EV2324-J-00A

High Efficiency, 2A, 24V, 500kHz Step-Down Switch Evaluation Board

DESCRIPTION

The EV2324-J-00A demonstrates MPS's MP2324, a high-frequency, synchronous, rectified, step-down converter with built-in high-side and low-side power MOSFETs. The MP2324 offers a very compact solution to achieve a 2A continuous output current with excellent load and line regulation over a wide input supply range. The MP2324 has synchronous mode operation for higher efficiency over the output current load range.

Current-mode operation provides fast transient response and eases loop stabilization.

Full protection features includes over-current protection and thermal shutdown.

The MP2324 is available in a space-saving 8-pin TSOT23 package.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	4.5 – 24	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	2	A

FEATURES

- Wide 4.5V to 24V Operating Input Range
- 120mΩ/50mΩ Low Rds(on) Internal Power MOSFETs
- Low Quiescent Current
- High Efficiency Synchronous Mode Operation
- Fixed 500kHz Switching Frequency
- Frequency Sync from 200kHz to 2MHz External Clock
- Power Save Mode at light load
- Internal Soft Start
- Power Good Indicator
- OCP Protection and Hiccup
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in an 8-pin TSOT-23 package

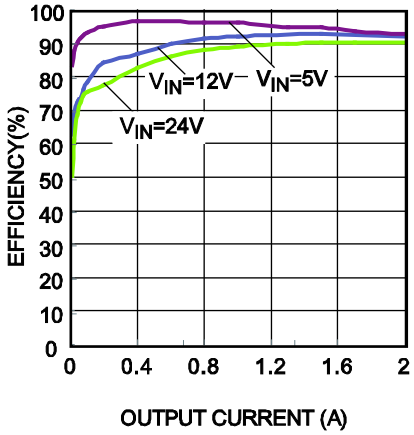
APPLICATIONS

- Notebook Systems and I/O Power
- Digital Set Top Boxes
- Flat Panel Television and Monitors

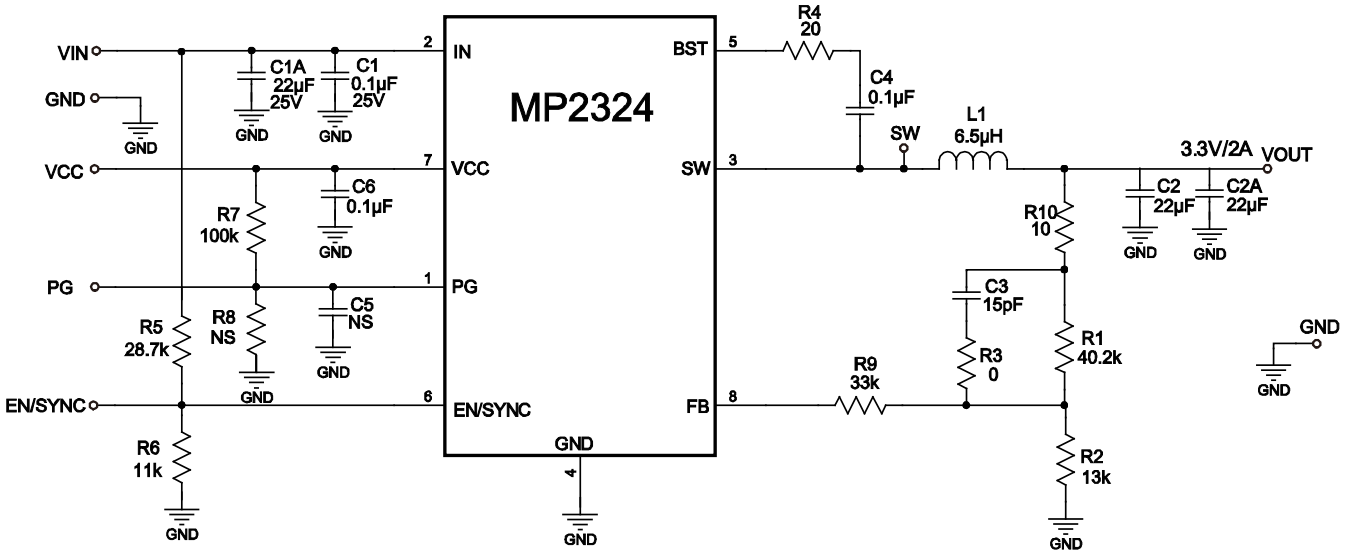
EV2324-J-00A EVALUATION BOARD

Board Number	MPS IC Number
EV2324-J-00A	MP2324GJ

Efficiency



EVALUATION BOARD SCHEMATIC



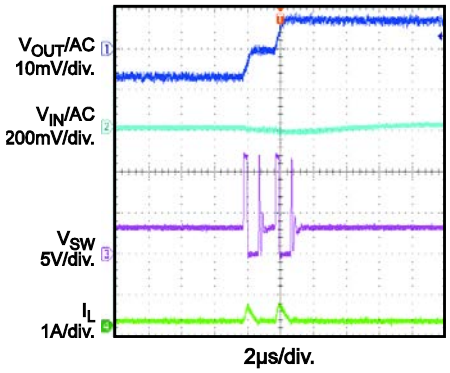
EV2324-J-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	0.1µF	Ceramic Cap., 25V, X7R	0805	muRata	GRM21BR71E104KA01L
1	C1A	22µF	Ceramic Cap., 25V, X5R	1206	muRata	GRM31CR61E226KE15L
0	C7,R8, C5	NS				
2	C2,C2A	22µF	Ceramic Cap., 10V, X7R	1206	muRata	GRM21BR60J226ME39L
1	C3	15pF	Ceramic Cap., 50V, C0G	0603	muRata	GRM1885C1H150JA01D
2	C4,C6	0.1µF	Ceramic Cap., 16V, X7R	0603	muRata	GRM188R71C104KA01D
1	R1	40.2k	Thick Film Res., 1%	0603	Yageo	9C06031A4022FKHFT
1	R2	13k	Thick Film Res., 1%	0603	Yageo	9C06031A132FKHFT
1	R3	0Ω	Thick Film Res., 1%	0603	Yageo	9C06031A0R00JLHFT
1	R4	20Ω	Thick Film Res., 5%	0603	Yageo	9C06031A20R0JLHFT
1	R5	28.7k	Thick Film Res., 1%	0603	Yageo	9C06031A2872FKHFT
1	R6	11k	Thick Film Res., 1%	0603	Yageo	9C06031A1102FKHFT
1	R7	100k	Thick Film Res., 1%	0603	Yageo	9C06031A1003FKHFT
1	R9	33k	Thick Film Res., 1%	0603	Yageo	9C06031A3302FKHFT
1	R10	10Ω	Thick Film Res., 1%	0603	Yageo	9C06031A20R0FKHFT
1	L1	6.5µH	Inductor, DCR=21.5mΩ, Is=6A	SMD	Wurth	744314650
1	U1	MP2324	Synchronous Step-Down Convert	TSOT23-8	MPS	MP2324GJ

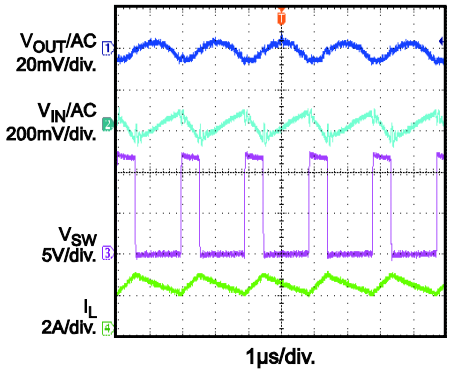
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} = 12V, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

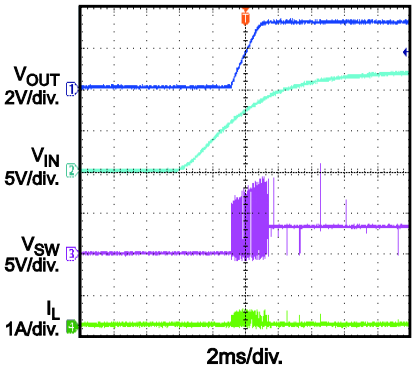
Input/Output Ripple
I_{OUT}= 0A



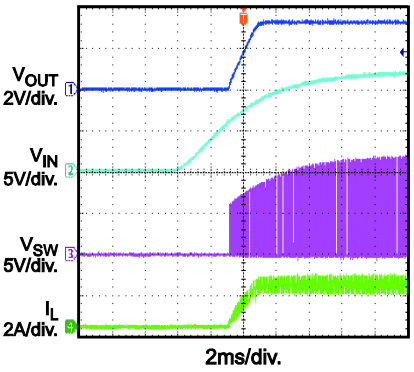
Input/Output Ripple
I_{OUT}= 2A



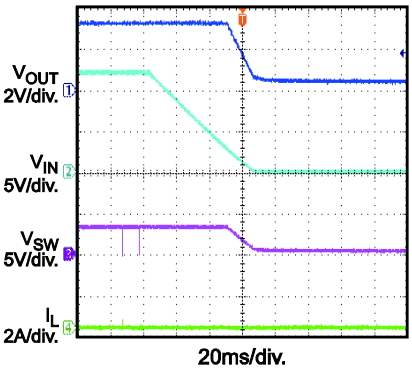
V_{IN} Start up
I_{OUT}= 0A



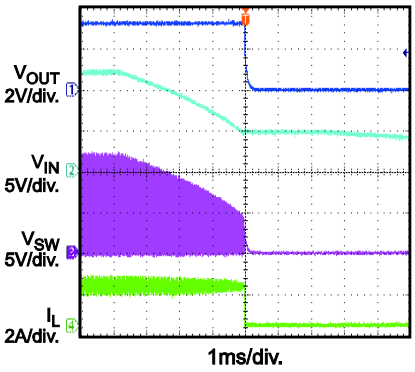
V_{IN} Start up
I_{OUT}= 2A



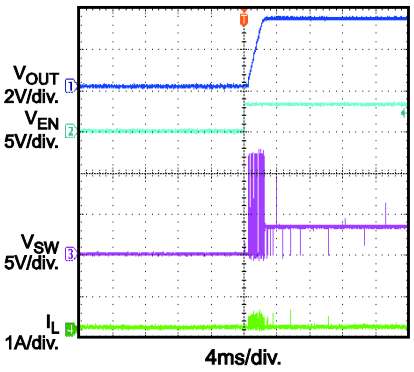
V_{IN} Shutdown
I_{OUT}= 0A



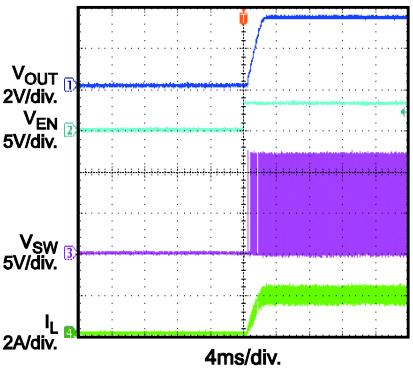
V_{IN} Shutdown
I_{OUT}= 2A



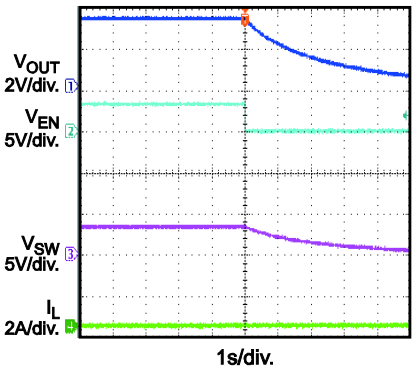
EN Start up
I_{OUT}= 0A



EN Start up
I_{OUT}= 2A



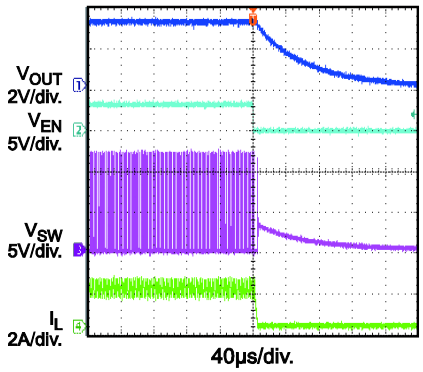
EN Shutdown
I_{OUT}= 0A



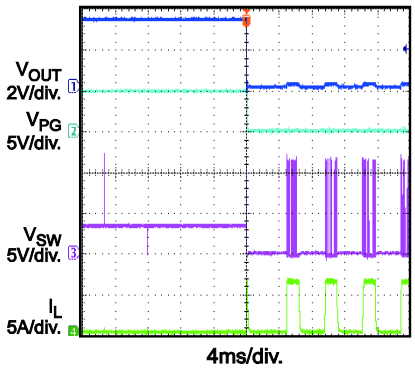
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN} = 12V, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

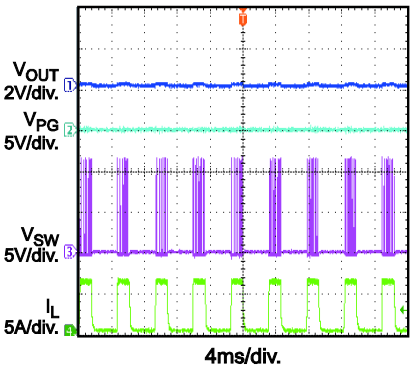
EN Shutdown
I_{OUT}= 2A



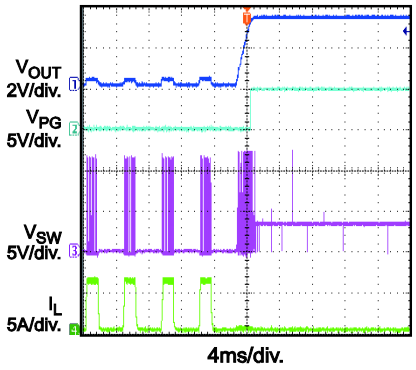
Short Circuit Entry



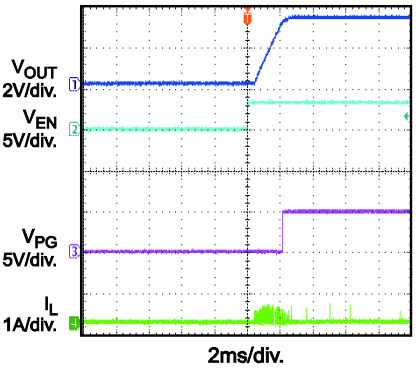
Short Circuit



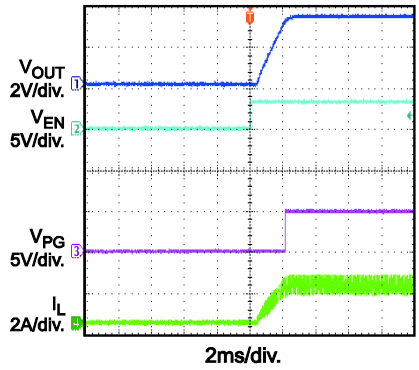
Short Circuit Recovery



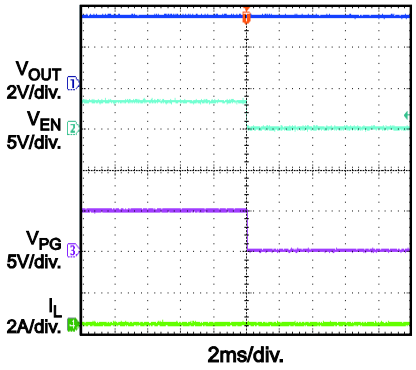
EN Start up (PG)
I_{OUT}= 0A



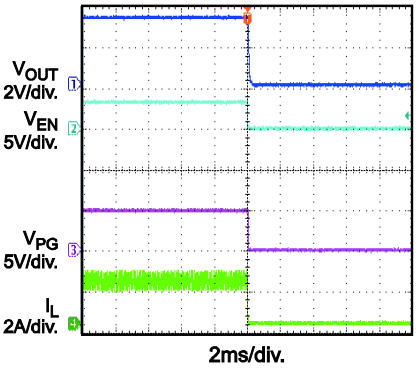
EN Start up (PG)
I_{OUT}= 2A



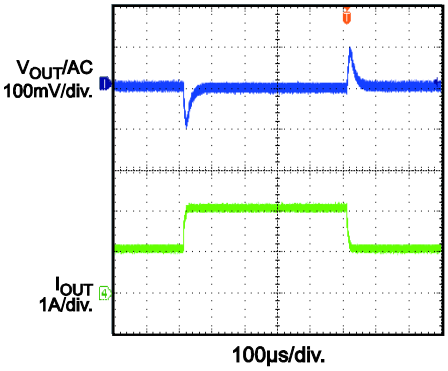
EN Shutdown(PG)
I_{OUT}= 0A



EN Shutdown(PG)
I_{OUT}= 2A



Load Transient Response
I_{OUT}= 1A to 2A



PRINTED CIRCUIT BOARD LAYOUT

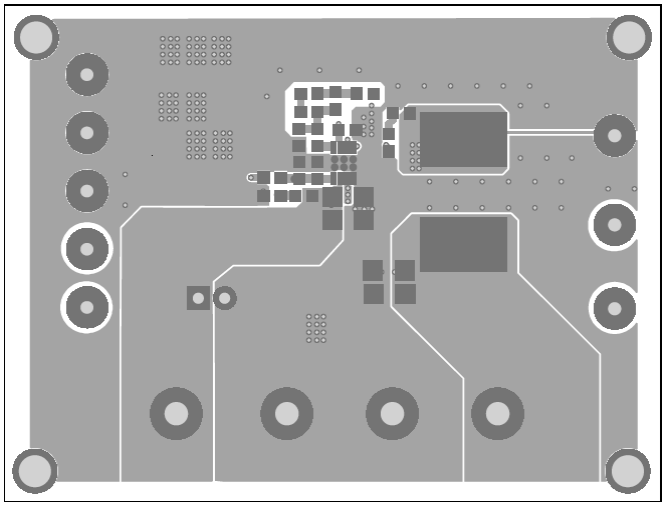


Figure 1—Top Layer

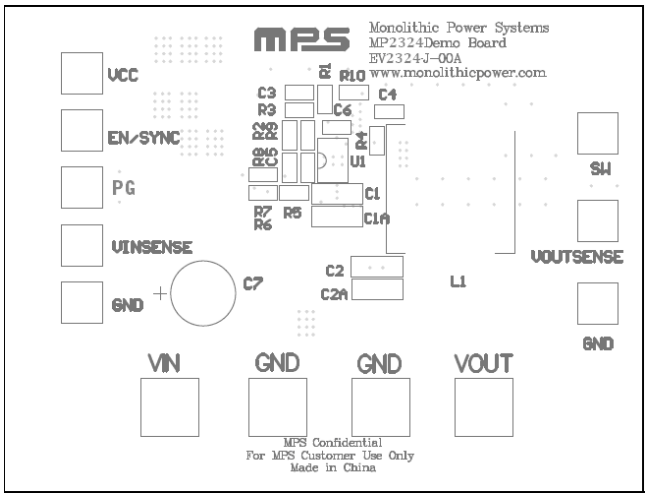


Figure 2—Top Silk Layer

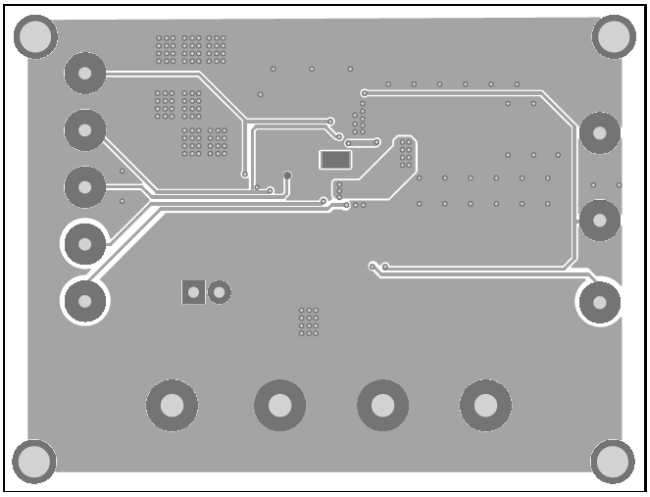


Figure 3—Bottom Layer