Signal Chain Power
ADP7182
Low-Noise Negative Linear Regulator

DESCRIPTION

Demonstration circuit SCP-ADP7182-EVALZ is a –28V, –200mA Low Dropout (LDO) regulator designed to allow low noise operation in noise sensitive circuits. It is easily configured for a wide output range and can provide extremely quiet operation with its high PSRR.

Like all boards in the Signal Chain Power series, this board is designed to be easily plugged into other SCP boards to form a complete signal chain power system, enabling fast evaluation of low power signal chains. To evaluate this board, some universal SCP hardware is required, namely:

SCP-INPUT-EVALZ
SCP-OUTPUT-EVALZ
SCP-1X5BKOUT-EVALZ
SCP-THRUBRD-EVALZ
SCP-FILTER-EVALZ
SCP-1X2BKOUT-EVALZ
SCP-5X1-EVALZ

To properly evaluate SCP series demo boards, you will need the SCP Configurator companion software. SCP Configurator can help you choose the right board and topology for your design.

Note that this Demo Manual does not cover details important to the operation and configuration regarding the ADP7182. Please refer to the ADP7182 datasheet for a complete description of the part.

Design files for this circuit board are available.

Table 1. Performance Summary

SYMBOL	PARAMETER	NOTES	MIN	TYP	MAX	UNITS
$V_{IN(MAX)}$	Max Input Voltage				–28	V
$V_{OUT(MAX)}$	Max Output Voltage				–27.58	V
$I_{OUT(MAX)}$	Max Output Current				–200	mA

BOARD IMAGE

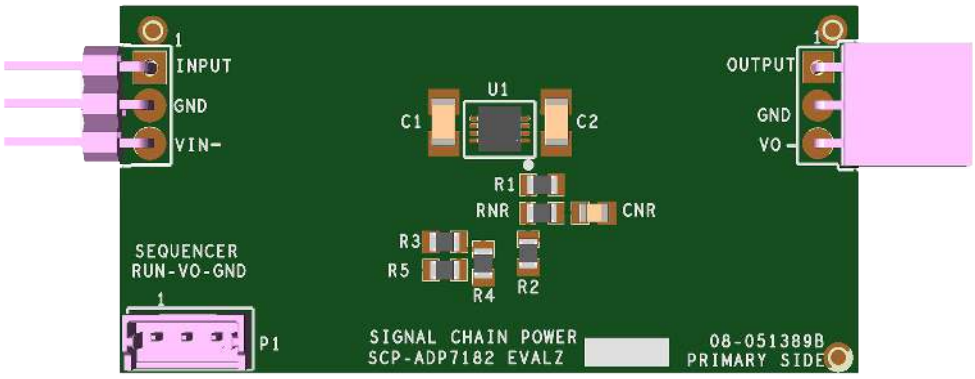


Figure 1. SCP-ADP7182-EVALZ Board

QUICK START PROCEDURE

Demonstration circuit SCP-ADP7182-EVALZ is easy to set up to evaluate the performance of any SCP hardware configuration.

1. The SCP-ADP7182-EVALZ ships with a default output voltage of –3.3V. To change the output voltage, see "Configuration Settings" section, and modify the board accordingly. Be sure to check for open connections or solder shorts after making any modifications.
2. Connect the SCP-INPUT-EVALZ and SCP-OUTPUT-EVALZ boards to the SCP-ADP7182-EVALZ (refer to Figure 2) and connect the input board to a voltage source, V_{SOURCE}. Connect the output board to a voltmeter or dynamic load. Slowly raise the input voltage until the SCP-ADP7182-EVALZ powers up into regulation and sweep V_{SOURCE} through the desired range of operation.

   NOTE: Make sure that the input voltage is always within spec. If using a dynamic load to measure output voltage, make sure the load is initially set to zero.
3. Check for proper output voltages. The output should be regulated at the programmed value (±5%).
4. Once the proper output voltage is established, power off V_{SOURCE} and similarly test other boards in the SCP system until all elements have been individually verified prior to assembling into the final circuit configuration.

   NOTE: When measuring the input or output voltage ripple, use the optional SMA connector locations available on the input, output, 1 × 5, 1 × 2, and 5 × 1 breakout boards. Avoid using the test point connections with long scope leads.

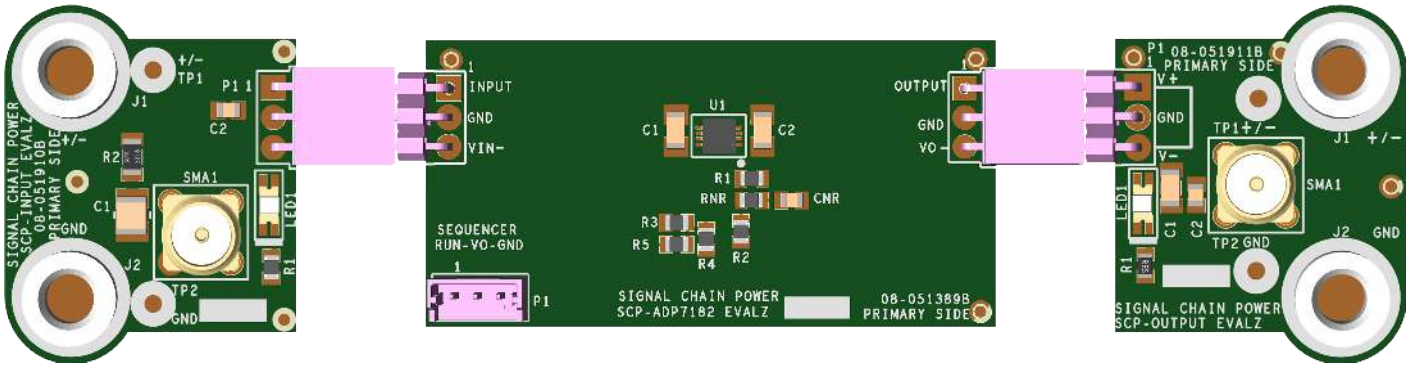


Figure 2. Proper Measurement Equipment Setup (Use SMA connectors for Measuring Input or Output Ripple)

CONFIGURATION SETTINGS

Demonstration circuit SCP-ADP7182-EVALZ is a –28V, –200mA Low Dropout (LDO) regulator designed to allow low noise operation in noise sensitive circuits. It is easily configured for a wide output range and can provide extremely quiet operation with its high PSRR.

The output of the SCP-ADP7182-EVALZ is resistor-programmable from –1.2V to –27.5V.

OUTPUT VOLTAGE PROGRAMMING

$$-V_{OUT} = 1.22V\left(1+\frac{R1}{R2}\right)$$

Table 2. Resistor Selection Guide for Common Output Voltages

V_{OUT} (V)	R1 (Ω)	R2 (Ω)
–1.2	0	Open
–1.25	1.02k	41.2k
–1.5	11.5k	49.9k
–1.8	26.1k	54.9k
–2.0	13.7k	21.5k
–2.5	57.6k	54.9k
–2.7	20.0k	13.7k
–3.0	49.9k	26.7k
–3.3	23.2k	10.2k
–3.5	30.9k	11.5k
–4.0	31.6k	10.2k
–4.5	25.7k	10.2k
–5.0	90.9k	23.2k
–5.5	174k	40.2k
–6.0	64.9k	13.7k
–6.5	137k	26.7k
–7.0	59.0k	10.7k
–7.5	63.4k	10.7k
–8.0	137k	21.5k
–8.5	169k	24.9k
–9.0	76.8k	10.7k
–9.5	150k	18.7k
–10	205k	23.2k
–11	133k	13.7k
–12	110k	10.5k
–13	340k	30.1k
–14	158k	11.5k
–15	665k	43.2k
–20	422k	22.6k
–25	115k	5.90k
–27.5	825k	38.3k

ENABLE PIN CONFIGURATION

The EN pin is tied to the optional SCP Run/Sequence header P1. To create a harness for this function, use Molex part 0510650300 with crimp pin 50212-8000.

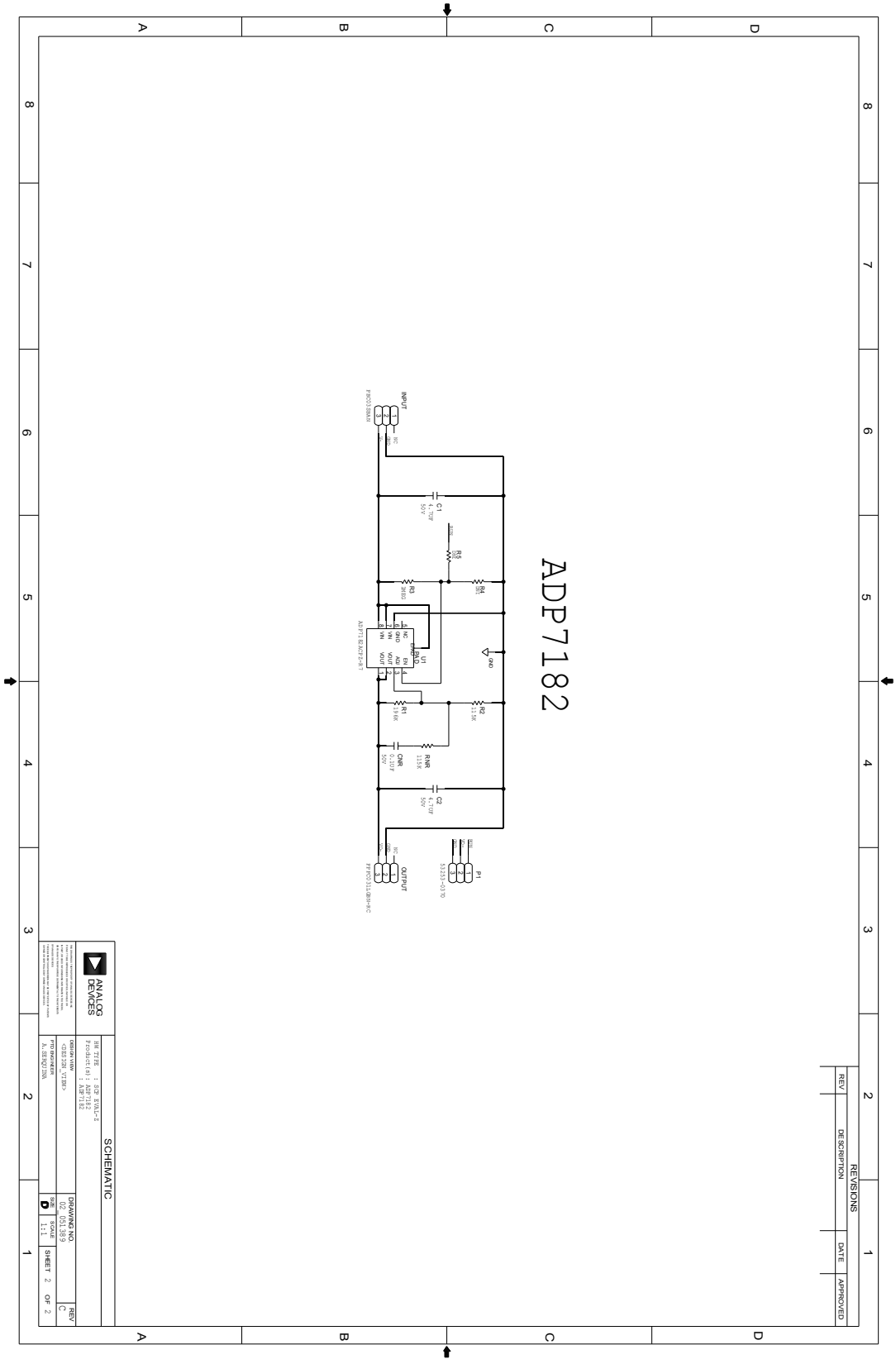
To use an active run signal, use a 1.00MΩ resistor for either pull-up or pull-down resistors R3 and R4, short R5 with 0Ω, and use the drive signal from connector P1.

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
1	1	PCB	PCB	ANALOG DEVICES 08_051389b
2	2	C1, C2	CAP 4.7UF 50V CER X7R 1206	SAMSUNG CL31B475KBHNNNE
3	1	C4	CAP 0.1uF 50V CER X7R 0805	AVX CORPORATION 08055C104JAT2A
4	1	INPUT	CONN-PCB MALE 3POS 2.54MM PITCH R/A	SULLINS PBC03SBAN
5	1	OUTPUT	CONN FEMALE 3POS 2.54MM PITCH R/A	SULLINS PPPC031LGBN-RC
6	1	P1	CONN-PCB 3POS HEADER WIRE TO BRD WAFER ASSY STRAIGHT 2MM PITCH (Note 1)	MOLEX 53253-0370
7	1	R1	RES 196k 1% THICK FILM 0805	YAGEO RC0805FR-07196KL
8	2	R2, RNR	RES 115k 1% THICK FILM 0805	VISHAY CRCW0805115KFKEA
9	1	R4	RES 1.00M 1% THICK FILM 0805	YAGEO RC0805JR-071ML
10	2	R5, R6	RES THICK FILM 0805 (Note 1)	N/A
11	1	U1	IC-ADI LOW NOISE, CMOS LDO LINEAR REGULATOR	ANALOG DEVICES ADP7142ACPZN-R7

Note 1. These items are not stuffed (DNI).

SCHEMATIC DIAGRAM



ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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