EV1606-TF-00A

2A Synchronous Step-down Converter with 27μA Quiescent Current

DESCRIPTION

The MP1606 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. MP1606 provides different fixed output voltage with PG function.

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 MP1606 is available in an ultra-small SOT563 package and requires a minimal number of readily available standard external components.

The MP1606 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.

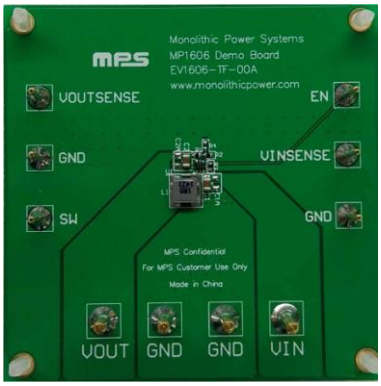
FEATURES

- Low I_Q: 27μA
- 1.1MHz Switching Frequency
- EN for Power Sequencing
- 1% Output Voltage Accuracy
- Wide 2.5V-to-5.5V Operating Input Range
- V_{OUT}: 0.8/0.9/1.0/1.2/1.35/2.0/2.85/3.2V
- Power Good
- Up to 2A Output Current
- 75mΩ and 45mΩ Internal Power MOSFET Switches
- 100% Duty On
- Output Discharge
- Vo OVP
- Short-Circuit Protection with Hiccup Mode
- Available in a SOT563 Package

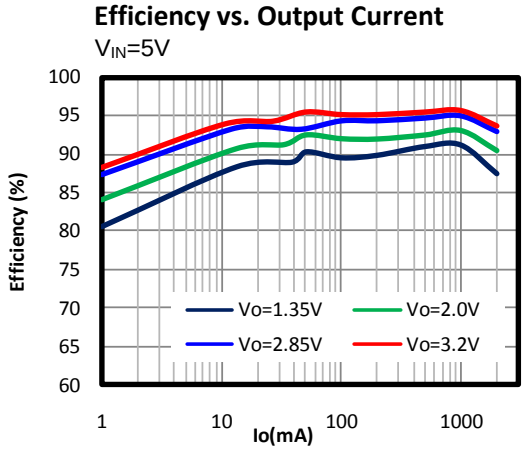
APPLICATIONS

- Wireless/Networking Cards
- Solid State Drives (SSD)
- Battery Powered Devices
- Low Voltage I/O System Power
- Multi Function Printer

EV1606-TF-00A EVALUATION BOARD



Board Number	MPS IC Number
EV1606-TF-00A	MP1606GTF



EVALUATION BOARD SCHEMATIC

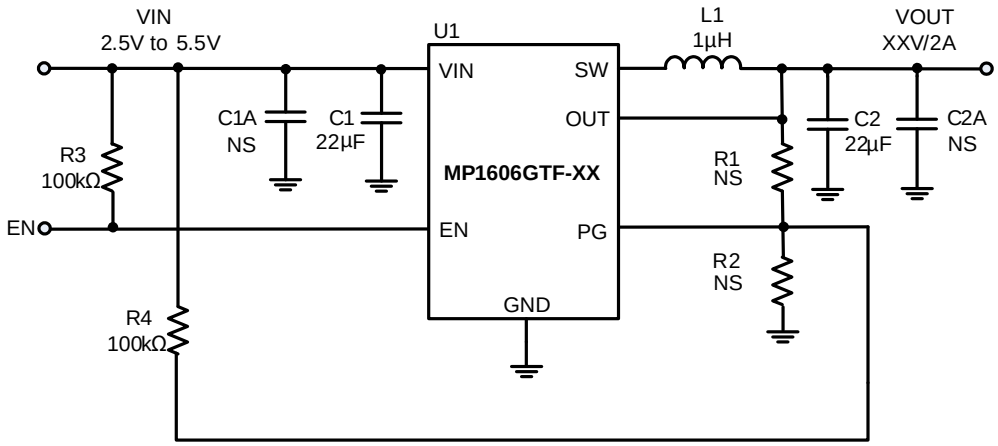


Figure 1—Typical Application Circuit for MP1606GTF-XX

Note: 1. V_{IN}<3.3V may need more input capacitor;
2. V_{IN}>V_{OUT} for application.

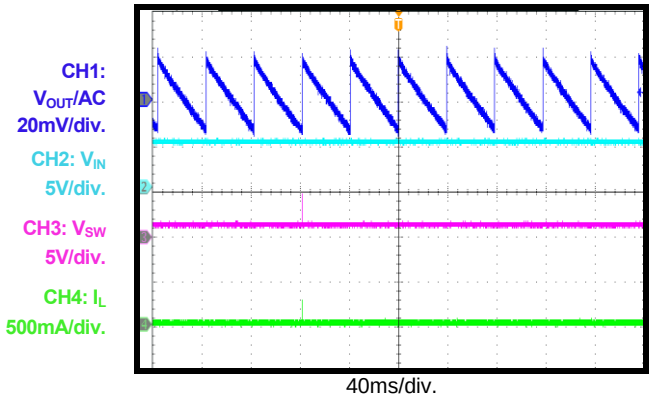
EV1606-TF-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
2	C1, C2	22µF	Ceramic Cap,10V,X5R	0805	muRata	GRM21BR61A226ME51L
2	R3, R4	100k	Film Res.1%	0402	any	
1	L1	1.0µH	Inductor,I_S=9A, DCR=27mΩ	SMD	Wurth	74437324010
1	U1		Step-down Switcher	SOT563	MPS	MP1606GTF-XX
0	C1A, C2A R1, R2	NS				

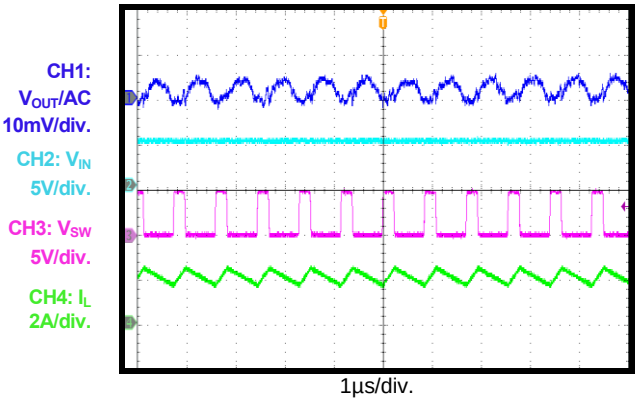
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.
V_{IN} = 5V, V_{OUT} = 1.2V, L =1.0µH, C_{OUT}=22µF,T_A = +25ºC, unless otherwise noted.

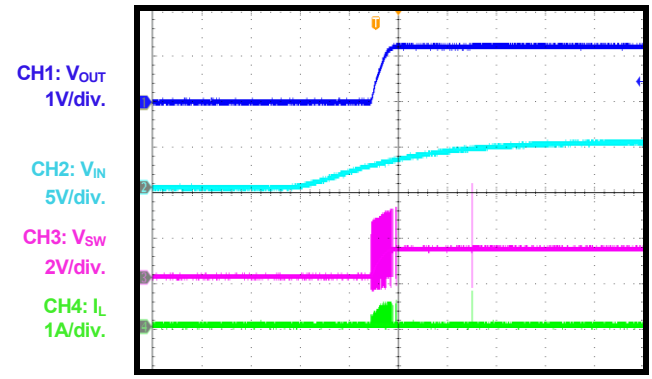
Steady State
I_{OUT}=0A



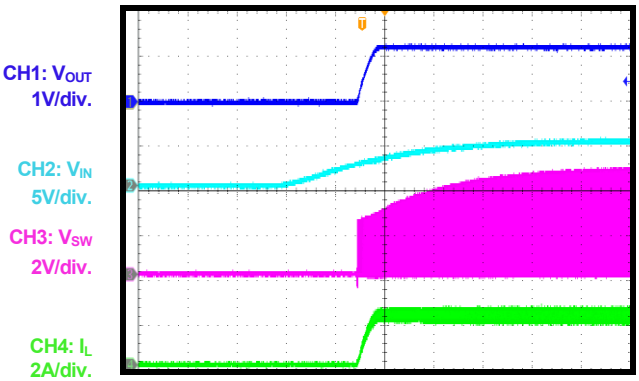
Steady State
I_{OUT}=2A



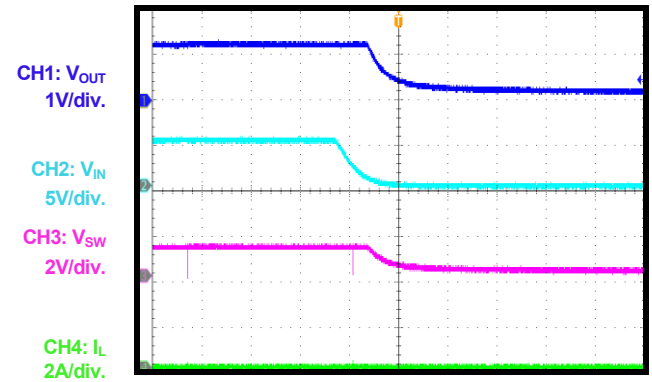
V_{IN} Power-Up
I_{OUT}=0A



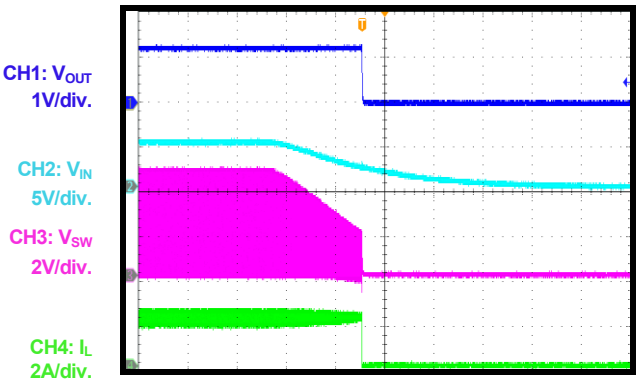
V_{IN} Power-Up
I_{OUT}=2A



V_{IN} Shutdown
I_{OUT}=0A



V_{IN} Shutdown
I_{OUT}=2A

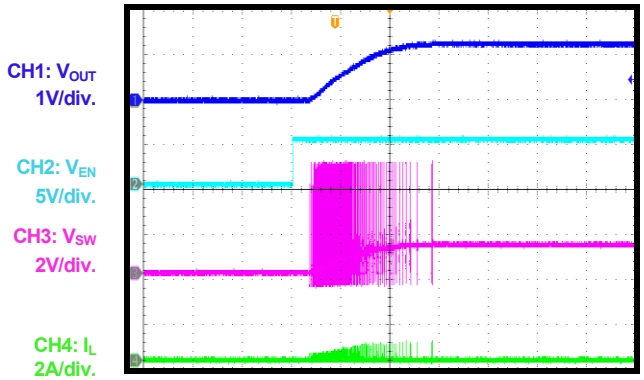


EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
V_{IN} = 5V, V_{OUT} = 1.2V, L =1.0µH, C_{OUT}=22uF, T_A = +25ºC, unless otherwise noted.

EN Power-Up

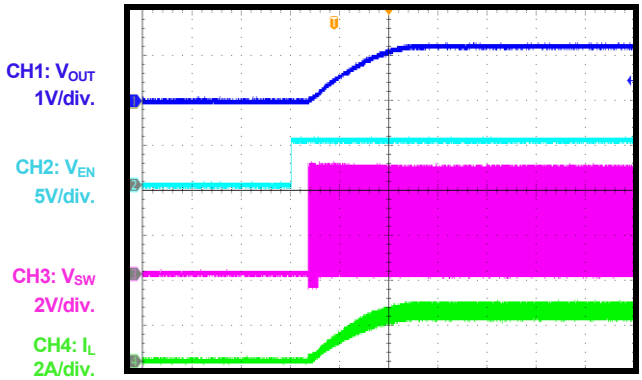
I_{OUT}=0A



400µs/div.

EN Power-Up

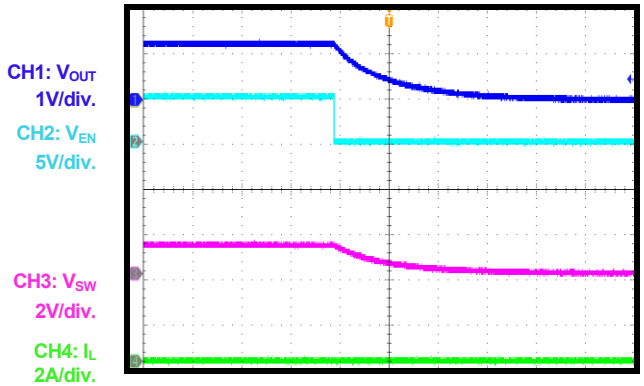
I_{OUT}=2A



400µs/div.

EN Shutdown

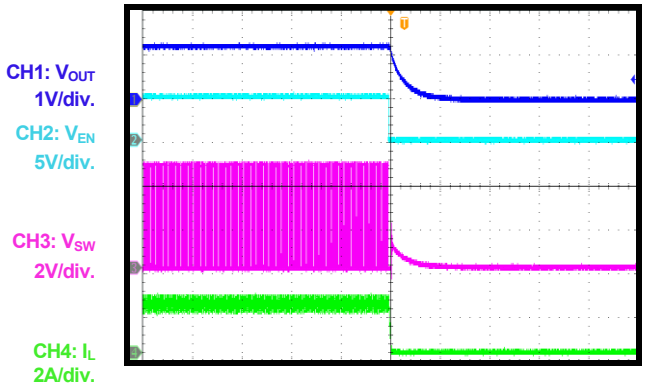
I_{OUT}=0A



4ms/div.

EN Shutdown

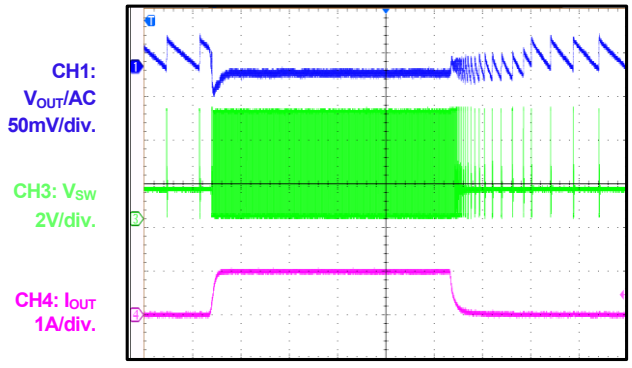
I_{OUT}=2A



40µs/div.

Load Transient

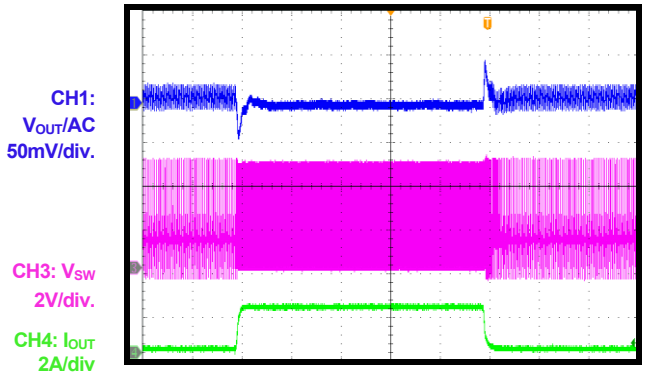
I_{OUT}=0A-1A



1ms/div.

Load Transient

I_{OUT}=0.1A-2A, 1A/µs

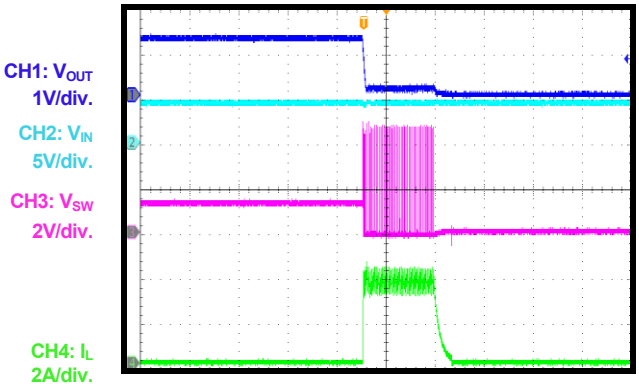


1ms/div.

EVB TEST RESULTS *(continued)*

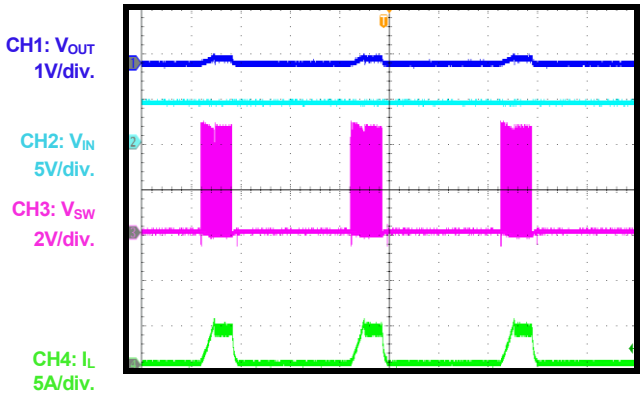
Performance waveforms are tested on the evaluation board.
V_{IN} = 5V, V_{OUT} = 1.2V, L =1.0µH, C_{OUT}=22uF, T_A = +25ºC, unless otherwise noted.

Short-Circuit Entry



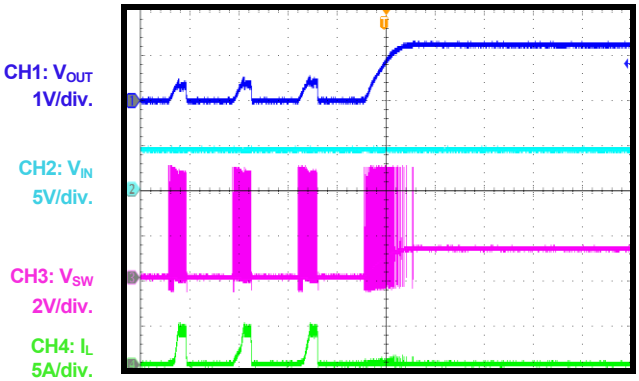
100µs/div.

Short-Circuit State



400µs/div.

Short-Circuit Recovery



1ms/div.

CIRCUIT BOARD LAYOUT

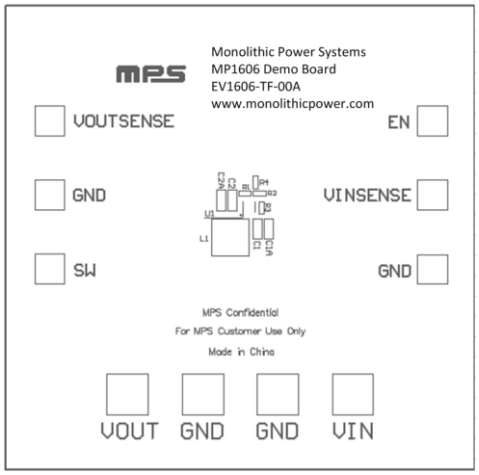


Figure 2—Top Silk Layer

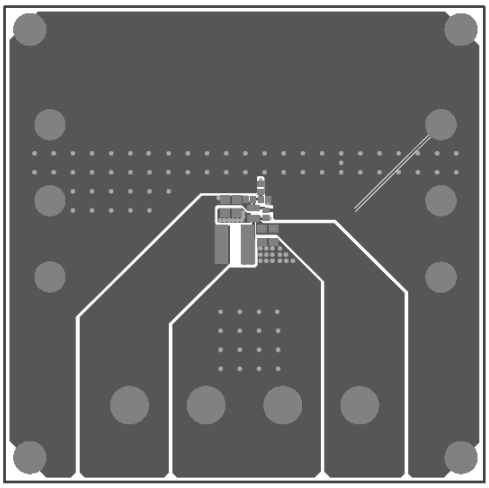


Figure 3—Top Layer

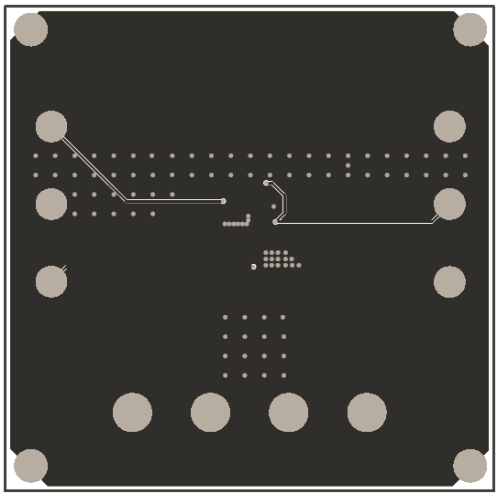


Figure 4—Bottom Layer

QUICK START GUIDE(MP1606GTF-XX)

Refer to Figure1 to set up fixed version. R1 and R2 must be removed. R4 connects PG pin and pulls up to Vin. MP1606GTF-12(-08, -09, -10, -135, -20, -285,-32) board provide corresponding fixed output voltage with PG function.

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output between 2.5V and 5.5V, 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. Fixed output versions are shown in Table 2.

Table 2—Fixed output version information

Part Number	Fixed V_{OUT} (V)
MP1606GTF-08	0.8
MP1606GTF-09	0.9
MP1606GTF-10	1.0
MP1606GTF-12	1.2
MP1606GTF-135	1.35
MP1606GTF-20	2.0
MP1606GTF-285	2.85
MP1606GTF-32	3.2