GS2881 Series

750mA LDO with Reverse Current Protection

Product Description

The GS2881 Series is a group of voltage regulators with high accuracy, high speed, low drop-out, reverse current protection, high ripple rejection and fast discharge function.

The series consists of a voltage reference, an error amplifier, a driver transistor, a current limiter, a thermal protection circuit, a reverse current protection circuit and a phase compensation circuit.

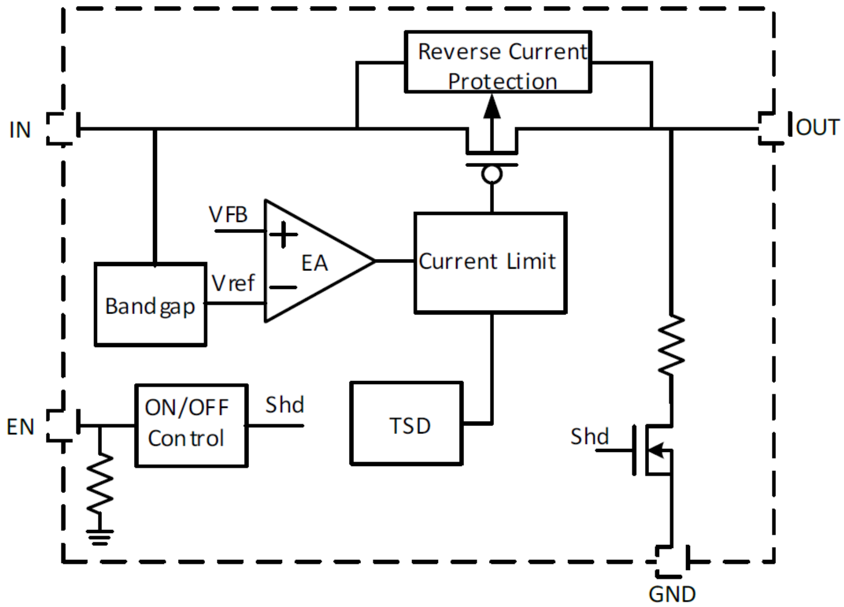
Features

- Output Accuracy: ±1.0%
- Low Quiescent Current: 28uA
- Low Dropout Voltage: 143mV@500mA/3.3V
- High PSRR: 78dB@1KHz, 10mA
- Output Current: 750mA
- Excellent Line and Load Transient Response
- Operating Voltage Range: from 1.8V to 7.0V
- Output Voltage Range: from 0.8V to 5.0V
- Over-Temperature Protection
- Current Limiting Protection
- Output Short-Circuit Protection
- Reverse Current Protection Function
- Available in SOT-23-5L Package
- RoHS Compliant and Halogen Free

Applications

- Battery-Powered Devices
- Reference Voltage Sources
- USB products and HDMI Equipment's
- Other Low Voltage Power Suppliers

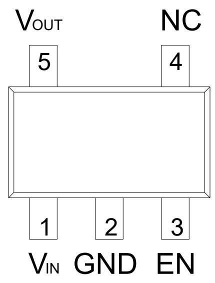
Functional Block Diagram



GS2881 Series

Packages & Pin Assignments

SOT-23-5L



Pin Name	Function
V_{IN}	Power Supply Input.
V_{OUT}	The pin is the power output of the device.
GND	Ground Pin.
EN	Chip Enable
NC	No Connect.

Ordering and Marking Information

Ordering Information

Part Number	Package	Output Voltage	Part Marking	Quantity / Reel
GS2881L08F	SOT-23-5L	0.8V	LW8108 □□□□□	3,000 PCS
GS2881L12F	SOT-23-5L	1.2V	LW8112 □□□□□	3,000 PCS
GS2881L15F*	SOT-23-5L	1.5V	LW8115 □□□□□	3,000 PCS
GS2881L18F	SOT-23-5L	1.8V	LW8118 □□□□□	3,000 PCS
GS2881L28F	SOT-23-5L	2.8V	LW8128 □□□□□	3,000 PCS
GS2881L30F*	SOT-23-5L	3.0V	LW8130 □□□□□	3,000 PCS
GS2881L33F	SOT-23-5L	3.3V	LW8133 □□□□□	3,000 PCS
GS2881L50F	SOT-23-5L	5.0V	LW8150 □□□□□	3,000 PCS

NOTE:
Please check the availability with sales representative if the part number marked * is required.

GS2881 1 2 2F

- **Product Code:**
  GS2881
- **Package Code:**
  1 is **L** for SOT-23-5L
- **Voltage Code:**
  2 2 is V_{OUT} Voltage
  For example, 08 is 0.8V and 12 is 1.2V etc.
- **Green Level:**
  F for RoHS Compliant and Halogen Free

Marking Information

LW81 1 1
2 2 2 2 2

Product Code:
LW81

Voltage Code:
1 is 08, 12 and so on.

- 08 for 0.8V, 12 for 1.2V and so on.

GS Code:
2 is GS Code

Absolute Maximum Ratings [1] (T_A=25°C unless otherwise specified)

Symbol	Parameter	Value	Units
V_{IN}	Power Supply Voltage	-0.3~8.0	V
V_{EN}	Enable Voltage	-0.3~8.0	V
V_{OUT}	Output Voltage	-0.3~ (V_{IN}+0.3)	V
PD	Maximum Power Dissipation	0.59	W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient [3]	210	°C/W
T_J	Junction Temperature Range	-40~150	°C
T_{STG}	Storage Temperature Range	-40~150	°C
T_{LEAD}	Lead Temperature(soldering) 5 sec.	260	°C
HBM	ESD Rating (Human Body Model) [2]	4	KV

NOTE:
1. Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability
2. Per ANSI/ESDA/JEDEC JS-001
3. Device mounted on FR-4 PCB

Recommanded Operating Range

Symbol	Parameter	Value	Units
V_{IN}	Power Supply Voltage	1.8~7.0	V
V_{EN}	Enable Voltage	0~7.0	V
V_{OUT}	Output Voltage	0.8~5.0	V
I_{OUT}	Output Current	0~0.75	A
T_J	Junction Temperature Range	-40~125	°C

Electrical Characteristics

(V_{IN}=V_{OUT}+1V, V_{OUT}=3.3V, C_{IN}= C_{OUT}=1uF, T_A =25°C, unless otherwise specified.)

Symbol	Parameter	Test Conditions		Min	Typ	Max	Unit
V_{IN}	Input Voltage			1.8		7.0	V
V_{OUT}	Output Accuracy	I_{OUT}= 1mA		-1.0		+1.0	%
I_{LIM}	Current Limit (1)	V_{IN}=4.3V, V_{OUT}=3.3V		0.8	1.05		A
I_Q	Quiescent Current	V_{IN}= V_{EN} = V_{OUT}+1V, No Load			28	45	μA
I_{SHD}	Shutdown Current	V_{IN}=7.0V, V_{EN}=0V				0.1	μA
V_{DROP}	Dropout Voltage (2)	I_{OUT}=300mA			84		mV
		I_{OUT}=500mA			143		
		I_{OUT}=750mA			221		
S_{LINE}	Line Regulation	V_{IN}= V_{OUT} +1V to 7.0V, I_{OUT}=1mA			0.05	0.1	%/V
S_{LOAD}	Load Regulation	1mA≤ I_{OUT} ≤750mA			0.001	0.01	%/mA
I_{SHORT}	Short Current	V_{OUT}=0V			70		mA
V_{ENH}	EN High Voltage	V_{IN}=1.8V to 7.0V, I_{OUT}=1mA		1.5			V
V_{ENL}	EN Low Voltage					0.5	V
T_{STR}	Startup Time	From V_{EN} 'L'→ 'H' to 95%* V_{OUT}, COUT=1uF, No Load			50		μs
PSRR	Power Supply Rejection Ratio	C_{IN}=None, V_{OUT}=3.3V, I_{OUT} =10mA	f=217Hz		79		dB
			f=1KHz		78		
			f=10KHz		72		
I_{REV}	Reverse Current (3)	V_{IN}=0V, V_{OUT}=7.0V			0.01	0.5	μA
I_{REVS}	V_{OUT} Pin Sink Current (4)	V_{IN}=6.0V, V_{OUT}=7.0V			1.5	2.5	μA
T_{SD}	Thermal Shut Down	Temperature rising			160		°C
△T_{SD}	TSD Hysteresis	Temperature falling			20		°C
$R_{DISCHRG}$	RON of Discharge MOSFET	V_{EN}=0V			80		Ω

NOTE:

1. Guaranteed by design.
2. The dropout voltage is defined as V_{IN} - V_{OUT}, when V_{OUT} =95%* V_{OUT} (NOM).
3. Reverse Current (I_{REV}) flows from V_{OUT} to V_{IN}.
4. V_{OUT} Pin Sink Current (I_{REVS}) flows from V_{OUT} to GND.

Performance Characteristics (TA =25ºC, unless otherwise specified.)

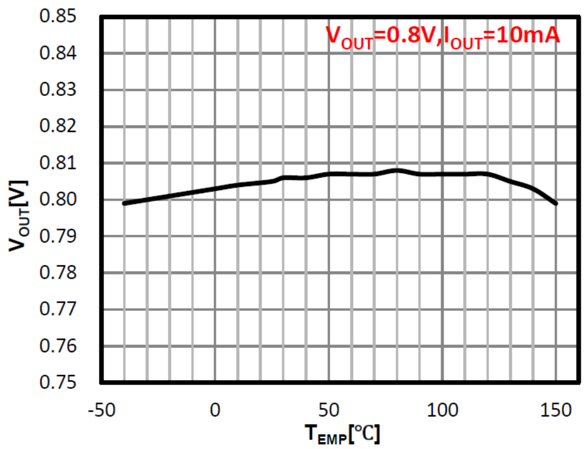


Figure 1. V_{OUT} vs Temperature

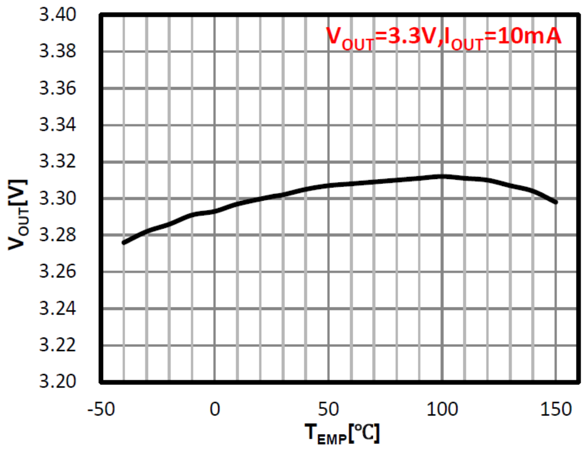


Figure 2. V_{OUT} vs Temperature

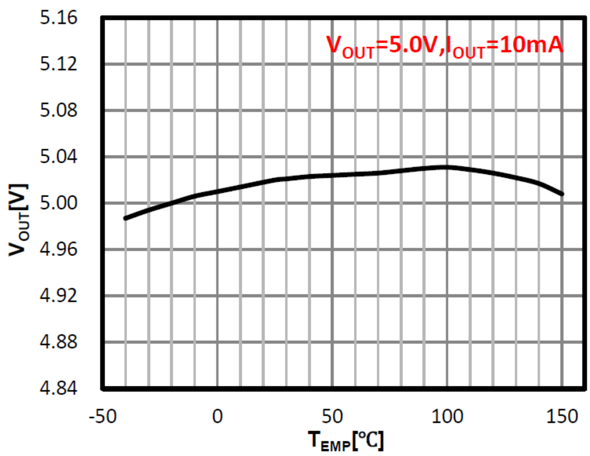


Figure 3. V_{OUT} vs Temperature

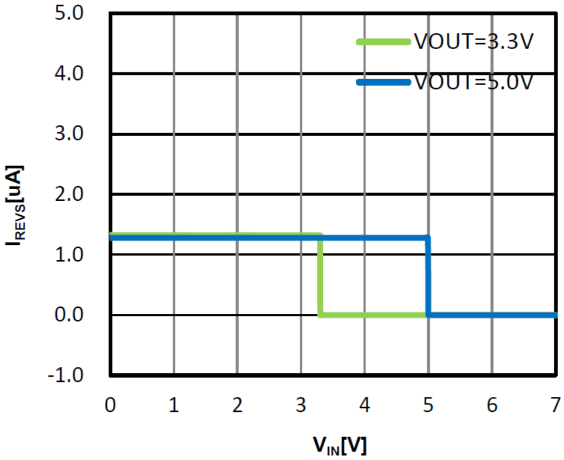


Figure 4. V_{OUT} Sink Current VS Input Voltage

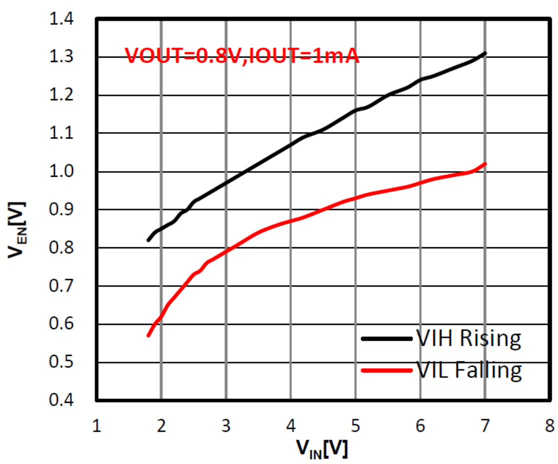


Figure 5. V_{EN} vs V_{IN}

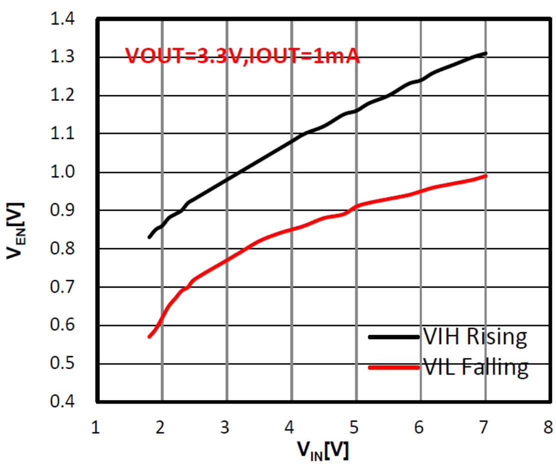


Figure 6. V_{EN} vs V_{IN}

Performance Characteristics

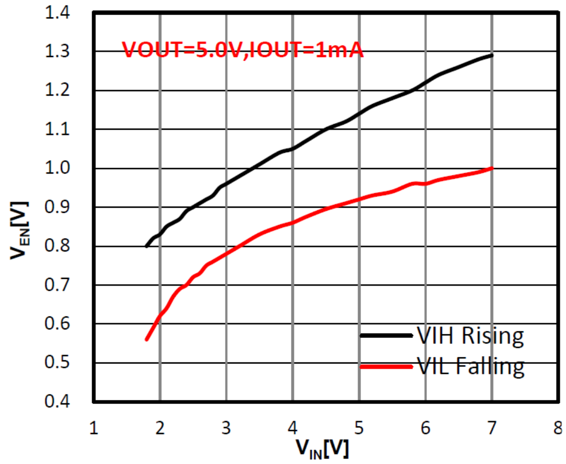


Figure 7. V_{EN} vs V_{IN}

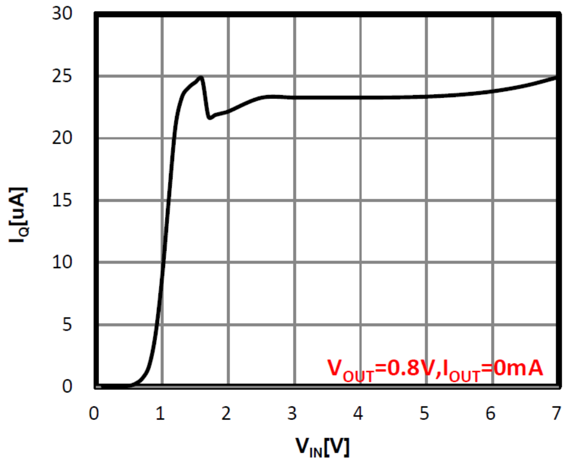


Figure 8. I_Q vs V_{IN}

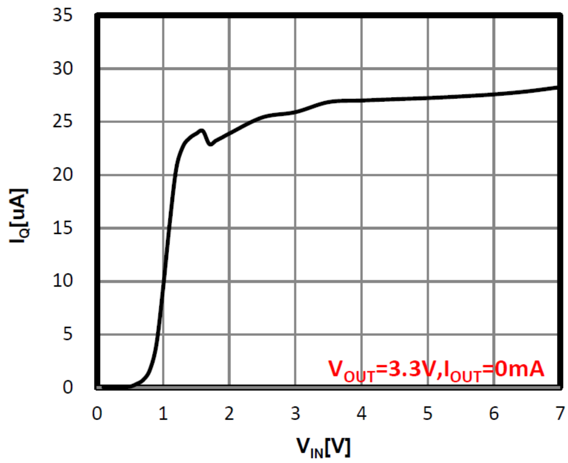


Figure 9. I_Q vs V_{IN}

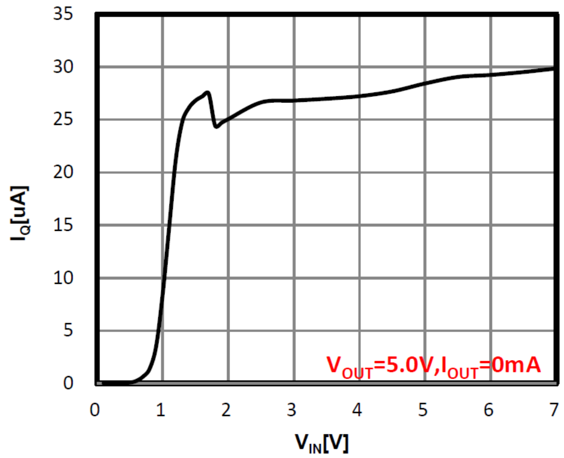


Figure 10. I_Q vs V_{IN}

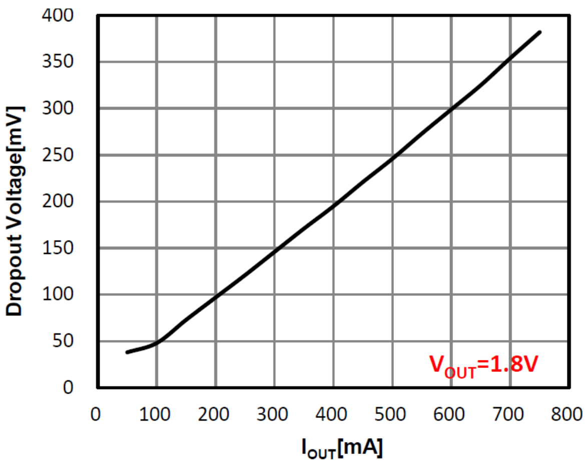


Figure 11. Dropout Voltage vs I_{OUT}

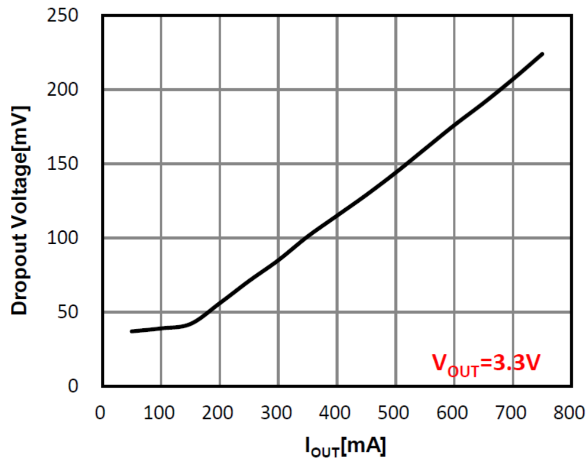


Figure 12. Dropout Voltage vs I_{OUT}

Performance Characteristics

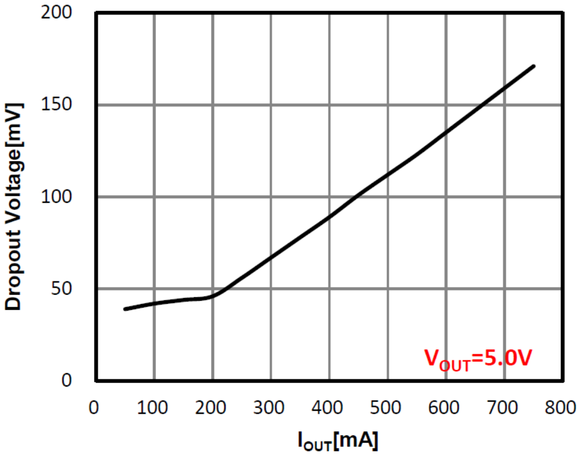


Figure 13. Dropout Voltage vs I_{OUT}

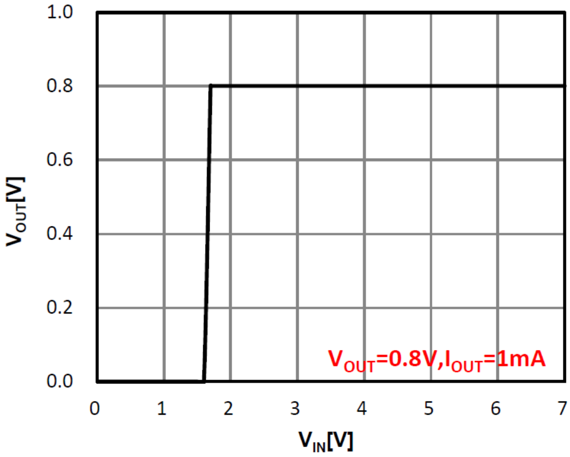


Figure 14. V_{OUT} vs V_{IN}

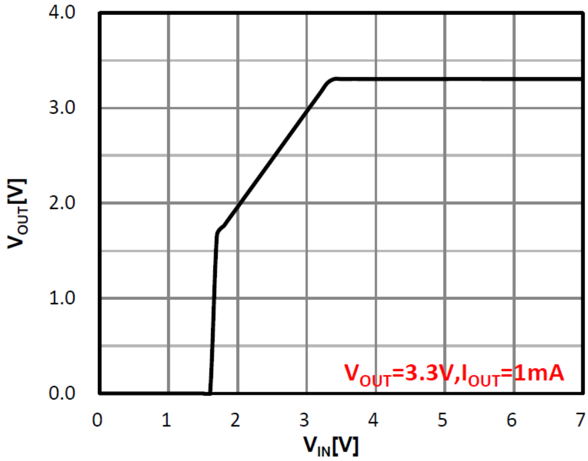


Figure 15. V_{OUT} vs V_{IN}

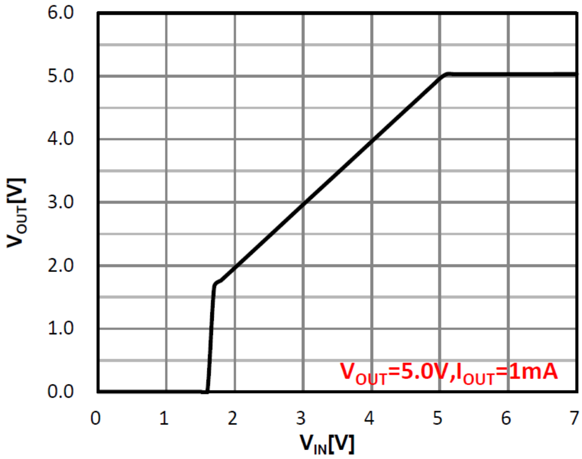
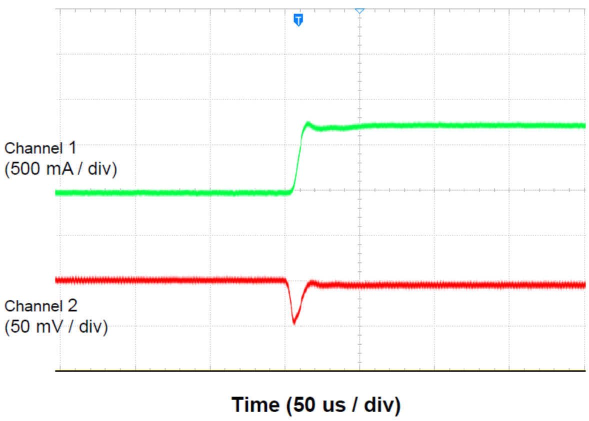
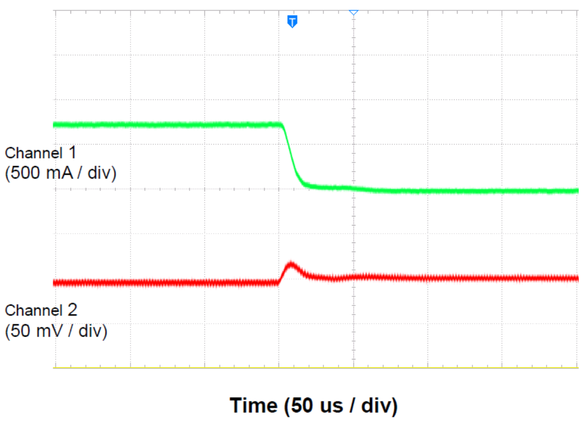


Figure 16. V_{OUT} vs V_{IN}



Channel 1 = I_{OUT}, channel 2 =V_{OUT}, V_{IN}=1.8V, V_{OUT}=0.8V

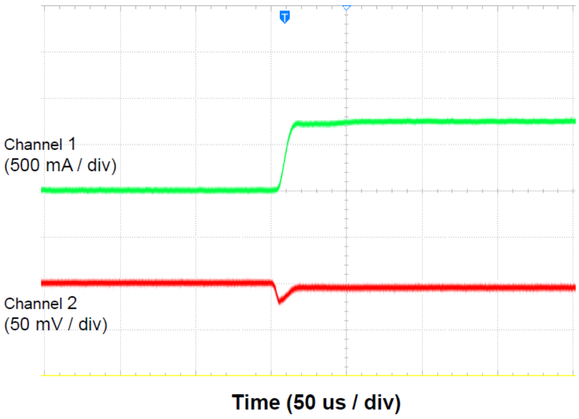
Figure 17. Load Transient (1 mA to 750 mA)



Channel 1 = I_{OUT}, channel 2 =V_{OUT}, V_{IN}=1.8V, V_{OUT}=0.8V

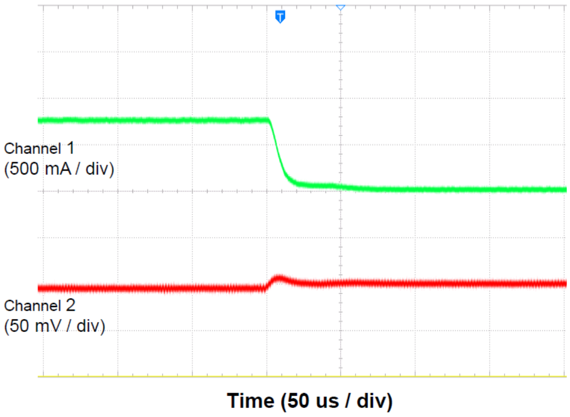
Figure 18. Load Transient (750 mA to 1 mA)

Performance Characteristics



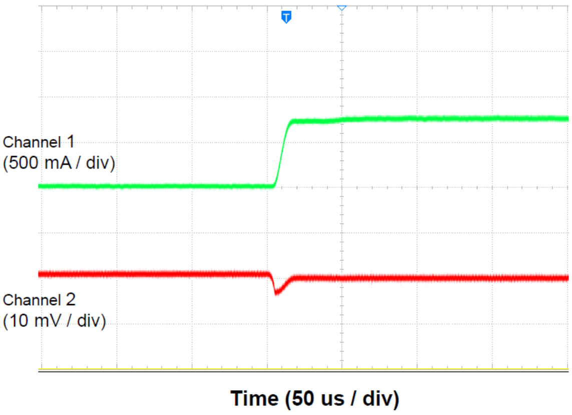
Channel 1 = I_{OUT}, channel 2 =V_{OUT}, V_{IN}=4.3V, V_{OUT}=3.3V

Figure 19. Load Transient (1 mA to 750 mA)



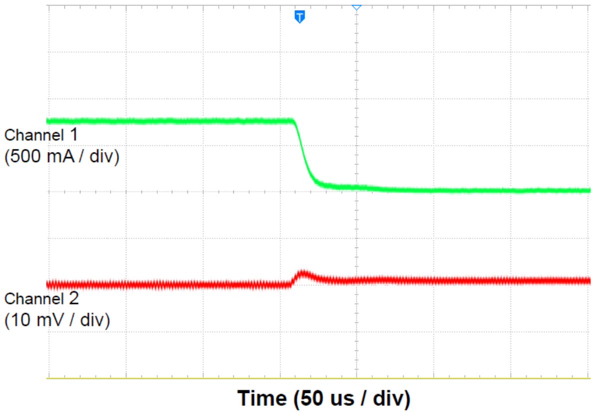
Channel 1 = I_{OUT}, channel 2 =V_{OUT}, V_{IN}=4.3V, V_{OUT}=3.3V

Figure 20. Load Transient (750 mA to 1 mA)



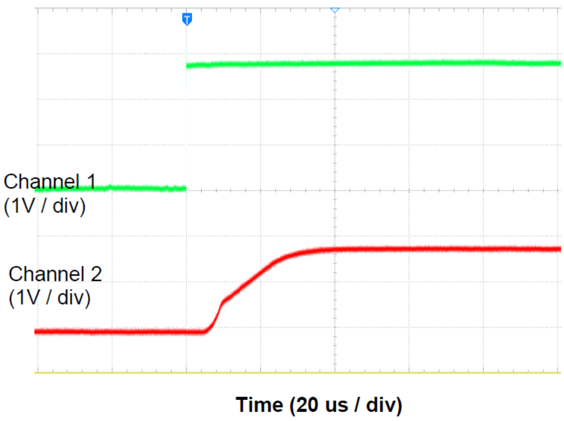
Channel 1 = I_{OUT}, channel 2 =V_{OUT}, V_{IN}=6.0V, V_{OUT}=5.0V

Figure 21. Load Transient (1 mA to 750 mA)



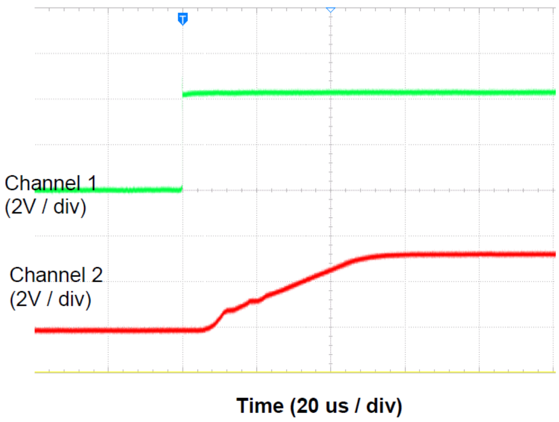
Channel 1 = I_{OUT}, channel 2 =V_{OUT}, V_{IN}=6.0V, V_{OUT}=5.0V

Figure 22. Load Transient (750 mA to 1 mA)



Channel 1 = En, channel 2 =V_{OUT}, V_{OUT}=1.8V, No Load

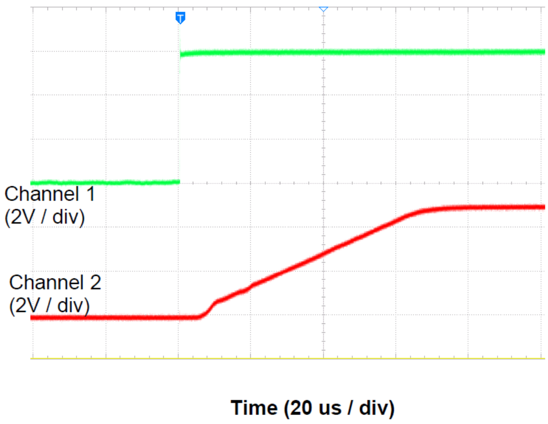
Figure 23. Power-Up with Enable



Channel 1 = En, channel 2 =V_{OUT}, V_{OUT}=3.3V, No Load

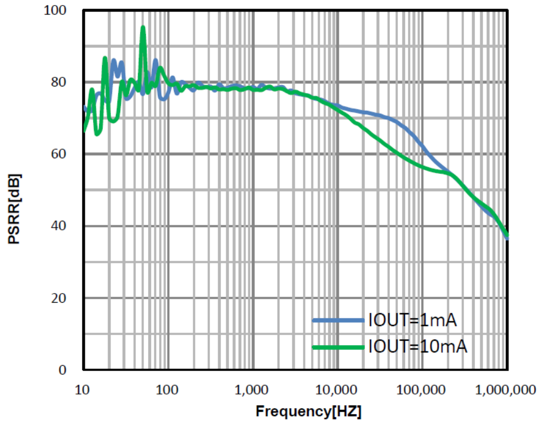
Figure 24. Power-Up with Enable

Performance Characteristics



Channel 1 = En, channel 2 = V_{OUT}, V_{OUT}=5.0V, No Load

Figure 25. Power-Up with Enable



V_{OUT}=3.3V, V_{IN}=4.3V, V_{PP}=0.2V,C_{IN}=non, C_{OUT}=1uF

Figure 26. PSRR vs Frequency

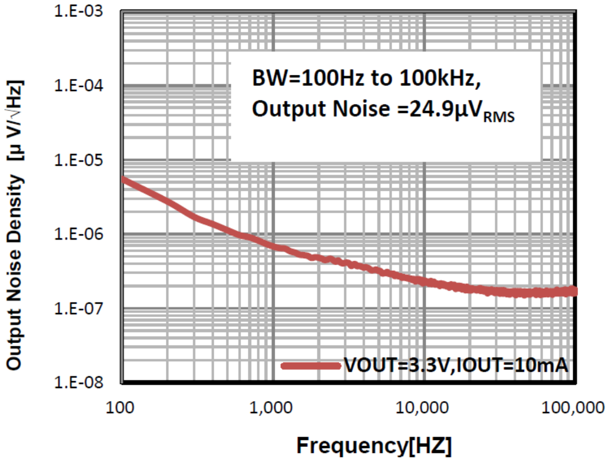
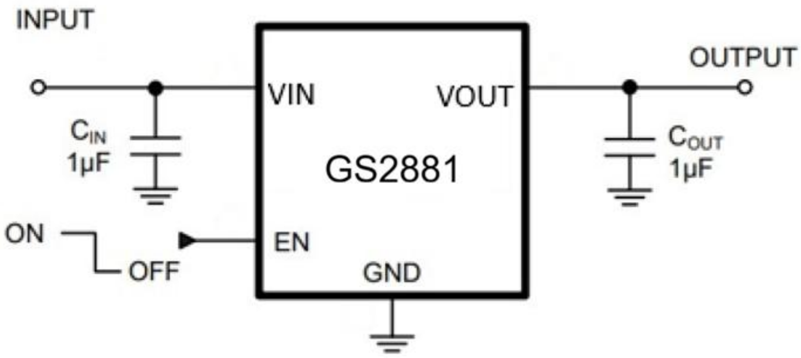


Figure 27. Output Noise Density vs Frequency

Typical Application Circuit



Input Capacitor Selection

Like any low-dropout regulator, the external capacitors used with the device must be carefully selected for regulator stability and performance. Using a capacitor whose value is >=1μF on the device input and the amount of capacitance can be increased without limit. An at least 10uF input capacitor is needed if input ripple voltage V_{PP}>1V. The input capacitor must be located a distance less than 0.5 inch from the input pin of the IC and returned to a clean analog ground. Any good quality ceramic or tantalum can be used for this capacitor. The capacitor with larger value and lower ESR (equivalent series resistance) provides better PSRR and line-transient response.

Output Capacitor Selection

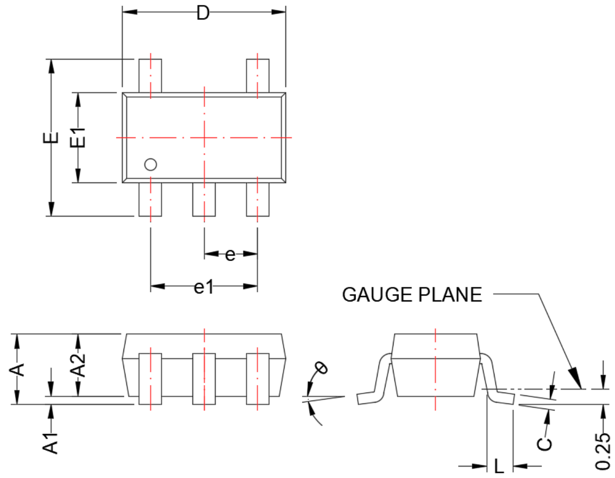
The output capacitor must meet both requirements for minimum amount of capacitance and ESR in all LDOs application. The device is designed specifically to work with low ESR ceramic output capacitor in space-saving and performance consideration. Using a ceramic capacitor whose value is at least 1μF on the device output ensures stability. An appropriate output capacitor can reduce noise and improve load transient response and PSRR. The output capacitor should be located not more than 0.5 inch from the V_{OUT} pin of the device and returned to a clean analog ground.

Layout Recommendation

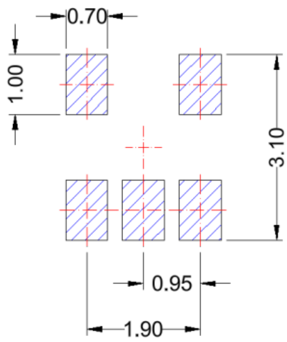
To improve ac performance such as PSRR, output noise, and transient response, it is recommended that the PCB be designed with separate ground planes for V_{IN} and V_{OUT}, with each ground plane connected only at the GND pin of the device.

SOT-23-5L

Package Dimension



Recommended Land Pattern



Unit:mm

Dimensions				
Symbol	Millimeters		Inches	
	Min	Max	Min	Max
A	0.90	1.45	0.035	0.057
A1	0.00	0.15	0.000	0.006
A2	0.90	1.30	0.035	0.051
b	0.30	0.50	0.012	0.020
c	0.08	0.26	0.003	0.010
D	2.70	3.10	0.106	0.122
E	2.20	3.00	0.087	0.118
E1	1.30	1.75	0.051	0.069
e	0.95 BSC		0.037 BSC	
e1	1.90 BSC		0.075 BSC	
L	0.30	0.60	0.012	0.024
θ	0°	8°	0°	8°

NOTE:
Dimensions are exclusive of Burrs, Mold Flash and Tie Bar extrusions.
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