EV1542DK-SEPIC-00A

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

EVALUATION BOARD

GENERAL DESCRIPTION

The EV1542DK-SEPIC-00A is the demo board for sepic applications using the MP1542, a current mode step up converter with a 2A, 0.18Ω internal switch to provide a highly efficient regulator with fast response. The EV1542DK-SEPIC-00A 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. The soft-start results in small inrush current and can be programmed with an external capacitor. The EV1542DK-SEPIC-00A can operate from a single Li-Ion battery to generate 3.3V at up to 500mA.

Other features include under voltage lockout, current limiting and thermal overload protection, all available in a low profile 8-pin MSOP package.

FEATURES

- Automatic Up-Down Conversion
- Operates from a Single Li-Ion Battery to Generate 3.3V at up to 500mA
- Uses Tiny Capacitors and Inductors
- Pin Selectable 700KHz or 1.3MHz Fixed Switching Frequency
- Programmable Soft-Start
- UVLO, 2A Switch, Thermal Shutdown
- Internal Current Limit

APPLICATIONS

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

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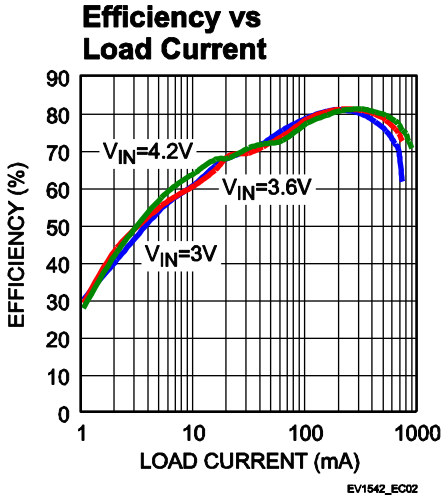
ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	3 – 4.2	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	500	mA

EV1542DK-SEPIC-00A EVALUATION BOARD

Dimensions (2.0"X x 2.0"Y x 0.0"Z)

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



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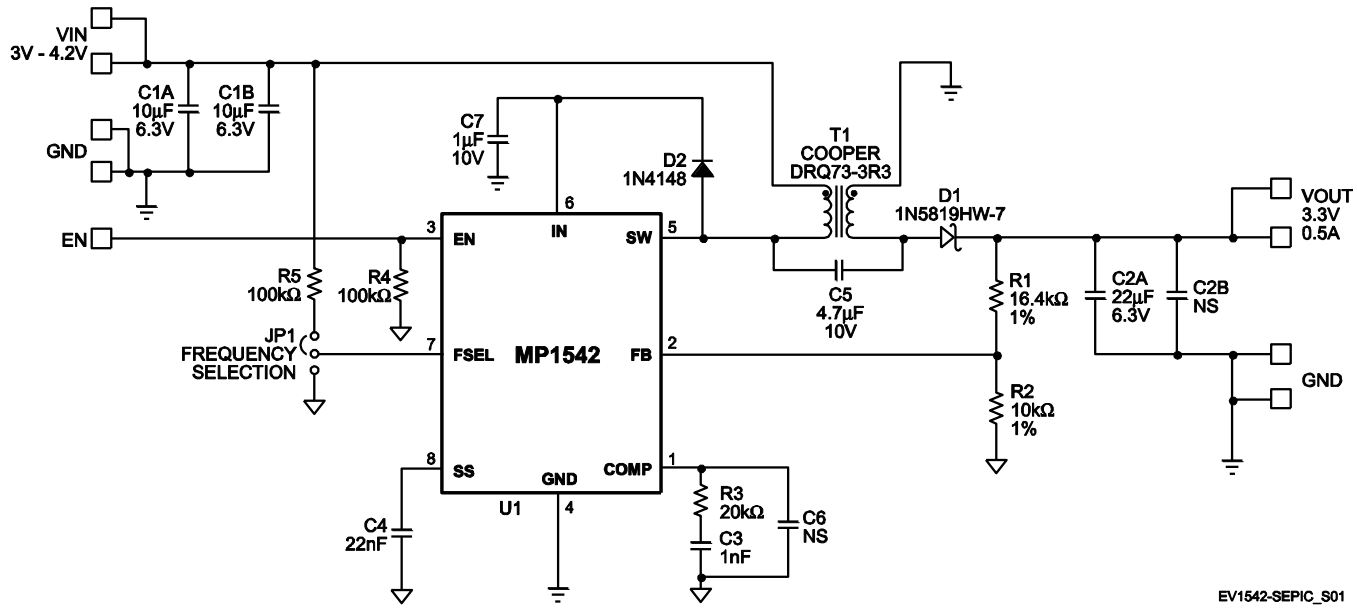
EVALUATION BOARD SCHEMATIC



EV1542DK-SEPIC-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
2	C1A, C1B	10µF	Ceramic Cap, 6.3V, X5R	1210	TDK	C3225X5R1A106K
1	C2A	22µF	Ceramic Cap, 6.3V, X5R	1210	TDK	C3225X5R0J226M
1	C3	1nF	Ceramic Cap, 50V, X7R	0805	TDK	C2012X7R1H102K
1	C4	22nF	Ceramic Cap, 100V, X7R	0805	TDK	C2012X7R2A223M
1	C5	4.7µF	Ceramic Cap, 10V, Y5V	0805	TDK	C2012Y5V1A475Z
2	C6, C2B	NS	Not Stuffed			
1	C7	1µF	Ceramic Cap, 10V, X5R	0805	TDK	C2012X5R1A105K
1	D1		Schottky Diode, 40V, 1A	SOD-123	Diodes Inc	1N5819HW-7
1	D2		Rectifier Diode, 75V, 200mW	SOD-323	Diodes Inc	1N4148WS-7
1	JP1		3-Pin Connector Header, 0.100		Sullins	PTC03SAAN
1	L1	3.3µH	Transformer, 1.66A		Cooper	DRQ73-3R3
1	R1	16.4kΩ	Metal Film Resistor, 1%	0805	Panasonic	ERJ-6ENF1642V
1	R2	10kΩ	Metal Film Resistor, 1%	0805	Panasonic	ERJ-6ENF1002V
1	R3	20kΩ	Metal Film Resistor, 5%	0805	Panasonic	ERJ-6GEYJ203V
2	R4, R5	100kΩ	Metal Film Resistor, 5%	0805	Panasonic	ERJ-6GEYJ104V
1	U1		DC-DC Converter	MSOP8	MPS	MP1542DK

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PRINTED CIRCUIT BOARD LAYOUT

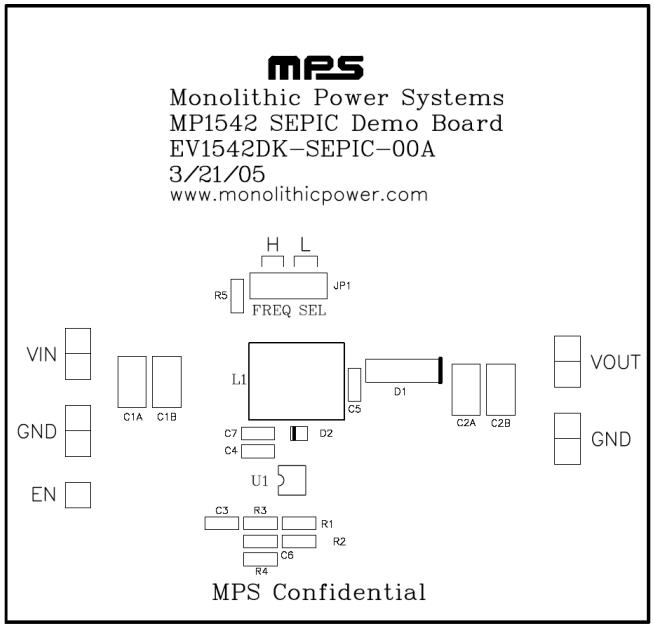

Figure 1—Top Silk Layer

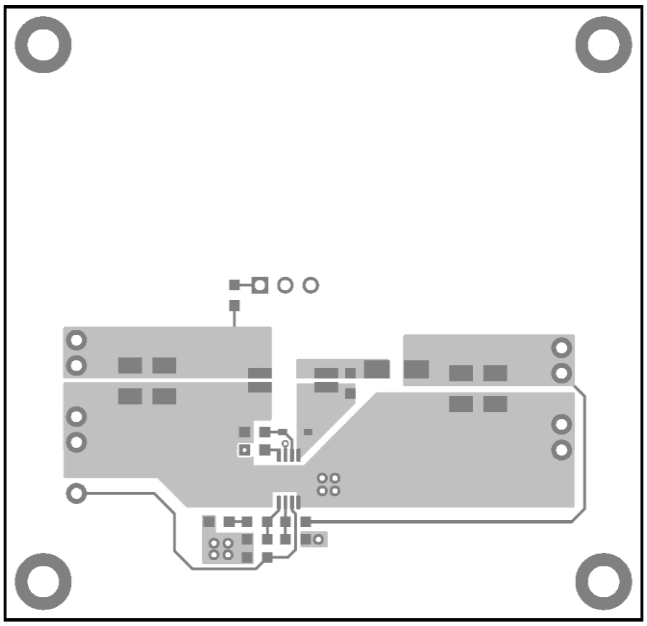

Figure 2—Top Layer

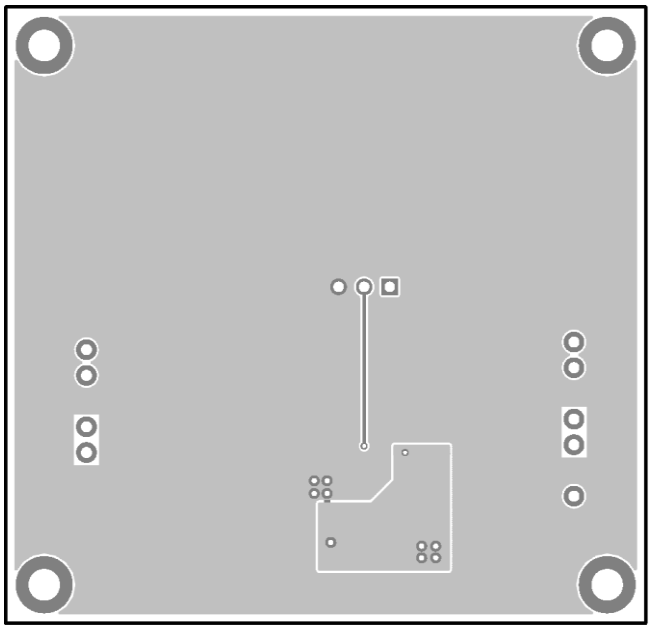

Figure 3—Bottom Layer

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QUICK START GUIDE

The output voltage of this board is set to 3.3V. The board layout accommodates most commonly used inductors and output capacitors.

1. Preset the power supply to $3V \le V_{IN} \le 6V$.
2. Turn the power supply off.
3. Connect the power supply terminals to:
    a. Positive (+): VIN, EN
    b. Negative (–): GND
4. Connect the load to:
    a. Positive (+): VOUT
    b. Negative (–): GND
5. Turn on the power supply 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 formula:

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

Where V_{FB} = 1.25V and R2 = 10kΩ

For example, for V_{OUT} = 5V

$$R1 = \left(\frac{5V}{1.25V} - 1 \right) \times 10k\Omega = 30k\Omega$$

Therefore use a 30.1kΩ standard 1% value.

8. The switching frequency is set to 1.3MHz if jumper JP1 is shunted at the H position. To get 700KHz operation, shunt JP1 at the L position.

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