

# 1N5223B through 1N5258B

## Silicon Epitaxial Planar Zener Diodes for Voltage Regulation

REJ03G1222-0300  
(Previous: ADE-208-137B)  
Rev.3.00  
Aug 22, 2005

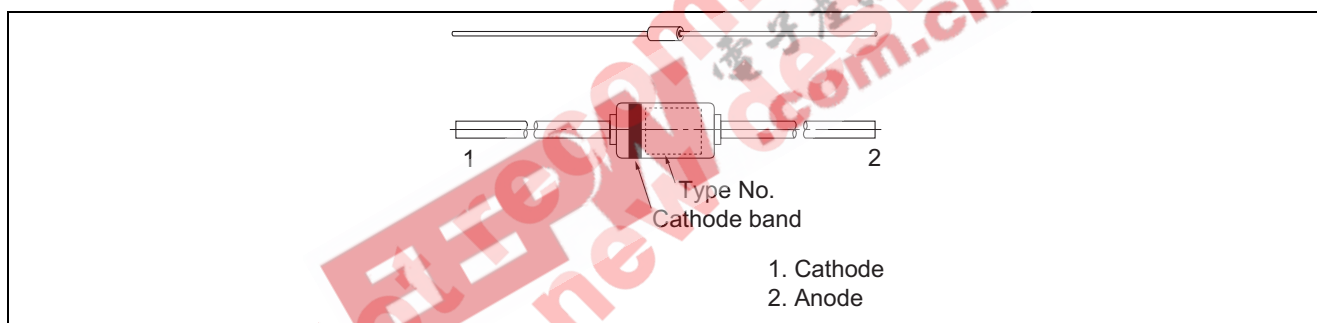
### Features

- Glass package DO-35 structure ensures high reliability.
- Wide spectrum from 2.7 V through 36 V of zener voltage provide flexible application.

### Ordering Information

Type No.	Cathode Band	Mark	Package Name	Package Code (Previous Code)
1N5223B through 1N5258B	Black	Type No.	DO-35	GRZZ0002ZB-A (DO-35)

### Pin Arrangement



## Absolute Maximum Ratings

(Ta = 25°C)

Item	Symbol	Ratings	Unit
Power dissipation	Pd	500	mW
Surge power dissipation	Pd (surge) * <sup>1</sup>	10	W
Lead temperature	T <sub>L</sub> * <sup>2</sup>	230	°C
Junction temperature	T <sub>j</sub> * <sup>3</sup>	200	°C
Storage temperature	Tstg	-65 to +200	°C

Notes: 1. Non-recurrent square wave, pw = 8.3 ms, Tj = 55°C, Tj is prior to surge.

2. Less than 1/16" from the case for 10 seconds.

3. By standard printed board, see fig 2.

## Electrical Characteristics

(Ta = 25°C)

Type No.	Zener Voltage		Reverse Current		Dynamic Resistance				$\gamma_Z$ (%/°C) * <sup>1</sup>	V <sub>F</sub> * <sup>2</sup> (V)
	V <sub>Z</sub> (V)	Test Condition	I <sub>R</sub> (μA)	Test Condition	Z <sub>zT</sub> (Ω)	Test Condition	Z <sub>zK</sub> (Ω)	Test Condition		
		I <sub>Z</sub> (mA)	Max	V <sub>R</sub> (V)	Max	I <sub>zT</sub> (mA)	Max	I <sub>zK</sub> (mA)	Max	Max
1N5223B	2.7 ± 5 (%)	20	75	1.0	30	20	1300	0.25	-0.08	1.1
1N5224B	2.8 ± 5 (%)	20	75	1.0	30	20	1400	0.25	-0.08	1.1
1N5225B	3.0 ± 5 (%)	20	50	1.0	29	20	1600	0.25	-0.075	1.1
1N5226B	3.3 ± 5 (%)	20	25	1.0	28	20	1600	0.25	-0.07	1.1
1N5227B	3.6 ± 5 (%)	20	15	1.0	24	20	1700	0.25	-0.065	1.1
1N5228B	3.9 ± 5 (%)	20	10	1.0	23	20	1900	0.25	-0.06	1.1
1N5229B	4.3 ± 5 (%)	20	5	1.0	22	20	2000	0.25	±0.055	1.1
1N5230B	4.7 ± 5 (%)	20	5	2.0	19	20	1900	0.25	±0.03	1.1
1N5231B	5.1 ± 5 (%)	20	5	2.0	17	20	1600	0.25	±0.03	1.1
1N5232B	5.6 ± 5 (%)	20	5	3.0	11	20	1600	0.25	+0.038	1.1
1N5233B	6.0 ± 5 (%)	20	5	3.5	7	20	1600	0.25	+0.038	1.1
1N5234B	6.2 ± 5 (%)	20	5	4.0	7	20	1000	0.25	+0.045	1.1
1N5235B	6.8 ± 5 (%)	20	3	5.0	5	20	750	0.25	+0.05	1.1
1N5236B	7.5 ± 5 (%)	20	3	6.0	6	20	500	0.25	+0.058	1.1
1N5237B	8.2 ± 5 (%)	20	3	6.5	8	20	500	0.25	+0.062	1.1
1N5238B	8.7 ± 5 (%)	20	3	6.5	8	20	600	0.25	+0.065	1.1
1N5239B	9.1 ± 5 (%)	20	3	7.5	10	20	600	0.25	+0.068	1.1
1N5240B	10 ± 5 (%)	20	3	8.0	17	20	600	0.25	+0.075	1.1
1N5241B	11 ± 5 (%)	20	2	8.4	22	20	600	0.25	+0.076	1.1
1N5242B	12 ± 5 (%)	20	1	9.1	30	20	600	0.25	+0.077	1.1
1N5243B	13 ± 5 (%)	9.5	0.5	9.9	13	9.5	600	0.25	+0.079	1.1
1N5244B	14 ± 5 (%)	9.0	0.1	10	15	9.0	600	0.25	+0.082	1.1
1N5245B	15 ± 5 (%)	8.5	0.1	11	16	8.5	600	0.25	+0.082	1.1
1N5246B	16 ± 5 (%)	7.8	0.1	12	17	7.8	600	0.25	+0.083	1.1
1N5247B	17 ± 5 (%)	7.4	0.1	13	19	7.4	600	0.25	+0.084	1.1
1N5248B	18 ± 5 (%)	7.0	0.1	14	21	7.0	600	0.25	+0.085	1.1
1N5249B	19 ± 5 (%)	6.6	0.1	14	23	6.6	600	0.25	+0.086	1.1
1N5250B	20 ± 5 (%)	6.2	0.1	15	25	6.2	600	0.25	+0.086	1.1

Notes: 1. 1N5223 to 1N5242: I<sub>Z</sub> = 7.5 mA, 1N5243 to 1N5258: I<sub>Z</sub> = I<sub>Z</sub>, Ta = 25°C to 125°C2. Tested with DC, I<sub>F</sub> = 200 mA

## Electrical Characteristics (cont.)

(Ta = 25°C)

Type No.	Zener Voltage		Reverse Current		Dynamic Resistance				$\gamma_Z$ (%/°C) *1	$V_F^{*2}$ (V)
	$V_Z$ (V)	Test Condition	$I_R$ (μA)	Test Condition	$Z_{ZT}$ (Ω)	Test Condition	$Z_{ZK}$ (Ω)	Test Condition		
		$I_Z$ (mA)	Max	$V_R$ (V)	Max	$I_{ZT}$ (mA)	Max	$I_{ZK}$ (mA)	Max	Max
1N5251B	22 ± 5 (%)	5.6	0.1	17	29	5.6	600	0.25	+0.087	1.1
1N5252B	24 ± 5 (%)	5.2	0.1	18	33	5.2	600	0.25	+0.088	1.1
1N5253B	25 ± 5 (%)	5.0	0.1	19	35	5.0	600	0.25	+0.089	1.1
1N5254B	27 ± 5 (%)	4.6	0.1	21	41	4.6	600	0.25	+0.090	1.1
1N5255B	28 ± 5 (%)	4.5	0.1	21	44	4.5	600	0.25	+0.091	1.1
1N5256B	30 ± 5 (%)	4.2	0.1	23	49	4.2	600	0.25	+0.091	1.1
1N5257B	33 ± 5 (%)	3.8	0.1	25	58	3.8	700	0.25	+0.092	1.1
1N5258B	36 ± 5 (%)	3.4	0.1	27	70	3.4	700	0.25	+0.093	1.1

Notes: 1. 1N5223 to 1N5242:  $I_Z = 7.5$  mA, 1N5243 to 1N5258:  $I_Z = I_{ZT}$ , Ta = 25°C to 125°C2. Tested with DC,  $I_F = 200$  mA

## Main Characteristic

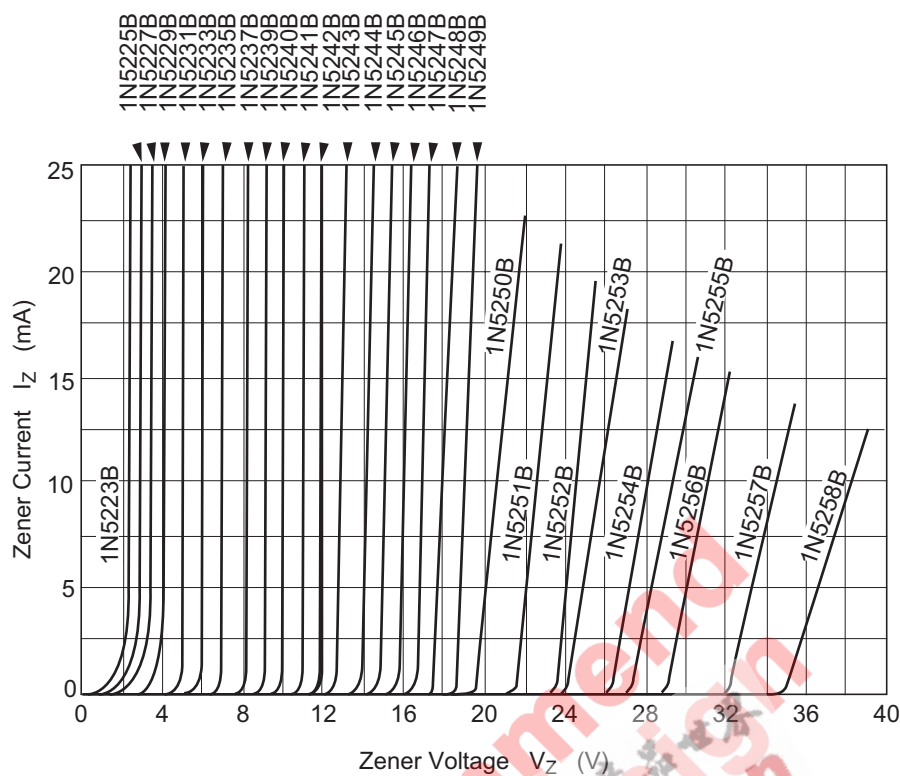


Fig.1 Zener current vs. Zener voltage

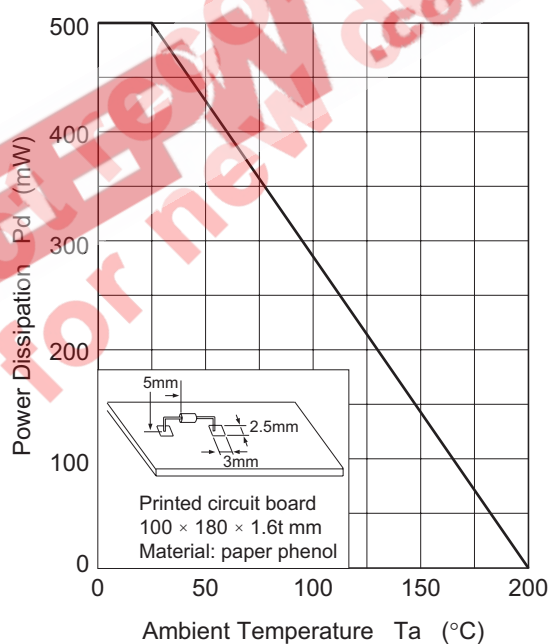
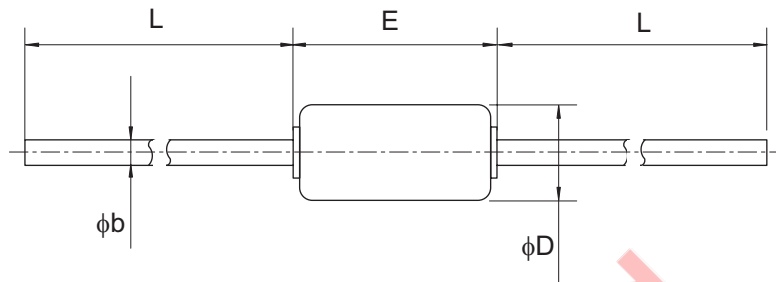


Fig.2 Power Dissipation vs. Ambient Temperature

## Package Dimensions

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
SC-40	GRZZ0002ZB-A	DO-35 / DO-35V	0.13g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
φb	-	0.5	-
φD	-	2.0	-
E	-	-	4.2
L	26.0	-	-

## Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

Keep safety first in your circuit designs!

1. Renesas Technology Corp. 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 Corp. 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 Corp. or a third party.
2. Renesas Technology Corp. 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 Corp. without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corp. or an authorized Renesas Technology Corp. 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 Corp. 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 Corp. by various means, including the Renesas Technology Corp. 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 Corp. assumes no responsibility for any damage, liability or other loss resulting from the information contained herein.
5. Renesas Technology Corp. 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 Corp. or an authorized Renesas Technology Corp. 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 Corp. 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 Corp. for further details on these materials or the products contained therein.



### 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 Hong Kong Ltd.**

7th Floor, North Tower, World Finance Centre, Harbour City, 1 Canton Road, Tsimshatsui, Kowloon, Hong Kong  
Tel: <852> 2265-6688, Fax: <852> 2730-6071

#### **Renesas Technology Taiwan Co., Ltd.**

10th Floor, No.99, Fushing North Road, Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

#### **Renesas Technology (Shanghai) Co., Ltd.**

Unit2607 Ruijing Building, No.205 Maoming Road (S), Shanghai 200020, China  
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

#### **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, Jalan Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: <603> 7955-9390, Fax: <603> 7955-9510