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EV2451DT-00A

0.6A, 2MHz, 36V Step-Down Converter Evaluation Board

DESCRIPTION

The EV2451DT-00A is an evaluation board for the MP2451, a fixed 2MHz frequency step-down switching regulator with an integrated internal high-side high voltage power MOSFET. The IC provides 0.6A output with current mode control for fast loop response and easy compensation.

High power conversion efficiency over a wide load range is achieved by scaling down the switching frequency at light load condition to reduce the switching and gate driving losses.

The soft-start function helps prevent inductor current runaway during startup and thermal shutdown provides reliable, fault tolerant operation.

By switching at 2MHz, smaller value inductor and input/output capacitor can be used to lower down cost and save board space.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	8-36	V
Output Voltage	V_{OUT}	5	V
Output Current	I_{OUT}	0-0.6	A

FEATURES

- Wide Operating Input Range
- Fixed 2MHz Switching Frequency
- 0.6A Output Current
- Up to 90% Efficiency

APPLICATIONS

- High Voltage Power Conversion
- Automotive Systems
- Industrial Power Systems
- Distributed Power Systems
- Battery Powered Systems

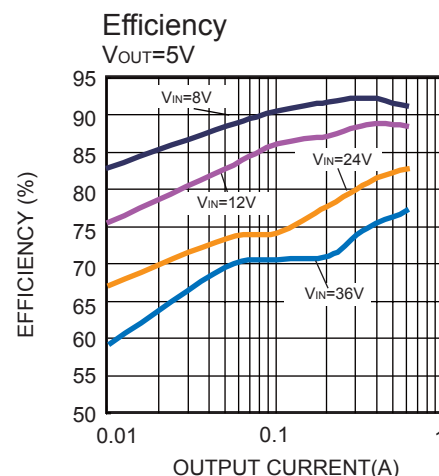
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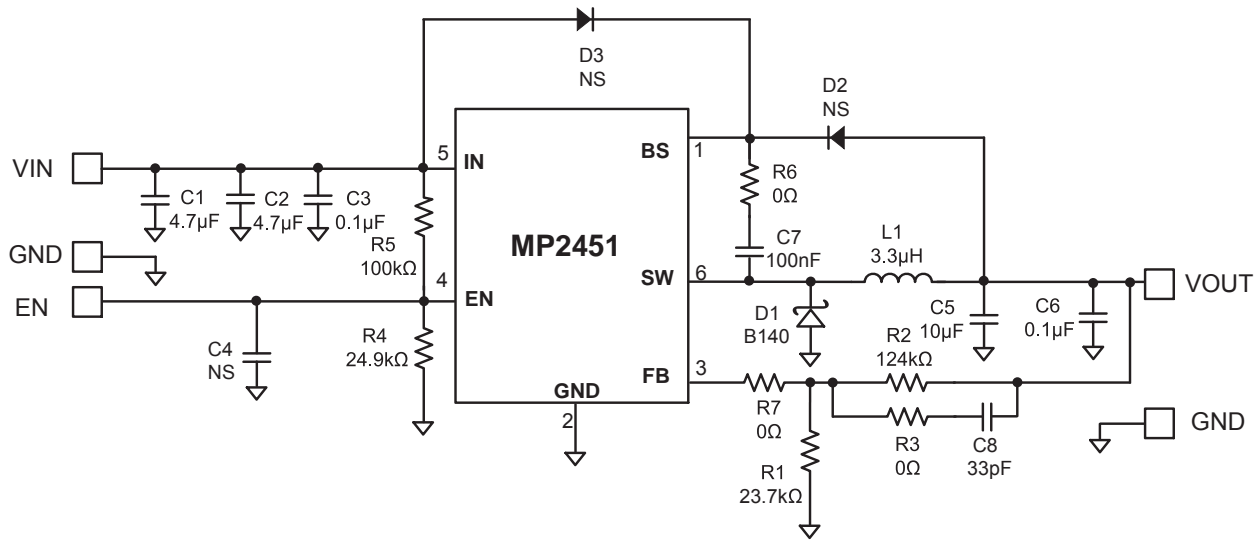
EV2451DT-00A EVALUATION BOARD



(L x W x H) 1.8" x 1.8" x 0.4"
4.6cm x 4.6cm x 1.0cm

Board Number	MPS IC Number
EV2451DT-00A	MP2451DT



EVALUATION BOARD SCHEMATIC

EV2451DT-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
2	C1,C2	4.7 μ F	Ceramic Cap, X7R, 50V	1210	MuRata	GRM32ER71H475KA88L
2	C3,C6	0.1 μ F	Ceramic Cap, X7R, 50V	0805	TDK	C2021X7R1H104K
1	C4	NS				
1	C5	10 μ F	Ceramic Cap, X7R, 16V	1210	MuRata	GRM32DR71C106KA01L
1	C7	100nF	Ceramic Cap, X7R, 50V	0603	TDK	C1608X7R1H104K
1	C8	33pF	Ceramic Cap, COG, 50V	0603	MuRata	GRM1885C1H330JA01
1	R1	23.7k Ω	Film Res, 1%	0603	Yageo	RC0603FR-072K37L
1	R2	124k Ω	Film Res, 1%	0603	Yageo	RC0603FR-0712K4L
2	R3,R6	0R0	Film Res, 5%	0603	Yageo	RC0603JR-070RL
1	R4	24.9k Ω	Film Res, 1%	0603	Yageo	RC0603FR-0724K9L
1	R5	100k Ω	Film Res, 1%	0603	Yageo	RC0603FR-07100KL
1	R7	124k Ω	Film Res, 1%			RC0603FR-07124KL
1	D1		Diode Schottky, 40V, 1A	SMA	Diodes Inc	B140-13-LF
2	D2,D3	NS				
	L1	3.3 μ H	Inductor, 3.3uH, 1.89A	SMD	TOKO	D62CB-#A920CY-3R3M
			Inductor, 3.3uH, 2.21A		Cooper Bussmann	SD25-3R3
			Inductor, 3.3uH, 2.15A		Würth	744043003
1	U1		Step-Down Regulator	SOT23-6	MPS	MP2451DT

PRINTED CIRCUIT BOARD LAYOUT

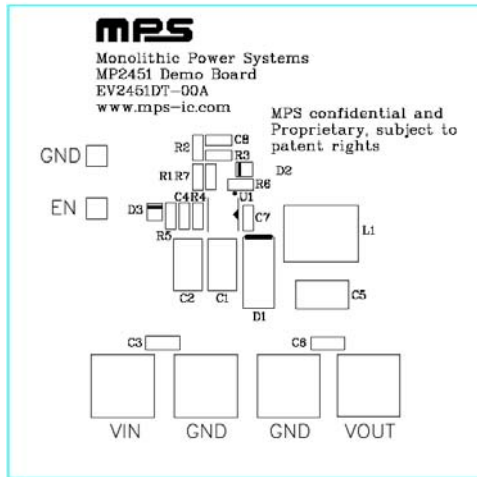


Figure 1—Top Silk Layer

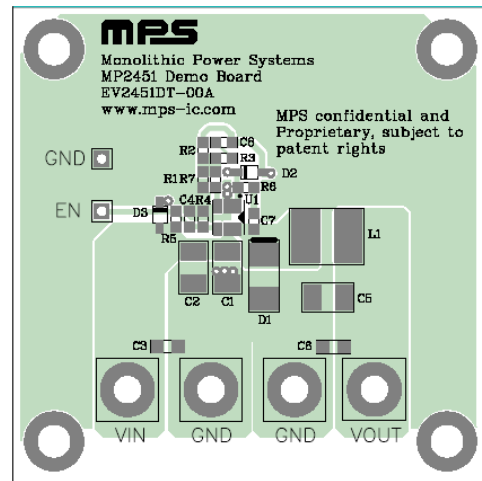


Figure 2—Top Layer

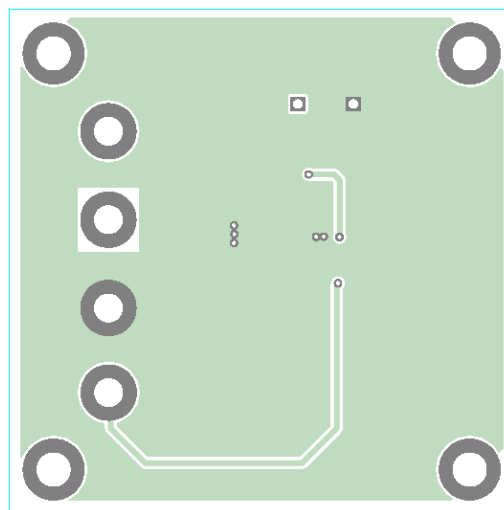


Figure 3—Bottom Layer

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 the power supply output to 12V and turn off the power supply.
3. Connect the positive terminal of the power supply output to the VIN pin and the negative terminal of the power supply output to the GND pin.
4. Turn on the power supply. The EV2451DT will automatically start up.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.6V to turn on the regulator or less than 1.2V to turn it off. Note that floating the EN pin will turn it off.
6. An input under-voltage lockout (UVLO) function is implemented by the addition of a resistor divider (R4 and R6). The EN threshold is 1.2V (falling edge), so the input UVLO threshold is:

$$UVLO = 1.2V \times \left(1 + \frac{R6}{R4} \right)$$

The UVLO threshold is preset to 6V on this board.

7. To adjust the output voltage, change the values of R1 and R2. Generally, Choose R2 around 124kΩ for optimal transient response. For $V_{FB}=0.8V$, $R2=124k\Omega$, R1 can be determined by:

$$R1 = \frac{99.2k\Omega}{V_{OUT}-0.8V}$$

Please follow the application information on the MP2451 datasheet to recalculate/select compensation values, the inductor value and the output capacitor value if the output voltage needs to be reprogrammed.

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