# EVQ28261-L-00A

## 21V, 3A 500kHz Synchronous Step-down Converter EV Board

The Future of Analog IC Technology

## DESCRIPTION

The EVQ28261-L-00A is for demonstrating MPS's MPQ28261, a high frequency synchronous rectified step-down switch mode converter with built in internal power MOSFETs. MPQ28261 offers a very compact solution to achieve 3A continuous output current over a wide input supply range with excellent load and line regulation. The MPQ28261 operates at high efficiency over a wide output current load range.

Current mode operation provides fast transient response and eases loop stabilization. The full protection features include OCP and thermal shutdown.

The MPQ28261 requires a minimum number of readily available standard external components and comes in a space saving 3x4mm 14-pin QFN package.

## FEATURES

- Wide 7V to 21V Operating Input Range
- 0.6V Internal Reference with 2% Accuracy
- 3A Output Current
- Low Rds(ON) Internal Power MOSFETs
- Fixed 500kHz Switching Frequency
- External Soft Start
- OCP and Thermal Shutdown
- Available in 14-pin QFN3x4 Package

## APPLICATIONS

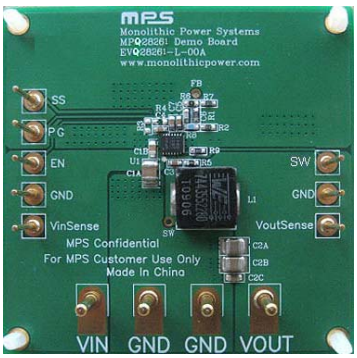
- DSL Modems
- Cable Modems
- Set Top Boxes



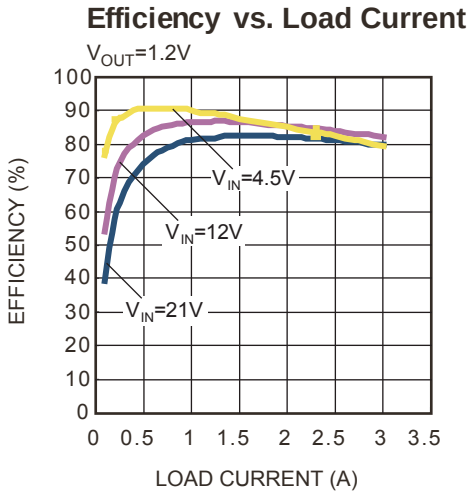
## ELECTRICAL SPECIFICATION

| Parameter | Symbol | Value | Units |
|---|---|---|---|
| Input Voltage | $V_{IN}$ | 7 – 21 | V |
| Output Voltage | $V_{OUT}$ | 1.2 | V |
| Output Current | $I_{OUT}$ | 3 | A |

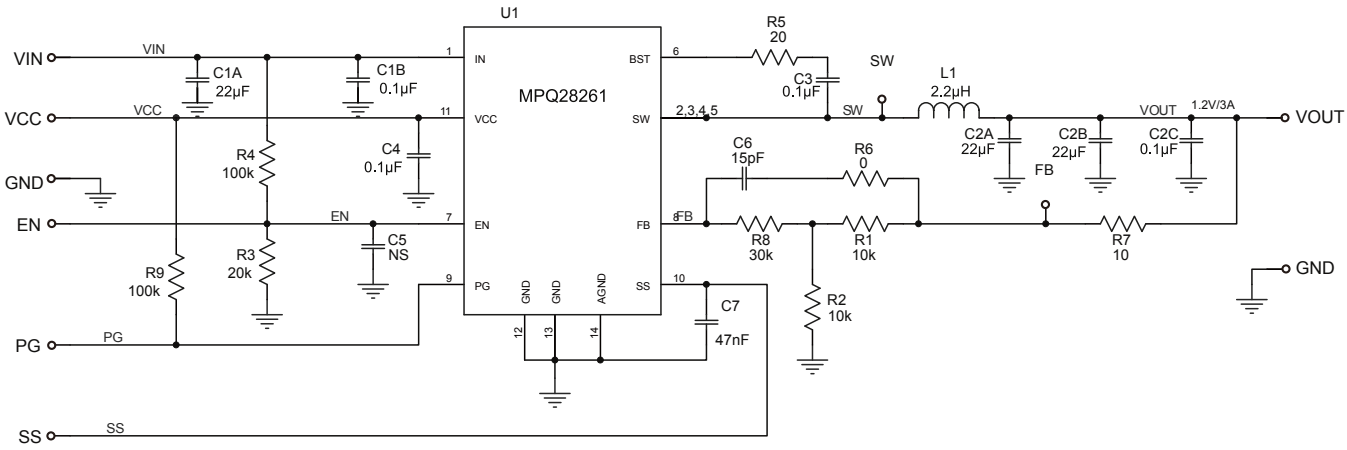
## EVQ28261-L-00A EVALUATION BOARD




| Board Number | MPS IC Number |
|---|---|
| EVQ28261-L-00A | MPQ28261DL |



## EVALUATION BOARD SCHEMATIC



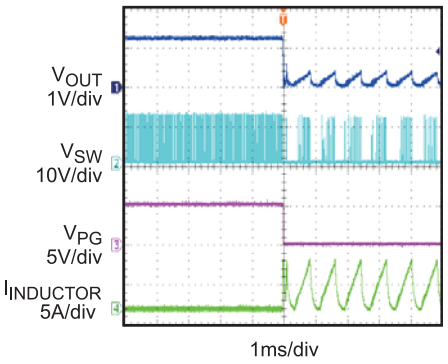

## EVQ28261-L-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|---|---|---|---|---|---|---|
| 1 | C1A | 22µF | Ceramic Cap., 25V, X5R | 1210 | Murata | GRM32ER61E226KE15L |
| 1 | C1B | 0.1µF | Ceramic Cap., 25V, X7R | 0805 | HHEC | C0805X104K025T |
| 2 | C2A,C2B | 22µF | Ceramic Cap., 6.3V, X5R | 1210 | Murata | GRM32DR60J226KA01L |
| 1 | C2C | 0.1µF | Ceramic Cap., 16V, X7R | 0805 | Murata | GRM219R71C104KA01D |
| 2 | C3,C4 | 0.1µF | Ceramic Cap., 25V, X7R | 0603 | Yageo | CC0603KRX7R8BB104 |
| 0 | C5 | NS | | 0603 | | |
| 1 | C6 | 15pF | Ceramic Cap., 50V,C0G | 0603 | TDK | C1608C0G1H150J |
| 1 | C7 | 47nF | Ceramic Cap., 50V,X7R | 0603 | Murata | GRM188R71H473KA61D |
| 1 | R1 | 10k | Film Res., 1% | 0603 | Yageo | RC0603FR-0710KL |
| 1 | R2 | 10k | Film Res., 1% | 0603 | Yageo | RC0603FR-0710KL |
| 1 | R3 | 20 kΩ | Film Res., 5% | 0603 | Any | |
| 2 | R4,R9 | 100 kΩ | Film Res., 5% | 0603 | Any | |
| 1 | R8 | 30 kΩ | Film Res., 5% | 0603 | Any | |
| 1 | R5 | 20Ω | Film Res., 5% | 0603 | Any | |
| 1 | R6 | 0Ω | Film Res., 5% | 0603 | Any | |
| 1 | R7 | 10Ω | Film Res., 5% | 0603 | Any | |
| 1 | L1 | 1.8µH | 7.6mΩ, 10.4A | SMD | TOKO | D104C-919AS-1R8N |
| | | 2.2µH | 14mΩ, 13A | SMD | Wurth | 744311220 |
| 1 | U1 | | Step-Down Converter | QFN14 | MPS | MPQ28261DL |

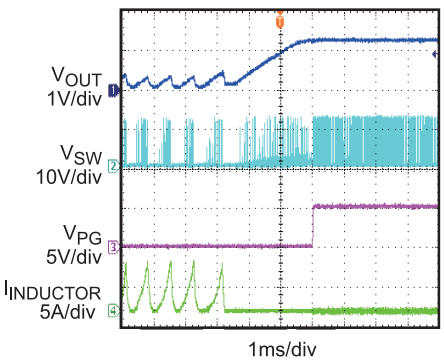
## EVB TEST RESULTS

**Performance waveforms are tested on the evaluation board.**
**$V_{IN}$ = 12V, $V_{OUT}$ = 1.2V, L = 2.2µH, $T_A$ = 25ºC, unless otherwise noted.**

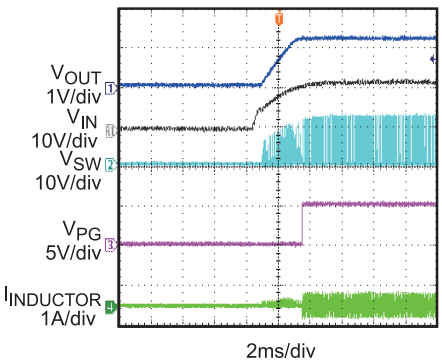
### Short Entry



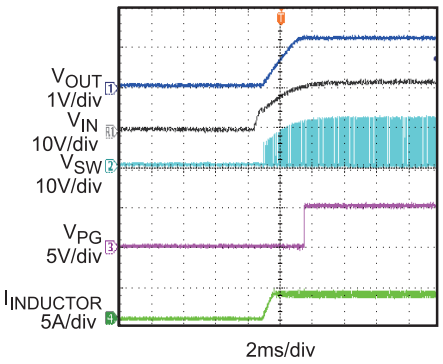

### Short Recovery



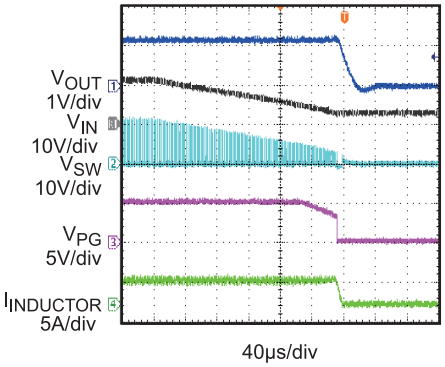

### Power Up without Load



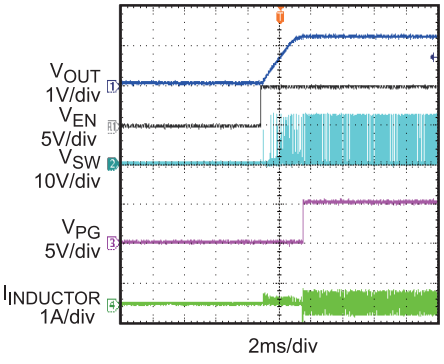

### Power Up with 3A Load



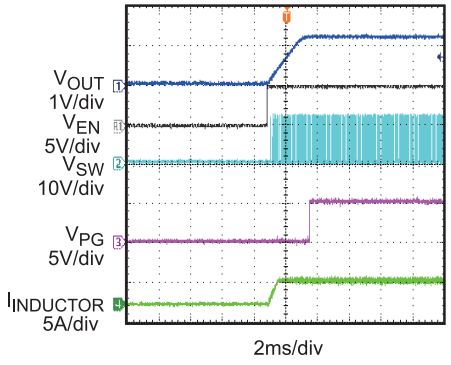

### Power Off with 3A Load



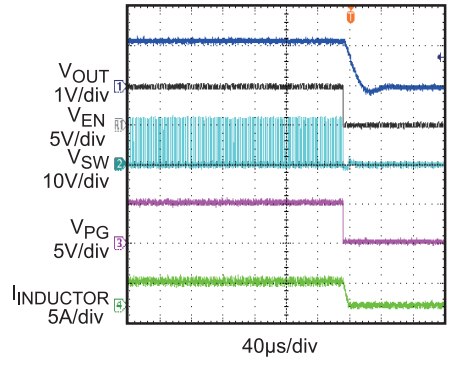

### Enable Startup without Load




### Enable Startup with 3A Load

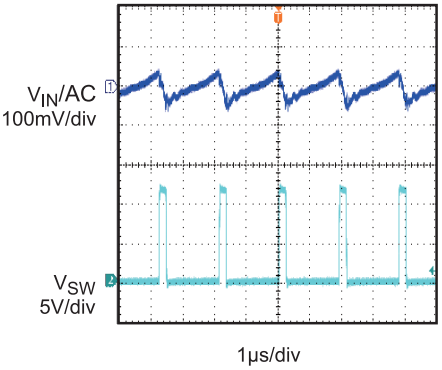



### Enable Shutdown with 3A Load




### Input Ripple Voltage

$I_{OUT}$=3A

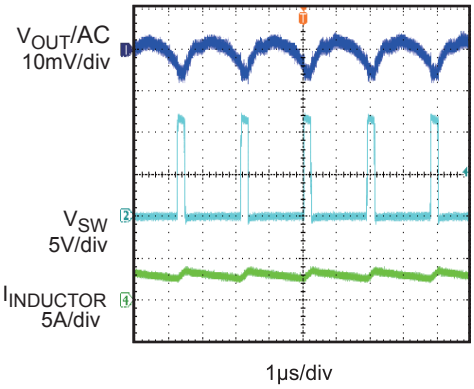


## EVB TEST RESULTS *(continued)*

**Performance waveforms are tested on the evaluation board.**
**$V_{IN}$ = 12V, $V_{OUT}$ = 1.2V, L = 2.2µH, $T_A$ = 25ºC, unless otherwise noted.**

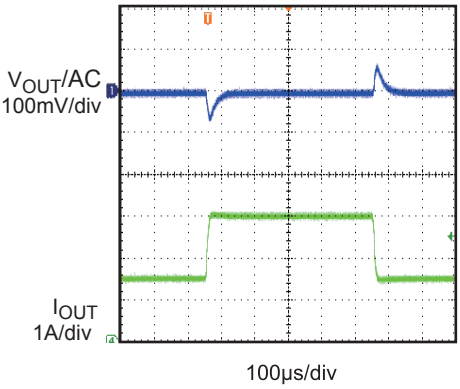
**Output Ripple Voltage**

$I_{OUT}$=3A




**Load Transient Response**

$I_{OUT}$=1.5A-3A



## PRINTED CIRCUIT BOARD LAYOUT

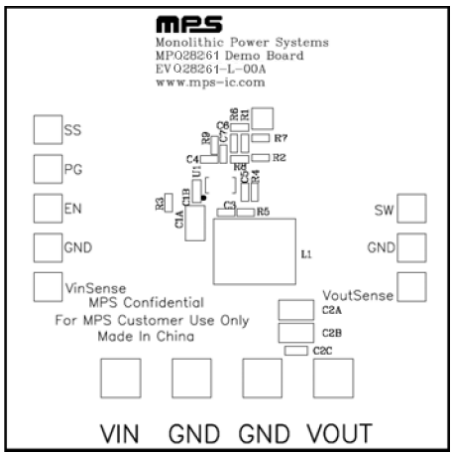



**Figure 1—Top Silk Layer**

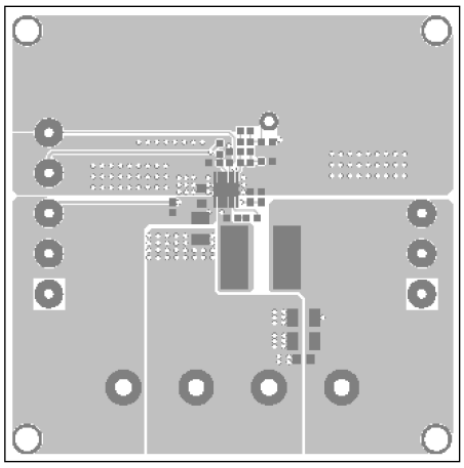


**Figure 2—Top Layer**

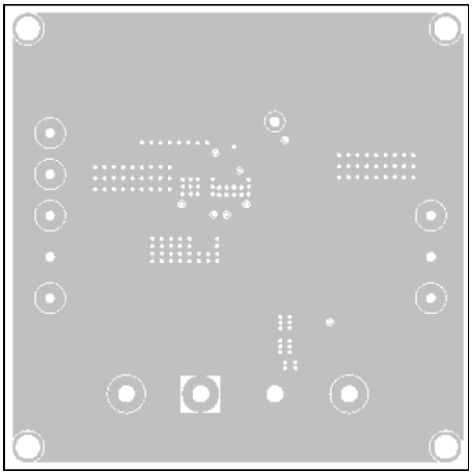


**Figure 3—Inner 1 Layer**

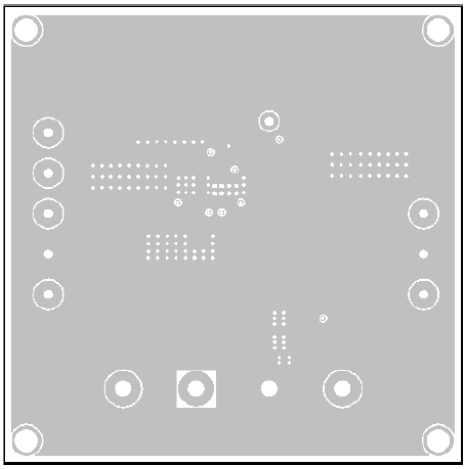


**Figure 4— Inner 2 Layer**

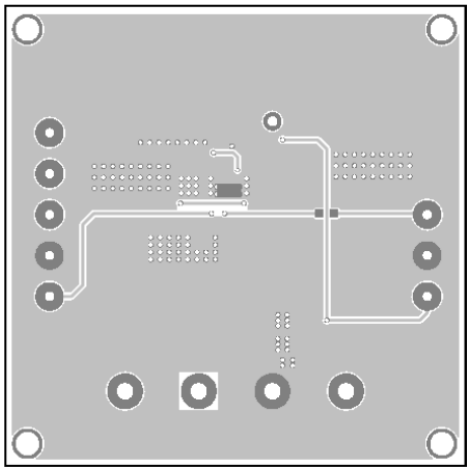


**Figure 5—Bottom Layer**

## QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output between 7V and 21V, 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 1.6V to turn on the regulator or less than 0.4V to turn it off.