

TOSHIBA Schottky Barrier Rectifier Schottky Barrier Type

# CMS05

Switching Mode Power Supply Applications

Portable Equipment Battery Applications

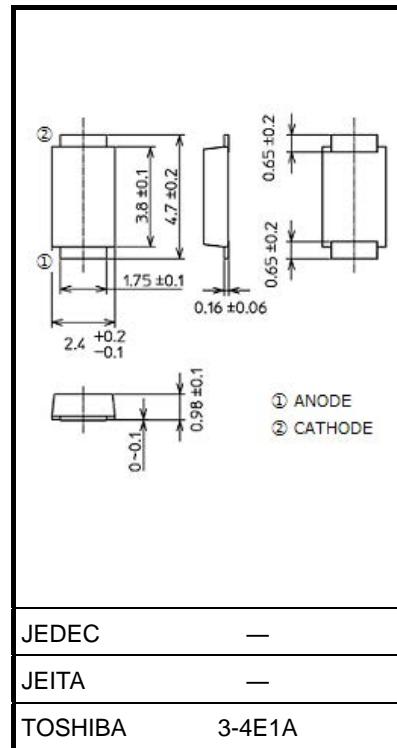
Unit: mm

- Repetitive peak reverse voltage :  $V_{RRM} = 30$  V
- Average forward current :  $I_F (AV) = 5$  A
- Peak forward voltage :  $V_{FM} = 0.45$  V (max)
- Suitable for compact assembly due to small surface-mount package "M-FLAT<sup>TM</sup>" (Toshiba package name)

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

Characteristics	Symbol	Rating	Unit
Repetitive peak reverse voltage	$V_{RRM}$	30	V
Average forward current	$I_F (AV)$	5 (Note 1)	A
Non-repetitive peak forward surge current	$I_{FSM}$	70 (50 Hz)	A
Junction temperature	$T_j$	-40 to 150	°C
Storage temperature	$T_{stg}$	-40 to 150	°C

Note 1:  $T_f = 100^\circ\text{C}$  Device mounted on a ceramic board  
 Board size : 50 mm × 50 mm  
 Soldering land size : 2 mm × 2 mm  
 Board thickness : 0.64 mm  
 Rectangular waveform ( $\alpha = 180^\circ$ ),  $VR = 15$  V



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.).

Weight: 0.023 g (typ.)

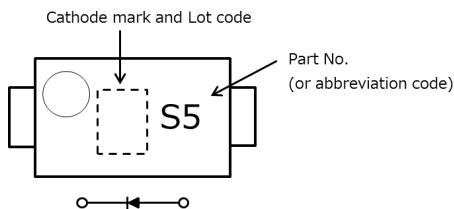
## Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	$V_{FM}$ (1)	$I_{FM} = 1$ A	—	0.35	—	V
	$V_{FM}$ (2)	$I_{FM} = 3$ A	—	0.40	—	
	$V_{FM}$ (3)	$I_{FM} = 5$ A	—	0.43	0.45	
Repetitive peak reverse current	$I_{RRM}$ (1)	$V_{RRM} = 5$ V	—	6	—	$\mu\text{A}$
	$I_{RRM}$ (2)	$V_{RRM} = 30$ V	—	65	800	
Junction capacitance	$C_j$	$V_R = 10$ V, $f = 1$ MHz	—	330	—	pF
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	—	—	60	$^\circ\text{C}/\text{W}$
		Device mounted on a glass-epoxy board board size: 50 mm × 50 mm soldering land: 6 mm × 6 mm board thickness: 1.6 mm	—	—	135	
	$R_{th}$ (j-t)	—	—	—	16	

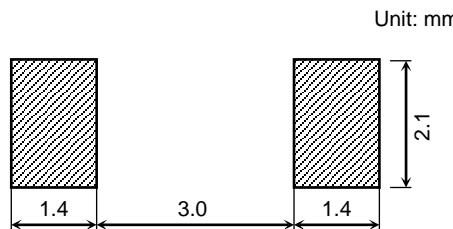
Start of commercial production  
2000-07

## Marking

Abbreviation Code	Part No.
S5	CMS05



## Land pattern dimensions for reference only



## Handling Precaution

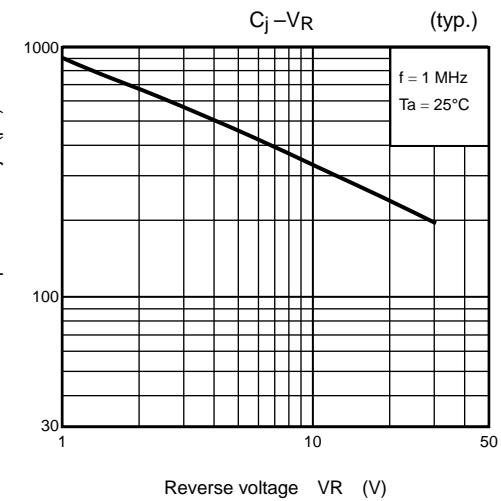
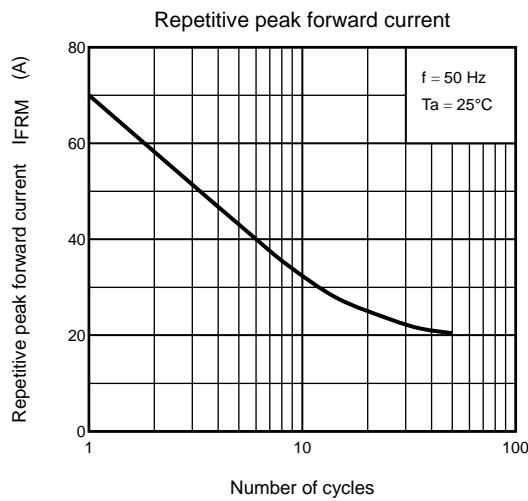
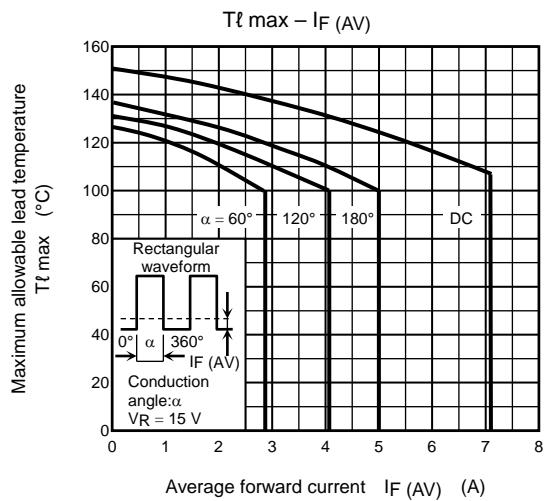
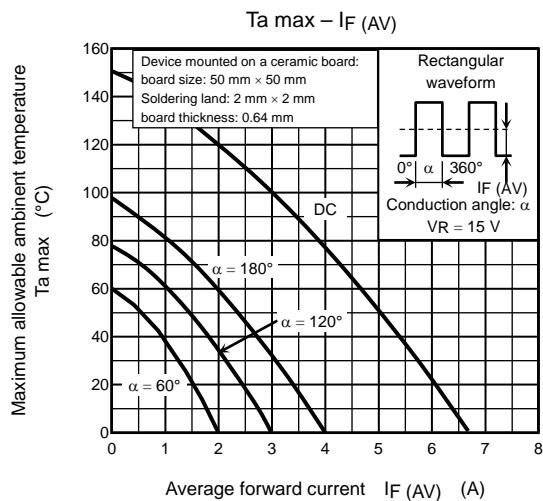
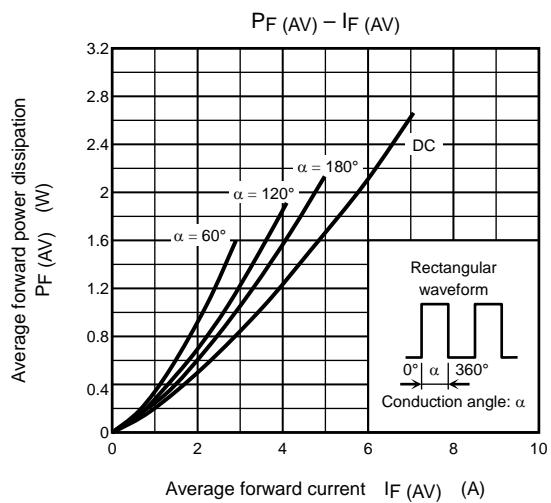
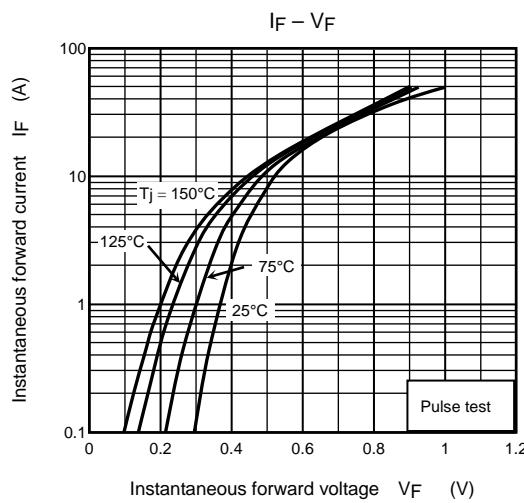
- 1) Schottky barrier diodes (SBDs) have reverse current greater than other types of diodes. This makes SBDs more vulnerable to damage due to thermal runaway under high-temperature and high-voltage conditions. Thus, both forward and reverse power losses of SBDs should be considered for thermal and safety design.
- 2) The absolute maximum ratings are rated values that must not be exceeded during operation, even for an instant. The following are the recommended general derating methods for designing a circuit board using this device.
 

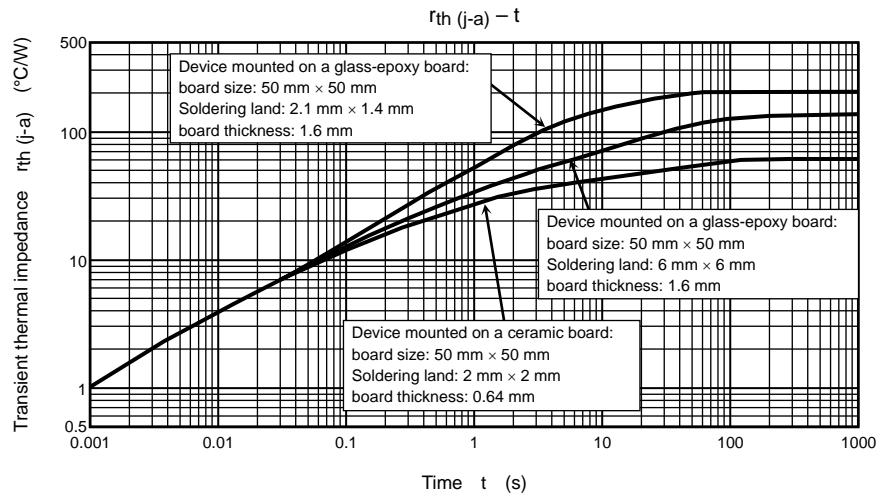
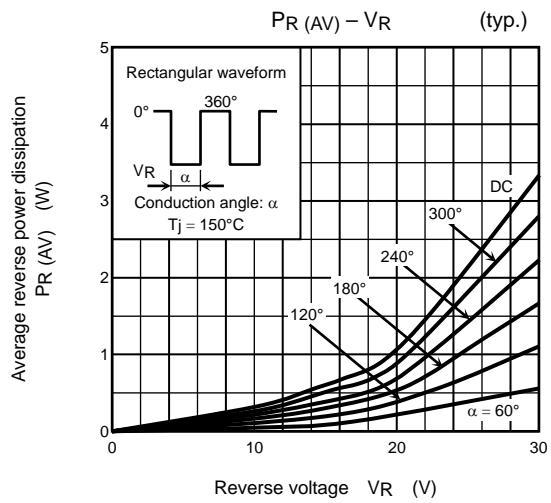
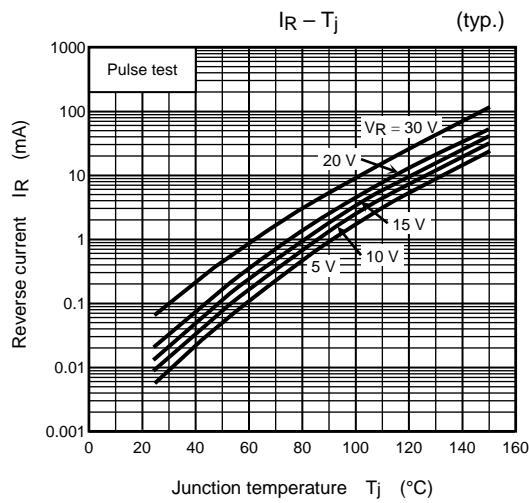
$V_{RRM}$  : Use this rating with reference to 1) above.  $V_{RRM}$  has a temperature coefficient of 0.1%/°C at low temperatures. Take this coefficient into account when designing a circuit board that will be operated in a low-temperature environment.

$I_{F(AV)}$  : We recommend that the worst-case current be no greater than 80% of the absolute maximum rating of  $I_{F(AV)}$  and that the worst-case junction temperature,  $T_j$ , be kept below 120°C. When using this device, allow margins, referring to the  $T_{a(max)}-I_{F(AV)}$  curve.

$I_{FSM}$  : This rating specifies peak non-repetitive forward surge current. This only applies to an abnormal operation, which seldom occurs during the lifespan of a device.

$T_j$  : Derate device parameters in proportion to this rating in order to ensure high reliability. We recommend that the junction temperature ( $T_j$ ) of a device be kept below 120°C.
- 3) Thermal resistance (junction-to-ambient) varies with the mounting conditions of a device on a circuit board. An appropriate thermal resistance value should be used, considering the heatsink, circuit board design and land pattern dimensions (provided for reference only).
- 4) For other design considerations, see the Rectifiers databook or the Toshiba website.





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