

# RKZ-KU Series

## Silicon Planar Zener Diode for Stabilized Power Supply

REJ03G1771-0100  
Rev.1.00  
Jul 13, 2009

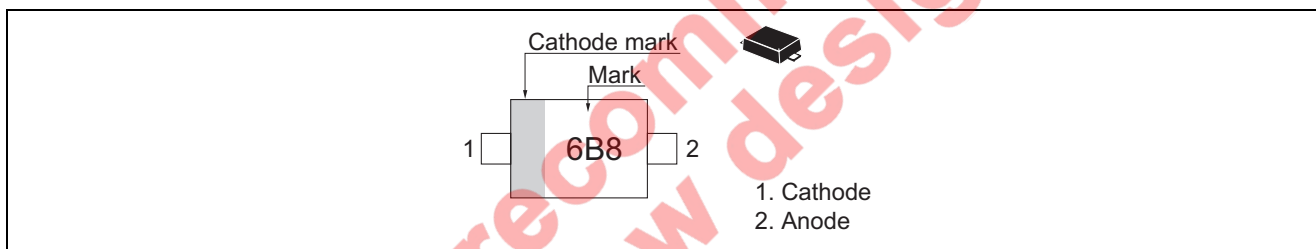
### Features

- Small outline yet high-power permitting 500 mW power dissipation.
- Halogen free, Environmental friendly Package includes Conformity to RoHS Directive.
- Thin Ultra small Resin Package (TURP-FM) is suitable for high density surface mounting and high speed assembly.

### Ordering Information

Part No.	Laser Mark	Package Name	Package Code	Taping Abbreviation (Quantity)
RKZ-KU Series P RKZ-KU Series R	Let to Mark Code	TURP-FM	PUSF0002ZD-A	P (4,000 pcs / reel) R (8,000 pcs / reel)

### Pin Arrangement



### Absolute Maximum Ratings

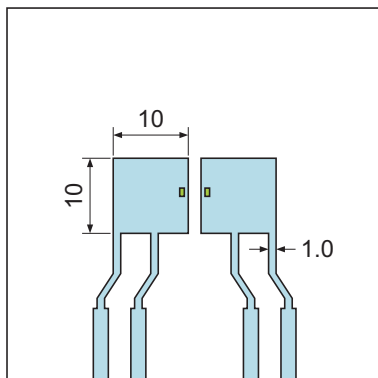
(Ta = 25°C)

Item	Symbol	Value	Unit
Power dissipation	Pd	500	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55 to +150	°C

Notes: 1. Device mounted on glass-epoxy board (50 × 50 mm, t = 1.6 mm)

2. Solder land (10 × 10 mm)

50h × 50w × 1.6t (mm)



Electrical Characteristics

(Ta = 25°C)

Part No.	Zener Voltage		Reverse Current		Dynamic Resistance		ESD-Capability	
	V <sub>Z</sub> (V) * <sup>1</sup>		Test Condition	I <sub>R</sub> (μA)	Test Condition	r <sub>d</sub> (Ω)	Test Condition	(kV) * <sup>2</sup>
	Min	Max	I <sub>Z</sub> (mA)	Max	V <sub>R</sub> (V)	Max	I <sub>ZT</sub> (mA)	Min
RKZ2.4AKU	2.33	2.52	20	120	1	100	20	30
RKZ2.4BKU	2.43	2.63						
RKZ2.7AKU	2.54	2.75	20	120	1	110	20	30
RKZ2.7BKU	2.69	2.91						
RKZ3.0AKU	2.85	3.07	20	50	1	120	20	30
RKZ3.0BKU	3.01	3.22						
RKZ3.3AKU	3.16	3.38	20	20	1	130	20	30
RKZ3.3BKU	3.32	3.53						
RKZ3.6AKU	3.45	3.69	20	10	1	130	20	30
RKZ3.6BKU	3.60	3.84						
RKZ3.9AKU	3.74	4.01	20	10	1	130	20	30
RKZ3.9BKU	3.89	4.16						
RKZ4.3AKU	4.04	4.29	20	10	1	130	20	30
RKZ4.3BKU	4.17	4.43						
RKZ4.3CKU	4.30	4.57	20	10	1	130	20	30
RKZ4.7AKU	4.44	4.68						
RKZ4.7BKU	4.55	4.80	20	10	1	130	20	30
RKZ4.7CKU	4.68	4.93						
RKZ5.1AKU	4.81	5.07	20	7.5	2	130	20	30
RKZ5.1BKU	4.94	5.20						
RKZ5.1CKU	5.09	5.37	20	7.5	2	80	20	30
RKZ5.6AKU	5.28	5.55						
RKZ5.6BKU	5.45	5.73	20	7.5	3	50	20	30
RKZ5.6CKU	5.61	5.91						
RKZ6.2AKU	5.78	6.09	20	7.5	4	30	20	30
RKZ6.2BKU	5.96	6.27						
RKZ6.2CKU	6.12	6.44	20	7.5	4	30	20	30
RKZ6.8AKU	6.29	6.63						
RKZ6.8BKU	6.49	6.83	20	7.5	4	30	20	30
RKZ6.8CKU	6.66	7.01						
RKZ7.5AKU	6.85	7.22	20	7.5	4	30	20	30
RKZ7.5BKU	7.07	7.45						
RKZ7.5CKU	7.29	7.67	20	7.5	7.15	30	20	30
RKZ8.2AKU	7.53	7.92						
RKZ8.2BKU	7.78	8.19	20	7.5	7.39	30	20	30
RKZ8.2CKU	8.03	8.45						
RKZ9.1AKU	8.29	8.73	20	7.5	7.88	30	20	30
RKZ9.1BKU	8.57	9.01						
RKZ9.1CKU	8.83	9.30	20	7.5	8.14	30	20	30
RKZ10AKU	9.12	9.59						
RKZ10BKU	9.41	9.90	20	7.5	8.39	30	20	30
RKZ10CKU	9.70	10.20						
RKZ10DKU	9.94	10.44			8.66			
					8.94			
					9.22			
					9.44			

- Notes: 1. Tested with pulse (P<sub>w</sub> = 40 ms)  
 2. C =150 pF, R = 330 Ω, Both forward and reverse direction 10 pulse  
 Failure criterion ; According to IR spec

Part No.	Zener Voltage		Reverse Current		Dynamic Resistance		ESD-Capability	
	V <sub>Z</sub> (V) * <sup>1</sup>		Test Condition	I <sub>R</sub> (μA)	Test Condition	r <sub>d</sub> (Ω)	Test Condition	(kV) * <sup>2</sup>
	Min	Max	I <sub>Z</sub> (mA)	Max	V <sub>R</sub> (V)	Max	I <sub>ZT</sub> (mA)	Min
RKZ11AKU	10.18	10.71	10	0.07	9.67	30	10	30
RKZ11BKU	10.50	11.05			9.98			
RKZ11CKU	10.82	11.38			10.28			
RKZ12AKU	11.13	11.71	10	0.07	10.6	35	10	30
RKZ12BKU	11.44	12.03			10.9			
RKZ12CKU	11.74	12.35			11.2			
RKZ13AKU	12.11	12.75	10	0.07	11.5	35	10	30
RKZ13BKU	12.55	13.21			11.9			
RKZ13CKU	12.99	13.66			12.3			
RKZ15AKU	13.44	14.13	10	0.07	12.8	40	10	30
RKZ15BKU	13.89	14.62			13.2			
RKZ15CKU	14.35	15.09			13.6			
RKZ16AKU	14.80	15.57	10	0.07	14.1	40	10	30
RKZ16BKU	15.25	16.04			14.5			
RKZ16CKU	15.69	16.51			14.9			
RKZ18AKU	16.22	17.06	10	0.07	15.4	45	10	30
RKZ18BKU	16.82	17.70			16.0			
RKZ18CKU	17.42	18.33			16.5			
RKZ20AKU	18.05	18.96	10	0.07	17.1	50	10	30
RKZ20BKU	18.63	19.59			17.7			
RKZ20CKU	19.23	20.22			18.3			
RKZ20DKU	19.72	20.72			18.7			
RKZ22AKU	20.15	21.20	5	0.07	19.1	55	5	30
RKZ22BKU	20.64	21.71			19.6			
RKZ22CKU	21.08	22.17			20.0			
RKZ22DKU	21.52	22.63			20.4			
RKZ24AKU	22.05	23.18	5	0.07	20.9	60	5	30
RKZ24BKU	22.61	23.77			21.5			
RKZ24CKU	23.12	24.31			22.0			
RKZ24DKU	23.63	24.85			22.4			
RKZ27AKU	24.26	25.52	5	0.07	23.0	70	5	30
RKZ27BKU	24.97	26.26			23.7			
RKZ27CKU	25.63	26.95			24.3			
RKZ27DKU	26.29	27.64			25.0			
RKZ30AKU	26.99	28.39	5	0.07	25.6	80	5	30
RKZ30BKU	27.70	29.13			26.0			
RKZ30CKU	28.36	29.82			26.9			
RKZ30DKU	29.02	30.51			27.6			
RKZ33AKU	29.68	31.22	5	0.07	28.2	80	5	25
RKZ33BKU	30.32	31.88			28.8			
RKZ33CKU	30.90	32.50			29.4			
RKZ33DKU	31.49	33.11			29.9			
RKZ36AKU	32.14	33.79	5	0.07	30.5	90	5	20
RKZ36BKU	32.79	34.49			31.2			
RKZ36CKU	33.40	35.13			31.7			
RKZ36DKU	34.01	35.77			32.3			

Notes: 1. Tested with pulse (P<sub>w</sub> = 40 ms)

2. C =150 pF, R = 330 Ω, Both forward and reverse direction 10 pulse  
Failure criterion ; According to IR spec

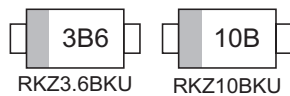
Mark Code

Part No.	Mark No.
RKZ2.4AKU	2A4
RKZ2.4BKU	2B4
RKZ2.7AKU	2A7
RKZ2.7BKU	2B7
RKZ3.0AKU	3A0
RKZ3.0BKU	3B0
RKZ3.3AKU	3A3
RKZ3.3BKU	3B3
RKZ3.6AKU	3A6
RKZ3.6BKU	3B6
RKZ3.9AKU	3A9
RKZ3.9BKU	3B9
RKZ4.3AKU	4A3
RKZ4.3BKU	4B3
RKZ4.3CKU	4C3
RKZ4.7AKU	4A7
RKZ4.7BKU	4B7
RKZ4.7CKU	4C7
RKZ5.1AKU	5A1
RKZ5.1BKU	5B1
RKZ5.1CKU	5C1
RKZ5.6AKU	5A6
RKZ5.6BKU	5B6
RKZ5.6CKU	5C6
RKZ6.2AKU	6A2
RKZ6.2BKU	6B2
RKZ6.2CKU	6C2
RKZ6.8AKU	6A8
RKZ6.8BKU	6B8
RKZ6.8CKU	6C8
RKZ7.5AKU	7A5
RKZ7.5BKU	7B5
RKZ7.5CKU	7C5

Part No.	Mark No.
RKZ8.2AKU	8A2
RKZ8.2BKU	8B2
RKZ8.2CKU	8C2
RKZ9.1AKU	9A1
RKZ9.1BKU	9B1
RKZ9.1CKU	9C1
RKZ10AKU	10A
RKZ10BKU	10B
RKZ10CKU	10C
RKZ10DKU	10D
RKZ11AKU	11A
RKZ11BKU	11B
RKZ11CKU	11C
RKZ12AKU	12A
RKZ12BKU	12B
RKZ12CKU	12C
RKZ13AKU	13A
RKZ13BKU	13B
RKZ13CKU	13C
RKZ15AKU	15A
RKZ15BKU	15B
RKZ15CKU	15C
RKZ16AKU	16A
RKZ16BKU	16B
RKZ16CKU	16C
RKZ18AKU	18A
RKZ18BKU	18B
RKZ18CKU	18C
RKZ20AKU	20A
RKZ20BKU	20B
RKZ20CKU	20C
RKZ20DKU	20D

Part No.	Mark No.
RKZ22AKU	22A
RKZ22BKU	22B
RKZ22CKU	22C
RKZ22DKU	22D
RKZ24AKU	24A
RKZ24BKU	24B
RKZ24CKU	24C
RKZ24DKU	24D
RKZ27AKU	27A
RKZ27BKU	27B
RKZ27CKU	27C
RKZ27DKU	27D
RKZ30AKU	30A
RKZ30BKU	30B
RKZ30CKU	30C
RKZ30DKU	30D
RKZ33AKU	33A
RKZ33BKU	33B
RKZ33CKU	33C
RKZ33DKU	33D
RKZ36AKU	36A
RKZ36BKU	36B
RKZ36CKU	36C
RKZ36DKU	36D

Note: 1. Example of Marking



Main Characteristics

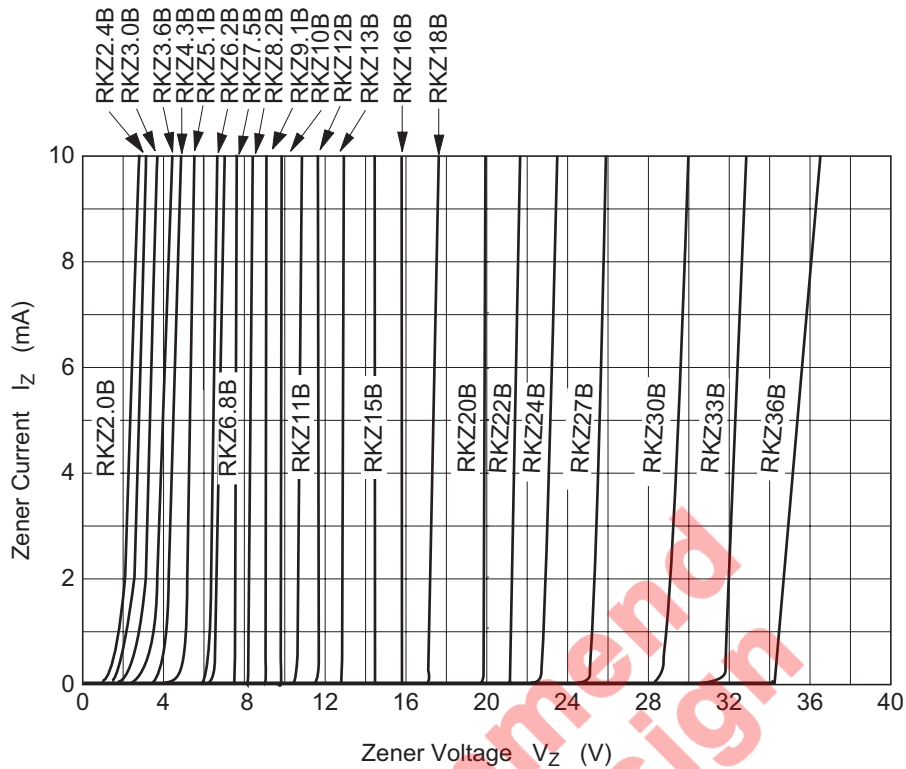


Fig.1 Zener current vs. Zener voltage

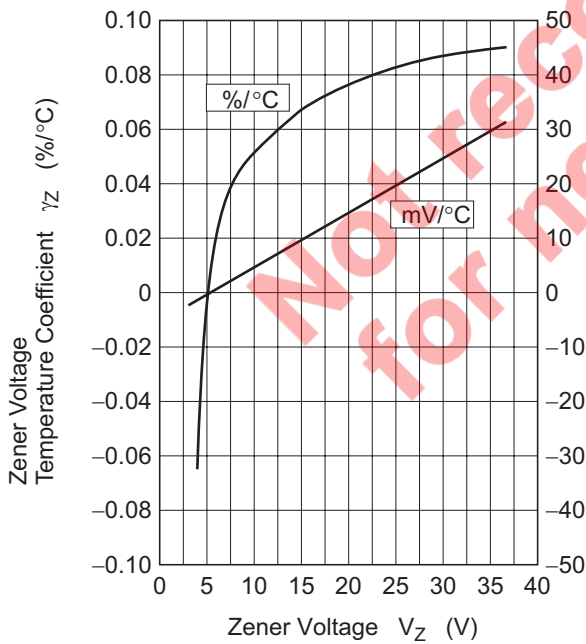


Fig.2 Temperature Coefficient vs. Zener voltage

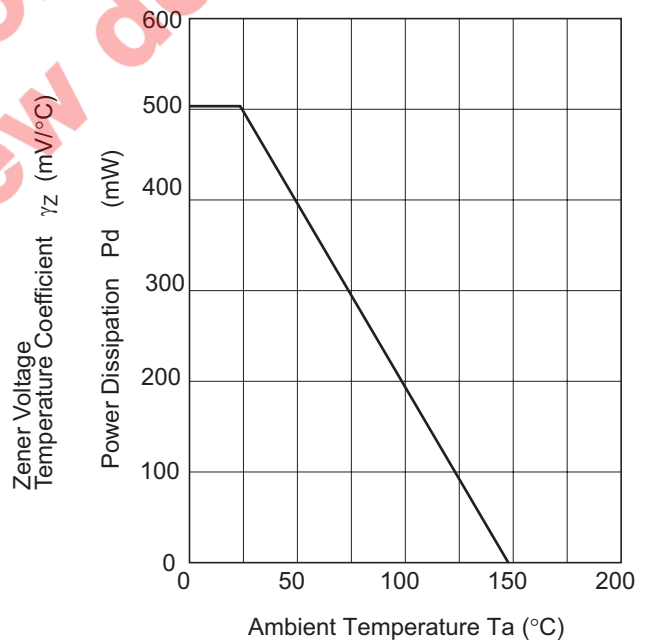
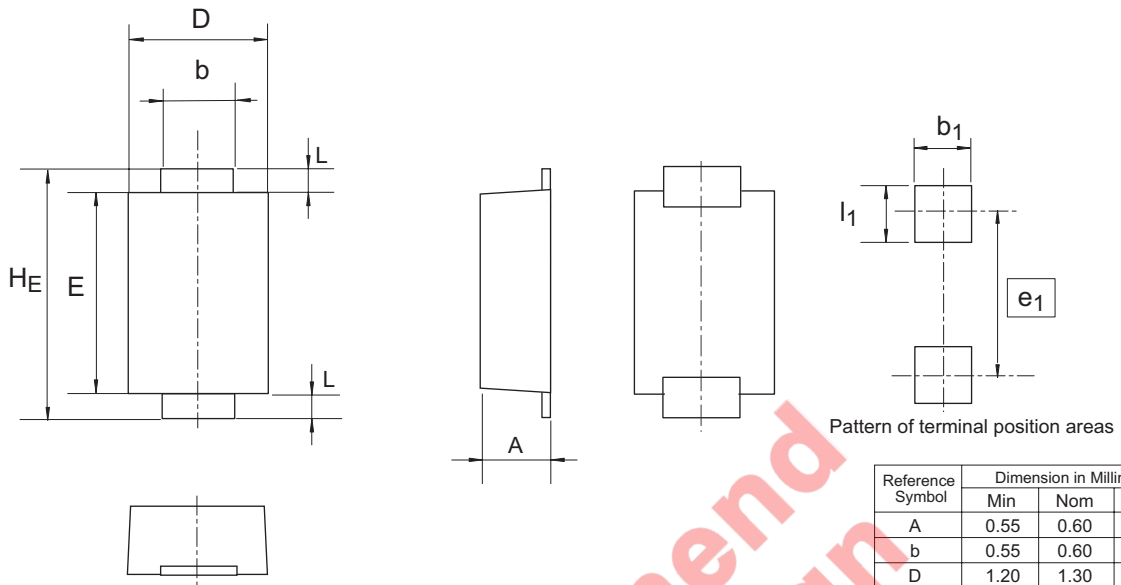


Fig.3 Power Dissipation vs. Ambient Temperature

Package Dimensions

Package Name	JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
TURP-FM	—	PUSF0002ZD-A	TURP-FM	0.004g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	0.55	0.60	0.65
b	0.55	0.60	0.65
D	1.20	1.30	1.40
E	1.80	1.90	2.00
L	0.25	0.30	0.35
HE	2.40	2.50	2.60
b <sub>1</sub>	-	0.90	-
e <sub>1</sub>	-	2.30	-
l <sub>1</sub>	-	0.80	-

Not recommend for new design

Notes:

1. This document is provided for reference purposes only so that Renesas customers may select the appropriate Renesas products for their use. Renesas neither makes warranties or representations with respect to the accuracy or completeness of the information contained in this document nor grants any license to any intellectual property rights or any other rights of Renesas or any third party with respect to the information in this document.
2. Renesas shall have no liability for damages or infringement of any intellectual property or other rights arising out of the use of any information in this document, including, but not limited to, product data, diagrams, charts, programs, algorithms, and application circuit examples.
3. You should not use the products or the technology described in this document for the purpose of military applications such as the development of weapons of mass destruction or for the purpose of any other military use. When exporting the products or technology described herein, you should follow the applicable export control laws and regulations, and procedures required by such laws and regulations.
4. All information included in this document such as product data, diagrams, charts, programs, algorithms, and application circuit examples, is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas products listed in this document, please confirm the latest product information with a Renesas sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas such as that disclosed through our website. (<http://www.renesas.com>)
5. Renesas has used reasonable care in compiling the information included in this document, but Renesas assumes no liability whatsoever for any damages incurred as a result of errors or omissions in the information included in this document.
6. When using or otherwise relying on the information in this document, you should evaluate the information in light of the total system before deciding about the applicability of such information to the intended application. Renesas makes no representations, warranties or guarantees regarding the suitability of its products for any particular application and specifically disclaims any liability arising out of the application and use of the information in this document or Renesas products.
7. With the exception of products specified by Renesas as suitable for automobile applications, Renesas products are not designed, manufactured or tested for applications or otherwise in systems the failure or malfunction of which may cause a direct threat to human life or create a risk of human injury or which require especially high quality and reliability such as safety systems, or equipment or systems for transportation and traffic, healthcare, combustion control, aerospace and aeronautics, nuclear power, or undersea communication transmission. If you are considering the use of our products for such purposes, please contact a Renesas sales office beforehand. Renesas shall have no liability for damages arising out of the uses set forth above.
8. Notwithstanding the preceding paragraph, you should not use Renesas products for the purposes listed below:
  - (1) artificial life support devices or systems
  - (2) surgical implantations
  - (3) healthcare intervention (e.g., excision, administration of medication, etc.)
  - (4) any other purposes that pose a direct threat to human lifeRenesas shall have no liability for damages arising out of the uses set forth in the above and purchasers who elect to use Renesas products in any of the foregoing applications shall indemnify and hold harmless Renesas Technology Corp., its affiliated companies and their officers, directors, and employees against any and all damages arising out of such applications.
9. You should use the products described herein within the range specified by Renesas, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas shall have no liability for malfunctions or damages arising out of the use of Renesas products beyond such specified ranges.
10. Although Renesas endeavors to improve the quality and reliability of its products, IC products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Please be sure to implement safety measures to guard against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas 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 applicable measures. Among others, since the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
11. In case Renesas products listed in this document are detached from the products to which the Renesas products are attached or affixed, the risk of accident such as swallowing by infants and small children is very high. You should implement safety measures so that Renesas products may not be easily detached from your products. Renesas shall have no liability for damages arising out of such detachment.
12. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written approval from Renesas.
13. Please contact a Renesas sales office if you have any questions regarding the information contained in this document, Renesas semiconductor products, or if you have any other inquiries.



**RENESAS SALES OFFICES**

<http://www.renesas.com>

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

**Renesas Technology America, Inc.**  
450 Holger Way, San Jose, CA 95134-1368, U.S.A  
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

**Renesas Technology Europe Limited**  
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

**Renesas Technology (Shanghai) Co., Ltd.**  
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120  
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

**Renesas Technology Hong Kong Ltd.**  
7th Floor, North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong  
Tel: <852> 2265-6688, Fax: <852> 2377-3473

**Renesas Technology Taiwan Co., Ltd.**  
10th Floor, No.99, Fushing North Road, Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

**Renesas Technology Singapore Pte. Ltd.**  
1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: <65> 6213-0200, Fax: <65> 6278-8001

**Renesas Technology Korea Co., Ltd.**  
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea  
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

**Renesas Technology 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: <603> 7955-9390, Fax: <603> 7955-9510

To our customers,

---

## Old Company Name in Catalogs and Other Documents

---

On April 1<sup>st</sup>, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

Send any inquiries to <http://www.renesas.com/inquiry>.

Not recommended  
for new design



## Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. 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.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. 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.
5. When exporting the 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. You should not use Renesas Electronics products or the 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. 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.
6. 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.
7. Renesas Electronics products are classified according to the following three quality grades: “Standard”, “High Quality”, and “Specific”. The recommended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below. 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 categorized as “Specific” without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. 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 an application categorized as “Specific” or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is “Standard” unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
  - “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.
  - “High Quality”: Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.
  - “Specific”: Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. 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.
9. 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 system manufactured by you.
10. 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.
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.