

TOSHIBA Rectifier Silicon Diffused Type

# CRG04

## General-Purpose Rectifier Applications

- Repetitive peak reverse voltage:  $V_{RRM} = 600\text{ V}$
- Average forward current:  $I_F (AV) = 1.0\text{ A}$
- Average forward voltage:  $V_{FM} = 1.1\text{ V(Max)}$
- 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	$V_{RRM}$	600	V
Average Forward Current	$I_F (AV)$	1.0(Note1)	A
Peak One Cycle Surge Forward Current (Non-Repetitive)	$I_{FSM}$	15.0 (50Hz)	A
Junction Temperature	$T_j$	-40 to 150	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-40 to 150	$^\circ\text{C}$

Note 1:  $T_a = 66^\circ\text{C}$ 

Device mounted on a ceramic board  
 board size: 50 mm × 50 mm  
 soldering land: 2 mm × 2 mm  
 board thickness: 0.64 mm  
 Half-sine waveform:  $\alpha = 180^\circ$

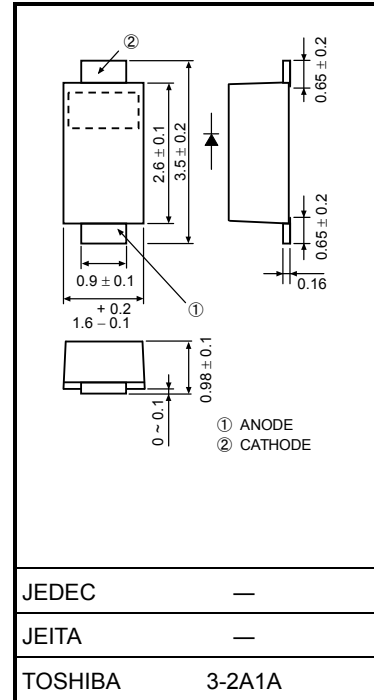
Note 2: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) 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).

## Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	$V_{FM(1)}$	$I_{FM} = 0.1\text{ A}$ (Pulse test)	—	0.84	—	V
	$V_{FM(2)}$	$I_{FM} = 0.7\text{ A}$ (Pulse test)	—	0.95	—	V
	$V_{FM(3)}$	$I_{FM} = 1.0\text{ A}$ (Pulse test)	—	0.98	1.1	V
Repetitive peak reverse current	$I_{RRM}$	$V_{RRM} = 600\text{ V}$ (Pulse test)	—	—	10	$\mu\text{A}$
Thermal resistance	$R_{th(j-a)}$	Device mounted on a ceramic board Board size: 50 mm × 50 mm Soldering land: 2 mm × 2 mm Board thickness: 0.64 mm	—	—	65	$^\circ\text{C/W}$
		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	
	$R_{th(j-l)}$	—	—	—	20	$^\circ\text{C/W}$

Unit: mm

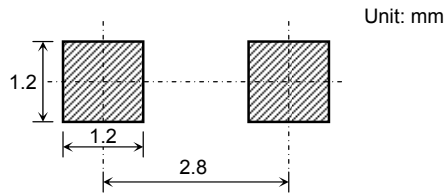


Weight: 0.013 g (typ.)

## Marking

Abbreviation Code	Part No.
G4	CRG04

## Standard Soldering Pad



## Handling Precaution

The absolute maximum ratings are rated values and must not be exceeded during operation, even for an instant. The following are the general derating methods that we recommend when you design a circuit with a device.

$V_{RRM}$ : We recommend that the worst case voltage, including surge voltage, be no greater than 80% of the 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.

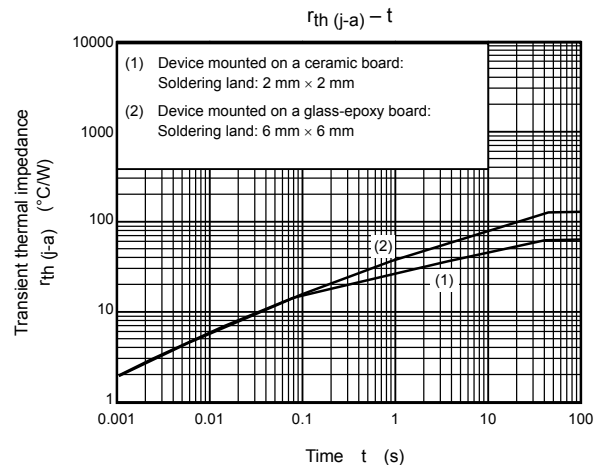
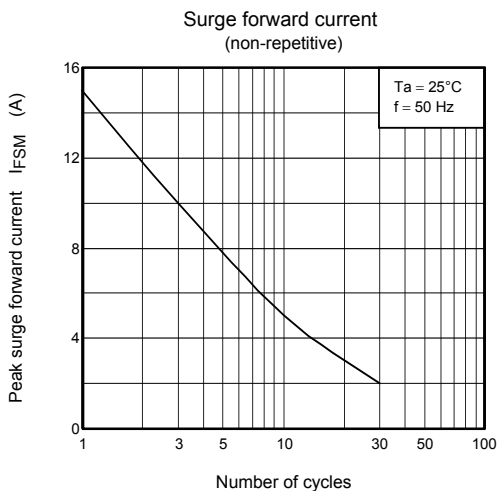
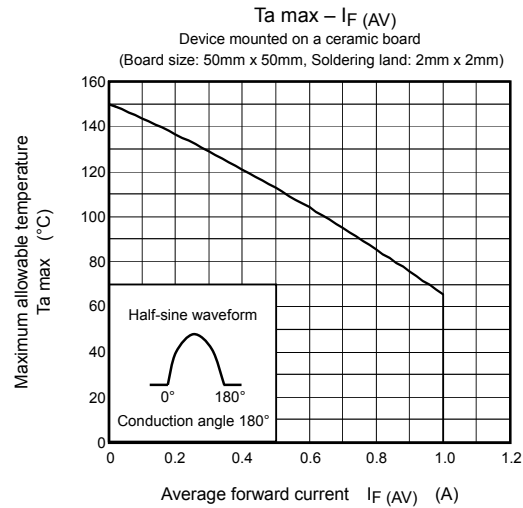
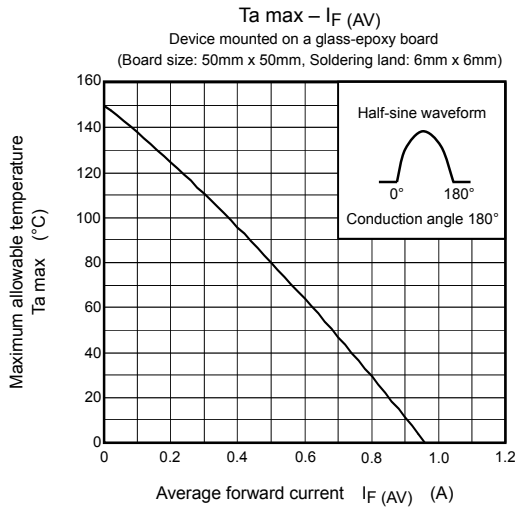
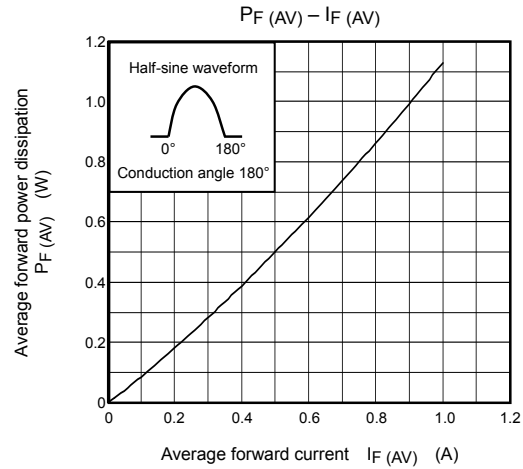
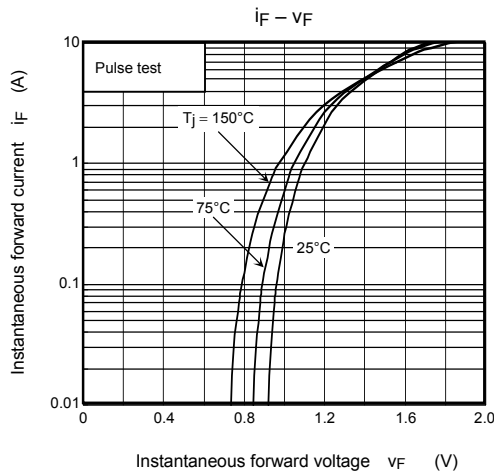
$I_{F(AV)}$ : We recommend that the worst case current be no greater than 80% of the maximum rating of  $I_{F(AV)}$ . Carry out adequate heat design. If you can't design a circuit with excellent heat radiation, set the margin by using an allowable  $T_a$  max- $I_{F(AV)}$  curve.

This rating specifies the non-repetitive peak current in one cycle of a 50-Hz sine wave, condition angle 180. Therefore, this is only applied for an abnormal operation, which seldom occurs during the lifespan of the device.

We recommend that a device be used at  $T_j$  below 120°C under the worst load and heat radiation conditions.

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.

Please refer to the Rectifiers databook for further information.



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20070701-EN GENERAL

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- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.  
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc.
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