# EV2238-D-00A

## High-Efficiency, 8A, 18V. Step-Down Converter Evaluation Board

## DESCRIPTION

The EV2238-D-00A Evaluation Board is designed to demonstrate the capabilities of MPS' MP2238, a fully-integrated high-frequency, synchronous rectified, step-down, switch-mode converter with internal power MOSFETs. It offers a very compact solution to achieve an 8A continuous output current over a wide input range, with excellent load and line regulation.

Constant On-Time control operation provides very fast transient response and easy loop design as well as very tight output regulation.

Full protection features include SCP, OCP, and thermal shutdown.

The MP2238 requires a minimal number of readily-available, standard, external components and is available in a space-saving 12-pin QFN 2mmx3mm package.

## ELECTRICAL SPECIFICATION (1)

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Input Voltage | $V_{IN}$ | 12 | V |
| Output Voltage | $V_{OUT}$ | 1 | V |
| Output Current | $I_{OUT}$ | 8 | A |

**Notes:**

1) For different Input/output voltage specs and different output capacitor/inductor may need change the application circuit parameters.

## FEATURES

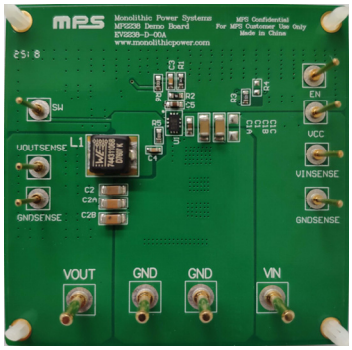
- Wide 4.2V-to-18V Operating Input Range
- 22mΩ/10mΩ Low-$R_{DS(ON)}$ Internal Power MOSFETs
- 8A Continuous Output Current
- 600mV Reference Voltage
- 600kHz Switching Frequency
- Internal Soft-Start
- Over-Current Protection and Hiccup
- Thermal Shutdown
- Ton Extension
- Available in a 12-pin QFN 2mx3mm package

## APPLICATIONS

- Digital TV Power Supply
- Digital Set-Top Boxes
- Flat-Panel Television and Monitors
- Distributed Power Systems

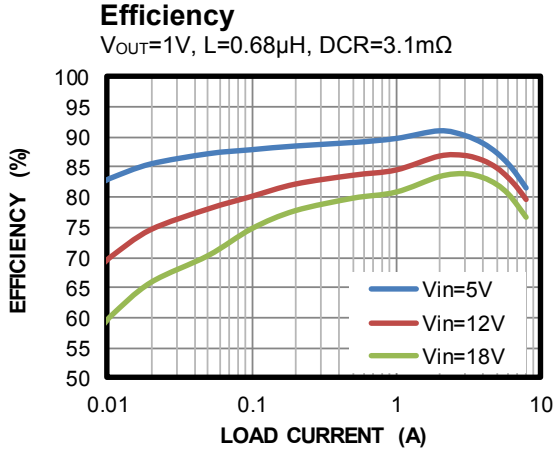


## EV2238-D-00A EVALUATION BOARD

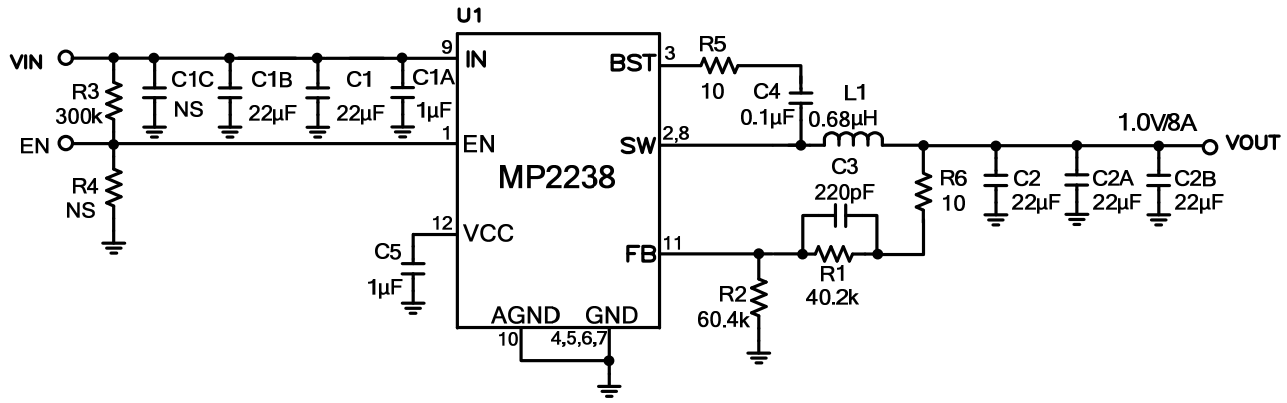



**(L x W ) 63.5mm x 63.5mm**

| Board Number | MPS IC Number |
|---|---|
| EV2238-D-00A | MP2238GD |



## EVALUATION BOARD SCHEMATIC




## EV2238-D-00A BILL OF MATERIALS

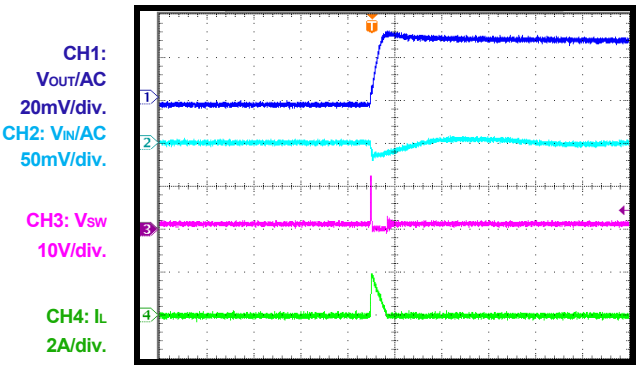
| Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|---|---|---|---|---|---|---|
| 2 | C1, C1B | 22µF | Ceramic Cap.,25V,X5R | 1206 | Murata | GRM31CR61E226KE15L |
| 2 | C1A, C5 | 1µF | Ceramic Cap.,25V,X7R | 0603 | Murata | GRM188R71E105KA12D |
| 0 | C1C | NS | | | | |
| 3 | C2, C2A, C2B | 22µF | Ceramic Cap.,10V,X7R | 1206 | Murata | GRM31CR71A226ME15L |
| 1 | C3 | 220pF | Ceramic Cap.,50V,X7R | 0603 | Murata | GRM188R71H221KA01D |
| 1 | C4 | 100nF | Ceramic Cap.,16V,X7R | 0603 | Murata | GRM188R71C104KA01D |
| 1 | R1 | 40.2k | Film Res,1%,0603 | 0603 | YAGEO | RC0603FR-0740K2L |
| 1 | R2 | 60.4k | Film Res,1%,0603 | 0603 | YAGEO | RC0603FR-0760K4L |
| 1 | R3 | 300k | Film Res,1%,0603 | 0603 | YAGEO | RC0603FR-07300KL |
| 0 | R4 | NS | | | | |
| 2 | R5, R6 | 10R | Film Res,1%,0603,10R | 0603 | YAGEO | RC0603FR-0710RL |
| 1 | L1 | 0.68µH | Inductor, $R_{DC}$=3.1mΩ, Isat=20A | SMD | Wurth | 744311068 |
| 1 | U1 | MP2238GD | Step-down converter | QFN | MPS | MP2238GD |

## EVB TEST RESULTS

**$V_{IN}$ =12V, $V_{OUT}$ =1V, L = 0.68µH, $T_A$ = +25°C, unless otherwise noted.**

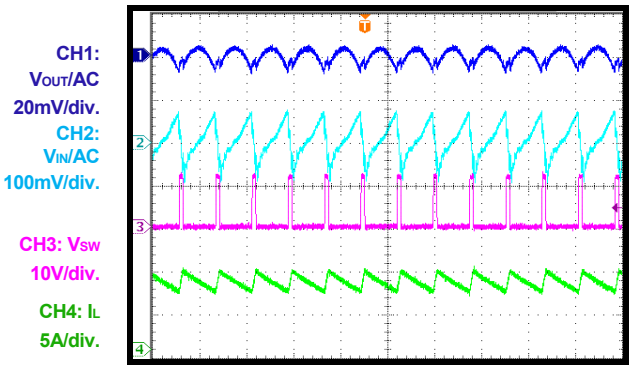
### Input / Output Ripple

$I_{OUT}$=0A



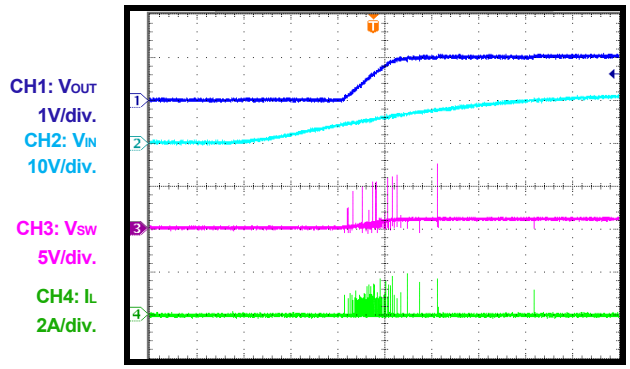

### Input / Output Ripple

$I_{OUT}$=8A



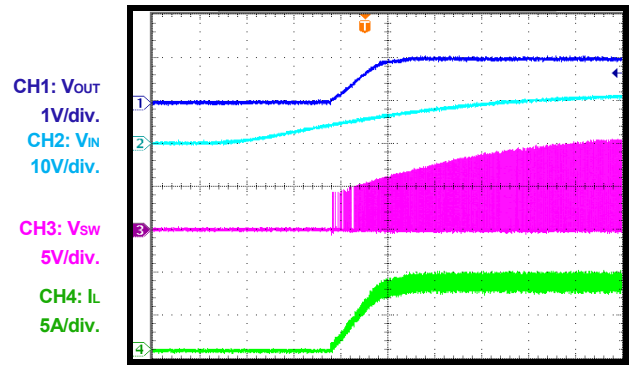

### Start up through Input Voltage

$I_{OUT}$=0A



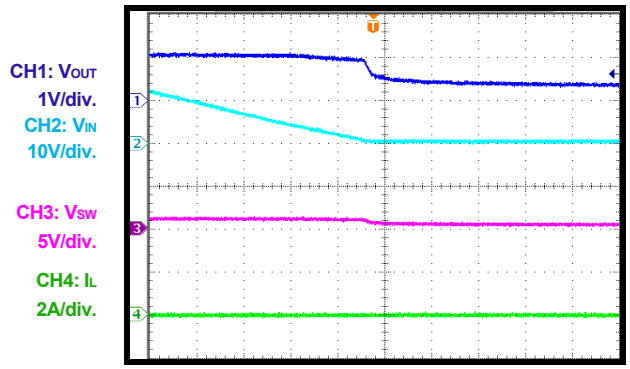

### Start up through Input Voltage

$I_{OUT}$=8A



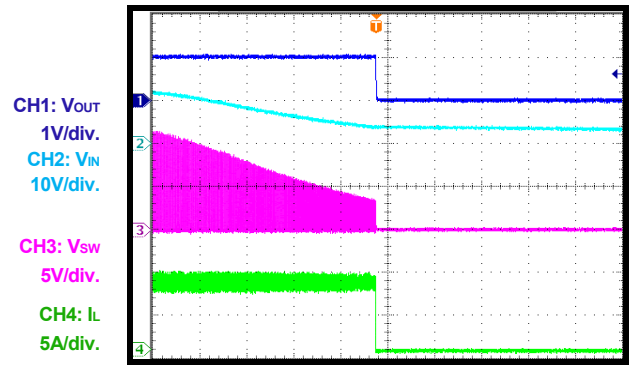

### Shutdown through Input Voltage

$I_{OUT}$=0A




### Shutdown through Input Voltage

$I_{OUT}$=8A

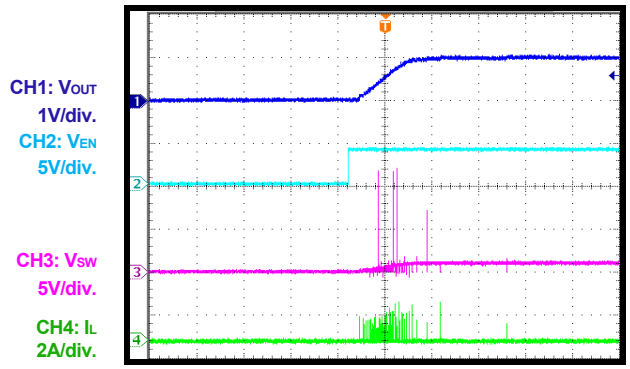


## EVB TEST RESULTS *(continued)*

**$V_{IN}$ = 12V, $V_{OUT}$ = 1V, L=0.68 µH, $T_A$ = 25°C, unless otherwise noted.**

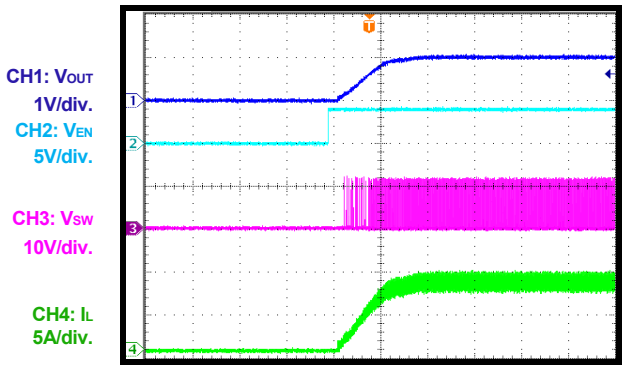
### Start up through Enable

$I_{OUT}$=0A



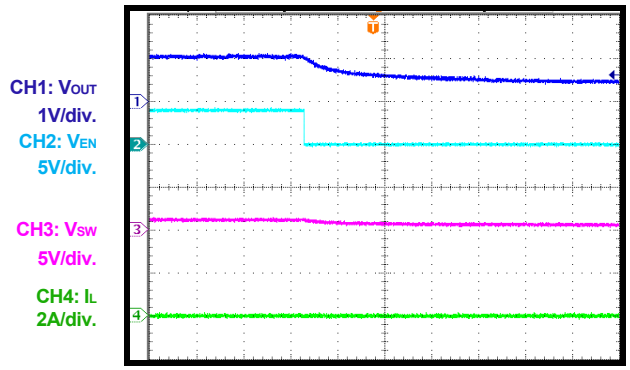

### Start up through Enable

$I_{OUT}$=8A



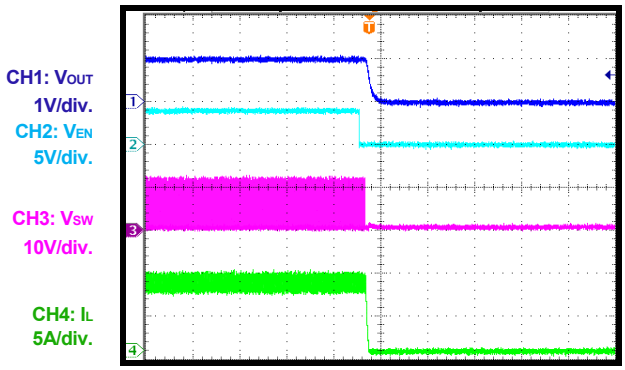

### Shutdown through Enable

$I_{OUT}$=0A

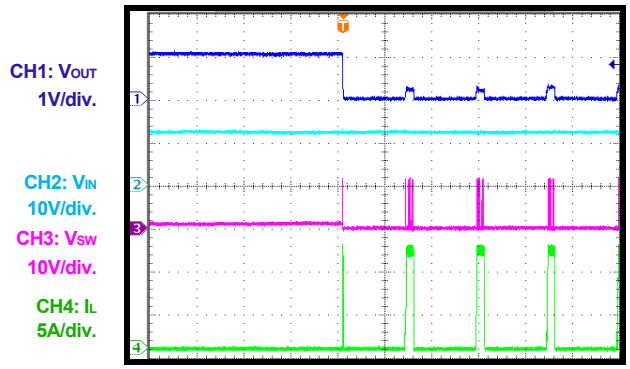



### Shutdown through Enable

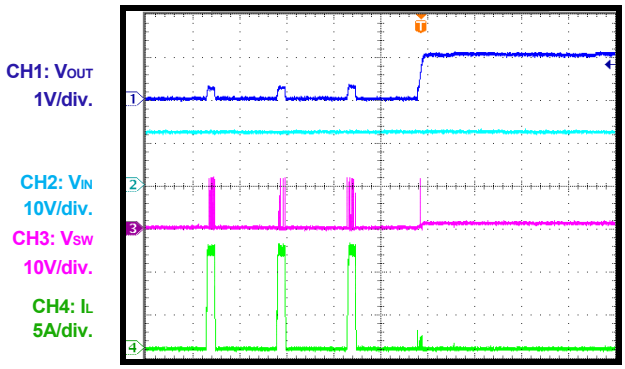
$I_{OUT}$=8A




### Short Circuit Entry



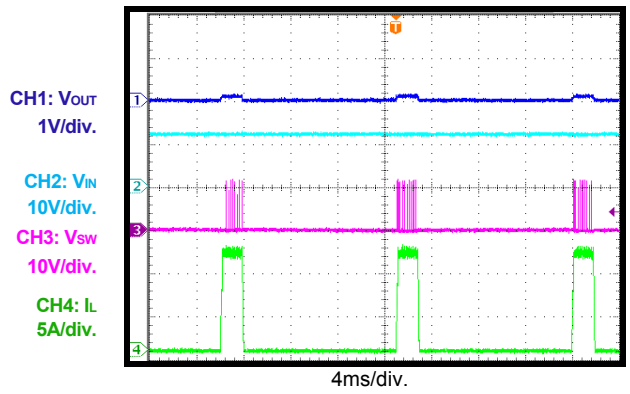

### Short Circuit Recovery



## EVB TEST RESULTS *(continued)*

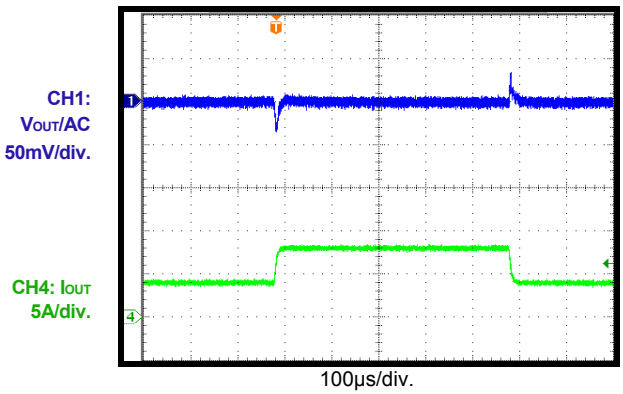
**$V_{IN}$ = 12V, $V_{OUT}$ = 1V, L=0.68 µH, $T_A$ = 25°C, unless otherwise noted.**

### Short Circuit Steady




### Transient Response

$I_{OUT}$=4A to 8A



## PRINTED CIRCUIT BOARD LAYOUT

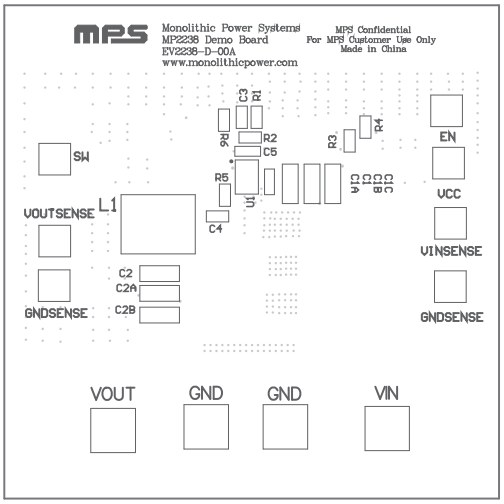



Figure 1—Top Silk Layer

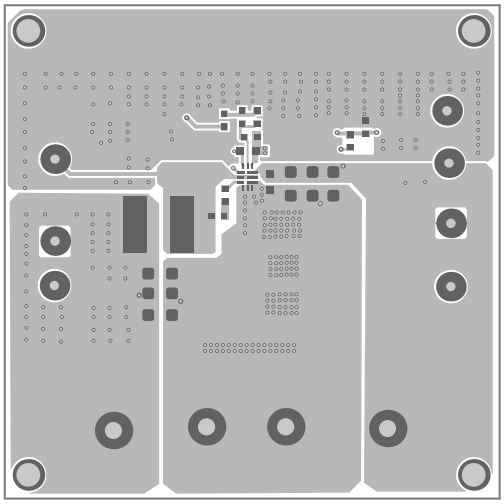


Figure 2—Top Layer

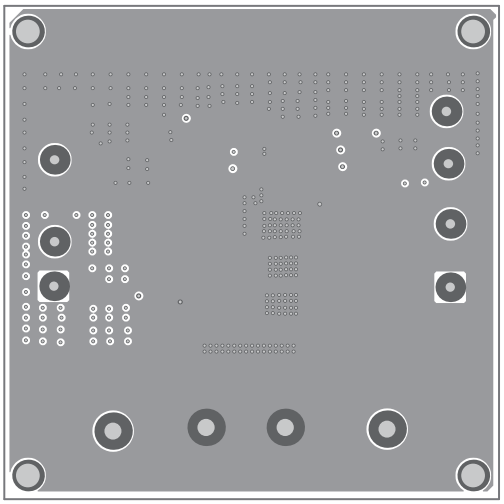


Figure 3—IN1 Layer

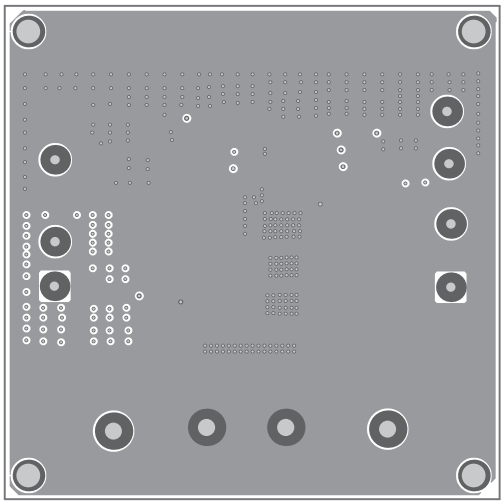


Figure 4—IN2 Layer

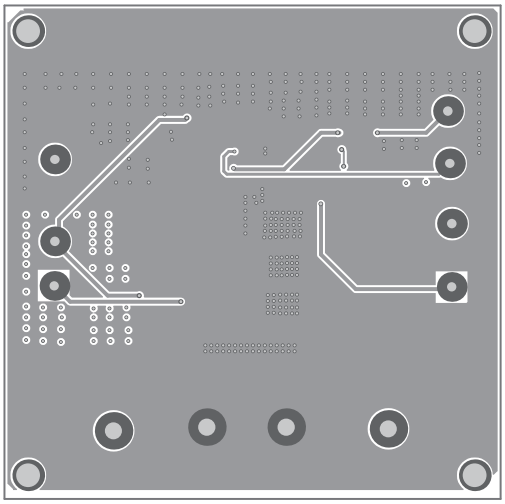


Figure 5—Bottom Layer

## 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 1.3V to turn on the regulator, or less than 0.9V to turn it off.