AP65101WU-EVM

500kHz, 16V, 1.5A, Current Mode, DCM/CCM Synchronous DC/DC Buck Converter in TSOT26

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.

The AP65101 simplifies board layout and reduces space requirements with its high level of integration and minimal need for external components, making it ideal for distributed power architectures.

The AP65101 is available in a standard Green TSOT26 package and is RoHS compliant.

- 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)

Parameter	Conditions	Performance Value
Input Voltage	Range 4.5V to 16V	12V
Output Current		1.5A
Output Voltage		3.3V
Transient Response	Peak-to-peak load step from 0.75A to 1.5A	100mV$_{P-P}$
Switching Frequency		500kHz
Efficiency		92%

Figure 1. Evaluation Board (Rev1)

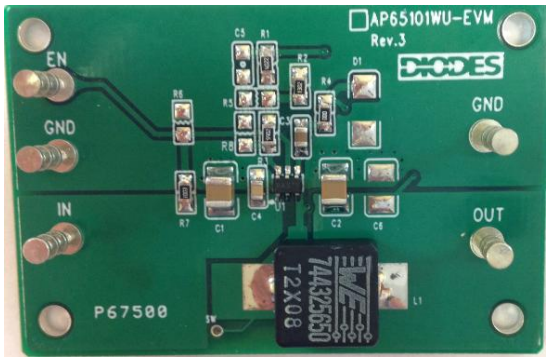


Figure 2. Load Transient 0.75 to 1.5A

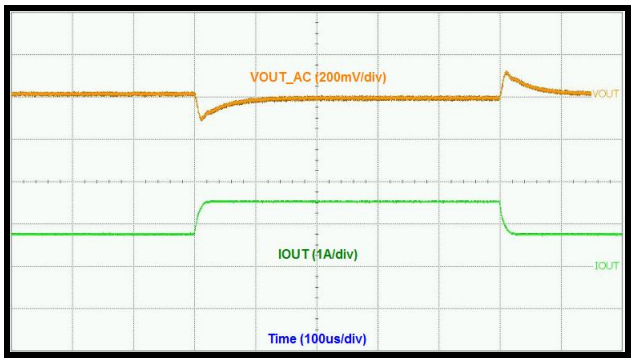


Figure 3. Efficiency (VOUT=3.3V)

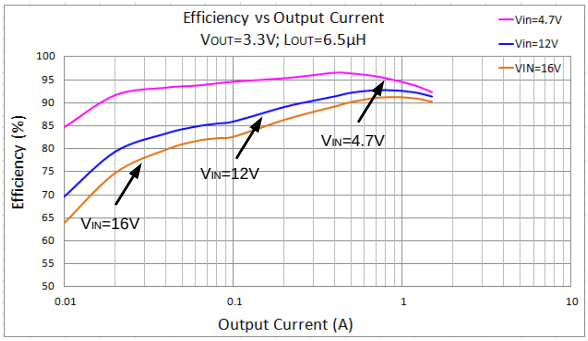
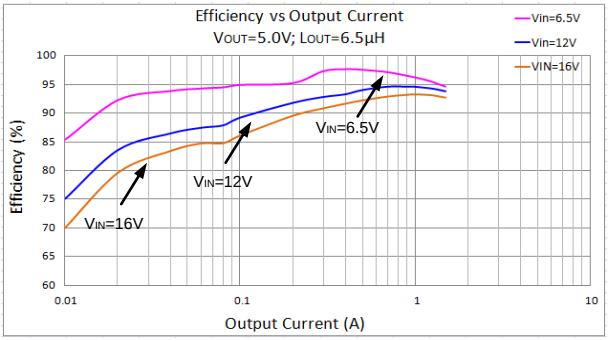
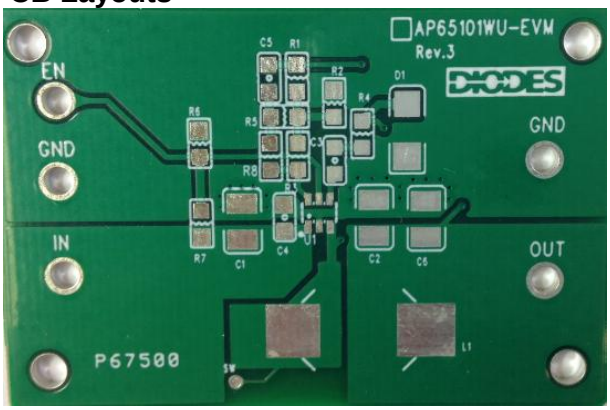


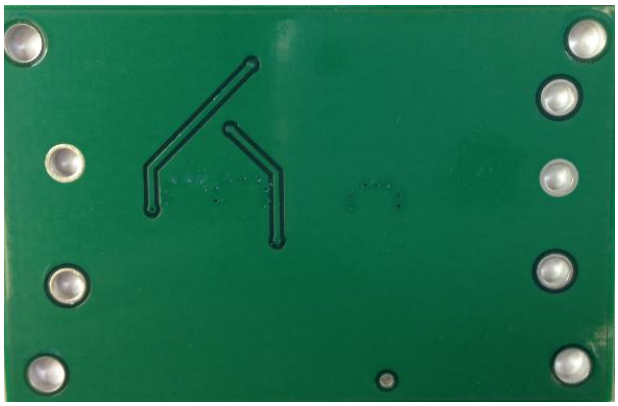
Figure 4. Efficiency (VOUT=5.0V)



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:

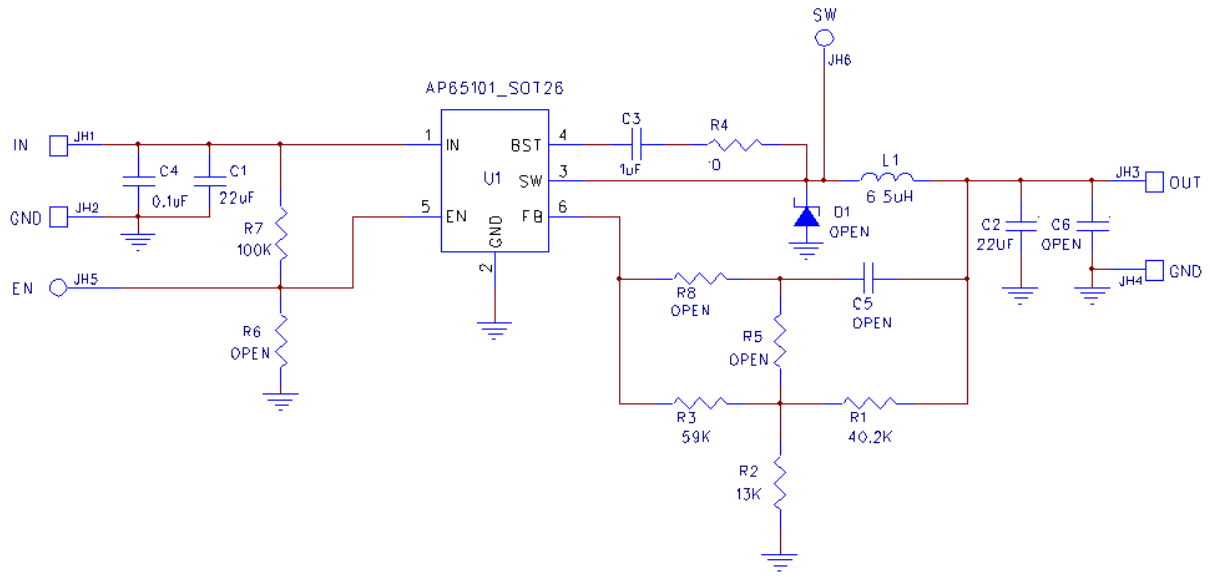
1. Connect a power supply to the input terminals V_{IN} and GND. Set V_{IN} to 12V.
2. Connect the positive terminal of the electronic load to V_{OUT} and negative terminal to GND.
3. EN has a positive voltage through a 100K pull-up to V_{IN}. No supply input is required for EN.
4. The evaluation board should now power up with a 3.3V output voltage.
5. Check for the proper output voltage of 3.3V (±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

Ref	Value	Description	Qty	Size	Vendor Name	Manufacturer PN
C1, C2	22µF	Ceramic Capacitor, 25V, X5R	1	1210	AVX	12103D226KAT2A
C3	1µF	Ceramic Capacitor, 16V, X7R, 10%	1	0805	Kemet	C0805C105K4RACTU
C4	0.1µF	Ceramic Capacitor, 25V, X7R, 10%	1	0805	Samsung	CL21B104KACNNNC
L1	6.5µH	DCR=12.5mΩ, Is=10A	1	10X10X5 mm	Wurth Electronics	744325650
R1	40.2KΩ	Film Resistor, 1%	1	0805	Panasonic	ERJ-6ENF4022V
R2	13KΩ	Film Resistor, 1%	1	0805	Panasonic	ERJ-6ENF1302V
R3	59KΩ	Film Resistor, 1%	1	0805	Panasonic	ERJ-6ENF5902V
R4	0Ω	Film Resistor, 1%	1	0805	Panasonic	ERJ-6GEY0R00V
R7	100KΩ	Film Resistor, 1%	1	0805	Panasonic	ERJ-6ENF1003V
T1	1598	Terminal Turret Triple 0.094" L (Test Points)	5		Keystone Electronics	1598-1
U1		DC/DC converter	1	TSOT26	Diodes	AP65101WU

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