

TOSHIBA Schottky Barrier Rectifier Schottky Barrier Type

CUS05

Switching Mode Power Supply Applications

Portable Equipment Battery Application

- Forward voltage: $V_{FM} = 0.37$ V (max) @ $I_F = 0.7$ A
- Average forward current: $I_F (AV) = 1.0$ A
- Repetitive peak reverse voltage: $V_{RRM} = 20$ V
- Suitable for high-density board assembly due to the use of a small Surface-mount package, US-FLAT™

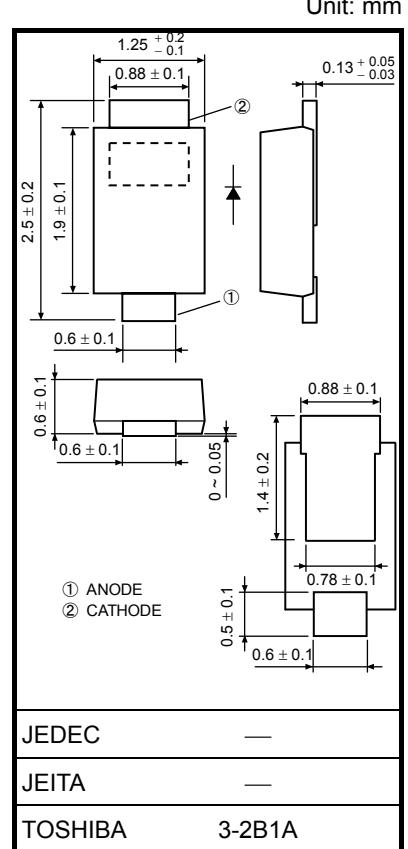
Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Repetitive peak reverse voltage	V_{RRM}	20	V
Average forward current	$I_F (AV)$	1.0 (Note 1)	A
Peak one cycle surge forward current (Non-repetitive)	I_{FSM}	20 (50 Hz)	A
Junction temperature	T_j	-40 to 125	°C
Storage temperature range	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 land: 2 mm × 2 mm)
Rectangular waveform ($\alpha = 180^\circ$), $V_R = 10$ V



Weight: 0.004 g (typ.)

JEDEC —
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TOSHIBA 3-2B1A

Start of commercial production
2007-02

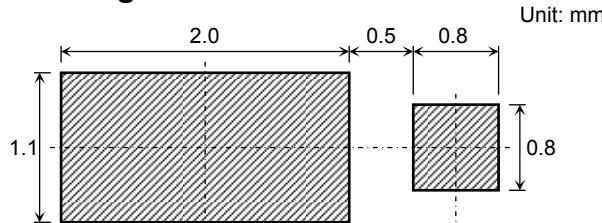
Electrical Characteristics ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	V_{FM} (1)	$I_{FM} = 0.1 \text{ A}$	—	0.25	—	V
	V_{FM} (2)	$I_{FM} = 0.7 \text{ A}$	—	0.33	0.37	
	V_{FM} (3)	$I_{FM} = 1.0 \text{ A}$	—	0.39	—	
Repetitive peak reverse current	I_{RRM} (1)	$V_{RRM} = 5 \text{ V}$	—	50	—	μA
	I_{RRM} (2)	$V_{RRM} = 20 \text{ V}$	—	0.2	1.0	mA
Junction capacitance	C_j	$V_R = 10 \text{ V}, f = 1.0 \text{ MHz}$	—	40	—	pF
Thermal resistance (junction to ambient)	$R_{th(j-a)}$	Device mounted on a ceramic board (board size: 50 mm × 50 mm) (soldering land: 2 mm × 2 mm) (board thickness: 0.64 mm)	—	—	75	$^\circ\text{C}/\text{W}$
		Device mounted on a glass-epoxy board (board size: 50 mm × 50 mm) (soldering land: 6 mm × 6 mm) (board thickness: 1.6 mm)	—	—	150	
Thermal resistance (junction to lead)	$R_{th(j-t)}$	Junction to lead of cathode side	—	—	30	$^\circ\text{C}/\text{W}$

Marking

Abbreviation Code	Part No.
5	CUS05

Standard Soldering Pad



Handling Precaution

Schottky barrier diodes have reverse current characteristic compared to the other diodes.

There is a possibility SBD may cause thermal runaway when it is used under high temperature or high voltage. This device is VF-I_{RRM} trade-off type, lower VF higher I_{RRM}; therefore, thermal runaway might occur when voltage is applied. Please take forward and reverse loss into consideration during design.

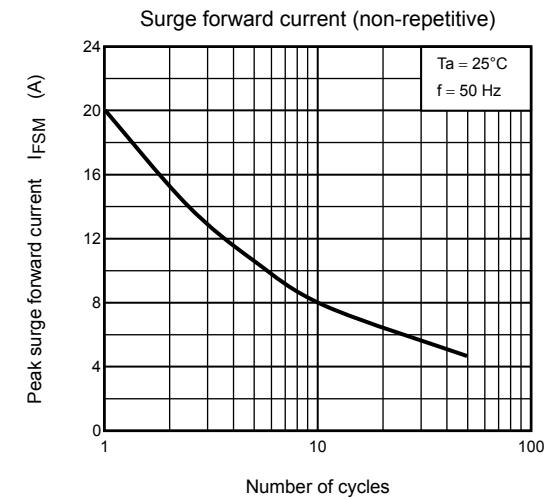
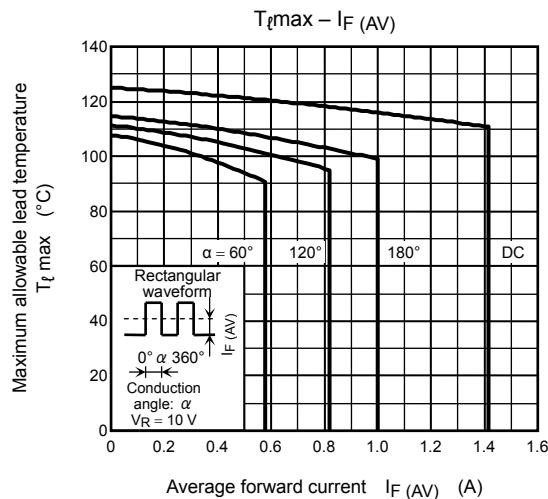
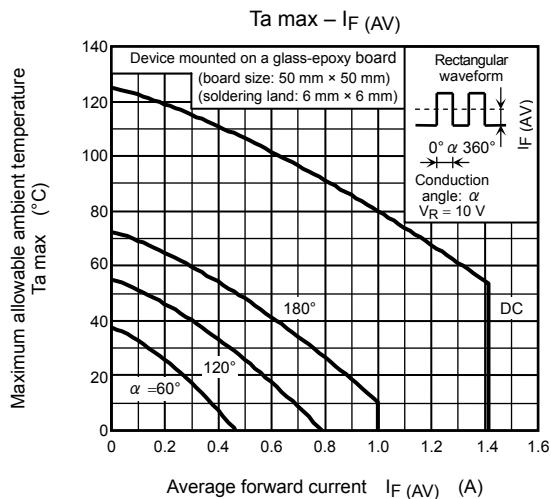
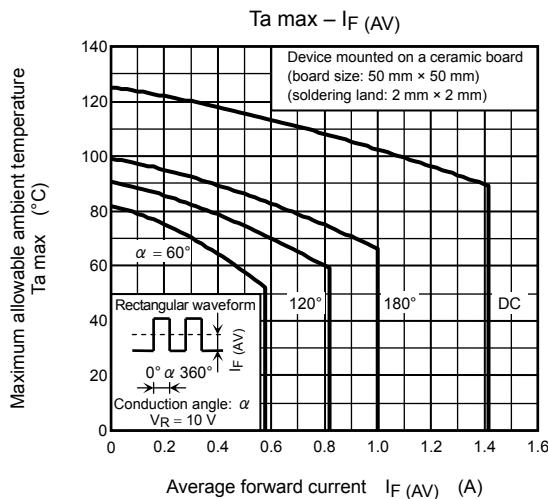
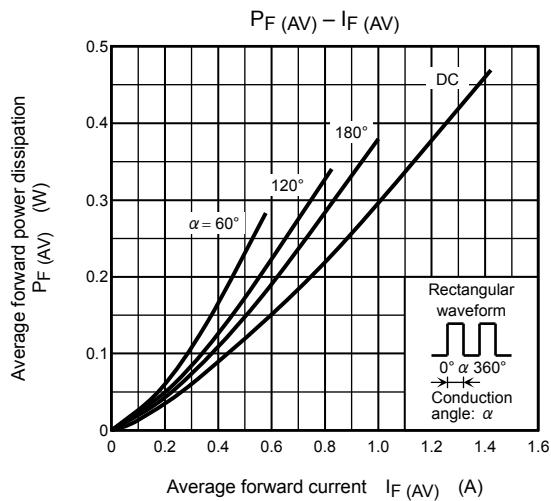
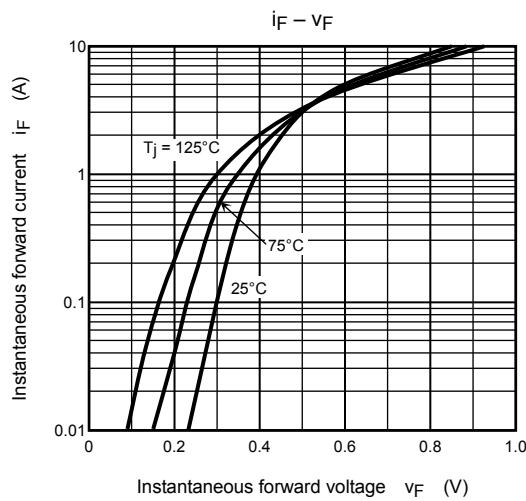
The absolute maximum ratings of a semiconductor device are a set of ratings that must not be exceeded, even for a moment. Do not exceed any of these ratings.

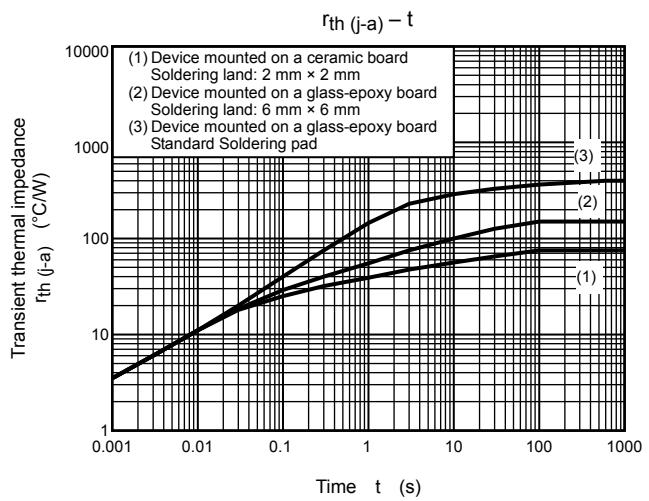
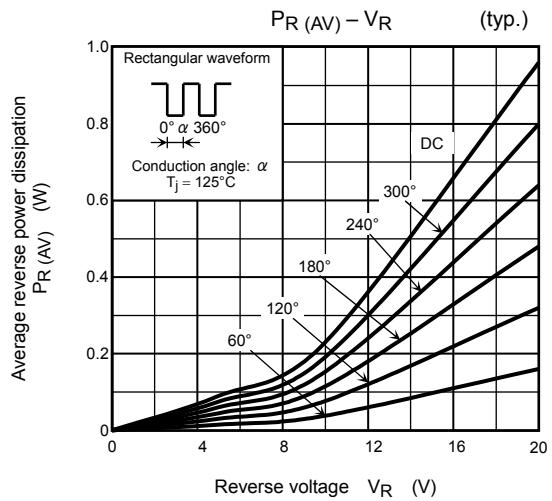
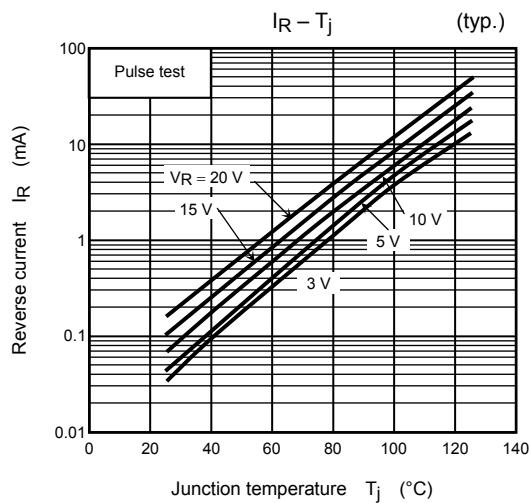
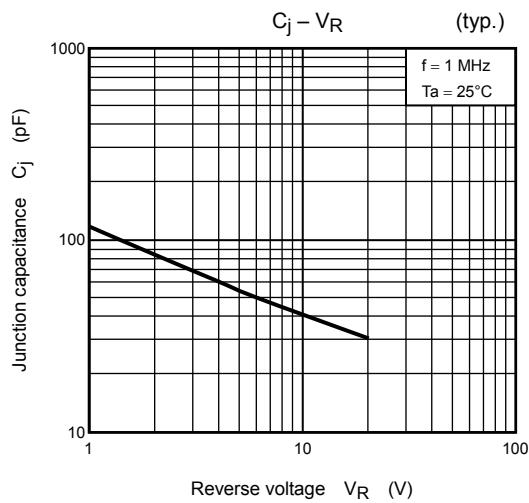
The following are the general derating methods that we recommend for designing a circuit using this device.

- V_{RRM}: Use this rating with reference to the above. 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)} and T_j be below 100°C. When using this device, take the margin into consideration by using an allowable Tamax-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 the device be used at T_j of below 100°C.

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

Refer to the Rectifiers databook for further information.





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