
<td>56.1°C</td>
</tr>
<tr>
<td>Resistor R3</td>
<td>63.0°C</td>
</tr>
<tr>
<td>Transformer T1</td>
<td>45.8°C</td>
</tr>
<tr>
<td>Diode D3</td>
<td>52.1°C</td>
</tr>
</tbody>
</table>
11 EMI Measurement

The graph below shows the conducted emission EMI noise and the EN55022 Class-B Quasi-Peak limits (measurement from the worst case line). The load was connected to a LISN and an isolation transformer; the load was a power resistor (12V@1.5A), while the input voltage was 230Vac. The resistor R1 was not populated. The receiver was set to Quasi-peak detector, 10 KHz bandwidth. The secondary side GND of the converter was connected to the ground of the LISN.
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