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EV28114DG-00A

600mA Synchronous Buck Step-Down Converter

DESCRIPTION

The EV28114 evaluation board is designed for low dropout step down converter applications. It implements the MP28114 1.7MHz Fixed Frequency, Current Mode, PWM step-down converter. The device integrates a main switch and a synchronous rectifier for high efficiency without an external Schottky diode. It is ideal for powering portable equipments that runs from a single cell Lithium-Ion (Li+) Battery. It can supply 600mA of load current from a 2.5V to 6V input voltage. The output voltage can be regulated as low as 0.6V. In 100% Duty Cycle Dropout operation, it works with minimum input voltage as low as output voltage.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage Range	V _{IN}	2.5 – 6.0	V
Output Voltage	V _{OUT}	1.8	V
Load Max	I _{OUT}	600	mA

FEATURES


- High Efficiency: Up to 95%
- 600mA Available Load Current
- 2.5V to 6V Input Voltage Range
- Output Voltage as Low as 0.6V
- 100% Duty Cycle in Dropout
- Short Circuit Protection
- Thermal Fault Protection
- <0.1µA Shutdown Current
- Programmable Enable Control

APPLICATIONS

- Cellular and Smart Phones
- Microprocessors/DSP Core Supplies
- PDAs
- MP3 Players
- Digital Still and Video Cameras
- Portable Instruments

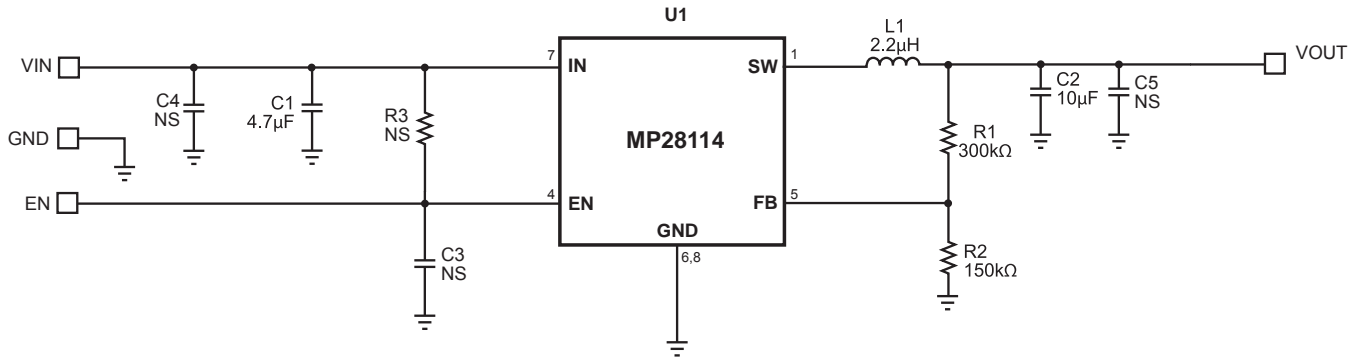
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EV28114DG-00A EVALUATION BOARD



The image shows a green PCB evaluation board with various components and test points. Labels on the board include EN, GND, VinSense, VoutSense, VIN, GND, GND, and VOUT. The board is populated with a central IC, a large inductor, and several capacitors. The text on the board reads: "MPS Monolithic Power Systems MP28114 Demo Board EV28114DG-00A www.mps-ic.com". A note at the bottom of the board states: "MPS Confidential For MPS Customer Use Only Made in China".

Dimensions (2.5"X x 2.5"Y x 0.5"Z)	
Board Number	MPS IC Number
EV28114DG-00A	MP28114DG

EVALUATION BOARD SCHEMATIC

EV28114DG-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	4.7µF	Ceramic Cap., 10V, X5R	SM0805	TDK	C2012X5R1A475K
1	C2	10µF	Ceramic Cap., 6.3V, X5R	SM0805	KYOCERA	CM21X5R106K06AT
3	C3,C4, C5		Do Not Stuff			
1	L1	2.2µH	1.63A	SMD	TOKO	D52LC-#A914BYW-2R2M
1	R1	300kΩ	Film Res., 1%	SM0603	Yageo	RC0603FR-07300KL
1	R2	150kΩ	Film Res., 1%	SM0603	Yageo	RC0603FR-07150KL
1	R3		Do Not Stuff			
1	U1		DC-DC Converter	QFN8	MPS	MP28114DG

PRINTED CIRCUIT BOARD LAYOUT

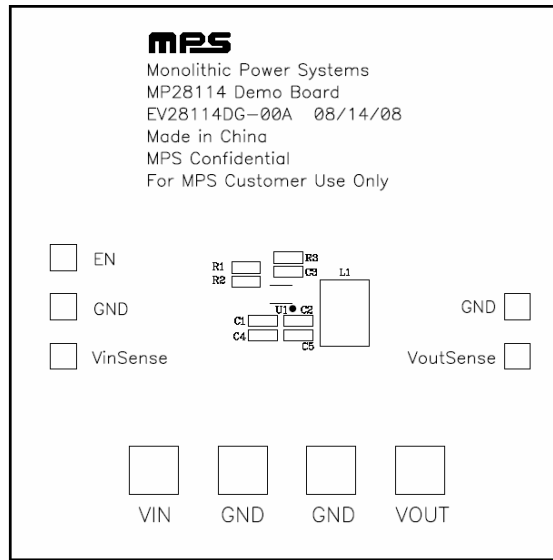


Figure 1—Top Silk Layer

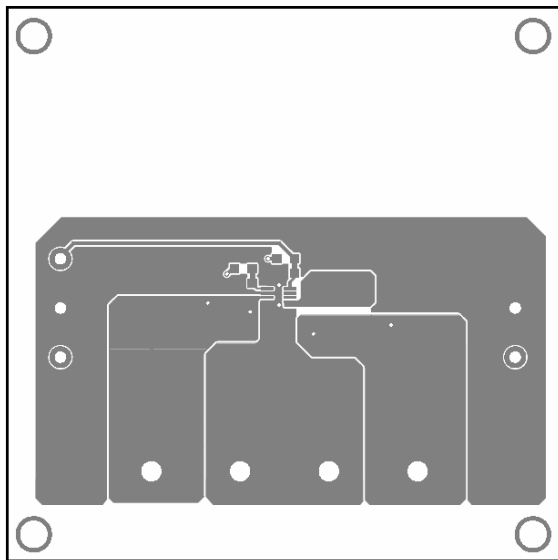


Figure 2—Top Layer

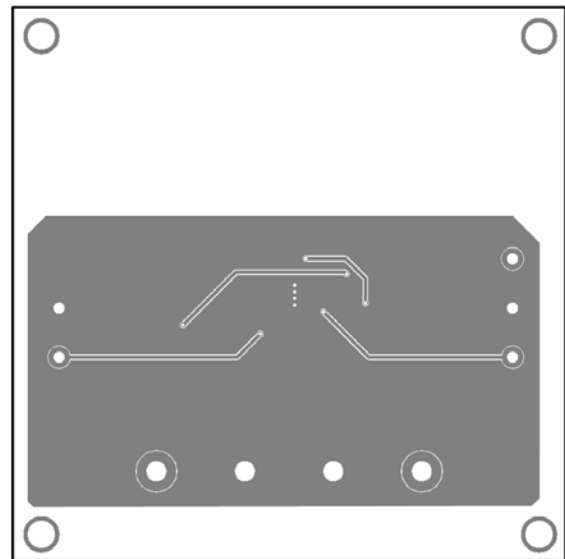


Figure 3—Bottom Layer

QUICK START GUIDE (ADJUSTABLE OUTPUT)

The default output voltage of this board is set to 1.8V.

The board layout accommodates most commonly used inductors and output capacitors.

1. Attach the positive and negative ends of the load to the VOUT and GND pins, respectively.
2. Attach the Input Voltage ($2.5V \leq V_{IN} \leq 6V$) and Input Ground to the VIN and GND pins, respectively.
3. To enable the MP28114 apply a voltage, $1.5V \leq V_{EN} \leq 6V$, to the EN pin. To disable the MP28114 apply a voltage, $V_{EN} < 0.3V$, to the EN pin. A 100K Ω resistor can be set in R3 to connect the EN pin to the IN pin, so the part will operate without applying any external voltage to the EN pin.
4. The Output Voltage V_{OUT} can be changed by varying R2. Calculate the new value by formula:

$$R2 = \frac{R1}{\left(\frac{V_{OUT}}{V_{FB}}\right) - 1}$$

Where $V_{FB} = 0.6V$ and $R1 = 300k\Omega$.

Example:

For $V_{OUT} = 1.8V$:

$$R2 = \frac{300k\Omega}{\left(\frac{1.8V}{0.6V}\right) - 1} = 150k\Omega$$

Therefore, use a 150k Ω standard 1% value.

QUICK START GUIDE (MODIFICATION FOR FIXED OUTPUT)

For modifying the EV28114DG-00A to accommodate a fixed output voltage version of the MP28114:

1. Verify that a fixed output version of the MP28114 chip is on the evaluation board. Refer to MP28114 datasheet for fixed voltage package codes.
2. Remove both R1 and R2.
3. Short R1 while leaving R2 open.
4. Attach the positive and negative ends of the load to the VOUT and GND pins, respectively.
5. Attach the Input Voltage ($2.5V \leq V_{IN} \leq 6V$) and Input Ground to the VIN and GND pins, respectively.
6. To enable the MP28114 apply a voltage, $1.5V \leq V_{EN} \leq 6V$, to the EN pin. To disable the MP28114 apply a voltage, $V_{EN} < 0.3V$, to the EN pin. The default setting for the jumper J1 on the board connects V_{IN} to the EN pin. In this configuration, the part will operate without applying any external voltage to the EN pin.

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