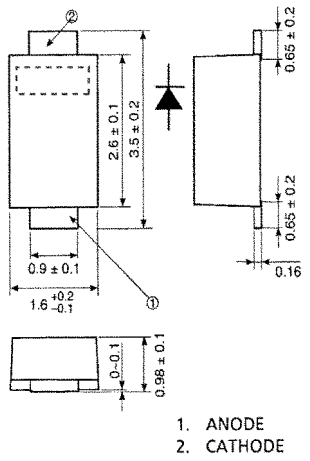
TOSHIBA Schottky Barrier Rectifier Schottky Barrier Type

# CRS01

## High Speed Rectifier Applications

- Low forward voltage: $V_{FM}$ = 0.37 V @ $I_{FM}$ = 0.7 A
- Average forward current: $I_{F\ (AV)}$ = 1.0 A
- Repetitive peak reverse voltage: $V_{RRM}$ = 30 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 | $V_{RRM}$ | 30 | V |
| Average forward current | $I_{F(AV)}$ | 1.0 (Note) | A |
| Peak one cycle surge forward current (non-repetitive) | $I_{FSM}$ | 20 (50 Hz) | A |
| | | 22 (60 Hz) | |
| Junction temperature | $T_j$ | −40~125 | °C |
| Storage temperature | $T_{stg}$ | −40~150 | °C |

Note: $T\ell$ = 98°C: Rectangular waveform ($\alpha$ = 180°), $V_R$ = 15 V

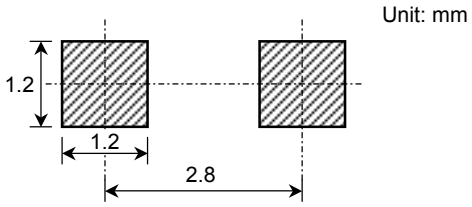
## Electrical Characteristics (Ta = 25°C)

| Characteristics | Symbol | Test Condition | Typ. | Max | Unit |
|---|---|---|---|---|---|
| Peak forward voltage | $V_{FM\ (1)}$ | $I_{FM}$ = 0.1 A | 0.25 | — | V |
| | $V_{FM\ (2)}$ | $I_{FM}$ = 0.7 A | 0.33 | 0.37 | |
| | $V_{FM\ (3)}$ | $I_{FM}$ = 1.0 A | 0.36 | — | |
| Repetitive peak reverse current | $I_{RRM}$ | $V_{RRM}$ = 30 V | — | 1.5 | mA |
| Junction capacitance | $C_j$ | $V_R$ = 10 V, f = 1.0 MHz | 40.0 | — | pF |
| Thermal resistance (junction to ambient) | $R_{th\ (j\text{-}a)}$ | Device mounted on a ceramic board (soldering land: 2 mm × 2 mm) | — | 70 | °C/W |
| | | Device mounted on a glass-epoxy board (soldering land: 6 mm × 6 mm) | — | 140 | |
| Thermal resistance (junction to lead) | $R_{th\ (j\text{-}\ell)}$ | — | — | 20 | °C/W |

## Marking

| Abbreviation Code | Part No. |
|---|---|
| S1 | CRS01 |

## 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 $V_F$-$I_{RRM}$ trade-off type, lower $V_F$ higher $I_{RRM}$; therefore, thermal runaway might occur when voltage is applied. Please take forward and reverse loss into consideration during design.

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

$V_{RRM}$: Use this rating with reference to the 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 $T_j$ be below 100°C. When using this device, take the margin into consideration by using an allowable Ta max - $I_{F(AV)}$ curve.

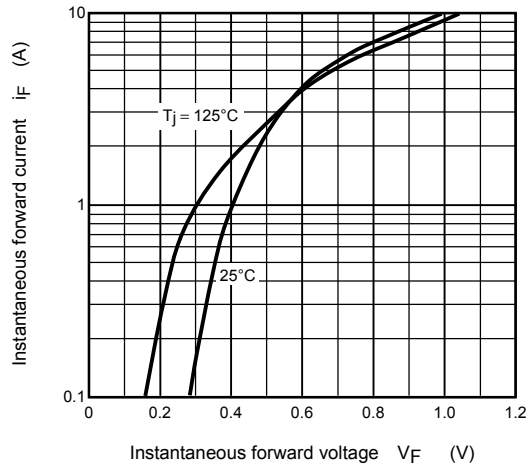
$I_{FSM}$: This rating specifies the non-repetitive peak current. This is only applied for an abnormal operation, which seldom occurs during the lifespan of the device.

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

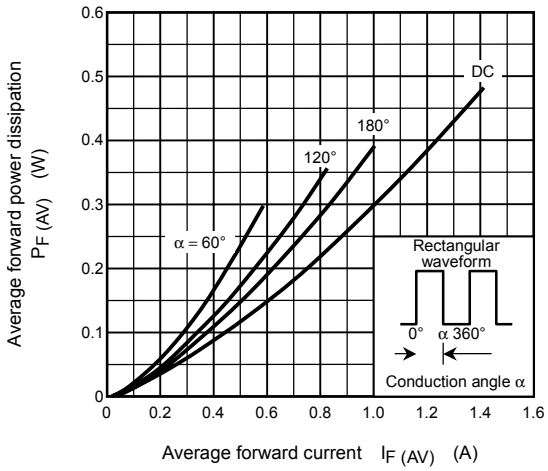
Thermal resistance between junction and ambient fluctuates depending on the device's mounting condition. When using a device, please design a circuit board and a soldering land size to match the appropriate thermal resistance value.

Please refer to the Rectifiers Databook for further information.

$i_F - v_F$

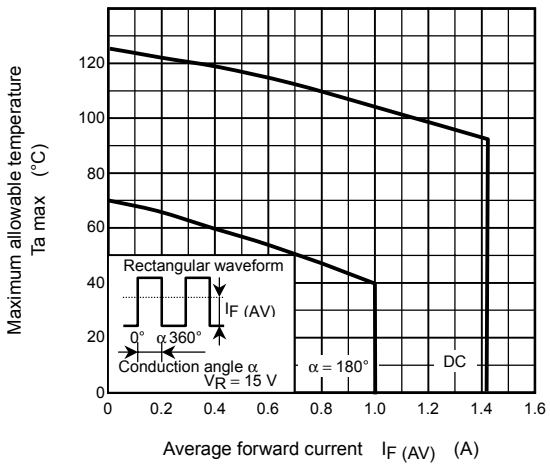



$P_{F\ (AV)} - I_{F\ (AV)}$

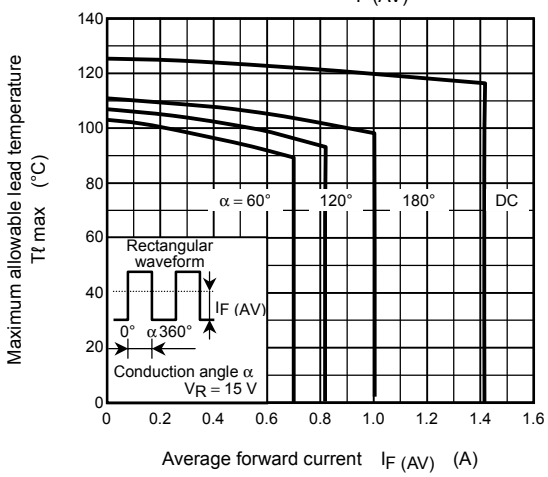



Ta max – $I_{F\ (AV)}$

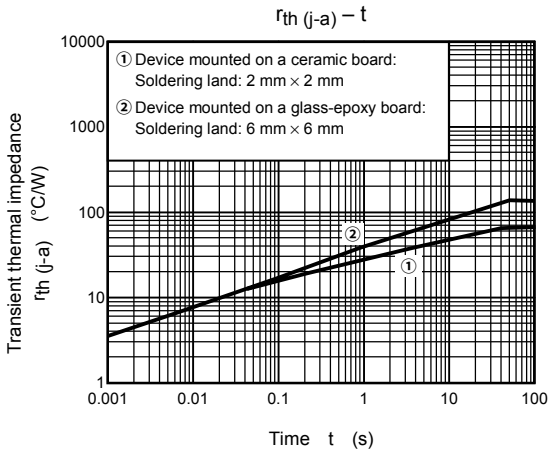
Ceramic substrate (substrate size: 50 mm × 50 mm)



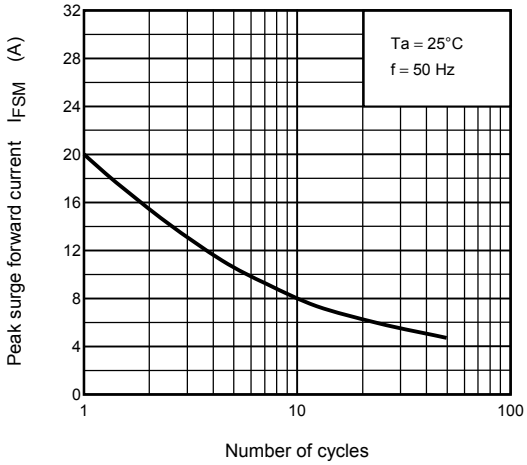

$T\ell$ max – $I_{F\ (AV)}$



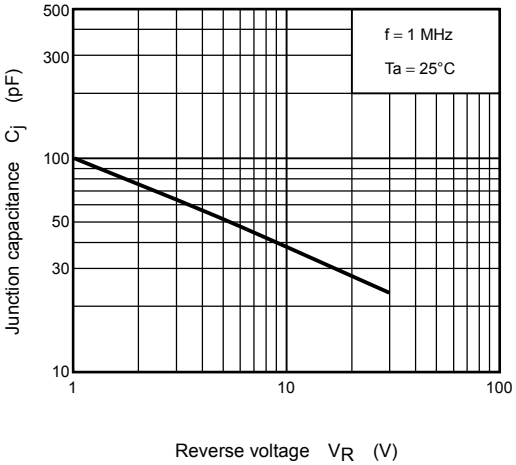

$r_{th\ (j\text{-}a)} - t$



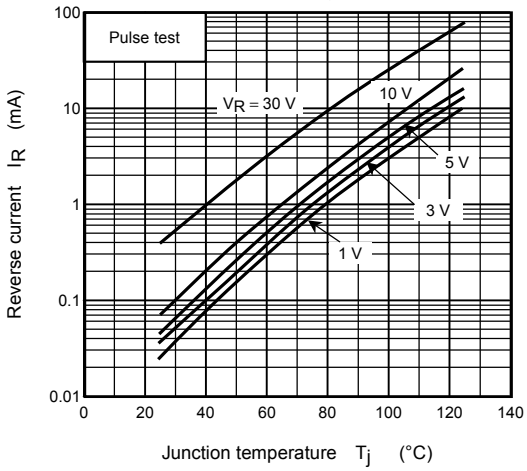
Surge forward current
(non-repetitive)



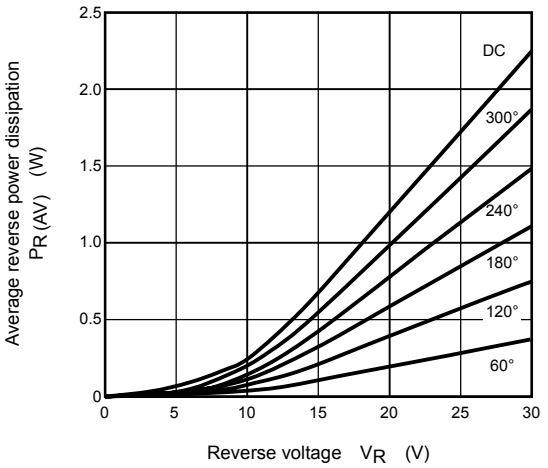

$C_j - V_R$ (typ.)




$I_R - T_j$ (typ.)




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



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