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DESCRIPTION

The EV4459DQT-00A is an evaluation board for the MP4459, a high frequency step-down switching regulator with an integrated internal high-side high voltage power MOSFET. The IC provides 1.5A 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 frequency foldback helps prevent inductor current runaway during startup and thermal shutdown provides reliable, fault tolerant operation.

By switching at 4MHz, the MP4459 prevents EMI (Electromagnetic Interference) noise problems, such as those found in AM radio and ADSL applications.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	36 Max	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	1.5	A

FEATURES

- Wide Operating Input Range
- Up to 4MHz Programmable Switching Frequency
- Precision Current Limit without a Current Sensing Resistor
- Up to 95% Efficiency
- Fully Assembled and Tested

APPLICATIONS

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

EV4459DQT-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
EV4459DQT-00A	MP4459DQT

EVALUATION BOARD SCHEMATIC
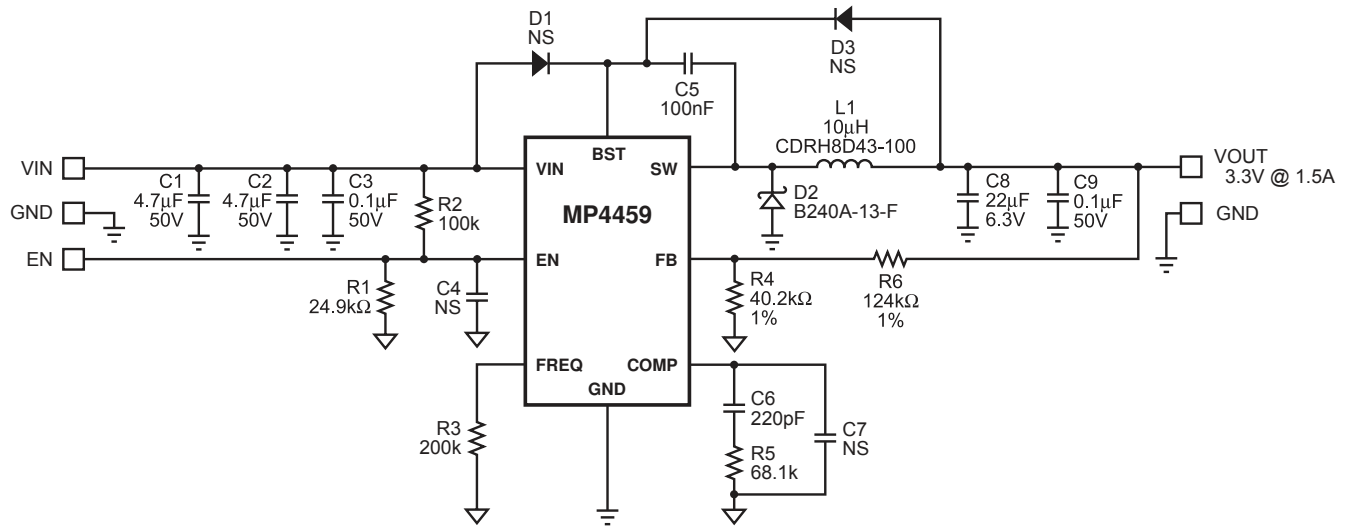
EV4459DQT-00A BILL OF MATERIALS

| Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
2	C1, C2	4.7uF	Ceramic Cap, 50V, X7R	1210	Murata	GRM32ER71H475KA88L
2	C3, C9	0.1uF	Ceramic Cap, 50V, X7R	805	TDK	C2012X7R1H104K
2	C4, C7		Do Not Stuff			
1	C5	100nF	Ceramic Cap, 50V, X7R	603	TDK	C1608X7R1H104K
1	C6	220pF	Ceramic Cap, 50V, C0G	603	TDK	C1608C0G1H221J
1	C8	22uF	Ceramic Cap, 6.3V, X5R	1210	TDK	C3225X5R0J226M
2	D1, D3		Do Not Stuff			
1	D2		Diode Schottky, 40V, 2A	SMA	Diodes Inc	B240A-13-F
1	R1	24.9k	Film Res, 1%	603	Panasonic	ERJ-3EKF2492V
1	R2	100k	Film Res, 5%	603	Panasonic	ERJ-3GEYJ104V
1	R3	200k	Film Res, 5%	603	Panasonic	ERJ-3GEYJ204V
1	R4	40.2k	Film Res, 1%	603	Panasonic	ERJ-3EKF4022V
1	R5	68.1k	Film Res, 1%	603	Panasonic	ERJ-3EKF6812V
1	R6	124k	Film Res, 1%	603	Panasonic	ERJ-3EKF1243V
1	L1	10uH	Inductor, 4.0A	SMD	Sumida	CDRH8D43-100
1	U1		Step-Down Regulator	QFN10	MPS	MP4459DQT

PRINTED CIRCUIT BOARD LAYOUT
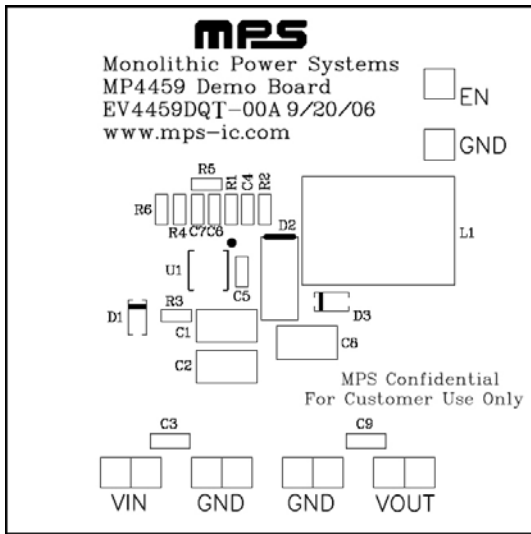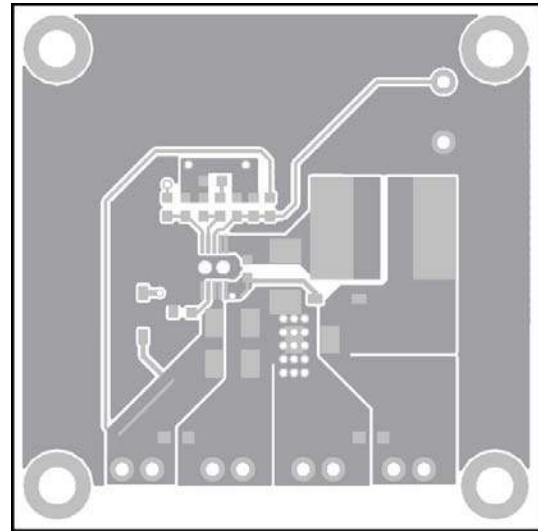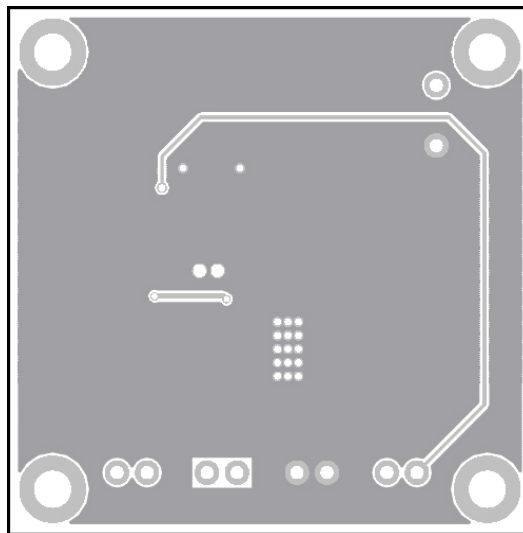

Figure 1—Top Silk Layer

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 EV4459DQT-00A 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.

6. An input under-voltage lockout (UVLO) function is implemented by the addition of a resistor divider (R1 and R2). The EN threshold is 1.2V (falling edge), so the input UVLO threshold is:

$$UVLO = 1.2V \times \left(1 + \frac{R2}{R1}\right)$$

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

7. To change the switching frequency, adjust the value of R3:

$$f_S(KHz) = \frac{70000}{R3(k\Omega)0.93}$$

   The switching frequency on the board is preset to 500KHz.

   Please note that an external bootstrap diode from a 5V supply to the BST pin is necessary to boost gate drive voltage if the switching frequency is above 2MHz. This is because the charge time is reduced at such high switching frequencies.

8. To adjust the output voltage, change the values of R4 and R6, V_{FB}=0.8V. or R2=40.2kΩ, change R1 using the equation:

$$R1 = 50.25 \times (V_{OUT} - 0.8) \ (k\Omega)$$

   Please follow the application information on the MP4459 datasheet to recalculate/select compensation values, the inductor value and the output capacitor value if the output voltage needs to be reprogrammed.