# EV1542DK-00A

## 700KHz/1.3MHz Boost Converter with a 2A Switch

The Future of Analog IC Technology™

## GENERAL DESCRIPTION

The EV1542DK-00A is the evaluation board for the MP1542, a current mode step-up converter with a 2A, 0.18Ω internal switch to provide a highly efficient regulator with quick response. The MP1542 can be operated at 700KHz or 1.3MHz allowing for easy filtering and low noise. An external compensation pin gives the user flexibility in setting loop dynamics, which allows the use of small, low-ESR ceramic output capacitors. Soft-start results in small inrush current and can be programmed with an external capacitor. The MP1542 operates from an input voltage as low as 2.5V and can generate 12V at up to 500mA from a 5V supply.

The MP1542 includes under-voltage lockout, current limiting and thermal overload protection preventing damage in the event of an output overload. The MP1542 is available in a low profile 8-pin MSOP package.

## FEATURES

- 2A, 0.18Ω, 25V Power MOSFET
- Uses Tiny Capacitors and Inductors
- Pin Selectable 700KHz or 1.3MHz Fixed Switching Frequency
- Programmable Soft-Start
- Operates with Input Voltage as Low as 2.5V and Output Voltage as High as 22V
- 12V at 500mA from 5V Input
- UVLO, Thermal Shutdown
- Internal Current Limit
- Available in an 8-Pin MSOP Package

## APPLICATIONS

- LCD Displays
- Portable Applications
- Handheld Computers and PDAs
- Digital Still and Video Cameras

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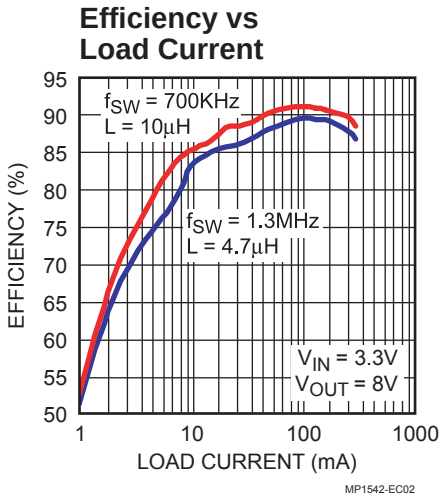
## ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Input Voltage | $V_{IN}$ | 2.5 – 6 | V |
| Output Voltage | $V_{OUT}$ | 8 | V |
| Output Current | $I_{OUT}$ | 400 | mA |

## EV1542DK-00A EVALUATION BOARD

**Dimensions (2.0"X x 2.0"Y x 0.4"Z)**

| Board Number | MPS IC Number |
|---|---|
| EV1542DK-00A | MP1542DK |





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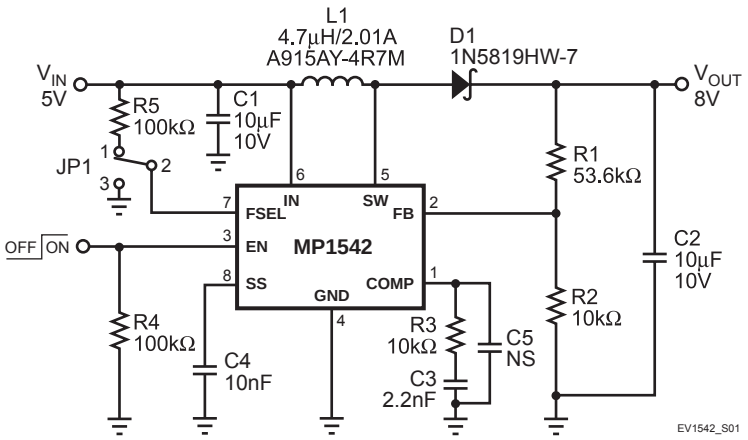
## EVALUATION BOARD SCHEMATIC




## EV1542DK-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|---|---|---|---|---|---|---|
| 2 | C1, C2 | 10µF | Ceramic Capacitor, 10V, X7R | 1210 | AVX | 1210ZC106KAT2A |
| 1 | C3 | 2.2nF | Ceramic Capacitor, 50V, X7R | 0805 | AVX | 08055C222KAT2A |
| 1 | C4 | 10nF | Ceramic Capacitor, 50V, X7R | 0805 | AVX | 08055C103KAT2A |
| 1 | C5 | | Not Stuffed | | | |
| 1 | D1 | | Schottky Diodes, 40V, 1A | SOD123 | Diodes Inc | 1N5819HW-7 |
| 1 | JP1 | | 3-Pin Connector Header, 0.100 | | Sullins | PTC03SAAN |
| 1 | L1 | 4.7µH | 2.01A, D53LC | SMD | Toko | A915AY-4R7M |
| 1 | R1 | 53.6kΩ | Film Resistor, 1% | 0805 | Panasonic | ERJ-6ENF5362V |
| 2 | R2, R3 | 10kΩ | Film Resistor, 1% | 0805 | Panasonic | ERJ-6ENF1002V |
| 2 | R4, R5 | 100kΩ | Film Resistor, 5% | 0805 | Panasonic | ERJ-6GEYJ104V |
| 1 | U1 | | DC-DC Converter | MSOP-8 | MPS | MP1542 |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## PRINTED CIRCUIT BOARD LAYOUT

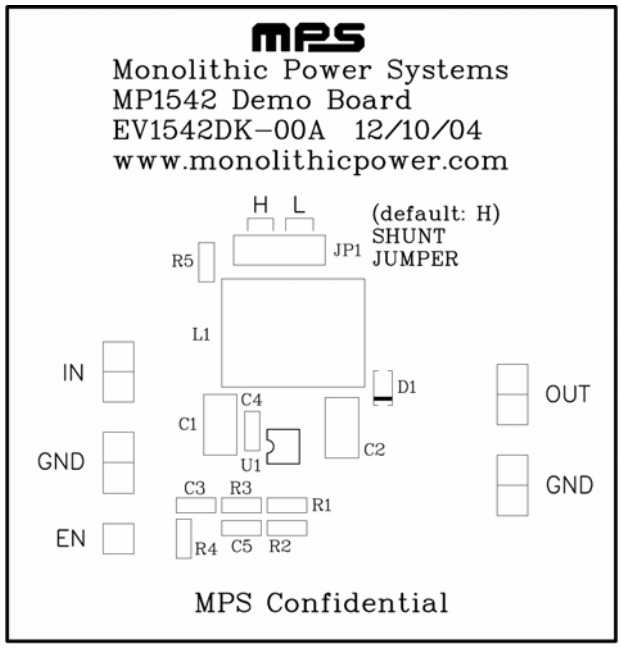


**Figure 1—Top Silk Layer**

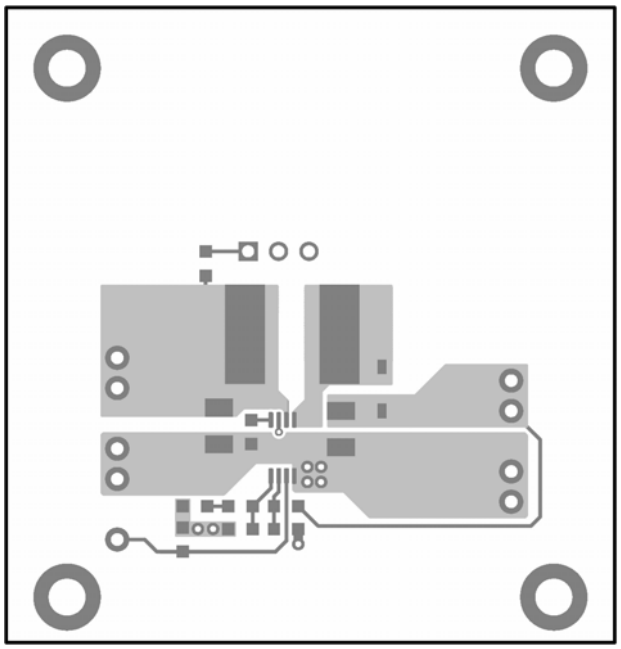

**Figure 2—Top Layer**

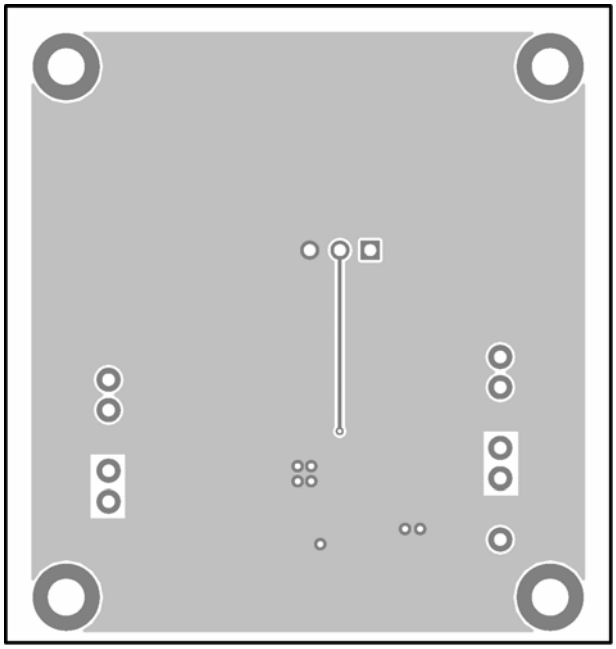

**Figure 3—Bottom Layer**


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## QUICK START GUIDE

The output voltage of this board is set to 8V. 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 (+): IN, EN
    b. Negative (–): GND
4. Connect Load to:
    a. Positive (+): OUT
    b. Negative (–): GND
5. Turn Power Supply on after making connections.
6. The MP1542 is enabled on the evaluation board once $V_{IN}$ is applied. To disable the MP1542, disconnect EN from IN.
7. The output voltage $V_{OUT}$ can be changed by varying R1. Calculate the new value using the fomula:

$$R1 = \left( \frac{V_{OUT}}{V_{FB}} - 1 \right) R2$$

Where $V_{FB}$ = 1.25V and R2 = 10kΩ

For example, for $V_{OUT}$ = 12V

$$R1 = \left( \frac{12V}{1.25V} - 1 \right) \times 10k\Omega = 86k\Omega$$

Therefore use an 86.6kΩ standard 1% value.

For output voltages greater than 10V, the output capacitor C2 needs to be replaced with a capacitor with a higher voltage rating suitable for the new output voltage.

8. The switching frequency is set to 1.3MHz if jumper JP1 is shunted between 1 and 2. To get 700KHz operation, shunt JP1 between 2 and 3.

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