

## DESCRIPTION

The EVM3606-QV-00A is an evaluation board for MPM3606, a synchronous rectified, step-down module converter with built-in power MOSFETs, inductor and two capacitors.

The evaluation board can deliver a 0.6A continuous output current with excellent load and line regulation over a wide input supply range. External AAM pin provides selectable power save mode or force PWM mode.

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

The MPM3606 is available in a space-saving QFN20 (3mm x5mmx1.6mm) package.

## ELECTRICAL SPECIFICATION

| Parameter      | Symbol    | Value    | Units |
|----------------|-----------|----------|-------|
| Input Voltage  | $V_{IN}$  | 4.5 – 21 | V     |
| Output Voltage | $V_{OUT}$ | 3.3      | V     |
| Output Current | $I_{OUT}$ | 0.6      | A     |

## FEATURES

- 4.5V-to-21V Operating Input Range
- 0.6A Continuous Load Current
- 200 $\mu$ A Low Quiescent Current
- 100m $\Omega$ /50m $\Omega$  Low  $R_{DS(ON)}$  Internal Power MOSFETs
- Integrated Inductor
- Integrated VCC and Bootstrap Capacitors
- External AAM pin for Power-Save Mode Programming
- OCP Protection with Hiccup
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in QFN-20 (3mmx5mmx1.6mm) Package
- Total Solution Size 6.7mm x 6.3mm

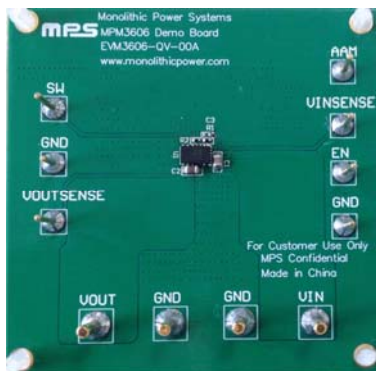
## APPLICATIONS

- Industrial Controls
- Medical and Imaging Equipment
- Telecom and Networking Applications
- LDO Replacement
- Space and Resource-limited Applications

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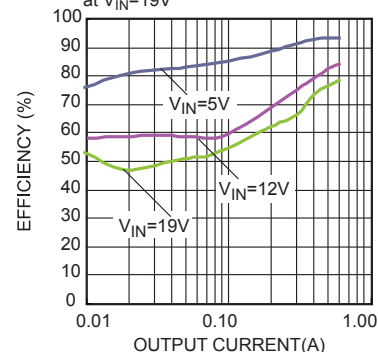
## EVM3606-QV-00A EVALUATION BOARD



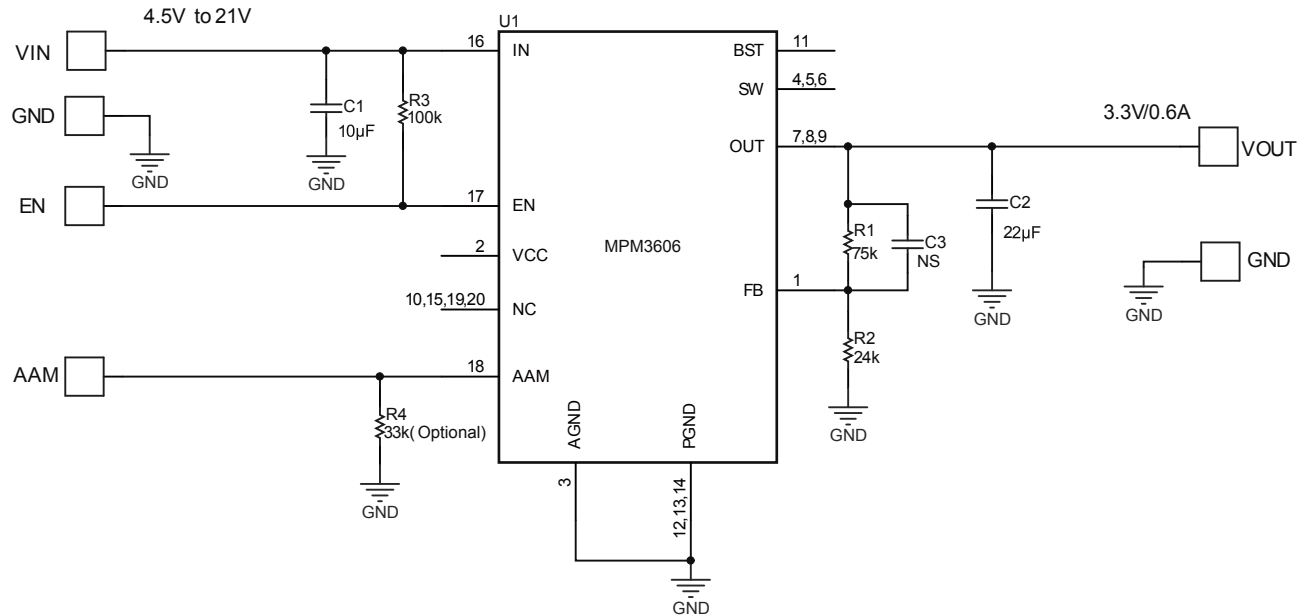
| Board Number   | MPS IC Number |
|----------------|---------------|
| EVM3606-QV-00A | MPM3606GQV    |

### Efficiency vs. Output Current

$V_{OUT}=3.3V, R_{AAM}=75k$  at  $V_{IN}=5V$ ,  
 $R_{AAM}=33k$  at  $V_{IN}=12V, R_{AAM}=20.5k$   
at  $V_{IN}=19V$



## EVALUATION BOARD SCHEMATIC



## EVM3606-QV-00A BILL OF MATERIALS

| Qty | Ref | Value   | Description                  | Package | Manufacturer | Manufacturer P/N   |
|-----|-----|---------|------------------------------|---------|--------------|--------------------|
| 1   | C1  | 10µF    | Ceramic Cap,25V,X5R          | 0805    | muRata       | GRM21BR61E106KA73L |
| 1   | C2  | 22µF    | Ceramic Cap,16V,X5R          | 0805    | muRata       | GRM219R61C226ME15L |
| 1   | C3  | NS      |                              | 0402    |              |                    |
| 1   | R1  | 75k     | Thick Film Res., 1%          | 0402    | Any          |                    |
| 1   | R2  | 24k     | Thick Film Res., 1%          | 0402    | Any          |                    |
| 1   | R3  | 100k    | Thick Film Res., 1%          | 0402    | Any          |                    |
| 1   | R4  | 33k     | Thick Film Res., 1%          | 0402    | Any          |                    |
| 1   | U1  | MPM3606 | Synchronous Step-Down Module | QFN-20  | MPS          | MPM3606GQV         |

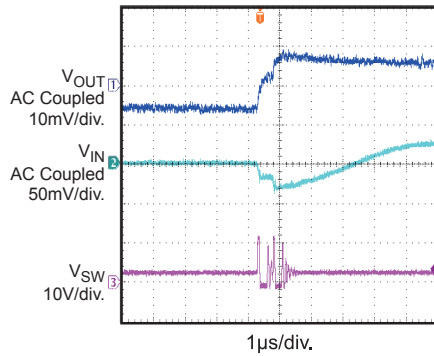
## EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN} = 12V$ ,  $V_{OUT} = 3.3V$ ,  $T_A = 25^\circ C$ , unless otherwise noted.

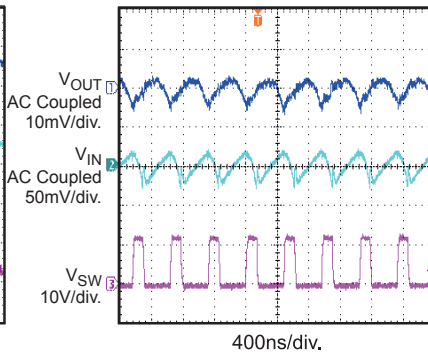
**Input/Output Ripple**

$I_{OUT} = 0A$



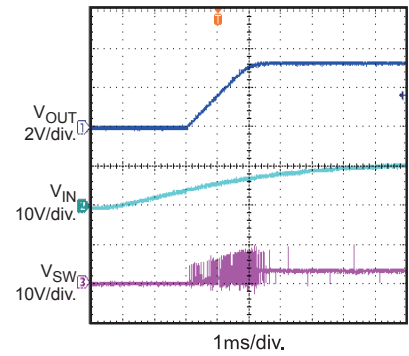
**Input/Output Ripple**

$I_{OUT} = 0.6A$



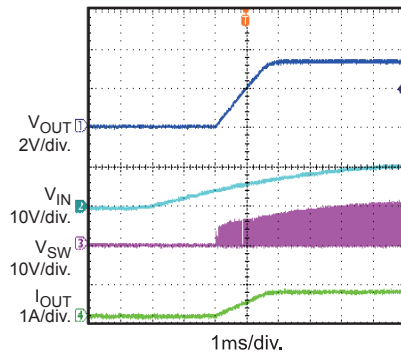
**VIN Startup**

$I_{OUT} = 0A$



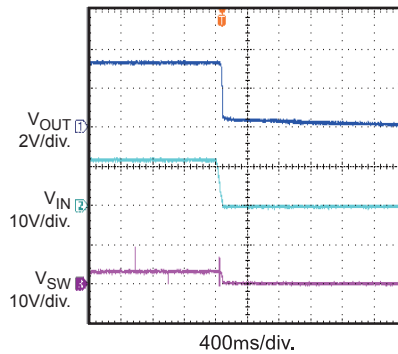
**VIN Startup**

$I_{OUT} = 0.6A$



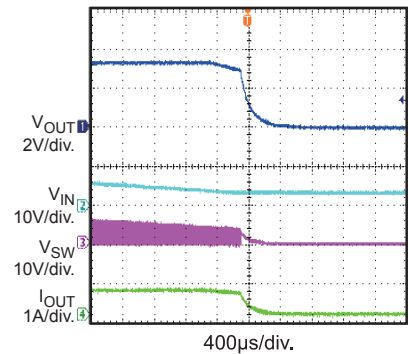
**VIN Shutdown**

$I_{OUT} = 0A$



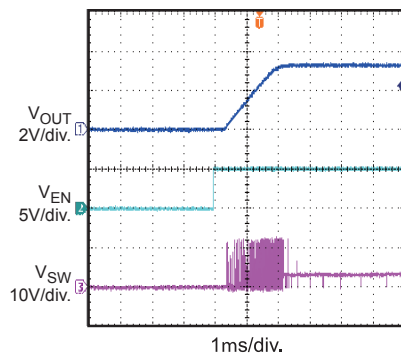
**VIN Shutdown**

$I_{OUT} = 0.6A$



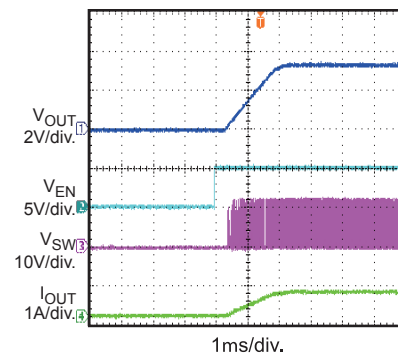
**EN Startup**

$I_{OUT} = 0A$



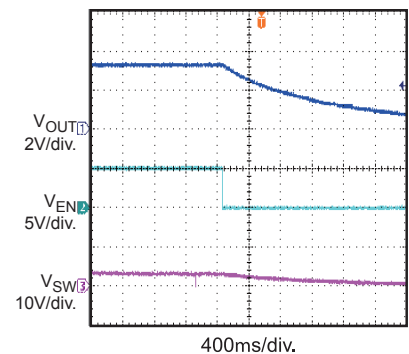
**EN Startup**

$I_{OUT} = 0.6A$



**EN Shutdown**

$I_{OUT} = 0A$



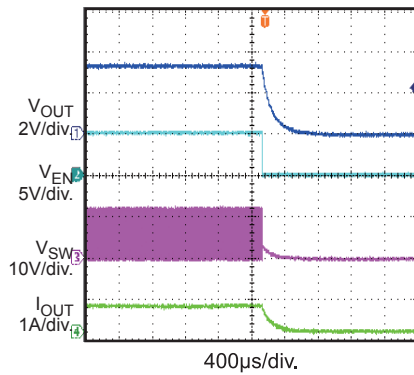
## EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

$V_{IN} = 12V$ ,  $V_{OUT} = 3.3V$ ,  $T_A = 25^\circ C$ , unless otherwise noted.

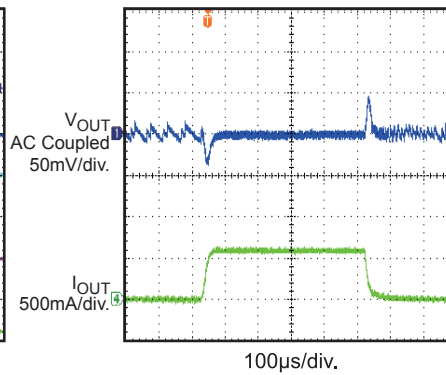
### EN Shutdown

$I_{OUT} = 0.6A$

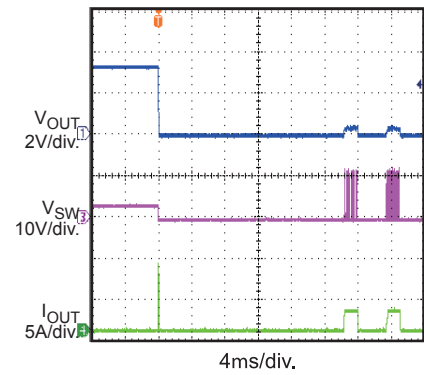


### Transient Response

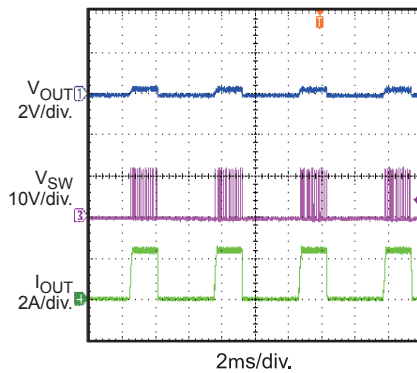
$I_{OUT} = 0A$  to  $0.6A$



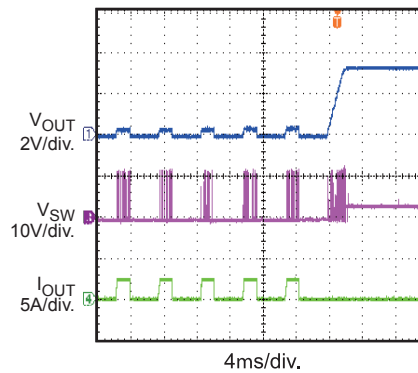
### Short Circuit Entry



### Short Circuit Steady State



### Short Circuit Recovery



## PRINTED CIRCUIT BOARD LAYOUT

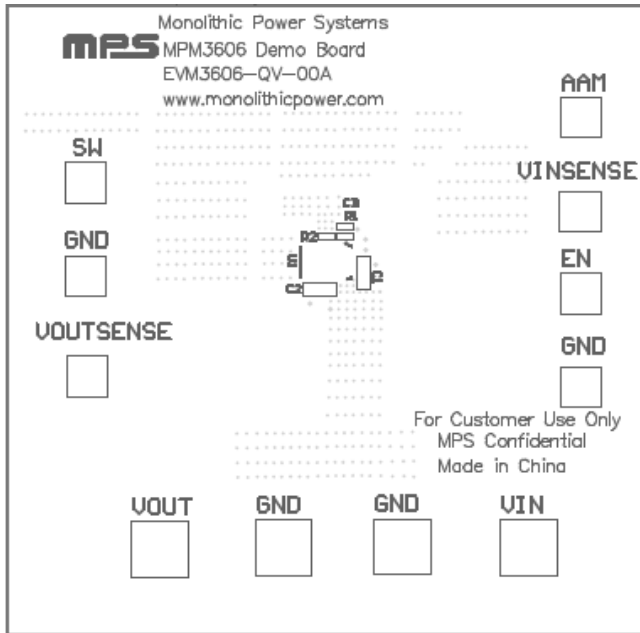


Figure 1—Top Silk Layer

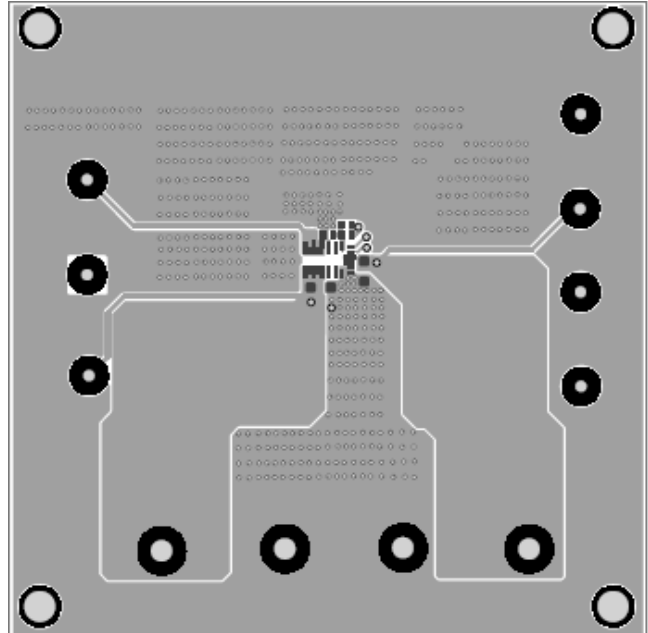


Figure 2—Top Layer

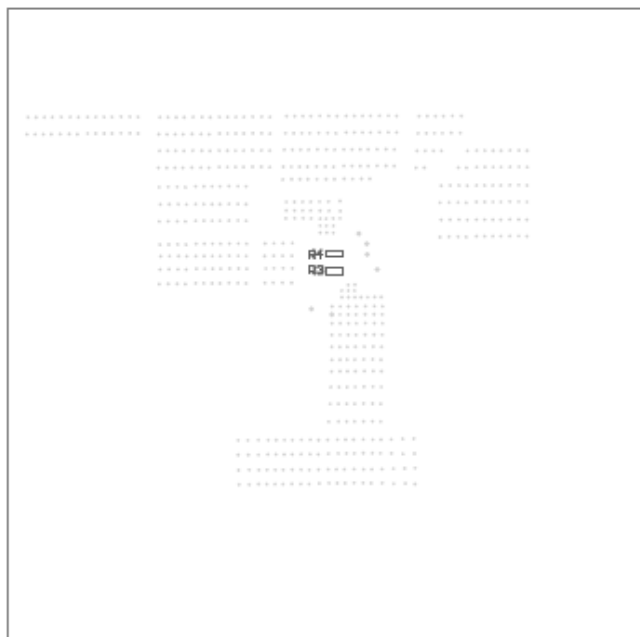


Figure 3—Bottom Silk Layer

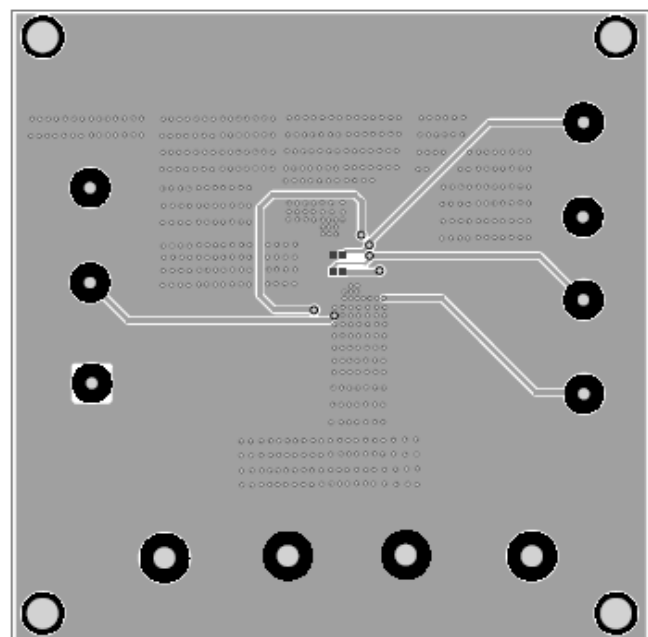


Figure 4—Bottom Layer

## 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 4.5V and 21V, 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 1.4V to turn on the regulator, or less than 1.25V to turn it off.
6. Float AAM pin or drive AAM to a high level voltage to set MPM3606 work at force PWM mode.

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