

TOSHIBA Schottky Barrier Diode

# CRS15

Switching Mode Power Supply Applications  
 Portable Equipment Battery Applications

- Repetitive peak reverse voltage :  $V_{RRM} = 30\text{ V}$
- Forward current :  $I_F(\text{DC}) = 3\text{ A}$
- Peak forward voltage :  $V_{FM} = 0.52\text{ V (max)}$
- Small, thin package suitable for high-density board assembly  
 Toshiba Nickname: "S-FLAT™"

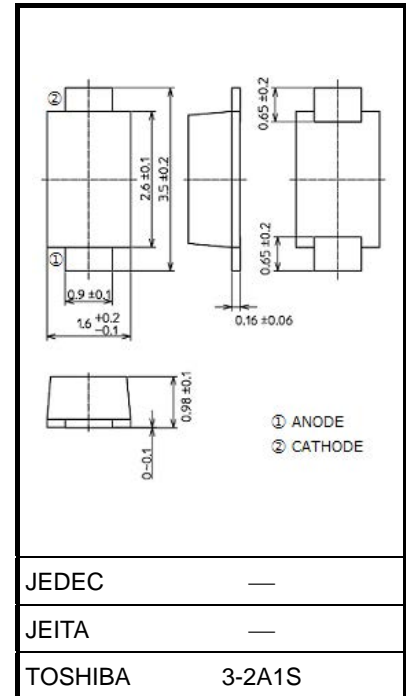
### Absolute Maximum Ratings (Ta = 25°C)

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

Note 1: Ta = 69°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  
 DC waveform

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: 0.013 g (typ.)

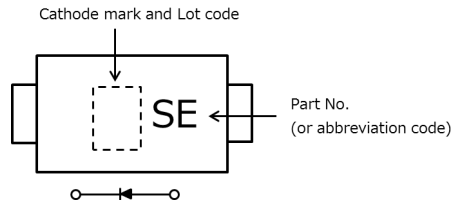
### Electrical Characteristics (Ta = 25°C)

| Characteristics                          | Symbol        | Test Condition   | Min | Typ.  | Max  | Unit |
|--|---------------|--|-----|-------|------|------|
| Peak forward voltage                     | $V_{FM}(1)$   | $I_{FM} = 0.1\text{ A}$ (pulse test)   | —   | 0.35  | —    | V    |
|  | $V_{FM}(2)$   | $I_{FM} = 1\text{ A}$ (pulse test)   | —   | 0.415 | —    |      |
|  | $V_{FM}(3)$   | $I_{FM} = 3\text{ A}$ (pulse test)   | —   | 0.47  | 0.52 |      |
| Repetitive peak reverse current          | $I_{RRM}(1)$  | $V_{RRM} = 5\text{ V}$ (pulse test)  | —   | 0.8   | —    | μA   |
|  | $I_{RRM}(2)$  | $V_{RRM} = 30\text{ V}$ (pulse test)   | —   | 10    | 50   |      |
| Junction capacitance                     | $C_j$         | $V_R = 10\text{ V}$ , $f = 1\text{ MHz}$   | —   | 90    | —    | pF   |
| Thermal resistance (junction to ambient) | $R_{th}(j-a)$ | Device mounted on a ceramic board<br>board size : 50 mm × 50 mm<br>soldering land size : 2 mm × 2 mm<br>board thickness : 0.64 mm    | —   | —     | 70   | °C/W |
|  |               | Device mounted on a glass-epoxy board<br>board size : 50 mm × 50 mm<br>soldering land size : 6 mm × 6 mm<br>board thickness : 1.6 mm | —   | —     | 140  |      |
| Thermal resistance (junction to lead)    | $R_{th}(j-l)$ | —  | —   | —     | 20   | °C/W |

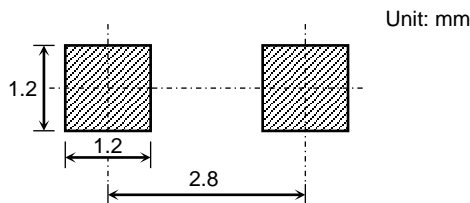
Start of commercial production  
 2008-08

## Marking

|                   |          |
|-------------------|----------|
| Abbreviation Code | Part No. |
| SE                | CRS15    |

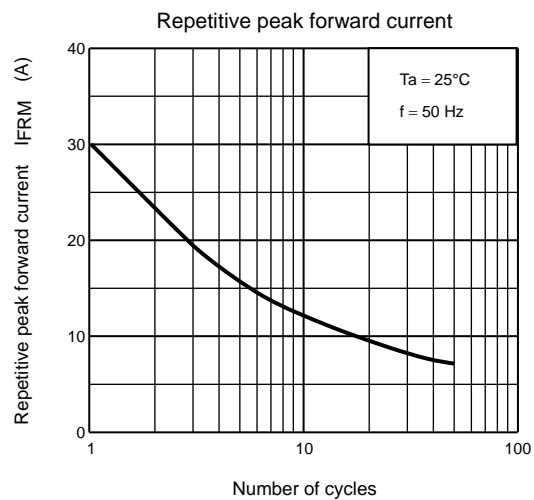
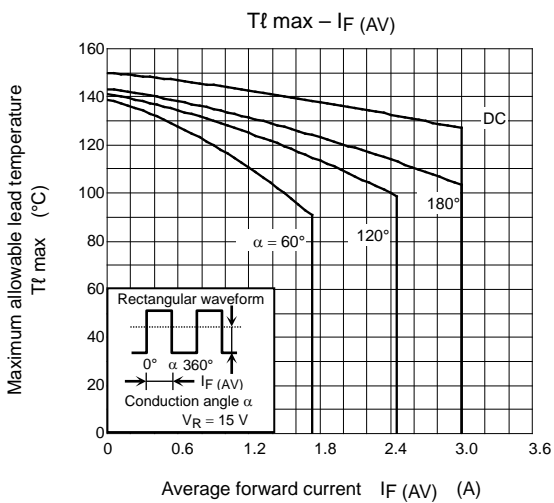
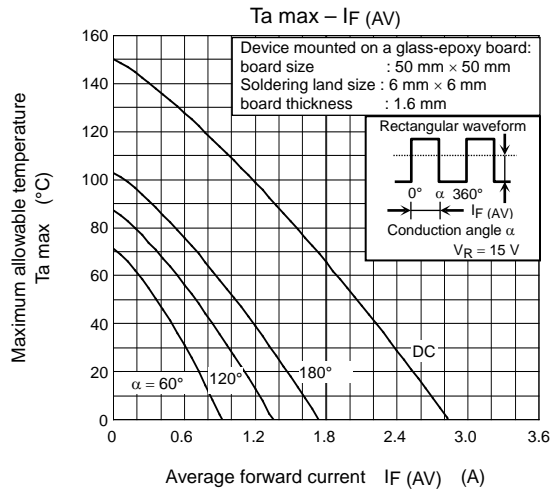
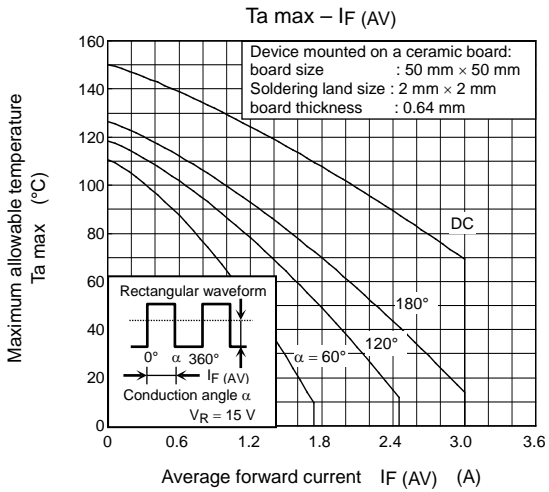
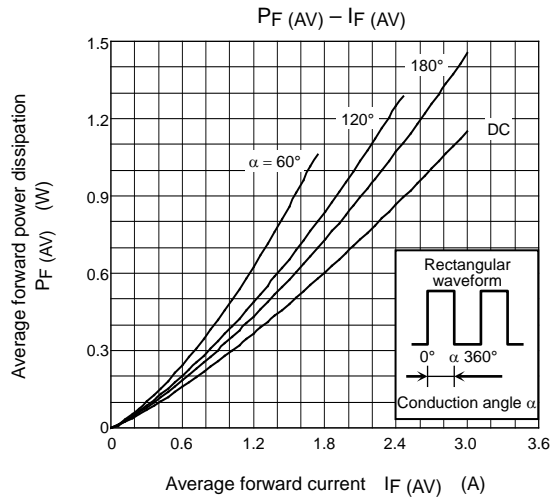
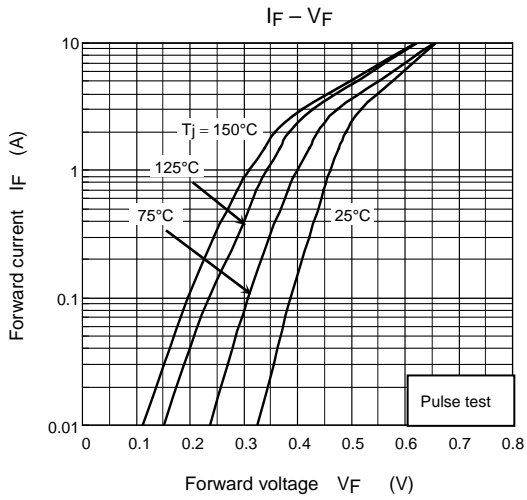


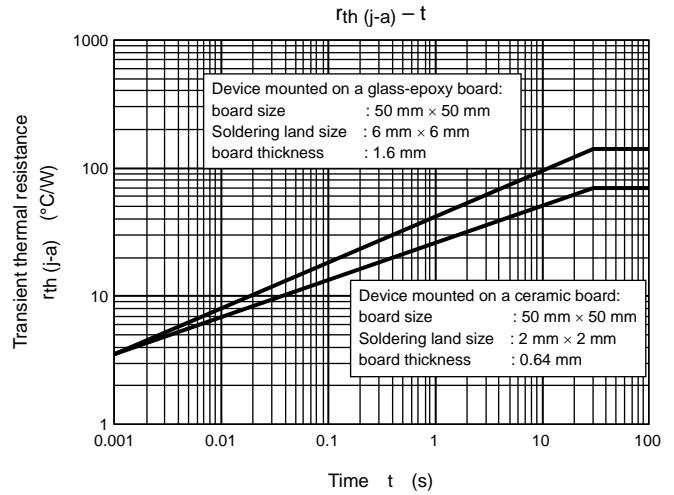
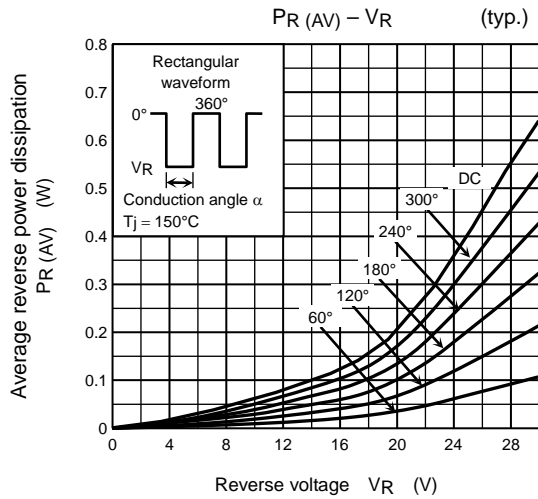
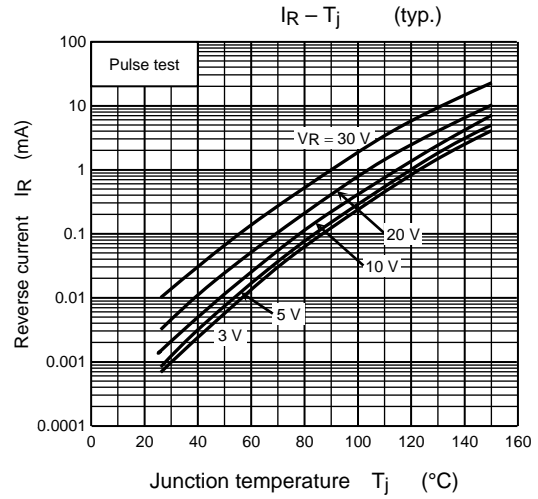
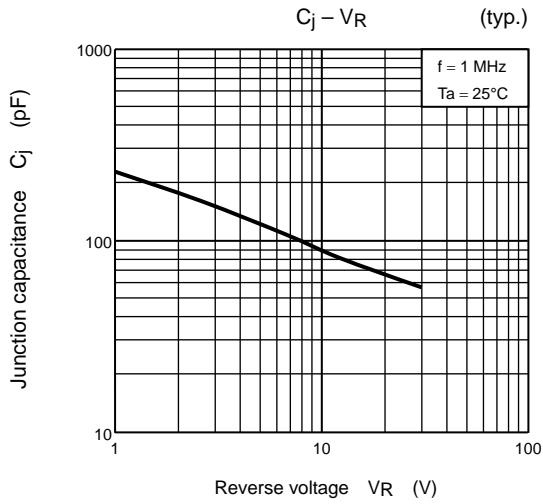
## Land pattern dimensions for reference only



## 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 absolute maximum ratings of a semiconductor device are a set of ratings that must not be exceeded, even for a moment. Do not exceed any of these ratings. 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.
  - $I_{F(AV)}$  and  $I_{F(DC)}$ : We recommend that the worst case current be no greater than 80% of the absolute maximum rating of  $I_{F(AV)}$  and  $T_j$  be below 120°C. When using this device, take the margin into consideration by using an allowable  $T_a$  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 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) For other design considerations, see the Toshiba website.





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