

# CUS05

Switching Mode Power Supply Applications  
 Portable Equipment Battery Application

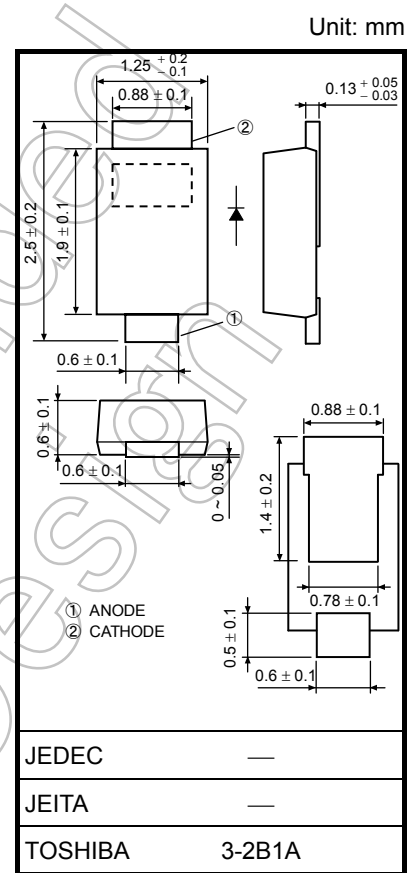
- Forward voltage:  $V_{FM} = 0.37 \text{ V (max) @ } I_F = 0.7 \text{ A}$
- Average forward current:  $I_F (AV) = 1.0 \text{ A}$
- Repetitive peak reverse voltage:  $V_{RRM} = 20 \text{ V}$
- Suitable for high-density board assembly due to the use of a small Surface-mount package, US-FLAT™

### 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: Ta = 66°C: Device mounted on a ceramic board  
 (board size: 50 mm × 50 mm,  
 Soldering land: 2 mm × 2 mm)  
 Rectangular waveform ( $\alpha = 180^\circ$ ),  $V_R = 10 \text{ V}$



Weight: 0.004 g (typ.)

Start of commercial production  
 2007-02

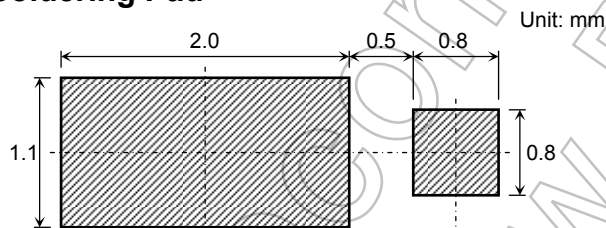
## Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	V <sub>FM</sub> (1)	I <sub>FM</sub> = 0.1 A	—	0.25	—	V
	V <sub>FM</sub> (2)	I <sub>FM</sub> = 0.7 A	—	0.33	0.37	
	V <sub>FM</sub> (3)	I <sub>FM</sub> = 1.0 A	—	0.39	—	
Repetitive peak reverse current	I <sub>RRM</sub> (1)	V <sub>RRM</sub> = 5 V	—	50	—	μA
	I <sub>RRM</sub> (2)	V <sub>RRM</sub> = 20 V	—	0.2	1.0	mA
Junction capacitance	C <sub>j</sub>	V <sub>R</sub> = 10 V, f = 1.0 MHz	—	40	—	pF
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)	—	—	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 <sub>th</sub> (j-t)	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<sub>F</sub>-I<sub>RRM</sub> trade-off type, lower V<sub>F</sub> higher I<sub>RRM</sub>; 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<sub>RRM</sub>:** Use this rating with reference to the above. V<sub>RRM</sub> has a temperature coefficient of 0.1%/°C. Take this temperature coefficient into account designing a device at low temperature.

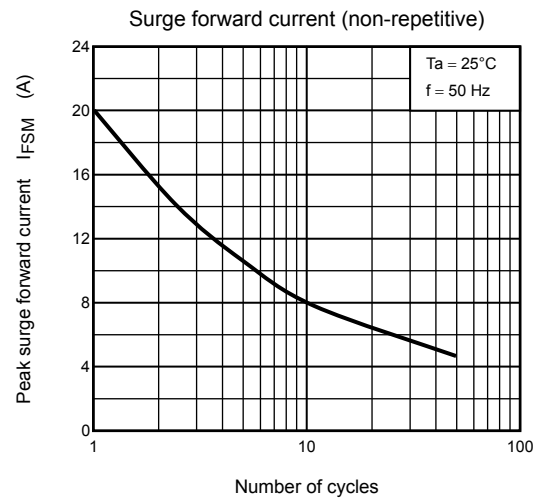
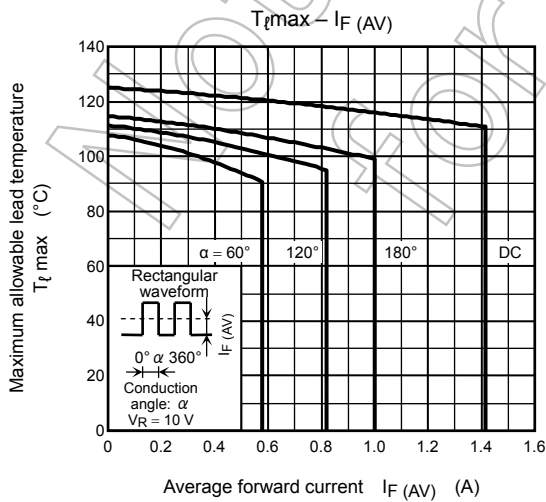
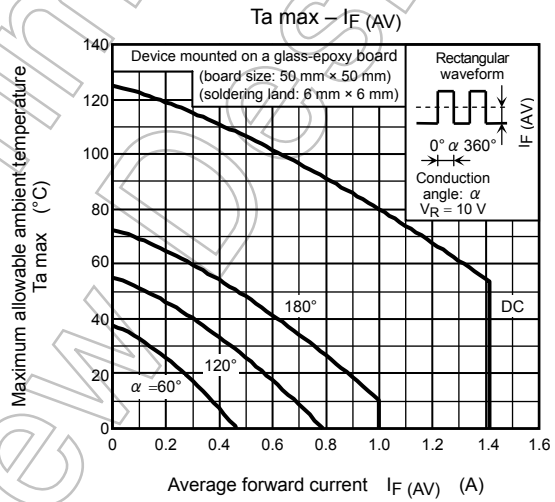
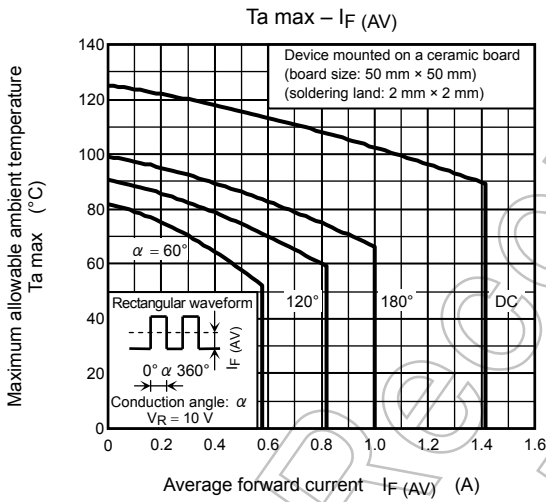
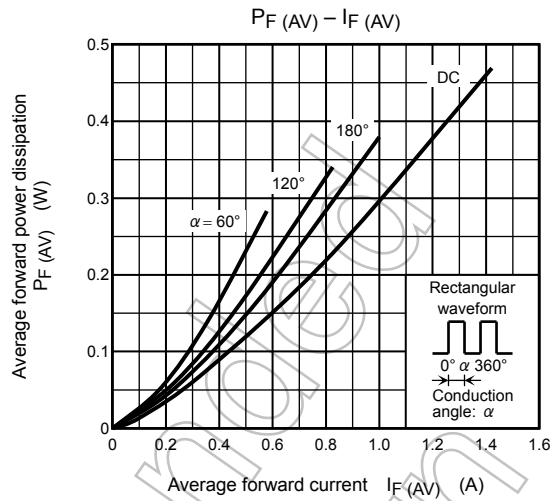
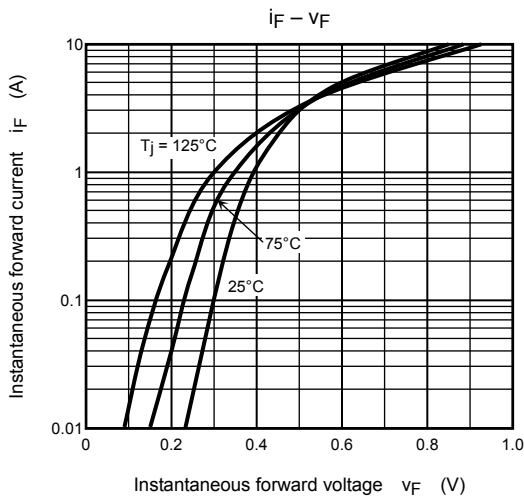
**I<sub>F(AV)</sub>:** We recommend that the worst case current be no greater than 80% of the absolute maximum rating of I<sub>F(AV)</sub> and T<sub>j</sub> be below 100°C. When using this device, take the margin into consideration by using an allowable T<sub>amax</sub>-I<sub>F(AV)</sub> curve.

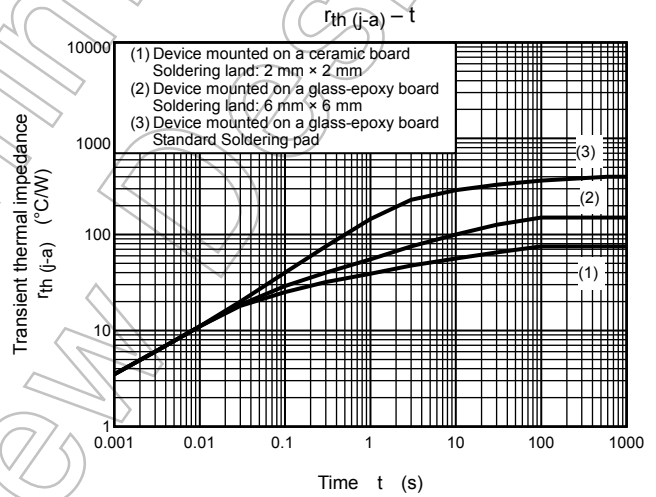
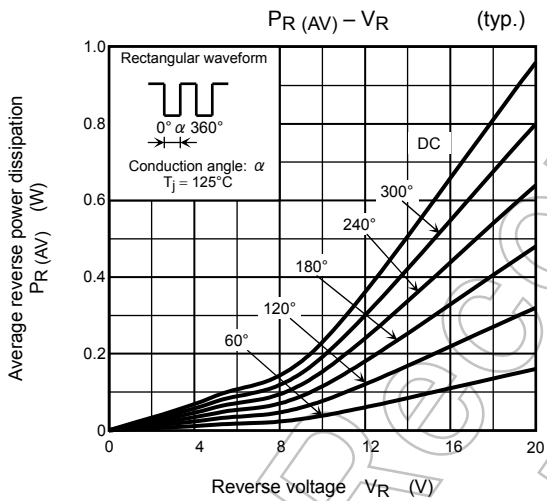
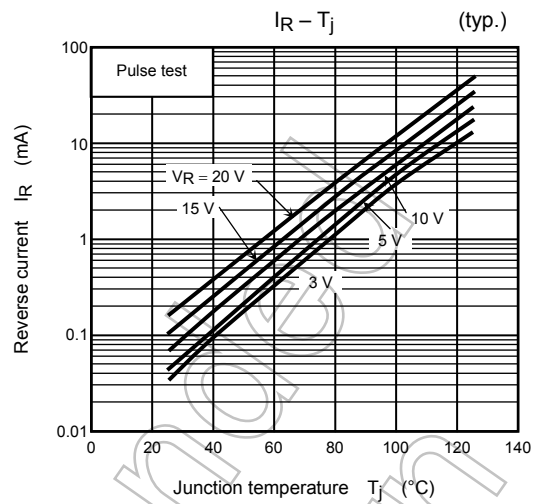
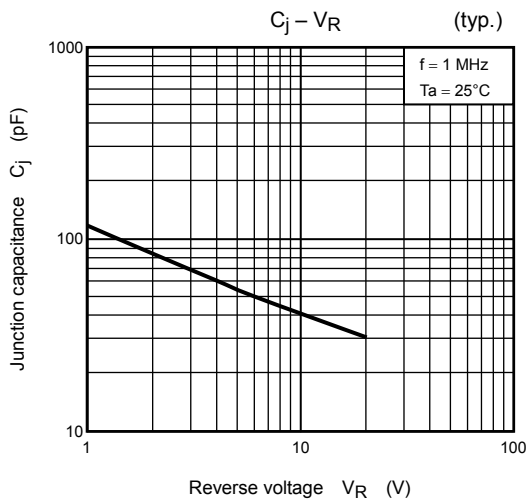
**I<sub>FSM</sub>:** This rating specifies the non-repetitive peak current. This is only applied for an abnormal operation, which seldom occurs during the lifespan of the device.

**T<sub>j</sub>:** Derate this rating when using a device in order to ensure high reliability. We recommend that the device be used at T<sub>j</sub> 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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