## Introduction

The ISL284xxEVAL1Z evaluation board is a design platform containing all the circuitry needed to characterize critical performance parameters of the ISL28470 quad instrumentation amplifier using a variety of user defined test circuits.

The ISL284xx are quad operational amplifiers featuring low noise, low distortion, and rail-to-rail output drive capability. They are designed to operate with single and dual supplies from $+5 \mathrm{VDC}( \pm 2.5 \mathrm{VDC})$ down to $+2.4 \mathrm{VDC}( \pm 1.2 \mathrm{VDC})$.

## Reference Documents

- ISL28476 Data Sheet, FN6301
- ISL28478 Data Sheet, FN6339
- ISL28486 Data Sheet, FN6312
- ISL28488 Data Sheet, FN6339


## Evaluation Board Key Features

The ISL284xxEVAL1Z is designed to enable the IC to operate from a single supply ( +2.4 VDC to +5 VDC ), or from split supplies ( $\pm 1.2 \mathrm{VDC}$ to $\pm 2 / 5 \mathrm{~V}$ ). The board is configured for 4 independent op amps connected for differential input with a closed loop gain of 10. A single external reference voltage (VREF) pin and provisions for a user-selectable voltage divider (filter is included).

## Power Supplies (Figure 1)

External power connections are made through the $\mathrm{V}_{+}, \mathrm{V}_{-}$ and GND connections on the evaluation board. For single
supply operation, the $\mathrm{V}_{-}$and GND pins are tied together to the power supply negative terminal. For split supplies $+V$ and $\mathrm{V}_{\text {- }}$ terminals connect to their respective power supply terminals. De-coupling capacitors $\mathrm{C}_{1}$ and $\mathrm{C}_{2}$, connect to GND through $R_{1}$ and $R_{2}, 0 \Omega$ resistors. Resistors $R_{3}$ and $R_{4}$ are $0 \Omega$ but can be changed by the user to provide additional power supply filtering, or to reduce the voltage rate-of-rise to less than $\pm 1 \mathrm{~V} / \mu \mathrm{s}$. Anti-reverse diodes $\mathrm{D}_{1}$ and $\mathrm{D}_{2}$ protect the circuit in the case of accidental polarity reversal.


FIGURE 1. POWER SUPPLY CIRCUIT

## Amplifier Configuration (Figure 2)

The schematic of each of the 4 op amps 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 2.4 VDC to +5 VDC supply, or from dual supplies from $\pm 1.2 \mathrm{VDC}$ to $\pm 2.5 \mathrm{VDC}$. 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 (Figure 3)

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


FIGURE 3. COMPONENT-SELECTABLE OPTIONS

## ISL284xxEVAL1Z Components Parts List

| DEVICE NUMBER | DESCRIPTION | COMMENTS |
| :---: | :---: | :---: |
| C1, C2, C5 | CAP-TANTALUM, SMD, D, $4.7 \mu \mathrm{~F}, 50 \mathrm{~V}, 10 \%$ LOW ESR, ROHS | Power Supply Decoupling |
| C3, C4 | CAP, SMD, 0603, $0.1 \mu \mathrm{~F}, 25 \mathrm{~V}, 10 \%$, X7R, ROHS | Power Supply Decoupling |
| C6-C25 | 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 (ISL28476EVAL1Z) | ISL28476FAZ, IC-RAIL-TO-RAIL PRECISION OP AMP, 16P, QSOP, ROHS |  |
| U1 (ISL28478EVAL1Z) | ISL28478FAZ, IC-RAIL-TO-RAIL PRECISION OP AMP, 16P, QSOP, ROHS |  |
| U1 (ISL28486EVAL1Z) | ISL28486FAZ, IC-RAIL-TO-RAIL PRECISION OP AMP, 16P, QSOP, ROHS |  |
| U1 (ISL28488EVAL1Z) | ISL28488FAZ, IC-RAIL-TO-RAIL PRECISION OP AMP, 16P, QSOP, ROHS |  |
| R2-R4, R11-R13, R20-R23, R25, R26, R28, R30, R31, R34, R38, R42, R43, R46, R55-R58, R59-R62 | RESISTOR, SMD, 0603, 0.1\%, MF, DNP-PLACE HOLDER | User selectable resistors - not populated |
| R6, R8, R10, R15, R17, R19, R36, R41, R51-R54, R63-R66 | RES, SMD, 0603, $0 \Omega, 1 / 16 \mathrm{~W}, \mathrm{TF}, \mathrm{ROHS}$ | $0 \Omega$ user selectable resistors |
| R5, R7, R9, R14, R16, R18, R33, R35, R40, R67-R70 | RES, SMD, 0603, 10k, 1/10W, 1\%, TF, ROHS | RG gain resistors |
| $\begin{gathered} \text { R24, R27, R29, R39, R45, R47, } \\ \text { R49, R50 } \end{gathered}$ | RES, SMD, 0603, 100k, 1/10W, 1\%, TF, ROHS | RF gain resistors |
| R1, R32, R37, R44, R48 | RES, SMD, 0805, 0 2 , 1/8W, TF, ROHS | $0 \Omega$ user selectable resistors |

ISL28xxEVAL1Z Top View
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ISL284XXEVAL1Z Schematic Diagram


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