



The Future of Analog IC Technology®

EV2227DQ-00A

24V, 3A, 1.6MHz Synchronous Step-Down Converters EV Board

DESCRIPTION

The MP2227 is an internally compensated 1.6MHz fixed frequency PWM synchronous step-down regulator. MP2227 operates from a 3.3V to 24V input and generates an adjustable output voltage from 0.8V to 0.9xV_{IN} at up to 3A load current.

The MP2227 integrates a 160mΩ high-side switch and an 80mΩ synchronous rectifier for high efficiency without an external Schottky diode. With peak current mode control and internal compensation, it is stable with an output ceramic capacitor and a small inductor.

Fault protection includes hiccup short-circuit protection, cycle-by-cycle current limiting and thermal shutdown. Other features include frequency synchronization and soft-start.

The MP2227 is available in a small 3mm x 3mm 10-lead QFN package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V _{IN}	4.5 - 24	V
Output Voltage	V _{OUT}	1.8	V
Output Current	I _{LOAD}	0 - 3	A

FEATURES

- 3A Output Current
- Input Supply Range: 3.3V to 24V
- 160mΩ high-side, 80mΩ low-side Internal Power MOSFET Switches
- All Ceramic Output Capacitors Design
- Up to 95% Efficiency
- 1.6MHz Fixed Switching Frequency
- Adjustable Output from 0.8V to 0.9xV_{IN}
- Internal LDO for Vcc supply
- 1MHz to 2MHz Frequency synchronization Input
- POK
- Hiccup Short Circuit Protection
- Thermal Shutdown

APPLICATIONS

- UP/ASIC/FPGA Core & I/O Supplies
- Printers and LCD TVs
- Network and Telecom Equipment
- Point of Load Regulators

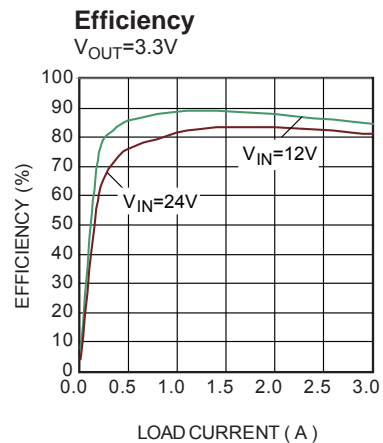
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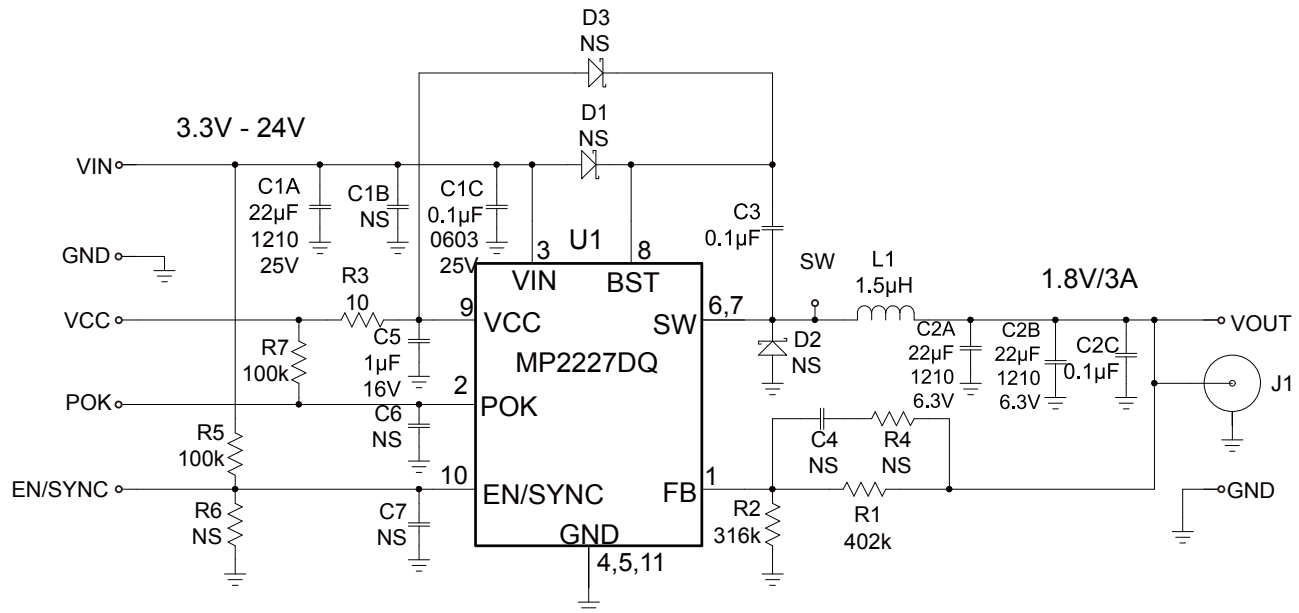
EV2227DQ-00A EVALUATION BOARD



(L x W x H) 6.1cm x 5.1cm x 1.3cm

Board Number	MPS IC Number
EV2227DQ-00A	MP2227



EVALUATION BOARD SCHEMATIC

EV2227DQ-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1A	22µF	Ceramic Cap. 25V, X7R	SMC1210	Murata	GRM32ER71E226KA
1	C1C	0.1µF	Ceramic Cap. 25V, X7R	SMC0603	Murata	GRM188R71E104KA
2	C2A,C2B	22µF	Ceramic Cap. 6.3V, X5R	SMC1210	Murata	GRM32DR60J226MA01L
2	C2C,C3	0.1µF	Ceramic Cap. 16V, X7R	SMC0603	Murata	GRM188R71C104KA
	C1B,C4,C6,C7	NS	Do Not Stuff	SMC0603		
1	C5	1µF	Ceramic Cap. 16V, X7R	SMC0603	Murata	GRM188R71C105KA
	D1,D3	NS	Do Not Stuff	SOD-323		
1	D2	0.5A,40V	Schottky Diode	SOD-123	Diodes Inc	B0540W-7-F
1	R1	402k	Film Resistor, 1%	SMR0603	Yageo	RC0603FR-07402KL
1	R2	316k	Film Resistor, 1%	SMR0603	Yageo	RC0603FR-07316KL
1	R3	10Ω	Film Resistor, 1%	SMR0603	Yageo	RC0603FR-0710R0L
2	R4,R6	NS	Do Not Stuff	SMR0603		
2	R5,R7	100k	Film Resistor, 5%	SMR0603	Yageo	RC0603JR-07100KL
	J1	NS		SMA		
1	L1	1.5µH	Inductor	SMD 7X7x3mm	Würth Electronics	WE-744344150
1	U1	MP2227DQ	Step-Down Regulator	QFN10 3x3mm	MPS Inc.	MP2227DQ R2

PRINTED CIRCUIT BOARD LAYOUT

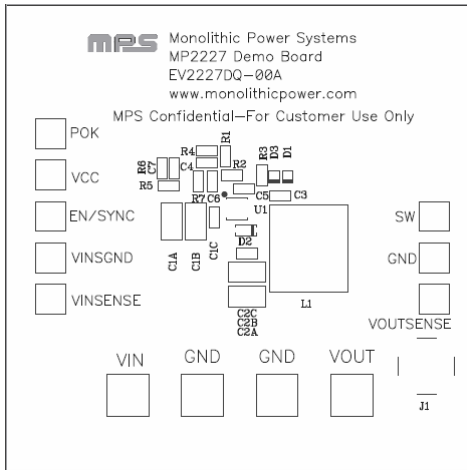


Figure 1—Top Silk Layer

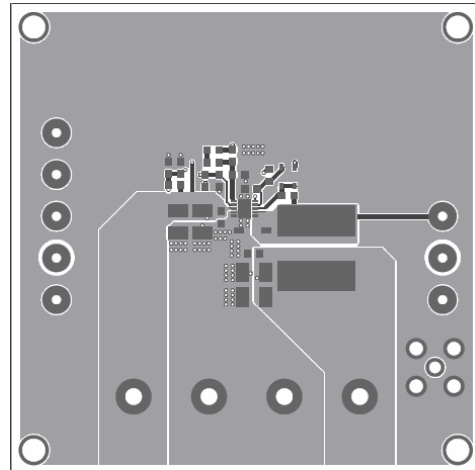


Figure 2—Top Layer

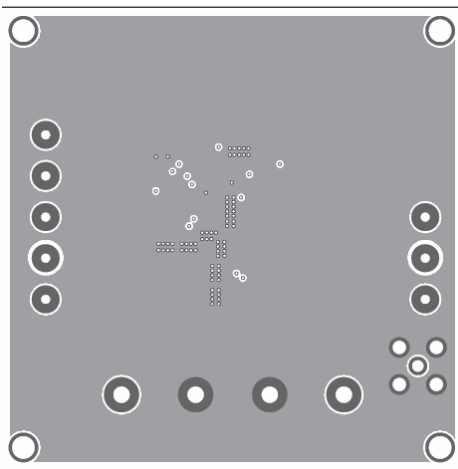


Figure 3—Inner 1 Layer

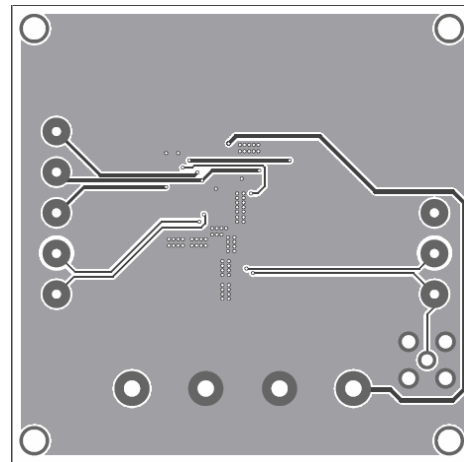


Figure 4—Inner 2 Layer

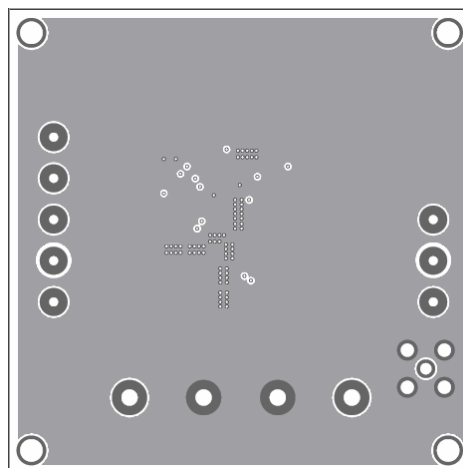


Figure 5—Bottom Layer

QUICK START GUIDE

1. The output voltage of this board is set to 1.8V. The board layout accommodates most commonly used inductors and output capacitors.
2. Attach the positive and negative ends of the load to the V_{OUT} and GND pins, respectively.
3. Attach the input voltage ($4V \leq V_{IN} \leq 24V$) and input ground to the IN and GND pins, respectively.
4. The MP2227 will startup automatically without applying an external voltage to the EN pin. The output voltage V_{OUT} can be changed by varying R2. Calculate the new value using the formula:

$$R2=R1 \times (V_{FB}/V_{OUT}-V_{FB})$$

Where the $V_{FB}=0.8V$ and $R1=402k\Omega$ then the $R2=316k$ for 1.8V output voltage.

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