Description

The AP65101 is a 500kHz switching frequency internal compensated synchronous DC/DC buck converter. It has integrated low $R_{DSON}$ high and low side MOSFETs.

The AP65101 enables continuous load current of up to 1.5A with efficiency as high as 97%.

**The AP65101 implements an automatic custom light load efficiency improvement algorithm.**

The AP65101 features current mode control operation, which enables fast transient response times and easy loop stabilization.

- Gaming Consoles
- Flat Screen TV Sets and Monitors
- Set Top Boxes
- Distributed Power Systems
- Green Electronics

- Home Audio
- Consumer Electronics
- Network Systems
- FPGA, DSP and ASIC Supplies

Performance Spec of AP65101WU-EVM (Rev3)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Performance Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Voltage</td>
<td>Range 4.5V to 16V</td>
<td>12V</td>
</tr>
<tr>
<td>Output Current</td>
<td></td>
<td>1.5A</td>
</tr>
<tr>
<td>Output Voltage</td>
<td></td>
<td>3.3V</td>
</tr>
<tr>
<td>Transient Response</td>
<td>Peak-to-peak load step from 0.75A to 1.5A</td>
<td>100mVpp</td>
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<tr>
<td>Switching Frequency</td>
<td></td>
<td>500kHz</td>
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<tr>
<td>Efficiency</td>
<td></td>
<td>92%</td>
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</table>
Figure 1. Evaluation Board (Rev1)

Figure 2. Load Transient 0.75 to 1.5A

Figure 3. Efficiency (VOUT=3.3V)

Figure 4. Efficiency (VOUT=5.0V)

PCB Layouts

Top Layer

Bottom Layer
Quick Start Guide

The AP65101WU-EVM has a simple layout and allows access to the appropriate signals through test points. To evaluate the performance of the AP65101, follow the procedure below:

1. Connect a power supply to the input terminals $V_{IN}$ and GND. Set $V_{IN}$ to 12V.
2. Connect the positive terminal of the electronic load to $V_{OUT}$ and negative terminal to GND.
3. EN has a positive voltage through a 100K pull-up to $V_{IN}$. No supply input is required for EN.
4. The evaluation board should now power up with a 3.3V output voltage.
5. Check for the proper output voltage of 3.3V ($\pm$1%) at the output terminals $V_{OUT}$ and GND. Measurement can also be done with a multimeter with the positive and negative leads between $V_{OUT}$ and GND.
6. Set the load to 1.5A through the electronic load. Check for the stable operation of the SW signal on the oscilloscope. Measure the switching frequency.

Measurement/Performance Guidelines:

1) When measuring the output voltage ripple, maintain the shortest possible ground lengths on the oscilloscope probe. Long ground leads can erroneously inject high frequency noise into the measured ripple.

2) For efficiency measurements, connect an ammeter in series with the input supply to measure the input current. Connect an electronic load to the output for output current.
EVALUATION BOARD SCHEMATIC

BILL OF MATERIALS

<table>
<thead>
<tr>
<th>Ref</th>
<th>Value</th>
<th>Description</th>
<th>Qty</th>
<th>Size</th>
<th>Vendor Name</th>
<th>Manufacturer PN</th>
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<tbody>
<tr>
<td>C1, C2</td>
<td>22μF</td>
<td>Ceramic Capacitor, 25V, X5R</td>
<td>1</td>
<td>1210</td>
<td>AVX</td>
<td>12103D226KAT2A</td>
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<td>C3</td>
<td>1μF</td>
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<td>0805</td>
<td>Kemet</td>
<td>C0805C105K4RACTU</td>
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<tr>
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<td>0.1μF</td>
<td>Ceramic Capacitor, 25V, X7R, 10%</td>
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<td>0805</td>
<td>Samsung</td>
<td>CL21B104KACNNNC</td>
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<td>L1</td>
<td>6.5μH</td>
<td>DCR=12.5mΩ, Is=10A</td>
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<td>10X10X5mm</td>
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<tr>
<td>R3</td>
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<td>ERJ-6ENF5902V</td>
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<td>R7</td>
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<td>T1</td>
<td>1598</td>
<td>Terminal Turret Triple 0.094&quot; L (Test Points)</td>
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<td>Keystone Electronics</td>
<td>1598-1</td>
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<td>U1</td>
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<td>DC/DC converter</td>
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<td>TSOT26</td>
<td>Diodes</td>
<td>AP65101WU</td>
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