

1.5A, Step-Down Converter with 1.4Mhz Switching Frequency

Description

The AP5101WG-EVM is an evaluation board for the current mode step-down converter with a built-in power MOSFET.

The AP5101 enables a constant output current of up to 1.5A over a wide input supply range from 4.75V to 24V. It provides excellent line

regulation, load regulation and transient response over the operating input voltage and temperature range.

The AP5101 is self-protected, through a cycle-by-cycle current limiting algorithm and an on-chip thermal protection. The AP5101 is available in SOP-8L package.

Applications

- Distributed Power Systems
- Battery Charger
- Pre-Regulator for Linear Regulators
- WLED Drivers

Performance Spec of AP5101WG-EVM

Parameter	Conditions	Performance Value
Input voltage	Range – 4.75V to 24V	12V
Output Current		1.5A
Output Voltage		3.3V
Output Voltage Ripple		30mVp-p
Transient Response	Peak Deviation Load step 0.2 to 0.8 v/us	50mV
Switching Frequency		1.4Mhz
Efficiency		88%

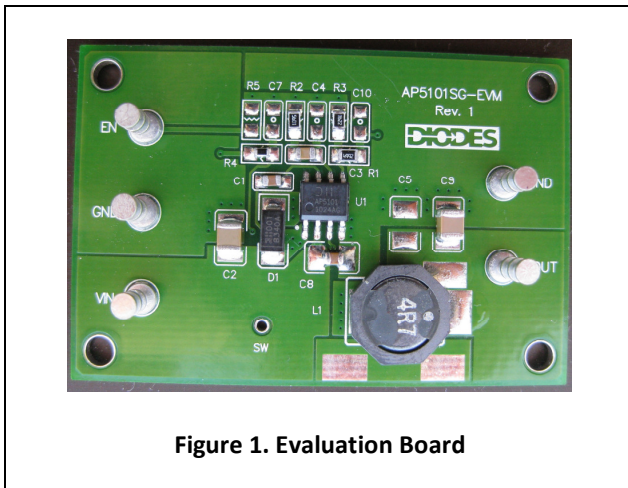


Figure 1. Evaluation Board

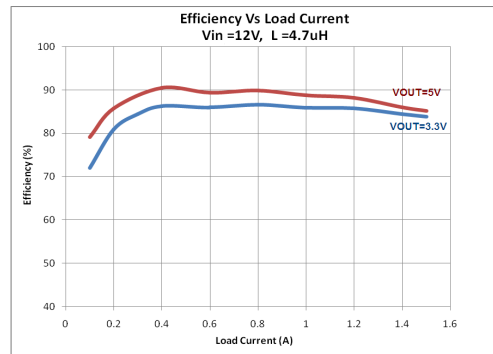


Figure 2. Efficiency vs Load Current

Quick Start Guide

The EV-AP5101 has a simple layout and allows access to the appropriate signals through test points. To evaluate the performance of the AP5101, follow the procedure below:

1. Connect a power supply to the input terminals Vin and GND. Set Vin to 12V.

Note : Vin ranges from 4.75V to 24V.

2. Connect the positive terminal of the electronic load to Vout and negative terminal to GND.
3. EN has a positive voltage through a 100K pull-up to Vin. No supply input is required for EN.

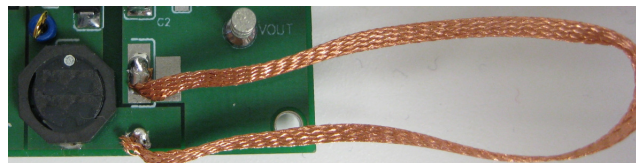
Note: To use the EN function drive EN above 1.3V to start the converter and below 0.4V to stop the converter.

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 Vout and GND. Measurement can also be done with a multimeter with the positive and negative leads between Vout 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. A test point is conveniently located at the head of the inductor.

Note: A 300mA load current is required to run the converter in continuous mode. Use an electronic load to supply the load current.

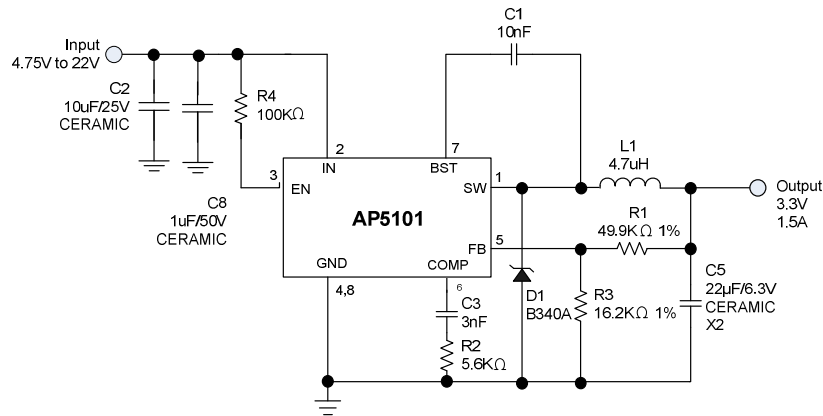
Measurement/Performance Guidelines:

- 1) The evaluation board has the inductor pad spaced for easy access to measure the inductor current. As shown in the picture, a current probe can be connected to the wire loop to measure the inductor current.



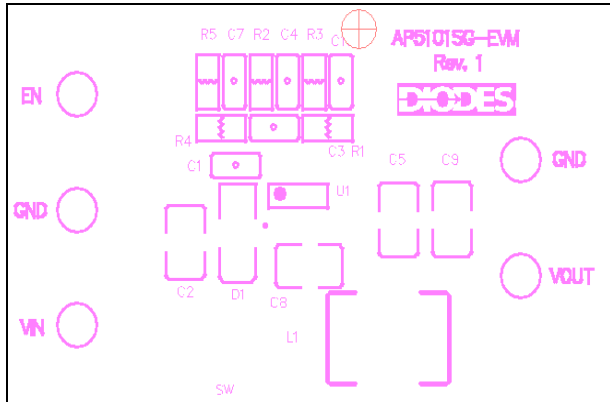
- 2) When measuring the output voltage ripple, avoid long ground leads on the oscilloscope probe.
- 3) For efficiency measurements, connect an ammeter in series with the input supply to measure the input current. Connect an electronic load to the output for output current.

EVALUATION BOARD SCHEMATIC

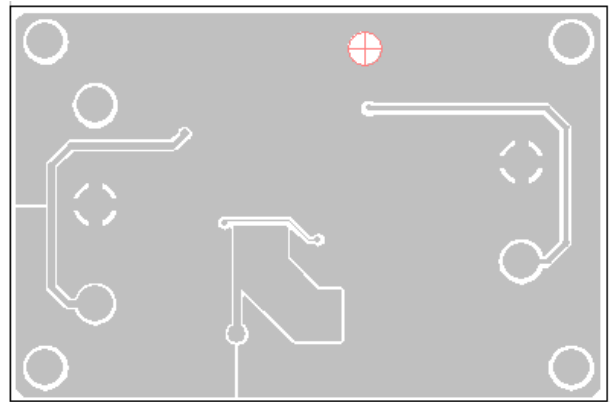


BILL OF MATERIALS

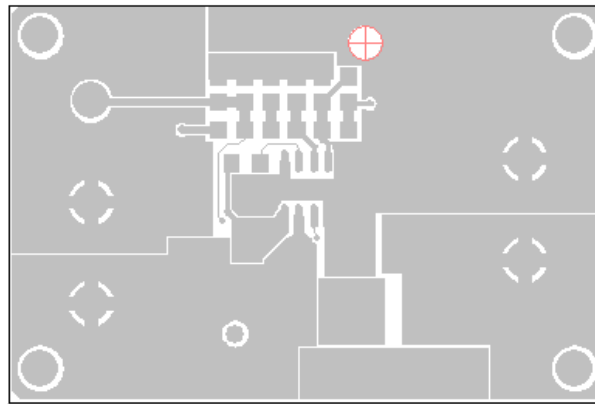
QTY	REF	VALUE	DESCRIPTION	PACKAGE	MANUFACTURER	MANUFACTURER P/N
1	C1	10nF	Ceramic Capacitor, 50V, X7R	0603	TDK	C20123D106KAJ2A
2	C2	10uF	Ceramic Capacitor, 25V, X5R	1210	AVX	12103D106KAJ2A
3	C3	3000pF	Ceramic Capacitor, 50V, X5R	0805	Murata	GRM216R71H302JA01
4	C5	22uF	Ceramic Capacitor, 6.3V, X5R	1210	AVX	12103D226KAT2A
5	C8	1uF	Ceramic Capacitor, 50V, X7R	0805	TDK	C20112Y5V1H105Z
6	D1	B340A	Diode Schottky, 40V, 3A	SOD-123	Diodes Inc	B340A-F
7	L1	4.7uH	Inductor, 4.6A	SMD	Würth Electronics	7440650047
8	R1	49.9k	Resistor, 1%	0805	Panasonic	ERJ-6ENF4992V
9	R2	5.6k	Resistor, 1%	0805	Panasonic	ERJ-6ENF5601V
10	R3	16.2k	Resistor, 1%	0805	Panasonic	ERJ-6ENF1622V
11	R4	100k	Resistor, 1%	0603	Panasonic	ERJ-3EKF1003V
12	U1		DC/DC Converter	SOP-8L	Diodes Inc	AP5101



TOP SILK LAYER



BOTTOM LAYER



TOP LAYER