

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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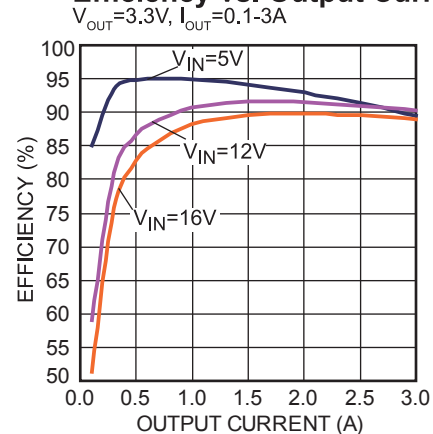
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EV2233-J-00A EVALUATION BOARD

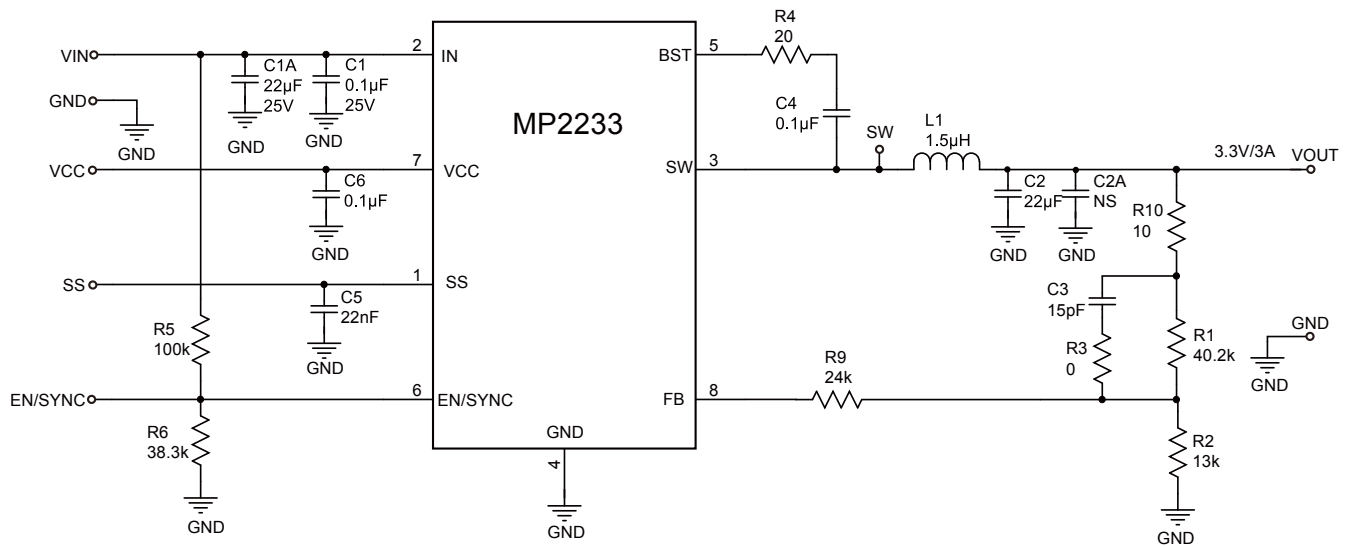


| Board Number | MPS IC Number |
|--------------|---------------|
| EV2233-J-00A | MP2233DJ |

Efficiency vs. Output Current



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 |

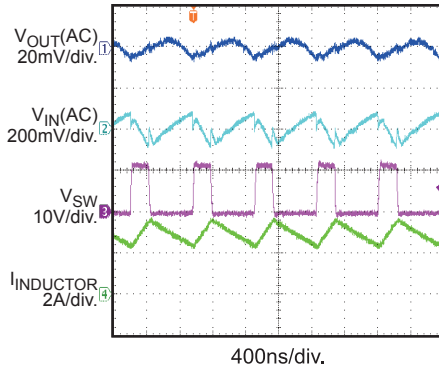
EVB TEST RESULTS

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.

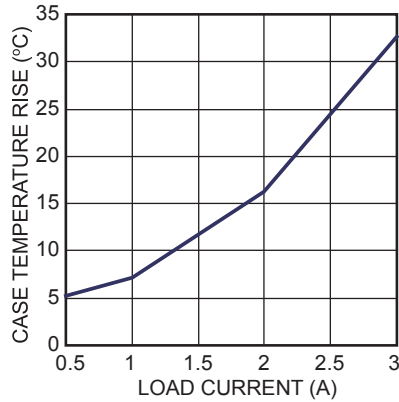
Input/Output Ripple

$I_{OUT} = 3A$



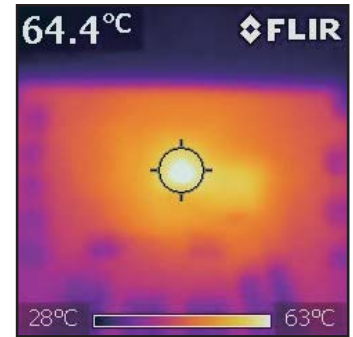
Case Temperature Rise vs. Output Current

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



Infrared Thermal Image

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



PRINTED CIRCUIT BOARD LAYOUT

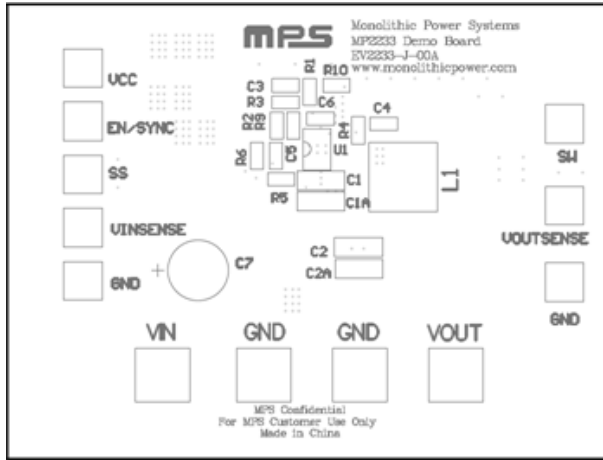


Figure 1—Top Silk Layer

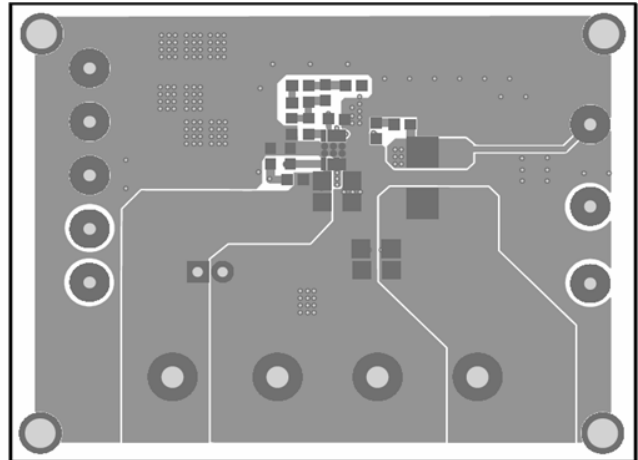


Figure 2—Top Layer

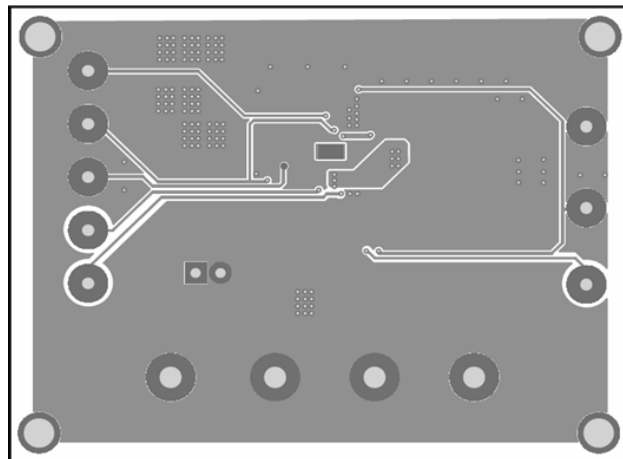


Figure 3—Bottom Layer