



The Future of Analog IC Technology®

# EV2499DS-00A

Integrated 100V Load Dump Protection,  
2A, 100KHz Step Down Regulator with  
Output Current Limit Control  
Evaluation Board

## DESCRIPTION

The MP2499 is a monolithic step-down switch mode converter with a programmable output current limit and an input over-voltage protection switch. It achieves 2A continuous output current over a wide input supply range with excellent load and line regulation.

Fault condition protection includes cycle-by-cycle current limiting and thermal shutdown. The MP2499 can survive high-voltage transients such as those found in automotive and industrial applications.

The MP2499 is available in a 16-pin SOIC package.

## ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Surge Voltage		90	V
Input Voltage	$V_{IN}$	12	V
Output Voltage	$V_{OUT}$	5	V
Output Current	$I_{LOAD}$	2	A

## FEATURES

- Wide 12V to 24V Operating Input Range
- Input Surge Protection Up to 90V
- Programmable up to 2A Output Current
- Output Adjustable
- Programmable Output Current Limit without power loss
- 0.25Ω Internal Power MOSFET Switch
- Stable with Low ESR Output Ceramic Capacitors
- 92% Efficiency @ 500mA ( $V_{OUT}=5V$ )
- Fixed 100kHz Frequency
- Thermal Shutdown
- Cycle-by-Cycle Over Current Protection
- Available in a 16-Pin SOIC Package

## APPLICATIONS

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

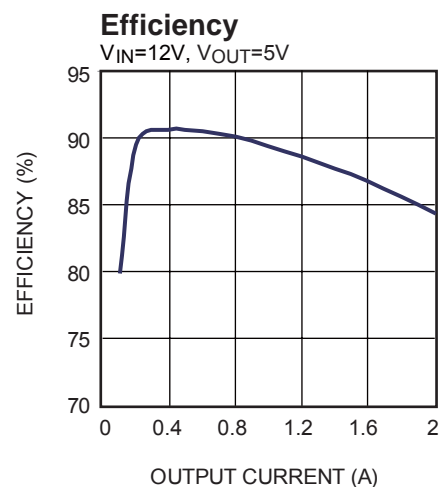
MPS® and "The Future of Analog IC Technology" are Registered Trademarks of Monolithic Power Systems, Inc.

## EV2499DS-00A EVALUATION BOARD

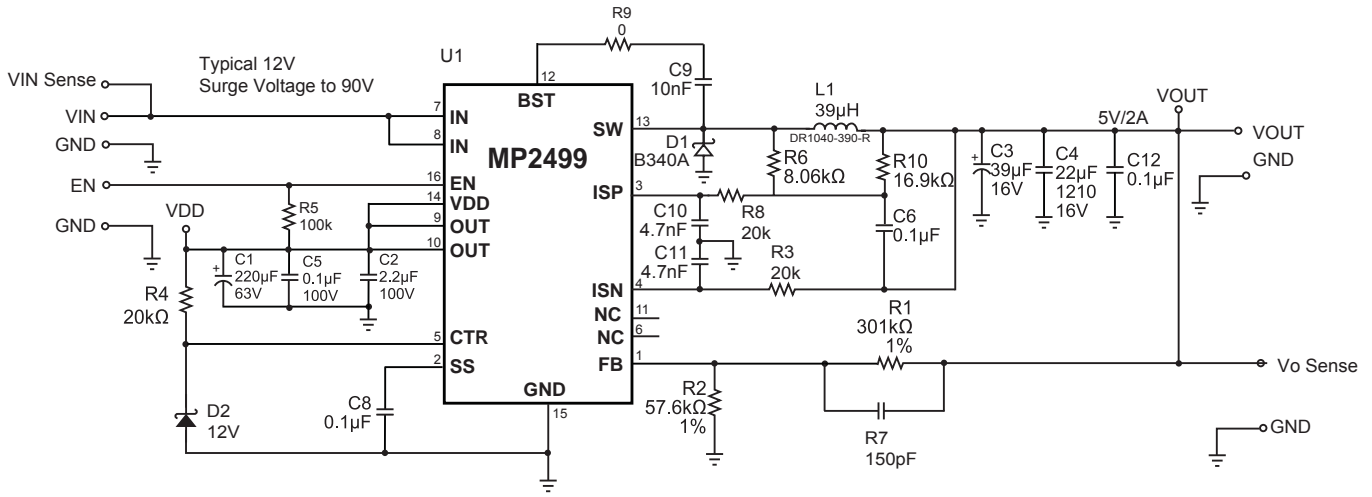


(L x W x H) 2.5" x 2.5" x 0.5"

Board Number	MPS IC Number
EV2499DS-00A	MP2499DS



## EVALUATION BOARD SCHEMATIC



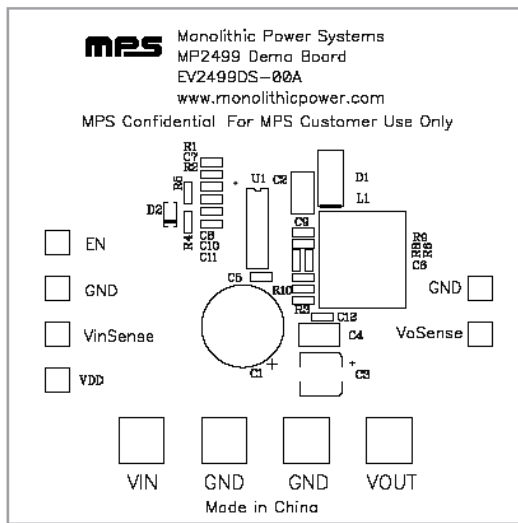
## EV2499DS-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	220uF	CAP., ELECT, 63V	10x20mm	Panasonic	EEUFC1J221X
1	C2	2.2uF	Ceramic Cap., 100V, 10%, X7R	1210	muRata	GRM32ER72A225K
1	C3	39uF	CAP., Alum., 16V	B6	Sanyo	16SVPC39MV
1	C4	22uF	Ceramic Cap., 16V, 10%, X7R	1210	muRata	GRM32ER71C226K
1	C5	0.1uF	Ceramic Cap., 100V, 10%, X7R	0603	muRata	GRM188R72A104K
4	C6,C8,C9,C12	0.1uF	Ceramic Cap., 50V, 10%, X7R	0603	muRata	GRM188R71H104K
1	C7	150pF	Ceramic Cap., 50V, 5%, C0G	0603	muRata	GRM1885C1H151J
2	C10,C11	4.7nF	Ceramic Cap., 50V, 10%, X7R	0603	muRata	GRM188R71H472K
1	D1	3A	Schottky Diode, SMD, 40V, 3A	SMA	ON Semiconductor	MBRA340T3G
1	D2	12V	Diode, SMD,	SOD-123	Central Sem.	CMHZ5242B
1	L1	39uH	Inductor, DR1050, 60.7mΩ	SMD	COOPER	DR1050-390-R
1	R1	301k	Film Res., 1%	0603	Yageo	RC0603FR-07301KL
1	R2	57.6k	Film Res., 1%	0603	Yageo	RC0603FR-0757K6L
3	R3,R4,R8	20k	Film Res., 1%	0603	Yageo	RC0603FR-0720KL

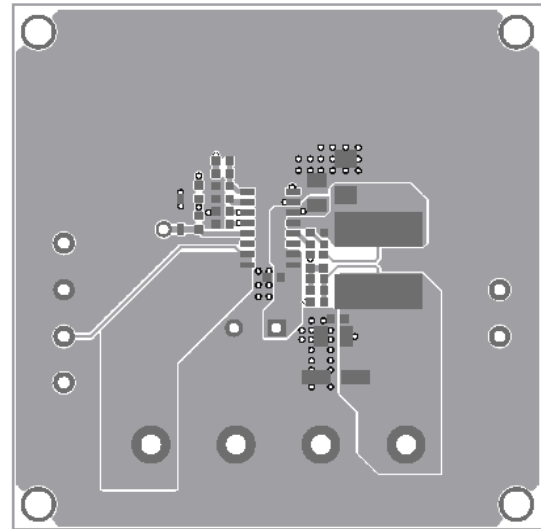
**EV2499DS-00A BILL OF MATERIALS (continued)**

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	R5	100k	Film Res., 5%	0603	Yageo	RC0603JR-07100KL
1	R6	8.06k	Film Res., 1%	0603	Yageo	RC0603FR-078K06L
1	R9	0Ω	Film Res., 5%	0603	Yageo	RC0603JR-070RL
1	R10	16.9k	Film Res., 1%	0603	Yageo	RC0603FR-0716K9L
1	U1		Step-Down Converter	SOIC8	MPS	MP2499DS

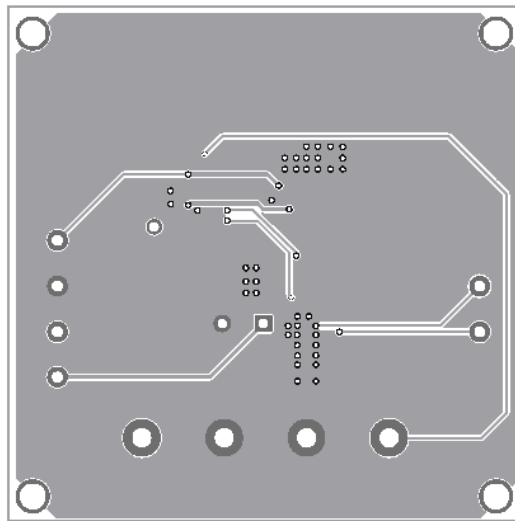
**PRINTED CIRCUIT BOARD LAYOUT**



**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 (12V) and input ground to the IN and GND pins, respectively.
4. The MP2499 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  $R1 = 301k\Omega$ .

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

$$R2=R1 \times V_{FB}/ (V_{OUT}-V_{FB}) = 301k\Omega \times (0.8/5-0.8)= 57.6k\Omega$$

For the closest standard 1% value.

5. The output current limit is set as:

$$I_{OUT} = \frac{100mV}{DCR} \times \frac{R6 + R10}{R10}$$

For DCR current sense, it is desirable to keep:

$$\frac{R6 \times R10}{R6 + R10} \times C6 = \frac{L1}{DCR}$$

DCR is the DC resistance of the inductor winding.

**NOTICE:** The information in this document is subject to change without notice. Users should warrant and guarantee that third party Intellectual Property rights are not infringed upon when integrating MPS products into any application. MPS will not assume any legal responsibility for any said applications.