EV2018-ZD-33-00A

16V, 500mA, Low Quiescent Current Line Regulator Evaluation Board

DESCRIPTION

The EV2018-ZD-33-00A is an evaluation board for the MP2018GZD-33, which is a low power linear regulator that supplies power to systems with high voltage batteries. It includes a wide 4.3V to 16V input range, low dropout voltage and low quiescent supply current. The low quiescent current and low dropout voltage allows operations at extremely low power levels. Therefore, the MP2018GZD-33 is ideal for the low power microcontrollers and the battery-powered equipments.

The EV2018-ZD-33-00A is a fully assembled and tested evaluation board. It generates a +3.3V output voltage at load current up to 500mA from 4.3V to 16V input range.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	4.3 – 16	V
Output Voltage	V_{OUT}	3.3	V
Output Current	I_{OUT}	500	mA

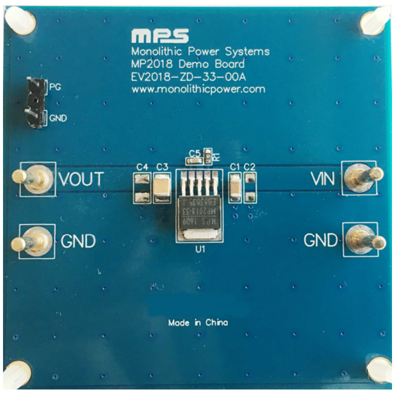
FEATURES

- 4.3V to 16V Input Range
- 12μA Quiescent Supply Current
- Stable With Low-value Output Ceramic Capacitor (> 0.47 μF)
- 500mA Specified Current
- Fixed Output Voltage
- Output ±2% Accuracy Over Temperature
- Specified Current Limit
- Power Good
- Programmable Power Good Delay
- Thermal Shutdown and Short-Circuit Protection
- -40°C to +125°C Specified Junction Temperature Range
- Available in TO252-5 Package

APPLICATIONS

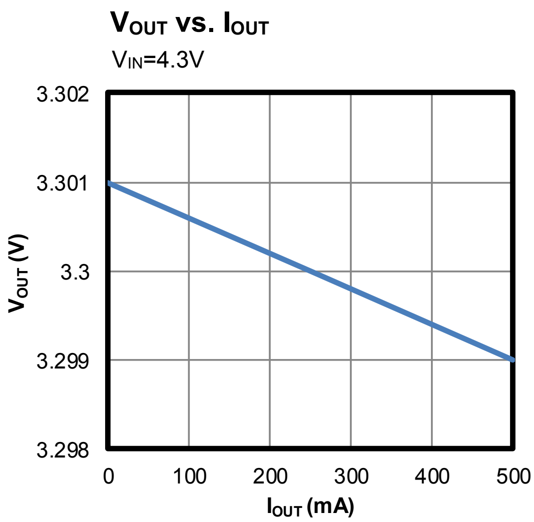
- Industrial/Automotive Applications
- Portable/Battery-Powered Equipment
- Ultra Low Power Microcontrollers
- Cellular Handsets
- Medical Imaging

EV2018-ZD-33-00A EVALUATION BOARD



(L × W × H) 6.35cm x 6.35cm x 1.0cm

Board Number	MPS IC Number
EV2018-ZD-33-00A	MP2018GZD-33



QUICK START GUIDDE

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively. Set load current between 0 – 500mA. Be aware that electronic loads represent a negative impedance to the regulator and if set to a too high current will trigger over-current-protection or short-current-protection.
2. Preset the power supply output between 4.3V and 16V, and then turn it off.

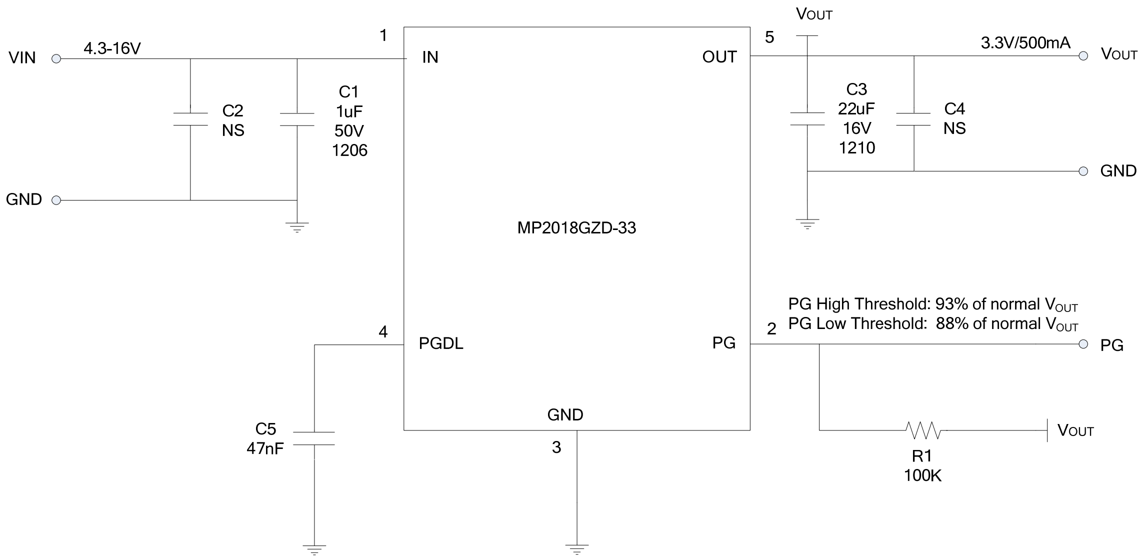
   If longer cables are used between the source and the EVB (>0.5m total), a damping capacitor should be installed at the input terminals.
3. Connect the positive and negative terminals of the power supply output to the VIN and GND pins, respectively.
4. Turn the power supply on. The MP2018GZD-33 will automatically startup. The default VOUT is 3.3V.
5. Setting PGDL

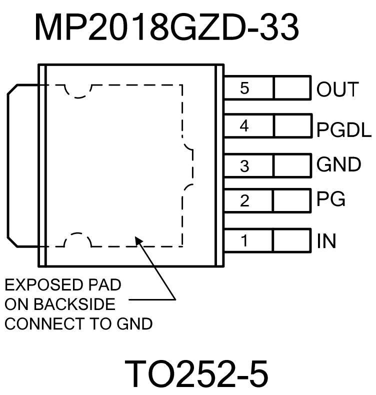
   There is a delay time when PG asserts high, the delay time can be programmed by adding a capacitor on PGDL. To select a capacitor for PGDL, use below equation:

$$C_{PGDL}(nF) = \frac{t_{PGDL}(ms) \times I_{PGDL}(\mu A)}{V_{th\_PGDL}(V)}$$

   The t_{PGDL} is the desired delay time for PG asserts high, I_{PGDL} is the PGDL charging current (5.5μA) and V_{th_PGDL} is 1.65V.

EVALUTION BOARD SCHEMATIC





Reference for C_{PGDL} (C5) Selection

C5(nF)	T_{PGDL}(ms)
Floating	0.044
1	0.35
10	3.11
22	6.58
47	14.54
100	30.5

EV2018-ZD-33-00A BILL OF MATERIALS

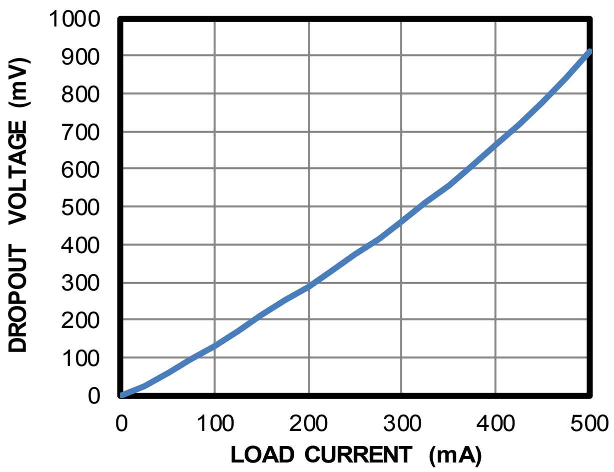
Qty	RefDes	Value	Description	Package	Manufacturer	Manufactuer_P/N
1	C1	1μF	Ceramic Cap, 50V, X7R	1206	Murata	GRM31CR71H225KA88L
2	C2,C4	NS				
1	C3	22μF	Ceramic Cap, 16V, X7R	1210	Murata	GRM32ER71C226KEA8L
1	C5	47nF	Ceramic Cap, 50V, X7R	0603	Murata	GRM188R71H473KA61D
1	R1	100k	Film Res,1%	0603	Yageo	RC0603FR-07100KL
1	U1		Linear Regulator	TO252-5	MPS	MP2018GZD-33
4	VIN,GND, GND, VOUT		2.0 Golden Pin		Any	
2	PG,GND		2.54mm Test Pin		Any	

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

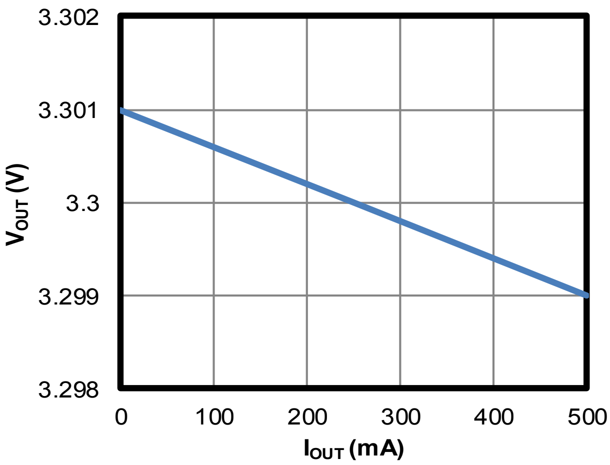
C_{IN} = 1µF, C_{OUT} = 22µF, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

Dropout Voltage vs. Load Current

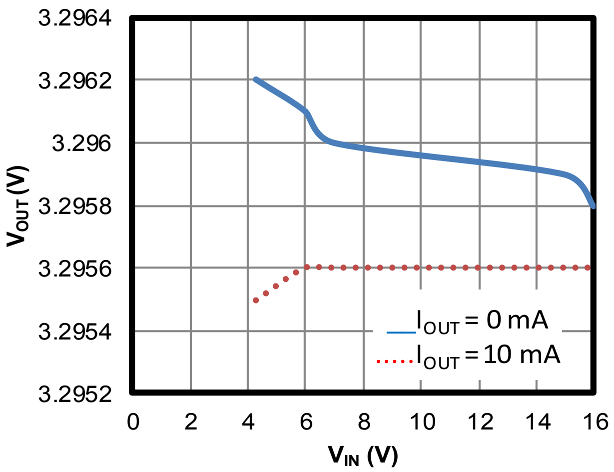


V_{OUT} vs. I_{OUT}

V_{IN}=4.3V

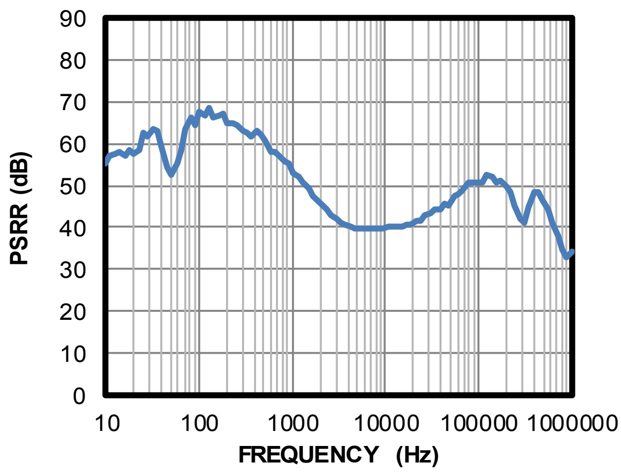


V_{OUT} vs. V_{IN}



PRSS vs. Frequency

C_{IN}=100pF, C_{OUT}=10µF, I_{OUT}=10mA



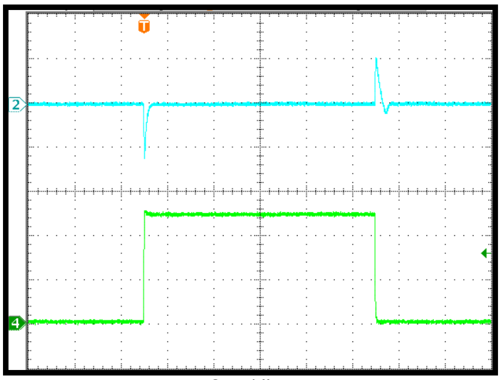
EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.

C_{IN} = 1µF, C_{OUT} = 22µF, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

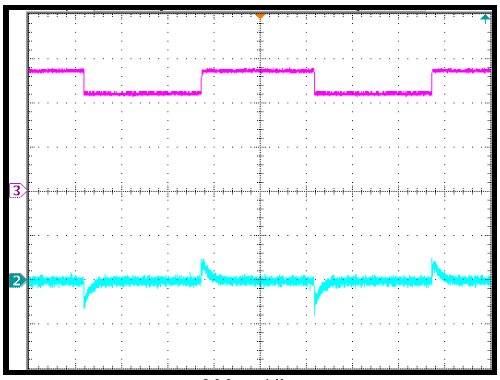
Load Transient

V_{IN}=12V, I_{OUT}=0<->500mA



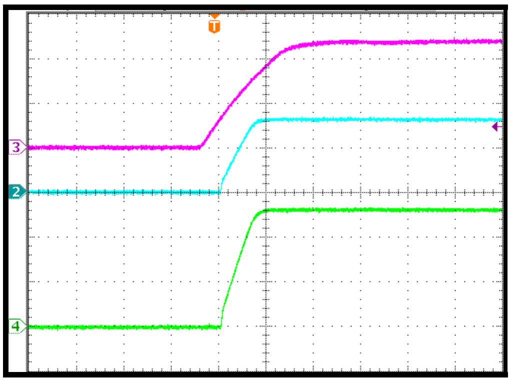
Line Transient

V_{IN}=4.3V-5.3V, I_{OUT}=500mA



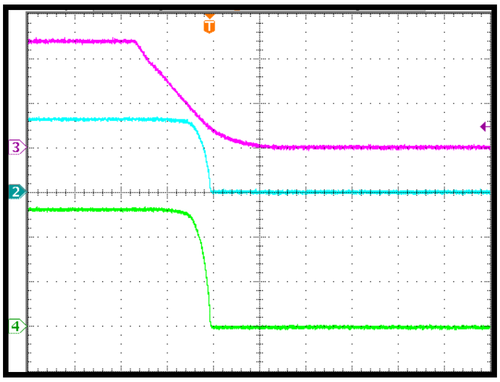
Start-Up Through V_{IN}

V_{IN}=12V, I_{OUT}=500mA



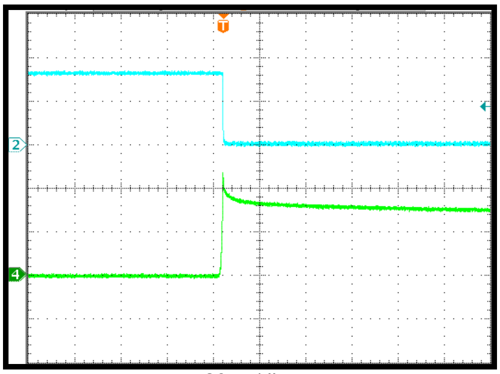
Shutdown Through V_{IN}

V_{IN}=12V, I_{OUT}=500mA



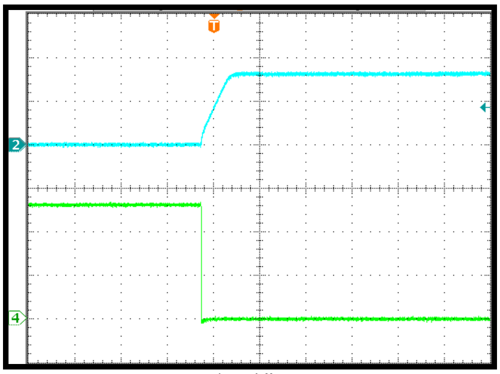
Short-Circuit Entry

I_{OUT}=0mA to Short Circuit



Short-Circuit Recovery

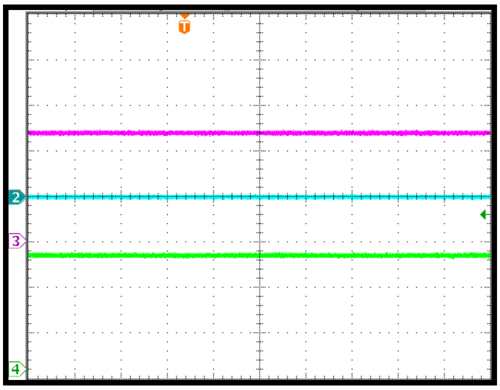
V_{IN} = 12V, Short Circuit to I_{OUT}=0mA



EVB TEST RESULTS *(continued)*

Performance waveforms are tested on the evaluation board.
C_{IN} = 1μF, C_{OUT} = 22μF, V_{OUT} = 3.3V, T_A = 25°C, unless otherwise noted.

Short-Circuit Steady State
V_{IN}=12V



CH2: V_{OUT} 2V/div.
CH3: V_{IN} 5V/div.
CH4: I_{OUT} 200mA/div.
4ms/div.

PRINTED CIRCUIT BOARD LAYOUT

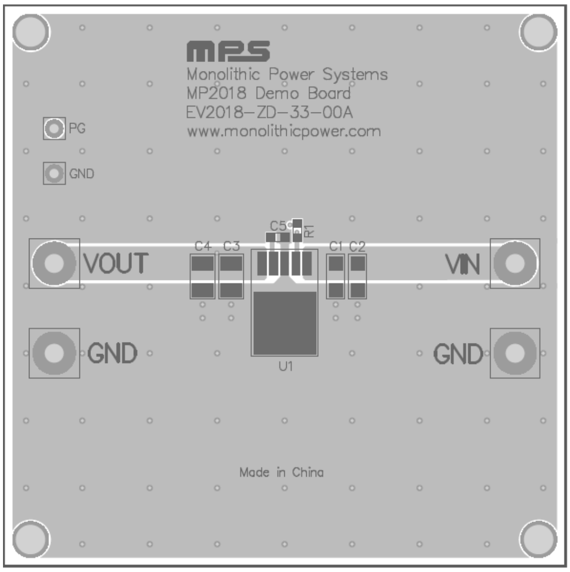


Figure 1: Top Silk & Top Layer

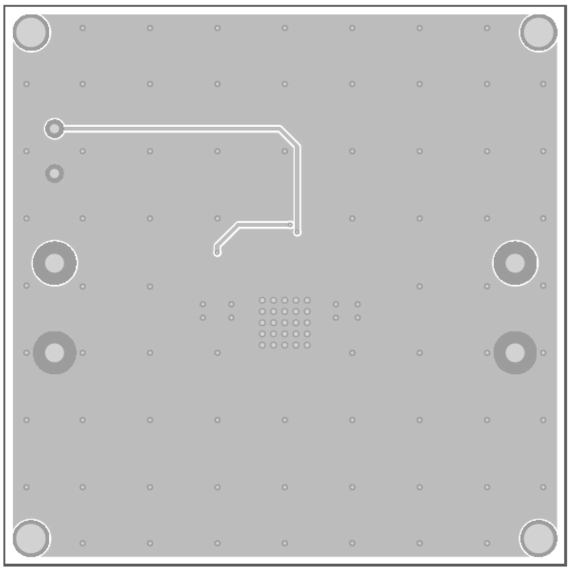


Figure 2: Bottom Layer

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