

R0E000010ACB20

R20UT2740EJ0100

Rev.1.00

Isolator for the E1 Emulator of RH850 and RL78

Dec 01, 2013

1. Preface

The R0E000010ACB20 is an isolator for the E1 emulator of RH850 and RL78. This product is used for a debugging environment where there is a GND gap between the user system and emulator system.

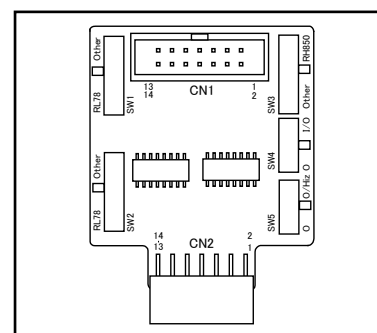
Package Components

Before using this product, check if your R0E000010ACB20 contains all of these items.

Table 1.1 Package Components

Item	Qty.
R0E000010ACB20 (Isolator for the E1 emulator)	1
R0E000010ACB20 User's Manual (English) (This manual)	1
R0E000010ACB20 User's Manual (Japanese)	1

Note: Please handle this product as precision equipment for transportation.



Important

CAUTION

Caution on Isolation Voltage:



This product is intended to isolate a small and electrically safe GND gap between the user system and emulator system. In any case isolation voltage must be maintained within SELV limits i.e. less than 42.4VAC, or 60VDC.

The isolator must never be used as an element of a safety isolation system. The part could be expected to function correctly at higher voltage across the isolation barrier; but then the circuitry on both sides of the barrier must be regarded as operating at an unsafe voltage and further isolation/insulation systems must form a barrier between these circuits and any user-accessible circuitry according to safety standard requirements.

Caution to Be Taken for Disposal:



Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

European Union regulatory notices:



The WEEE (Waste Electrical and Electronic Equipment) regulations put responsibilities on producers for the collection and recycling or disposal of electrical and electronic waste. Return of WEEE under these regulations is applicable in the European Union only. This equipment (including all accessories) is not intended for household use. After use the equipment cannot be disposed of as household waste, and the WEEE must be treated, recycled and disposed of in an environmentally sound manner. Renesas Electronics Europe GmbH can take back end of life equipment, register for this service at "<http://www.renesas.eu/weee>".

Cautions to Be Taken for Handling the Isolator:



- Take full care not to touch any parts or cause short circuits on this product.
- Protect this product from excessive physical shock.
- Do not modify this product. Modifying the product will void your warranty.

Cautions for Use Temperature:



The isolator is to be used in an environment with a maximum ambient temperature of 35°C. Care should be taken that this temperature is not exceeded.

**CAUTION****Cautions to Be Taken for Connecting the Isolator:**

- Always switch OFF the power before connecting or disconnecting this product.
- This product has some switches. Make settings depending on debugging interface you use. Before changing settings power off this product and other connected devices.
- To connect this product to the user system align the #1 pin of the connector to the right position.
- To connect this product to the emulator align the #1 pin of the connector to the right position.

Cautions to Be Taken for Power Supply When Connecting:

- This product needs the power supply from both user system and E1 emulator.
- Do not change the voltage of the user system after turning on the power.
- When an attempt to connect the emulator debugger to the user system has failed, turn off the user system and then unplug and plug the USB cable of the emulator before trying again.

Cautions to Be Taken for Power Supply When Disconnecting:

- Turn off the power supply of the user system promptly when you disconnect the user system from the emulator debugger. If the power supply of a user system continues being ON, a user program will carry out a reset start. Moreover, you may fail to reconnect the emulator debugger to the user system.
- When an attempt to reconnect to the user system has failed, turn off the user system and then unplug and plug the USB cable of the emulator before trying again.

European Union regulatory notices

This product complies with the following EU Directive.

Environmental Compliance and Certification:

- Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EC

2. Specifications

Table 2.1 Product Specifications

Item		Specification	Remark
Supported Emulator		E1 emulator	
Power supply	User system side	Supply from the user system (UVCC) Voltage: 3.0 V to 5.5 V	Supply from the user system (UVCC) needs to be 100 mA (max).
	E1 emulator side	Supply from the emulator's power supply facility Voltage: 3.3 V or 5.0 V	
Acceptable GND gap voltage		less than 42.4VAC, or 60VDC	
Applicable MCU Families		RH850 Family RL78 Family	Isolator's switch settings vary depending on the target MCU you use. See 4.6 Switch Settings for Each MCU for switch setting.
Device for isolation		ACSL-6420-00TE (Avago Technologies US Inc.) IL261-3E (NVE Corporation)	
LED indication		LED1: Illuminated when power is supplied from the emulator LED2: Illuminated when power is supplied from the user system	This isolator is only usable when both LEDs are illuminated.
Operating temperature		5 to 35°C (no condensation)	
Storage temperature		-10 to 60°C (no condensation)	

3. Notes on Usage

Note on Power-Supply Voltage:

When you use an emulator with this isolator connected, power-supply voltage of the MCU on your system should be between 3.0 V and 5.5 V. Power-supply voltage less than 3.0 V is not supported

Notes on Using This Product with RH850 in LPD1pin mode:

- (1) When using this product in LPD1pin mode, it is necessary to start up in 1wireUART by the Renesas Flash Programmer first, following the procedures below.
 - 1) Set the switches to 1wireUART referring to Section 4.1 of this manual.
 - 2) Connect this product to the emulator and the user system referring to Section 4.2.
 - 3) Turn on them referring to Section 4.3.
 - 4) Start the Renesas Flash Programmer.
 - 5) Choose [Microcontroller] menu -> [Set Option Bytes] command.
 - 6) Choose [Microcontroller] menu -> [Set Project], and open [Project Settings] dialog box. Choose [Other Settings] tab and set the value of OPBT0 to LPD1pin mode. (For details see the user's manual of the microcontroller.) Click [OK] and close [Project Settings] dialog box.
 - 7) Click the start button on the main window and rewrite option bytes.
 - 8) Exit the Renesas Flash Programmer.
 - 9) Shut down the power supply referring to Section 4.4.
- (2) Notes on Starting up the CubeSuite+.

Be sure to set [Set OPJTAG in LPD connection before connecting] to [No]. If [Yes] is selected, the debug tool starts up the microcontroller in serial programming mode, and the CubeSuite+ does not start up.
- (3) Notes on Exiting the CubeSuite+

Set [Set OPJTAG in JTAG connection before disconnecting] to [No]. If [Yes] is selected, it is necessary to repeat the procedure (1) described above next time the CubeSuite+ is started up.

Note on LPD data output (LPDO) with RH850 in LPD4pin mode:

When you use an emulator with this isolator connected, do not make terminal processing (pull-up or pull-down) of LPD data output (LPDO) on your system.

4. Usage

4.1 Setting Switches (SW1- SW5)

To configure the circuit of this product depending on the communication method of the MCU you use, set switches SW 1 through SW5. For details, see 4.6 Switch Settings for Each MCU.

4.2 Setup

Confirm both the user system and the emulator are switched OFF before installing this product. Do not connect the USB cable to the emulator. To connect this product to the user system or the emulator, be sure to align the #1 pin of the connector to the right position.

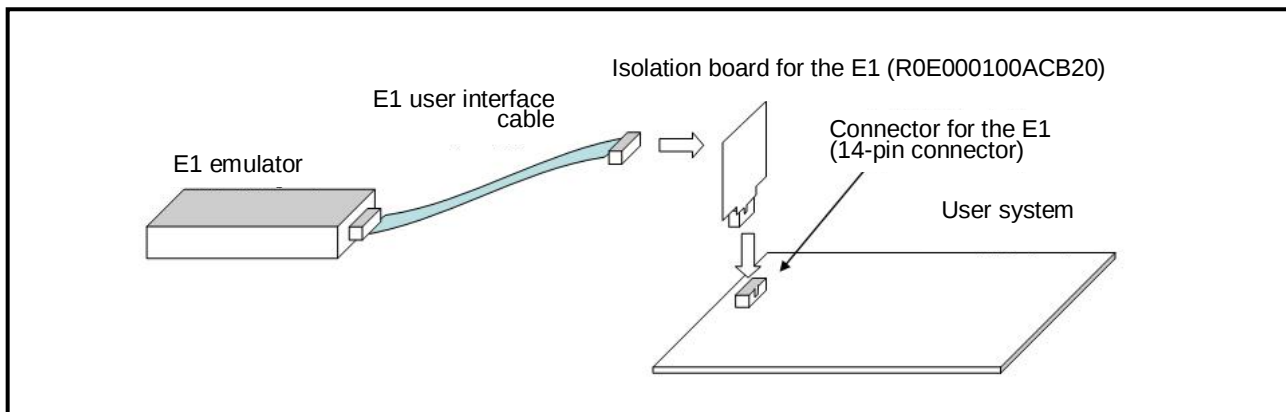


Figure 4.1 Mounting the R0E000010ACB20

4.3 Starting the Power Supply

Start the power supply following the procedure below.

- (1) Turn ON the emulator.

Connect the host machine and the E1 emulator with the USB cable, then, turn on the power for the E1 emulator.

- (2) Turn ON the user system.

Turn ON the user system.

- (3) Start the debugger (Power supply setting).

Start the debugger from the host PC, and set the initial settings so that power is supplied from the emulator. Select 3.3V for supply voltage regardless of the voltage used for the user system.

However, when you cannot choose 3.3V, choose 5.0V.

For the settings after the above, refer to the user's manual for the E1 emulator.

4.4 Shutdown the Power Supply

- (1) Shut down the power supply of the user system.

Shut down the power supply of the user system.

- (2) Shut down the power supply of the emulator.

Remove the USB cable between the host machine and E1 emulator, then, shut down the power supply of the emulator.

4.5 Connection Diagrams

Since isolator IC ACSL-6420-00TE is an open-drain output, it is pulled-up on this product. Figure 4.2 shows connection diagrams for each MCU family. The switches which are configurable according to MCU families are shown on the diagrams.

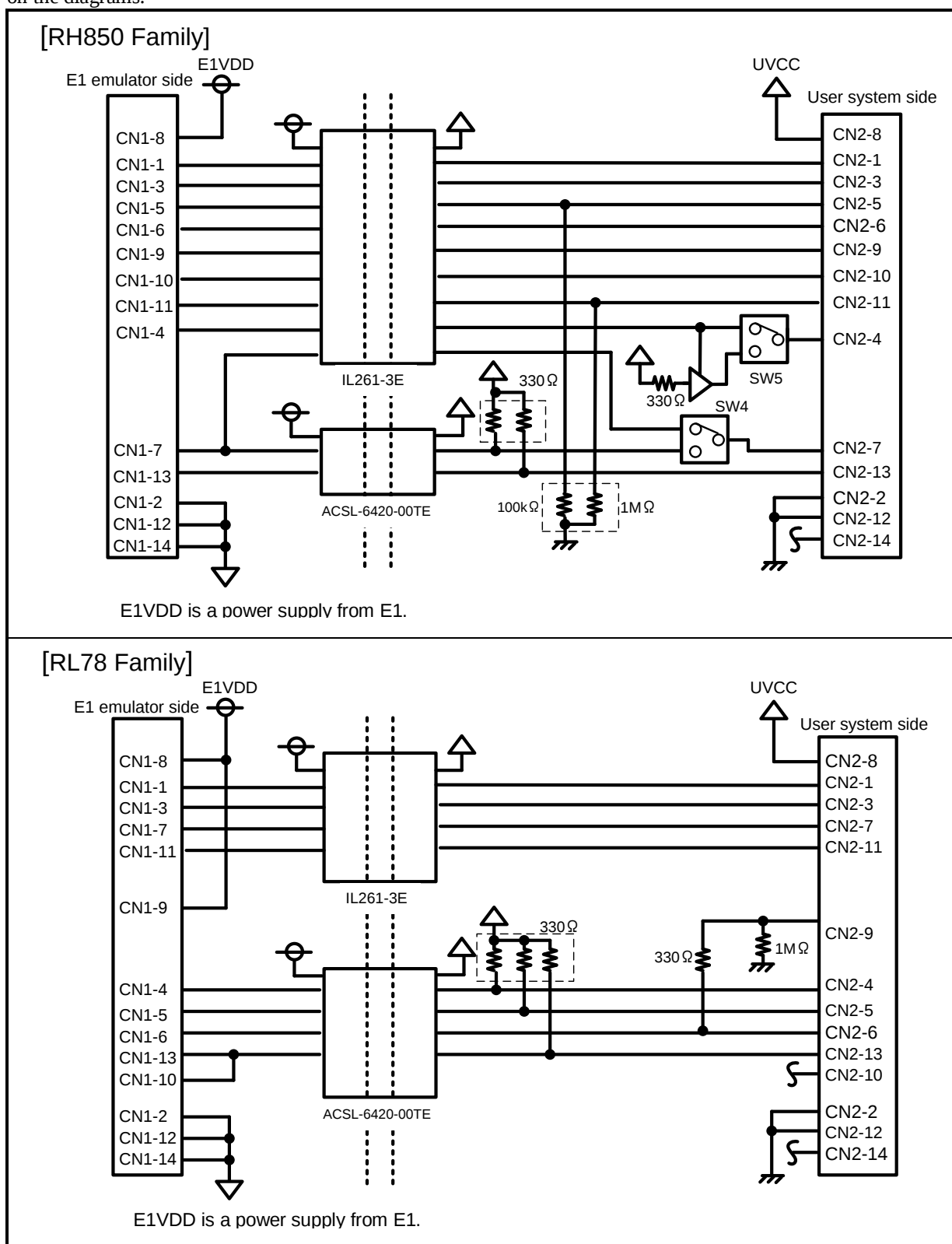
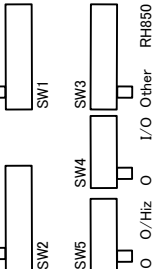
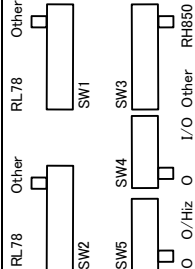
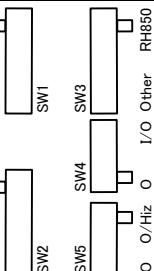
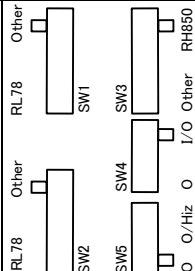
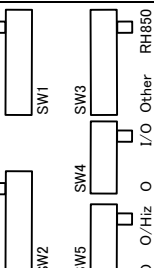


Figure 4.2 Connection Diagrams

4.6 Switch Settings for Each MCU

Table 4.1 Isolator Switch Setting

Switch setting No.	Settings of SW1 to SW5			Switch setting No.	Settings of SW1 to SW5		
RL78 family Single wire serial (When using CubeSuite+ / Renesas Flash Programmer)	SW1 : RL78 SW2 : RL78 SW3 : Other SW4 : O SW5 : O	Other RL78 Other RL78		RH850 family 2WireUART (When using Renesas Flash Programmer)	SW1 : Other SW2 : Other SW3 : RH850 SW4 : O SW5 : O	Other RL78 Other RL78	
RH850 family LPD4pin mode (When using CubeSuite+)	SW1 : Other SW2 : Other SW3 : RH850 SW4 : O SW5 : O/Hiz	Other RL78 Other RL78		RH850 family 1WireUART (When using Renesas Flash Programmer)	SW1 : Other SW2 : Other SW3 : RH850 SW4 : I/O SW5 : O	Other RL78 Other RL78	
RH850 family LPD1pin mode (When using CubeSuite+)	SW1 : Other SW2 : Other SW3 : RH850 SW4 : I/O SW5 : O/Hiz	Other RL78 Other RL78					

* Do not use the isolator with settings other than the above.

4.7 External Dimensions

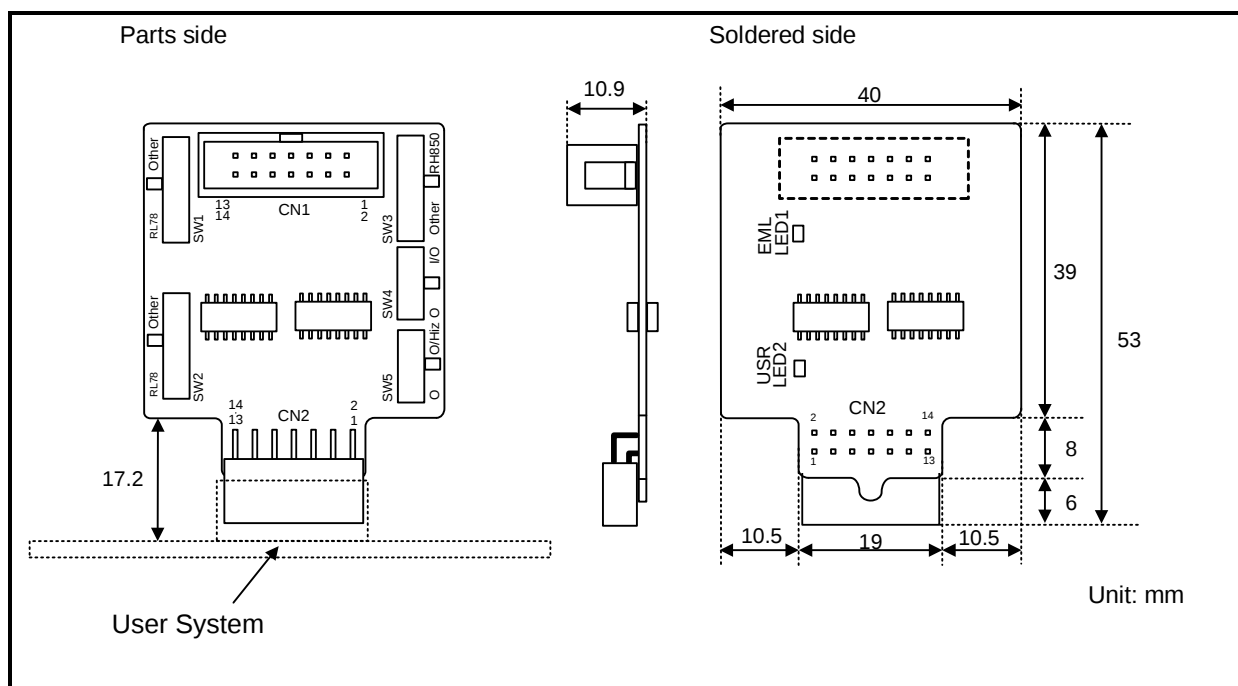


Figure 4.3 External Dimensions

5. Warranty

This product comes with a one-year warranty after purchase.

- (1) Should the product break down or be damaged while you're using it under normal condition based on its user's manual, it will be replaced free of cost.
- (2) However, if the following failure or damage occurs to the product under warranty, the product will be replaced at cost.
 - a) Failure or damage attributable to the misuse or abuse of the product or its use under other abnormal conditions.
 - b) Failure or damage attributable to improper handling of the product after purchase, such as dropping of the product when it is transported or moved.
 - c) Failure or damage to the product caused by other pieces of equipment connected to it.
 - d) Failure or damage attributable to fire, earthquakes, thunderbolts, floods, or other natural disasters or abnormal voltages, etc.
 - e) Failure or damage attributable to modifications, repairs, adjustments, or other acts made to the product by other than Renesas Electronics Corporation.
- (3) This product is accessories product. We cannot accept any request for repair.

Precautions

This product is only intended for use in a laboratory environment under ambient temperature and humidity conditions. A safe separation distance should be used between this and any sensitive equipment. Its use outside the laboratory, classroom, study area or similar such area invalidates conformity with the protection requirements of the Electromagnetic Compatibility Directive and could lead to prosecution.

The product generates, uses, and can radiate radio frequency energy and may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception, which can be determined by turning the equipment off or on, you are encouraged to try to correct the interference by one or more of the following measures;

- ensure attached cables do not lie across the equipment
- reorient the receiving antenna
- increase the distance between the equipment and the receiver
- connect the equipment into an outlet on a circuit different from that which the receiver is connected
- power down the equipment when not in use
- consult the dealer or an experienced radio/TV technician for help

NOTE: It is recommended that wherever possible shielded interface cables are used.

The product is potentially susceptible to certain EMC phenomena. To mitigate against them it is recommended that the following measures be undertaken;

- The user is advised that mobile phones should not be used within 10m of the product when in use.
- The user is advised to take ESD precautions when handling the equipment.

This product does not represent an ideal reference design for an end product and does not fulfil the regulatory standards for an end product.

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 of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
3. Renesas Electronics does not assume any liability for infringement of 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. 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 should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics product.
5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The recommended 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; and industrial robots etc.
"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; and safety equipment etc.
Renesas Electronics products are neither intended nor 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 damages (nuclear reactor control systems, military equipment etc.). You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application for which it is not intended. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for which the product is not intended by Renesas Electronics.
6. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, 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, please evaluate 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. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technology may 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 should not use Renesas Electronics products or technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. When exporting the Renesas Electronics products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations.
10. It is the responsibility of the buyer or distributor of Renesas Electronics products, who distributes, disposes of, or otherwise places the product with a third party, to notify such third party in advance of the contents and conditions set forth in this document, Renesas Electronics assumes no responsibility for any losses incurred by you or third parties as a result of unauthorized use of Renesas Electronics products.
11. This document may not be 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, or if you have any other inquiries.

(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

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



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.

2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited

1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

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: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.

7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.

Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited

Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.

13F, No. 363, Fu Shing North Road, Taipei, 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 906, 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 Korea Co., Ltd.

11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141



CAUTION

If the requirements shown in the "CAUTION" sentences are ignored, the equipment may cause personal injury or damage to the products.

Renesas Tools Website <http://www.renesas.com/tools>
All trademarks and registered trademarks are the property of their respective owners.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Renesas Electronics:](#)

[R0E000010ACB20](#)