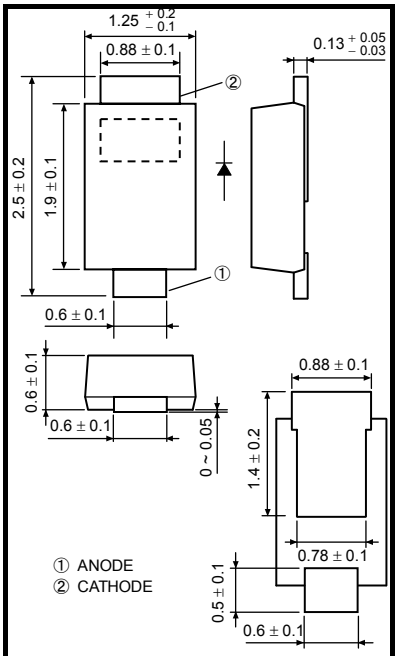
TOSHIBA Schottky Barrier Rectifier Schottky Barrier Type

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™

Unit: mm



JEDEC	―
JEITA	―
TOSHIBA	3-2B1A

Weight: 0.004 g (typ.)

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: Ta = 66°C: Device mounted on a ceramic board
(board size: 50 mm × 50 mm,
Soldering land: 2 mm × 2 mm)
Rectangular waveform (α = 180°), V_R = 10 V

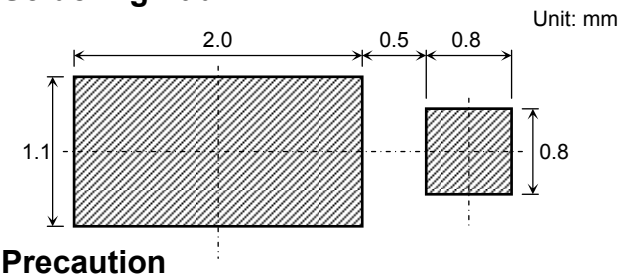
Electrical Characteristics (Ta = 25°C)

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

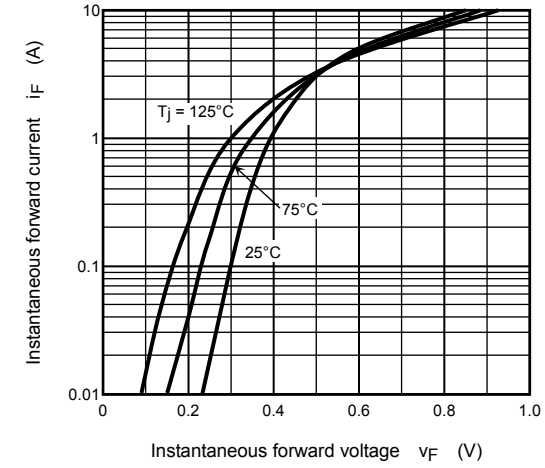
I_{FSM}: This rating specifies the non-repetitive peak current. This is only applied for an abnormal operation, which seldom occurs during the lifespan of the device.

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.

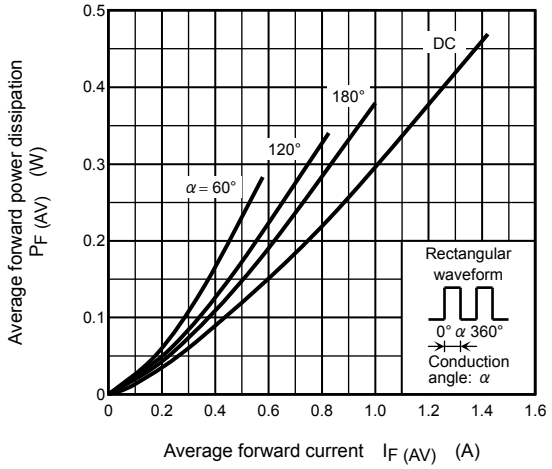
Thermal resistance between junction and ambient fluctuates depending on the device's mounting condition. When using a device, please design a circuit board and a soldering land size to match the appropriate thermal resistance value.

Refer to the Rectifiers databook for further information.

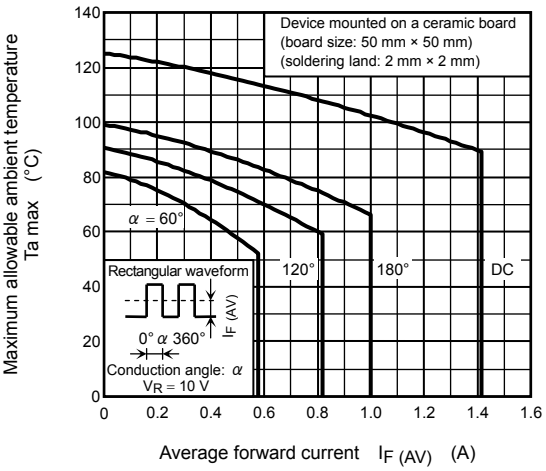
$i_F - v_F$



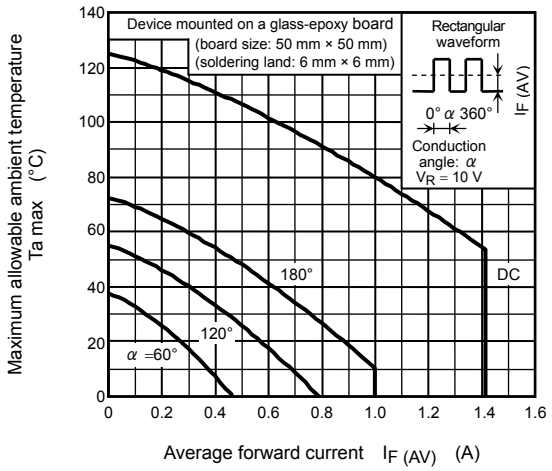
$P_{F\ (AV)} - I_{F\ (AV)}$



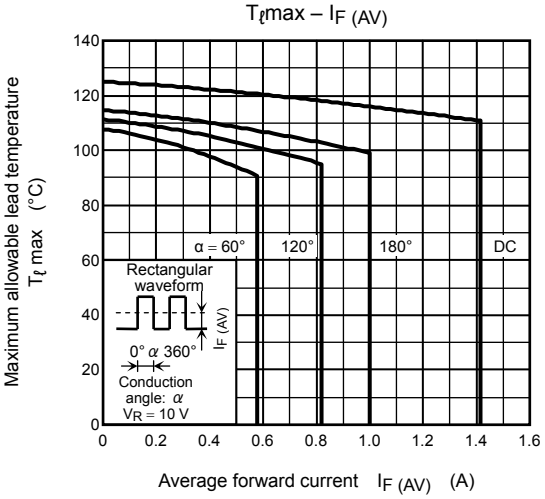
Ta max – $I_{F\ (AV)}$



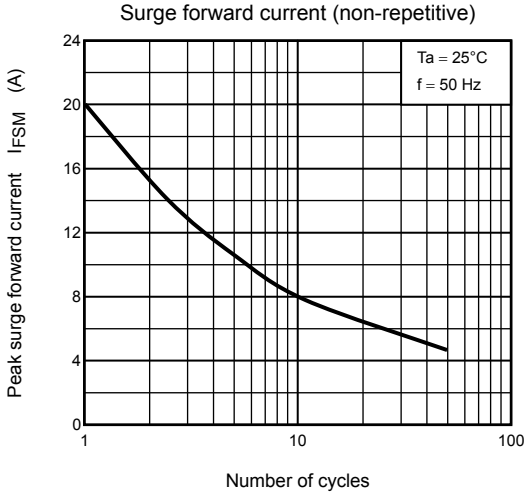
Ta max – $I_{F\ (AV)}$



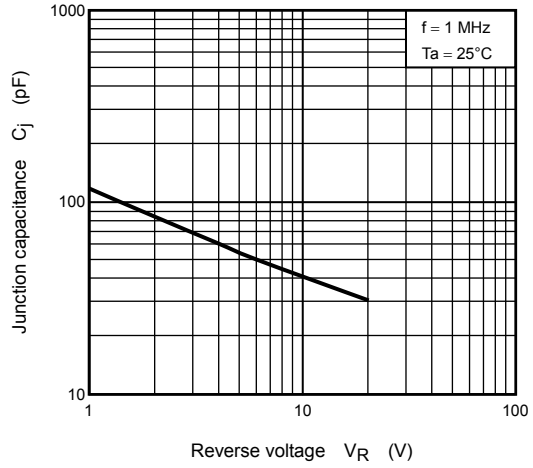
$T_ℓ$max – $I_{F\ (AV)}$



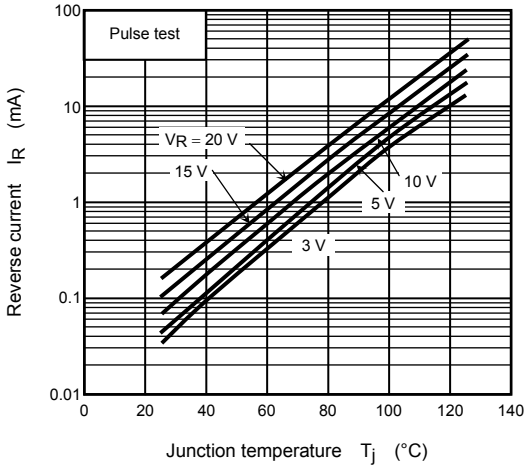
Surge forward current (non-repetitive)



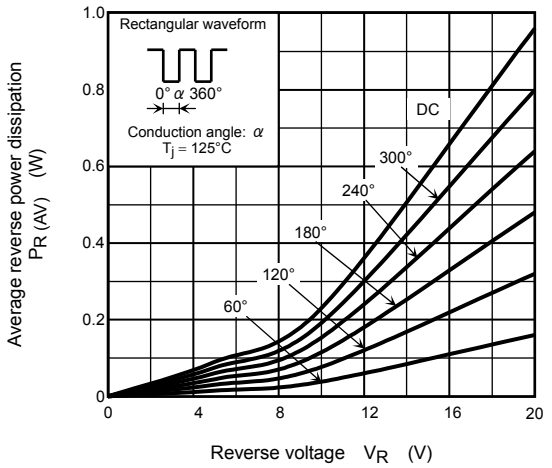
$C_j - V_R$ (typ.)



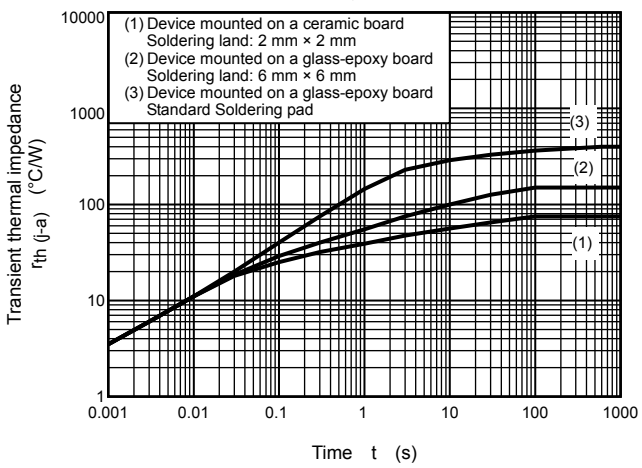
$I_R - T_j$ (typ.)



$P_{R\ (AV)} - V_R$ (typ.)



$r_{th\ (j\text{-}a)} - t$



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