

ISL281x8EVAL1Z

Evaluation Board

AN1350
Rev 0.00
Aug 14, 2007

Introduction

The ISL281x8EVAL1Z evaluation board is a design platform containing all the circuitry needed to characterize critical performance parameters of the ISL281x8 operational amplifiers, using a variety of user defined test circuits.

The ISL28138 and ISL28148 high-speed operational amplifiers feature low power consumption, while the ISL28158 and ISL28168 operational amplifiers feature ultra-low power consumption. All op amps have rail-to-rail output drive capability and are designed to operate with a single lithium cell or two Ni_Cd batteries.

Reference Documents

- ISL28138 Data Sheet, FN6336
- ISL28148 Data Sheet, FN6337
- ISL28158 Data Sheet, FN6377
- ISL28168 Data Sheet, FN6378

Evaluation Board Key Features

The ISL281x8EVAL1Z is designed to enable the IC to operate from a single supply, +2.4VDC to +5.5VDC or from split supplies, ±1.2VDC to ±2.75V. The board is configured for a single op amp connected for differential input with a closed loop gain of 10. It also contains a single external reference voltage (VREF) pin and provisions for a user-selectable voltage divider (filter are included).

Power Supplies (Figure 1)

External power connections are made through the V+, V- and Ground connections on the evaluation board. For single supply operation, the V- and Ground pins are tied together to the power supply negative terminal. For split supplies V+

and V- terminals connect to their respective power supply terminals. De-coupling capacitors C₁ and C₂ connect to ground through R₁ and R₂₁ 0Ω resistors. Resistors R₂₀ and R₂₄ are 0Ω but can be changed by the user to provide additional power supply filtering, or to reduce the voltage rate-of-rise to less than ±1V/μs. Two additional capacitors, C₃ and C₄ are connected close to the part to filter out high frequency noise. Anti-reverse diodes D₁ and D₂ protect the circuit in the case of accidental polarity reversal.

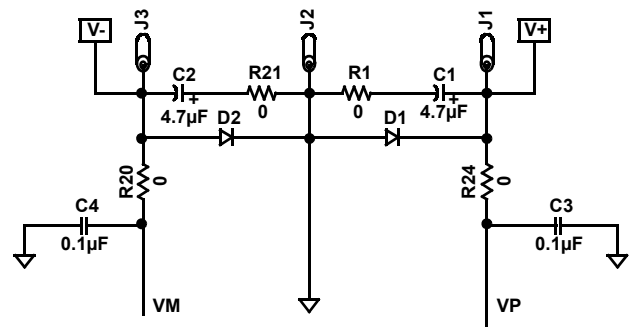


FIGURE 1. POWER SUPPLY CIRCUIT

Amplifier Configuration (Figure 2)

The schematic of the op amp with the components supplied is shown in Figure 2. The circuit implements a differential input amp with a closed loop gain of 10. The circuit can operate from a single supply or from dual supplies. The VREF pin can be connected to ground to establish a ground referenced input for split supply operation, or can be externally set to any reference level for single supply operation.

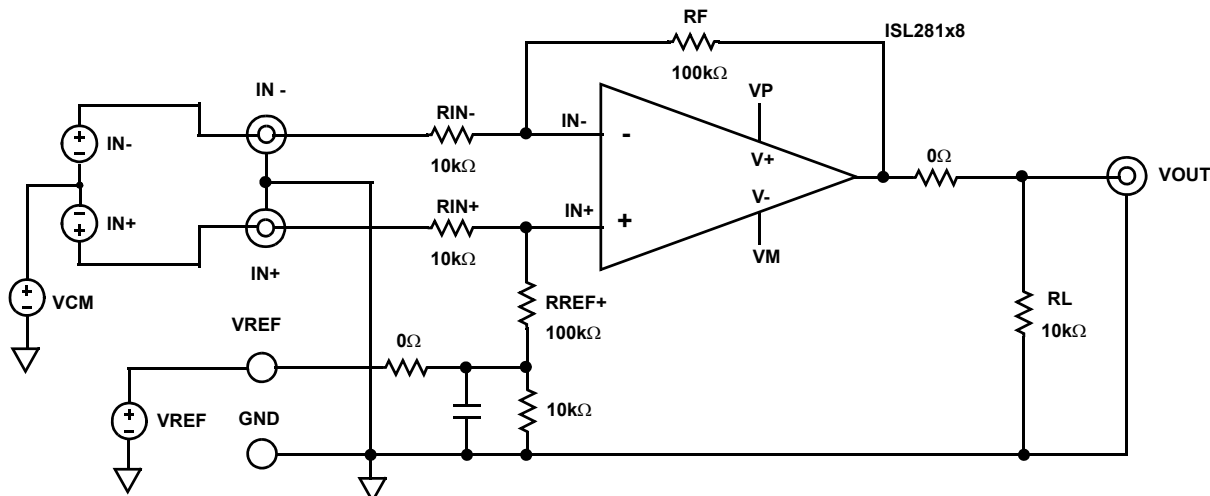


FIGURE 2. BASIC AMPLIFIER CONFIGURATION

User-selectable Options (Figures 3 and 4)

Component pads are included to enable a variety of user-selectable circuits to be added to the amplifier inputs, the VREF input, outputs and the amplifier feedback loops.

A voltage divider and filter option (Figure 3) can be added to establish a power supply-tracking common mode reference at the VREF input. The inverting and non-inverting inputs have additional resistor placements for adding input attenuation, or to establish input DC offsets through the VREF pin.

The output (Figure 4) has a 10kΩ load resistor to ground, and has additional resistor and capacitor placements for loading.

NOTE: Operational amplifiers are sensitive to output capacitance and may oscillate. In the event of oscillation, reduce output capacitance by using shorter cables, or add a resistor in series with the output.

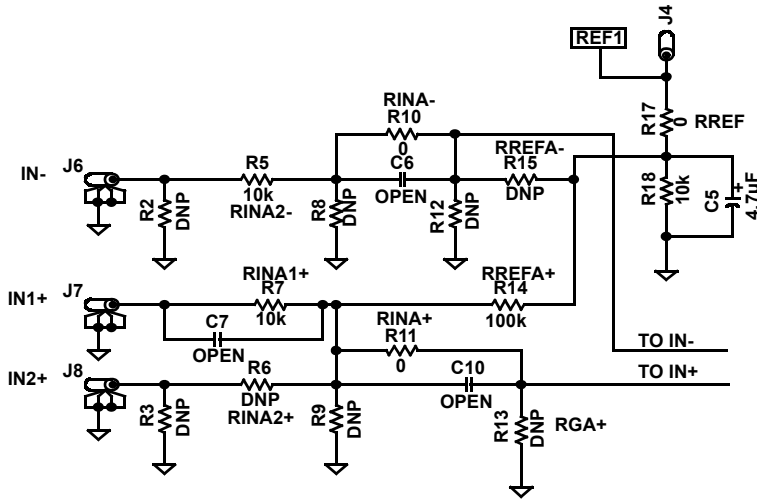


FIGURE 3. 1/2 INPUT STAGE

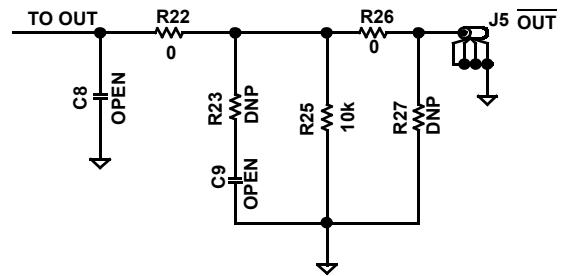
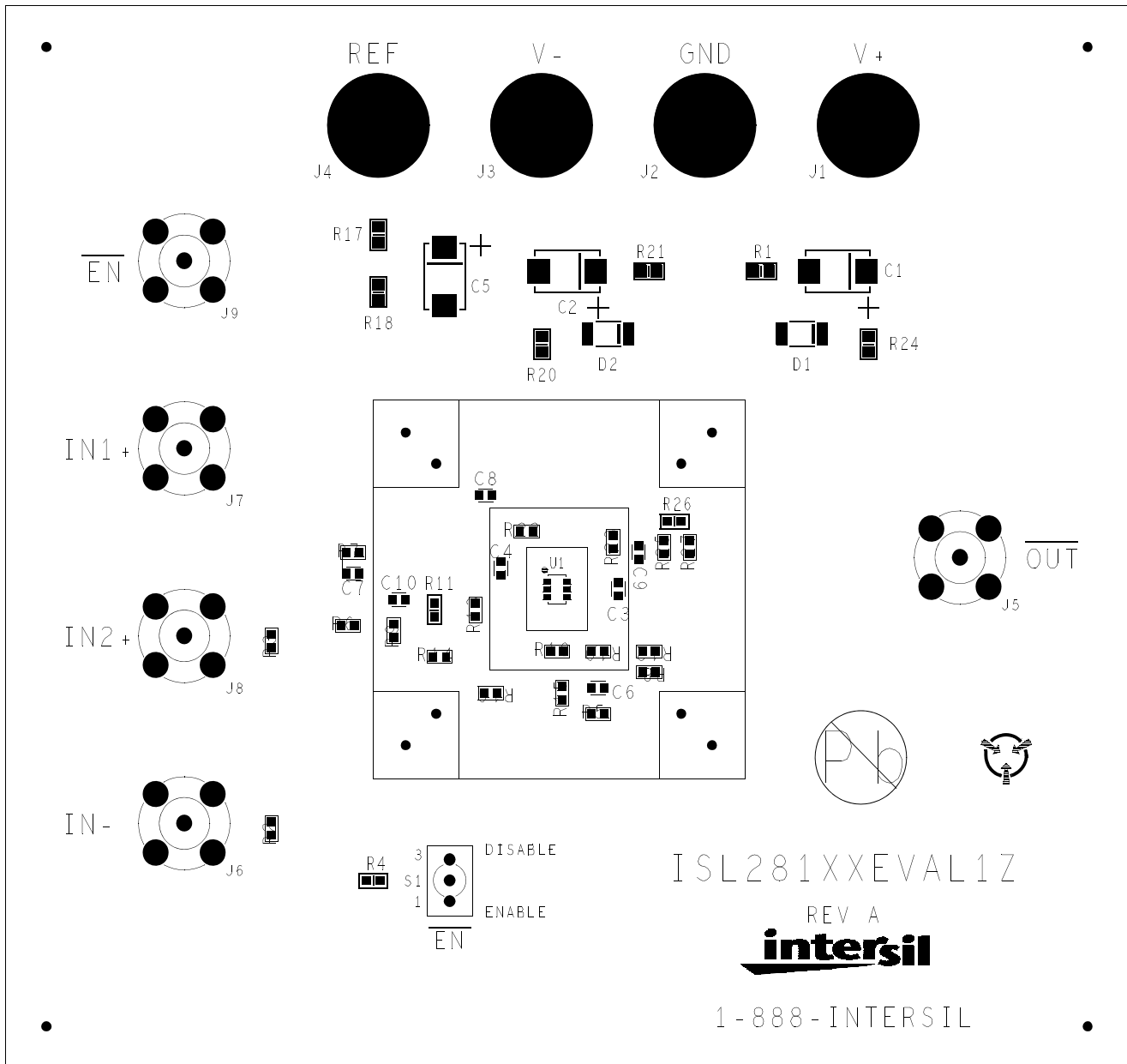


FIGURE 4. 1/2 OUTPUT STAGE

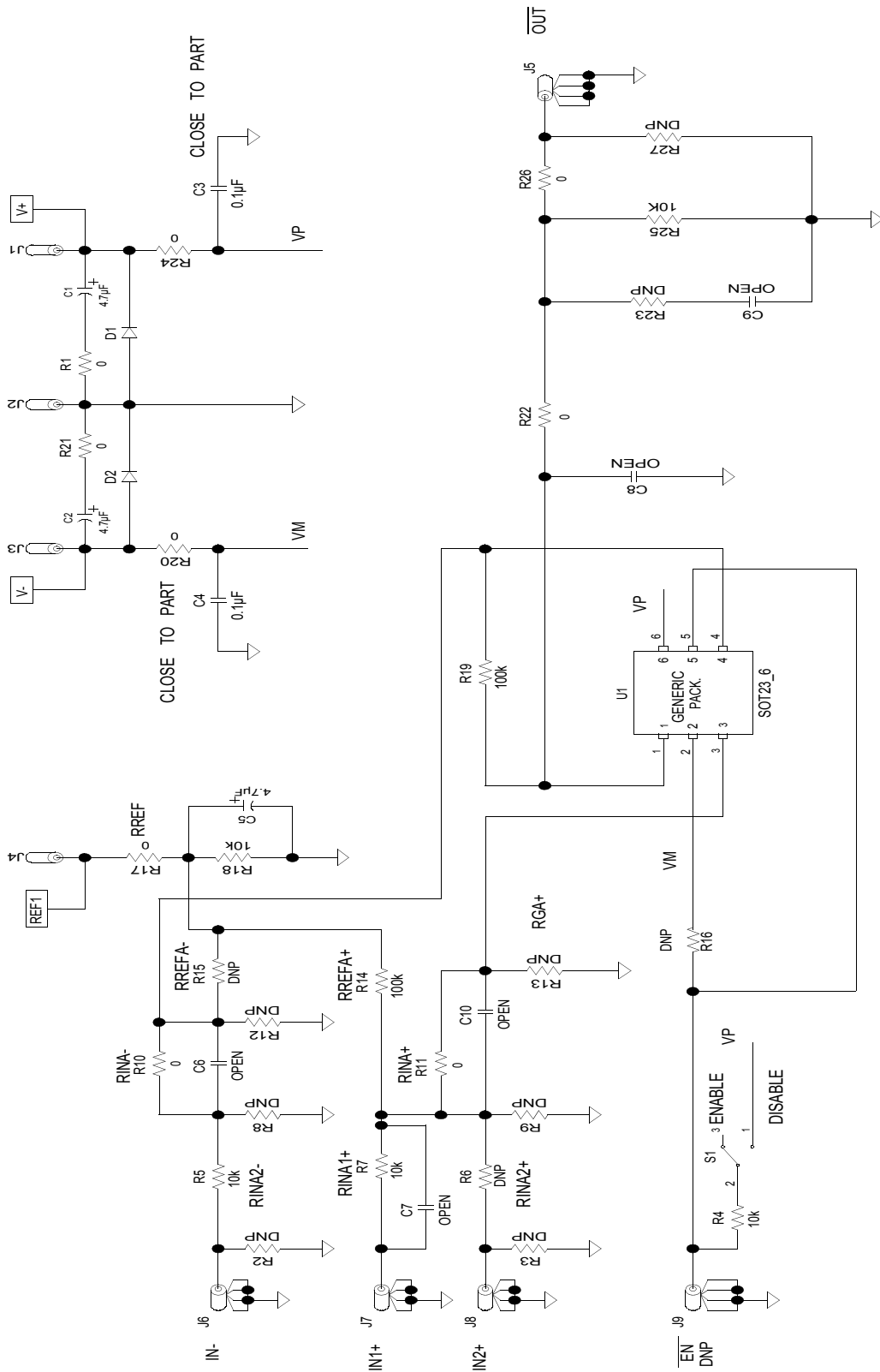
ISL281x8EVAL1Z Components Parts List

DEVICE NUMBER	DESCRIPTION	COMMENTS
C1, C2, C5	CAP-TANTALUM,S MD, D, 4.7µF, 50V, 10%, LOW ESR, ROHS	Power Supply Decoupling
C3, C4	CAP, SMD, 0603, 0.1µF, 25V, 10%, X7R, ROHS	Power Supply Decoupling
C6 to C10	CAP, SMD, 0603, DNP-PLACE HOLDER, ROHS	User-selectable capacitors - not populated
D1, D2	DIODE-RECTIFIER, SMD, SOD-123, 2P, 40V, 0.5A, ROHS	Reverse Power Protection
U1 (ISL28138EVAL1Z)	ISL28138FHZ-T7, IC-RAIL-TO-RAIL OP AMP, SOT-23, ROHS	
U1 (ISL28148EVAL1Z)	ISL28148FHZ-T7, IC-RAIL-TO-RAIL OP AMP, SOT-23, ROHS	
U1 (ISL28158EVAL1Z)	ISL28158FHZ-T7, IC-RAIL-TO-RAIL OP AMP, SOT-23, ROHS	
U1 (ISL28168EVAL1Z)	ISL28168FHZ-T7, IC-RAIL-TO-RAIL OP AMP, SOT-23, ROHS	
R2, R3, R6, R8, R9, R12, R13, R15, R16, R23, R25, R27	RESISTOR, SMD, 0603, 0.1%, MF, DNP-PLACE HOLDER	User-selectable resistors - not populated
R1, R10, R11, R17, R20, R21, R24, R26, R22	RES, SMD, 0603, 0Ω, 1/10W, TF, ROHS	0Ω user selectable resistors
R4, R5, R7, R18	RES, SMD, 0603, 10k, 1/10W, 1%, TF, ROHS	Gain and other user selectable resistors
R14, R19	RES, SMD, 0603, 100k, 1/10W, 1%, TF, ROHS	Gain resistors

ISL281x8EVAL1Z Top View



ISL281x8EVAL1Z Schematic Diagram



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(Rev.4.0-1 November 2017)



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