ISL284xxEVAL1Z

Evaluation Board User Guide

AN1339
Rev 0.00
July 23, 2007

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 +5VDC (±2.5VDC) down to +2.4VDC (±1.2VDC).

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 (+2.4VDC to +5VDC), or from split supplies (±1.2VDC to ±2/5V). 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 V_+, V_- and GND connections on the evaluation board. For single supply operation, the V_- and GND 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 C_1 and C_2, connect to GND through R_1 and R_2, 0Ω resistors. Resistors R_3 and R_4 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. Anti-reverse diodes D_1 and D_2 protect the circuit in the case of accidental polarity reversal.

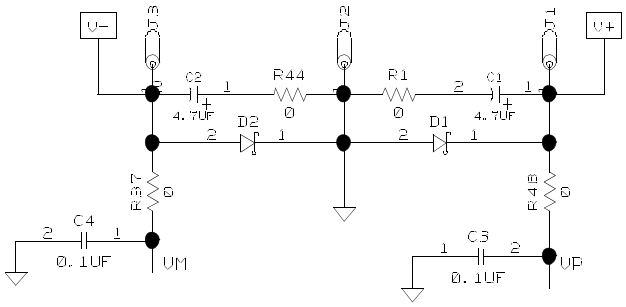


FIGURE 1. POWER SUPPLY CIRCUIT

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 2.4VDC to +5VDC supply, or from dual supplies from ±1.2VDC to ±2.5VDC. 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.

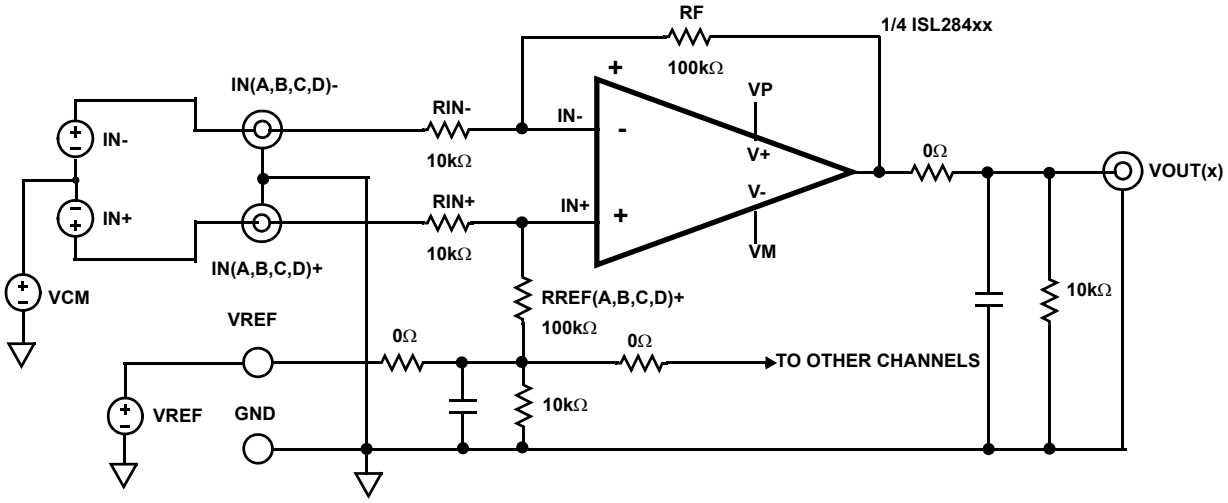


FIGURE 2. BASIC AMPLIFIER CONFIGURATION

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.

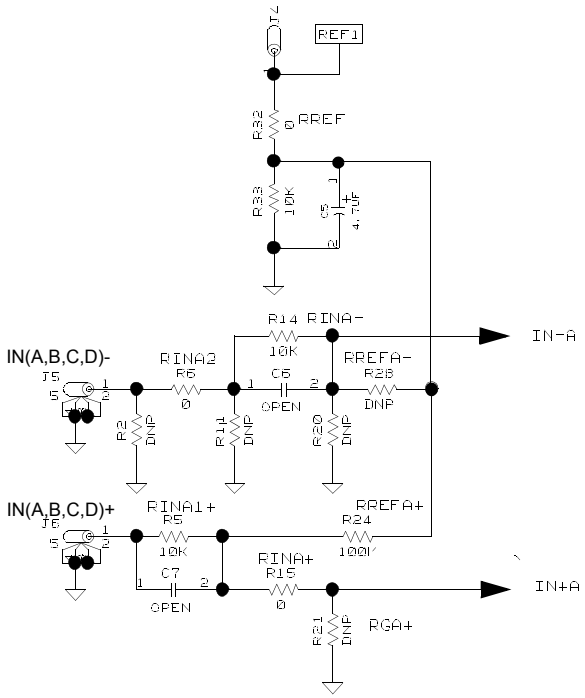
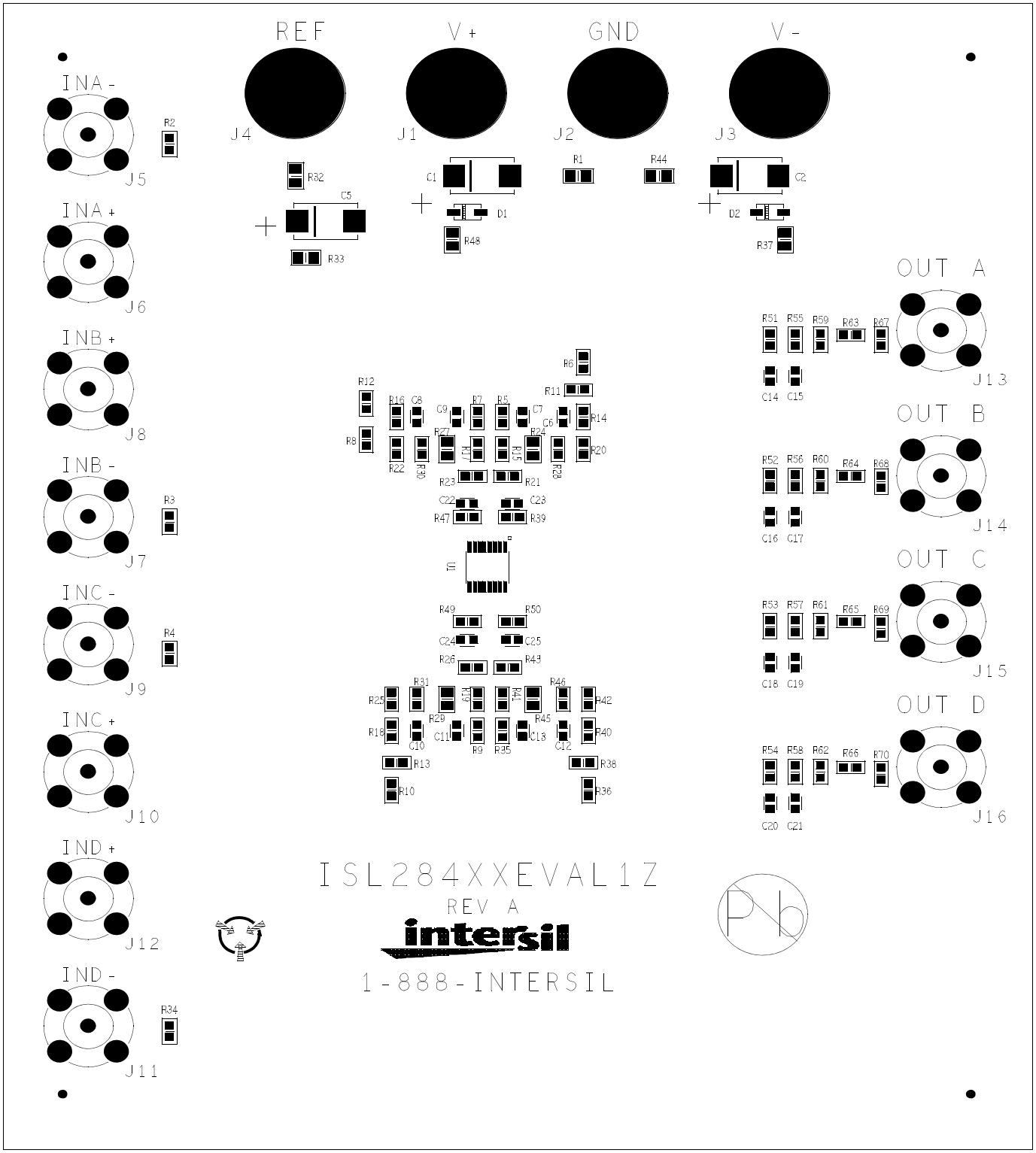


FIGURE 3. COMPONENT-SELECTABLE OPTIONS

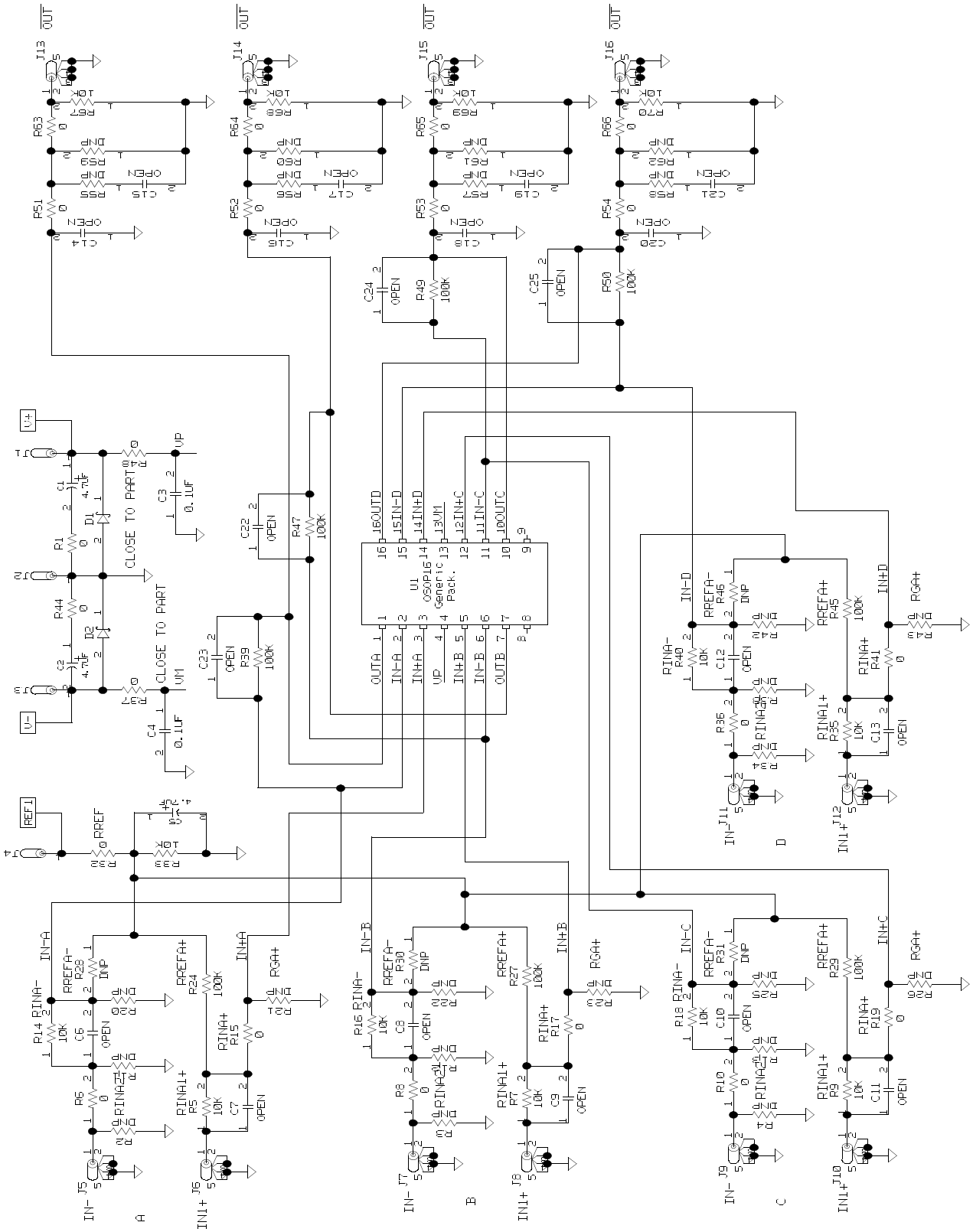
ISL284xxEVAL1Z Components Parts List

DEVICE NUMBER	DESCRIPTION	COMMENTS
C1, C2, C5	CAP-TANTALUM, SMD, D, 4.7µF, 50V, 10% LOW ESR, ROHS	Power Supply Decoupling
C3, C4	CAP, SMD, 0603, 0.1µF, 25V, 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, 0Ω, 1/16W,TF, ROHS	0Ω 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
R24, R27, R29, R39, R45, R47, R49, R50	RES, SMD, 0603, 100k, 1/10W, 1%, TF, ROHS	RF gain resistors
R1, R32, R37, R44, R48	RES, SMD, 0805, 0Ω, 1/8W, TF, ROHS	0Ω user selectable resistors

ISL28xxEVAL1Z Top View



ISL284XXEVAL1Z Schematic Diagram



Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other claims involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
4. You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
5. Renesas Electronics products are classified according to the following two quality grades: “Standard” and “High Quality”. The intended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below.

   "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.

   "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.

   Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user’s manual or other Renesas Electronics document.
6. When using Renesas Electronics products, refer to the latest product information (data sheets, user’s manuals, application notes, “General Notes for Handling and Using Semiconductor Devices” in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, such as safety design for hardware and software, including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
10. It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
11. This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.

(Note 1) “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.

(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

(Rev.4.0-1 November 2017)

RENESAS

SALES OFFICES

Renesas Electronics Corporation

http://www.renesas.com

Refer to "http://www.renesas.com/" for the latest and detailed information.

Renesas Electronics America Inc.
1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.
Tel: +1-408-432-8888, Fax: +1-408-434-5351

Renesas Electronics Canada Limited
9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-651-700, Fax: +44-1628-651-804

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
Room 1709 Quantum Plaza, No.27 ZhichunLu, Haidian District, Beijing, 100191 P. R. China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, 200333 P. R. China
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited
Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852 2886-9022

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics India Pvt. Ltd.
No.777C, 100 Feet Road, HAL 2nd Stage, Indiranagar, Bangalore 560 038, India
Tel: +91-80-67208700, Fax: +91-80-67208777

Renesas Electronics Korea Co., Ltd.
17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5338

Colophon 7.0