To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 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 1st, 2010
Renesas Electronics Corporation

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

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

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.

RENESAS

ZENER DIODES

RD4.7JS to RD39JS

DO-34 Package
Low noise, Sharp Breakdown characteristics
400 mW Zener Diode

DESCRIPTION

NEC Type RD [ ] JS series are DHD (Double Heatsink Diode) construction Mini Package (DO-34; Body length 2.4 mm Max.) possessing an allowable power dissipation of 400 mW, featuring low noise, sharp breakdown characteristic.

FEATURES

- DO-34 Glass sealed package
- Low noise
- Sharp Breakdown characteristic
- V_Z Applied E24 standard

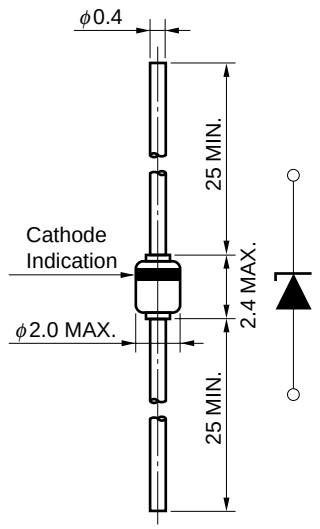
ORDER INFORMATION

RD4.7JS to RD39JS with suffix “AB1”, “AB2”, or “AB3” should be applied for orders for suffix “AB”.

APPLICATIONS

Circuits for, Constant Voltage, Constant Current, Wave form clipper, etc.

PACKAGE DIMENSIONS
(in milimeters)



DO-34 (JEDEC)
Marking color: Blue

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

Forward Current	I_F	150 mA	
Power Dissipation	P	400 mW	to see Fig. 5.
Surge Revese Power	P_{RSM}	2.4 W (t = 10 μs)	to see Fig. 9.
Junction Temperature	T_j	175 °C	
Storage Temperature	T_{stg}	–65 to +175 °C	

Document No. D13937EJ5V0DS00 (5th edition)
(Previous No. SC-4001A)
Date Published March 1999 N CP(K)
Printed in Japan

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

Type Number	Suffix	Zener Voltage V_Z (V)[Note 1]			Dynamic Impedance Z_Z (Ω)[Note 2]		Knee Dynamic Impedance Z_{ZK} (Ω)[Note 2]		Reverse Current I_R (μA)	
		MIN.	MAX.	I_Z (mA)	MAX.	I_Z (mA)	MAX.	I_Z (mA)	MAX.	V_R (V)
RD4.7JS	AB	4.42	4.90	5	100	5	800	0.5	2	1.0
	AB1	4.42	4.61							
	AB2	4.55	4.75							
	AB3	4.69	4.90							
RD5.1JS	AB	4.84	5.37	5	80	5	500	0.5	2	1.5
	AB1	4.84	5.04							
	AB2	4.98	5.20							
	AB3	5.14	5.37							
RD5.6JS	AB	5.31	5.92	5	60	5	200	0.5	1	2.5
	AB1	5.31	5.55							
	AB2	5.49	5.73							
	AB3	5.67	5.92							
RD6.2JS	AB	5.86	6.53	5	60	5	100	0.5	1	3.0
	AB1	5.86	6.12							
	AB2	6.06	6.33							
	AB3	6.26	6.53							
RD6.8JS	AB	6.47	7.14	5	40	5	60	0.5	0.5	3.5
	AB1	6.47	6.73							
	AB2	6.65	6.93							
	AB3	6.86	7.14							
RD7.5JS	AB	7.06	7.84	5	30	5	60	0.5	0.5	4.0
	AB1	7.06	7.36							
	AB2	7.28	7.60							
	AB3	7.52	7.84							
RD8.2JS	AB	7.76	8.64	5	30	5	60	0.5	0.5	5.0
	AB1	7.76	8.10							
	AB2	8.02	8.36							
	AB3	8.28	8.64							
RD9.1JS	AB	8.56	9.55	5	30	5	60	0.5	0.5	6.0
	AB1	8.56	8.93							
	AB2	8.85	9.23							
	AB3	9.15	9.55							
RD10JS	AB	9.45	10.55	5	30	5	60	0.5	0.1	7.0
	AB1	9.45	9.87							
	AB2	9.77	10.21							
	AB3	10.11	10.55							
RD11JS	AB	10.44	11.56	5	30	5	60	0.5	0.1	8.0
	AB1	10.44	10.88							
	AB2	10.76	11.22							
	AB3	11.10	11.56							
RD12JS	AB	11.42	12.60	5	30	5	80	0.5	0.1	9.0
	AB1	11.42	11.90							
	AB2	11.74	12.24							
	AB3	12.08	12.60							
RD13JS	AB	12.47	13.69	5	37	5	80	0.5	0.1	10
	AB1	12.47	13.03							
	AB2	12.91	13.49							
	AB3	13.37	13.96							

Type Number	Suffix	Zener Voltage V_z (V)Note 1			Dynamic Impedance Z_z (Ω)Note 2		Knee Dynamic Impedance Z_{zk} (Ω)Note 2		Reverse Current I_R (μA)	
		MIN.	MAX.	I_z (mA)	MAX.	I_z (mA)	MAX.	I_z (mA)	MAX.	V_R (V)
RD15JS	AB	13.84	15.52	5	42	5	80	0.5	0.1	11
	AB1	13.84	14.46							
	AB2	14.34	14.98							
	AB3	14.85	15.52							
RD16JS	AB	15.37	17.09	5	50	5	80	0.5	0.1	12
	AB1	15.37	16.01							
	AB2	15.85	16.51							
	AB3	16.35	17.09							
RD18JS	AB	16.94	19.03	5	65	5	80	0.5	0.1	13
	AB1	16.94	17.70							
	AB2	17.56	18.35							
	AB3	18.21	19.03							
RD20JS	AB	18.86	21.08	5	85	5	100	0.5	0.1	15
	AB1	18.86	19.70							
	AB2	19.52	20.39							
	AB3	20.21	21.08							
RD22JS	AB	20.88	23.17	5	100	5	100	0.5	0.1	17
	AB1	20.88	21.77							
	AB2	21.54	22.47							
	AB3	22.23	23.17							
RD24JS	AB	22.93	25.57	5	120	5	120	0.5	0.1	19
	AB1	22.93	23.96							
	AB2	23.72	24.78							
	AB3	24.54	25.57							
RD27JS	AB	25.20	28.61	5	150	5	150	0.5	0.1	21
	AB1	25.20	26.50							
	AB2	26.19	27.53							
	AB3	27.21	28.61							
RD30JS	AB	28.22	31.74	5	200	5	200	0.5	0.1	23
	AB1	28.22	29.66							
	AB2	29.19	30.69							
	AB3	30.20	31.74							
RD33JS	AB	32.18	34.83	5	250	5	250	0.5	0.1	25
	AB1	32.18	32.78							
	AB2	32.15	33.79							
	AB3	33.13	34.83							
RD36JS	AB	34.12	37.91	5	300	5	300	0.5	0.1	27
	AB1	34.12	35.86							
	AB2	35.07	36.87							
	AB3	36.07	37.91							
RD39JS	AB	37.04	40.99	5	360	5	360	0.5	0.1	30
	AB1	37.04	38.94							
	AB2	38.00	39.94							
	AB3	38.99	40.99							

Note 1. tested with pulse (40 ms).

2. Z_z and Z_{zk} are measured at I_z by given a very small A.C. current signal.

3. Suffix AB is suffix AB1, AB2 or suffix AB3.

TYPICAL CHARACTERISTICS (T_A = 25 °C)

Fig. 1 I_Z-V_Z CHARACTERISTICS

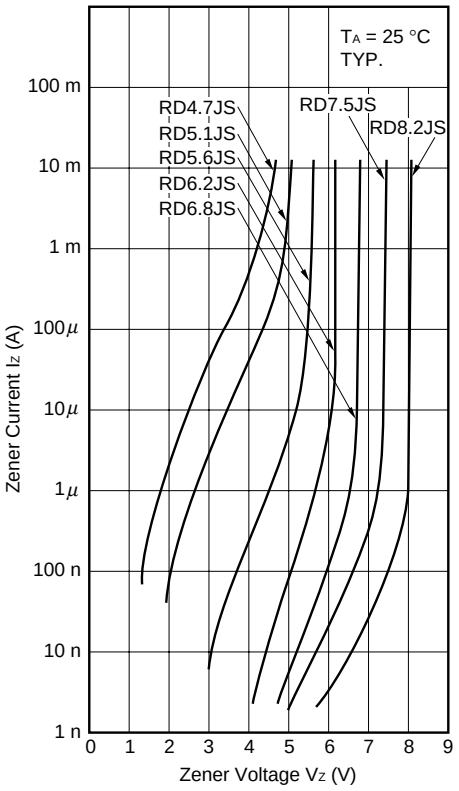


Fig. 2 I_Z-V_Z CHARACTERISTICS

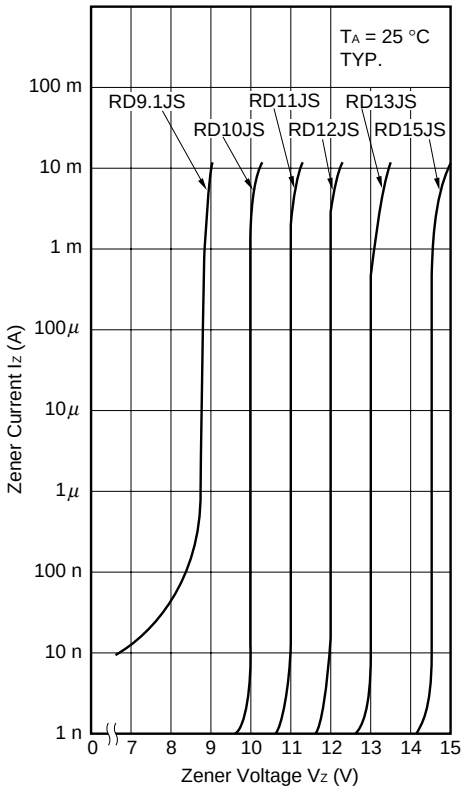


Fig. 3 I_Z-V_Z CHARACTERISTICS

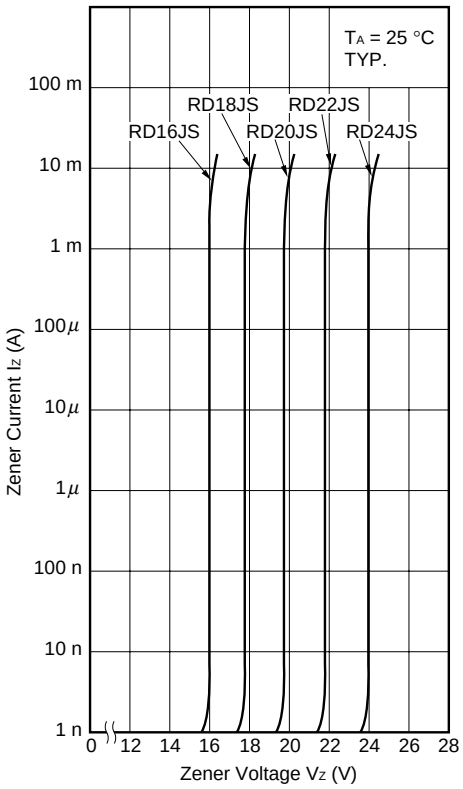


Fig. 4 I_Z-V_Z CHARACTERISTICS

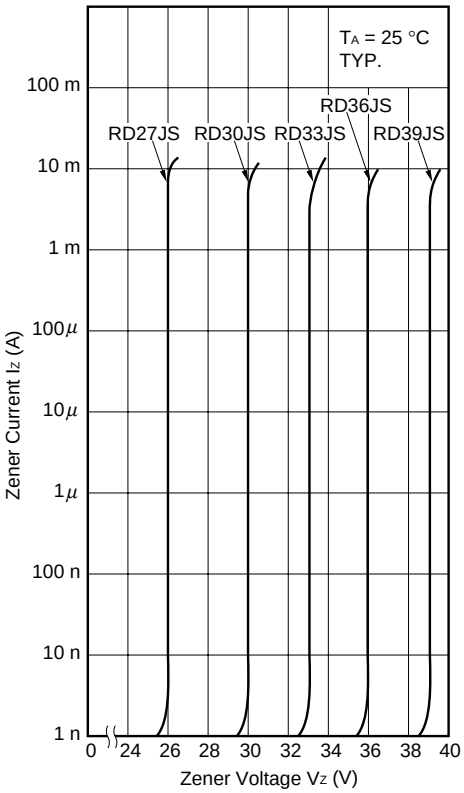


Fig. 5 P-T_A Rating

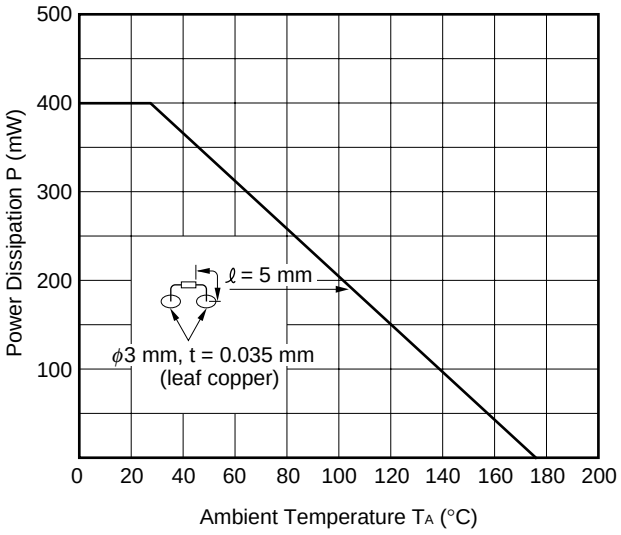


Fig. 6 γ_Z-V_Z CHARACTERISTICS

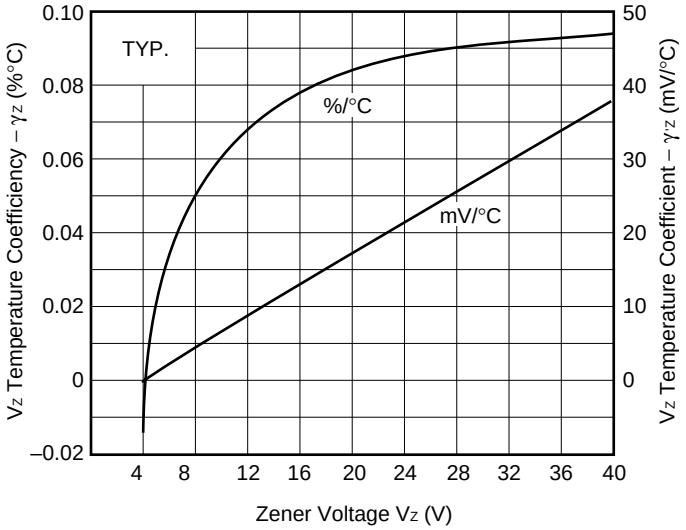


Fig. 7 R_{th}-S CHARACTERISTICS

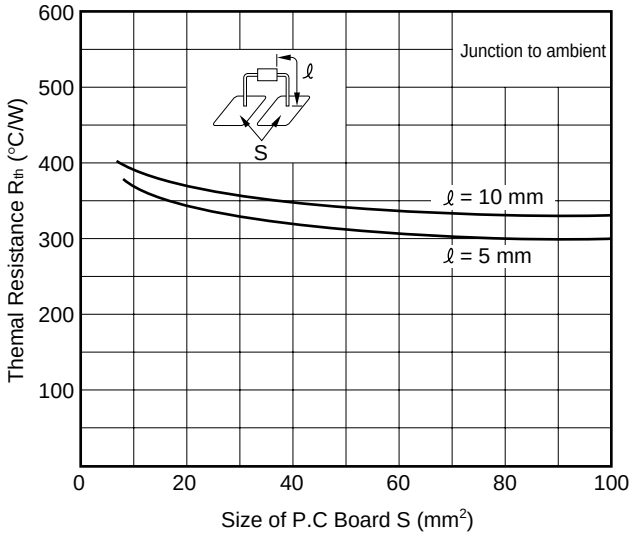


Fig. 8 e_n-V_Z CHARACTERISTICS

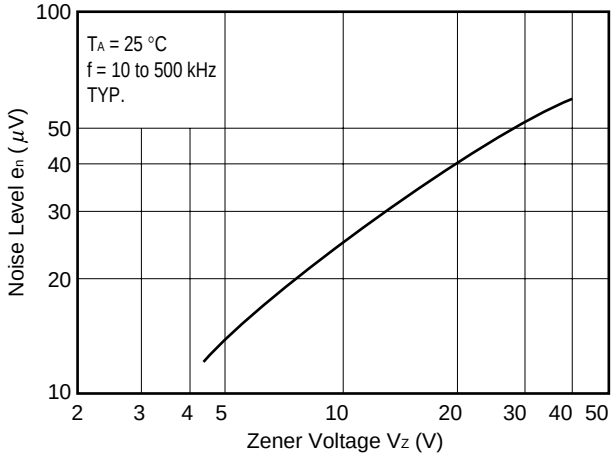


Fig. 9 SURGE REVERSE POWER RATINGS

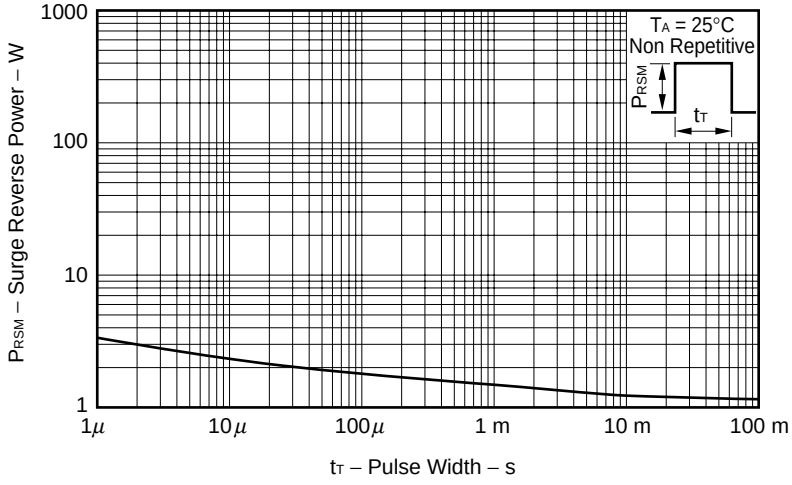
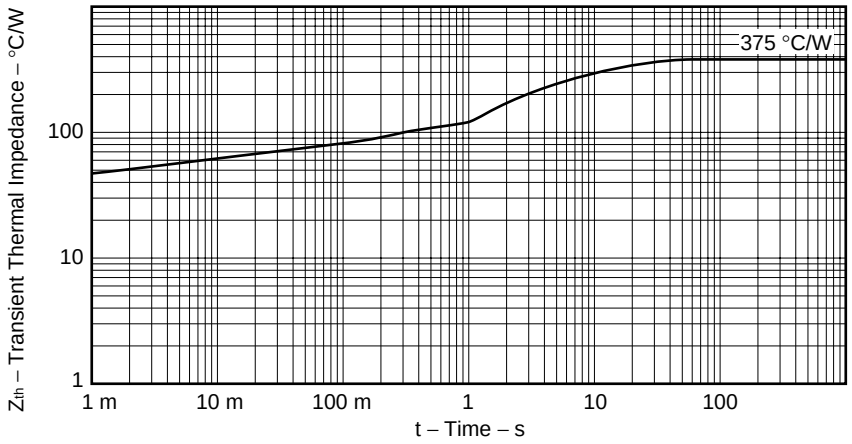


Fig. 10 TRANSIENT THERMAL IMPEDANCE CHARACTERISTIC



[MEMO]

[MEMO]

- **The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.**
- No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.
- NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.
- Descriptions of circuits, software, and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software, and information in the design of the customer's equipment shall be done under the full responsibility of the customer. NEC Corporation assumes no responsibility for any losses incurred by the customer or third parties arising from the use of these circuits, software, and information.
- While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.
- NEC devices are classified into the following three quality grades:
  "Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated “quality assurance program“ for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.
  - 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
  - Special: 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, life support systems or medical equipment for life support, etc.

  The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.

M7 98.8