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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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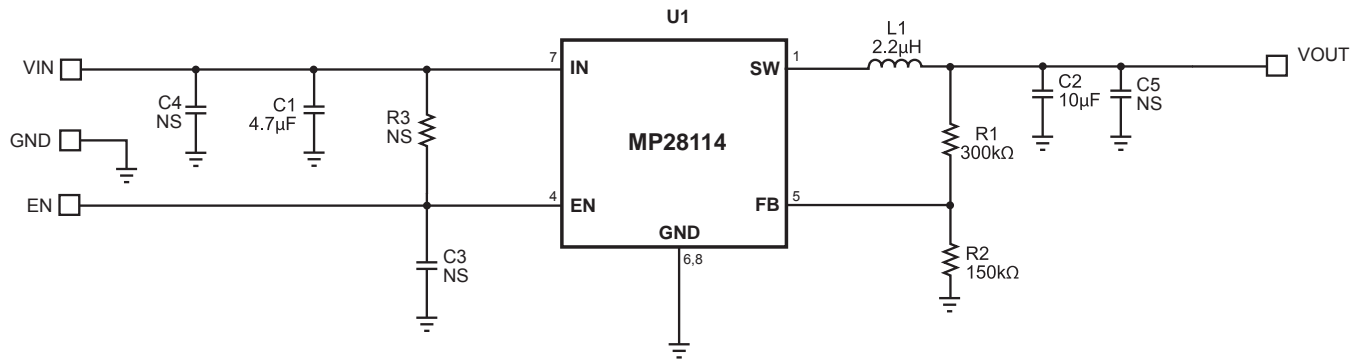
EV28114DG-00A EVALUATION BOARD



The image shows a green PCB evaluation board with various components and test points. The board is labeled with 'MPS Monolithic Power Systems MP28114 Demo Board EV28114DG-00A www.mps-ic.com'. It features an EN pin, GND pins, VinSense and VoutSense test points, and VIN, GND, GND, VOUT terminals. A small label on the board reads '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

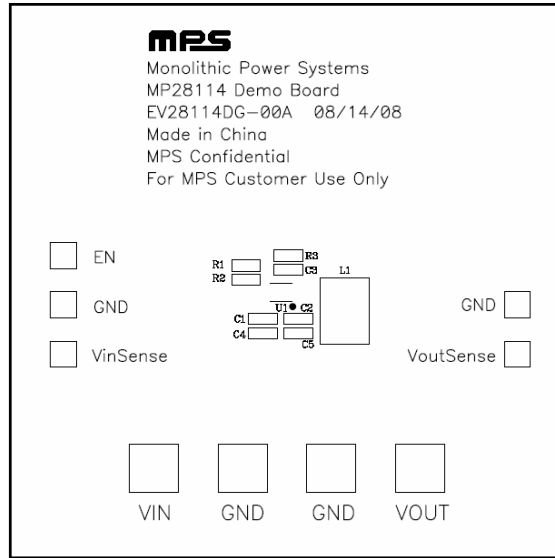


Figure 1—Top Silk Layer

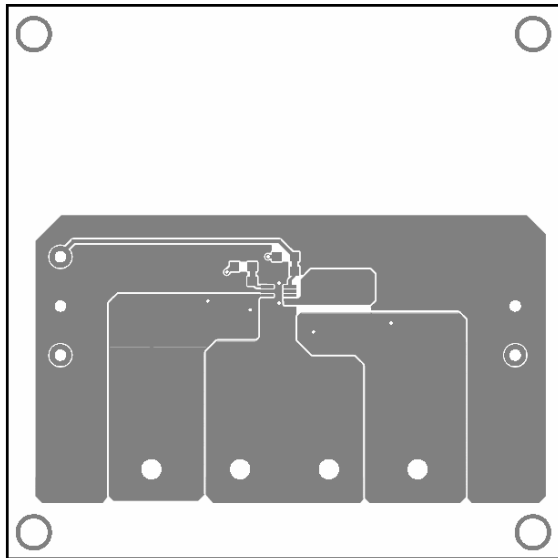


Figure 2—Top Layer

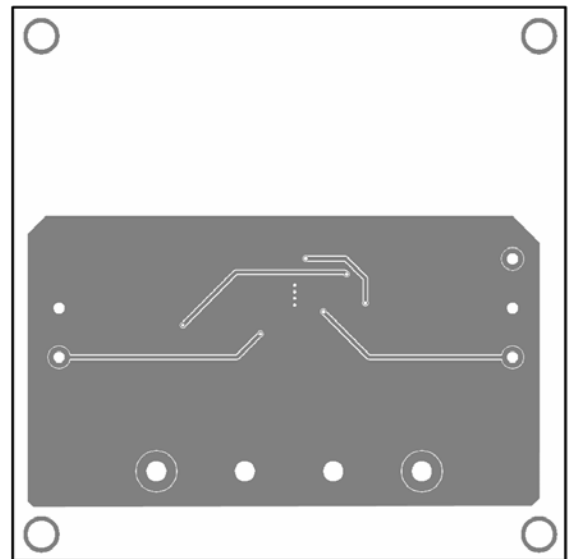


Figure 3—Bottom Layer

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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