

DESCRIPTION

The EV2308GD-00A is for demonstrating MPS's MP2308, a high-frequency, synchronous, rectified, step-down, switch-mode converter with internal power MOSFETs. MP2308 offers a very compact solution to achieve 4A continuous output current over a wide input supply range with excellent load and line regulation. The MP2308 operates at high efficiency over a wide output current load range.

Current-mode operation provides fast transient response and eases loop stabilization. The full protection features include over-current protection and thermal shutdown.

The MP2308 requires a minimal number of readily-available standard external components and comes in a space saving 2x3mm 14-pin QFN package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	6 – 18	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	4	A

FEATURES

- Wide 4.75V-to-18V Operating Input Range
- 4A Output Current
- Low $R_{DS(ON)}$ Internal Power MOSFETs
- Programmable Switching Frequency
- Programmable EN Delay
- Frequency SYNC from 300kHz-to-2MHz External Clock
- Low Power Mode Selectable by External Signal
- External Soft-Start
- OCP and Thermal Shutdown
- Available in 14-pin QFN2x3 Package

APPLICATIONS

- DSL Modems
- Cable Modems
- Set Top Boxes

All MPS parts are lead-free and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance.

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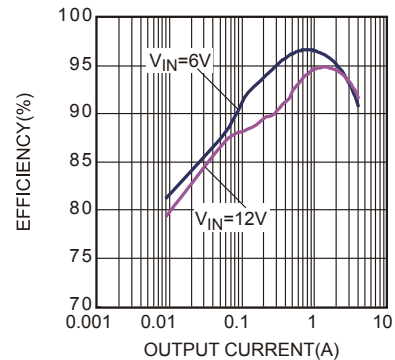
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EV2308GD-00A EVALUATION BOARD

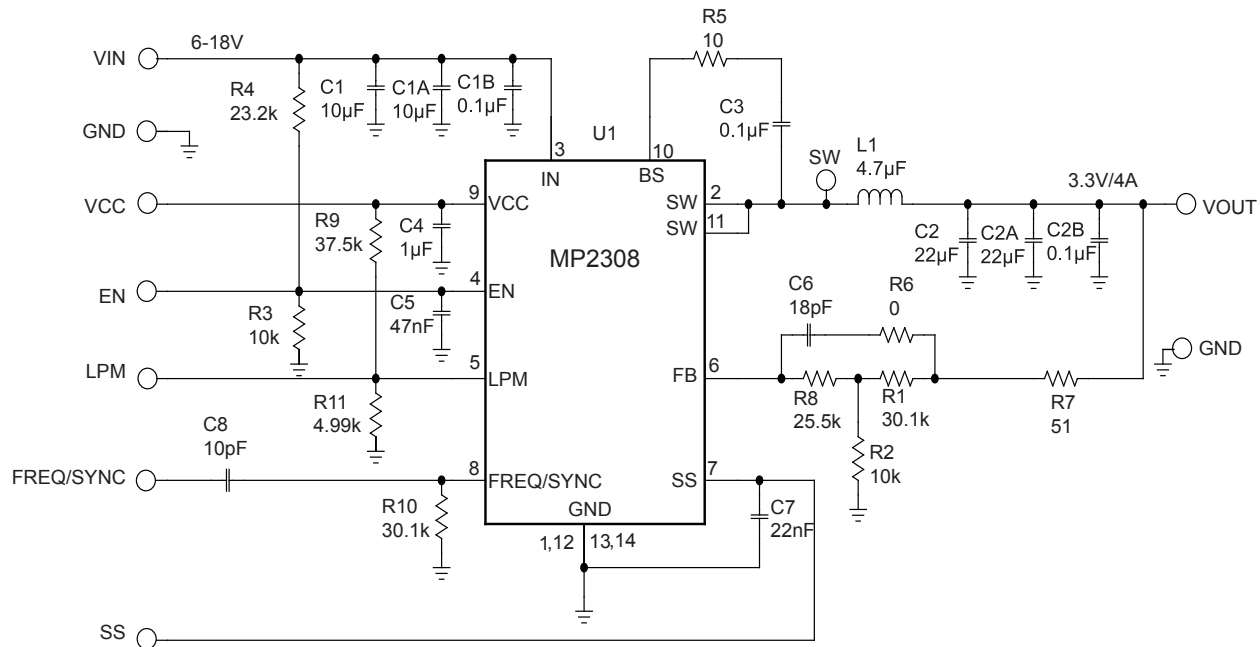


Board Number	MPS IC Number
EV2308GD-00A	MP2308GD

Efficiency vs. Output Current



EVALUATION BOARD SCHEMATIC



EV2308GD-00A BILL OF MATERIALS

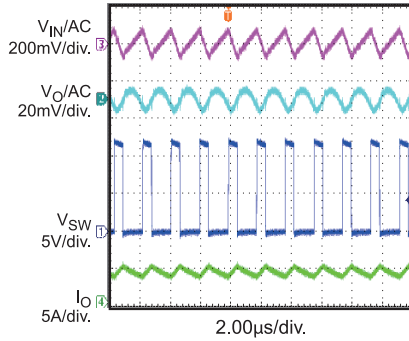
Qty	Ref	Value	Description	Package	Manufacturer	Part Number
2	C1,C1A	10 μ F	Ceramic Cap., 25V, X7R	1210	Murata	GRM32DR71E106KA12L
2	C1B,C2B	0.1 μ F	Ceramic Cap., 25V, X7R	0805	Murata	GRM21BR71E104KA01L
2	C2,C2A	22 μ F	Ceramic Cap., 6.3V, X5R	1210	Murata	GRM32DR60J226KA01L
1	C3	0.1 μ F	Ceramic Cap., 25V, X7R	0603	Murata	GRM188R71E104KA01D
1	C4	1 μ F	Ceramic Cap., 6.3V, X5R	0603	Murata	GRM188R60J105KE19D
1	C5	47nF	Ceramic Cap., 25V, X7R	0603	Murata	GRM188R71E473KA01D
1	C6	18pF	Ceramic Cap., 50V, NP0	0603	Murata	GRM1885C1H180JA01D
1	C7	22nF	Ceramic Cap., 50V, X7R	0603	Murata	GRM188R71H223KA01D
1	C8	10pF	Ceramic Cap., 50V, NP0	0603	Murata	GRM1885C1H100JA01D
2	R1, R10	30.1k Ω	Film Res., 1%	0603	Yageo	9C06031A3012FKHFT
2	R2, R3	10k Ω	Film Res., 1%	0603	Yageo	9C06031A1002FKHFT
1	R4	23.2k Ω	Film Res., 1%	0603	Yageo	9C06031A2322KHFT
1	R5	10 Ω	Film Res., 5%	0603	Yageo	RC0603JR-0710RL
1	R6	0 Ω	Film Res., 5%	0603	Yageo	RC0603JR-070R0L
1	R7	51 Ω	Film Res., 5%	0603	Yageo	RC0603JR-0751RL
1	R8	25.5k Ω	Film Res., 1%	0603	Yageo	9C06031A2552FKHFT
1	R9	37.5k Ω	Film Res., 1%	0603	Yageo	9C06031A3752FKHFT
1	R11	4.99k Ω	Film Res., 1%	0603	Yageo	9C06031A4991FKHFT
1	L1	4.7 μ H	DCR=10.5m Ω , Is=11A	10x10x4mm	Würth	7443552280
1	U1	MP2308	Step-Down Converter	QFN14 (2x3)	MPS	MP2308GD-R2

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
 $T_A = 25^\circ\text{C}$, unless otherwise noted.

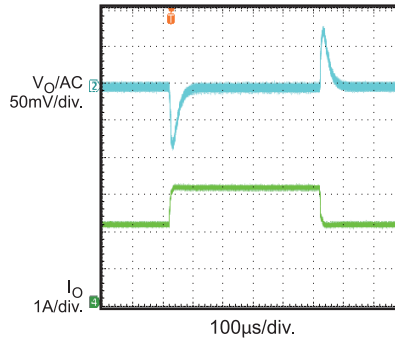
Input / Output Ripple

$V_{in}=12\text{V}$, $V_{out}=3.3\text{V}$, $I_{out}=4\text{A}$
 $T_A=25^\circ\text{C}$



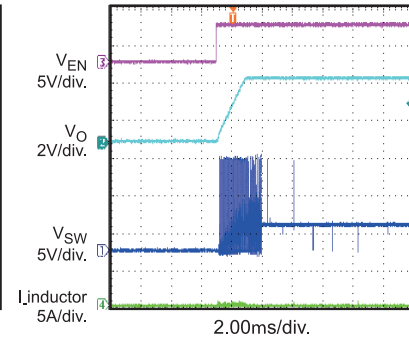
Transient Response

$V_{in}=12\text{V}$, $V_{out}=3.3\text{V}$, $I_{out}=2-3\text{A}$
 $1\text{A}/\mu\text{s}$, $T_A=25^\circ\text{C}$



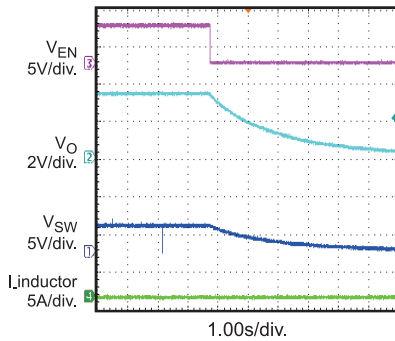
Enable start up

$V_{in}=12\text{V}$, $V_{out}=3.3\text{V}$, $I_{out}=0\text{A}$
 $T_A=25^\circ\text{C}$



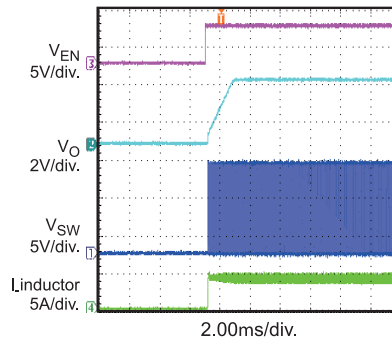
Enable shutdown

$V_{in}=12\text{V}$, $V_{out}=3.3\text{V}$, $I_{out}=0\text{A}$
 $T_A=25^\circ\text{C}$



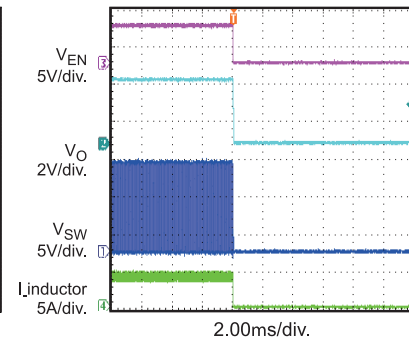
Enable start up

$V_{in}=12\text{V}$, $V_{out}=3.3\text{V}$, $I_{out}=4\text{A}$
 $T_A=25^\circ\text{C}$



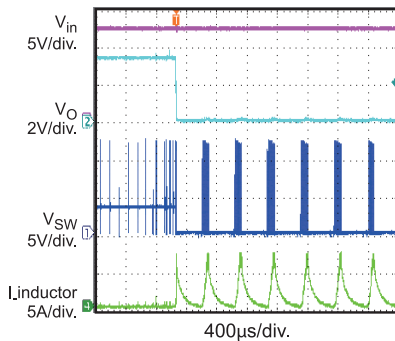
Enable shutdown

$V_{in}=12\text{V}$, $V_{out}=3.3\text{V}$, $I_{out}=4\text{A}$
 $T_A=25^\circ\text{C}$



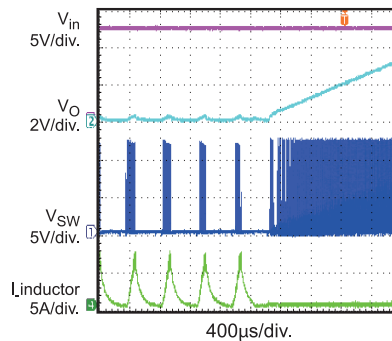
Short Circuit Entry

$V_{in}=12\text{V}$, $V_{out}=3.3\text{V}$, $I_{out}=0\text{A}$
 $T_A=25^\circ\text{C}$



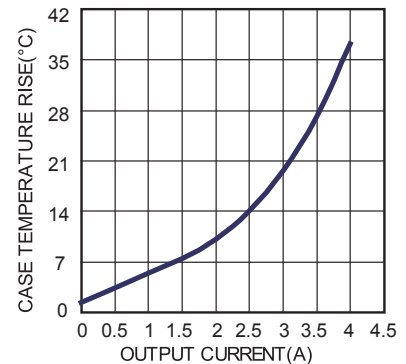
Short Circuit Recovery

$V_{in}=12\text{V}$, $V_{out}=3.3\text{V}$, $I_{out}=0\text{A}$
 $T_A=25^\circ\text{C}$



Case Temperature Rise vs. Output Current

$V_{in}=12\text{V}$, $V_o = 3.3\text{V}$, $I_o=0-4\text{A}$, $T_A=25^\circ\text{C}$



PRINTED CIRCUIT BOARD LAYOUT

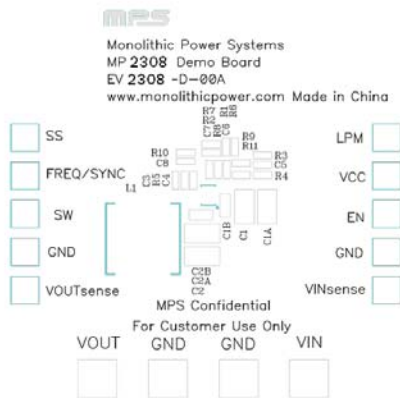


Figure 1—Top Silk Layer

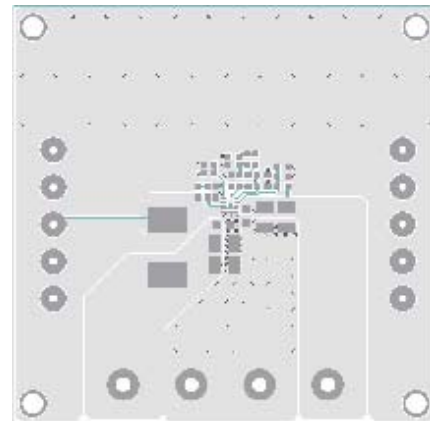


Figure 2—Top Layer

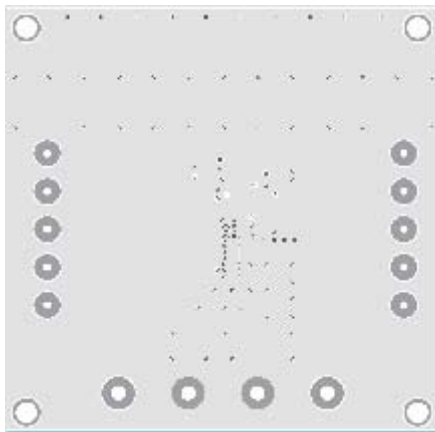


Figure 3—Inner 1 Layer

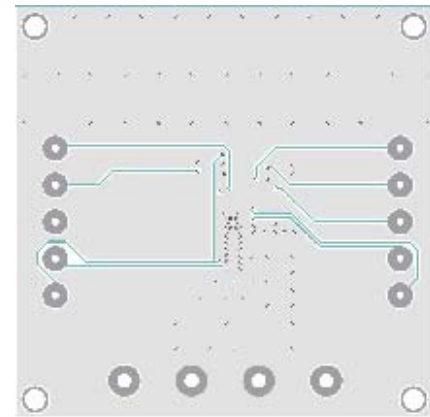


Figure 4— Inner 2 Layer

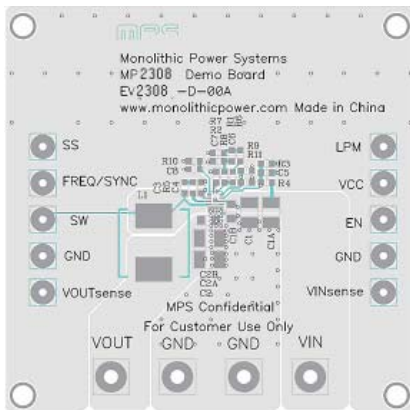


Figure 5—Top and Top Silk Layer

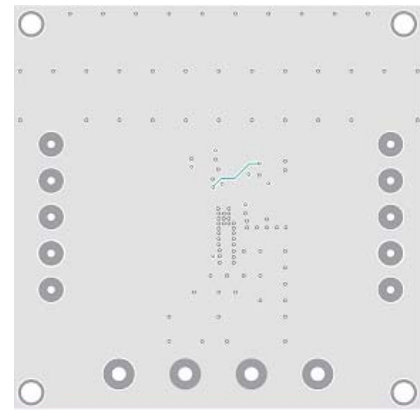


Figure 6—Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output between 6V and 18V, and then turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to the VIN and GND pins, respectively.
4. Turn the power supply on. The board will automatically start up.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.6V to turn on the regulator or less than 0.4V to turn it off.
6. Apply up to 2MHz frequency logic level clock signal to the SYNC pin to synchronize the device to an external clock. The duty cycle is not critical.

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