TOSHIBA Schottky Barrier Diode

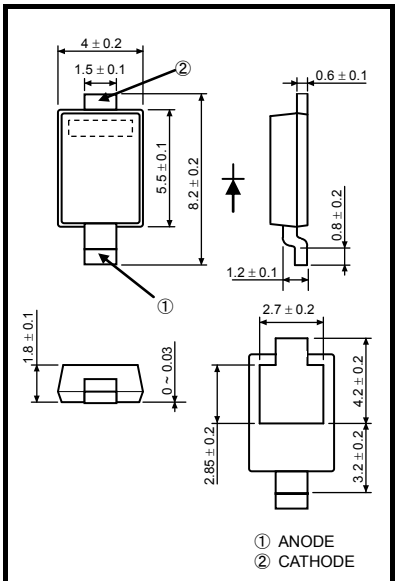
CLS02

Switching-Mode Power Supply (Secondary-Rectification) Applications (Low Voltage)

DC/DC Converter Applications

- Forward voltage: V_{FM} = 0.55 V (max)
- Average forward current: $I_{F\ (AV)}$ = 10 A
- Repetitive peak reverse voltage: V_{RRM} = 40 V
- Suitable for compact assembly due to small surface-mount package: "L–FLAT™" (Toshiba package name)

Unit: mm



JEDEC	―
JEITA	―
TOSHIBA	3-4F1A

Weight: 0.15 g (typ.)

Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Repetitive peak reverse voltage	V_{RRM}	40	V
Average forward current	$I_{F\ (AV)}$	10 (Note.1)	A
Non-repetitive peak surge current	I_{FSM}	100 (50 Hz)	A
Junction temperature	T_j	−40~125	°C
Storage temperature range	T_{stg}	−40~150	°C

Note1: $T\ell$ = 75°C
Rectangular waveform (α = 180°), V_R = 20 V

Note2: 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).

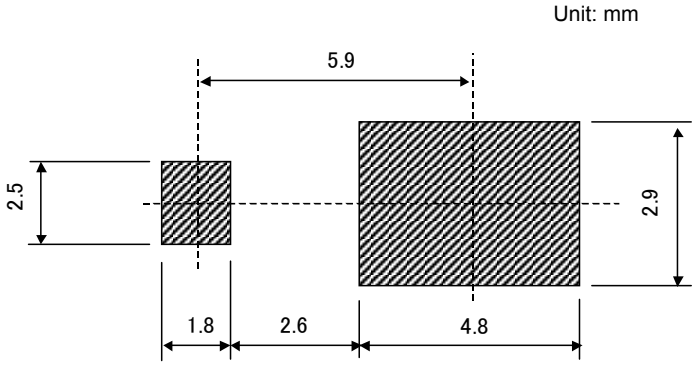
Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	$V_{FM\ (1)}$	I_{FM} = 3.0 A (pulse test)	―	0.36	―	V
	$V_{FM\ (2)}$	I_{FM} = 5.0 A (pulse test)	―	0.41	―	
	$V_{FM\ (3)}$	I_{FM} = 10 A (pulse test)	―	0.5	0.55	
Peak repetitive reverse current	$I_{RRM\ (1)}$	V_{RRM} = 5 V (pulse test)	―	4.0	―	μA
	$I_{RRM\ (2)}$	V_{RRM} = 40 V (pulse test)	―	0.03	1.0	mA
Junction capacitance	C_j	V_R = 10 V, f = 1.0 MHz	―	420	―	pF
Thermal resistance (junction to ambient)	$R_{th\ (j\text{-}a)}$	Device mounted on a glass-epoxy board (board size: 50 mm × 50 mm) (board thickness: 1.6 t) (soldering land) Cathode 5.7 mm × 6.2 mm Anode 4.5 mm × 3.4 mm	―	―	100	°C/W
Thermal resistance (junction to lead)	$R_{th\ (j\text{-}\ell)}$	―	―	―	5	°C/W

Marking

Abbreviation Code	Part No.
S02	CLS02

Standard Soldering Pad



Handling Precautions

1) Schottky barrier diodes have reverse current characteristics compared to other diodes. There is a possibility that SBD will cause thermal runaway when used under high-temperature or high-voltage conditions. Be sure to take forward and reverse loss into consideration during design.

2) The absolute maximum ratings, are rated values that must not be exceeded during operation, even for an instant. The following are the general derating methods that we recommend for when designing a circuit incorporating this 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 when designing a device for operation at low temperatures.

   $I_{F\ (AV)}$: We recommend that the worst case current be no greater than 80% of the maximum rating of $I_{F\ (AV)}$ and that T_j be below 100°C. When using this device, take the margin into consideration by using an allowable Tamax-$I_{F\ (AV)}$ curve.

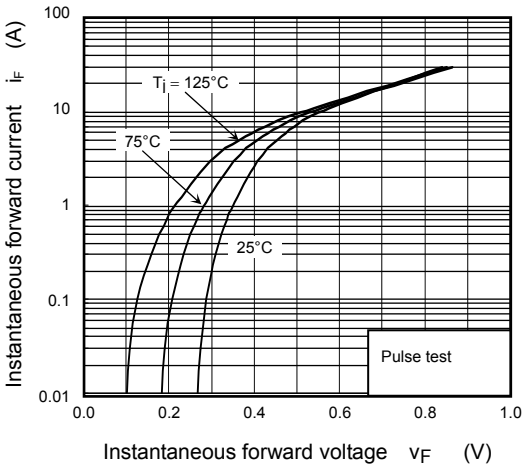
   I_{FSM}: This rating specifies the non-repetitive peak current. This applies only to abnormal operation, which seldom occurs during the lifespan of the device.

   T_j: Derate this rating when using the device in order to ensure high reliability. We recommend that the device be used at a T_j of below 100°C.

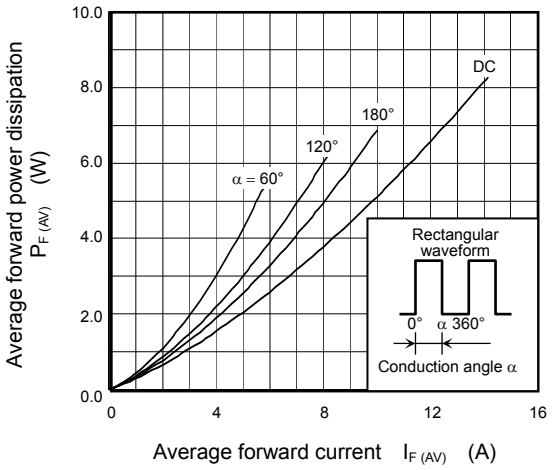
3) Thermal resistance between junction and ambient fluctuates depending on the mounting condition of the device. When using the device, design the circuit board and soldering land size to match the appropriate thermal resistance value.

4) Refer to the databook on Rectifiers for further information.

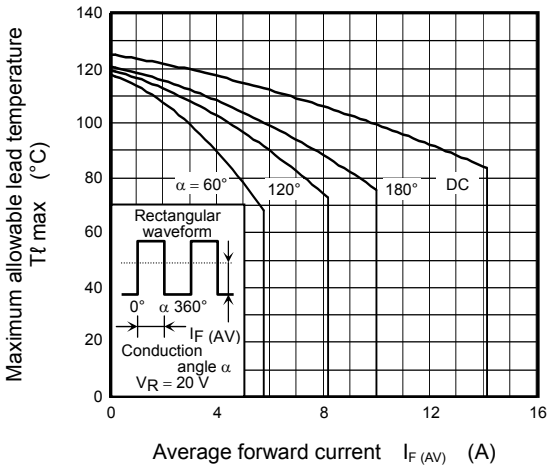
$i_F - v_F$



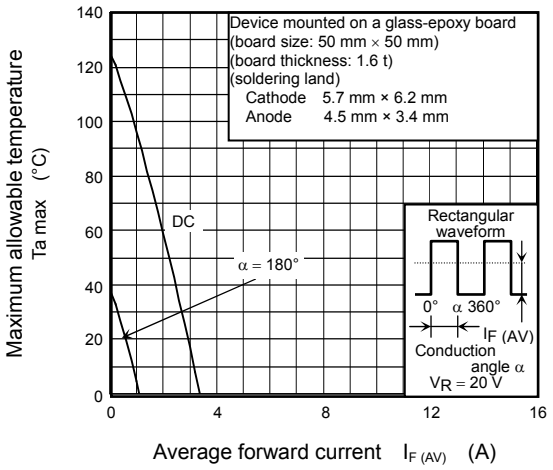
$P_{F\,(AV)} - I_{F\,(AV)}$



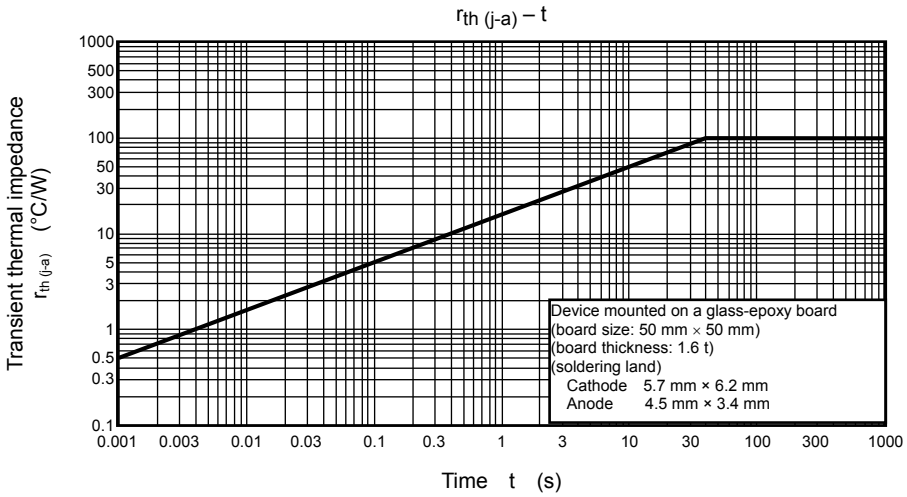
$T\ell\ \max - I_{F\,(AV)}$



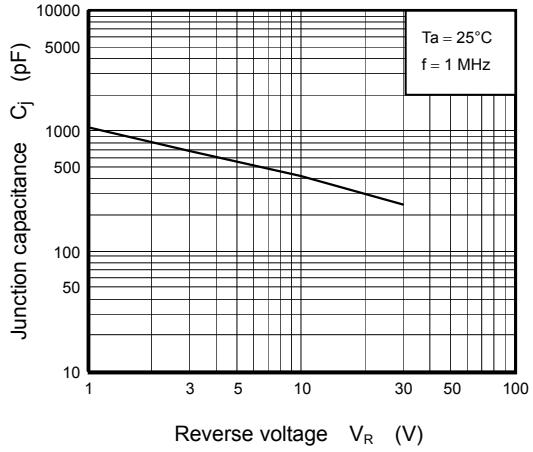
$Ta\ \max - I_{F\,(AV)}$



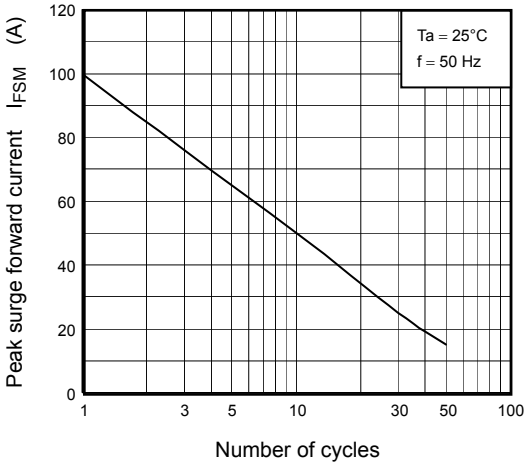
$r_{th\ (j\text{-}a)} - t$



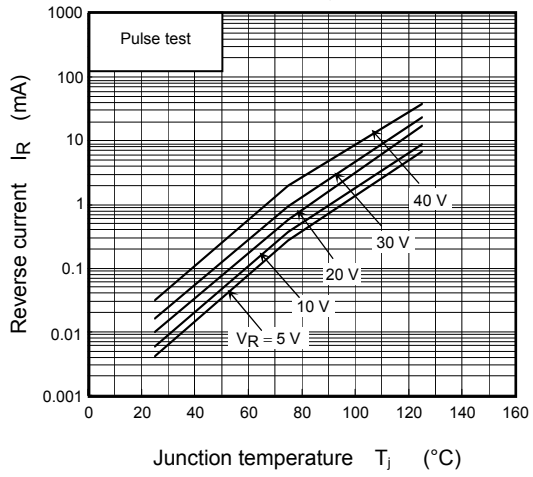
$C_j - V_R$ (typ.)



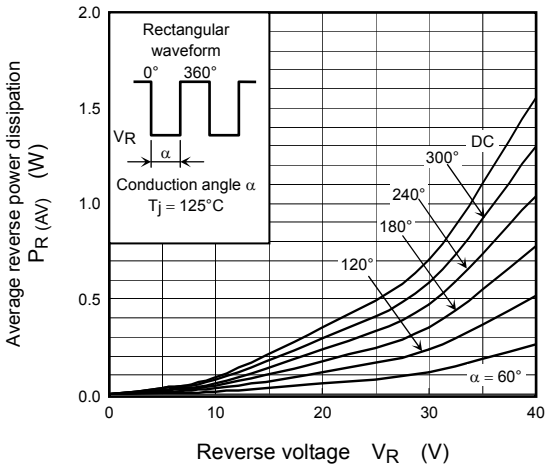
Surge forward current
(non-repetitive)



$I_R - T_j$ (typ.)



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



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20070701-EN GENERAL

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