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EV2493DS-00A

2A, 36V, 150kHz Step-Down Converter with Programmable Output Current Limit Evaluation Board

DESCRIPTION

The EV2493DS-00A is an evaluation board for the MP2493. The MP2493 is a monolithic step-down switch mode converter with a programmable output current limit. It achieves 1.5A continuous output current over a wide input supply range with excellent load and line regulation.

The maximum output current can be programmed by sensing current through the inductor DC resistance (DCR) or an accurate sensor resistor. The current sensing of EV2493DS-00A is through the inductor DC resistance (DCR).

Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown.

The MP2493 requires a minimum number of readily available standard external components.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	8 - 36	V
Output Voltage	V_{OUT}	5	V
Output Current	I_{LOAD}	2	A

FEATURES

- Programmable up to 2A Output Current
- Output Adjustable from 0.8V to 15V
- Programmable Output Current Limit without Additional Power Loss
- 0.25Ω Internal Power MOSFET Switch
- Stable with Low ESR Output Ceramic Capacitors
- 95% Efficiency @ 500mA ($V_o=5V$)
- Fixed 150kHz Frequency
- Thermal Shutdown
- Cycle-by-Cycle Over Current Protection
- Good EMI Performance
- Wide 8V to 36V Operating Input Range

APPLICATIONS

- USB Power Supplies
- Automotive Cigarette Lighter Adapters
- Linear Chargers

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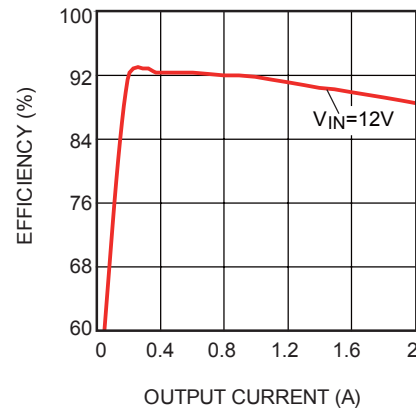
EV2493DS-00A EVALUATION BOARD



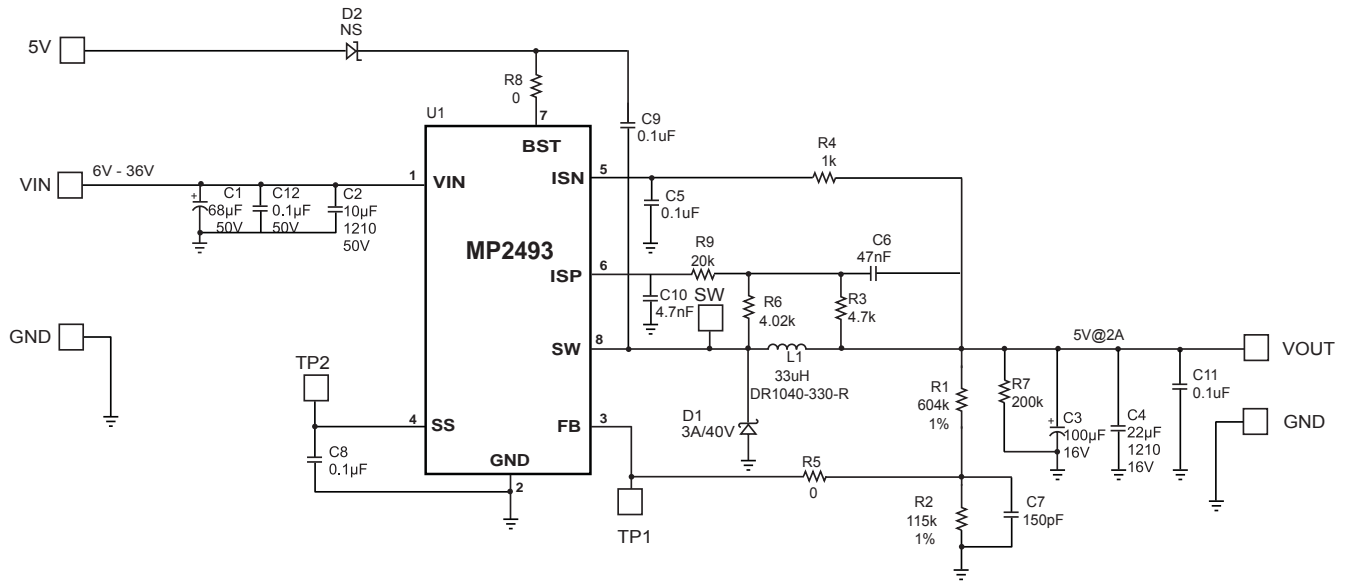
Board Number	MPS IC Number
EV2493DS-00A	MP2493DS

Efficiency

$V_{OUT}=5V$



EVALUATION BOARD SCHEMATIC



EV2493DS-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	68uF	Cap., Alum. 50V	8x11.5	Panasonic	EEUFC1H680
1	C2	10uF	Ceramic Cap., 50V, 10%, X5R	1210	Taiyo Yuden	UMK325BJ106KM-T
1	C3	100uF	Cap., Alum. 16V	C6	Sanyo	16SVPC100M
1	C4	22uF	Ceramic Cap., 16V, 10%, X7R	1210	muRata	GRM32ER71C226K
5	C5,C8,C9,C11,C12	0.1uF	Ceramic Cap., 50V, 10%, X7R	0603	muRata	GRM188R71H104K
1	C6	47nF	Ceramic Cap., 50V, 10%, X7R	0603	muRata	GRM188R71H473K
1	C7	150pF	Ceramic Cap., 50V, 5%, C0G	0603	muRata	GRM1885C1H151J
1	C10	4.7nF	Ceramic Cap., 50V, 10%, X7R	0603	muRata	GRM188R71H472K
1	D1	3A	Schottky Diode, SMD, 40V, 3A	SMA	ON Semiconductor	MBRA340T3G
0	D2	NS	Diode, SMD,	SOD123		
1	L1	33uH	Inductor, DR1040, 90mΩ	SMD	COOPER	DR1040-330-R
1	R1	604k	Film Res., 1%	0603	Yageo	RC0603FR-07604KL
1	R2	115k	Film Res., 1%	0603	Yageo	RC0603FR-07115KL
1	R3	4.7k	Film Res., 5%	0603	Yageo	RC0603JR-074K7L
1	R4	1k	Film Res., 5%	0603	Yageo	RC0603JR-071KL
2	R5,R8	0Ω	Film Res., 5%	0603	Yageo	RC0603JR-070RL
1	R6	4.02k	Film Res., 1%	0603	Yageo	RC0603FR-074K02L
1	R7	200k	Film Res., 5%	0603	Yageo	RC0603JR-07200KL
1	R9	20k	Film Res., 5%	0603	Yageo	RC0603JR-0720KL
1	U1		Step-Down Converter	SOIC8	MPS	MP2493DS

PRINTED CIRCUIT BOARD LAYOUT

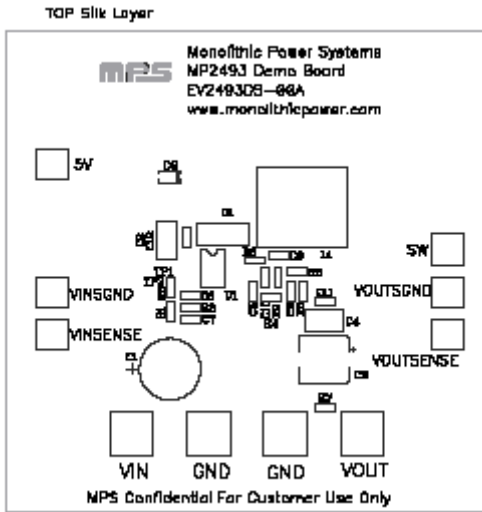


Figure 1—Top Silk Layer

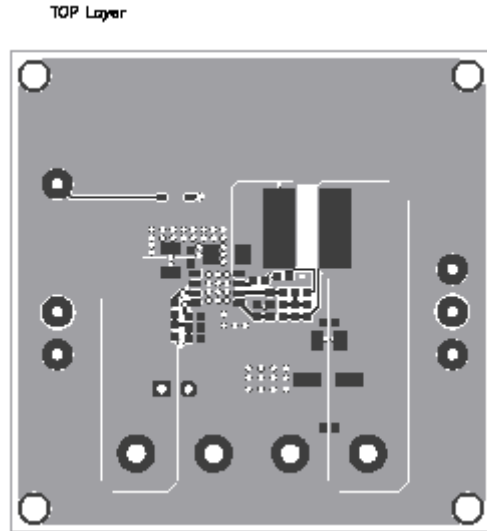


Figure 2—Top Layer

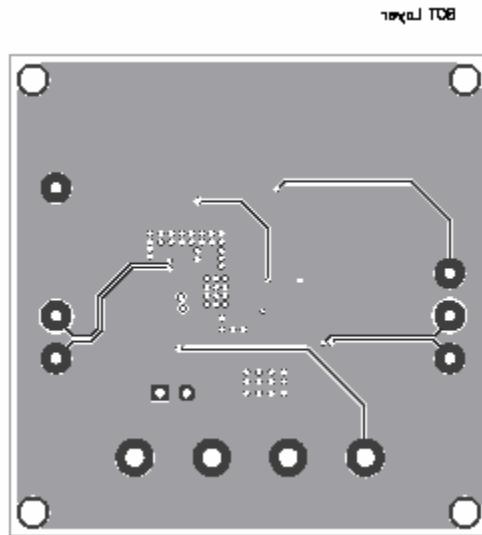


Figure 3—Bottom Layer

QUICK START GUIDE

1. The output voltage of this board is set to 5V. The board layout accommodates most commonly used inductors and output capacitors.
2. Attach the positive and negative ends of the load to the VOUT and GND pins, respectively.
3. Attach the input voltage ($8V \leq V_{IN} \leq 36V$) and input ground to the IN and GND pins, respectively.
4. The MP2493 will startup automatically without applying an external voltage to the EN pin. The output voltage V_{OUT} can be changed by varying R2. Calculate the new value using the formula:

$$R2 = R1 \times V_{FB} / (V_{OUT} - V_{FB})$$

Where $V_{FB} = 0.8V$ and $R1 = 604k\Omega$.

For example, for $V_{OUT} = 5V$:

$$R2 = R1 \times V_{FB} / (V_{OUT} - V_{FB}) = 604k\Omega \times (0.8/5 - 0.8) = 115k\Omega$$

For the closest standard 1% value.

5. The output current limit is set as:

$$I_{OUT} = \frac{100mV}{DCR} \times \frac{R6 + R3}{R3}$$

For DCR current sense, it is desirable to keep:

$$\frac{R6 + R3}{R6 + R3} \cdot C6 = \frac{L1}{DCR}$$

DCR is the DC resistance of the inductor winding.

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