chanhvinh.com

TOSHIBA Schottky Barrier Diode

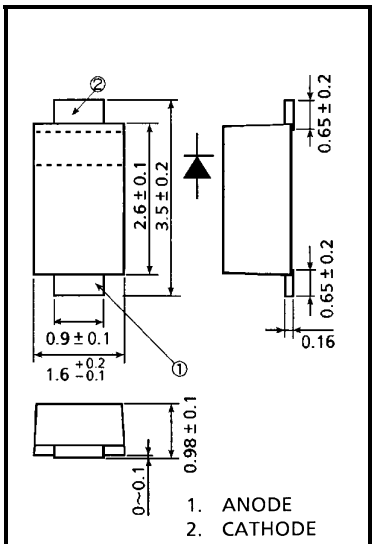
CRS12

Switching Mode Power Supply Applications
(Output voltage: ≤12 V)

DC/DC Converter Applications

- Forward voltage: V_{FM} = 0.58 V (max)
- Average forward current: $I_{F\ (AV)}$ = 1.0 A
- Repetitive peak reverse voltage: V_{RRM} = 60 V
- Suitable for compact assembly due to small surface-mount package "S−FLAT™" (Toshiba package name)

Unit: mm



JEDEC	—
JEITA	—
TOSHIBA	3-2A1A

Weight: 0.013 g (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Repetitive peak reverse voltage	V_{RRM}	60	V
Average forward current	$I_{F\ (AV)}$	1.0 (Note)	A
Non-repetitive peak surge current	I_{FSM}	20 (50 Hz)	A
Junction temperature	T_j	−40~150	°C
Storage temperature range	T_{stg}	−40~150	°C

Note: Ta = 73°C
Device mounted on a ceramic board
Board size: 50 mm × 50 mm
Soldering size: 2 mm × 2 mm
Board thickness: 0.64 t
Rectangular waveform (α = 180°), V_R = 30 V

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	$V_{FM\ (1)}$	I_{FM} = 0.7 A (pulse test)	—	0.48	—	V
	$V_{FM\ (2)}$	I_{FM} = 1.0 A (pulse test)	—	0.52	0.58	
Peak repetitive reverse current	$I_{RRM\ (1)}$	V_{RRM} = 5 V (pulse test)	—	0.4	—	μA
	$I_{RRM\ (2)}$	V_{RRM} = 60 V (pulse test)	—	4.0	100	
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 t)	—	—	70	°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 t)	—	—	140	
		Device mounted on a glass-epoxy board (board size: 50 mm × 50 mm) (soldering land: 1.2 mm × 1.2 mm) (board thickness: 1.6 t)	—	—	240	
Thermal resistance (junction to lead)	$R_{th\ (j\text{-}\ell)}$	—	—	—	20	°C/W

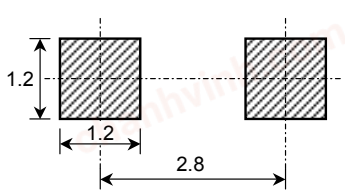
chanhvinh.com

Marking

Abbreviation Code	Part No.
SB	CRS12

Standard Soldering Pad

Unit: mm



Handling Precaution

1) Schottky barrier diodes have reverse current characteristic compared to other diodes.
There is a possibility SBD may cause thermal runaway when it is used under high temperature or high voltage.
Please take forward and reverse loss into consideration during design.

2) The maximum ratings denote the absolute maximum ratings, which are rated values and must not be exceeded during operation, even for an instant. The followings are the general derating method that we recommend when you design a circuit with a device.

V_{RRM}: Use this rating with reference to (1) 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 maximum rating of $I_{F\ (AV)}$ and T_j bebelow 120°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.

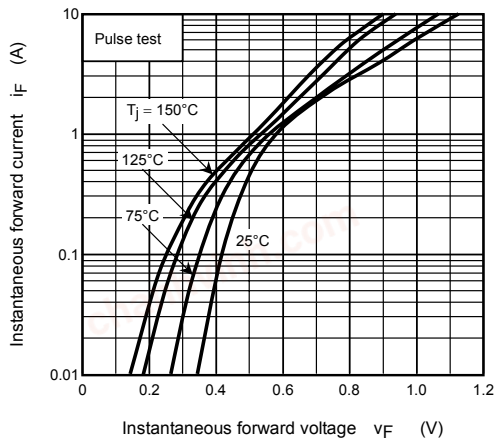
T_j: Derate this rating when using a device in order to ensure high reliability.
We recommend that a device be used at a T_j of below 120°C.

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

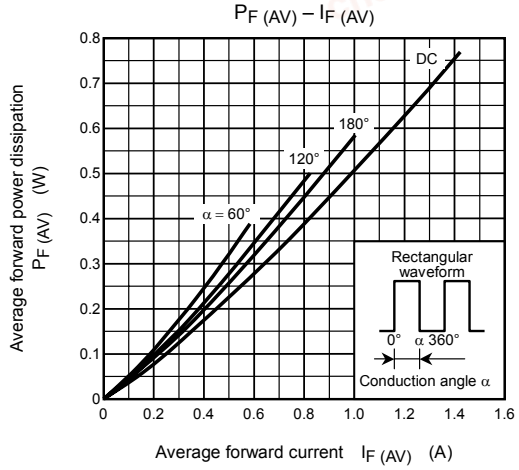
4) Please refer to the Rectifiers databook for further information.

chanhvinh.com

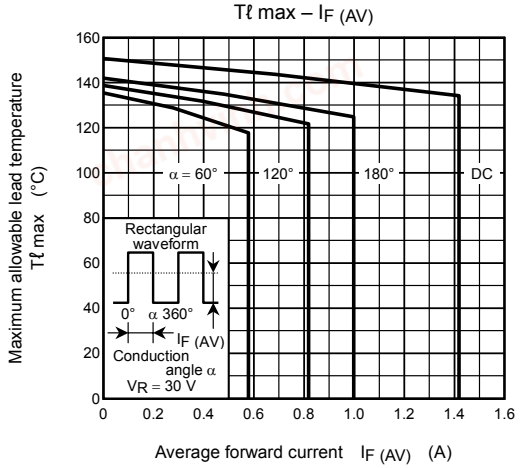
$i_F - v_F$



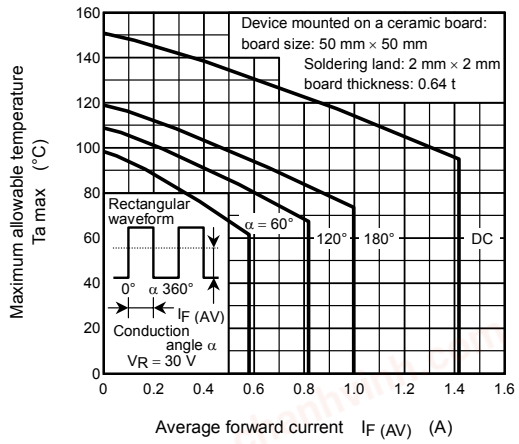
$P_{F\,(AV)} - I_{F\,(AV)}$



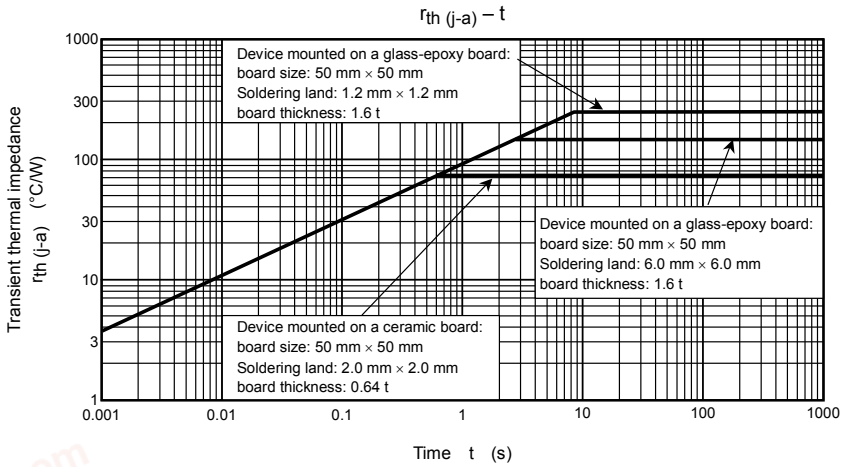
T_ℓ max – $I_{F\,(AV)}$



Ta max – IF (AV)

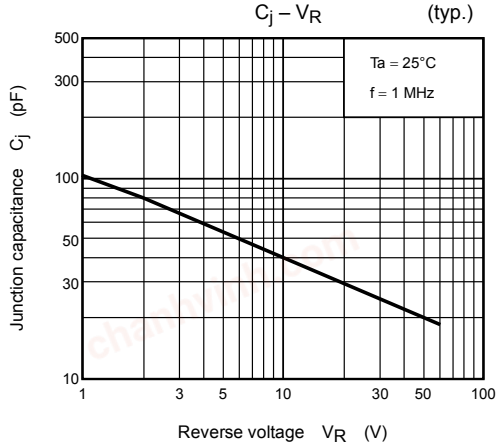


$r_{th\,(j\text{-}a)} - t$

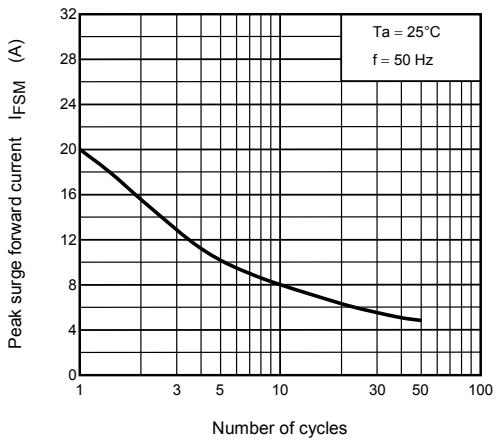


chanhvinh.com

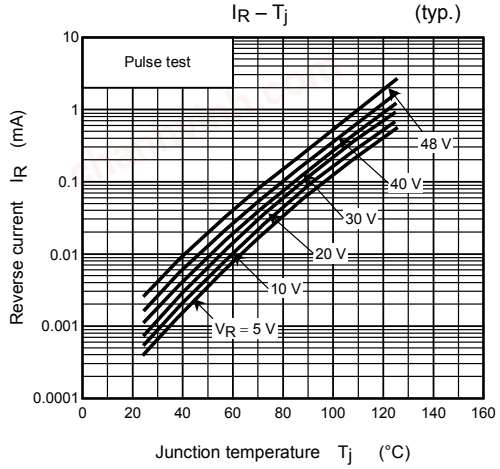
$C_j - V_R$ (typ.)



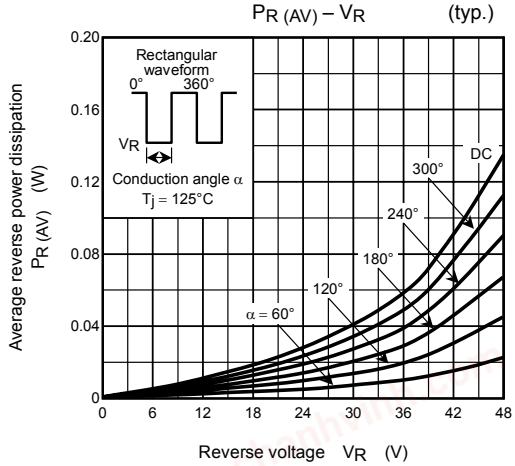
Surge forward current
(non-repetitive)



$I_R - T_j$ (typ.)



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



chanhvinh.com

RESTRICTIONS ON PRODUCT USE

030619EAA

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
  In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the “Handling Guide for Semiconductor Devices,” or “TOSHIBA Semiconductor Reliability Handbook” etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury (“Unintended Usage”). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer’s own risk.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.