EVM3632S-PQ-00A

High-Frequency 18V/3A DC/DC Regulator with Integrated Inductor Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

EVM3632S-PQ-00A evaluation board is based on MPS'S MPM3632S. The MPM3632S is a synchronous rectified, step-down Mini-Module regulator with built-in power MOSFETs, inductor and two capacitors. It offers a very compact solution with only input and output capacitors to achieve a 3A continuous output current with excellent load and line regulation over a wide input supply range. The MPM3632S operates in fixed 2.2MHz switching frequency with Constant-On-Time control which provides fast load transient response.

Full protection features include output over voltage protection, over-current protection and thermal shut down.

MPM3632S eliminates design and manufacturing risks while dramatically improving time to market.

The MPM3632S is available in a space-saving LGA10 (3mmx3mmx1.45mm) 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

- Complete Switch Mode Power Supply
- Wide 4V-to-18V Operation Input Range
- 36mΩ/18mΩ Low $R_{DS(ON)}$ Internal Power MOSFETs
- 0.5% Accuracy Output Voltage
- 3A Continuous Output Current
- 2.2MHz Switching Frequency
- Forced CCM Mode
- Power Good Indicator
- 500μA Low Quiescent Current
- Hiccup OCP Protection
- Programmable Soft Start (Metal option)
- Output Over Voltage Protection
- Fast Transient Response
- Available in LGA3x3x1.45mm Package

APPLICATIONS

- Sever Systems
- Medical and Imaging Equipment
- Distributed Power Systems

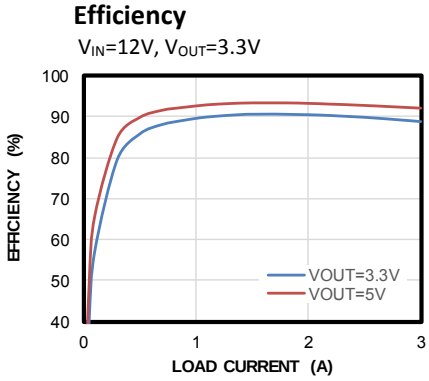
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EVM3632S-PQ-00A EVALUATION BOARD



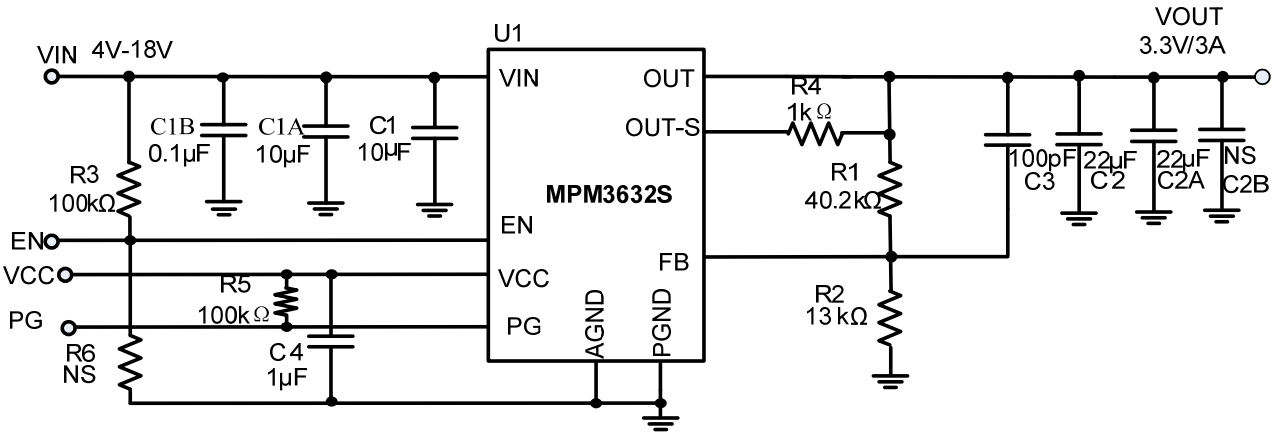
(L x W x H) 63.7mm x 63.7mm x 6.4mm

Board Number	MPS IC Number
EVM3632S-PQ-00A	MPM3632SGPQ



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EVALUATION BOARD SCHEMATIC



EVM3632S-PQ-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufactuer_P/N
2	C1,C1A	10µF	Ceramic Cap,25V,X5R	0805	muRata	GRM21BR61E106KA73L
2	C2,C2A	22µF	Ceramic Cap,16V,X5R	0805	muRata	RM21BR61C226ME44L
1	C3	100pF	Ceramic Cap,16V,X5R	0402	muRata	GRM1555C1E101JA01D
1	C1B	0.1µF	Ceramic Cap,25V,X7R	0402	muRata	GRM188R71E104KA01D
1	C4	1µF	Ceramic Cap.,16V,X6S	0402	muRata	GRM155C81C105KE11D
0	C2B	NS	NS	NS	NS	NS
1	R1	40.2kΩ	Film Res,1%,0402,40K2	0402	Yageo	RC0402FR-0740K2L
1	R2	13kΩ	Film Res,1%,0402,13K	0402	Yageo	RC0402FR-0713KL
2	R3,R5	100kΩ	Thick Film Res., 1%	0402	Yageo	RC0402FR-07100KL
1	R4	1kΩ	Thick Film Res., 1%	0402	Yageo	RC0402FR-071KL
0	R6	NS	NS	NS	NS	NS
1	U1	MPM3632S	Synchronous Step-Down Convert	NS	MPS	MPM3632SGPQ

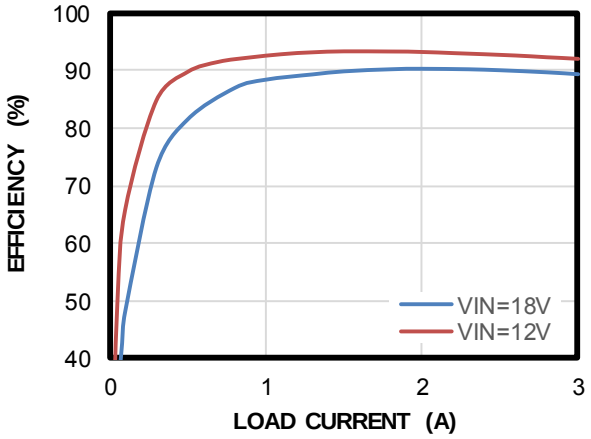
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EVB TEST RESULTS

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

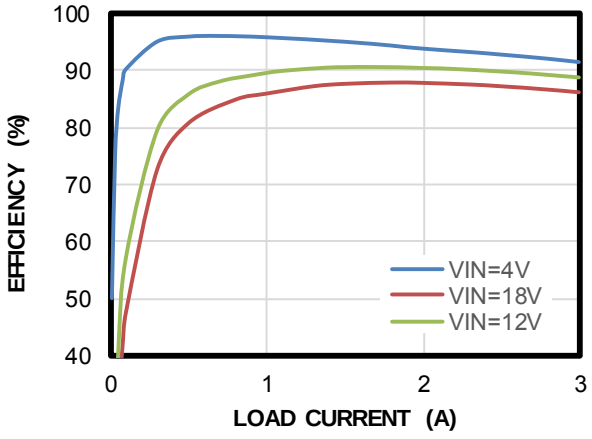
Efficiency vs. Load Current

V_{OUT}=5V



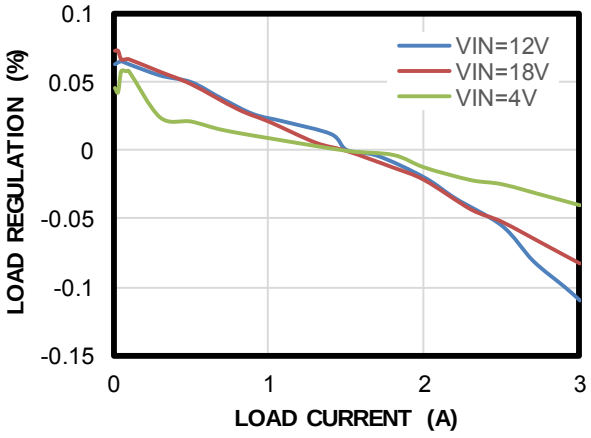
Efficiency vs. Load Current

V_{OUT}=3.3V



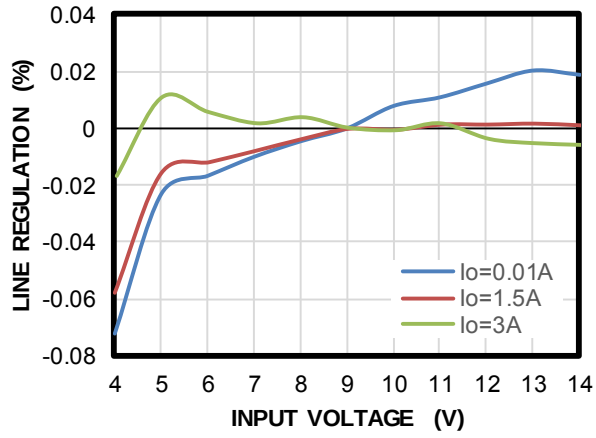
Load Regulation vs. Load Current

V_{OUT}=3.3V



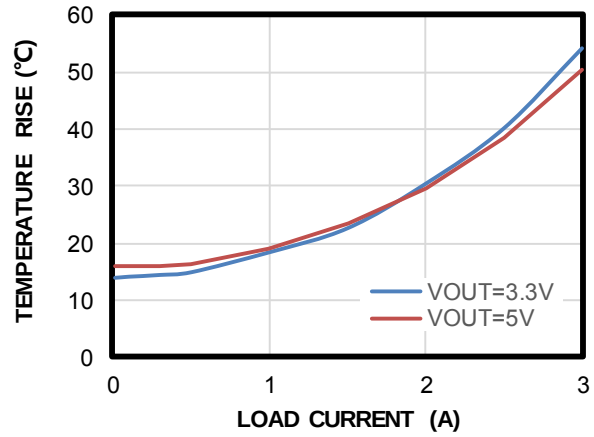
Line Regulation vs. Input Voltage

V_{IN}=12V, V_{OUT}=3.3V



Temperature Rise vs. Load Current

V_{IN}=12V

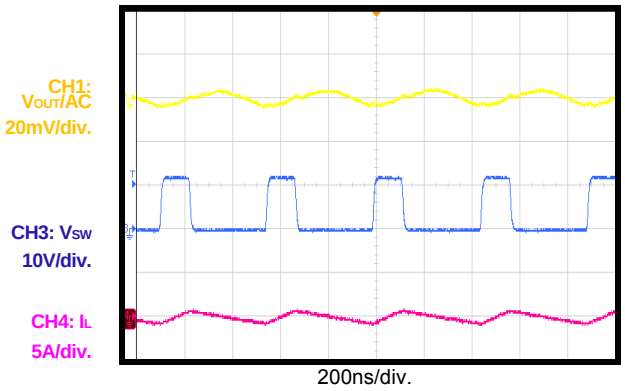


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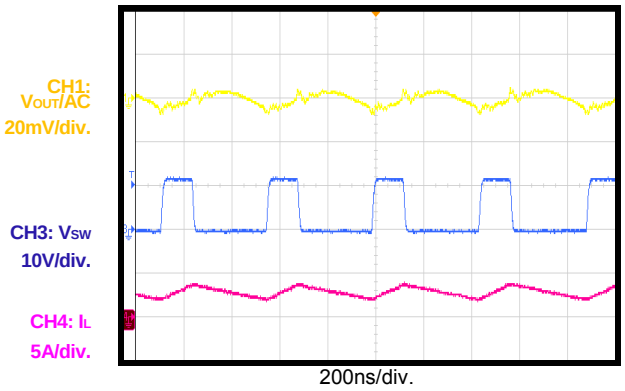
EVB TEST RESULTS *(continued)*

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

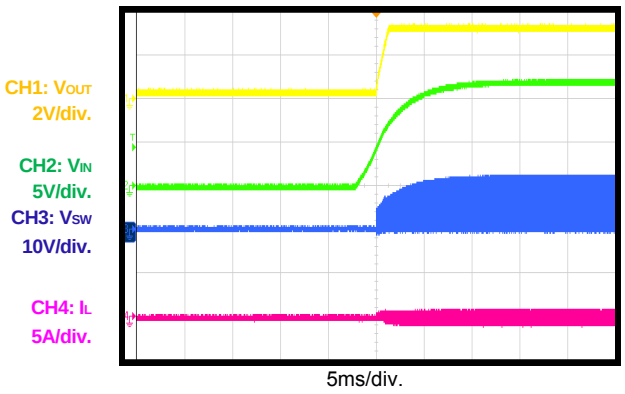
Vo Ripple
I_{OUT}=0A



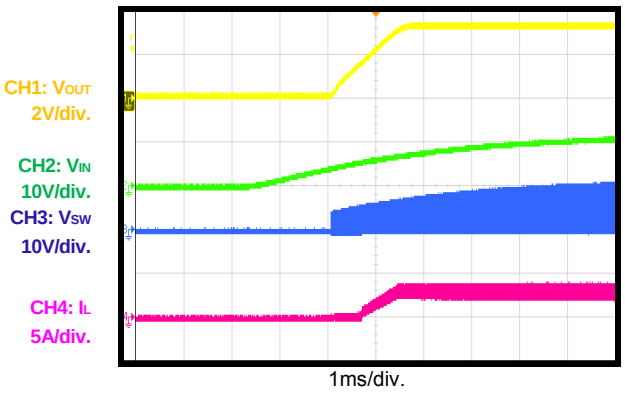
Vo Ripple
I_{OUT}=3A



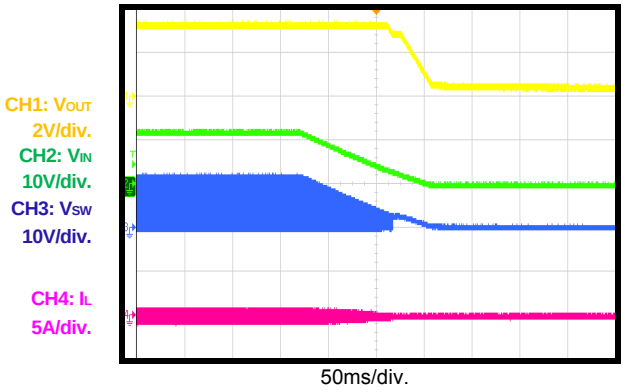
VIN Start-Up Through Input Voltage
I_{OUT}=0A



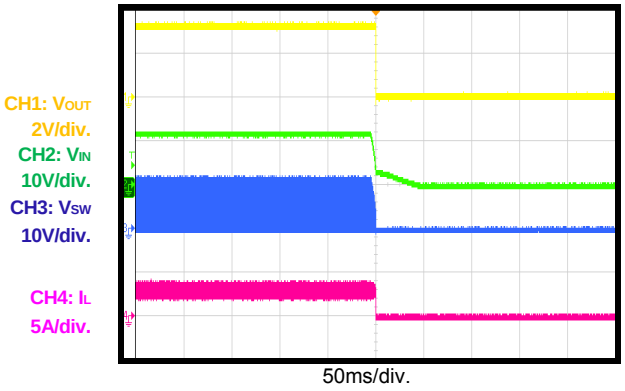
VIN Start-Up Through Input Voltage
I_{OUT}=3A



Shutdown Through Input Voltage
I_{OUT}=0A



Shutdown Through Input Voltage
I_{OUT}=3A

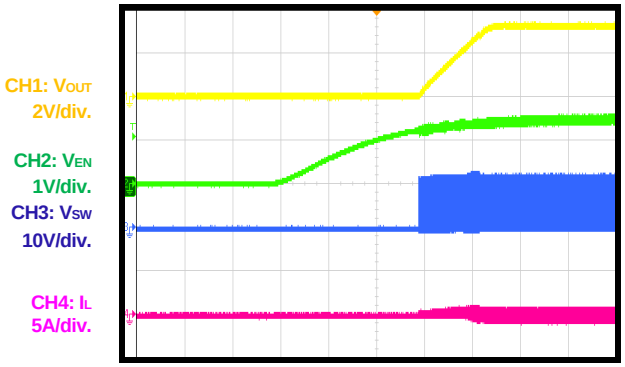


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EVB TEST RESULTS *(continued)*

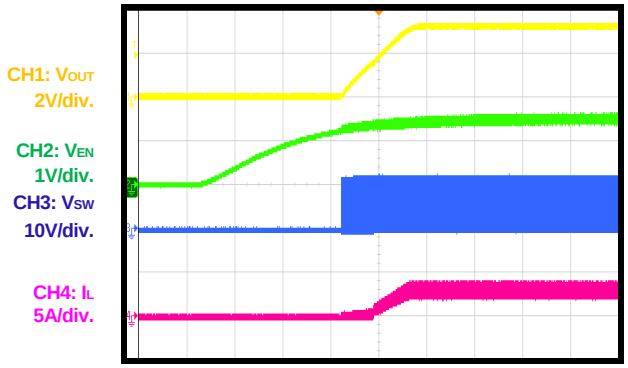
V_{IN} =12V, V_{OUT} =3.3V, T_A = +25°C, unless otherwise noted.

Start-Up Through Enable
I_{OUT}=0A



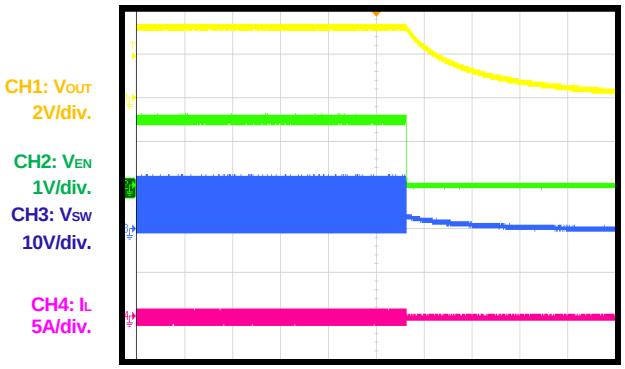
1ms/div.

Start-Up Through Enable
I_{OUT}=3A



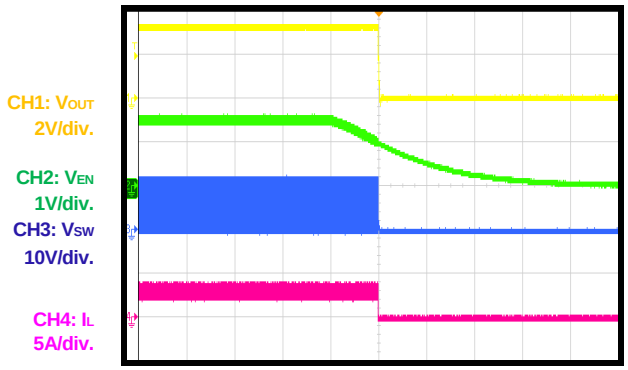
1ms/div.

Shutdown Through Enable
I_{OUT}=0A



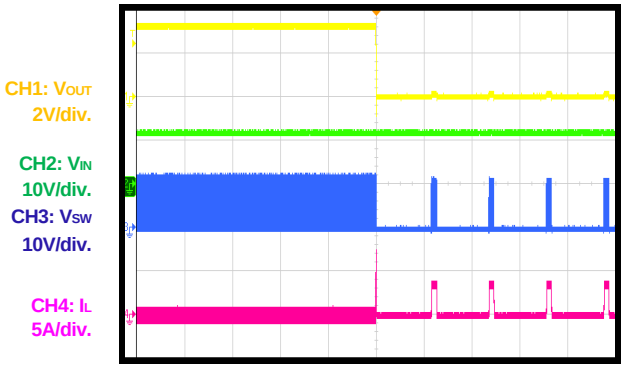
1s/div.

Shutdown Through Enable
I_{OUT}=3A



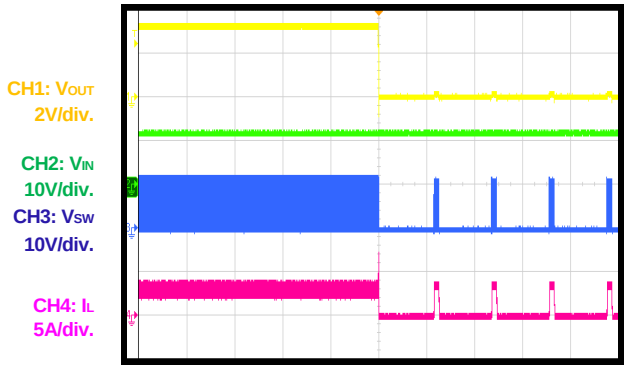
1ms/div.

Short Circuit Entry
I_{OUT}=0A



10ms/div.

Short Circuit Entry
I_{OUT}=3A



10ms/div.

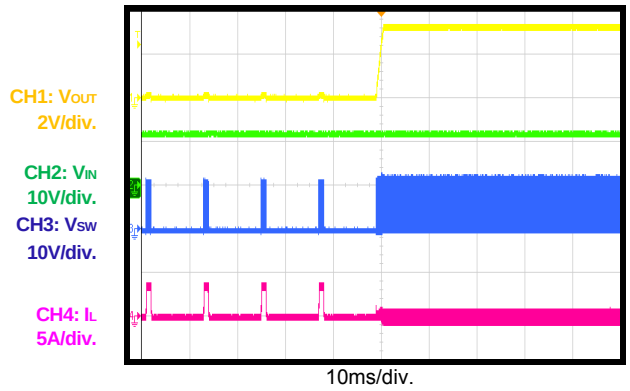
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EVB TEST RESULTS *(continued)*

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

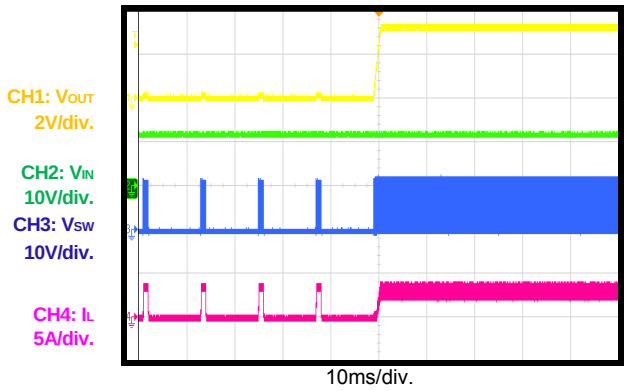
Short Circuit Recovery

I_{OUT}=0A

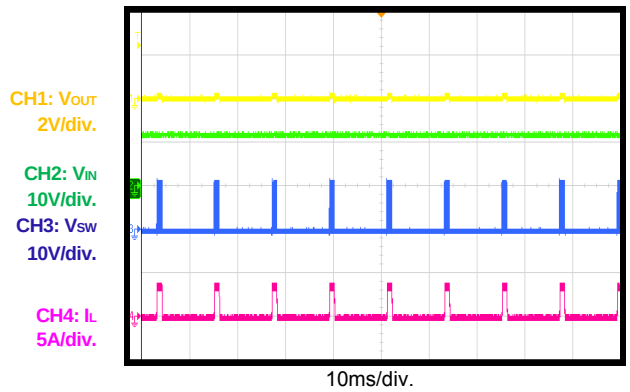


Short Circuit Recovery

I_{OUT}=3A

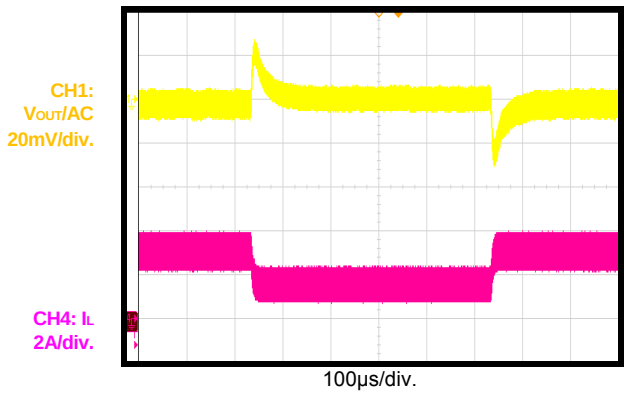


Short Circuit Steady State



Transient Response

I_{OUT}=1.5A-3A, 800mA/μs



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PRINTED CIRCUIT BOARD LAYOUT

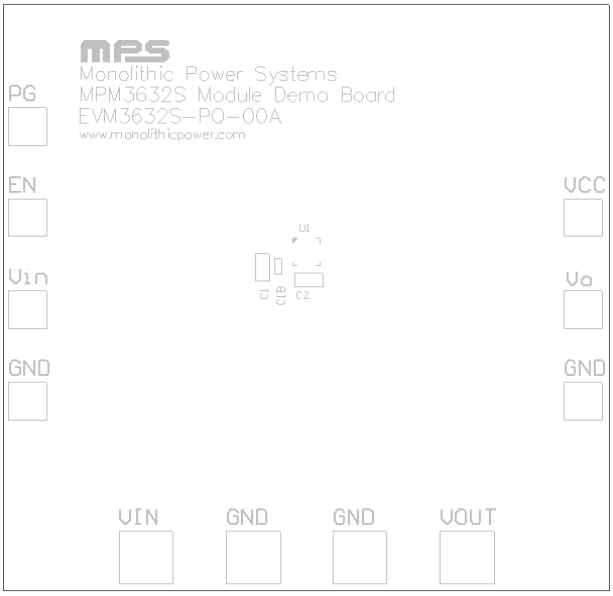


Figure1: Top Silk Layer

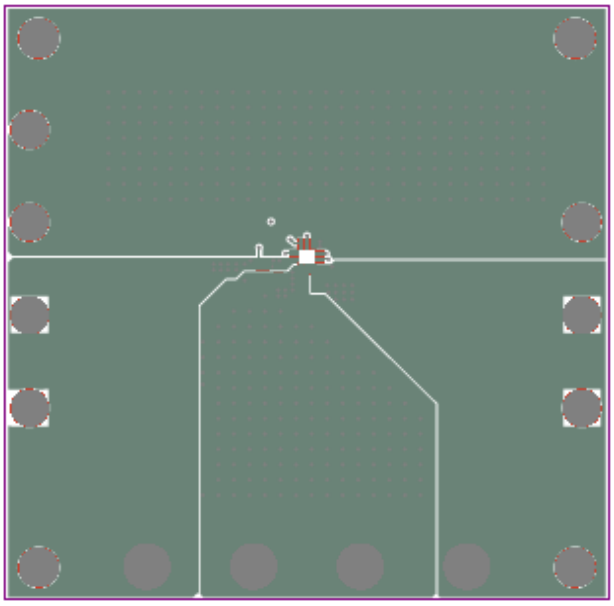


Figure2: Top Layer

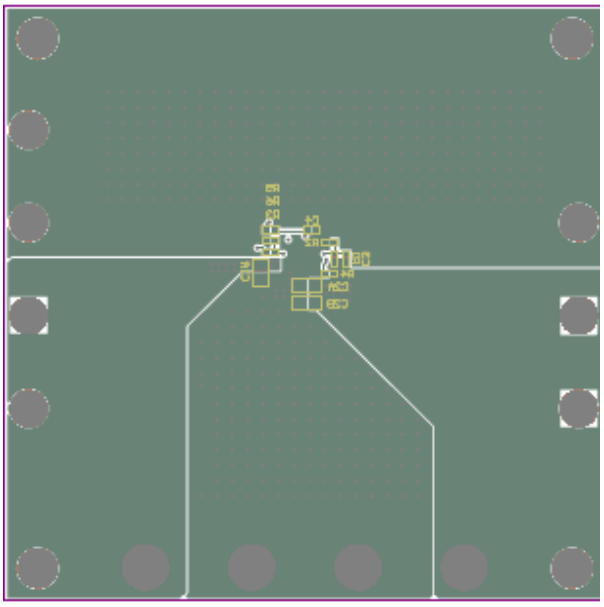


Figure3: Bottom Layer

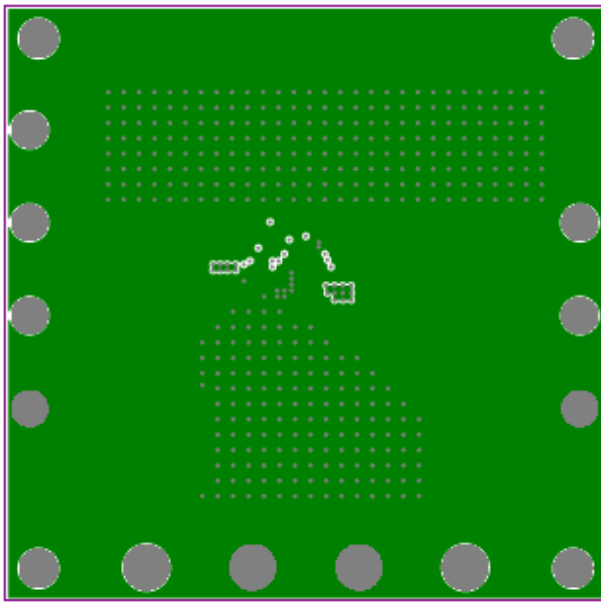


Figure4:Inner1 Layer

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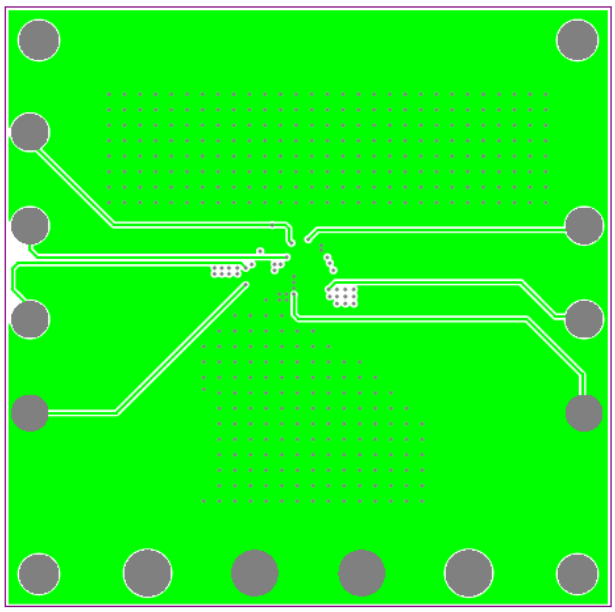


Figure5:Inner2 Layer

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QUICK START GUIDE

1. Preset Power Supply to12V.
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.
6. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.2V to turn on the regulator, or less than 1V to turn it off.

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