

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

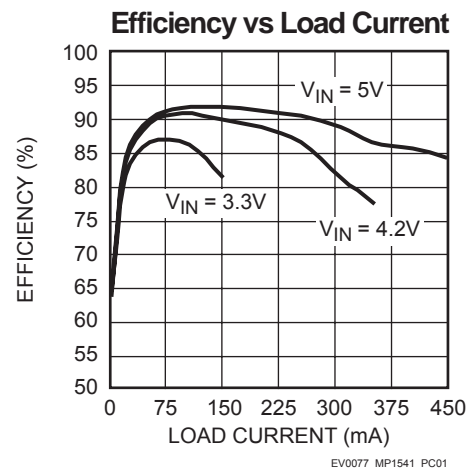
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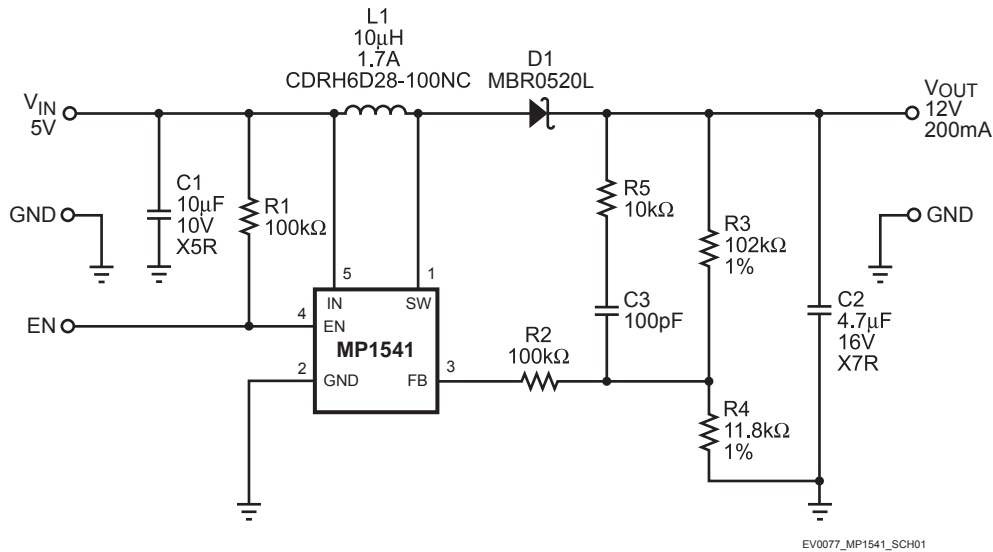
EV0077 EVALUATION BOARD



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

| Board Number | MPS IC Number |
|---------------|---------------|
| EV0077 Rev. A | MP1541 |



EVALUATION BOARD SCHEMATIC


EV0077_MP1541_SCH01

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

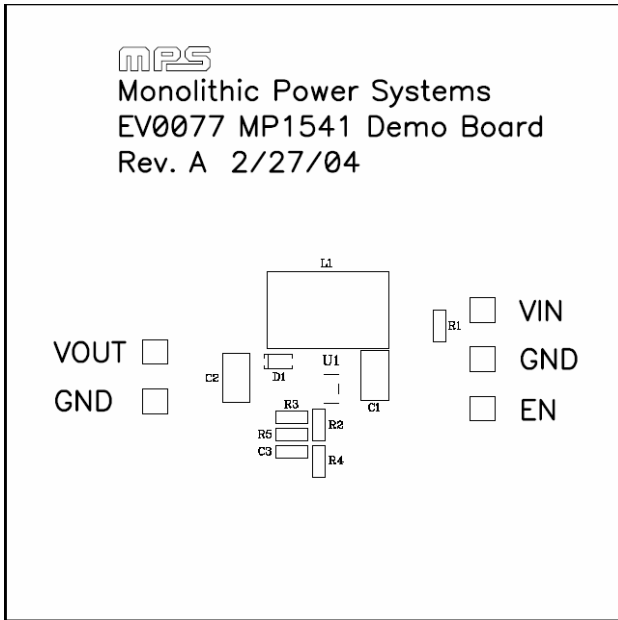


Figure 1—Top Silk Layer

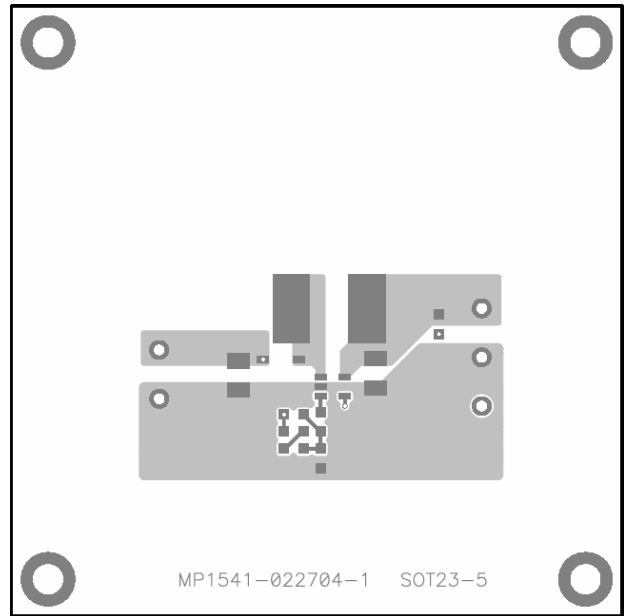


Figure 2—Top Layer

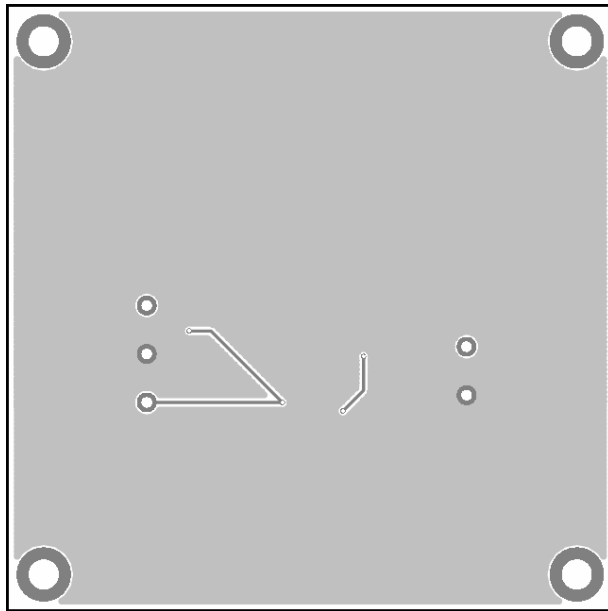


Figure 3— Bottom Layer

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 $2.5V \leq V_{IN} \leq 6V$.
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 $R4 = 11.8k\Omega$

For example, for $V_{OUT} = 8V$

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

Therefore use a 63.4k Ω standard 1% value.

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