



The Future of Analog IC Technology®

# MP2212

## 16V, 3A, 600kHz Synchronous Step-Down Converter

### DESCRIPTION

The MP2212 is an internally compensated 600kHz fixed frequency PWM synchronous step-down regulator. With a 3V to 6V bias supply ( $V_{CC}$ ), MP2212 operates from a 3V to 16V input and generates an adjustable output voltage from 0.8V to  $0.9 \times V_{IN}$  at up to 3A load current.

The MP2212 integrates an 80mΩ high-side switch and an 80mΩ synchronous rectifier for high efficiency without an external Schottky diode. With peak current mode control and internal compensation, it is stable with a ceramic output capacitor and a small inductor. Fault protection includes hiccup short-circuit protection, cycle-by-cycle current limiting and thermal shutdown. Other features include frequency synchronization input and internal soft-start.

The MP2212 is available in small 3mm x 3mm 10-lead QFN and 8-lead SOIC with exposed pad packages.

### FEATURES

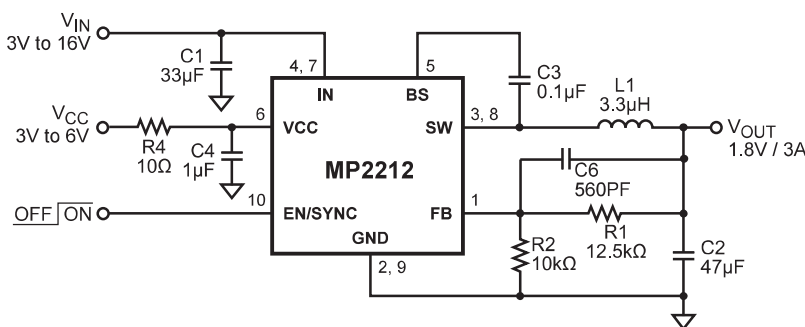
- 3A Output Current
- Input Supply Range: 3V to 16V
- 80mΩ Internal Power MOSFET Switches
- All Ceramic Output Capacitors Design
- Up to 95% Efficiency
- 600kHz Fixed Switching Frequency
- Adjustable Output from 0.8V to  $0.9 \times V_{IN}$
- Internal Soft-Start
- Frequency Synchronization Input
- Thermal Shutdown
- Cycle-by-Cycle Current Limiting
- Hiccup Short Circuit Protection
- 10-lead, 3mm x 3mm QFN Package and 8-lead SOICE package

### APPLICATIONS

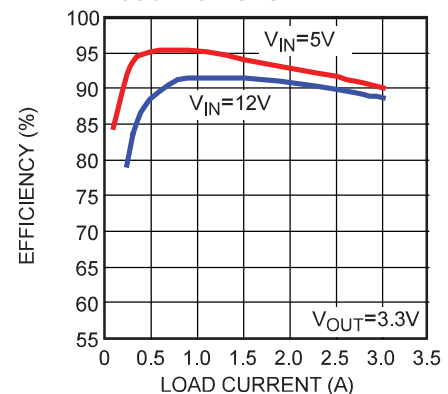
- μP/ASIC/DSP/FPGA Core and I/O Supplies
- Printers and LCD TVs
- Network and Telecom Equipment
- Point of Load Regulators

All MPS parts are lead-free and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance. "MPS" and "The Future of Analog IC Technology" are Trademarks of Monolithic Power Systems, Inc.

### TYPICAL APPLICATION



Efficiency vs. Load Current



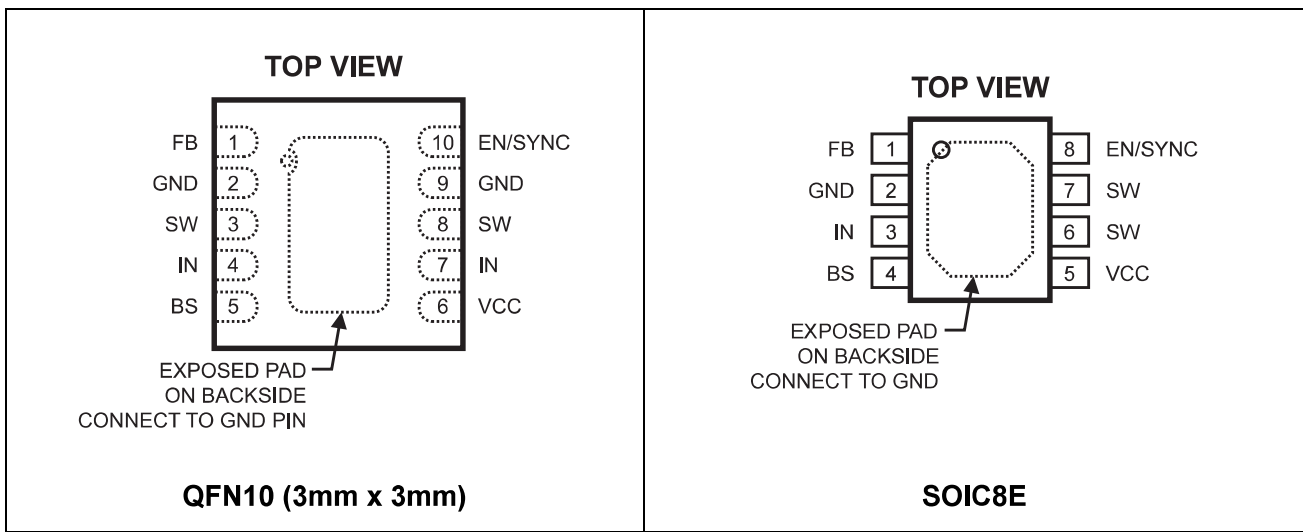
### ORDERING INFORMATION

Part Number	Package	Top Marking	Free Air Temperature (T <sub>A</sub> )
MP2212DQ*	QFN10 (3mm x 3mm)	Z7	-40°C to +85°C
MP2212DN**	SOIC8E	MP2212DN	-40°C to +85°C

\* For Tape & Reel, add suffix -Z (e.g. MP2212DQ-Z);  
 For RoHS compliant packaging, add suffix -LF (e.g. MP2212DQ-LF-Z)

\*\* For Tape & Reel, add suffix -Z (e.g. MP2212DN-Z);  
 For RoHS compliant packaging, add suffix -LF (e.g. MP2212DN-LF-Z)

### PACKAGE REFERENCE



### ABSOLUTE MAXIMUM RATINGS <sup>(1)</sup>

IN to GND .....	-0.3V to +18V
SW to GND .....	-0.3V to V <sub>IN</sub> + 0.3V
.....	-2.5V to V <sub>IN</sub> + 2.5V for < 50ns
FB, EN/SYNC, VCC to GND.....	-0.3V to +6.5V
BS to SW .....	-0.3V to +6.5V
Continuous Power Dissipation (T <sub>A</sub> = +25°C) <sup>(2)</sup>	
QFN10 (3mm x 3mm) .....	2.5W
SOIC8E.....	2.5W
Junction Temperature .....	150°C
Lead Temperature .....	260°C
Storage Temperature.....	-65°C to +150°C

### Recommended Operating Conditions <sup>(3)</sup>

Supply Voltage V <sub>IN</sub> .....	3V to 16V
Bias Voltage V <sub>CC</sub> .....	3V to 6V
EN/SYNC Voltage.....	no more than V <sub>CC</sub>
Output Voltage V <sub>OUT</sub> .....	0.8V to 0.9x V <sub>IN</sub>
Maximum Junction Temp. (T <sub>J</sub> ).....	+125°C

### Thermal Resistance <sup>(4)</sup> θ<sub>JA</sub> θ<sub>JC</sub>

QFN10 (3mm x 3mm) .....	50	12	°C/W
SOIC8E.....	50	10	°C/W

#### Notes:

- Exceeding these ratings may damage the device.
- The maximum allowable power dissipation is a function of the maximum junction temperature T<sub>J</sub>(MAX), the junction-to-ambient thermal resistance θ<sub>JA</sub>, and the ambient temperature T<sub>A</sub>. The maximum allowable continuous power dissipation at any ambient temperature is calculated by P<sub>D</sub>(MAX)=(T<sub>J</sub>(MAX)-T<sub>A</sub>)/ θ<sub>JA</sub>. Exceeding the maximum allowable power dissipation will cause excessive die temperature, and the regulator will go into thermal shutdown. Internal thermal shutdown circuitry protects the device from permanent damage.
- The device is not guaranteed to function outside of its operating conditions.
- Measured on JESD51-7 4-layer PCB.