The PMP7174 is a fixed switching frequency, DCM flyback (LM5021) and has the following requirements:

- Input voltage range: 85Vac – 130Vac
- Output voltage: 24V (1.45A - 35W)
- Galvanic isolation: YES, 4kV
- Surface area: 68mm x 34mm

If not other described, all tests are done at 115Vac input voltage and 2200uF capacitive load.
1 Startup

The AC input inrush current, output voltage and current at startup are shown in the images below, respectively.

Inrush current, no load
Channel 4  5A/div, time base 10ms/div

Channel 1 Bulk Voltage – 100V/div
Channel 2 Output voltage – 5V/div, ramp up, program pin open, 15mA current drain
Channel 4 Output current - 1A/div, time base 20ms/div
Channel 1 Bulk Voltage – 100V/div
Channel 2 Output voltage – 10V/div, ramp up 8V->24V, program pin closed, 15mA current drain
Channel 4 Output current - 1A/div, time base 50ms/div

2 Output over load protection

If the load current hits the threshold point of 1600mA, the converter will go in hiccup mode.

Channel 1 Output voltage – 10V/div
Channel 4 Output current - 1A/div, time base 1s/div
3 Efficiency

The efficiency data are shown in the tables and graph below. The load: constant current load.

**Power consumption: 8V, 15mA @ the output (program pin open) - ~ 300mW**

### 85Vac

<table>
<thead>
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<td>Iout</td>
<td>0.000</td>
<td>0.100</td>
<td>0.250</td>
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<td>0.750</td>
<td>1.000</td>
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<td>5.995</td>
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### 130Vac

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<td>0.250</td>
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<td>99.63</td>
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<tr>
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<td>86.93</td>
<td>87.27</td>
<td>86.65</td>
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</tbody>
</table>

**Efficiency = f (Iout)**

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Page 4 of 8  Power Management Solutions
4 Output Ripple Voltage and current

The output ripple voltage and spikes is shown in the plot below. Load 1.45A

5 Switching Node Waveform

The image below shows the gate voltage and peak voltage at the drain of Q4 – power switch.

6 Loop Response

The image below shows the loop response of the converter measured at 1A output load with 2200uF capacitive load and without.
Crossover frequency is 919Hz, Phase margin is 93deg (with 2200uF and 24Ohm in parallel)
Crossover frequency is 3500Hz, Phase margin is 64deg (only 24Ohm at the output)

7 Thermal Image

The thermal measurements are shown in the picture below (ambient temperature ~25°C):

<table>
<thead>
<tr>
<th>Transformer temperature: Top side view</th>
<th>Transformer temperature: Bottom side view</th>
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</thead>
<tbody>
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<td>68.6°C</td>
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</tbody>
</table>

Thermal measurements: Top side view  
Thermal measurement: Bottom side view
8 EMI Measurements

The conducted emission measurements are shown in pictures below (the measurements are not done in certified lab)

Quasi peak detector measurement

Average detector measurement
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