EV0077 (MP1541)

1.3MHz Low Power Boost Converter

EVALUATION BOARD - INITIAL RELEASE

GENERAL DESCRIPTION

The EV0077 Evaluation Board is designed to demonstrate the capabilities of MPS' MP1541. The MP1541 is a 5-pin thin SOT23 current mode step up converter intended for small, low power applications. The MP1541 switches at 1.3MHz and allows the use of tiny, low cost capacitors and inductors 2mm or less in height. Internal soft start results in small inrush current and extends battery life. The MP1541 operates from an input voltage as low as 2.5V and can generate 12V at up to 200mA from a 5V supply.

The MP1541 includes under-voltage lockout, current limiting, and thermal overload protection to prevent damage in the event of an output overload. The MP1541 is available in a small 5-pin TSOT23 package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Supply Voltage	V_{IN}	2.5 – 6	V
Output Voltage	V_{OUT}	12	V
Output Current	I_{OUT}	0.2	A

FEATURES

- On Board Power MOSFET
- Uses Tiny Capacitors and Inductors
- 1.3MHz Fixed Switching Frequency
- Internally Compensated
- Internal Soft Start
- Operates with Input Voltage as Low as 2.5V and Output Voltage as High as 22V
- 12V at 200mA from 5V Input
- UVLO, Thermal Shutdown
- Internal Current Limit
- Available in a TSOT23-5 Package

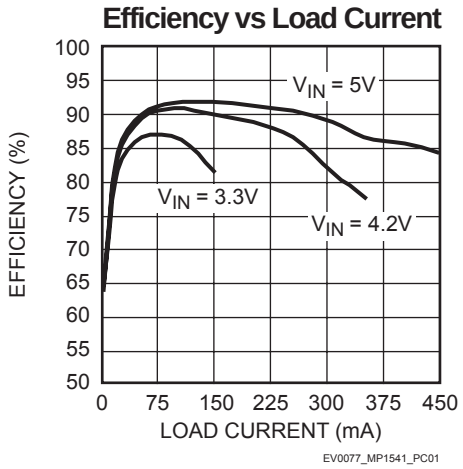
APPLICATIONS

- Camera Phone Flash
- Handheld Computers and PDAs
- Digital Still and Video Cameras
- External Modems
- Small LCD Displays
- White LED Driver

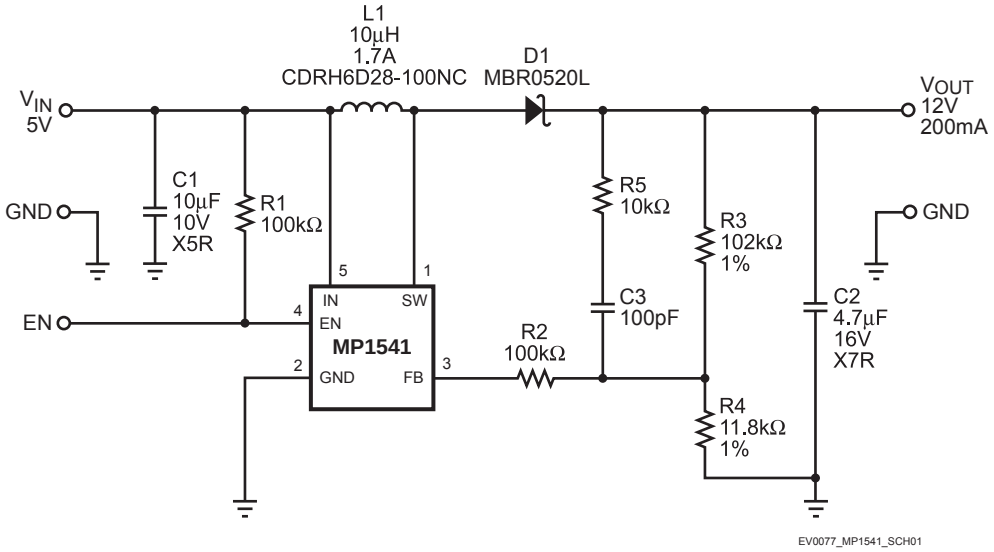
EV0077 EVALUATION BOARD

(2.5"X x 2.5"Y x 0.8"Z)

Board Number	MPS IC Number
EV0077 Rev. A	MP1541



EVALUATION BOARD SCHEMATIC



EV0077 BILL OF MATERIALS

Qty	Ref	Description	Manufacturer P/N	Distributor P/N (1)
1	C1	Ceramic Capacitor, 10µF, 10V, X5R, 1210	Panasonic: ECJ-4YB1A106K	PCC2170CT-ND
1	C2	Ceramic Capacitor, 4.7µF, 16V, X7R, 1210	Panasonic: ECJ-4YB1C475K	PCC2168CT-ND
1	C3	Ceramic Capacitor, 100pF, 50V, NPO	Panasonic: ECJ-2VC1H101J	PCC101CGCT-ND
1	D1	Schottky Diode, 0.5A, 20V, SOD-123	Fairchild: MBR0520L	MBR0520LCT-ND
1	L1	Inductor, 10µH, 1.7A	Sumida: CDRH6D28-100NC	
1	U1	1.3MHz Boost Converter, SOT23-5	MPS: MP1541	
2	R1, R2	Resistor, 100kΩ, 5%, 0603	Panasonic: ERJ-6GEYJ104V	P100KACT-ND
1	R5	Resistor, 10kΩ, 5%, 0603	ERJ-6GEYJ103V	P10KACT-ND
1	R3	Resistor, 102kΩ, 1%, 0603	Panasonic: ERJ-6ENF1023V	P102KCCT-ND
1	R4	Resistor, 11.8kΩ, 1%, 0603	Panasonic: ERJ-6ENF1182V	P11.8KCCT-ND

Note
1) Distributor: Digikey

PRINTED CIRCUIT BOARD LAYOUT

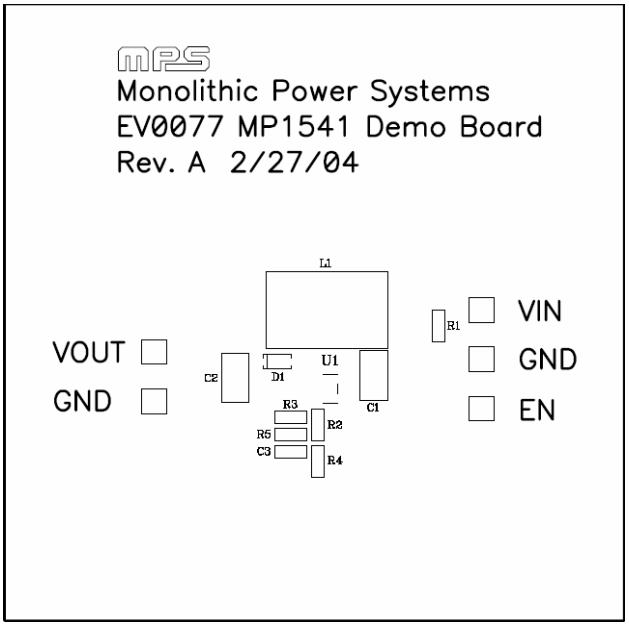


Figure 1—Top Silk Layer

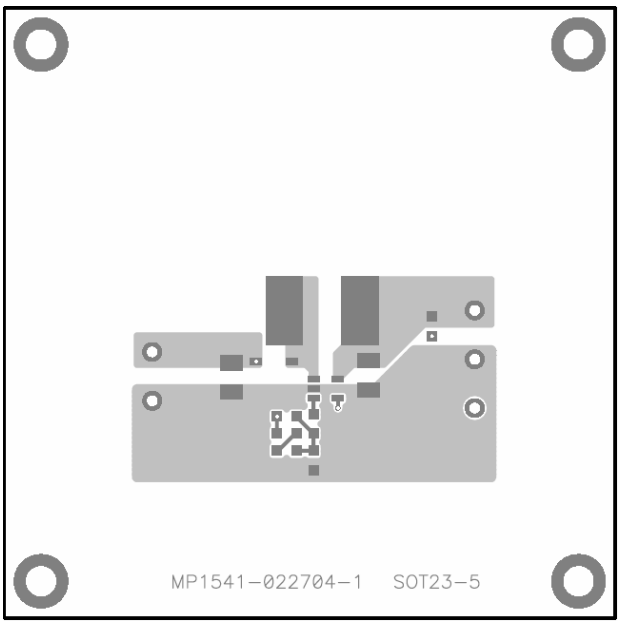


Figure 2—Top Layer

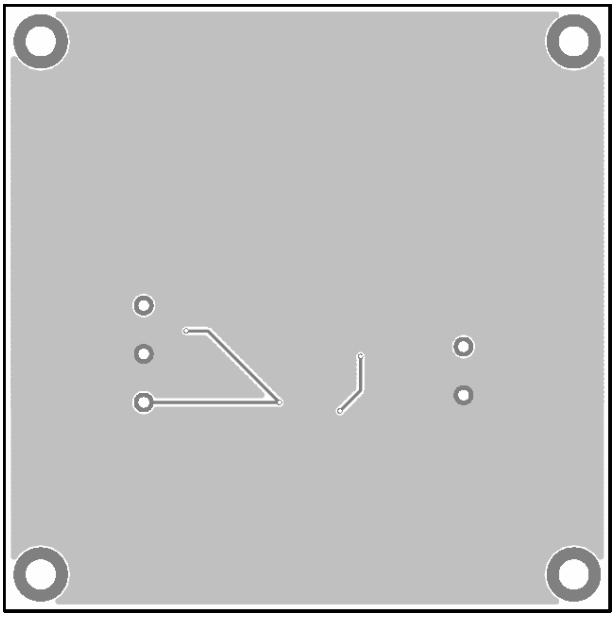


Figure 3— Bottom Layer

QUICK START GUIDE

The output voltage of this board is set to 12V. The board layout accommodates most commonly used inductors and output capacitors.

1. Preset Power Supply to 2.5V ≤ V_{IN} ≤ 6V.
2. Turn Power Supply off.
3. Connect Power Supply terminals to:
    a. Positive (+): VIN
    b. Negative (–): GND
4. Connect Load to:
    a. Positive (+): VOUT
    b. Negative (–): GND
5. Turn Power Supply on after making connections.
6. The MP1541 is automatically enabled on the evaluation board once VIN is applied. To disable the MP1541, connect the EN pin to ground.
7. The output voltage V_{OUT} can be changed by varying R3. Calculate the new value using the fomula:

$$R3 = \left(\frac{V_{OUT}}{V_{FB}} - 1 \right) R4$$

where V_{FB} = 1.25V and R4 = 11.8kΩ

For example, for V_{OUT} = 8V

$$R3 = \left(\frac{8V}{1.25V} - 1 \right) \times 11.8k\Omega = 63.72k\Omega$$

Therefore use a 63.4kΩ standard 1% value.