

EV2229-Q-00A

High Efficiency 21V, 6A, Synchronous Step-Down Converter Evaluation Board

The Future of Analog IC Technology

DESCRIPTION

The EV2229-Q-00A is the evaluation board for MP2229, a high-frequency synchronous rectified step-down switch mode converter with internal power MOSFETs. It offers a very compact solution to achieve 6A continuous output current over a wide input supply range with excellent load and line regulation. The MP2229 has synchronous mode operation for higher efficiency over the output current load range.

Current mode operation provides fast transient response and eases loop stabilization. Full protection features include over-current protection and thermal shutdown.

The MP2229 requires a minimal number of readily-available standard external components and is available in a space saving 3mm x 3mm 14-pin QFN package.

ELECTRICAL SPECIFICATIONS

| Parameter | Symbol | Value | Units |
|----------------|------------------|--------|-------|
| Input Voltage | V _{IN} | 4.5-21 | V |
| Output Voltage | V _{OUT} | 1 | V |
| Output Current | I _{OUT} | 6 | А |

FEATURES

- Wide 4.5V to 21V Operating Input Range
- 6A Output Current
- Low $40m\Omega/18m\Omega$ $R_{DS(ON)}$ of Internal Power MOSFETs
- Programmable Switching Frequency
- Frequency SYNC from 300kHz to 2MHz External Clock
- Low Power Mode Selectable by External Signal
- External Soft Start
- Pre-Bias Startup
- OCP with Hiccup Mode
- Thermal Shutdown
- Output Adjustable from 0.6V
- Available in QFN-14 (3mmx3mm) Package

APPLICATIONS

- DSL Modems
- Cable Modems
- Set -Top Boxes
- Telecom
- Distributed Power Systems

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EV2229-Q-00A EVALUATION BOARD





EVALUATION BOARD SCHEMATIC



EV2229-Q-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|-----|---------------|--------|------------------------|-----------------|--------------|--------------------|
| 1 | C1 | 22µF | Ceramic Cap., 25V, X5R | 1206 | Murata | GRM31CR61E226KE15L |
| 1 | C1A | 10µF | Ceramic Cap., 25V, X5R | 1206 | Murata | GRM31CR61E106KA12L |
| 1 | C1B | 0.1µF | Ceramic Cap., 25V, X7R | 0603 | Murata | GRM188R71E104KA01D |
| 3 | C2,C2A C2B | 22µF | Ceramic Cap., 10V, X7R | 1206 | Murata | GRM31CR71A226KE15L |
| 2 | C3,C5 | 0.1µF | Ceramic Cap., 16V, X7R | 0603 | Murata | GRM188R71C104KA01D |
| 1 | C4 | 22nF | Ceramic Cap., 50V, X7R | 0603 | Murata | GRM188R71H223KA01D |
| 0 | C6 | NS | | 0603 | | |
| 1 | C7 | 10pF | Ceramic Cap., 50V, C0G | 0603 | Murata | GRM1885C1H100JA01D |
| 1 | R1 | 20kΩ | Film Res., 1% | 0603 | YAGEO | RC0603FR-0720KL |
| 2 | R2,R4 | 30kΩ | Film Res., 1% | 0603 | YAGEO | RC0603FR-0730KL |
| 1 | R3 | 68kΩ | Film Res., 1% | 0603 | YAGEO | RC0603FR-0768KL |
| 2 | R5, R10 | 10Ω | Film Res., 1% | 0603 | YAGEO | RC0603FR-0710RL |
| 2 | R6, R8 | 100KΩ | Film Res., 1% | 0603 | YAGEO | RC0603FR-07100KL |
| 1 | R7 | 6.8KΩ | Film Res., 1% | 0603 | YAGEO | RC0603FR-076K8L |
| 0 | R9 | NS | | 0603 | | |
| 1 | L1 | 1µH | DCR=4.6mΩ, Is=19A | SMD | Wurth | 744311100 |
| 1 | U1 | MP2229 | Step-Down Converter | QFN14- 3x3mm | MPS | MP2229GQ |



EVB TEST RESULTS

Performance waveforms are tested on the evaluation board. $V_{IN} = 12V$, $V_{OUT}=1V$, L=1µH, F_s=500kHz, T_A=25°C, unless otherwise noted. Input/Output Ripple Input/Output Ripple Startup Through $I_{OUT} = 0A$ $I_{OUT} = 6A$ Input Voltage $I_{OUT} = 0A$ V_{OUT}/AC 20mV/div. V_{OUT}/AC 20mV/div. V_{IN}/AC 100mV/div. VOUT 500mV/div. V_{IN}/AC 50mV/div. V_{IN} 10V/div V_{SW} V_{SW} 10V/div. VSW 10V/div. 5V/div. L 2A/div. 2A/div. 5A/div. 2µs/div. 2µs/div. 1ms/div. Startup Through **Shutdown Through Shutdown Through** Input Voltage Input Voltage **Input Voltage** I_{OUT} = 6A $I_{OUT} = 0A$ $I_{OUT} = 6A$







EVB TEST RESULTS (continued)

Performance waveforms are tested on the evaluation board. $V_{IN} = 12V$, $V_{OUT}=1V$, L=1µH, F_s=500kHz, T_A=25°C, unless otherwise noted.







PRINTED CIRCUIT BOARD LAYOUT



Figure 1—Top Silk Layer



Figure 3—Inner1 Layer



Figure 2—Top Layer



Figure 4—Inner2 Layer



Figure 5— 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-21V 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 the power supply on. The MP2229 will automatically startup.
- 5. To use the Enable function, apply a digital input to EN pin. Drive EN higher than 1.7V to turn on the regulator, drive EN less than 0.9V to turn it off.
- 6. To use the external synchronous function to adjust the switching frequency, apply an external clock signal to FREQ/SYNC pin through 10pF AC coupling capacitor.

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