

ISL1557IRZ-EVAL

The ISL1557IRZ-EVAL evaluation board is designed to provide a quick and easy method for evaluating the [ISL1557](#). The ISL1557 is a high-speed current feedback differential amplifier used in a single port Power Line Communication (PLC) application.

Features

- Drives up to 750mA from a +12V supply
- Full, medium, low, and disable power settings

Specifications

This board is optimized for the following operating conditions:

- Nominal Supply Voltage = $\pm 6V$ or $+12V$
- Bias Voltages at pins Bias 0 and Bias 1:
 $V_{IH(min)} = 2V, V_{IL(max)} = 0.8V$
- Signal Bandwidth: 35kHz to 190MHz

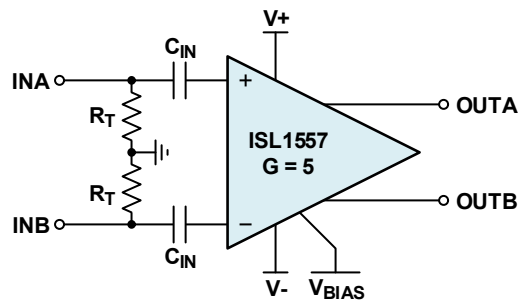


Figure 1. ISL1557IRZ-EVAL Block Diagram

Contents

1. Functional Description	3
1.1 Gain Setting	3
1.2 Operating Conditions	3
1.3 Evaluation Set Up	3
2. Board Design	4
2.1 PCB Layout Guidelines	5
2.2 Schematic Drawing	5
2.3 Bill of Materials	6
2.4 Board Layout	7
3. Typical Performance Graphs	8
4. Ordering Information	8
5. Revision History	8

1. Functional Description

1.1 Gain Setting

The ISL1557IRZ evaluation board is set to a gain of 5V/V. The gain can be adjusted by changing RCG.

$$(EQ. 1) \quad A_V = 1 + \frac{RFA}{0.5 \times RCG}$$

1.2 Operating Conditions

The ISL1557IRZ operates on a nominal supply of $\pm 6V$ or $+12V$. The C0 and C1 control pins bias the operating supply current of the ISL1557IRZ. Table 1 summarizes the four power modes and the typical supply current for each mode. The minimum voltage to set C0 and C1 pins high is 2V and the maximum voltage to set C0 and C1 pins low is 0.8V.

Table 1. Operating Power Modes

Power Modes	C0	C1	Supply Current per Port
Full Power	0	0	30mA
Medium Power	1	0	22mA
Low Power	0	1	12mA
Disable	1	1	1.2mA

1.3 Evaluation Set Up

1. Connect +12V to +VS pin and ground to -VS and GND pin.
2. Turn on the power supply and the quiescent supply current in full power mode for the two amplifiers should read 30mA.
3. Apply a 1MHz differential sine wave signal from -0.25V to +0.25V ($0.5V_{P-P}$) to INA and INB. $1V_{P-P}$ differential across INA-INB.
4. With an oscilloscope, probe OUTA (Pin 16) or OUTB (Pin 13) with a high impedance ($10M\Omega$) probe and verify correct output voltage. Each output has $\pm 1.25V$ ($2.5V_{P-P}$). $5V_{P-P}$ differential across Pin 16 and Pin 13.

2. Board Design



Figure 2. ISL1557IRZ-EVAL Evaluation Board (Top)

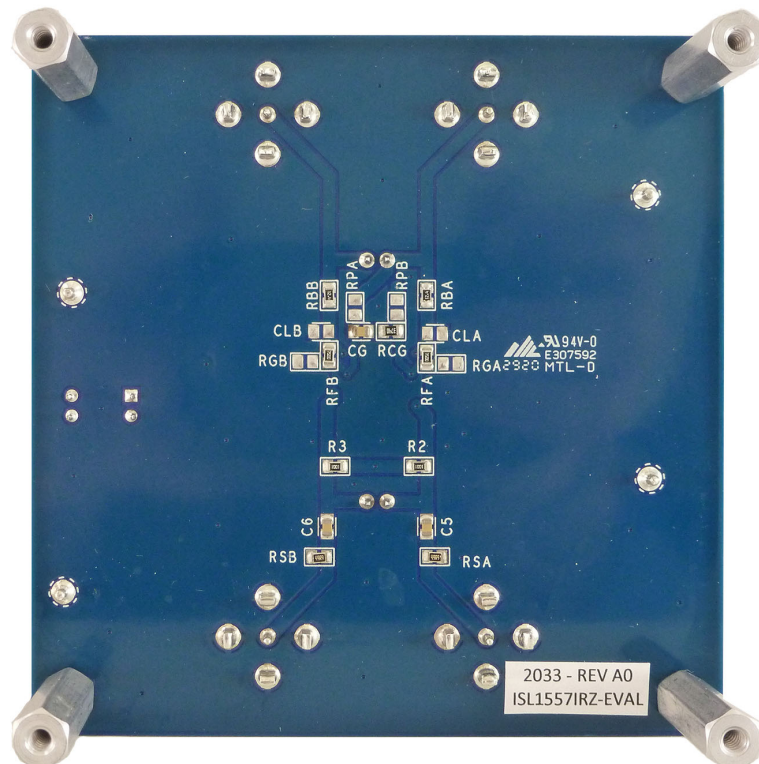


Figure 3. ISL1557IRZ-EVAL Evaluation Board (Bottom)

2.1 PCB Layout Guidelines

C2 and C4 are small ceramic signal decoupling capacitors and C1 and C3 are tantalum power supply decoupling capacitors. Renesas recommends placing the decoupling capacitors close to the supply pins. **Note:** Be careful of the polarities of C1 and C3 because it can be set to either positive or negative. Place RFA and RFB as close as possible to the inverting and output pins to keep the feedback loop minimal. See the ISL1557 datasheet for the appropriate feedback and gain settings.

2.2 Schematic Drawing

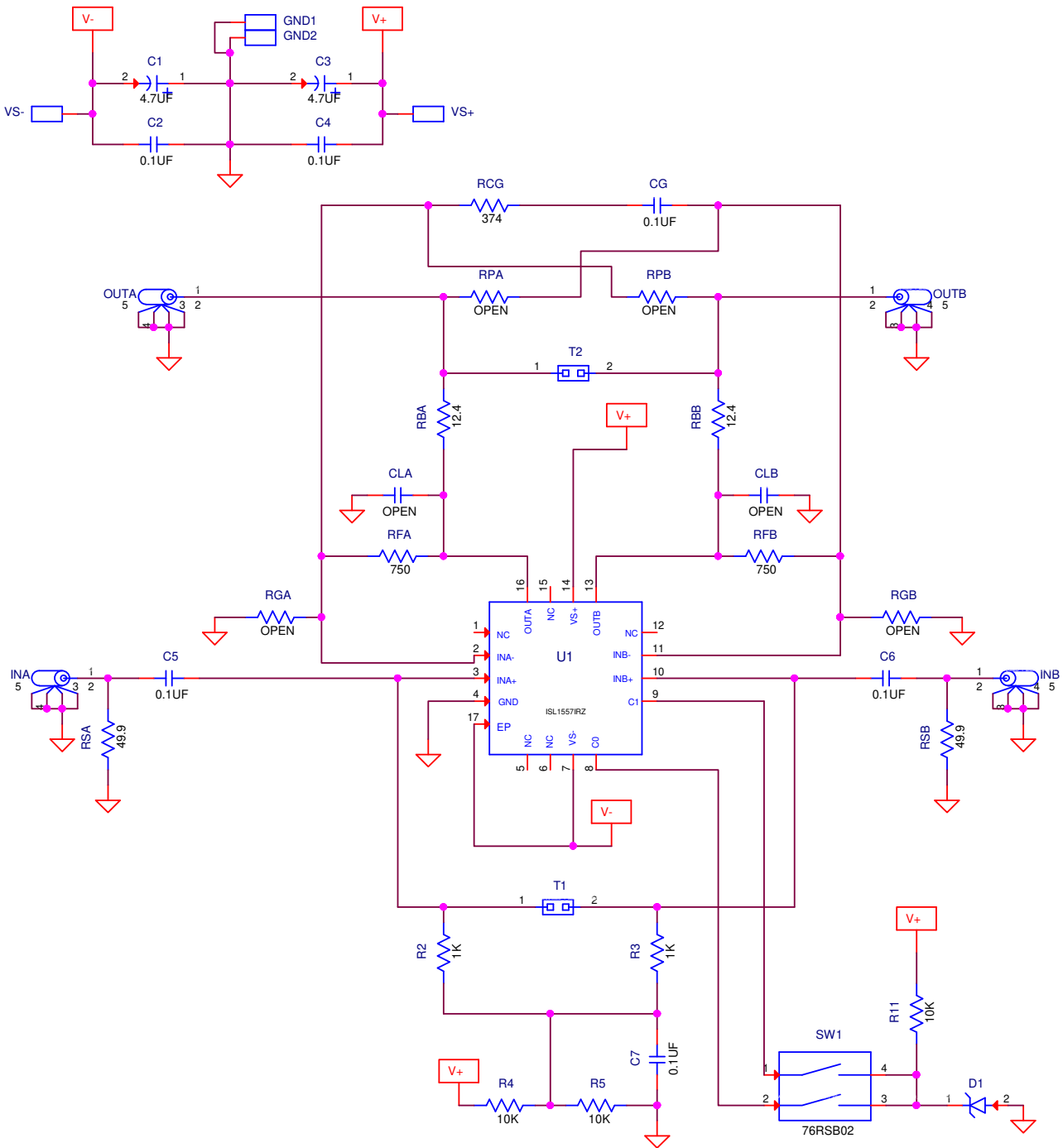


Figure 4. Schematic

2.3 Bill of Materials

Qty	Reference Designator	Description	Manufacturer	Manufacturer Part
1		PWB-PCB, ISL1571IRZEVALZ, REVA, ROHS	Imagineering Inc	ISL1571IRZEVALZREVAPCB
6	C2, C4, C5, C6, C7, CG	CAP, SMD, 0805, 0.1 μ F, 50V, 5%, X7R, ROHS	Kemet	C0805C104J5RACTU
0	CLA, CLB	CAP, SMD, 0805, DNP-PLACE HOLDER, ROHS		
2	C1, C3	CAP TANT, SMD, C, 4.7 μ F, 25V,10%, ROHS	Kemet	T491C475K025AT
4	VS+, VS-, GND1, GND2	CONN-GEN, TURRET, UNINSUL, 0.076 MNT.HOLE, ROHS	Cambion	160-2044-02-01-00
4	INA, INB, OUTA, OUTB	CONN-BNC, RECEPTACLE, TH, 4 POST, 50 Ω , SILVERCONTACT, ROHS	Amphenol	31-5329-51RFX
2	T1,T2	CONN-HEADER, 1x2, RETENTIVE, 2.54mm,0.230x0.120, ROHS	BERG/FCI	69190-202HLF
1	D1	DIODE-ZENER, SMD, SOD-80 MiniMELF, 5.1V, 5%, 0.5W, ROHS	Vishay	TZM5231B-GS08
1	U1	IC-POWER LINE COMMUNICATION, 16P, QFN, ROHS	Renesas Electronics	ISL1557IRZ-T7
2	R2, R3	RES, SMD, 0805, 1k, 1/8W, 1%, TF, ROHS	Venkel	CR0805-8W-1001FT
3	R4, R5, R11	RES, SMD, 0805, 10k, 1/8W, 1%, TF, ROHS	Venkel	CR0805-8W-1002FT
1	RCG	RES, SMD, 0805, 374 Ω , 1/8W, 1%, TF, ROHS	Yageo	RC0805FR-07374RL
2	RBA, RBB	RES, SMD, 0805, 12.4 Ω , 1/8W, 1%, TF, ROHS	Rohm	MCR10EZHF12R4
2	RSA, RSB	RES, SMD, 0805, 49.9 Ω , 1/8W, 1%, TF, ROHS	Rohm	MCR10EZHF49R9
2	RFA, RFB	RES, SMD, 0805, 750 Ω , 1/8W, 1%, TF, ROHS	Panasonic	ERJ-6ENF7500V
0	RGA, RGB, RPA, RPB	RES, SMD, 0805, DNP-PLACE HOLDER, ROHS		
1	SW1	SWITCH-DIP, ROCKER, TH, 2POS, SPST, 150mA, 300V _{DC} , ROHS	Grayhill	76RSB02ST
4	Four Corners	SCREW, 4-40x1/4in, PHILLIPS, PANHEAD, STAINLESS, ROHS	Building Fasteners	PMSSS 440 0025 PH
4	Four Corners	STANDOFF, 4-40x3/4in, F/F, HEX, ALUMINUM, 0.25 OD, ROHS	Keystone	2204

3. Typical Performance Graphs

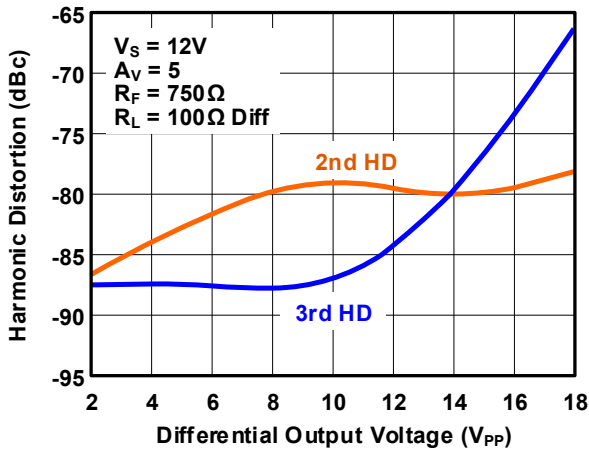


Figure 9. Harmonic Distortion at 10MHz (Full Bias Mode)

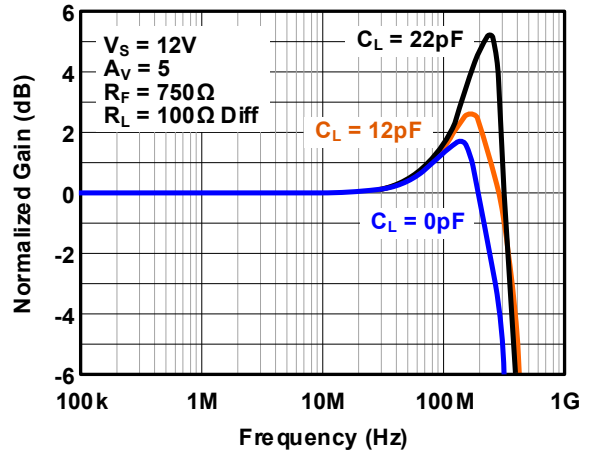


Figure 10. Frequency Response with Various C_L (Full Bias Mode)

4. Ordering Information

Part Number	Description
ISL1557IRZ-EVAL	ISL1557 evaluation board

5. Revision History

Rev.	Date	Description
1.00	Apr 6, 2021	Initial release

IMPORTANT NOTICE AND DISCLAIMER

RENESAS ELECTRONICS CORPORATION AND ITS SUBSIDIARIES (“RENESAS”) PROVIDES TECHNICAL SPECIFICATIONS AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for developers skilled in the art designing with Renesas products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. Renesas grants you permission to use these resources only for development of an application that uses Renesas products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Renesas intellectual property or to any third party intellectual property. Renesas disclaims responsibility for, and you will fully indemnify Renesas and its representatives against, any claims, damages, costs, losses, or liabilities arising out of your use of these resources. Renesas' products are provided only subject to Renesas' Terms and Conditions of Sale or other applicable terms agreed to in writing. No use of any Renesas resources expands or otherwise alters any applicable warranties or warranty disclaimers for these products.

(Rev.1.0 Mar 2020)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:
www.renesas.com/contact/

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.