TOSHIBA Zener Diode Silicon Junction

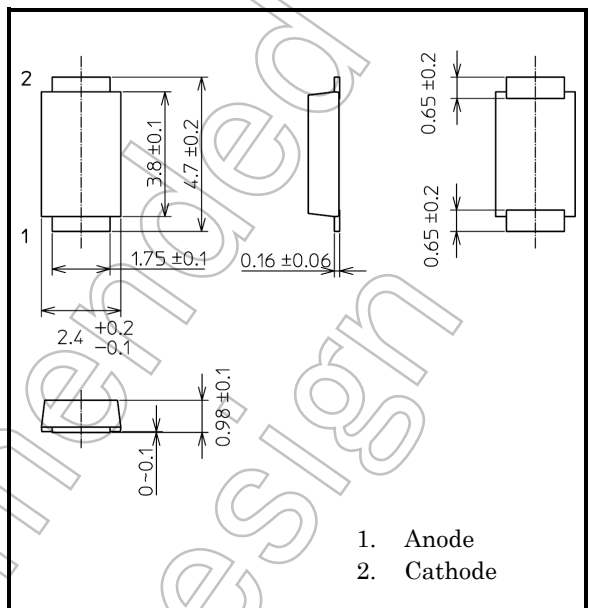
CMZB100 to CMZB390

○ Communication, Control and Measurement Equipment

○ Constant Voltage Regulation

- Power dissipation: P = 1 W
- Zener voltage: V_Z = 100 to 390 V
- Suitable for high-density board assembly due to the use of a small surface-mount package, M−FLAT™

Unit: mm



JEDEC	―
JEITA	―
TOSHIBA	3-4E1S

Weight: 0.023 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

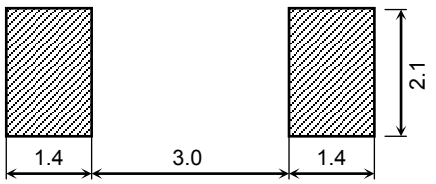
Characteristics	Symbol	Rating	Unit
Power dissipation	P	1 (Note 1)	W
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	−55 to 150	°C

Note : Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature / current / voltage, etc.) are within the absolute maximum ratings.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 1: Ta = 40°C
Device mounted on a glass-epoxy board
Board size: 50 mm × 50 mm
Land pattern: 6 mm × 6 mm
Board thickness: 1.6 mm

Land Pattern Dimensions (for reference only)

Unit: mm



Start of commercial production
2010-09

Electrical Characteristics (Ta = 25°C)

Type	Zener Voltage Vz (V)				Dynamic Resistance r_d (Ω)		Temperature Coefficient		Forward Voltage V_F (V)		Reverse Current I_R (μA)	
				Measure-ment Current I_Z (mA)		Measure-ment Current I_Z (mA)	αT (mV/°C)			Measure-ment Current I_F (A)		Measure-ment Voltage V_R (V)
	Min	Typ.	Max		Max		Typ.	Max	Max		Max	
CMZB100	90	100	110	3	300	3	87	138	1.2	0.2	10	80
CMZB110	99	110	121	3	300	3	96	152	1.2	0.2	10	88
CMZB150	135	150	165	2	450	2	136	210	1.2	0.2	10	120
CMZB180	162	180	198	1.5	500	1.5	161	254	1.2	0.2	10	144
CMZB200	180	200	220	1.5	500	1.5	170	269	1.2	0.2	10	160
CMZB220	198	220	242	0.5	5000	0.5	200	309	1.2	0.2	10	176
CMZB240	216	240	264	0.5	5000	0.5	215	343	1.2	0.2	10	192
CMZB270	243	270	297	0.5	5000	0.5	243	385	1.2	0.2	10	216
CMZB300	270	300	330	0.5	5000	0.5	270	428	1.2	0.2	10	240
CMZB330	297	330	363	0.5	5000	0.5	296	473	1.2	0.2	10	264
CMZB390	351	390	429	0.5	10000	0.5	350	555	1.2	0.2	10	312

Marking

Abbreviation Code	Part No.	Abbreviation Code	Part No.
B1A	CMZB100	B2E	CMZB240
B1B	CMZB110	B2H	CMZB270
B1F	CMZB150	B3A	CMZB300
B1J	CMZB180	B3D	CMZB330
B2A	CMZB200	B3K	CMZB390
B2C	CMZB220		

Handling Precaution

1) The absolute maximum ratings of a semiconductor device are a set of ratings that must not be exceeded,even for a moment. Do not exceed any of these ratings. The following are the general derating methods that we recommend when you design a circuit with a device.

P: We recommend that the worst case power dissipation be no greater than 50% of the absolute maximum rating of power dissipation. Carry out adequate heat design.

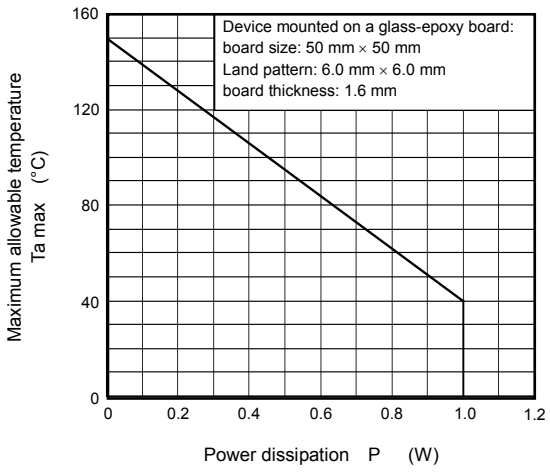
P_{RSM}: We recommend that a device be used within the recommended area in the figure, P_{RSM}-tw.

T_j: Derate this rating when using a device in order to ensure high reliability. We recommend that the device be used at T_j of below 120°C.

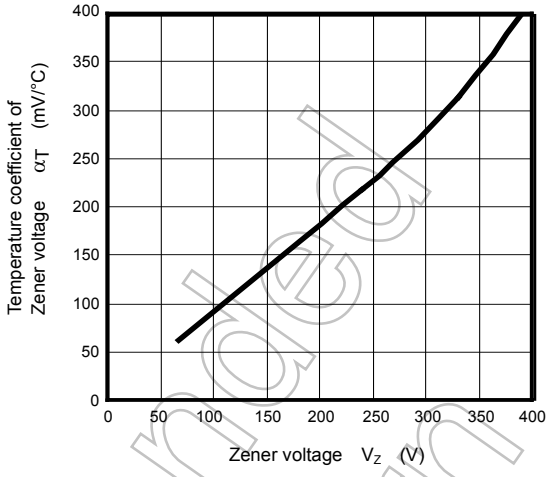
2) Thermal resistance between junction and ambient fluctuates depending on the device's mounting condition. When using a device, design a circuit board and a land pattern to match the appropriate thermal resistance value.

3) Please refer to the Rectifiers databook for further information.

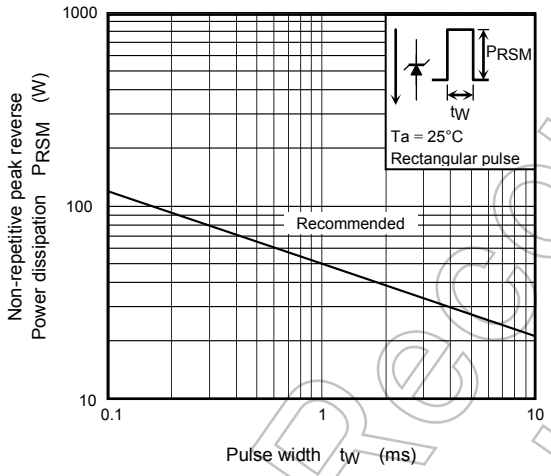
Ta max – P



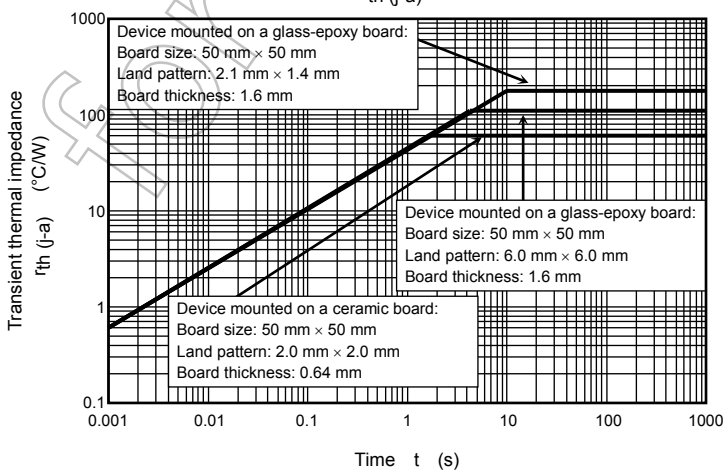
α_T – V_Z (typ.)



P_{RSM} – t_W (reference value)



$r_{th\ (j\text{-}a)}$ – t



RESTRICTIONS ON PRODUCT USE

- Toshiba Corporation, and its subsidiaries and affiliates (collectively "TOSHIBA"), reserve the right to make changes to the information in this document, and related hardware, software and systems (collectively "Product") without notice.
- This document and any information herein may not be reproduced without prior written permission from TOSHIBA. Even with TOSHIBA's written permission, reproduction is permissible only if reproduction is without alteration/omission.
- Though TOSHIBA works continually to improve Product's quality and reliability, Product can malfunction or fail. Customers are responsible for complying with safety standards and for providing adequate designs and safeguards for their hardware, software and systems which minimize risk and avoid situations in which a malfunction or failure of Product could cause loss of human life, bodily injury or damage to property, including data loss or corruption. Before customers use the Product, create designs including the Product, or incorporate the Product into their own applications, customers must also refer to and comply with (a) the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and (b) the instructions for the application with which the Product will be used with or for. Customers are solely responsible for all aspects of their own product design or applications, including but not limited to (a) determining the appropriateness of the use of this Product in such design or applications; (b) evaluating and determining the applicability of any information contained in this document, or in charts, diagrams, programs, algorithms, sample application circuits, or any other referenced documents; and (c) validating all operating parameters for such designs and applications. **TOSHIBA ASSUMES NO LIABILITY FOR CUSTOMERS' PRODUCT DESIGN OR APPLICATIONS.**
- **PRODUCT IS NEITHER INTENDED NOR WARRANTED FOR USE IN EQUIPMENTS OR SYSTEMS THAT REQUIRE EXTRAORDINARILY HIGH LEVELS OF QUALITY AND/OR RELIABILITY, AND/OR A MALFUNCTION OR FAILURE OF WHICH MAY CAUSE LOSS OF HUMAN LIFE, BODILY INJURY, SERIOUS PROPERTY DAMAGE AND/OR SERIOUS PUBLIC IMPACT ("UNINTENDED USE").** Except for specific applications as expressly stated in this document, Unintended Use includes, without limitation, equipment used in nuclear facilities, equipment used in the aerospace industry, medical equipment, equipment used for automobiles, trains, ships and other transportation, traffic signaling equipment, equipment used to control combustions or explosions, safety devices, elevators and escalators, devices related to electric power, and equipment used in finance-related fields. **IF YOU USE PRODUCT FOR UNINTENDED USE, TOSHIBA ASSUMES NO LIABILITY FOR PRODUCT.** For details, please contact your TOSHIBA sales representative.
- Do not disassemble, analyze, reverse-engineer, alter, modify, translate or copy Product, whether in whole or in part.
- Product shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable laws or regulations.
- The information contained herein is presented only as guidance for Product use. No responsibility is assumed by TOSHIBA for any infringement of patents or any other intellectual property rights of third parties that may result from the use of Product. No license to any intellectual property right is granted by this document, whether express or implied, by estoppel or otherwise.
- **ABSENT A WRITTEN SIGNED AGREEMENT, EXCEPT AS PROVIDED IN THE RELEVANT TERMS AND CONDITIONS OF SALE FOR PRODUCT, AND TO THE MAXIMUM EXTENT ALLOWABLE BY LAW, TOSHIBA (1) ASSUMES NO LIABILITY WHATSOEVER, INCLUDING WITHOUT LIMITATION, INDIRECT, CONSEQUENTIAL, SPECIAL, OR INCIDENTAL DAMAGES OR LOSS, INCLUDING WITHOUT LIMITATION, LOSS OF PROFITS, LOSS OF OPPORTUNITIES, BUSINESS INTERRUPTION AND LOSS OF DATA, AND (2) DISCLAIMS ANY AND ALL EXPRESS OR IMPLIED WARRANTIES AND CONDITIONS RELATED TO SALE, USE OF PRODUCT, OR INFORMATION, INCLUDING WARRANTIES OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, ACCURACY OF INFORMATION, OR NONINFRINGEMENT.**
- Do not use or otherwise make available Product or related software or technology for any military purposes, including without limitation, for the design, development, use, stockpiling or manufacturing of nuclear, chemical, or biological weapons or missile technology products (mass destruction weapons). Product and related software and technology may be controlled under the applicable export laws and regulations including, without limitation, the Japanese Foreign Exchange and Foreign Trade Law and the U.S. Export Administration Regulations. Export and re-export of Product or related software or technology are strictly prohibited except in compliance with all applicable export laws and regulations.
- Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product. Please use Product in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. **TOSHIBA ASSUMES NO LIABILITY FOR DAMAGES OR LOSSES OCCURRING AS A RESULT OF NONCOMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS.**