

### DESCRIPTION

The EVQ4568-Q-00A Evaluation Board is designed to demonstrate the capabilities of MPQ4568. The MPQ4568 is a high-frequency, step-down, switching regulator with integrated high-side/ low-side, high-voltage power MOSFETs. It provides a highly efficient output of up to 100mA.

60V rated MOSFETs and 4.5V to 45V operation range accommodates a variety of step-down applications in automotive input environment. A 5 $\mu$ A shutdown mode quiescent current allows use in battery-powered applications.

It allows for high power conversion efficiency over a wide load range by scaling down the switching frequency under light-load condition to reduce the switching and gate driver losses.

### ELECTRICAL SPECIFICATION

| Parameter      | Symbol           | Value    | Units |
|----------------|------------------|----------|-------|
| Input Voltage  | V <sub>IN</sub>  | 4.5 – 45 | V     |
| Output Voltage | V <sub>OUT</sub> | 3.3      | V     |
| Output Current | I <sub>OUT</sub> | 100      | mA    |

### FEATURES

- 20 $\mu$ A Quiescent Current
- <5 $\mu$ A Shutdown Mode Current
- Wide 4.5V to 45V Operating Range with 50V Input OVP
- 60V Integrated MOSFETs
- Stable with Ceramic Output Capacitors
- Programmable Soft-Start
- Adjustable Input UVLO Hysteresis
- Precision Peak Current Limit without Current-Sensing Resistor
- Programmable Peak Current Limit

### APPLICATIONS

- 4mA to 20mA Current Loops
- Automotive Systems
- Industrial Power Systems
- Distributed Power Systems
- Battery Powered 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.

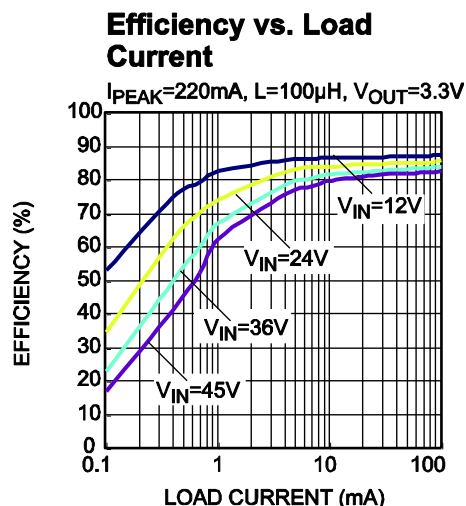
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## EVQ4568-Q-00A EVALUATION BOARD

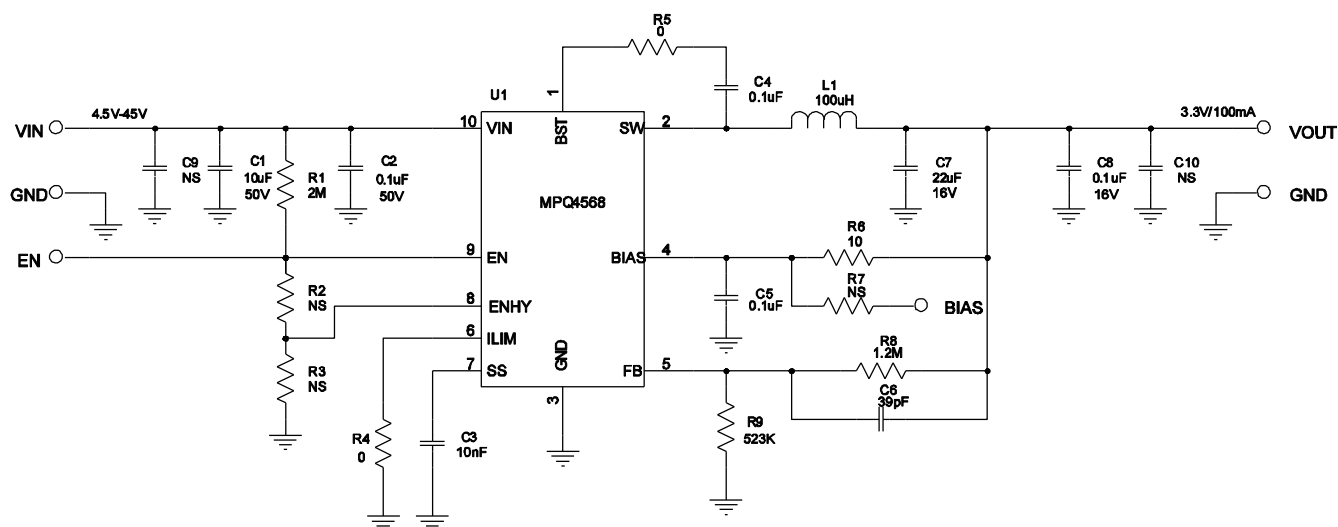


(L × W × H) 6.35cm × 6.35cm × 1cm

| Board Number  | MPS IC Number |
|---------------|---------------|
| EVQ4568-Q-00A | MPQ4568GQ     |



## EVALUATION BOARD SCHEMATIC

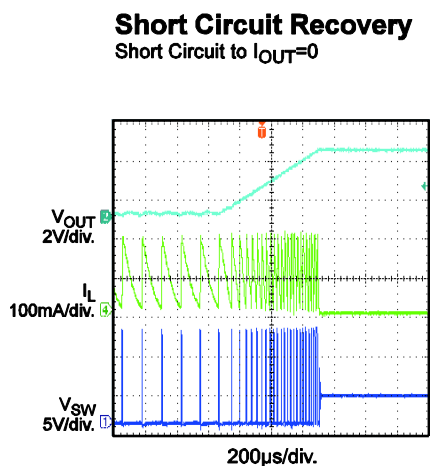
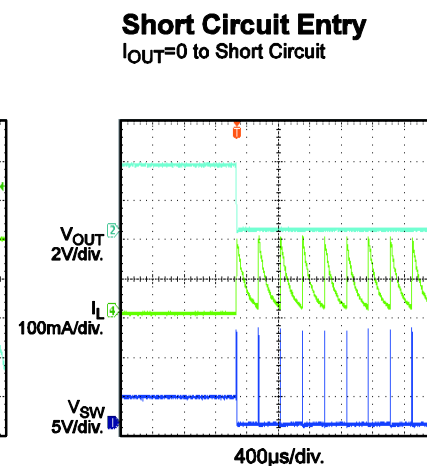
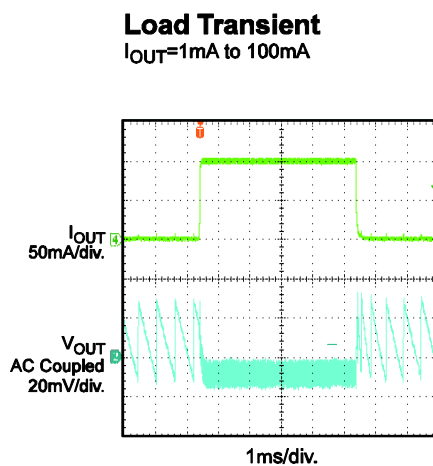
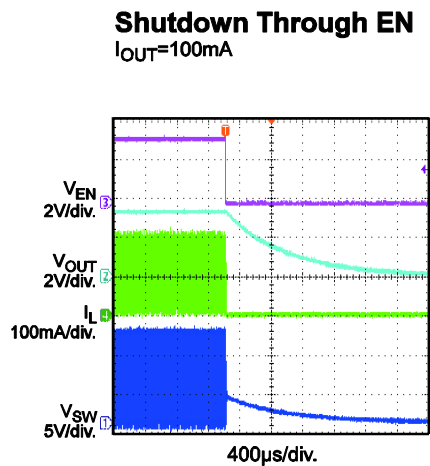
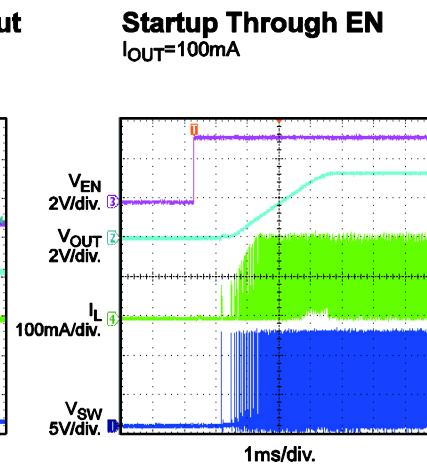
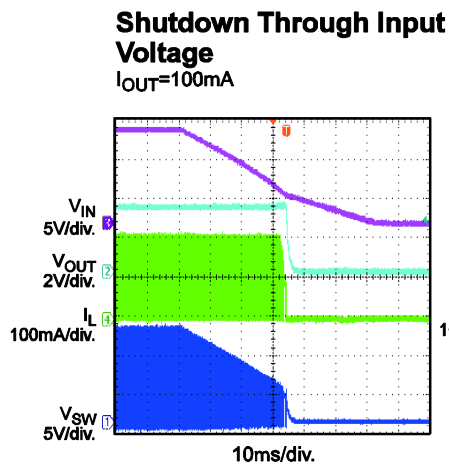
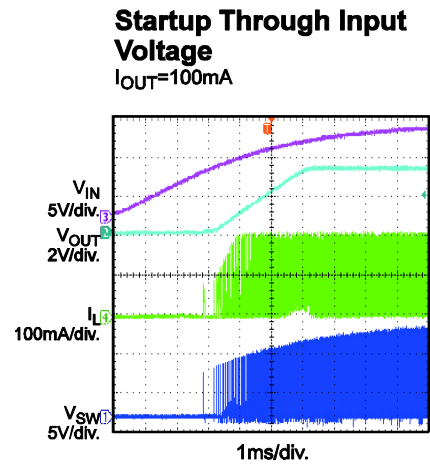
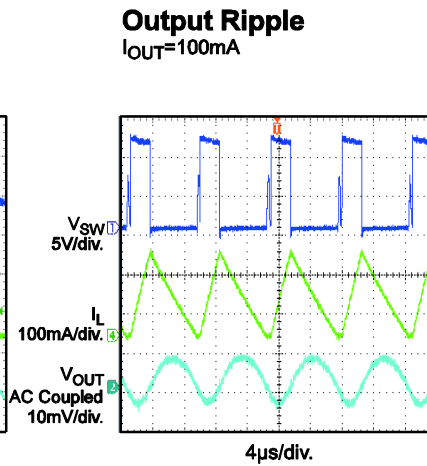
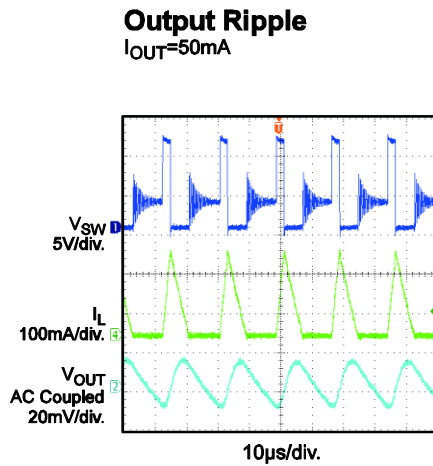


# EVQ4568-Q-00A BILL OF MATERIALS

| Qty. | RefDes     | Value | Description                    | Package | Manufacture | Manufacture_PN     |
|------|------------|-------|--------------------------------|---------|-------------|--------------------|
| 1    | C1         | 10uF  | Ceramic Capacitor;50V;X7R;1210 | 1210    | muRata      | GRM32ER71H106KA12L |
| 2    | C2, C4     | 0.1uF | Ceramic Capacitor;50V;X7R;0603 | 0603    | muRata      | GRM188R71H104KA93D |
| 1    | C3         | 10nF  | Ceramic Capacitor;50V;X7R;0603 | 0603    | muRata      | GRM188R71H103KA01D |
| 2    | C5,C8      | 0.1uF | Ceramic Capacitor;16V;X7R;0603 | 0603    | muRata      | GRM188R71C104KA01D |
| 1    | C6         | 39pF  | Ceramic Capacitor;50V;C0G;0603 | 0603    | muRata      | GRM1885C1H390JA01  |
| 1    | C7         | 22uF  | Ceramic Capacitor;16V;X7R;1210 | 1210    | muRata      | GRM32ER71C226KEA8L |
| 2    | C9, C10    | NS    |                                | 0603    |             |                    |
| 1    | L1         | 100uH | Inductor;100uH;430mΩ; 0.42A    | SMD     | TDK         | SLF6028T-101MR42   |
| 1    | R1         | 2M    | Film Resistor;1%               | 0603    | Yageo       | RC0603FR-072ML     |
| 1    | R4         | 100K  | Film Resistor;1%               | 0603    | Yageo       | RC0603FR-07100KL   |
| 1    | R5         | 0     | Film Resistor;5%               | 0603    | Yageo       | RC0603JR-070RL     |
| 1    | R6         | 10    | Film Resistor;1%               | 0603    | Yageo       | RC0603FR-0710RL    |
| 1    | R8         | 1.2M  | Film Resistor;1%               | 0603    | Yageo       | RC0603FR-071M2L    |
| 1    | R9         | 523K  | Film Resistor;1%               | 0603    | Yageo       | RC0603FR-07523KL   |
| 3    | R2, R3, R7 | NS    |                                | 0603    |             |                    |
| 1    | U1         |       | Step-Down Regulator            | QFN-10  | MPS         | MPQ4568GQ          |

# EVB TEST RESULTS

$V_{IN} = 12V$ ,  $V_{OUT} = 3.3V$ ,  $L = 100\mu H$ ,  $T_A = 25^\circ C$ , unless otherwise noted.



## PRINTED CIRCUIT BOARD LAYOUT

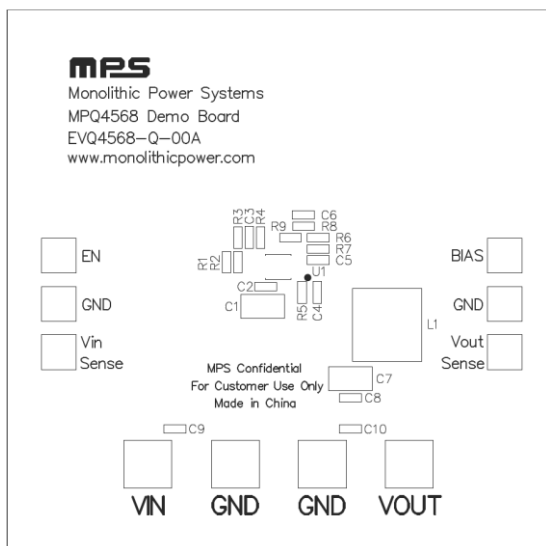


Figure 1: Top Silkscreen Layer

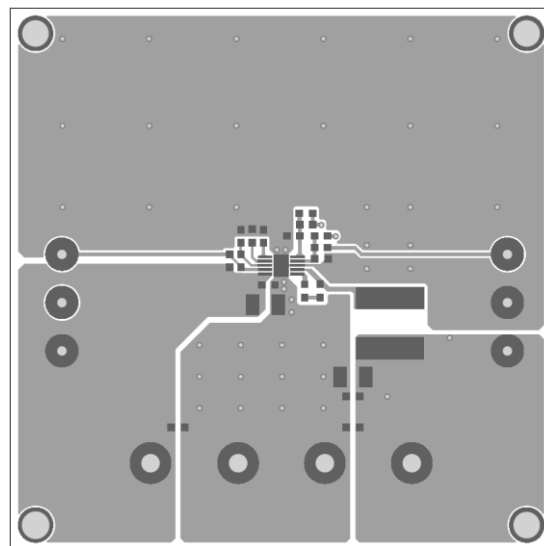


Figure 2: Top Layer

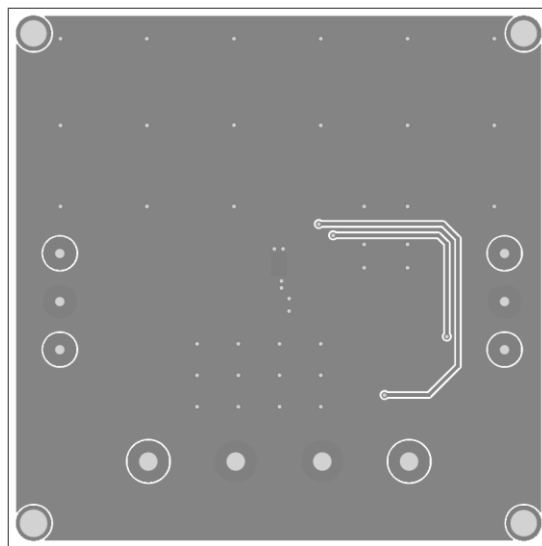


Figure 3: Bottom Layer

## QUICK START GUIDE

1. Connect the positive terminal of the load to VOUT pin, and the negative terminal of the load to GND pin.
2. Preset the power supply output to 4.5V-45V and turn off the power supply.
3. Connect the positive terminal of the power supply output to the VIN pin and the negative terminal of the power supply output to the GND pin.
4. Turn on the power supply. The EVQ4568 will automatically start up.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.6V to turn on the regulator or less than 1.2V to turn it off. Note that floating the EN pin will turn it off.
6. To adjust the output voltage, change the values of R8 and R9. Generally, to reduce the divider current, it is suggested to keep R8=1.2M and change R9 following below equation to adjust the output voltage.

$$R9 = R8 \times \frac{V_{FB}}{V_{OUT} - V_{FB}}$$

Where  $V_{FB}=1V$ .

For example, if keep R8=1.2M, chose R9=300k can get 5V output voltage.

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