



EV2172C-Q-00A

5.5V, 2A, Sync Step-Down Converter with Output Discharge in UTQFN Package

DESCRIPTION

The MP2172C is a monolithic, step-down, switch-mode converter with built-in internal power MOSFETs. It achieves 2A continuous output current from a 2.5V-to-5.5V input voltage with excellent load and line regulation. The output voltage can be regulated to as low as 0.6V.

The Constant-On-Time control scheme provides fast transient response and eases loop stabilization. Fault protections include cycle-by-cycle current limiting and thermal shutdown.

The MP2172C is available in an ultra-small UTQFN package and requires a minimal number of readily available standard external components.

The MP2172C is ideal for a wide range of applications including high performance DSPs, wireless power, portable and mobile devices, and other low-power systems.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V _{IN}	2.5 – 5.5	V
Output Voltage	V _{OUT}	1.2	V
Output Current	I _{OUT}	2	A

Note: V_{IN}<3.3V may need more input capacitor.

FEATURES

- Fixed Frequency PWM mode
- 1.1MHz Switching Frequency
- EN for Power Sequencing
- 1% FB Accuracy
- Wide 2.5V-to-5.5V Operating Input Range
- Output Adjustable from 0.6V
- Up to 2A Output Current
- 75mΩ and 45mΩ Internal Power MOSFET Switches
- 100% Duty On
- Output Discharge
- V_O OVP
- Short-Circuit Protection with Hiccup Mode
- Power Good Only for Fixed Output Version
- Available in UTQFN Package

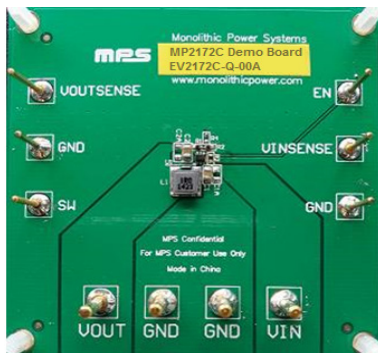
APPLICATIONS

- Wireless/Networking Cards
- Portable Instruments
- Battery Powered Devices
- Low Voltage I/O System Power
- Multi Function Printer

All MPS parts are lead-free, halogen free, and adhere to the RoHS directive. For MPS green status, please visit MPS website under Quality Assurance.

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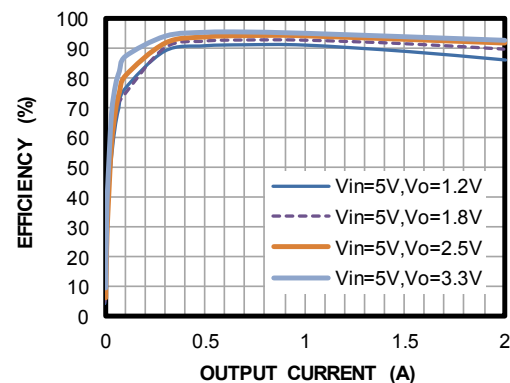
EV1602C-TF-00A EVALUATION BOARD



Board Number	MPS IC Number
EV2172C-Q-00A	MP2172CGQFU

Efficiency vs. Output Current

V_{IN}=5V, L=1μH (DCR=27mΩ)



EVALUATION BOARD SCHEMATIC

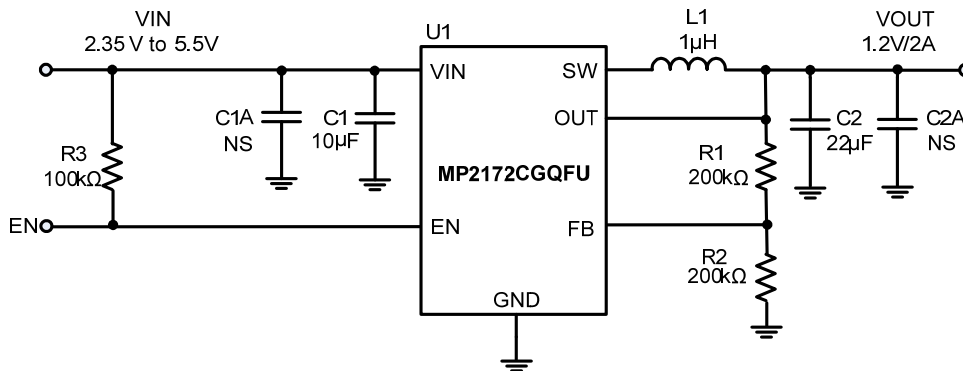


Figure 1: Typical Application Circuit for MP2172CGQFU

Note: $V_{IN} < 3.3V$ may need more input capacitor.



EV2172C-Q-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
2	C1, C2	22 μ F	Ceramic Cap,10V,X5R	0805	muRata	GRM21BR61A226ME51L
2	R1,R2	200k	Film Res.1%,	0402	any	
1	R3	100k	Film Res.1%	0402	any	
1	L1	1.0 μ H	Inductor, Is=9A, DCR=27m Ω	SMD	Wurth	74437324010
1	U1		Step-down Switcher	UTQFN	MPS	MP2172CGQFU
0	C1A, C2A, R4	NS				

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN} = 5V$, $V_{OUT} = 1.2V$, $L = 1.0\mu H$, $C_{OUT} = 22\mu F$, $T_A = +25^\circ C$, unless otherwise noted.

Steady State

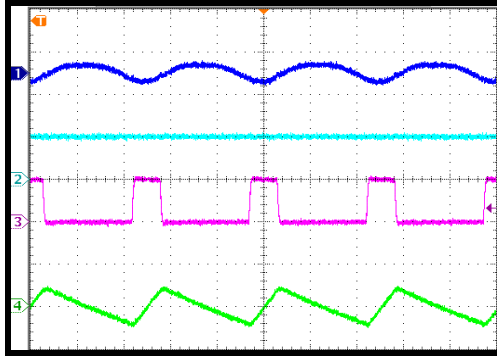
$I_{OUT} = 0A$

CH1:
 V_{out}/AC
10mV/div.

CH2: V_{IN}
5V/div.

CH3: V_{sw}
5V/div.

CH4: I_L
1A/div.



400ns/div.

Steady State

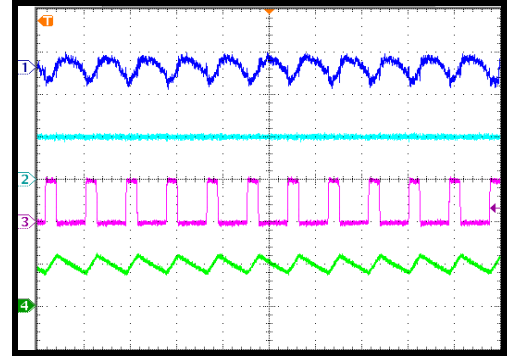
$I_{OUT} = 2A$

CH1:
 V_{out}/AC
10mV/div.

CH2: V_{IN}
5V/div.

CH3: V_{sw}
5V/div.

CH4: I_L
2A/div.



1µs/div.

V_{IN} Power-Up

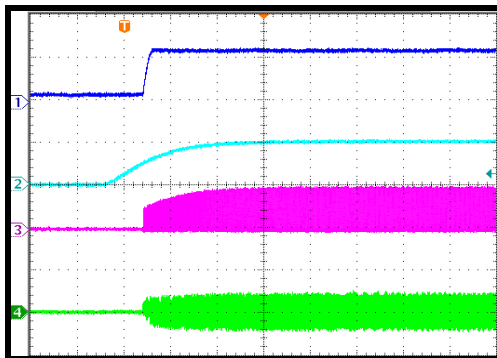
$I_{OUT} = 0A$

CH1: V_{out}
1V/div.

CH2: V_{IN}
5V/div.

CH3: V_{sw}
5V/div.

CH4: I_L
1A/div.



4ms/div.

V_{IN} Power-Up

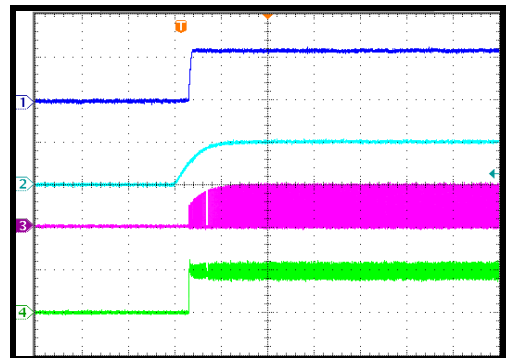
$I_{OUT} = 2A$

CH1: V_{out}
1V/div.

CH2: V_{IN}
5V/div.

CH3: V_{sw}
5V/div.

CH4: I_L
2A/div.



10ms/div.

V_{IN} Shutdown

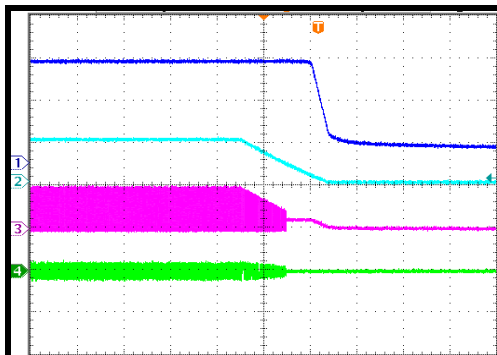
$I_{OUT} = 0A$

CH1: V_{out}
500mV/div.

CH2: V_{IN}
5V/div.

CH3: V_{sw}
5V/div.

CH4: I_L
2A/div.



40ms/div.

V_{IN} Shutdown

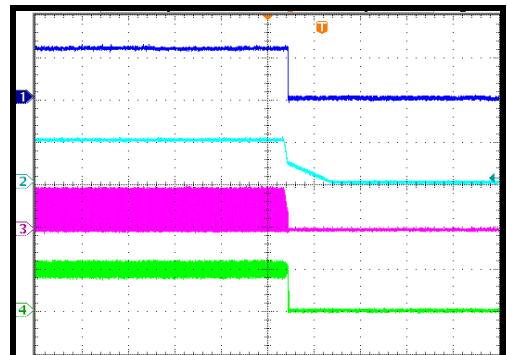
$I_{OUT} = 2A$

CH1: V_{out}
1V/div.

CH2: V_{IN}
5V/div.

CH3: V_{sw}
5V/div.

CH4: I_L
2A/div.



40ms/div.

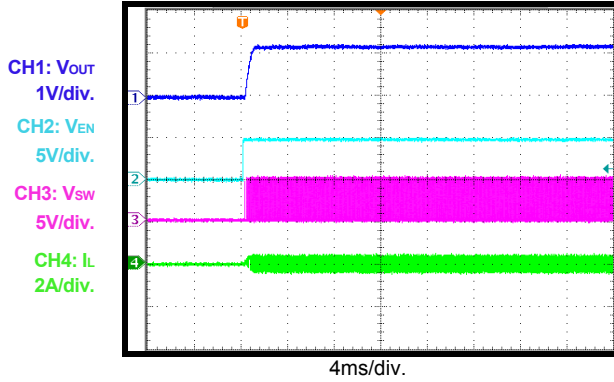
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

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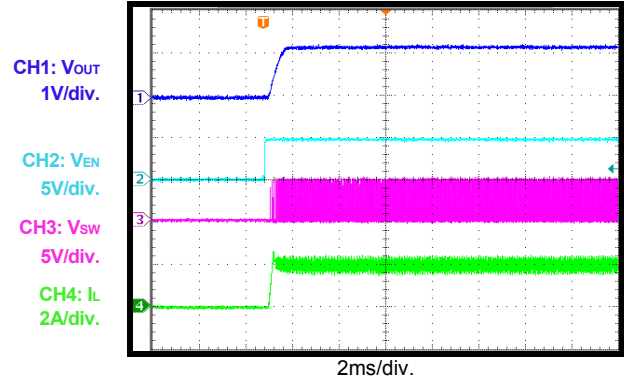
EN Power-Up

$I_{OUT} = 0A$



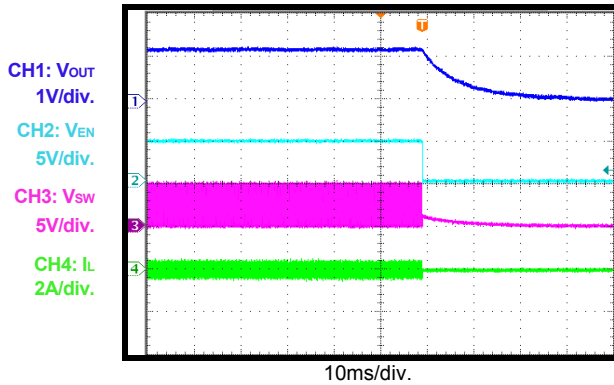
EN Power-Up

$I_{OUT} = 2A$



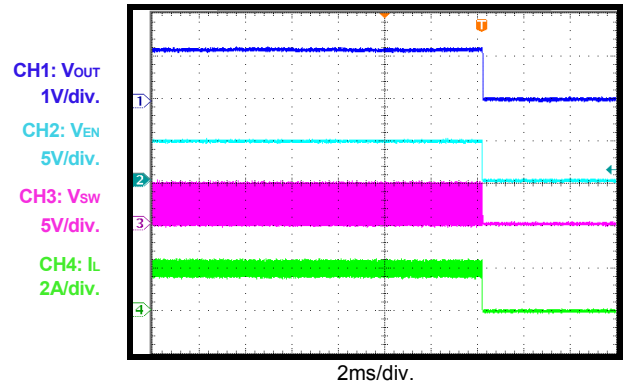
EN Shutdown

$I_{OUT} = 0A$



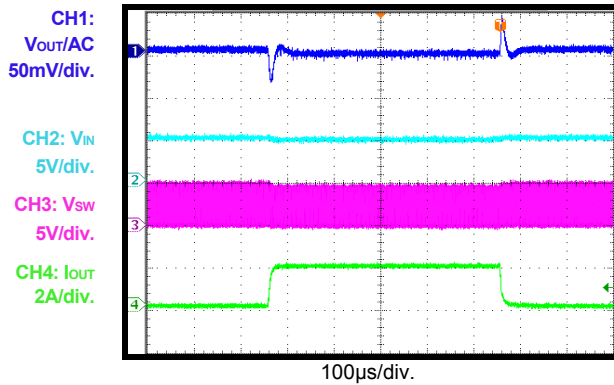
EN Shutdown

$I_{OUT} = 2A$

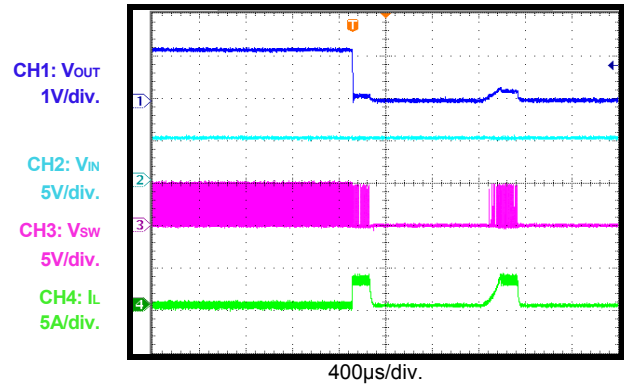


Transient

$V_{IN} = 5V$, $I_{OUT} = 0A$ to $2A$



Short-Circuit Entry

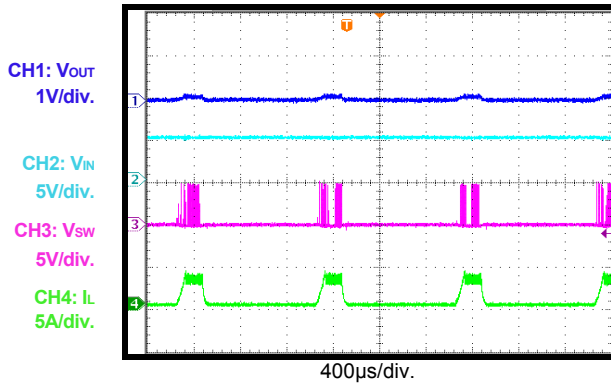


EVB TEST RESULTS *(continued)*

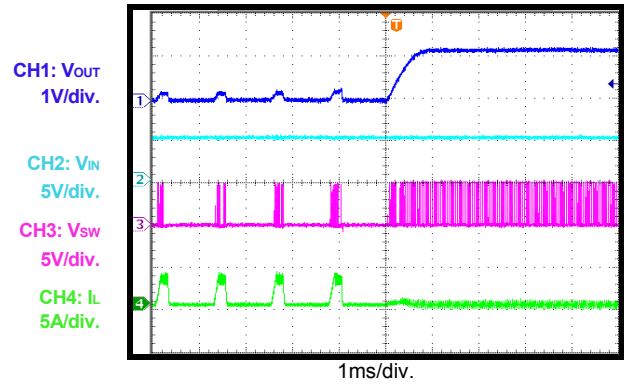
Performance waveforms are tested on the evaluation board.

$V_{IN} = 5V$, $V_{OUT} = 1.2V$, $L = 1.0\mu H$, $C_{OUT} = 22\mu F$, $T_A = +25^\circ C$, unless otherwise noted.

Short-Circuit State



Short-Circuit Recovery



CIRCUIT BOARD LAYOUT

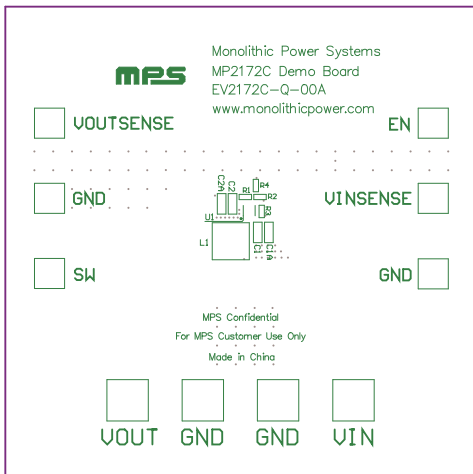


Figure 2: Top Silk Layer

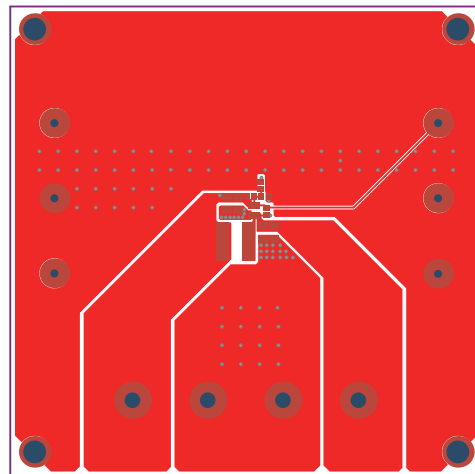


Figure 3: Top Layer

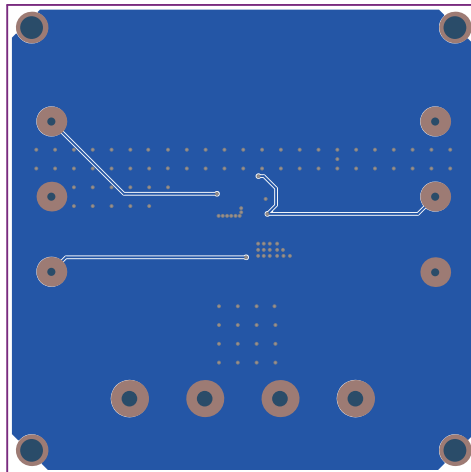


Figure 4: Bottom Layer