Test Report: PMP4190
3-V to 6-V DC Input, 5-V/0.5-A, 1-MHz Isolated Flyback Reference Design

Description
This simple and compact design demonstrates how integrated boost converters, usually relegated to portable applications, can be leveraged in isolated auxiliary supplies. This example showed how to use the TPS61175 with a low input voltage. This simple design can be placed in a small amount of board space. The design consumes a total of 1.8 in² on one side of the board.
1 Test Prerequisites

1.1 Voltage and Current Requirements

Table 1. Voltage and Current Requirements

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SPECIFICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage Range</td>
<td>3VDC – 6VDC</td>
</tr>
<tr>
<td>Output Voltage/Current</td>
<td>5V/0.5A</td>
</tr>
</tbody>
</table>

1.2 Required Equipment

- DC voltage source
- Electronic load
- Multi-meters
- Oscilloscope
2 Testing and Results

2.1 Efficiency

2.1.1 5V Output

![Efficiency Graph](image)

2.2 Losses

2.2.1 5V Output

![Losses Graph](image)
2.3 Thermal Images
Measured after 30 minutes at full load and 25° C ambient temperature with no external airflow.

2.3.1 3VDC Input, Top, 5V/0.5A Output
Sp1 – U2
Sp2 – D2

2.3.2 3VDC Input, Bottom, 5V/0.5A Output
2.3.3 5VDC Input, Top, 5V/0.5A Output
Sp1 – U2
Sp2 – D2

2.3.4 5VDC Input, Bottom, 5V/0.5A Output
3  Waveforms

3.1  Switching

3.1.1  SW to GND, 3VDC Input, 5V/0.5A Output

3.1.2  SW to GND, 5VDC Input, 5V/0.5A Output
3.2 Output Voltage Ripple

3.2.1 5V/0.5A Output, 3VDC Input

3.2.2 5V/0.5A Output, 5VDC Input
3.3 Bode Plot

3.3.1 5V/0.5A Output, 3VDC (3-Gain/3-Phase) and 5VDC (5-Gain/5-Phase) Input
3.4 Load Transients

3.4.1 5V Output, 0A to 0.25A, 3VDC Input
C1 – Vout
C4 – Iout

3.4.2 5V Output, 0A to 0.25A, 5VDC Input
C1 – Vout
C4 – Iout
3.4.3 5V Output, 0.25A to 0.50A, 3VDC Input
C1 – Vout
C4 – Iout

3.4.4 5V Output, 0.25A to 0.50A, 5VDC Input
C1 – Vout
C4 – Iout
3.5 Start up

3.5.1 5V Output, No Load
C1 – Vout
C3 – Vin

3.5.2 5V Output, 0.5A,
C1 – Vout
C3 – Vin
3.6 Shutdown

3.6.1 5V Output, No Load
C1 – Vout
C3 – Vin

3.6.2 5V Output, 0.5A,
C1 – Vout
C3 – Vin
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