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EV2309DS-00A

1A, 23V, 340KHz Synchronous Step-Down Converter Evaluation Board

GENERAL DESCRIPTION

The EV2309DS-00A is an evaluation board for the MP2309, a monolithic synchronous buck regulator. The device integrates 140mΩ MOSFETS that provide 1A continuous load current over a wide operating input voltage of 4.75V to 23V. Current mode control provides fast transient response and cycle-by-cycle current limit.

An adjustable soft-start prevents inrush current at turn-on. In shutdown mode, the supply current is only 1μA.

This device, available in an 8-pin SOIC package, provides a very compact system solution with minimal reliance on external components.

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 1	A

FEATURES

- Up to 1A Output Current
- Wide 4.75V to 23V Operating Input Range
- Monolithic Synchronous Buck with 140mΩ 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
- Networking Systems
- FPGA, DSP, ASIC Power Systems
- Green Electronics/ Appliances
- Notebook Computers

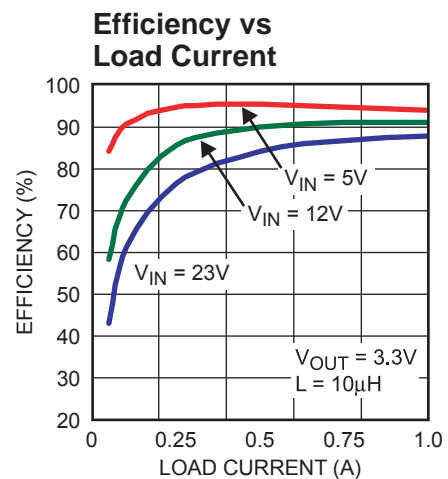
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EV2309DS-00A EVALUATION BOARD

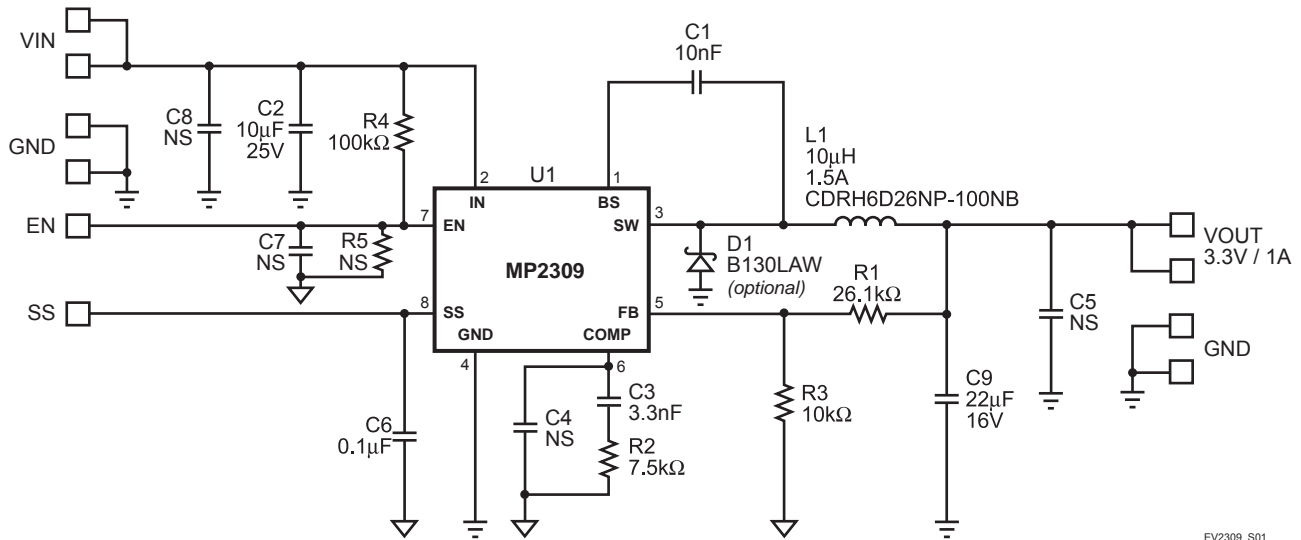


(L x W x H) 2.0" x 1.5" x 0.5"
(5.0cm x 3.8cm x 1.2cm)

Board Number	MPS IC Number
EV2309DS-00A	MP2309



MP2309-EC01

EVALUATION BOARD SCHEMATIC

EV2309DS-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer: Manufacturer P/N	Distributor: Distributor P/N
1	C1	10nF	Ceramic Capacitor, 50V, X7R	0805	Panasonic: ECJ-2VB1H223K	Digikey: PCC223BGCT-ND
1	C2	10μF	Ceramic Capacitor, 25V, X7R	1210	TDK: C3225X7R1E106M	Digikey: 445-1434-1-ND
1	C3	3.3nF	Ceramic Capacitor, 50V, X7R	0805	Panasonic: ECJ-2VB1H332K	Digikey: PCC332BNCT-ND
4	C4, C5, C7, C8	NS	Not Stuffed			
1	C6	0.1μF	Ceramic Capacitor, 50V, X7R	0805	TDK: C2012X7R1H104K	Digikey: 445-1349-1-ND
1	C9	22μF	Ceramic Capacitor, 16V, X5R	1210	TDK: C3225X5R1C226M	Digikey: 445-1436-1-ND
1	D1		Diode Schottky, 30V, 1A	SOD-123	Diodes Inc.: B130LAW	Digikey: B130LAWDICT-ND
1	L1	10μH	Inductor, 1.5A	SMD	Sumida: CDRH6D26NP-100NB	
1	R1	26.1kΩ	Resistor, 1%	0805	Panasonic: ERJ-6ENF2612V	Digikey: P26.1KCCT-ND
1	R2	7.5kΩ	Resistor, 5%	0805	Panasonic: ERJ-6GEYJ752V	Digikey: P7.5KACT-ND
1	R3	10kΩ	Resistor, 1%	0805	Panasonic: ERJ-6ENF1002V	Digikey: P10.0KCCT-ND
1	R4	100kΩ	Resistor, 5%	0805	Panasonic: ERJ-6GEYJ104V	Digikey: P100KACT-ND
1	R5	NS	Not Stuffed			
1	U1		Step-Down Converter, 1A, 340KHz	SO8	MPS: MP2309DS	

PRINTED CIRCUIT BOARD LAYOUT

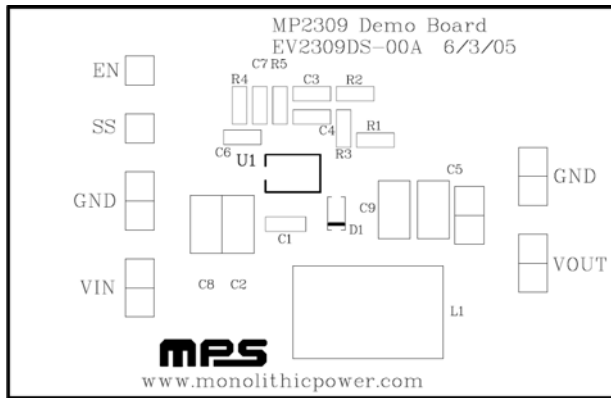


Figure 1—Top Silk Layer

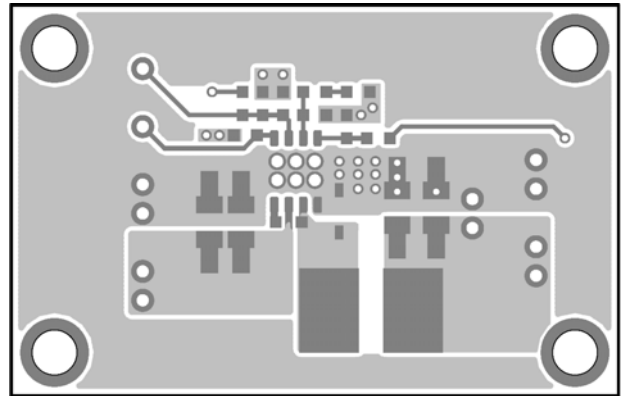


Figure 2—Top Layer

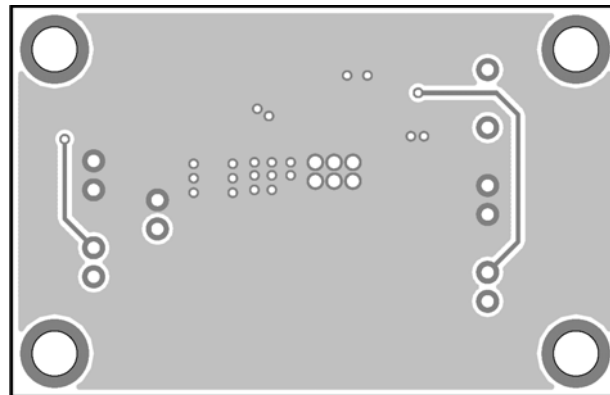


Figure 3—Bottom Layer

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 MP2309 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.

V _{OUT}	R1	R2	C3	L1
1.8V	9.53kΩ	4.99kΩ	4.7nF	4.7μH
2.5V	16.9kΩ	5.6kΩ	4.7nF	4.7μH to 6.8μH
3.3V	26.1kΩ	7.5kΩ	3.3nF	6.8μH to 10μH
5V	44.2kΩ	10kΩ	3.3nF	10μH to 15μH
12V	121kΩ	25.5kΩ	2.2nF	33μH to 47μH

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