

TOSHIBA Rectifier Silicon Diffused Type

# CRG09

## General Purpose Rectifier Applications

- Repetitive peak reverse voltage:  $V_{RRM} = 400\text{ V}$
- Average forward current:  $I_F(AV) = 1.0\text{ A}$
- Forward voltage:  $V_{FM} = 1.1\text{ V (max)}$  ( $@I_{FM} = 0.7\text{ A}$ )
- High ESD Capability
- Suitable for high-density board assembly due to the use of a small surface-mount package, S-FLAT™

## Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Repetitive peak reverse voltage	$V_{RRM}$	400	V
Average forward current	$I_{F(AV)}$	1.0 (Note 1)	A
Non-repetitive peak surge current	$I_{FSM}$	15 (50 Hz)	A
Junction temperature	$T_j$	-40 to 150	°C
Storage temperature	$T_{stg}$	-40 to 150	°C

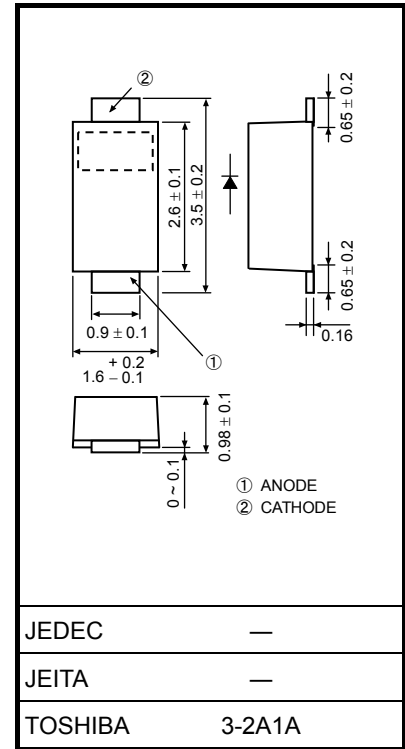
Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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:  $T_a = 66^\circ\text{C}$

- Device mounted on a ceramic board
- Board size: 50 mm × 50 mm
- Soldering size: 2 mm × 2 mm
- Board thickness: 0.64 mm

Unit: mm



Weight: 0.013 g (typ.)

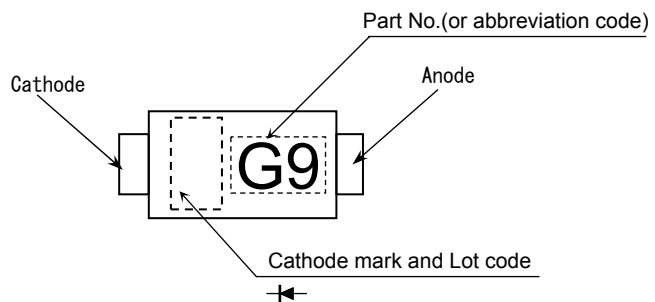
Start of commercial production  
2008-12

**Electrical Characteristics (Ta = 25°C)**

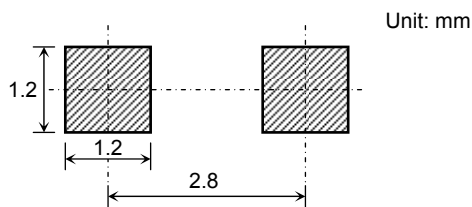
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	V <sub>FM</sub> (1)	I <sub>FM</sub> = 0.1 A (pulse test)	—	0.83	—	V
	V <sub>FM</sub> (2)	I <sub>FM</sub> = 0.7 A (pulse test)	—	0.95	1.1	
	V <sub>FM</sub> (3)	I <sub>FM</sub> = 1.0 A (pulse test)	—	1.00	—	
Repetitive peak reverse current	I <sub>RRM</sub>	V <sub>RRM</sub> = 400 V (pulse test)	—	—	10	μA
Electrostatic Discharge Capability	ESD(1)	C = 150 pF , R = 2 kΩ, A contact electric discharge	—	25	—	kV
	ESD(2)	C = 330 pF , R = 2 kΩ, A contact electric discharge	—	25	—	kV
Thermal resistance (junction to ambient)	R <sub>th</sub> (j-a)	Device mounted on a ceramic board (board size: 50 mm × 50 mm) (soldering land: 2 mm × 2 mm) (board thickness: 0.64 mm)	—	—	65	°C/W
		Device mounted on a glass-epoxy board (board size: 50 mm × 50 mm) (soldering land: 6 mm × 6 mm) (board thickness: 1.6 mm)	—	—	130	
Thermal resistance (junction to lead)	R <sub>th</sub> (j-l)	—	—	—	20	°C/W

**Marking**

Abbreviation Code	Part No.
G9	CRG09



**Land pattern dimensions for reference only**



## Handling Precaution

1) The absolute maximum ratings denote the absolute maximum ratings, which are rated values that must not be exceeded during operation, even for an instant. The following are the general derating methods that we recommend for designing a circuit incorporating this device.

$V_{RRM}$ : We recommend that the worst case voltage, including surge voltage, be no greater than 80% of the absolute maximum rating of  $V_{RRM}$  for a DC circuit and be no greater than 50% of that of  $V_{RRM}$  for an AC circuit.

$V_{RRM}$  has a temperature coefficient of 0.1%/°C. Take this temperature coefficient into account designing a device at low temperature.

$I_{F(AV)}$ : We recommend that the worst case current be no greater than 80% of the absolute maximum rating of  $I_{F(AV)}$ . Carry out adequate heat design. If you can't design a circuit with excellent heat radiation, set the margin by using an allowable  $T_a$  max- $I_{F(AV)}$  curve.

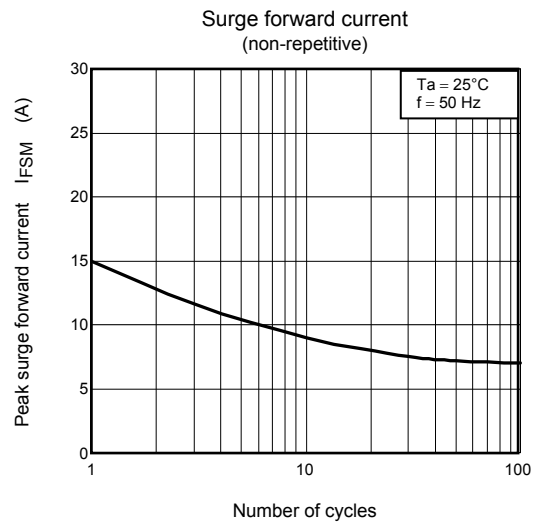
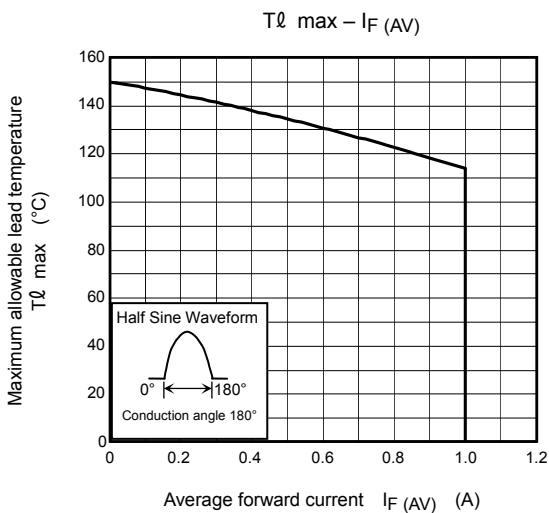
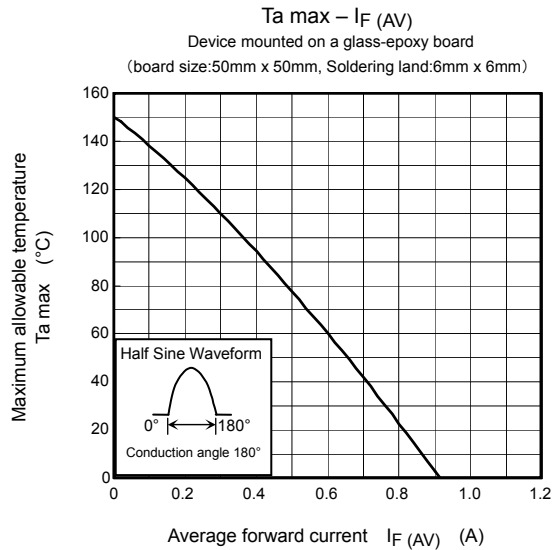
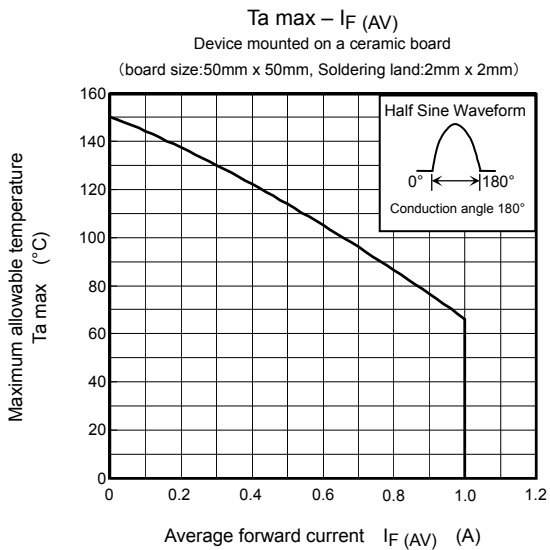
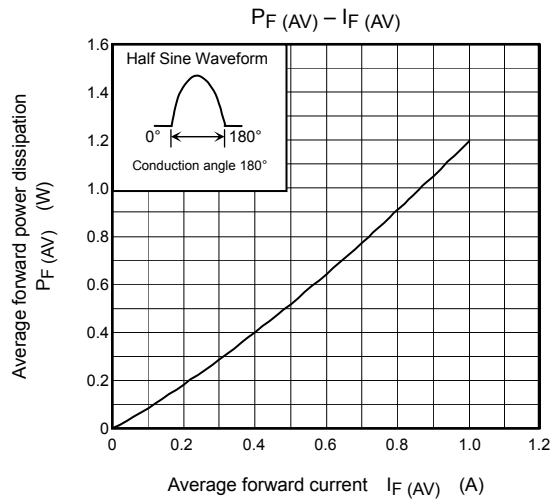
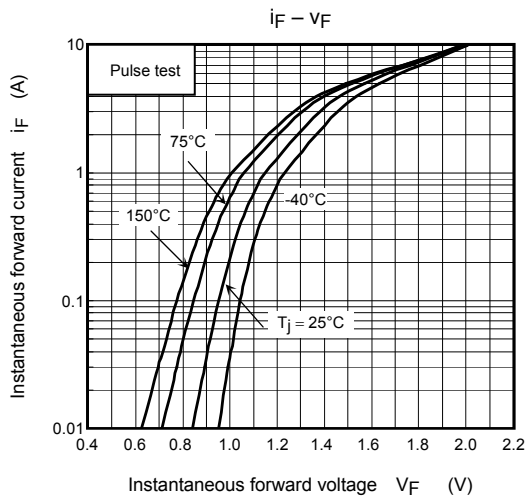
$I_{FSM}$ : This rating specifies the non-repetitive peak current. This is only applied for an abnormal operation, which seldom occurs during the lifespan of the device.

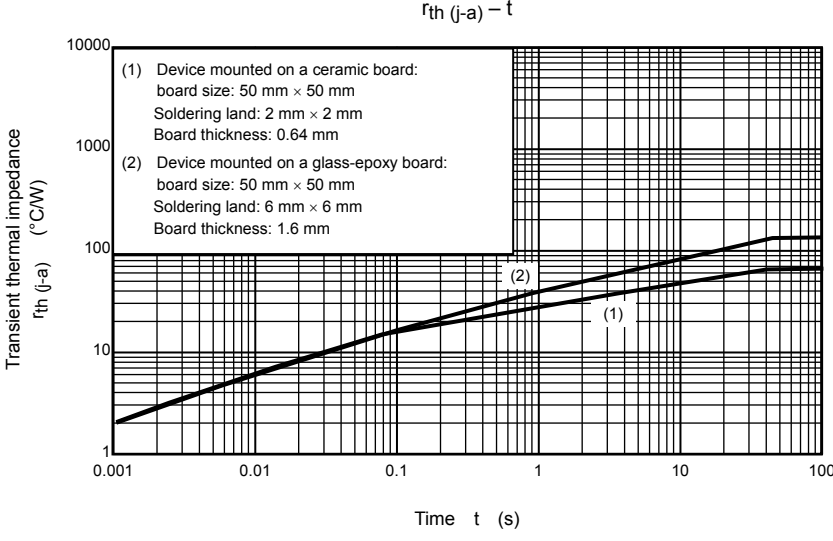
$T_j$ : Derate this rating when using a device in order to ensure high reliability.

We recommend that a device be used at a  $T_j$  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 soldering land size to match the appropriate thermal resistance value.

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





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