EVM3632C-QV-00B

18V Input 3A Module Step-Down Converter Evaluation Board

DESCRIPTION

The EVM3632C-QV-00B Evaluation Board is designed to demonstrate the capabilities of MPS' MPM3632C, a step-down regulator module integrated with a synchronous, rectifying power MOSFET, inductor, and three capacitors. The MPM3632C offers a very compact solution that requires only input and output capacitors to achieve 3A of continuous output current with excellent load and line regulation over a wide input range.

The MPM3632C operates at a fixed 3MHz switching frequency and employs constant-on-time (COT) control, which provides a fast load transient response.

Full protection features include output over-voltage protection (OVP), over-current protection (OCP), and thermal shutdown.

The MPM3632C is available in a space-saving QFN-20 (3mmx5mmx1.6mm) package.

ELECTRICAL SPECIFICATION

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

FEATURES

- Complete Switch-Mode Power Supply
- 3MHz Switching Frequency
- Wide 4V to 18V Operation Input Range
- Output Adjustable from 0.8V
- Internal Fixed Soft-Start Time
- 3A Continuous Output Current
- Forced CCM for Low Output Ripple
- Power Good Indicator (PG)
- Hiccup Over-Current Protection (OCP)
- Output Over-Voltage Protection (OVP)
- Thermal Shutdown
- Fast Transient Response
- Available in a QFN-20 (3mmx5mmx1.6mm) Package
- Total Solution Size: 7mmx7.9mm

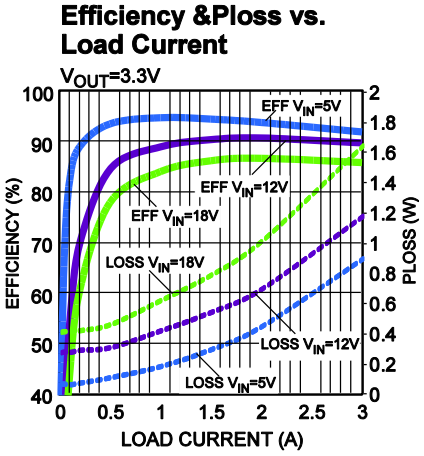
APPLICATIONS

- Server Systems
- Medical and Imaging Equipment
- Distributed Power Systems
- Point of Load for FPGA, ASICs, DSPs
- Space Constrained Applications

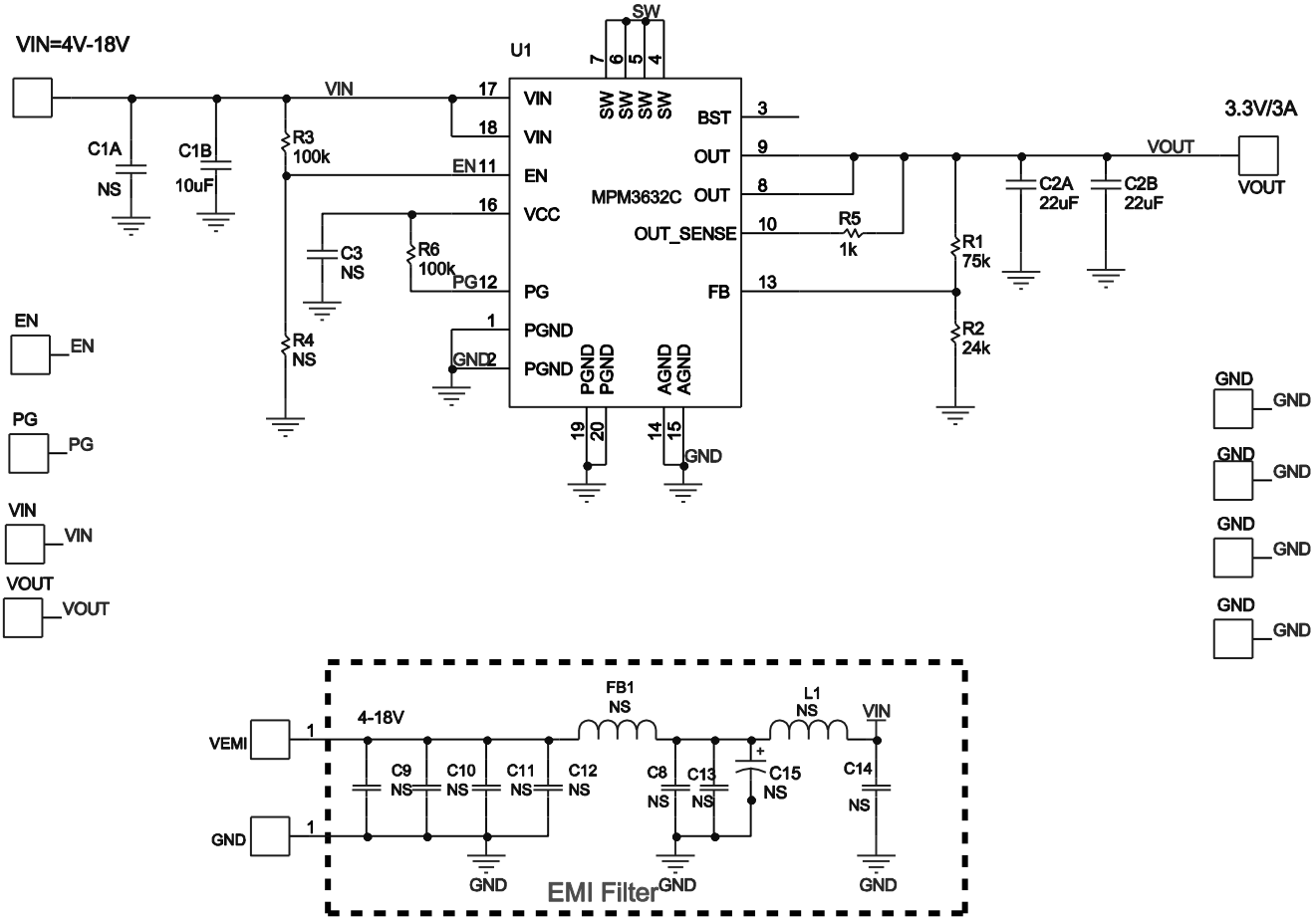
EVM3632C-QV-00A EVALUATION BOARD

(L × W × H) 64mm × 64mm × 1.6mm

Board Number	MPS IC Number
EVM3632C-QV-00B	MPM3632CGQV



EVALUATION BOARD SCHEMATIC



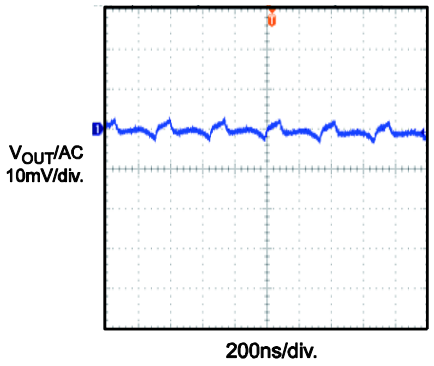
EVM3632C-QV-00B BILL OF MATERIALS

Qty	Designator	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1B	10μF	Ceramic Cap.,25V,X5R	0805	Murata	GRM21BR61E106MA73L
2	C2A,C2B	22μF	Ceramic Cap.,16V,X5R	0805	TDK	C2012X5R1C226K
1	R1	75k	Film Res,1%,0402,75K	0402	YAGEO	RC0402FR-0775KL
1	R2	24K	Film Res,1%,0402,24K	0402	YAGEO	RC0402FR-0724KL
1	R5	1k	Film Res,1%,0402,1K	0402	YAGEO	RC0402FR-071KL
2	R3,R6	100k	Film Res,1%,0402,100K	0402	YAGEO	RC0402FR-07100KL

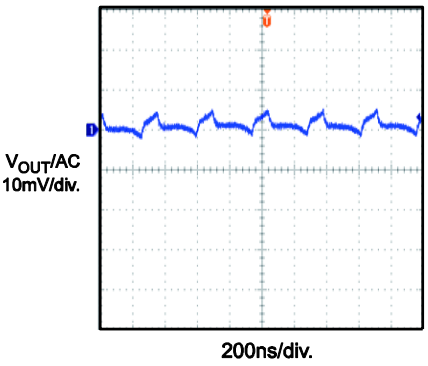
EVB TEST RESULTS

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

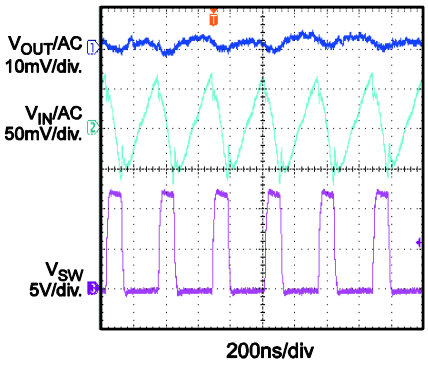
Output Ripple
I_{OUT}=0A



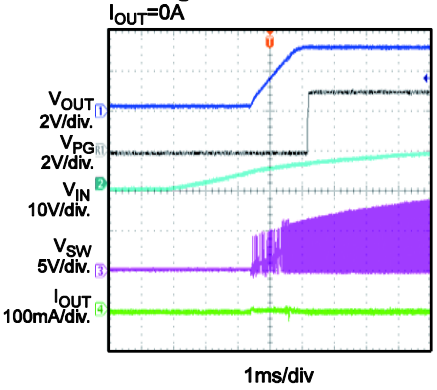
Output Ripple
I_{OUT}=3A



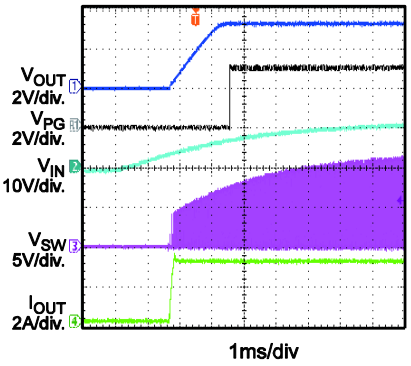
Input vs. Output Ripple
I_{OUT}=3A, C_{IN}=10µF, Probe BW=20MHz



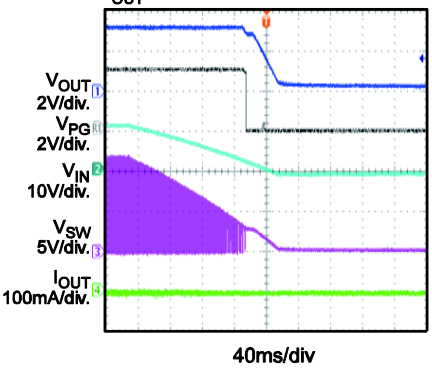
Start-Up through Input Voltage
I_{OUT}=0A



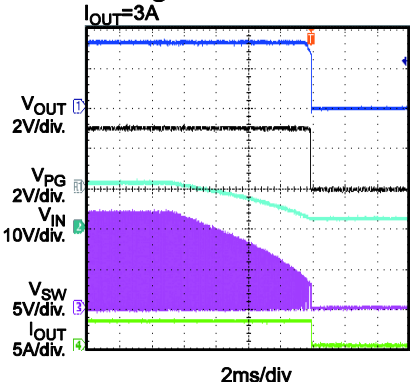
Start-Up through Input Voltage
I_{OUT}=3A



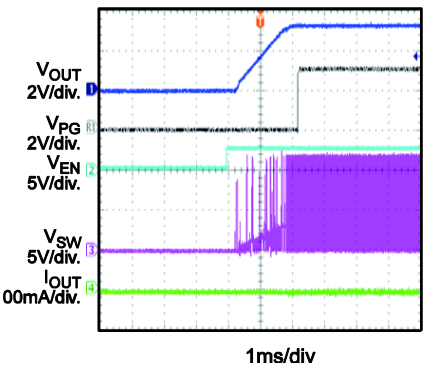
Shutdown through Input Voltage
I_{OUT}=0A



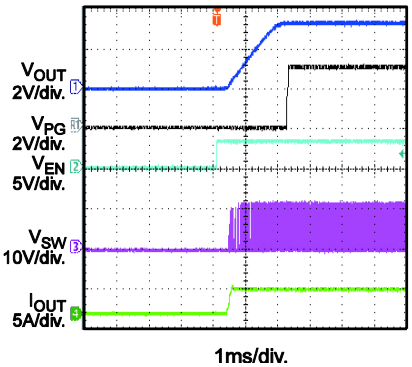
Shutdown through Input Voltage
I_{OUT}=3A



Start-Up through EN
I_{OUT}=0A



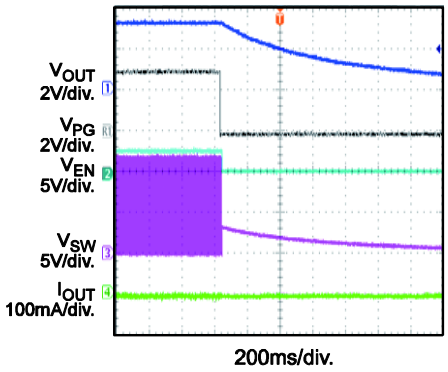
Start-Up through EN
I_{OUT}=3A



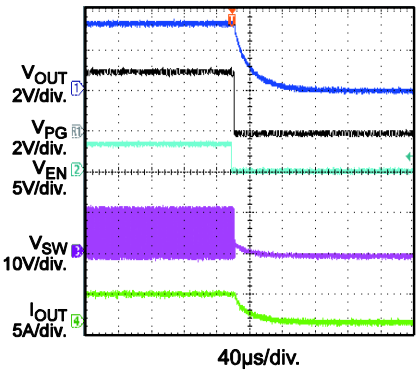
EVB TEST RESULTS *(continued)*

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

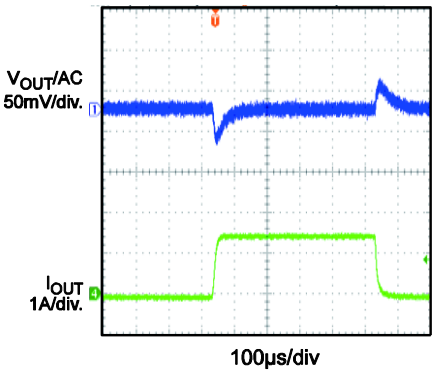
Shutdown through EN
I_{OUT}=0A



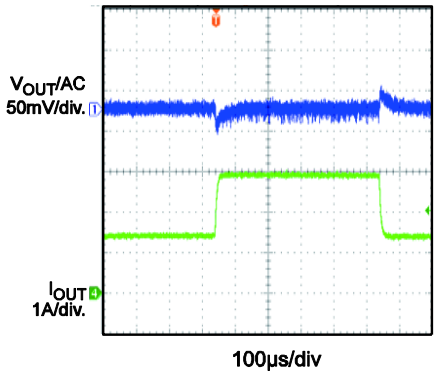
Shutdown through EN
I_{OUT}=3A



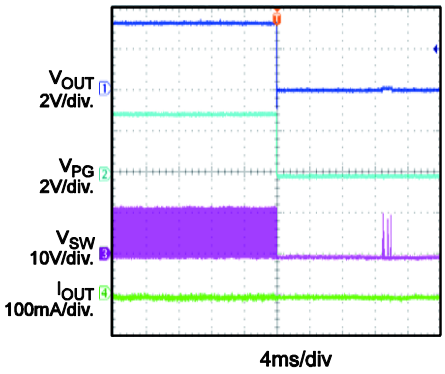
Response to Load Transient
I_{OUT}=0A-1.5A, 2.5A/µs



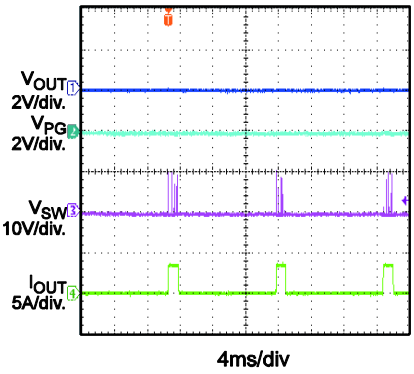
Response to Load Transient
I_{OUT}=1.5A-3A, 2.5A/µs



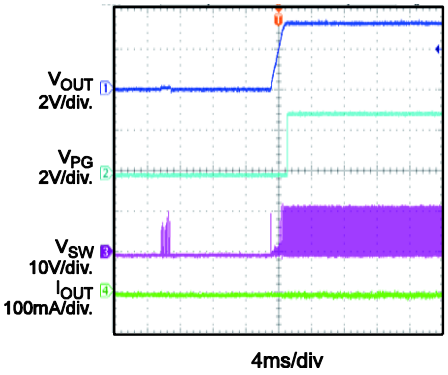
V_{OUT} Short Protection
I_{OUT}=0A



Steady State of Short Protection
Apply Short on V_{OUT}



Recover from V_{OUT} Short
I_{OUT}=0A



PRINTED CIRCUIT BOARD LAYOUT

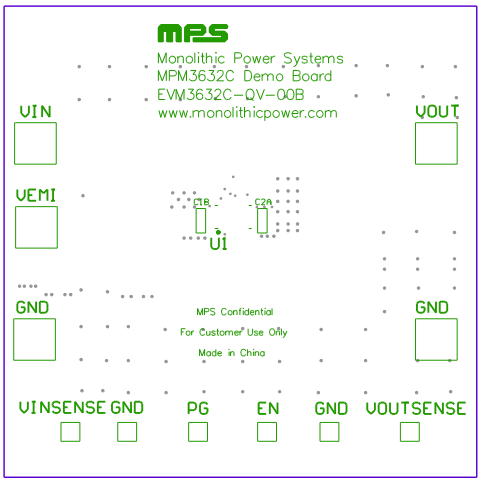


Figure 1: Top Silk Layer

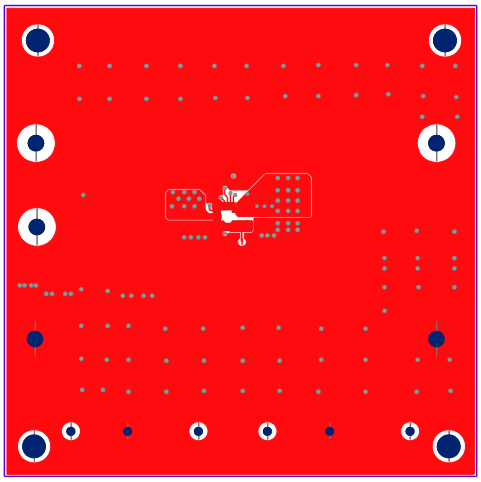


Figure 2: Top Layer

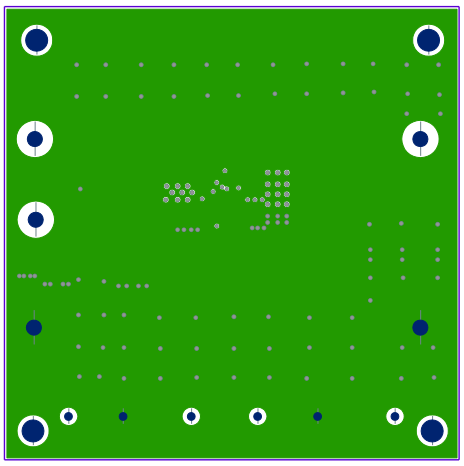


Figure 3: Mid Layer1

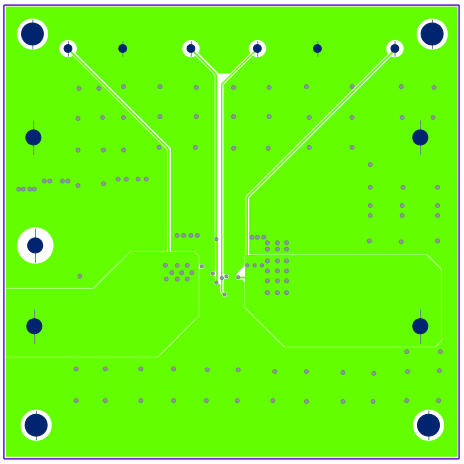


Figure 4: Mid Layer2

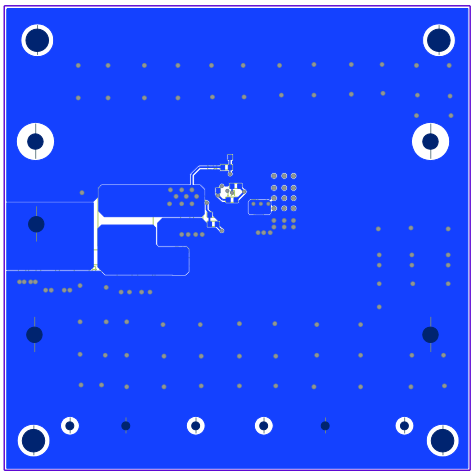


Figure 5: Bottom Layer

QUICK START GUIDE

1. Preset Power Supply to $4V \leq V_{IN} \leq 18V$.
2. Turn Power Supply off.
3. Connect Power Supply terminals to:
    a. Positive (+): VIN
    b. Negative (–): GND
4. Connect Load to:
    a. Positive (+): VOUT
    b. Negative (–): GND
5. Turn Power Supply on after making connections. The board will automatically start up.

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EVM3632C-QV-00B