EV2333H-TL-00A

High-Efficiency, 1.2MHz, 3A, 18V.
Step-Down Converter Evaluation Board

DESCRIPTION

The EV2333H-TL-00A Evaluation Board is designed to demonstrate the capabilities of MPS' MP2333H, a fully-integrated high-frequency, synchronous rectified, step-down, switch-mode converter with internal power MOSFETs. It offers a very compact solution to achieve a 3A continuous output current over a wide input range, with excellent load and line regulation. The MP2333H has synchronous-mode operation for higher efficiency over the output current-load range.

Constant On-Time control operation provides very fast transient response and easy loop design as well as very tight output regulation.

Full protection features include SCP, OCP, UVP, and thermal shutdown.

The MP2333H requires a minimal number of readily-available, standard, external components and is available in a space-saving SOT583 (1.6mmx2.1mm) package.

ELECTRICAL SPECIFICATION (1)

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	12	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	3	A

Notes:
1) For different Input/output voltage specs and different output capacitor/inductor may need change the application circuit parameters.

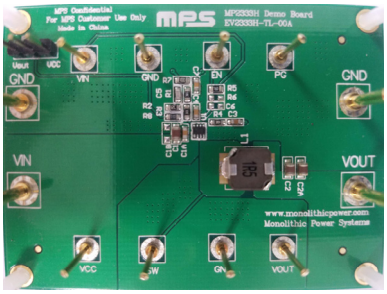
FEATURES

- Wide 4.2V-to-18V Operating Input Range
- 75mΩ/40mΩ Low-$R_{DS(ON)}$ Internal Power MOSFETs
- 200μA Low Iq
- High-Efficiency Synchronous-Mode Operation
- Fast Load Transient Response
- 1.2MHz Switching Frequency
- Ton Extension
- Forced PWM Operation
- Programmable Soft-Start Time
- Power Good Indication
- Over-Current Protection and Hiccup
- Pre-bias Startup
- Thermal Shutdown
- Available in a SOT583 package

APPLICATIONS

- Game Consoles
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors
- General Purposes

EV2333H-TL-00A EVALUATION BOARD

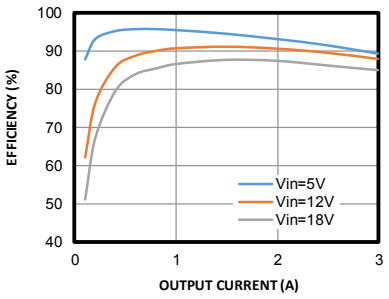


(L x W x H) 63.7mm x 48.4mm x 6.4mm

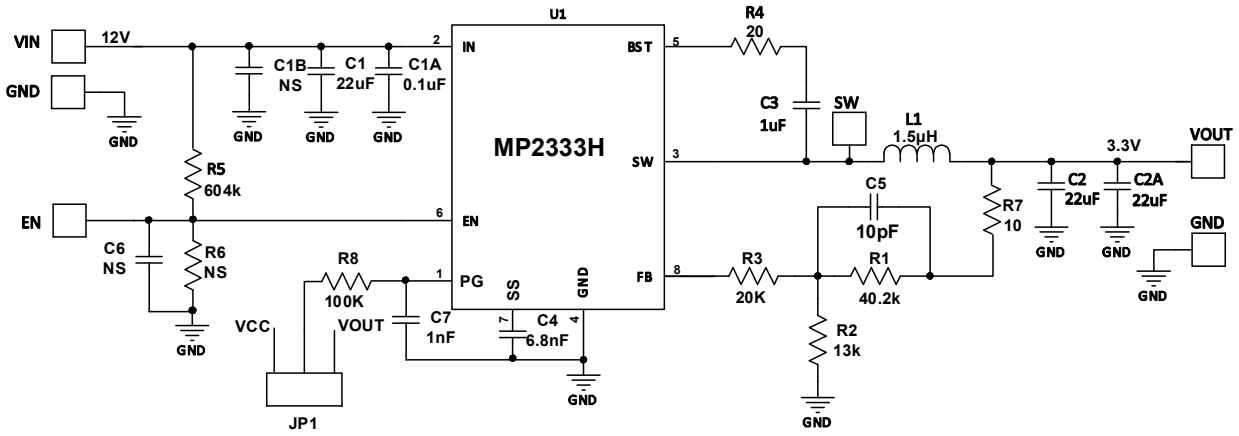
Board Number	MPS IC Number
EV2333H-TL-00A	MP2333HGTL

Efficiency

V_{OUT}=3.3V, L=1.5μH, DCR=4.3mΩ



EVALUATION BOARD SCHEMATIC



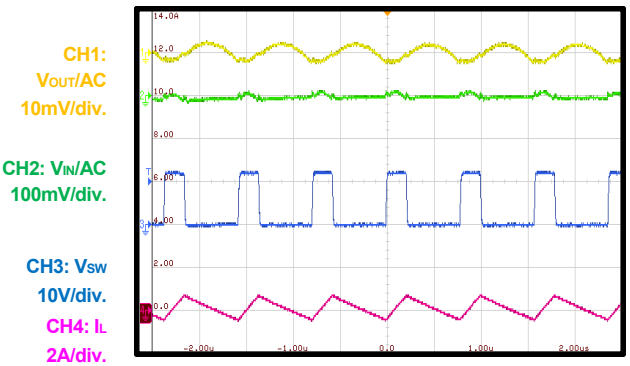
EV2333H-TL-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	C1	22µF	Ceramic Cap., 25V, X5R	0805	muRata	GRM21BR61E226ME44L
1	C1A	0.1µF	Ceramic Cap., 25V, X7R	0603	muRata	GRM188R71E104KA01D
2	C2,C2A	22µF	Ceramic Cap., 16V, X5R	0805	muRata	GRM21BR61C226ME44L
1	C3	1µF	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R71C105KA12D
1	C4	6.8nF	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R71H682KA01D
1	C5	10pF	Ceramic Cap., 50V, COG	0603	muRata	GRM1885C1H100JA01D
0	C1B,C6	NS				
1	C7	1nF	Ceramic Cap., 50V, X7R	0603	muRata	GRM188R71H102KA01D
1	R1	40.2k	Thick Film Res., 1%	0603	Yageo	RC0603FR-0740K2L
1	R2	13k	Thick Film Res., 1%	0603	Yageo	RC0603FR-0713KL
1	R3	20k	Thick Film Res., 1%	0603	Yageo	RC0603FR-0720KL
1	R4	20Ω	Thick Film Res., 1%	0603	Yageo	RC0603FR-0720RL
1	R5	604k	Thick Film Res., 1%	0603	Yageo	RC0603FR-07604KL
0	R6	NS				
1	R7	10Ω	Thick Film Res., 1%	0603	Yageo	RC0603JR-0710RL
1	R8	100k	Thick Film Res., 1%	0603	Yageo	RC0603FR-07100KL
1	L1	1.5µH	Inductor, DCR=11.5mΩ,Is=11.5A	SMD	Sunlord	WPL6530H1R5MT
1	U1	MP2333H GTL	Synchronous Step-Down Converter	SOT583	MPS	MP2333HGTL
1	JP1	Jumper	Jumper	SIP-3	Any	

EVB TEST RESULTS

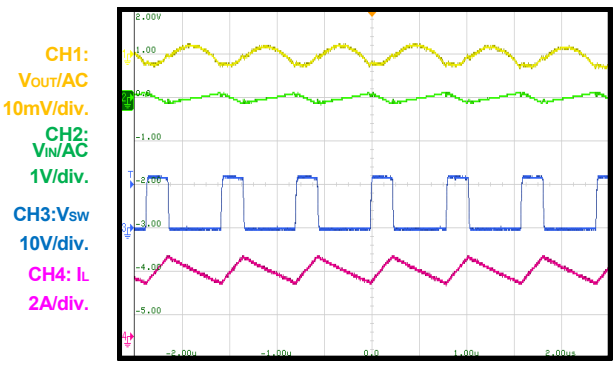
V_{IN} =12V, V_{OUT} =3.3V, L = 1.5µH, T_A = +25°C, unless otherwise noted.

Input/Output ripple
I_{OUT}=0A



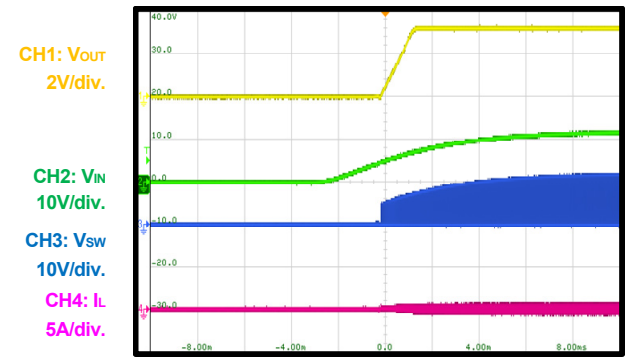
500ns/div.

Input/Output ripple
I_{OUT}=3A



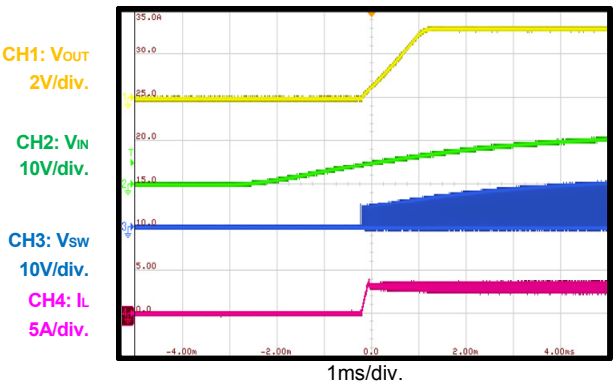
500ns/div.

Startup through input voltage
I_{OUT}=0A



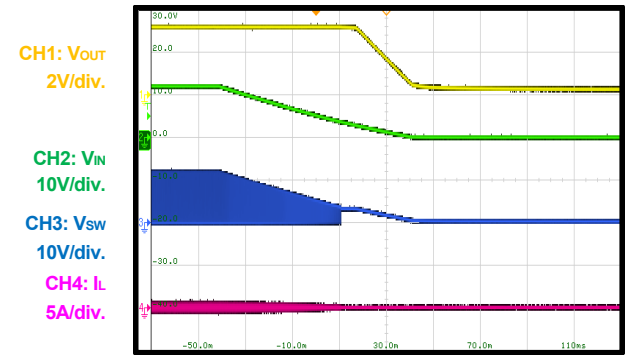
2ms/div.

Startup through input voltage
I_{OUT}=3A



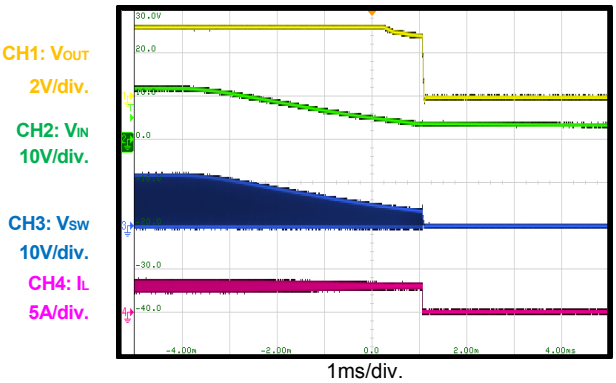
1ms/div.

Shutdown through input voltage
I_{OUT}=0A



20ms/div.

Shutdown through input voltage
I_{OUT}=3A



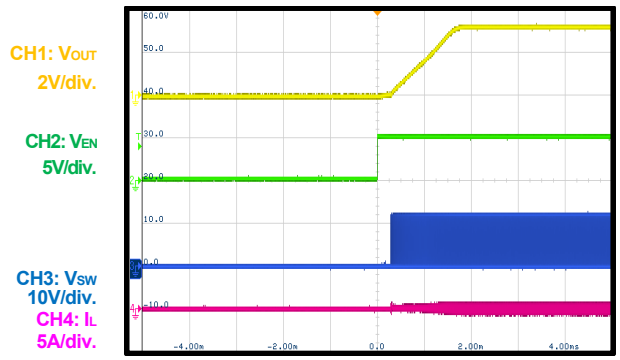
1ms/div.

EVB TEST RESULTS *(continued)*

V_{IN} =12V, V_{OUT} =3.3V, L = 1.5µH, T_A = +25°C, unless otherwise noted.

Startup through EN

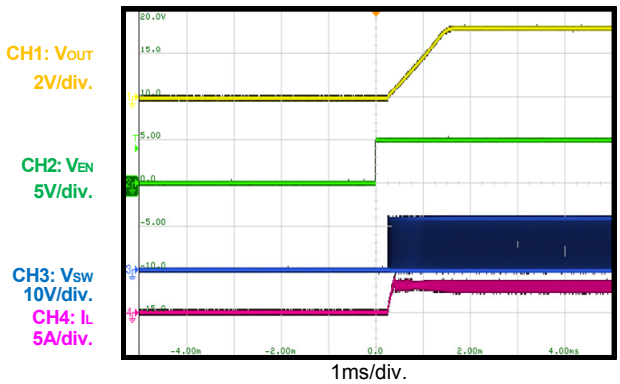
I_{OUT}=0A



1ms/div.

Startup through EN

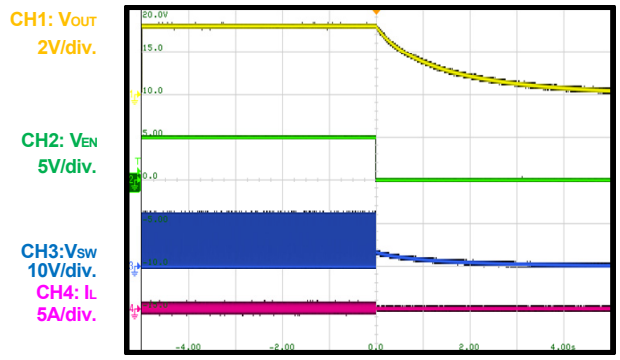
I_{OUT}=3A



1ms/div.

Shutdown through EN

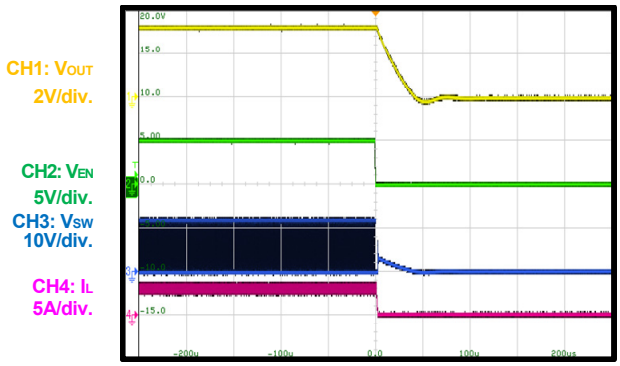
I_{OUT}=0A



1s/div.

Shutdown through EN

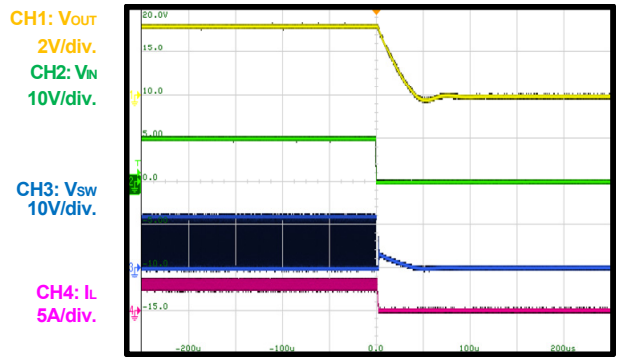
I_{OUT}=3A



50µs/div.

Short-Circuit entry

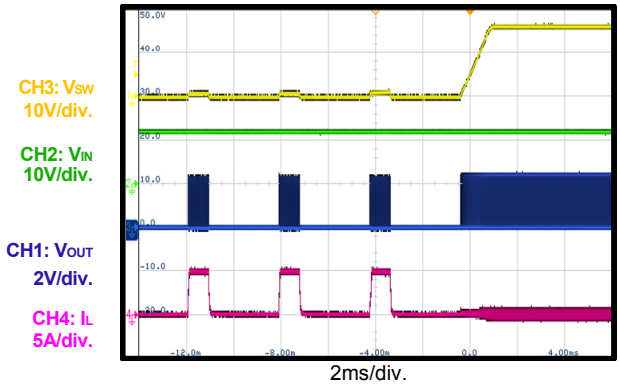
I_{OUT}=0A



2ms/div.

Short-Circuit recovery

I_{OUT}=0A



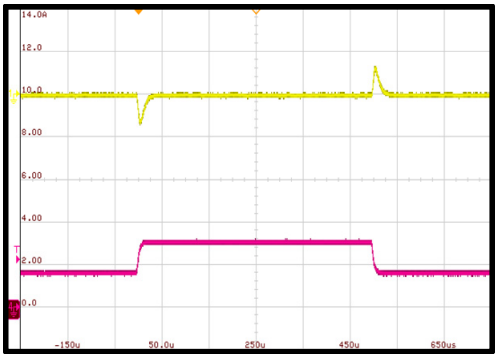
2ms/div.

EVB TEST RESULTS *(continued)*

V_{IN} =12V, V_{OUT} =3.3V, L = 1.5µH, T_A = +25°C, unless otherwise noted.

Load transient

I_{OUT}=1.5A to 3A, Slew rate is 2.5A/µs by CCDH E-load



PRINTED CIRCUIT BOARD LAYOUT

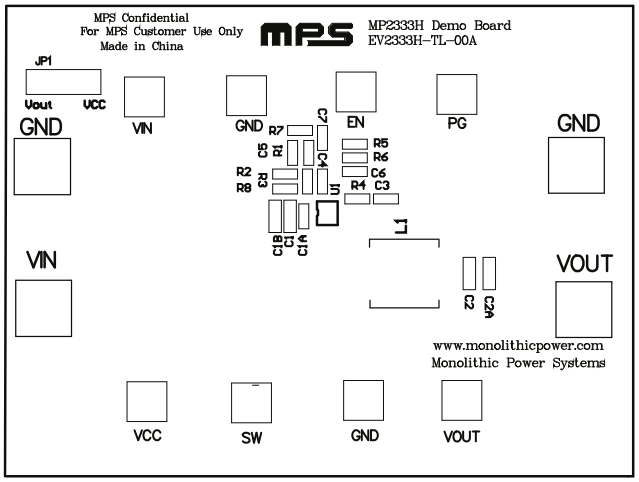


Figure 1: Top Silk Layer

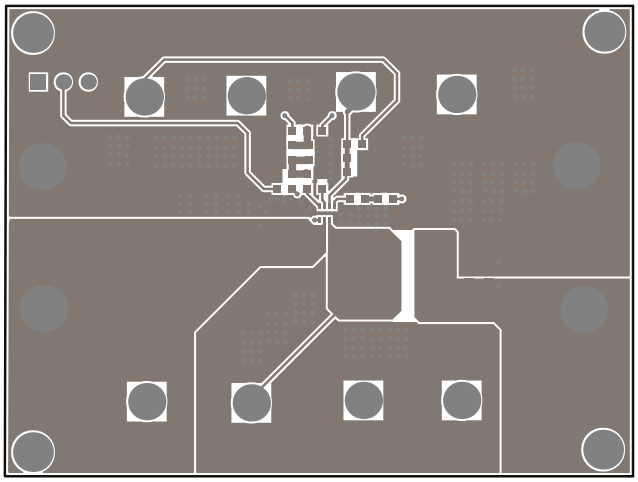


Figure 2: Top Layer

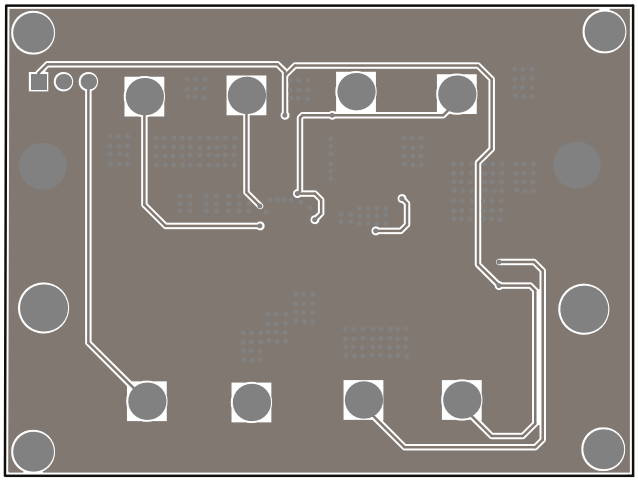


Figure 3: Bottom Layer