



The Future of Analog IC Technology®

# EV1570DN-00A

3A, 23V, 340KHz

## Synchronous Step-Down Converter

EVALUATION BOARD – INITIAL RELEASE

### GENERAL DESCRIPTION

The EV1570DN-00A is the evaluation board of MPS' MP1570 synchronous buck converter. It has a wide supply range from 4.75V to 23V and a continuous output current up to 3A. It features synchronous rectification for high efficiency with integrated high-side and low-side power MOSFETs. The output voltage is set to 3.3V, but can be easily adjusted to other levels from 1.22V. Current mode control and integrated power MOSFETs minimize component counts, board area, and solution cost. Fault condition protections include cycle-by-cycle current limiting, thermal shutdown, over voltage protection and under voltage lockout. Internal soft-start reduces turn-on stress. Small but thermally enhanced SO-8 package minimizes board area with excellent thermal management.

### ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Supply Voltage	$V_{IN}$	4.75 to 23	V
Output Voltage	$V_{OUT}$	3.3	V
Output Current	$I_{OUT}$	0 to 3	A

### FEATURES

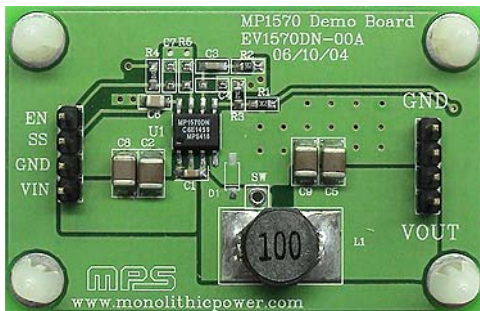
- Up to 3A Output Current
- Wide 4.75V to 23V Operating Input Range
- Monolithic Synchronous Buck with 100mΩ High-Side and Low-Side FETs
- Fixed 340KHz Frequency
- All Ceramic Input and Output Capacitors
- Programmable Soft-Start
- Programmable Input Under Voltage Lockout

### APPLICATIONS

- Distributed Power Systems
- Pre-Regulator for Linear Regulators
- Notebook Computers

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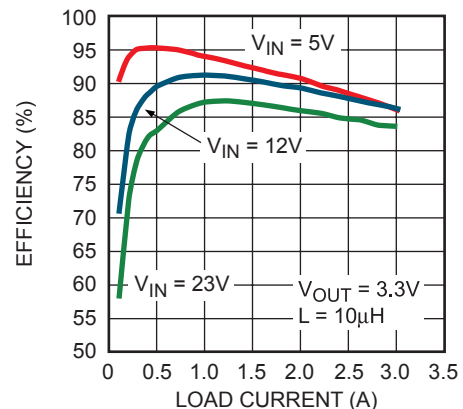
## EV1570DN-00A EVALUATION BOARD



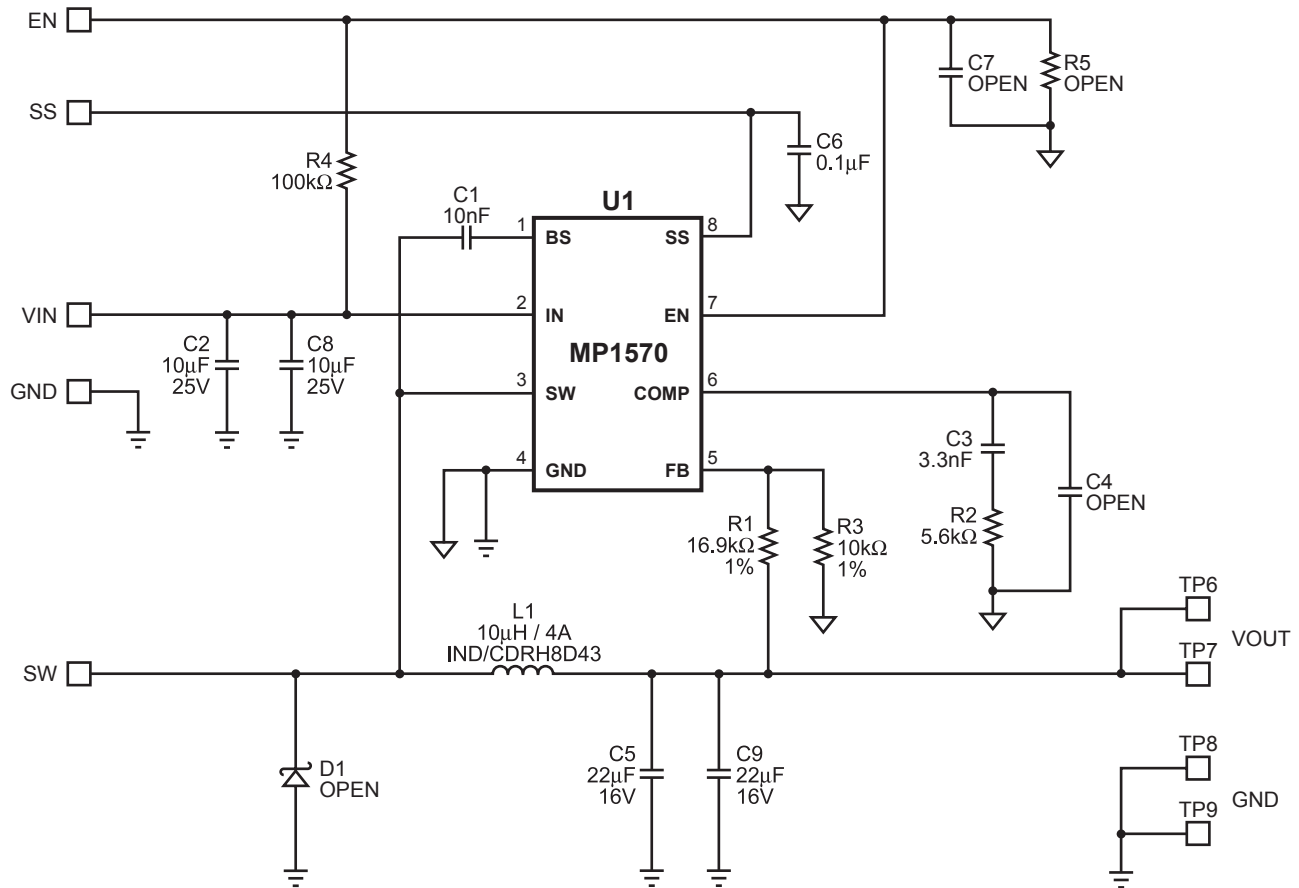
(2"X x 1.5"Y x 0.5"Z)

Board Number	MPS IC Number
EV1570DN-00A	MP1570

Efficiency vs Load Current



MP1570-EC01

**EVALUATION BOARD SCHEMATIC**


EV1570DN-00A\_S01

**EV1570DN-00A BILL OF MATERIALS**

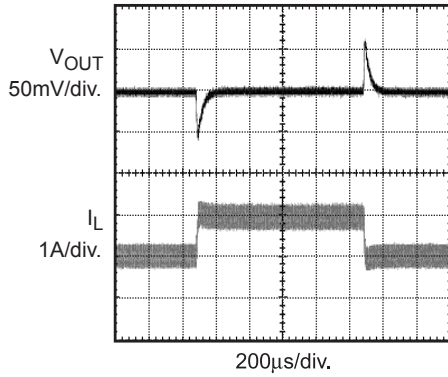
Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	C1	10nF	Ceramic Capacitor, 50V, X7R	0603	Any	
2	C2 C8	10μF	Ceramic Capacitor, 25V, X5R	1210	Taiyo Yuden	TMK325BJ106MM
1	C3	3.3nF	Ceramic Capacitor, 50V, X7R	0603	Any	
2	C4 C7		Open			
2	C5 C9	22μF	Ceramic Capacitor, 16V, X5R	1210	Taiyo Yuden	EMK325BJ226MM
1	C6	0.1μF	Ceramic Capacitor, 50V, X7R	0805	Any	
1	D1		Open			
1	L1	10μH	Inductor, 4A		Sumida	CDRH8D43-100NC
1	R1	16.9kΩ	Resistor, 1%	0603	Any	
1	R2	5.6kΩ	Resistor, 5%	0603	Any	
1	R3	10kΩ	Resistor, 1%	0603	Any	
1	R4	100kΩ	Resistor, 5%	0603	Any	
1	R5		Open			
1	U1		Synchronous Buck Converter	SO8	MPS	MP1570DN

### TYPICAL PERFORMANCE CHARACTERISTICS

$V_{IN} = 12V$ ,  $V_{OUT} = 3.3V$ ,  $R_{LOAD} = 2\Omega$ , unless otherwise noted.

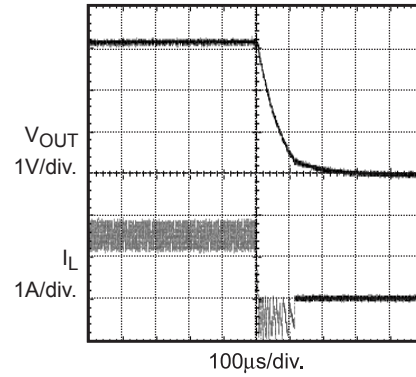
#### Load Transient Waveforms

1A - 2A STEP



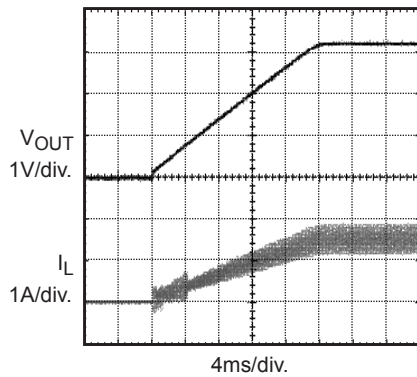
MP1570-WF01

#### Turn Off Waveforms



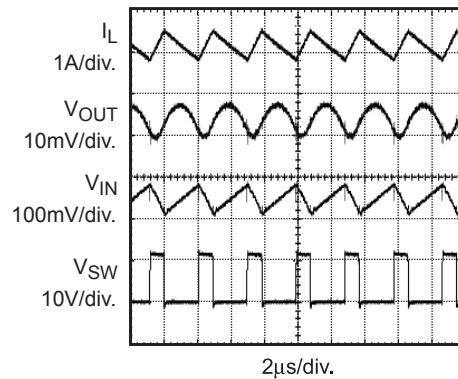
MP1570-WF02

#### Soft-Start Waveforms



MP1570-WF03

#### Switching Waveforms



MP1570-WF04

### PRINTED CIRCUIT BOARD LAYOUT

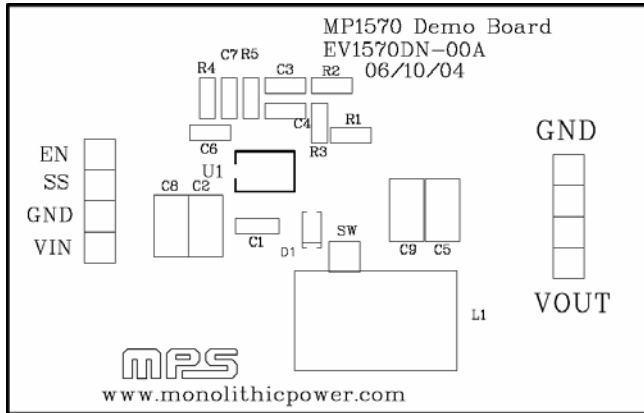


Figure 1—Top Silk Layer

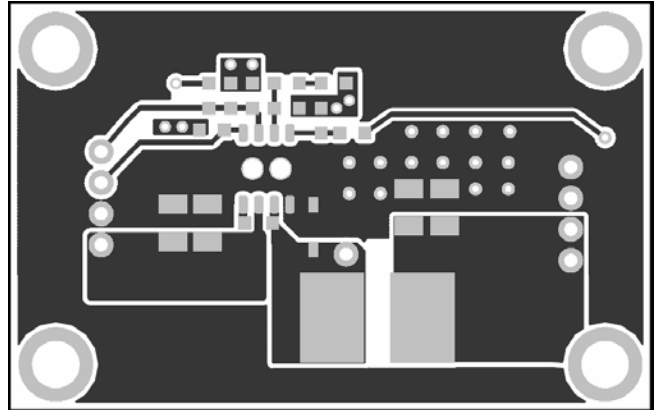


Figure 2—Top Layer

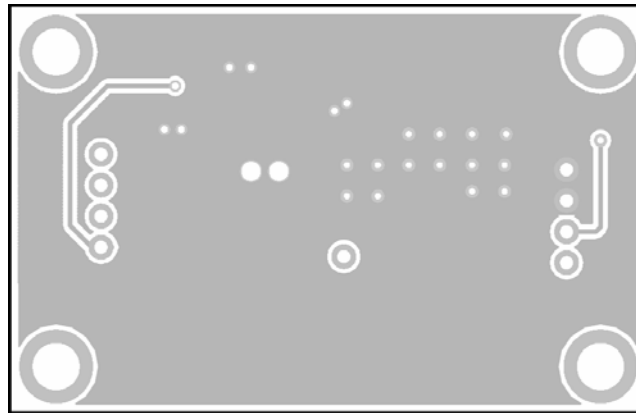


Figure 3—Bottom Layer

## QUICK START GUIDE

1. Connect the positive terminal of the load to VOUT pins, and the negative terminal of the load to GND pins.
2. Preset power supply output to 4.75V to 23V and turn off the power supply.
3. Connect the positive terminal of the power supply output to VIN pin, and the negative terminal of the power supply output to GND pin.
4. Turn power supply on and the MP1570 will automatically startup.
5. To use Enable function, apply a digital input to EN pin. Drive EN higher than 2.5V to turn on the regulator, drive EN less than 0.7V to turn it off.
6. An under voltage lockout (UVLO) function can be implemented by the addition of a resistor divider R4 and R5. The EN threshold is 2.5V, so VIN UVLO threshold is:  $\left(1 + \frac{R4}{R5}\right) \times 2.5V$ .

## RECOMMENDED COMPONENTS FOR STANDARD OUTPUT VOLTAGES

The output voltage of this board is set to 3.3V. This board is laid out to accommodate most commonly used inductors and output capacitors and to be programmed for most standard output voltages. The following table lists recommended components for some standard output voltages. Listed compensation components (R2, C3) values are based on the output capacitor installed on this board. For other capacitors, refer to the Application Information section of the MP1570 datasheet..

V <sub>OUT</sub>	R1	R2	C3	L1
1.8V	4.75kΩ	5.6kΩ	3.3nF	4.7μH
2.5V	10.5kΩ	4.7kΩ	4.7nF	4.7μH to 6.8μH
3.3V	16.9kΩ	5.6kΩ	3.3nF	6.8μH to 10μH
5V	30.9kΩ	7.5kΩ	3.3nF	10μH to 15μH
12V	88.7kΩ	10kΩ	1.2nF	15μH to 22μH

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