



The Future of Analog IC Technology®

EV5418-G-00B

Negative Charge Pump And Adjustable Regulator

DESCRIPTION

The MP5418 is a monolithic negative charge pump with built-in adjustable negative regulator. Its input range is from 2.3V to 5.5V, MP5418 provide a unregulated output which equal to negative input voltage. And MP5418 also provide a regulated output between 0V and negative input voltage.

No external inductor is required for simplicity and compactness. Internal soft start circuit effectively reduces the in-rush current both while startup.

The MP5418 is available in a ultra low profile QFN 1.4mmx1.8mm package. MP5418 just requires 4 ceramic capacitors to get the minimal solution size. It is ideal for a wide range of applications include optical module, RF amplifier and sensor supply.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	2.5 – 5.5	V
Output Voltage	V_{OUT1}	$-V_{IN}$	V
	V_{OUT2}	$-V_{CTL}$	V
Output Current	I_{OUT2}	60	mA

Note: If it needs larger current, please refer to selecting the Fly Capacitor in MP5418 datasheet.

FEATURES

- Low I_Q : 240 μ A
- V_{IN} Range from 2.3V to 5.5V
- Up to 200mA Output Current
- Only 4 x 4.7 μ F capacitor Needed for 60mA
- Auto Power Save Mode
- EN Control
- No In Rush Current during Start Up
- Over and Short Current Protection
- Dual Output:
 1. -1x Charge Pump
 2. Regulated output between 0V and $-V_{IN}$
- Small QFN 1.4mmx1.8mm Package for Space Saving

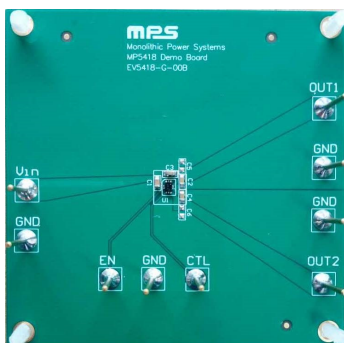
APPLICATIONS

- Optical Module
- Bias for RF amplifier
- Sensor Supply in Portable Instrument

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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EV5418-G-00B EVALUATION BOARD



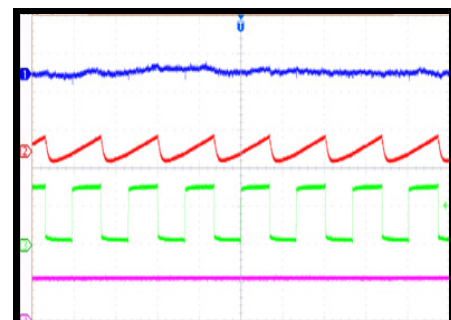
(L x W x H) 6.4cm x 6.4cm

Board Number	MPS IC Number
EV5418-G-00B	MP5418GQG

Steady State

$V_{IN}=3.3V$, $CTL=1V$, $I_{OUT1}=0A$, $I_{OUT2}=20mA$

- CH1: V_{OUT2}/AC
2mV/div.
- CH2: V_{OUT1}/AC
50mV/div.
- CH3: CP
2V/div.
- CH4: CTL
1V/div.



4 μ s/div.

EVALUATION BOARD SCHEMATIC

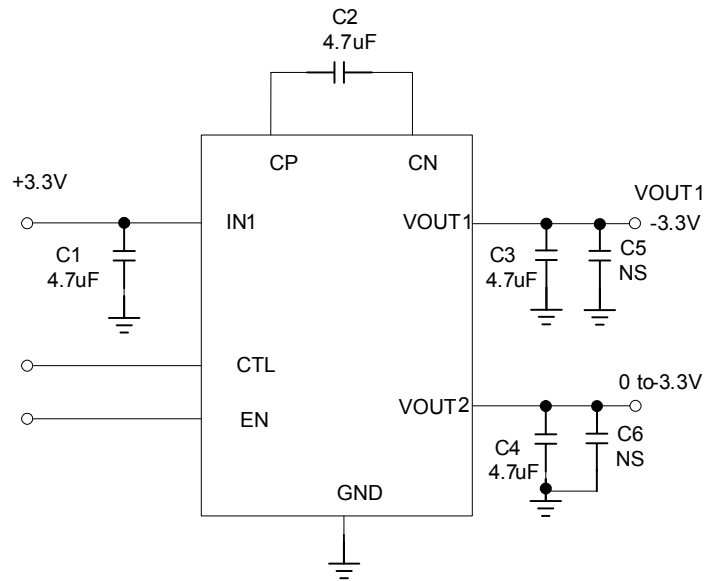


Figure 1—Typical Application Circuit for MP5418GQG

Note: If it needs larger current, please refer to selecting the Fly Capacitor in MP5418 datasheet.



EV5418-G-00B BILL OF MATERIALS

TABLE 1. MP5418GQG BILL OF MATERIALS

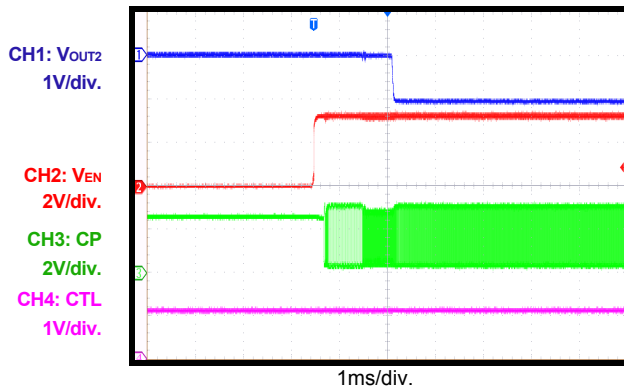
Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer/PN
4	C1, C2, C3, C4	4.7 μ F	Ceramic Cap.,16V,X6S	0603	Murata	GRM188C81C475KE11D
1	U1	MP5418	Negative Charge Pump And Adjustable Regulator	QFN-10 (1.4mmx1.8mm)	MPS	MP5418GQG

EVB TEST RESULTS

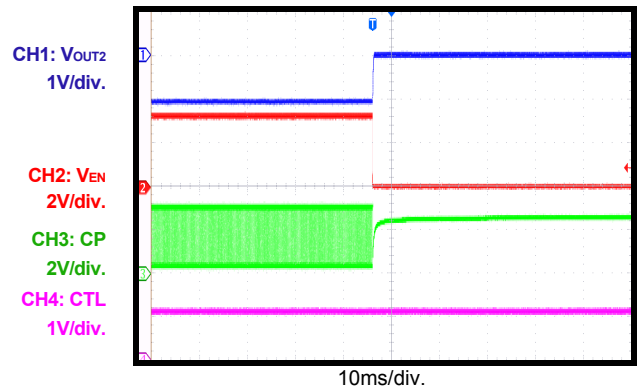
Performance waveforms are tested on the evaluation board.

$V_{IN} = 3.3V$, $V_{OUT1} = -3.3V$, $V_{OUT2} = -1V$, $C_{IN} = C_{FLY} = C_{OUT1} = C_{OUT2} = 4.7\mu F$, $T_A = +25^\circ C$, unless otherwise noted.

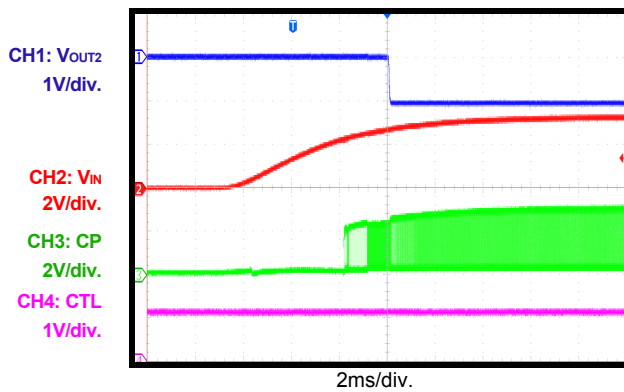
EN ON/FF
 $V_{IN} = 3.3V$, $CTL = 1V$, $OUT2$ with 50Ω



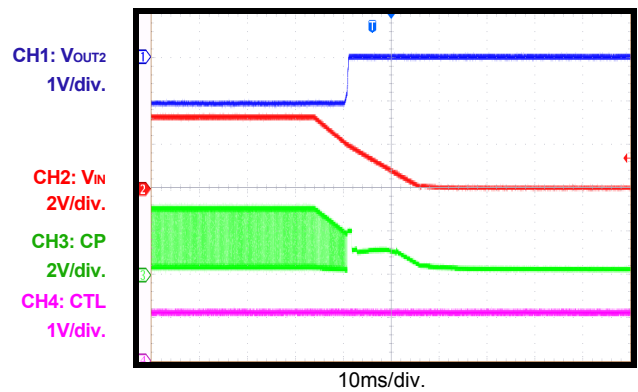
EN ON/FF
 $V_{IN} = 3.3V$, $CTL = 1V$, $OUT2$ with 50Ω



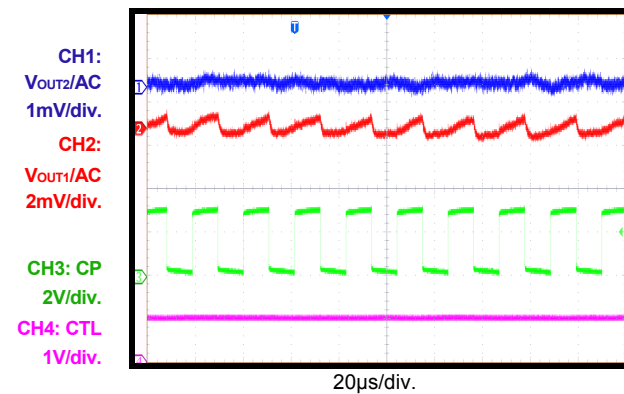
VIN ON/OFF
 $V_{IN} = 3.3V$, $CTL = 1V$, $OUT2$ with 50Ω



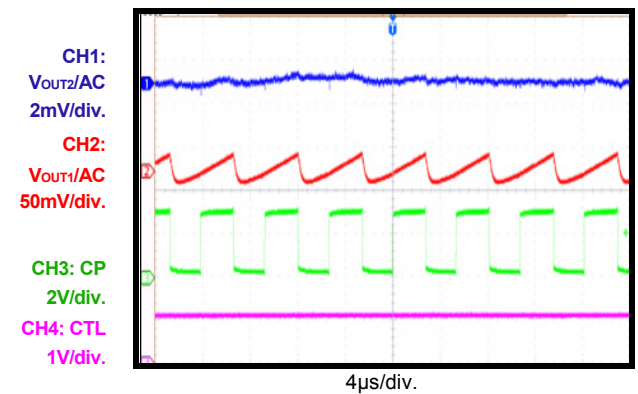
VIN ON/OFF
 $V_{IN} = 3.3V$, $CTL = 1V$, $OUT2$ with 50Ω



Steady State
 $V_{IN} = 3.3V$, $CTL = 1V$, $I_{OUT1} = 0A$, $I_{OUT2} = 0A$



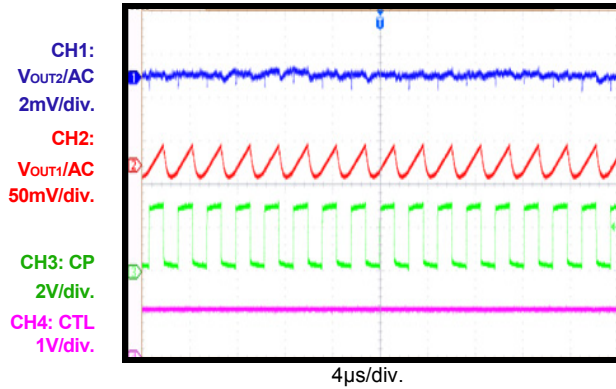
Steady State
 $V_{IN} = 3.3V$, $CTL = 1V$, $I_{OUT1} = 0A$, $I_{OUT2} = 20mA$



EVB TEST RESULTS (continued)

Performance waveforms are tested on the evaluation board.

 $V_{IN} = 3.3V$, $V_{OUT1} = -3.3V$, $V_{OUT2} = -1V$, $C_{IN} = C_{FLY} = C_{OUT1} = C_{OUT2} = 4.7\mu F$, $T_A = +25^\circ C$, unless otherwise noted.

Steady State
 $V_{IN} = 3.3V$, $CTL = 1V$, $I_{OUT1} = 0A$, $I_{OUT2} = 60mA$


CIRCUIT BOARD LAYOUT

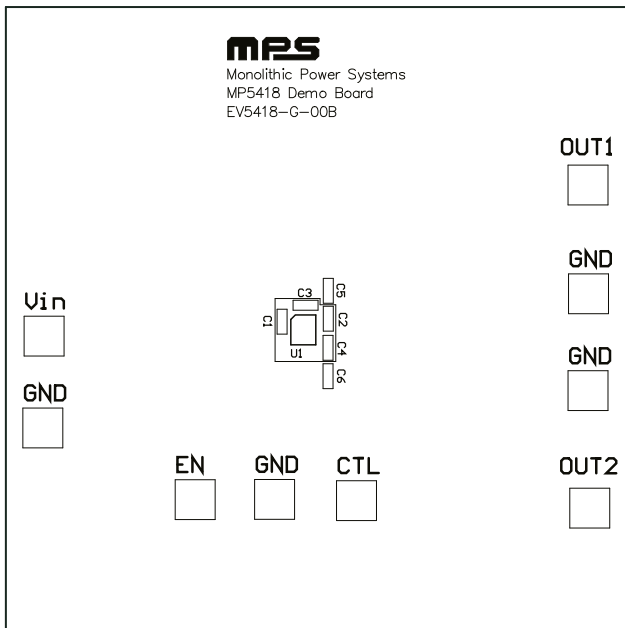


Figure 3—Top Silk Layer

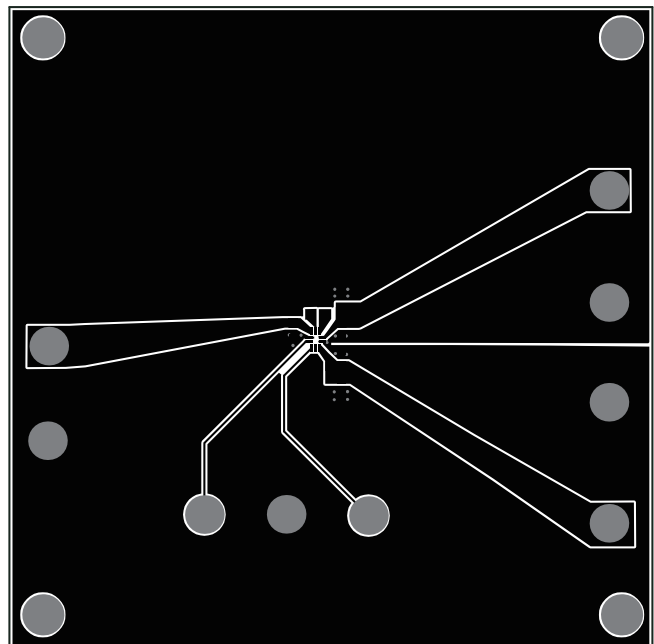


Figure 4—Top Layer

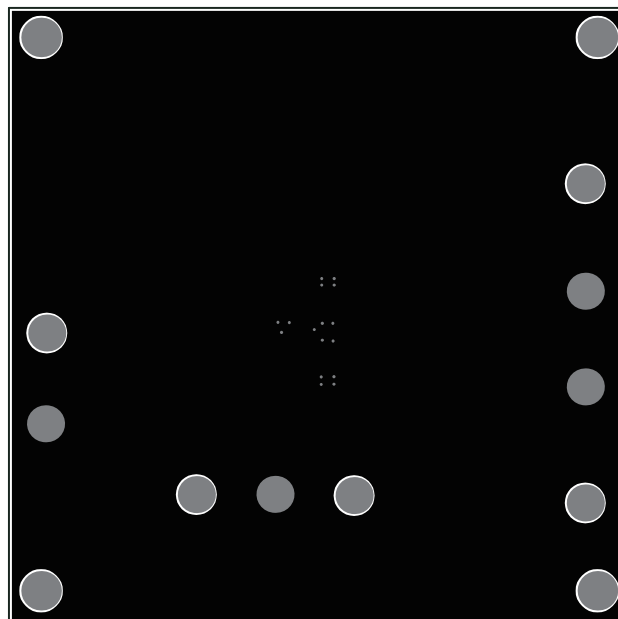


Figure 5—Bottom Layer

QUICK START GUIDE(MP5418GQG)

The output voltage OUT1 of this board is equal to negative input voltage. The output voltage OUT2 of this board is equal to negative CTL voltage .operating from +2.3V to +5.5V input.

1. Connect the positive and negative terminals of the load to the VOUT2 and GND pins, respectively.
2. Preset the power supply output between 2.3V 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. Connect EN and CTL.
5. Turn the power supply on. The board will start up.

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