

DESCRIPTION

The EV2312-Q-00A is an evaluation board for the MP2312, a high efficiency monolithic synchronous step-down converter.

The Evaluation Board can deliver 2.1A continuous load current from a 6V to 24V input with excellent load and line regulation.

Constant-On-Time (COT) control mode provides fast transient response and eases loop stabilization.

The Evaluation Board can be turned on or shut down via a remote ON/OFF input that is reference to ground. This input is compatible with popular logic devices.

ELECTRICAL SPECIFICATION

| Parameter | Symbol | Value | Units |
|---------------------|-----------|--------|-------|
| Input Voltage | V_{IN} | 6 – 24 | V |
| Output Voltage | V_{OUT} | 5 | V |
| Output Current | I_{OUT} | 2.1 | A |
| Switching Frequency | f_{SW} | 500 | kHz |

FEATURES

- Wide 6V to 24V Operating Input Range
- 2.1A Continuous Output Current
- Low $R_{DS(ON)}$ Internal Power MOSFETs
- Proprietary Switching Loss Reduction Technique
- 1% Reference Voltage
- Internal Soft Start
- Output Discharge
- 500kHz Switching Frequency
- OCP, OVP, UVP Protection and Thermal Shutdown
- Available in a QFN3x3 package

APPLICATIONS

- Laptop Computer
- Tablet PC
- Networking Systems
- Personal Video Recorders
- Flat Panel Television and Monitors
- Distributed Power Systems

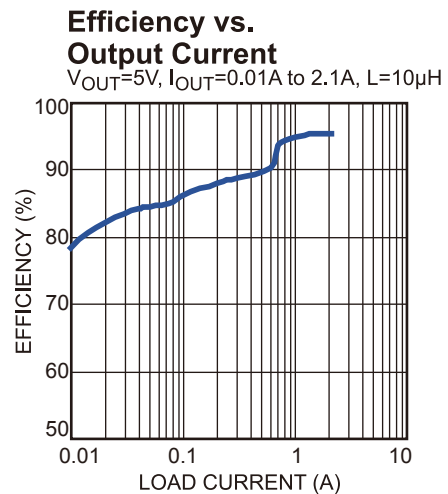
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EV2312-Q-00A EVALUATION BOARD

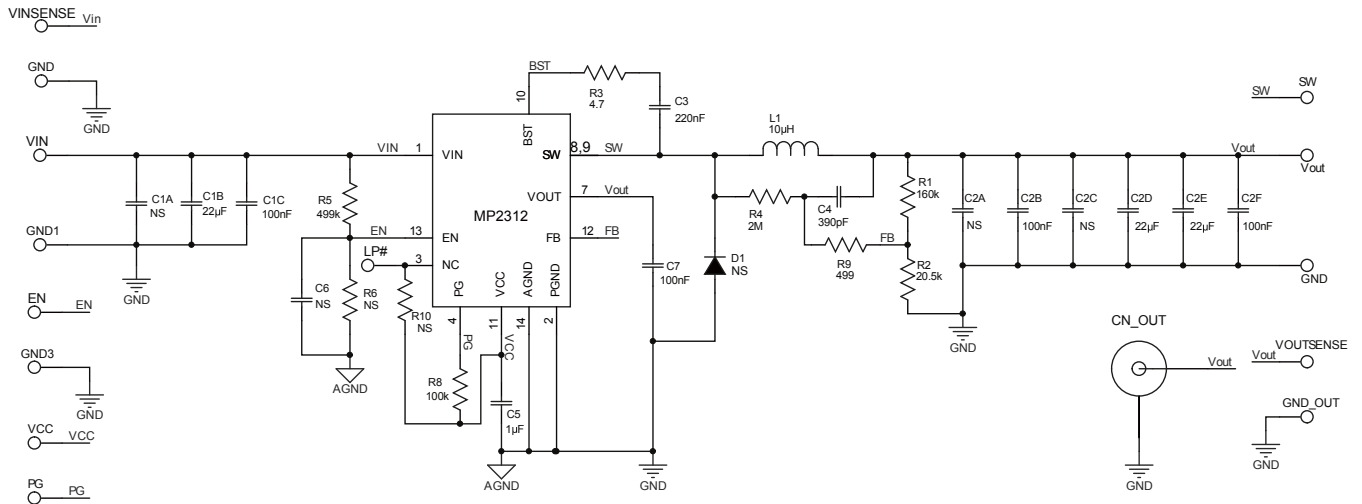


(L x W x H) 8.55cm x 8.55cm x 1.6cm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV2312-Q-00A | MP2312GQ |



EVALUATION BOARD SCHEMATIC



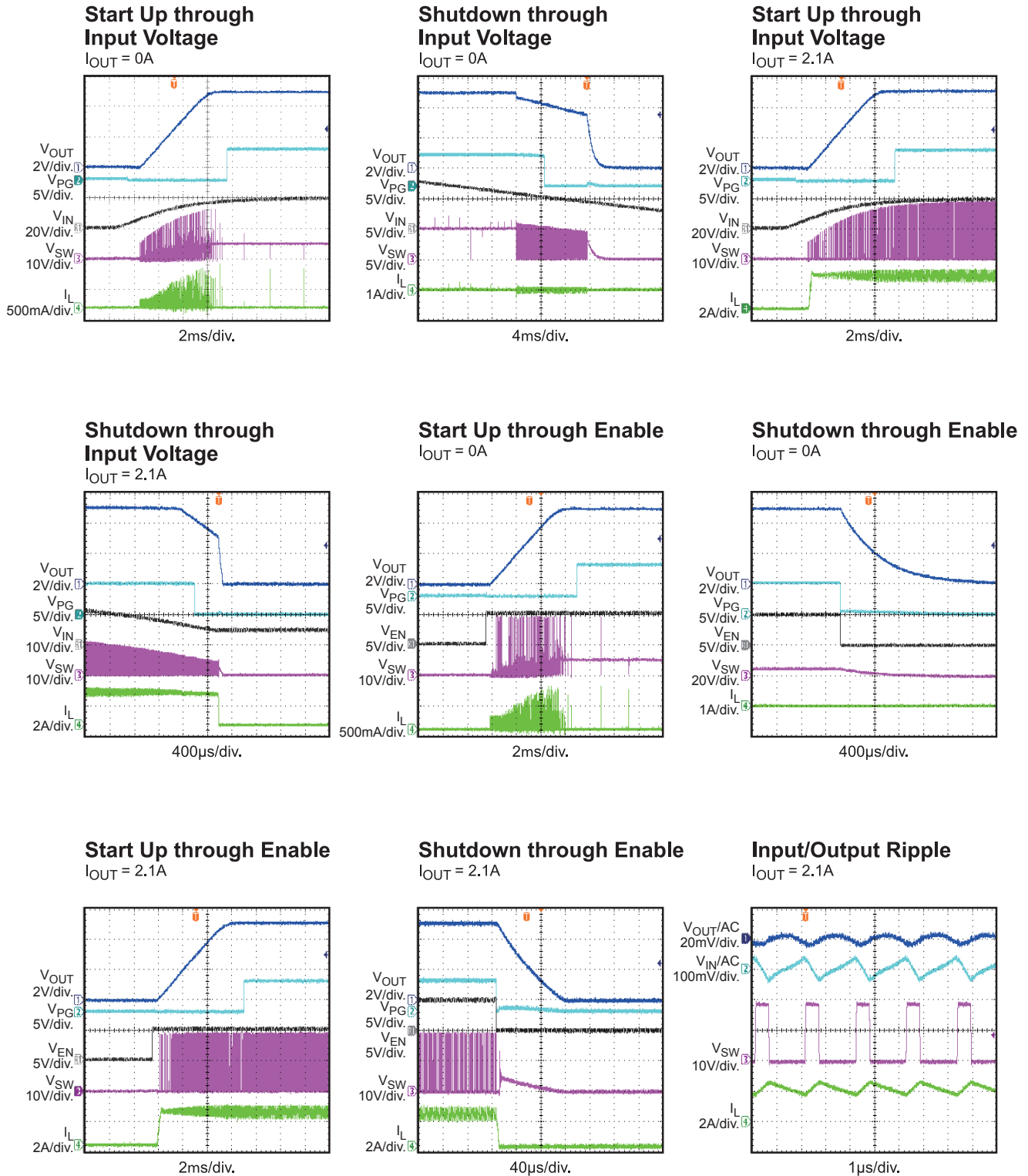
EV2312-Q-00A BILL OF MATERIALS

| Qty. | Ref | Value | Description | Package | Manufacture | Manufacture_PN |
|------|----------------|------------|--------------------------------------|---------|-------------|--------------------|
| 1 | C1B | 22 μ F | Ceramic Capacitor;25V;X5R;1210 | 1210 | muRata | GRM32ER61E226KE15L |
| 2 | C1C,C2B | 100nF | Ceramic Capacitor;50V;X7R;0603 | 0603 | muRata | GRM188R71H104KA93D |
| 0 | C1A,C2A,C2C,C6 | NS | | | | |
| 2 | C2D,C2E | 22 μ F | Ceramic Capacitor;6.3V;X5R;1206 | 1206 | muRata | GRM31CR60J226KE19 |
| 2 | C2F, C7 | 100nF | Ceramic Capacitor;16V;X7R;0603 | 0603 | muRata | GRM188R71C104KA01D |
| 1 | C3 | 220nF | Ceramic Capacitor;16V;X7R;0603 | 0603 | muRata | GRM188R71C224KA01 |
| 1 | C4 | 390pF | Ceramic Capacitor;50V;X7R;0603 | 0603 | muRata | GRM1885C1H391JA01 |
| 1 | C5 | 1 μ F | Ceramic Capacitor;10V;X5R;0603 | 0603 | muRata | GRM188R71A105KA61D |
| 0 | D1 | NS | Schottky Diode;40V;0.5A | SOD-123 | | |
| 1 | L1 | 10 μ H | Inductor;10 μ H;25m Ω ,4A | SMD | Würth | 7447715100 |
| 1 | R1 | 160k | Film Resistor;1% | 0603 | Yageo | RC0603FR-07160KL |
| 1 | R2 | 20.5k | Film Resistor;1% | 0603 | Yageo | RC0603FR-0720K5L |
| 1 | R3 | 4.7 | Film Resistor;5% | 0603 | Yageo | RC0603JR-074R7L |
| 1 | R4 | 2M | Film Resistor;1% | 0603 | Yageo | RC0603FR-072ML |
| 0 | R6 | NS | Film Resistor;1% | 0603 | | |
| 1 | R5 | 499k | Film Resistor;1% | 0603 | Yageo | RC0603FR-07499KL |
| 2 | R8 | 100k | Film Resistor;1% | 0603 | Yageo | RC0603FR-07100KL |
| 1 | R9 | 499 | Film Resistor;1% | 0603 | Yageo | RC0603FR-07499RL |
| 0 | R10 | NS | Film Resistor;5% | 0603 | | |
| 1 | U1 | | Step Down Converter | QFN 3x3 | MPS | MP2312GQ |

EVB TEST RESULTS

Performance waveforms are tested on the EV2312-Q-00A.

$V_{IN} = 19V$, $V_{OUT} = 5V$, $L = 10\mu H$, $T_A = 25^\circ C$, unless otherwise noted.



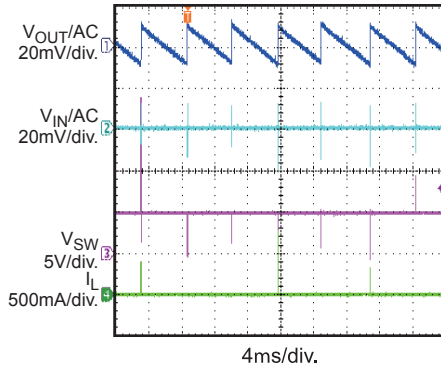
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the EV2312-Q-00A.

$V_{IN}=19V$, $V_{OUT}=5V$, $L=10\mu H$, $T_J=+25^\circ C$, unless otherwise noted.

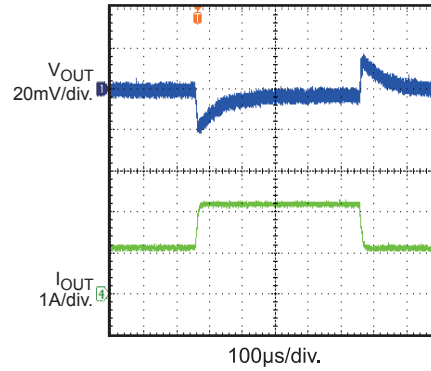
Input/Output Ripple

$I_{OUT} = 0A$



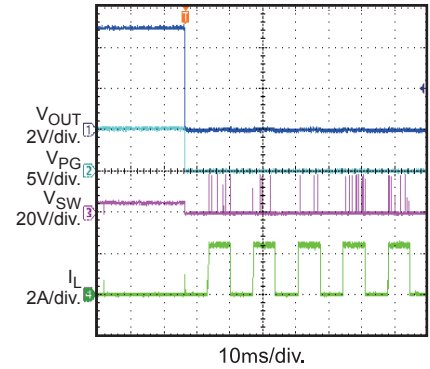
Transient Response

$I_{OUT} = 1.05A - 2.1A, 2.5A/\mu s$



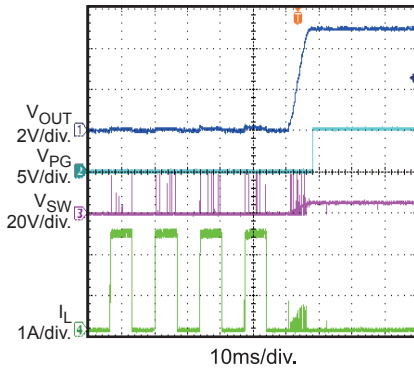
Short Circuit Entry

$I_{OUT} = 0A$



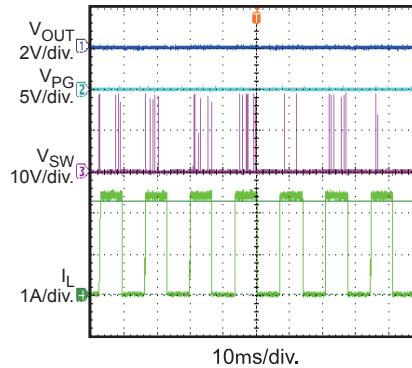
Short Circuit Recovery

$I_{OUT} = 0A$



Short Circuit Steady State

$I_{OUT} = 0A$



PRINTED CIRCUIT BOARD LAYOUT

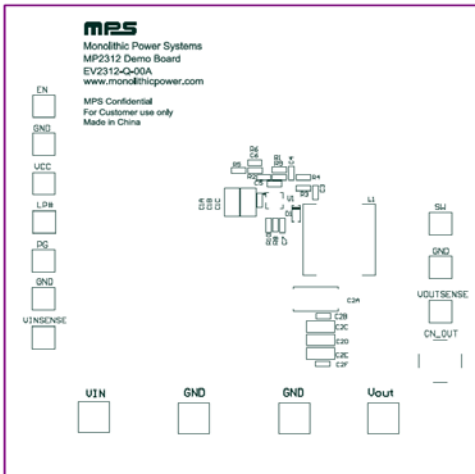


Figure 1: Top Silk Layer

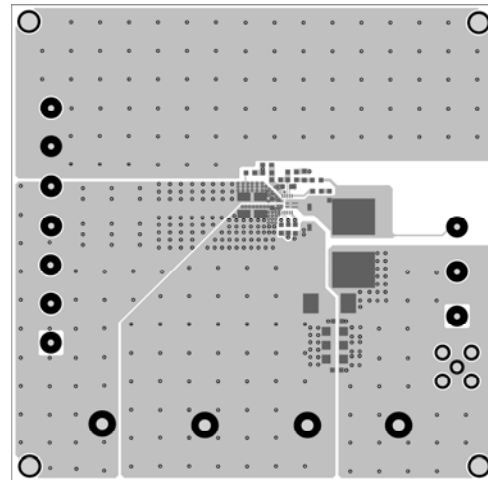


Figure 2: Top Layer

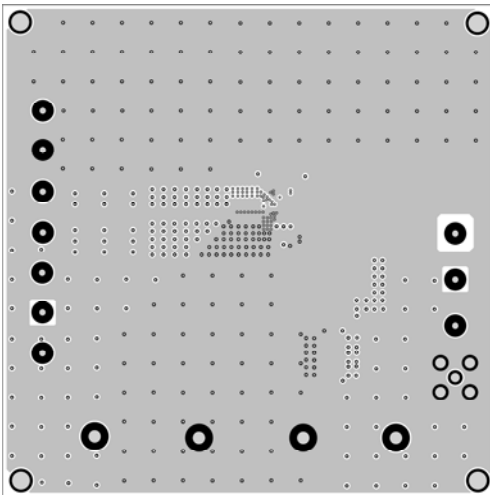


Figure 3: Inner Layer1

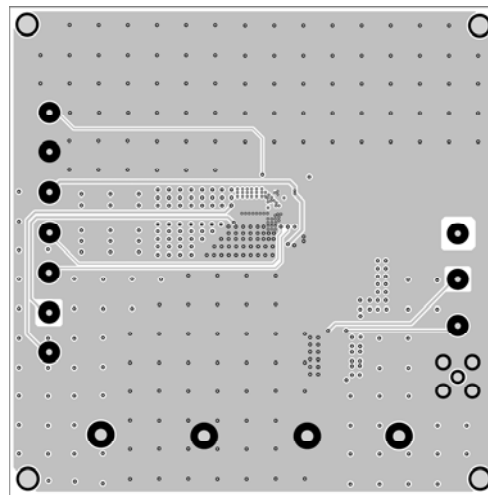


Figure 4: Inner Layer2

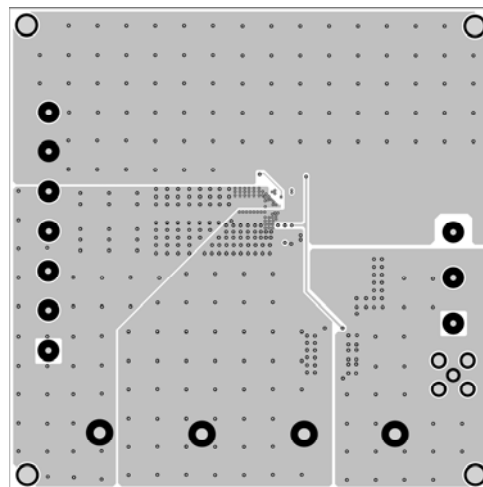


Figure 5: Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the VOUT and GND pins respectively.
2. Preset the output of power supply between 6V and 24V, 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 MP2312GQ will automatically start up.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 2V to turn on the regulator or less than 0.4V to turn it off.
6. Use R1 and R2 to set the output voltage within $V_{FB}=0.604V$. Follow the Application information section in the device datasheet to select the proper value of R1, R2, inductor and output capacitor values when output voltage is changed.

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