

### DESCRIPTION

The EV2233-J-00A demonstrates MPS's MP2233, a high-frequency, synchronous, rectified, step-down converter with built-in high-side and low-side power MOSFETs. The MP2233 offers a very compact solution to achieve a 3A continuous output current with excellent load and line regulation over a wide input supply range. The MP2233 has synchronous mode operation for higher efficiency over the output current load range.

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

Protective features include OCP and thermal shutdown.

The MP2233 is available in a space saving 8-pin TSOT23 package.

### ELECTRICAL SPECIFICATION

| Parameter      | Symbol    | Value  | Units |
|----------------|-----------|--------|-------|
| Input Voltage  | $V_{IN}$  | 5 – 16 | V     |
| Output Voltage | $V_{OUT}$ | 3.3    | V     |
| Output Current | $I_{OUT}$ | 3      | A     |

### FEATURES

- Wide 5V to 16V Operating Input Range
- 80mΩ/30mΩ Low  $R_{DS(ON)}$  Internal Power MOSFET
- Proprietary Switching-Loss-Reduction Technique
- High-Efficiency Synchronous Mode Operation
- Default 1.4MHz Switching Frequency
- Externally-Programmable Soft-Start
- OCP Protection and Hiccup
- Thermal Shutdown
- Output Adjustable from 0.8V
- Available in an 8-pin TSOT-23 Package

### APPLICATIONS

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

All MPS parts are lead-free and adhere to the RoHS directive. For MPS green status, please visit MPS website under Products, Quality Assurance page.

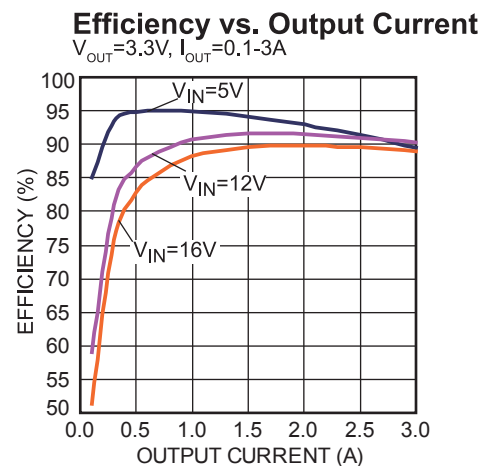
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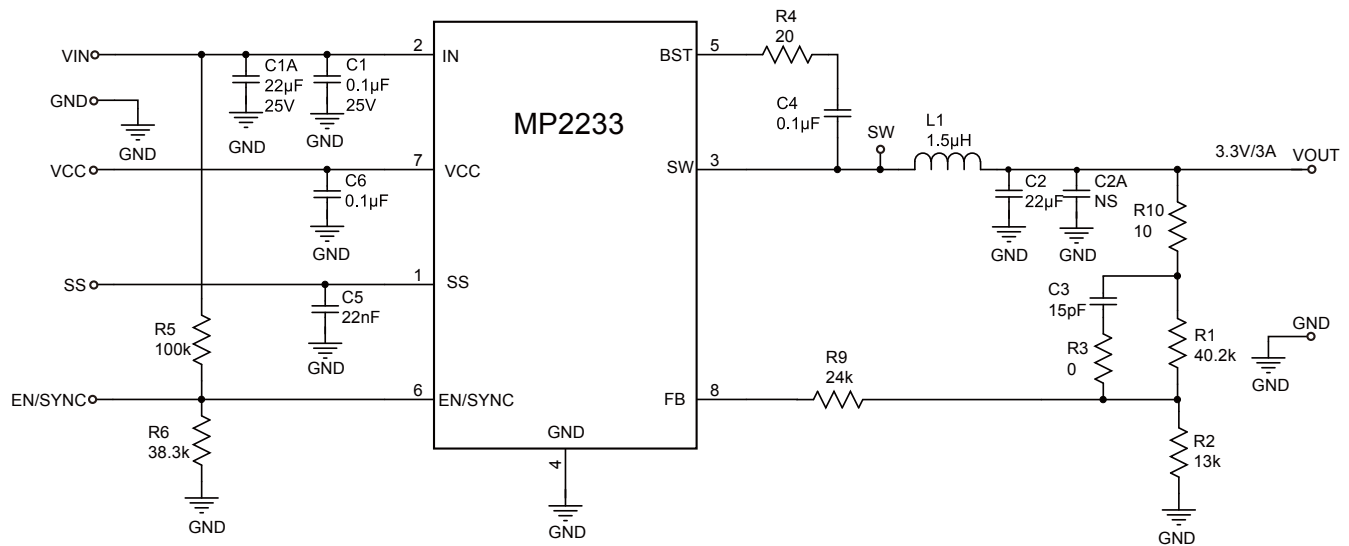
## EV2233-J-00A EVALUATION BOARD



| Board Number | MPS IC Number |
|--------------|---------------|
| EV2233-J-00A | MP2233DJ      |



## EVALUATION BOARD SCHEMATIC



## EV2233-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 |
| 1   | C2     | 22µF      | Ceramic Cap., 10V, X7R        | 1206     | muRata       | GRM31CR70A226KE19L |
| 1   | C3     | 15pF      | Ceramic Cap., 50V, C0G        | 0603     | muRata       | GRM1885C1H150JA01D |
| 2   | C4,C6  | 0.1µF     | Ceramic Cap., 16V, X7R        | 0603     | muRata       | GRM188R71C104KA01D |
| 1   | C5     | 22nF      | Ceramic Cap., 50V, X7R        | 0603     | muRata       | GRM188R71H223KA01D |
|     | C2A,C7 | NS        |                               |          |              |                    |
| 1   | R1     | 40.2K     | Thick Film Res., 1%           | 0603     | Yageo        | RC0603FR-0740K2L   |
| 1   | R2     | 13K       | Thick Film Res., 1%           | 0603     | Yageo        | RC0603FR-0713KL    |
| 1   | R3     | 0Ω        | Thick Film Res., 1%           | 0603     | Yageo        | RC0603JR-070RL     |
| 1   | R4     | 20Ω       | Thick Film Res., 1%           | 0603     | Yageo        | RC0603FR-0720RL    |
| 1   | R5     | 100K      | Thick Film Res., 1%           | 0603     | Yageo        | RC0603FR-07100KL   |
| 1   | R6     | 38.3K     | Thick Film Res., 1%           | 0603     | Yageo        | RC0603FR-0738K3L   |
| 1   | R9     | 24K       | Thick Film Res., 1%           | 0603     | Yageo        | RC0603FR-0724KL    |
| 1   | R10    | 10Ω       | Thick Film Res., 1%           | 0603     | Yageo        | RC0603FR-0710RL    |
| 1   | L1     | 1.5µH     | Inductor, DCR=10mΩ, Is=11A    | 7×7×4    | Würth        | 744311150          |
| 1   | U1     | MP2233 DJ | Synchronous Step-Down Convert | TSOT23-8 | MPS          | MP2233DJ           |

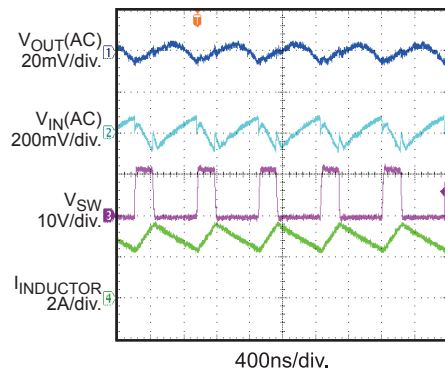
## EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN}=12V$ ,  $V_{OUT}=3.3V$ ,  $L=1.5\mu H$ ,  $T_A=25^{\circ}C$ , unless otherwise noted.

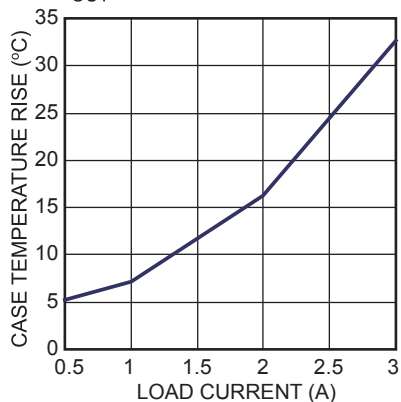
### Input/Output Ripple

$I_{OUT} = 3A$



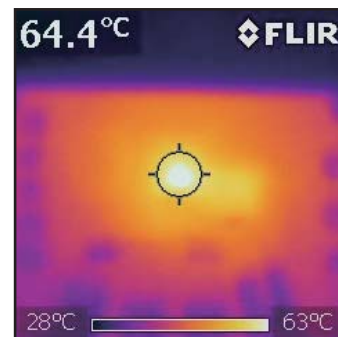
### Case Temperature Rise vs. Output Current

$I_{OUT} = 0.5A - 3A$



### Infrared Thermal Image

$I_{OUT} = 3A$ ,  $T_A = 31^{\circ}C$



## PRINTED CIRCUIT BOARD LAYOUT

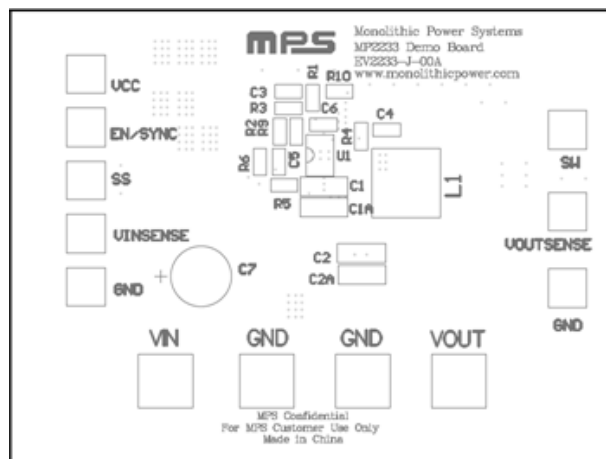


Figure 1—Top Silk Layer

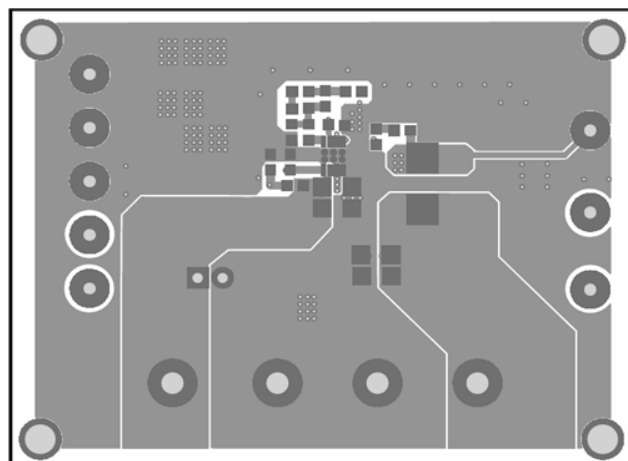


Figure 2—Top Layer

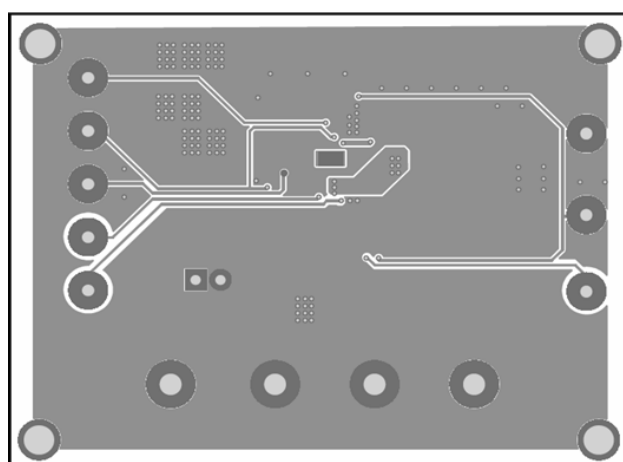


Figure 3—Bottom Layer

## 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 5V and 16V, 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.

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