AP65500EV1

340kHz 18V 5A Synchronous DC/DC Buck Converter

Description

The AP65500 is a 340kHz switching frequency external compensated synchronous DC/DC buck converter. It has integrated low R_{DSON} high and low side MOSFETs.

The AP65500 enables continues load current of up to 5A with efficiency as high as 96%.

The AP65500 implements an automatic custom light load efficiency improvement algorithm.

The AP65500 features current mode control operation, which enables fast transient response times and easy loop stabilization.

The AP65500 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 AP65500 is RoHS compliant and available in a standard Green SO-8EP and package.

- 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 AP65500EV1

Parameter	Conditions	Performance Value
Input voltage	4.75V to 18V Range	12V
Output Current		5A
Output Voltage		3.3V
Output Voltage Ripple		30mV$_{P-P}$
Switching Frequency		340kHz
Efficiency		96%

Figure 1. Evaluation Board

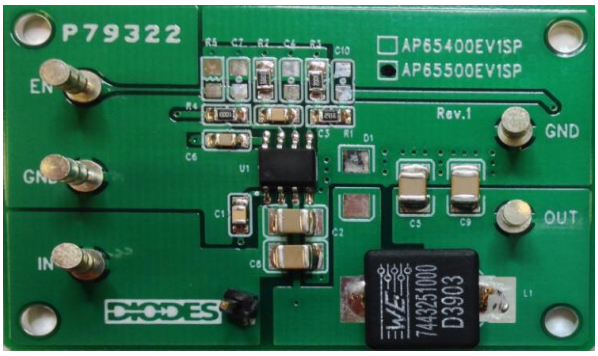
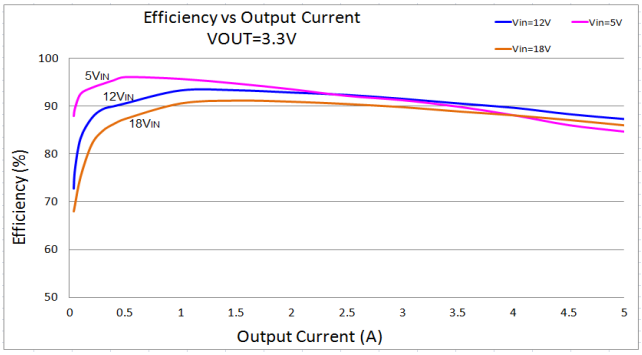
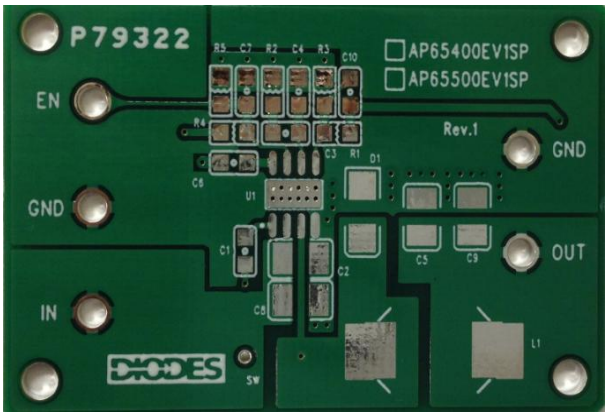


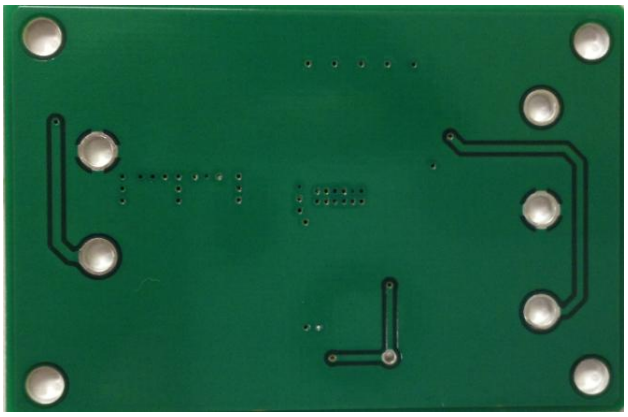
Figure 2. Efficiency vs Output Current



PCB Layouts



Top Layer



Bottom Layer

Quick Start Guide

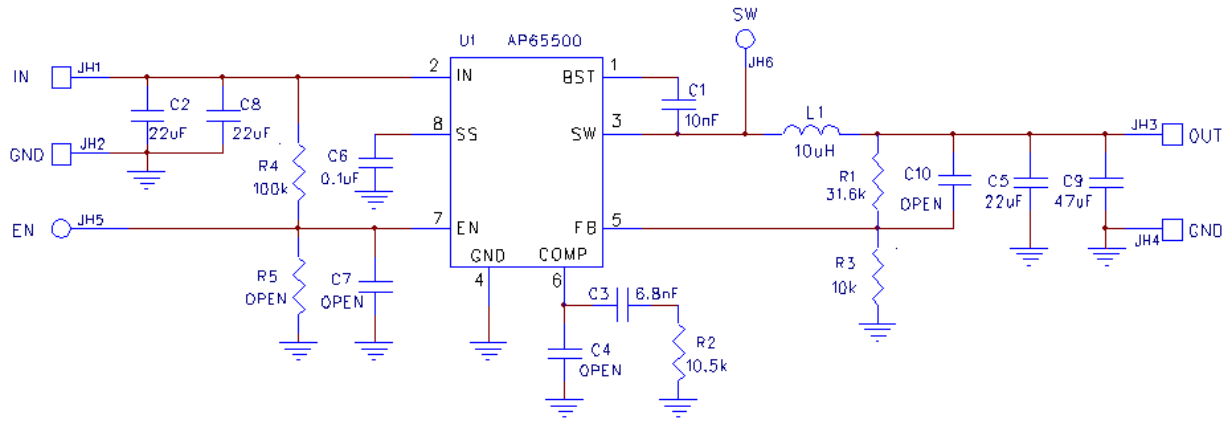
The AP65500EV1 has a simple layout and allows access to the appropriate signals through test points. To evaluate the performance of the AP65500, follow the procedure below:

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. Note: To use the EN function drive EN above 1.3V to start the converter and below 0.4V to stop the converter.
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 5A through the electronic load. Check for the stable operation of the SW signal on the oscilloscope. Measure the switching frequency. A test point is conveniently located at the head of the inductor.

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	PACKAGE	MANUFACTURER	MANUFACTURER P/N
C1	10nF	Ceramic Capacitor, 50V, X7R	0805	AVX	08055C103KAT2A
C2, C5, C8	22µF	Ceramic Cap, 25V, X5R	1210	AVX	1210YD226KAT2A
C3	6.8nF	Ceramic Cap, 50V, X7R	0805	AVX	08055C682KAT2A
C6	0.1µF	Ceramic Cap, 50V, X7R	0805	AVX	08055C104KAT2A
C9	47µF	Ceramic Capacitor, 16V, X5R	1210	AVX	GRM32ER61C476KE15K
L1	10µH	Inductor, 7.2A	SMD	Wurth Electronics	7443251000
R1	31.6kΩ	Resistor, 1%	0805	Panasonic	ERJ-6ENF3162V
R2	10.5kΩ	Resistor, 1%	0805	Panasonic	ERJ-6ENF1052V
R3	10.0kΩ	Resistor, 1%	0805	Panasonic	ERJ-6ENF1002V
R4	100kΩ	Resistor, 1%	0805	Panasonic	ERJ-6ENF1003V
U1		DC/DC Converter	SO-8EP	Diodes Inc	AP65500SP

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