

# CMS03

### Switching Mode Power Supply Applications

### Portable Equipment Battery Applications

- Repetitive peak reverse voltage :  $V_{RRM} = 30\text{ V}$
- Average forward current :  $I_F (AV) = 3\text{ A}$
- Peak forward voltage :  $V_{FM} = 0.45\text{ V (max)}$
- Suitable for compact assembly due to small surface-mount package  
“M-FLAT™” (Toshiba package name)

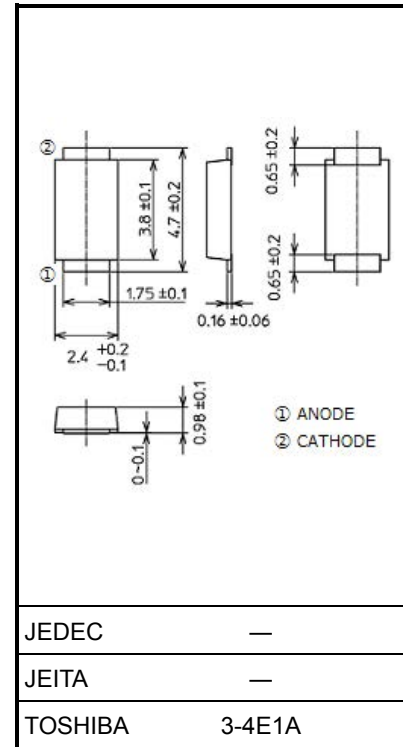
### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Rating	Unit
Repetitive peak reverse voltage	$V_{RRM}$	30	V
Average forward current	$I_F (AV)$	3 (Note 1)	A
Non-repetitive peak forward surge current	$I_{FSM}$	40 (50 Hz)	A
Junction temperature	$T_j$	-40 to 150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-40 to 150	$^\circ\text{C}$

Note 1:  $T_l = 117.6^\circ\text{C}$  Rectangular waveform ( $\alpha = 180^\circ$ ),  $V_R = 15\text{ V}$   
 $T_a = 28.4^\circ\text{C}$  Device mounted on a ceramic board  
Board size : 50 mm × 50 mm  
Soldering land size : 2 mm × 2 mm  
Board thickness : 0.64 mm

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).

Unit: mm



Weight: 0.023 g (typ.)

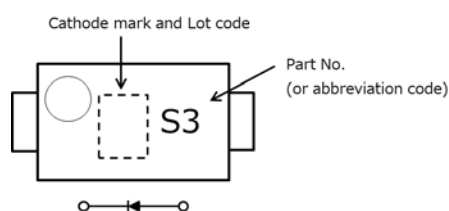
### Electrical Characteristics ( $T_a = 25^\circ\text{C}$ )

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	$V_{FM} (1)$	$I_{FM} = 0.5\text{ A}$ (pulse test)	—	0.35	—	V
	$V_{FM} (2)$	$I_{FM} = 1\text{ A}$ (pulse test)	—	0.37	—	
	$V_{FM} (3)$	$I_{FM} = 3\text{ A}$ (pulse test)	—	0.42	0.45	
Repetitive peak reverse current	$I_{RRM} (1)$	$V_{RRM} = 5\text{ V}$ (pulse test)	—	3	—	$\mu\text{A}$
	$I_{RRM} (2)$	$V_{RRM} = 30\text{ V}$ (pulse test)	—	30	500	
Junction capacitance	$C_j$	$V_R = 10\text{ V}$ , $f = 1\text{ MHz}$	—	190	—	pF
Thermal resistance(junction to ambient)	$R_{th} (j-a)$	Device mounted on a ceramic board board size : 50 mm × 50 mm soldering land size : 2 mm × 2 mm board thickness : 0.64 mm	—	—	60	$^\circ\text{C/W}$
		Device mounted on a glass-epoxy board board size : 50 mm × 50 mm soldering land size : 6 mm × 6 mm board thickness : 1.6 mm	—	—	135	
Thermal resistance (junction to lead)	$R_{th} (j-t)$	—	—	—	16	

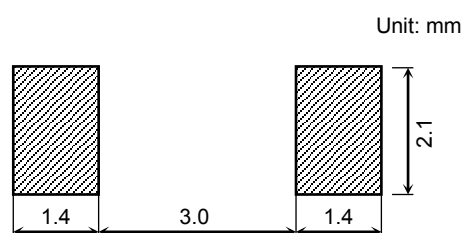
Start of commercial production  
2000-07

## Marking

Abbreviation Code	Part No.
S3	CMS03



## Land pattern dimensions for reference only



## Handling Precaution

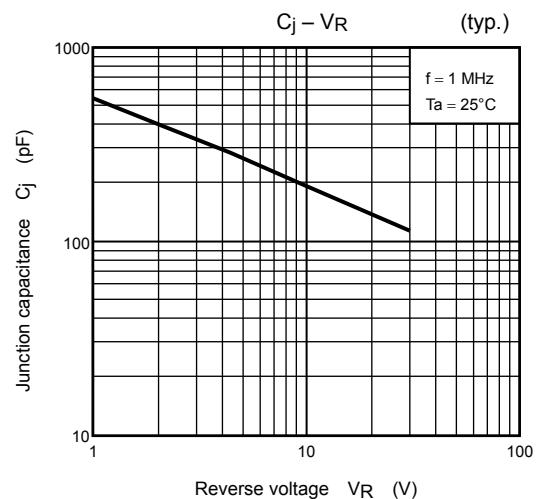
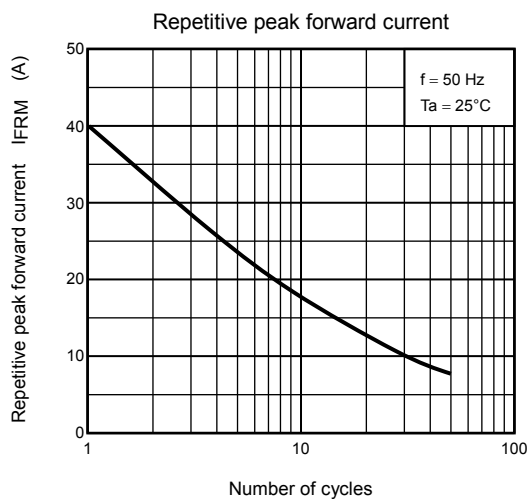
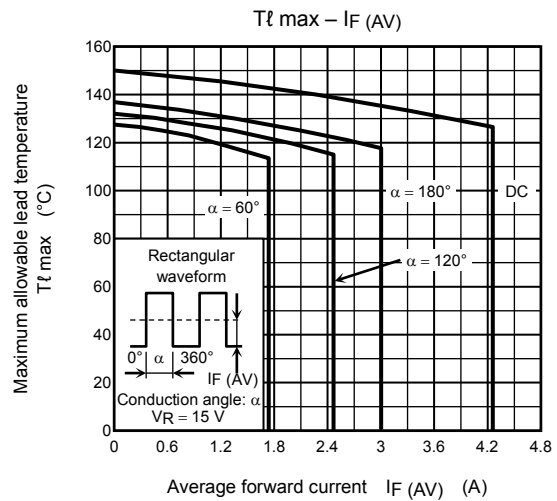
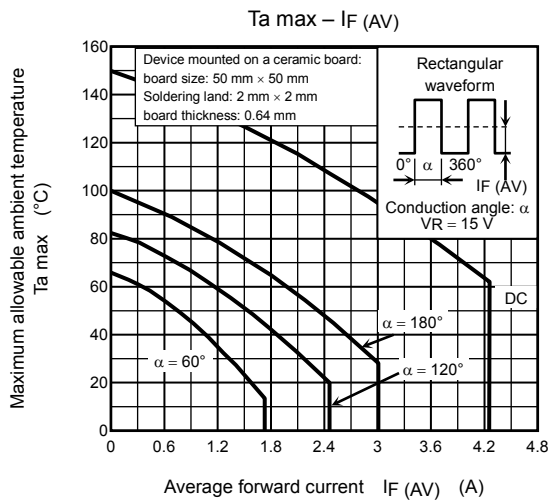
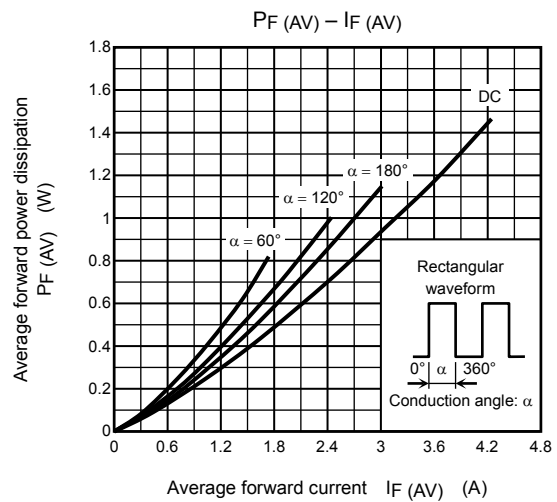
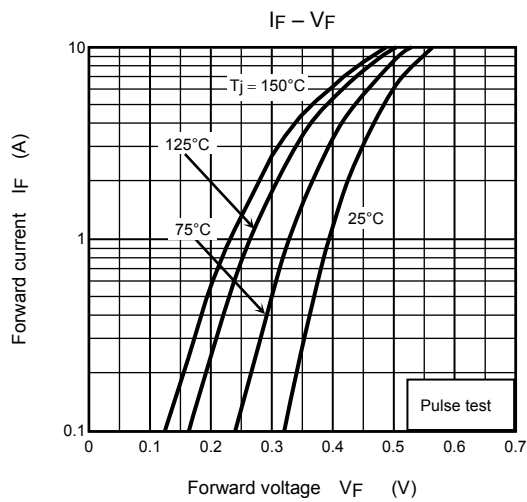
- 1) Schottky barrier diodes (SBDs) have reverse current greater than other types of diodes. This makes SBDs more vulnerable to damage due to thermal runaway under high-temperature and high-voltage conditions. Thus, both forward and reverse power losses of SBDs should be considered for thermal and safety 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.
 

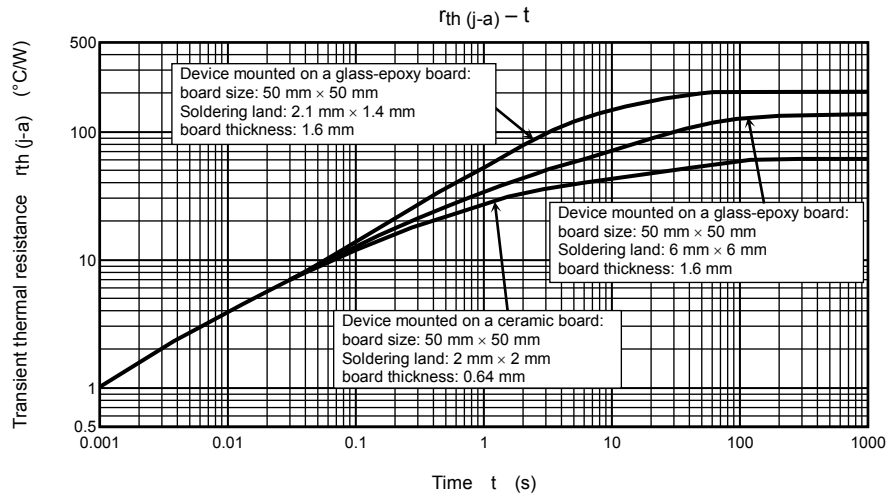
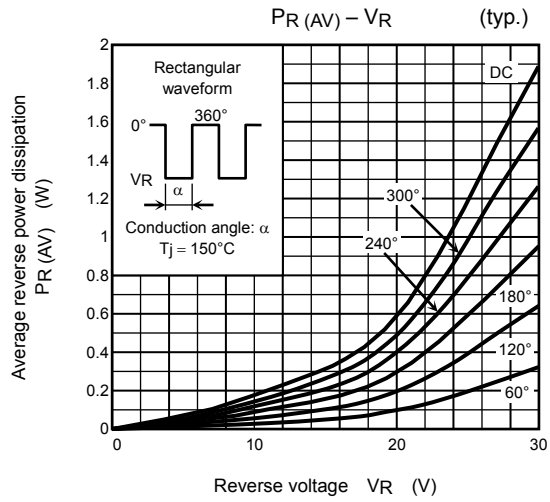
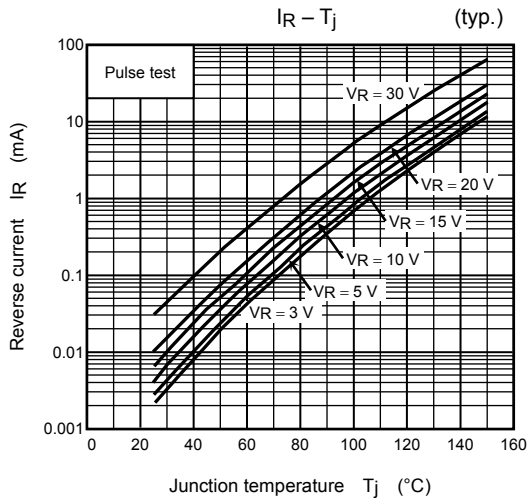
$V_{RRM}$  : Use this rating with reference to 1) above.  $V_{RRM}$  has a temperature coefficient of  $0.1\%/^{\circ}\text{C}$  at low temperatures. Take this coefficient into account when designing a circuit board that will be operated in a low-temperature environment.

$I_{F(AV)}$  : 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  $120^{\circ}\text{C}$ . 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  $120^{\circ}\text{C}$ .
- 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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