

Introduction

The ISL2819xEVAL1Z evaluation board is a design platform containing all the circuitry needed to characterize critical performance parameters of the ISL28196 and ISL28197 comparators, using a variety of user defined test circuits.

The ISL28196 and ISL28197 are CMOS comparators featuring low supply currents (2.5uA and 0.8uA respectively), low input bias currents (15pA), rail-to-rail input and output drive capability, and are designed to operate with two 1.5V Alkaline batteries.

Ordering Information

- ISL28196EVAL1Z
- ISL28197EVAL1Z

Reference Documents

- ISL28196, ISL28197 Data Sheet, FN6152

Evaluation Board Key Features

The ISL2819xEVAL1Z is designed to enable the IC to operate from a single supply, +1.8VDC to +5.5VDC or from split supplies, ±0.9VDC to ±2.75V. The board is configured for a single comparator. An external reference voltage (VREF) pin provides the capability to adjust comparator threshold level.

Power Supplies (Figure 1)

External power connections are made through the +V, -V, VREF 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.

Comparator Configuration (Figure 2)

The schematic of the comparator with the components supplied is shown in Figure 2. Resistors R12 and R15 form a high resistance voltage divider with a current draw of only 250nA at VREF = 5V. At this level, the low bias current (15pA) adds only 75μV of error to the comparator threshold level of 2.5V. Resistors R5 and R6 form high impedance inputs to prevent loading of the input signal.

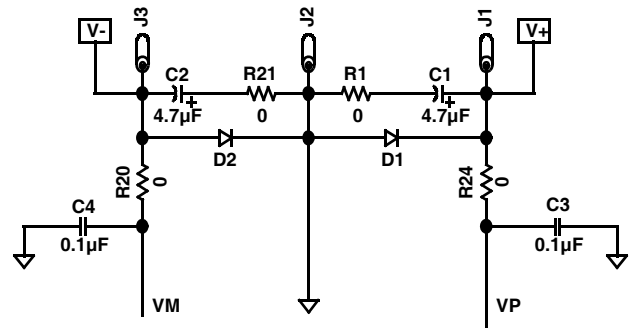


FIGURE 1. POWER SUPPLY CIRCUIT

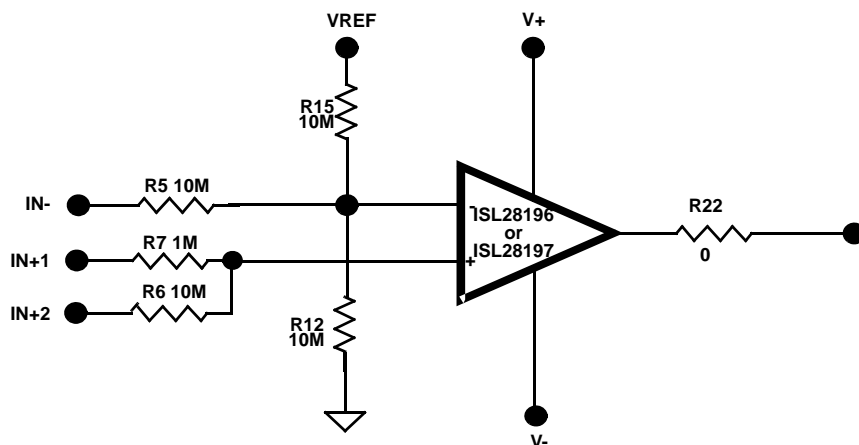


FIGURE 2. EQUIVALENT CIRCUIT SCHEMATIC

User-selectable Options (Figures 3, 4)

Component pads are included to enable a variety of user-selectable circuits to be added to the comparator inputs, the VREF input, and comparator output.

A voltage divider and filter option (Figure 4) 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 5) has additional resistor and capacitor placements for loading.

Comparator with Hysteresis (Figure 5)

A positive feedback hysteresis loop can be created by a connection between the output and one of the non-inverting inputs (IN1+ or IN2+). The other non-inverting input can be used to set the comparator's threshold level. The ratio of R6 and R7 can be used to select the desired hysteresis level. Since IN-, in this case, becomes the comparator's signal input, R12 and R15 will have to be removed.

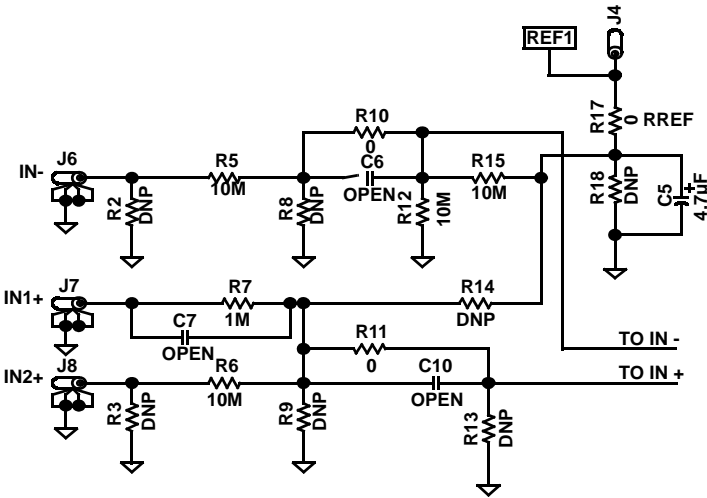


FIGURE 3. INPUT STAGE

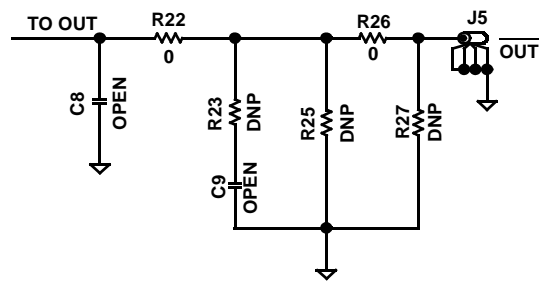


FIGURE 4. OUTPUT STAGE

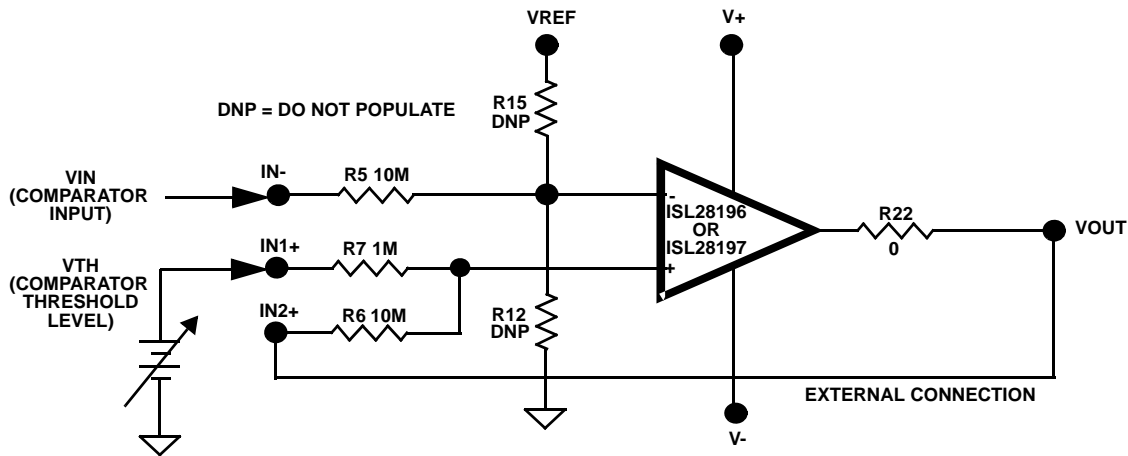


FIGURE 5. COMPARATOR WITH HYSTERESIS

ISL2819xEVAL1Z Components Parts List

DEVICE #	DESCRIPTION	COMMENTS
C1,C2, C5	CAP-TANTALUM, SMD, D, 4.7 μ F, 50V,10%.LOW ESR, ROHS	Power Supply Decoupling
C3, C4	CAP, SMD, 0603, 0.1 μ F, 25V,10%, X7R, ROHS	Power Supply Decoupling
C6-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 (ISL28196EVAL1Z)	ISL28196FHZ-T7, IC-RAIL-TO-RAIL COMPARATOR, SOT-23, ROHS	
U1 (ISL28197EVAL1Z)	ISL28197FHZ-T7, IC-RAIL-TO-RAIL COMPARATOR, SOT-23, ROHS	
R2, R3, R8, R9, R13, R14, R16, R18, R19, R23, R25, R27	RESISTOR, SMD, 0603, 0.1%, MF, DNP-PLACE HOLDER	User-selectable resistors - not populated
R1, R10, R11, R17, R20, R21, R22, R24, R26	RES, SMD, 0603, 0 Ω , 1/10W, TF, ROHS	0 Ω user-selectable resistors
R4	RES, SMD, 0603, 10k, 1/10W, 1%, TF, ROHS	Gain and other user-selectable resistors
R7	RES, SMD, 0603, 1M, 1/10W, 1%, TF, ROHS	Input resistors
R5, R6, R12, R15	RES, SMD, 0603, 10M, 1/10W, 1%, TF, ROHS	Input resistors

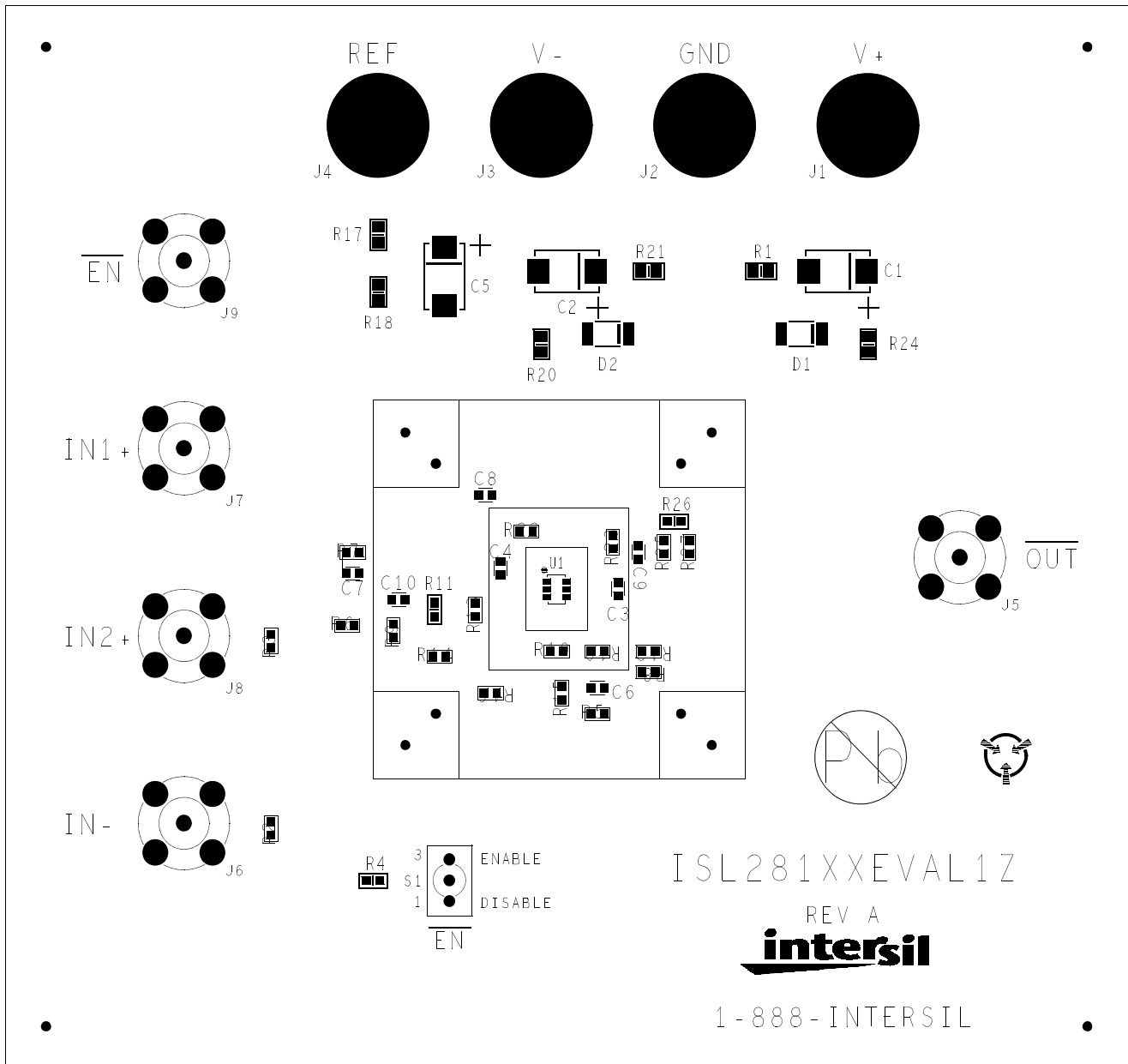


FIGURE 6. ISL2819xEVAL1Z TOP VIEW

Intersil Corporation reserves the right to make changes in circuit design, software and/or specifications at any time without notice. Accordingly, the reader is cautioned to verify that the Application Note or Technical Brief is current before proceeding.

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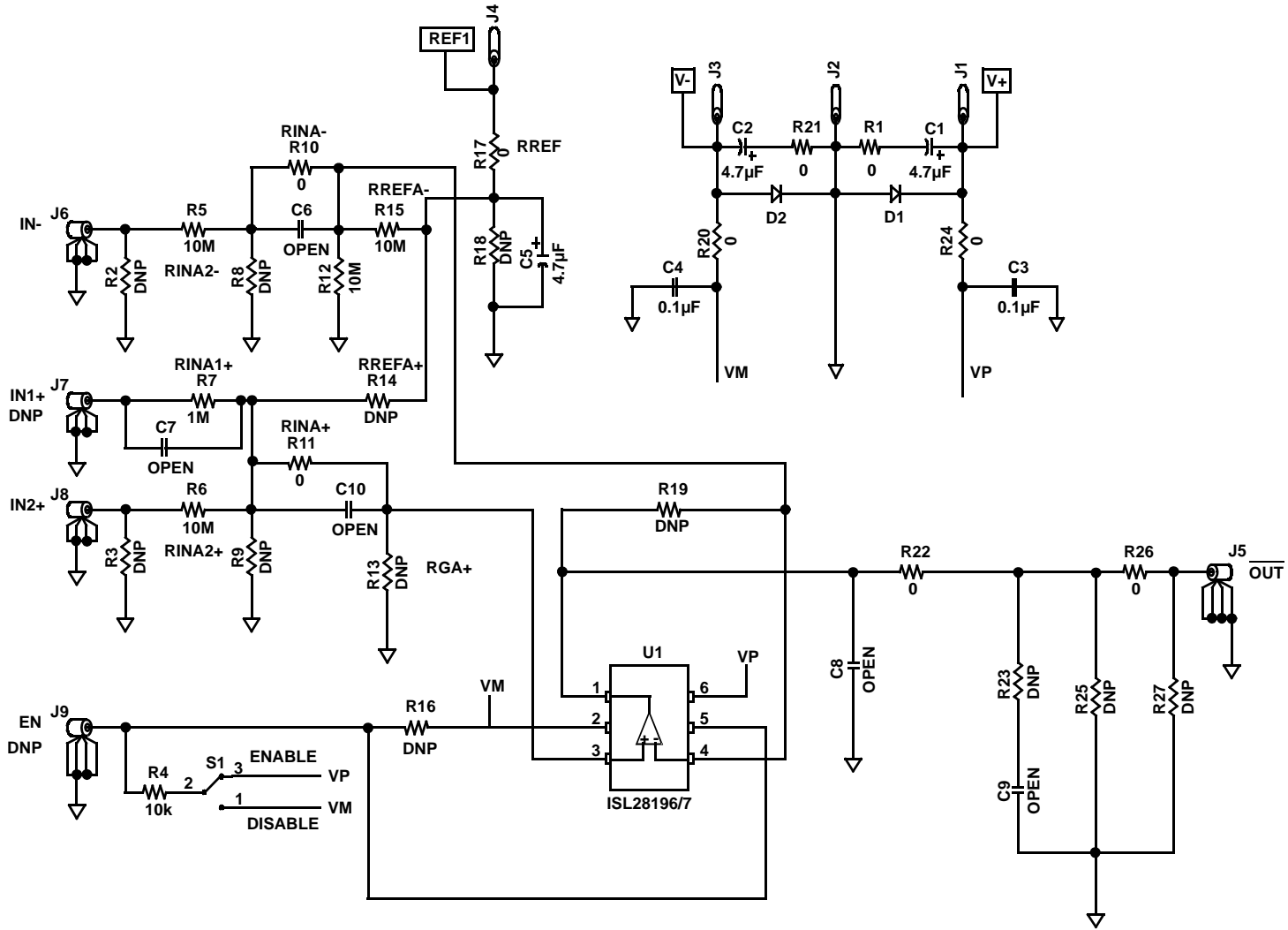


FIGURE 7. ISL2819xEVAL1Z SCHEMATIC DIAGRAM