

---

# HZ-P Series

Silicon Epitaxial Planar Zener Diodes  
for Voltage Controller & Voltage Limiter

# HITACHI

ADE-208-123D (Z)

Rev.4  
Sep. 2000

---

## Features

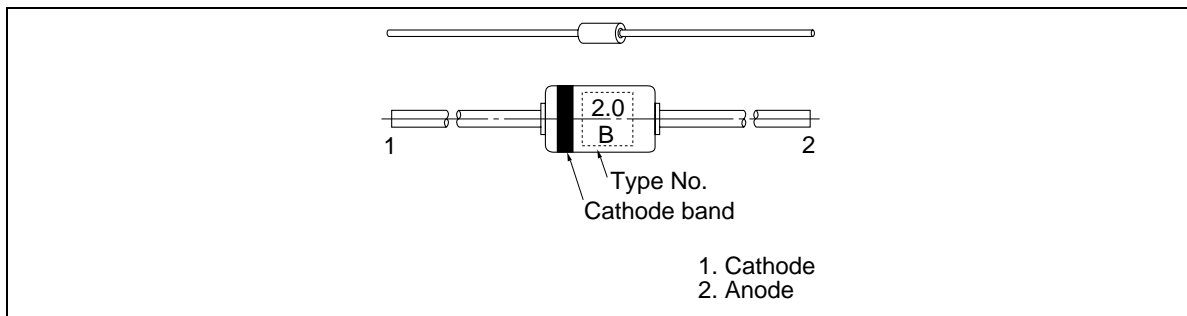
- Wide spectrum from 1.88V through 40V of zener voltage provide flexible application.
- Glass package DO-41 structure ensures high reliability.

## Ordering Information

Type No.	Mark	Package Code
HZ-P Series	Type No.	DO-41

---

## Outline



## HZ-P Series

### Absolute Maximum Ratings

(T<sub>a</sub> = 25°C)

Item	Symbol	Value	Unit
Power dissipation	P <sub>d</sub>	0.8	W
Junction temperature	T <sub>j</sub>	175	°C
Storage temperature	T <sub>stg</sub>	-55 to +175	°C

### Electrical Characteristics

(T<sub>a</sub> = 25°C)

		Zener Voltage			Reverse Current		Dynamic Resistance	
		V <sub>z</sub> (V)* <sup>1</sup>		Test Condition	I <sub>R</sub> (μA)	Test Condition	r <sub>d</sub> (Ω)	Test Condition
Type	Grade	Min	Max	I <sub>z</sub> (mA)	Max	V <sub>R</sub> (V)	Max	I <sub>z</sub> (mA)
HZ2.0	BP	1.88	2.12	40	200	0.5	25	40
	CP	2.00	2.24					
HZ2.2	BP	2.08	2.33	40	200	0.7	20	40
	CP	2.20	2.45					
HZ2.4	BP	2.28	2.56	40	200	1.0	15	40
	CP	2.40	2.70					
HZ2.7	BP	2.5	2.9	40	200	1.0	15	40
	CP	2.7	3.1					
HZ3.0	BP	2.8	3.2	40	100	1.0	15	40
	CP	3.0	3.4					
HZ3.3	BP	3.1	3.5	40	80	1.0	15	40
	CP	3.3	3.7					
HZ3.6	BP	3.4	3.8	40	60	1.0	15	40
	CP	3.6	4.0					
HZ3.9	BP	3.7	4.1	40	40	1.0	15	40
	CP	3.9	4.4					
HZ4.3	BP	4.0	4.5	40	20	1.0	15	40
	CP	4.3	4.8					
HZ4.7	BP	4.4	4.9	40	20	1.0	10	40
	CP	4.7	5.2					

Note: 1. Tested with DC.

**Electrical Characteristics (cont)**

(T<sub>a</sub> = 25°C)

		Zener Voltage		Reverse Current			Dynamic Resistance	
		V <sub>z</sub> (V)* <sup>1</sup>		Test Condition	I <sub>R</sub> (μA)	Test Condition	r <sub>d</sub> (Ω)	Test Condition
Type	Grade	Min	Max	I <sub>z</sub> (mA)	Max	V <sub>R</sub> (V)	Max	I <sub>z</sub> (mA)
HZ5.1	BP	4.8	5.4	40	20	1.0	8	40
	CP	5.1	5.7					
HZ5.6	BP	5.3	6.0	40	20	1.5	8	40
	CP	5.6	6.3					
HZ6.2	BP	5.8	6.6	40	20	3.0	6	40
	CP	6.2	7.0					
HZ6.8	BP	6.4	7.2	40	20	3.5	6	40
	CP	6.8	7.7					
HZ7.5	BP	7.0	7.9	40	20	4.0	4	40
	CP	7.5	8.4					
HZ8.2	BP	7.7	8.7	40	20	5.0	4	40
	CP	8.2	9.3					
HZ9.1	BP	8.5	9.6	40	20	6.0	6	40
	CP	9.1	10.2					
HZ10	BP	9.4	10.6	40	10	7.0	6	40
	CP	10.0	11.2					
HZ11	BP	10.4	11.6	20	10	8.0	8	20
	CP	11.0	12.3					
HZ12	BP	11.4	12.6	20	10	9.0	8	20
	CP	12.0	13.5					
HZ13	BP	12.4	14.1	20	10	10.0	10	20
	CP	13.3	15.0					
HZ15	BP	13.8	15.6	20	10	11.0	10	20
	CP	14.7	16.5					
HZ16	BP	15.3	17.1	20	10	12.0	12	20
	CP	16.2	18.3					
HZ18	BP	16.8	19.1	20	10	13.0	12	20
	CP	18.0	20.3					
HZ20	BP	18.8	21.2	20	10	15.0	14	20
	CP	20.0	22.4					

Note: 1. Tested with DC.

## HZ-P Series

### Electrical Characteristics (cont)

(T<sub>a</sub> = 25°C)

		Zener Voltage			Reverse Current		Dynamic Resistance	
		V <sub>z</sub> (V)* <sup>1</sup>		Test Condition	I <sub>R</sub> (μA)	Test Condition	r <sub>d</sub> (Ω)	Test Condition
Type	Grade	Min	Max	I <sub>z</sub> (mA)	Max	V <sub>R</sub> (V)	Max	I <sub>z</sub> (mA)
HZ22	BP	20.8	23.3	10	10	17.0	14	10
	CP	22.0	24.5					
HZ24	BP	22.8	25.6	10	10	19.0	16	10
	CP	24.0	27.6					
HZ27	BP	25.1	28.9	10	10	21.0	16	10
	CP	27.0	30.8					
HZ30	BP	28.0	32.0	10	10	23.0	18	10
	CP	30.0	34.0					
HZ33	BP	31.0	35.0	10	10	25.0	18	10
	CP	33.0	37.0					
HZ36	BP	34.0	38.0	10	10	27.0	20	10
	CP	36.0	40.0					

Notes: 1. Tested with DC.

2. Type No. is as follows; HZ2.0BP, HZ2.0CP, ••• HZ36BP, HZ36CP.

# Main Characteristic

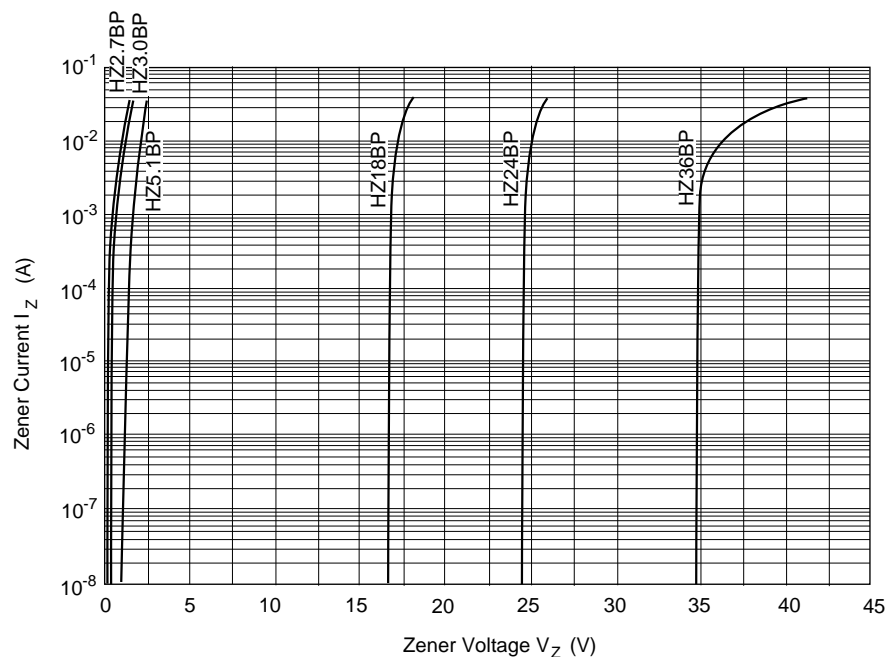


Fig.1 Zener current Vs. Zener voltage

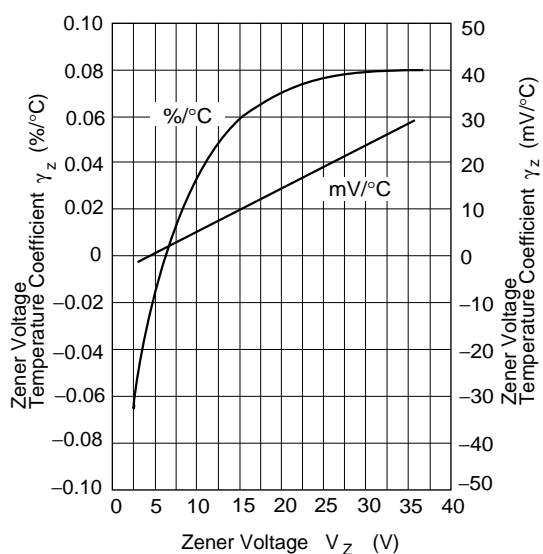


Fig.2 Temperature Coefficient Vs. Zener voltage

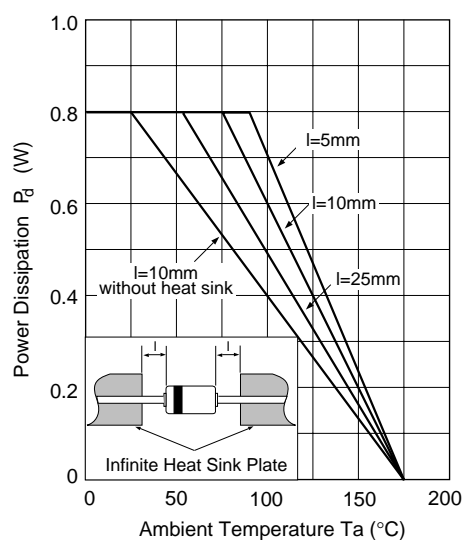


Fig.3 Power Dissipation Vs. Ambient Temperature

## HZ-P Series

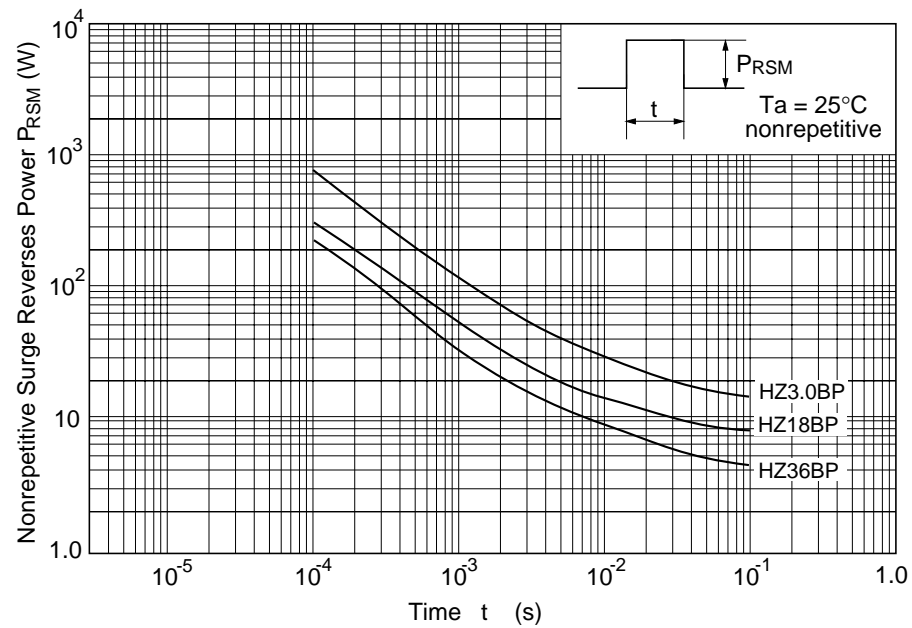


Fig.4 Surge Reverse Power Ratings (Reference Data)

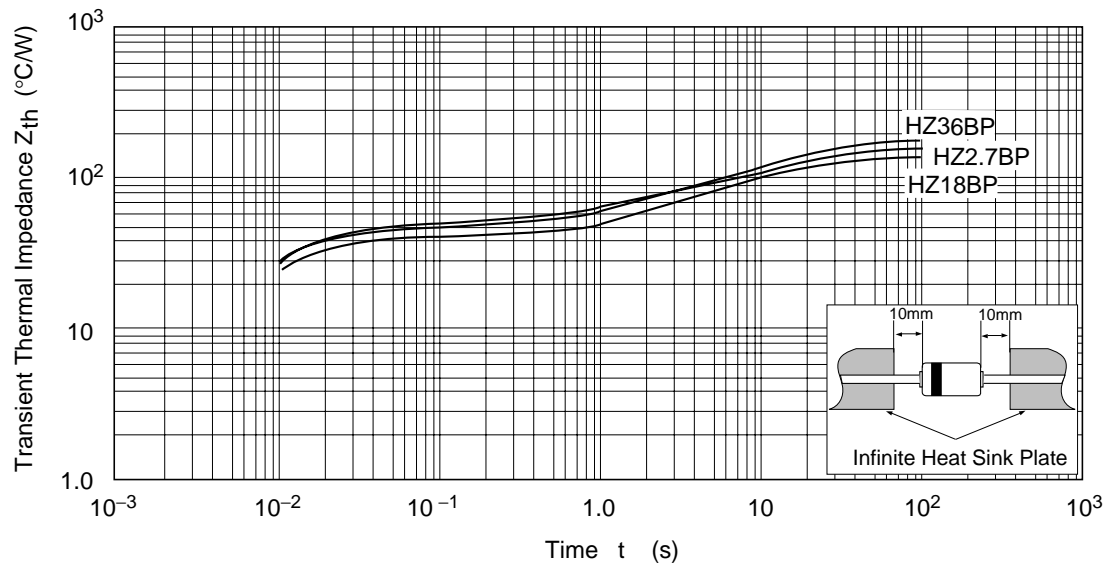
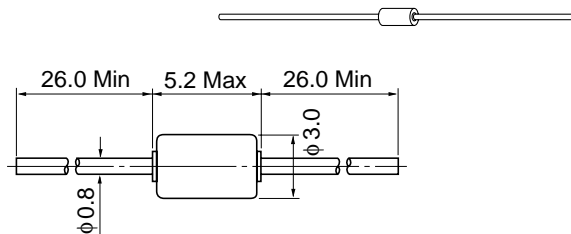


Fig.5 Transient Thermal Impedance

**Package Dimensions**

Unit: mm



Hitachi Code	DO-41
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.38 g

---

## HZ-P Series

---

### 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	North America	: <a href="http://semiconductor.hitachi.com/">http://semiconductor.hitachi.com/</a>
	Europe	: <a href="http://www.hitachi-eu.com/hel/ecg">http://www.hitachi-eu.com/hel/ecg</a>
	Asia	: <a href="http://sicapac.hitachi-asia.com">http://sicapac.hitachi-asia.com</a>
	Japan	: <a href="http://www.hitachi.co.jp/Sicd/indx.htm">http://www.hitachi.co.jp/Sicd/indx.htm</a>

#### For further information write to:

Hitachi Semiconductor (America) Inc.	Hitachi Europe Ltd.
179 East Tasman Drive	Electronic Components Group
San Jose, CA 95134	Whitebrook Park
Tel: <1> (408) 433-1990	Lower Cookham Road
Fax: <1> (408) 433-0223	Maidenhead
	Berkshire SL6 8YA, United Kingdom
	Tel: <44> (1628) 585000
	Fax: <44> (1628) 585200

Hitachi Europe GmbH
Electronic Components Group
Dornacher Straße 3
D-85622 Feldkirchen, Munich
Germany
Tel: <49> (89) 9 9180-0
Fax: <49> (89) 9 29 30 00

Hitachi Asia Ltd.
Hitachi Tower
16 Collyer Quay #20-00
Singapore 049318
Tel: <65>-538-6533/538-8577
Fax: <65>-538-6933/538-3877
URL: <a href="http://www.hitachi.com.sg">http://www.hitachi.com.sg</a>

Hitachi Asia Ltd.
(Taipei Branch Office)
4/F, No. 167, Tun Hwa North Road
Hung-Kuo Building
Taipei (105), Taiwan
Tel: <886>-(2)-2718-3666
Fax: <886>-(2)-2718-8180
Telex: 23222 HAS-TP
URL: <a href="http://www.hitachi.com.tw">http://www.hitachi.com.tw</a>

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: <852>-(2)-735-9218
Fax: <852>-(2)-730-0281
URL: <a href="http://semiconductor.hitachi.com.hk">http://semiconductor.hitachi.com.hk</a>

Copyright © Hitachi, Ltd., 2001. All rights reserved. Printed in Japan.  
Colophon 4.0