

To all our customers

---

## **Regarding the change of names mentioned in the document, such as Hitachi Electric and Hitachi XX, to Renesas Technology Corp.**

---

The semiconductor operations of Mitsubishi Electric and Hitachi were transferred to Renesas Technology Corporation on April 1st 2003. These operations include microcomputer, logic, analog and discrete devices, and memory chips other than DRAMs (flash memory, SRAMs etc.) Accordingly, although Hitachi, Hitachi, Ltd., Hitachi Semiconductors, and other Hitachi brand names are mentioned in the document, these names have in fact all been changed to Renesas Technology Corp. Thank you for your understanding. Except for our corporate trademark, logo and corporate statement, no changes whatsoever have been made to the contents of the document, and these changes do not constitute any alteration to the contents of the document itself.

Renesas Technology Home Page: <http://www.renesas.com>

Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

## Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corporation puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage.

Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

1. These materials are intended as a reference to assist our customers in the selection of the Renesas Technology Corporation product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corporation or a third party.
2. Renesas Technology Corporation assumes no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
3. All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor for the latest product information before purchasing a product listed herein.  
The information described here may contain technical inaccuracies or typographical errors. Renesas Technology Corporation assumes no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors.  
Please also pay attention to information published by Renesas Technology Corporation by various means, including the Renesas Technology Corporation Semiconductor home page (<http://www.renesas.com>).
4. When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corporation assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
5. Renesas Technology Corporation semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corporation or an authorized Renesas Technology Corporation product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
6. The prior written approval of Renesas Technology Corporation is necessary to reprint or reproduce in whole or in part these materials.
7. If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination.  
Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
8. Please contact Renesas Technology Corporation for further details on these materials or the products contained therein.

# HZU Series

Silicon Epitaxial Planar Zener Diodes for Stabilizer

**RENESAS**

ADE-208-024G (Z)

Rev.7  
Dec. 2002

---

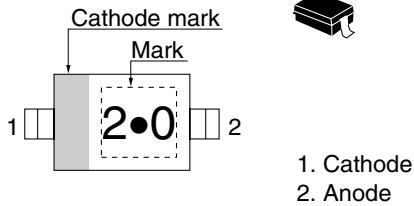
## Features

- Ultra small Resin Package (URP) is suitable for surface mount design.
- These diodes are delivered taped.

## Ordering Information

Type No.	Mark	Package Code
HZU Series	Let to Mark Code	URP

## Pin Arrangement



# HZU Series

## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Value	Unit
Power dissipation	Pd *1	200	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55 to +150	°C

Note: 1. With P.C. Board.

## Electrical Characteristics

(Ta = 25°C)

Type	Grade	Zener Voltage		Reverse Current		Dynamic Resistance		
		V <sub>z</sub> (V) *1		Test Condition	I <sub>R</sub> (μA)	Test Condition	r <sub>d</sub> (Ω)	Test Condition
		Min	Max	I <sub>z</sub> (mA)	Max	V <sub>R</sub> (V)	Max	I <sub>z</sub> (mA)
HZU2.0	B	1.90	2.20	5	120	0.5	100	5
HZU2.2	B	2.10	2.40	5	120	0.7	100	5
HZU2.4	B	2.30	2.60	5	120	1.0	100	5
HZU2.7	B	2.50	2.90	5	120	1.0	110	5
	B1	2.50	2.75					
	B2	2.65	2.90					
HZU3.0	B	2.80	3.20	5	50	1.0	120	5
	B1	2.80	3.05					
	B2	2.95	3.20					
HZU3.3	B	3.10	3.50	5	20	1.0	130	5
	B1	3.10	3.35					
	B2	3.25	3.50					
HZU3.6	B	3.40	3.80	5	10	1.0	130	5
	B1	3.40	3.65					
	B2	3.55	3.80					
HZU3.9	B	3.70	4.10	5	10	1.0	130	5
	B1	3.70	3.97					
	B2	3.87	4.10					

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

Type	Grade	Zener Voltage		Reverse Current		Dynamic Resistance		
		$V_z$ (V) *1		Test Condition	$I_R$ ( $\mu$ A)	Test Condition	$r_d$ ( $\Omega$ )	Test Condition
		Min	Max	$I_z$ (mA)	Max	$V_R$ (V)	Max	$I_z$ (mA)
HZU4.3	B	4.01	4.48	5	10	1.0	130	5
	B1	4.01	4.21					
	B2	4.15	4.34					
	B3	4.28	4.48					
HZU4.7	B	4.42	4.90	5	10	1.0	130	5
	B1	4.42	4.61					
	B2	4.55	4.75					
	B3	4.69	4.90					
HZU5.1	B	4.84	5.37	5	5	1.5	130	5
	B1	4.84	5.04					
	B2	4.98	5.20					
	B3	5.14	5.37					
HZU5.6	B	5.31	5.92	5	5	2.5	80	5
	B1	5.31	5.55					
	B2	5.49	5.73					
	B3	5.67	5.92					
HZU6.2	B	5.86	6.53	5	2	3.0	50	5
	B1	5.86	6.12					
	B2	6.06	6.33					
	B3	6.26	6.53					
HZU6.8	B	6.47	7.14	5	2	3.5	30	5
	B1	6.47	6.73					
	B2	6.65	6.93					
	B3	6.86	7.14					
HZU7.5	B	7.06	7.84	5	2	4.0	30	5
	B1	7.06	7.36					
	B2	7.28	7.60					
	B3	7.52	7.84					
HZU8.2	B	7.76	8.64	5	2	5.0	30	5
	B1	7.76	8.10					
	B2	8.02	8.36					
	B3	8.28	8.64					

Note: 1. Tested with pulse ( $P_w = 40$  ms).

# HZU Series

Type	Grade	Zener Voltage		Reverse Current		Dynamic Resistance		
		$V_z$ (V) * <sup>1</sup>		Test Condition	$I_R$ ( $\mu$ A)	Test Condition	$r_d$ ( $\Omega$ )	Test Condition
		Min	Max	$I_z$ (mA)	Max	$V_R$ (V)	Max	$I_z$ (mA)
HZU9.1	B	8.56	9.55	5	2	6.0	30	5
	B1	8.56	8.93					
	B2	8.85	9.23					
	B3	9.15	9.55					
HZU10	B	9.45	10.55	5	2	7.0	30	5
	B1	9.45	9.87					
	B2	9.77	10.21					
	B3	10.11	10.55					
HZU11	B	10.44	11.56	5	2	8.0	30	5
	B1	10.44	10.88					
	B2	10.76	11.22					
	B3	11.10	11.56					
HZU12	B	11.42	12.60	5	2	9.0	35	5
	B1	11.42	11.90					
	B2	11.74	12.24					
	B3	12.08	12.60					
HZU13	B	12.47	13.96	5	2	10.0	35	5
	B1	12.47	13.03					
	B2	12.91	13.49					
	B3	13.37	13.96					
HZU15	B	13.84	15.52	5	2	11.0	40	5
	B1	13.84	14.46					
	B2	14.34	14.98					
	B3	14.85	15.52					
HZU16	B	15.37	17.09	5	2	12.0	40	5
	B1	15.37	16.01					
	B2	15.58	16.51					
	B3	16.35	17.09					
HZU18	B	16.94	19.03	5	2	13.0	45	5
	B1	16.94	17.70					
	B2	17.56	18.35					
	B3	18.21	19.03					

Note: 1. Tested with pulse ( $P_w = 40$  ms).

Type	Grade	Zener Voltage		Reverse Current		Dynamic Resistance		
		$V_z$ (V) * <sup>1</sup>		Test Condition	$I_R$ ( $\mu$ A)	Test Condition	$r_d$ ( $\Omega$ )	Test Condition
		Min	Max	$I_z$ (mA)	Max	$V_R$ (V)	Max	$I_z$ (mA)
HZU20	B	18.86	21.08	5	2	15.0	50	5
	B1	18.86	19.70					
	B2	19.52	20.39					
	B3	20.21	21.08					
HZU22	B	20.88	23.17	5	2	17.0	55	5
	B1	20.88	21.77					
	B2	21.54	22.47					
	B3	22.23	23.17					
HZU24	B	22.93	25.57	5	2	19.0	60	5
	B1	22.93	23.96					
	B2	23.72	24.78					
	B3	24.54	25.57					
HZU27	B	25.10	28.90	2	2	21.0	70	2
HZU30	B	28.00	32.00	2	2	23.0	80	2
HZU33	B	31.00	35.00	2	2	25.0	80	2
HZU36	B	34.00	38.00	2	2	27.0	90	2

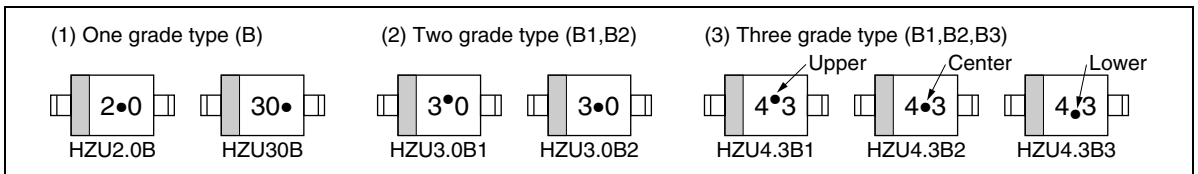
Note: 1. Tested with pulse ( $P_w = 40$  ms).

# HZU Series

## Mark Code

Type	Grade	Mark No.	Type	Grade	Mark No.	Type	Grade	Mark No.
HZU2.0	B	2•0	HZU6.2	B1	6•2	HZU13	B1	13•
HZU2.2	B	2•2		B2	6•2		B2	13•
HZU2.4	B	2•4		B3	6•2		B3	13•
HZU2.7	B1	2•7	HZU6.8	B1	6•8	HZU15	B1	15•
	B2	2•7		B2	6•8		B2	15•
HZU3.0	B1	3•0		B3	6•8		B3	15•
	B2	3•0	HZU7.5	B1	7•5	HZU16	B1	16•
HZU3.3	B1	3•3		B2	7•5		B2	16•
	B2	3•3		B3	7•5		B3	16•
HZU3.6	B1	3•6	HZU8.2	B1	8•2	HZU18	B1	18•
	B2	3•6		B2	8•2		B2	18•
HZU3.9	B1	3•9		B3	8•2		B3	18•
	B2	3•9	HZU9.1	B1	9•1	HZU20	B1	20•
HZU4.3	B1	4•3		B2	9•1		B2	20•
	B2	4•3		B3	9•1		B3	20•
	B3	4•3	HZU10	B1	10•	HZU22	B1	22•
HZU4.7	B1	4•7		B2	10•		B2	22•
	B2	4•7		B3	10•		B3	22•
	B3	4•7	HZU11	B1	11•	HZU24	B1	24•
HZU5.1	B1	5•1		B2	11•		B2	24•
	B2	5•1		B3	11•		B3	24•
	B3	5•1	HZU12	B1	12•	HZU27	B	27•
HZU5.6	B1	5•6		B2	12•	HZU30	B	30•
	B2	5•6		B3	12•	HZU33	B	33•
	B3	5•6				HZU36	B	36•

Notes: 1. Example of Marking



- The grade B type includes from B1 min. to B3 (or B2) max.
- B grade is standard and has better delivery, These are marked one of B1, B2, B3.
- Type No. is as follows; HZU2.0B, HZU2.2B, ... HZU36B. (B grade)
- Type No. is as follows; HZU2.7B1, HZU2.7B2, ... HZU24B3. (B 1, B2, B3 grade)



Main Characteristic

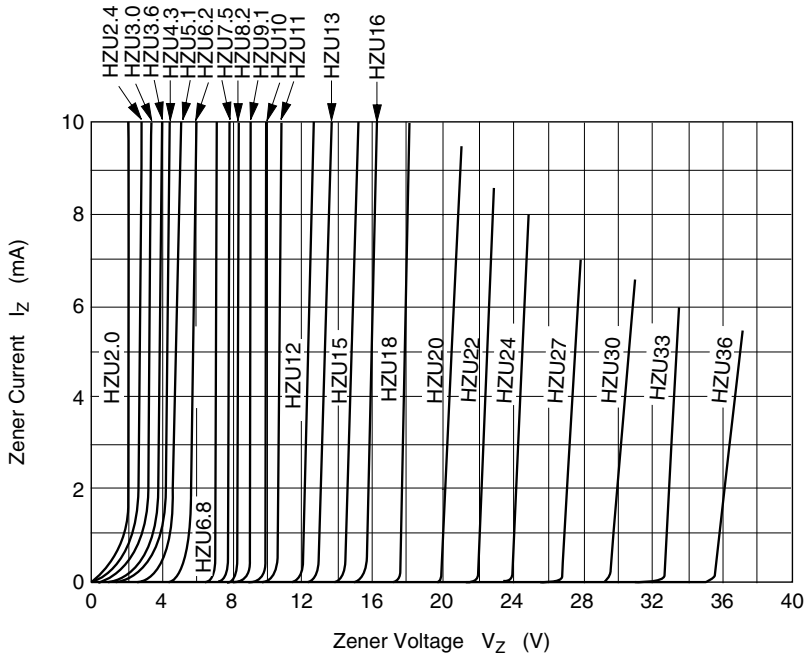


Fig.1 Zener current vs. Zener voltage

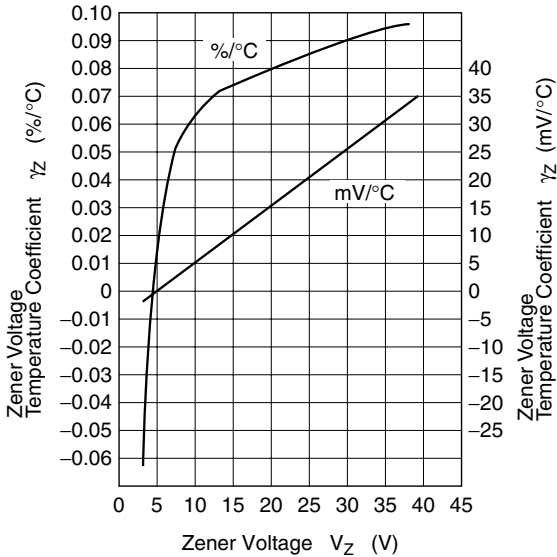


Fig.2 Temperature Coefficient vs. Zener voltage

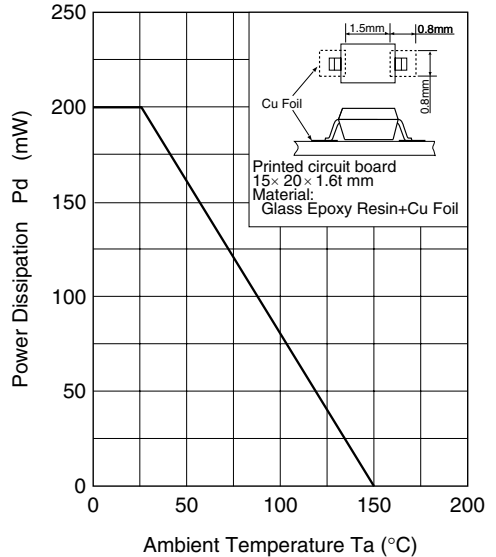
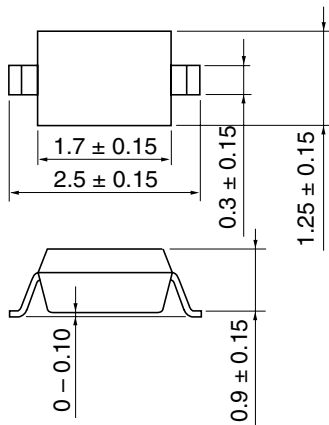


Fig.3 Power Dissipation vs. Ambient Temperature

## Package Dimensions

As of July, 2002

Unit: mm



Hitachi Code	URP
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.004 g

**Disclaimer**

1. Hitachi neither warrants nor grants licenses of any rights of Hitachi's or any third party's patent, copyright, trademark, or other intellectual property rights for information contained in this document. Hitachi bears no responsibility for problems that may arise with third party's rights, including intellectual property rights, in connection with use of the information contained in this document.
2. Products and product specifications may be subject to change without notice. Confirm that you have received the latest product standards or specifications before final design, purchase or use.
3. Hitachi makes every attempt to ensure that its products are of high quality and reliability. However, contact Hitachi's sales office before using the product in an application that demands especially high quality and reliability or where its failure or malfunction may directly threaten human life or cause risk of bodily injury, such as aerospace, aeronautics, nuclear power, combustion control, transportation, traffic, safety equipment or medical equipment for life support.
4. Design your application so that the product is used within the ranges guaranteed by Hitachi particularly for maximum rating, operating supply voltage range, heat radiation characteristics, installation conditions and other characteristics. Hitachi bears no responsibility for failure or damage when used beyond the guaranteed ranges. Even within the guaranteed ranges, consider normally foreseeable failure rates or failure modes in semiconductor devices and employ systemic measures such as fail-safes, so that the equipment incorporating Hitachi product does not cause bodily injury, fire or other consequential damage due to operation of the Hitachi product.
5. This product is not designed to be radiation resistant.
6. No one is permitted to reproduce or duplicate, in any form, the whole or part of this document without written approval from Hitachi.
7. Contact Hitachi's sales office for any questions regarding this document or Hitachi semiconductor products.

**Sales Offices**

---



---

# HITACHI

**Hitachi, Ltd.**

Semiconductor & Integrated Circuits  
 Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan  
 Tel: (03) 3270-2111 Fax: (03) 3270-5109

URL <http://www.hitachisemiconductor.com/>

**For further information write to:**

<p>Hitachi Semiconductor (America) Inc.                  179 East Tasman Drive                  San Jose, CA 95134                  Tel: &lt;1&gt; (408) 433-1990                  Fax: &lt;1&gt; (408) 433-0223</p>	<p>Hitachi Europe Ltd.                  Electronic Components Group                  Whitebrook Park                  Lower Cookham Road                  Maidenhead                  Berkshire SL6 8YA, United Kingdom                  Tel: &lt;44&gt; (1628) 585000                  Fax: &lt;44&gt; (1628) 778322</p>	<p>Hitachi Asia Ltd.                  Hitachi Tower                  16 Collyer Quay #20-00                  Singapore 049318                  Tel : &lt;65&gt;-6538-6533/6538-8577                  Fax : &lt;65&gt;-6538-6933/6538-3877                  URL : <a href="http://semiconductor.hitachi.com.sg">http://semiconductor.hitachi.com.sg</a></p>	<p>Hitachi Asia (Hong Kong) Ltd.                  Group III (Electronic Components)                  7/F., North Tower                  World Finance Centre,                  Harbour City, Canton Road                  Tsim Sha Tsui, Kowloon Hong Kong                  Tel : &lt;852&gt;-2735-9218                  Fax : &lt;852&gt;-2730-0281                  URL : <a href="http://semiconductor.hitachi.com.hk">http://semiconductor.hitachi.com.hk</a></p>
	<p>Hitachi Europe GmbH                  Electronic Components Group                  Dornacher Str 3                  D-85622 Feldkirchen                  Postfach 201, D-85619 Feldkirchen                  Germany                  Tel: &lt;49&gt; (89) 9 9180-0                  Fax: &lt;49&gt; (89) 9 29 30 00</p>	<p>Hitachi Asia Ltd.                  (Taipei Branch Office)                  4/F, No. 167, Tun Hwa North Road                  Hung-Kuo Building                  Taipei (105), Taiwan                  Tel : &lt;886&gt;-(2)-2718-3666                  Fax : &lt;886&gt;-(2)-2718-8180                  Telex : 23222 HAS-TP                  URL : <a href="http://semiconductor.hitachi.com.tw">http://semiconductor.hitachi.com.tw</a></p>	

Copyright © Hitachi, Ltd., 2002. All rights reserved. Printed in Japan.  
 Colophon 7.0