

SiC Schottky Barrier Diode

# TRS10E65H

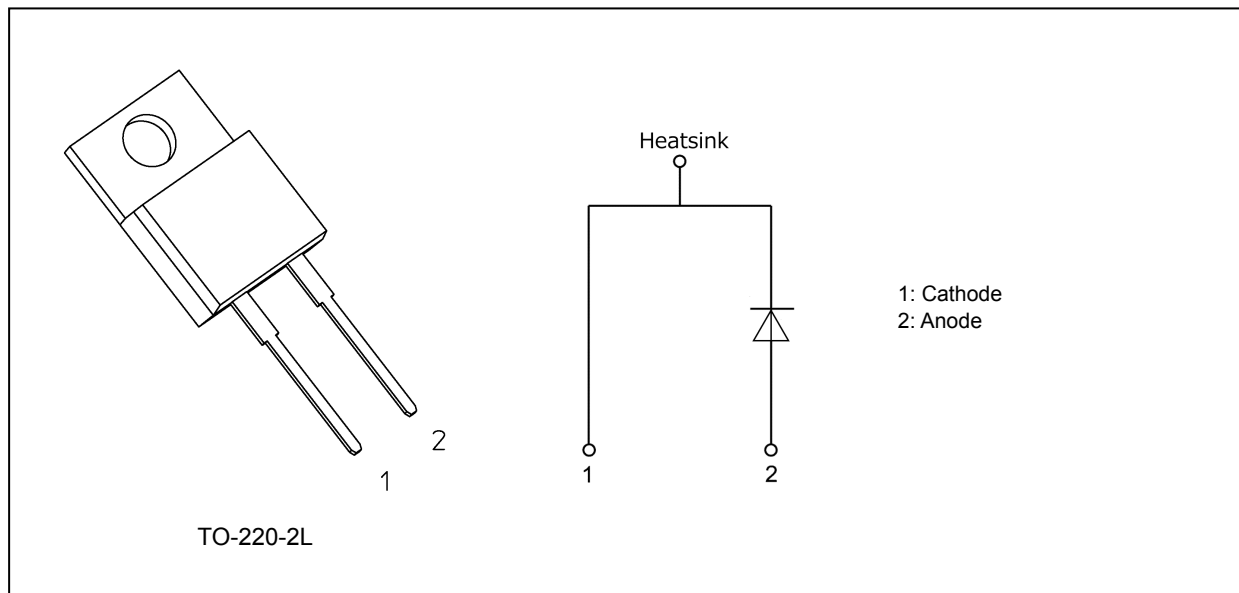
## 1. Applications

- Power Factor Correction
- Solar Inverters
- Uninterruptible Power Supplies
- DC-DC Converters

## 2. Features

- (1) Chip design of 3rd generation
- (2) Low forward voltage :  $V_F = 1.2 \text{ V}$  (typ.)
- (3) Low total capacitive charge:  $Q_c = 27 \text{ nC}$  (typ.)
- (4) Low reverse current:  $I_R = 2.0 \text{ }\mu\text{A}$  (typ.)

## 3. Packaging and Internal Circuit



Start of commercial production

2023-05

### 4. Absolute Maximum Ratings (Note) (Unless otherwise specified, $T_a = 25\text{ }^{\circ}\text{C}$ )

| Characteristics                           | Symbol      | Note     | Rating     | Unit               |
|-------------------------------------------|-------------|----------|------------|--------------------|
| Repetitive peak reverse voltage           | $V_{RRM}$   |          | 650        | V                  |
| Forward DC current                        | $I_{F(DC)}$ | (Note 1) | 10         | A                  |
|                                           |             | (Note 2) | 27         |                    |
| Non-repetitive peak forward surge current | $I_{FSM}$   | (Note 3) | 62         | A                  |
|                                           |             | (Note 4) | 51         |                    |
|                                           |             | (Note 5) | 510        |                    |
| Power dissipation                         | $P_D$       | (Note 2) | 88         | W                  |
| Junction temperature                      | $T_j$       |          | 175        | $^{\circ}\text{C}$ |
| Storage temperature                       | $T_{stg}$   |          | -55 to 175 |                    |
| Mounting torque                           | TOR         |          | 0.6        | N · m              |

Note: 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).

Note 1:  $T_c = 148\text{ }^{\circ}\text{C}$

Note 2:  $T_c = 25\text{ }^{\circ}\text{C}$

Note 3:  $f = 50\text{ Hz}$  (half-sine wave,  $t = 10\text{ ms}$ ),  $T_c = 25\text{ }^{\circ}\text{C}$

Note 4:  $f = 50\text{ Hz}$  (half-sine wave,  $t = 10\text{ ms}$ ),  $T_c = 150\text{ }^{\circ}\text{C}$

Note 5: Square wave,  $t = 10\text{ }\mu\text{s}$ ,  $T_c = 25\text{ }^{\circ}\text{C}$

### 5. Thermal Characteristics

| Characteristics                          | Symbol        | Note     | Max  | Unit                 |
|------------------------------------------|---------------|----------|------|----------------------|
| Thermal resistance (junction-to-case)    | $R_{th(j-c)}$ | (Note 1) | 1.70 | $^{\circ}\text{C/W}$ |
| Thermal resistance (junction-to-ambient) | $R_{th(j-a)}$ | (Note 2) | 50   |                      |

Note 1:  $T_c = 25\text{ }^{\circ}\text{C}$

Note 2:  $T_a = 25\text{ }^{\circ}\text{C}$

### 6. Electrical Characteristics (Unless otherwise specified, $T_a = 25\text{ }^{\circ}\text{C}$ )

| Characteristics                     | Symbol | Test Condition                                             | Min | Typ. | Max  | Unit          |
|-------------------------------------|--------|------------------------------------------------------------|-----|------|------|---------------|
| Forward voltage (pulse measurement) | $V_F$  | $I_F = 5\text{ A}$                                         | —   | 1.0  | —    | V             |
|                                     |        | $I_F = 10\text{ A}$                                        | —   | 1.2  | 1.35 |               |
|                                     |        | $I_F = 10\text{ A}$ , $T_a = 150\text{ }^{\circ}\text{C}$  | —   | 1.36 | —    |               |
| Reverse current (pulse measurement) | $I_R$  | $V_R = 650\text{ V}$                                       | —   | 2.0  | 100  | $\mu\text{A}$ |
|                                     |        | $V_R = 650\text{ V}$ , $T_a = 150\text{ }^{\circ}\text{C}$ | —   | 18   | —    |               |
| Total capacitance                   | $C_t$  | $V_R = 1\text{ V}$ , $f = 1\text{ MHz}$                    | —   | 649  | —    | pF            |
|                                     |        | $V_R = 400\text{ V}$ , $f = 1\text{ MHz}$                  | —   | 38   | —    |               |
|                                     |        | $V_R = 650\text{ V}$ , $f = 1\text{ MHz}$                  | —   | 36   | —    |               |
| Total capacitive charge             | $Q_c$  | $V_R = 400\text{ V}$ , $f = 1\text{ MHz}$                  | —   | 27   | —    | nC            |

7. Marking (Note)

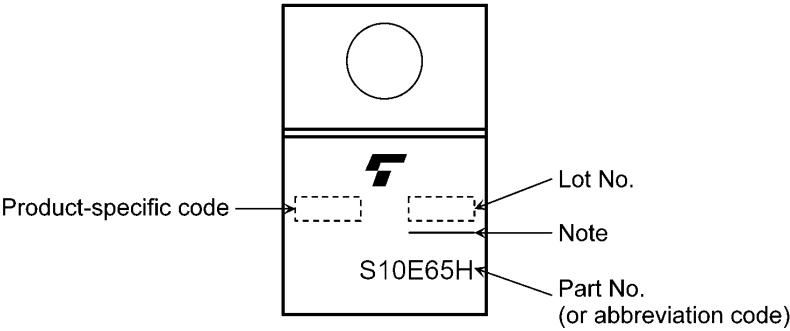


Fig. 7.1 Marking

Note: A line under a Lot No. identifies the indication of product Labels.  
[[G]]/RoHS COMPATIBLE or [[G]]/RoHS [[Pb]]  
Please contact your TOSHIBA sales representative for details as to environmental matters such as the RoHS compatibility of Product.  
The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

| Abbreviation Code | Part Number |
|-------------------|-------------|
| S10E65H           | TRS10E65H   |

8. Usage Considerations

For other design considerations, see the Toshiba website.

9. Characteristics Curves (Note)

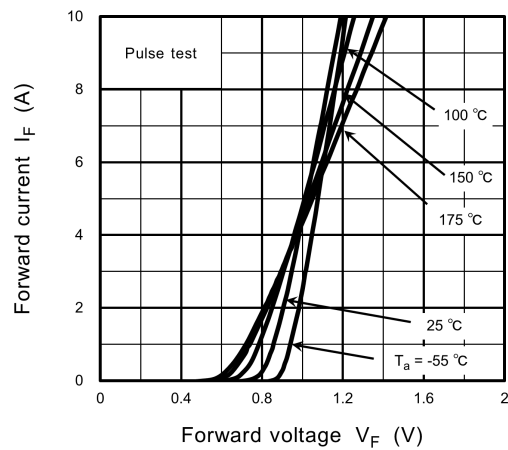


Fig. 9.1  $I_F - V_F$

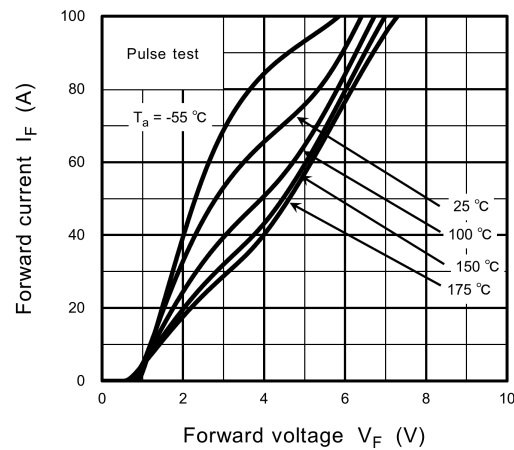


Fig. 9.2  $I_F - V_F$

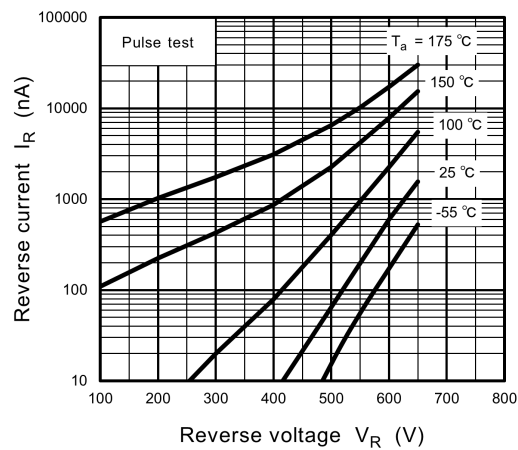


Fig. 9.3  $I_R - V_R$

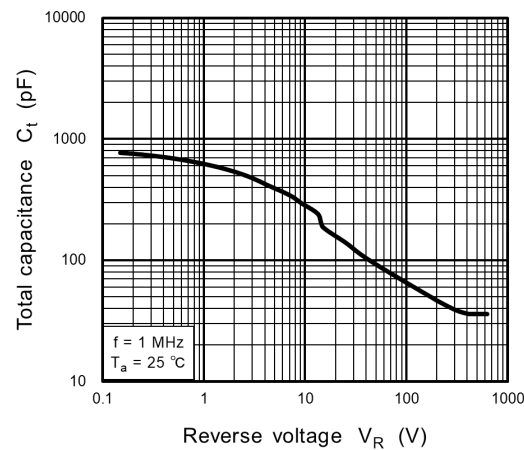


Fig. 9.4  $C_t - V_R$

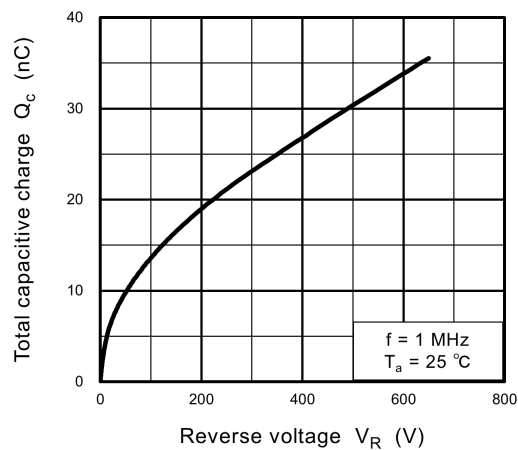


Fig. 9.5  $Q_c - V_R$

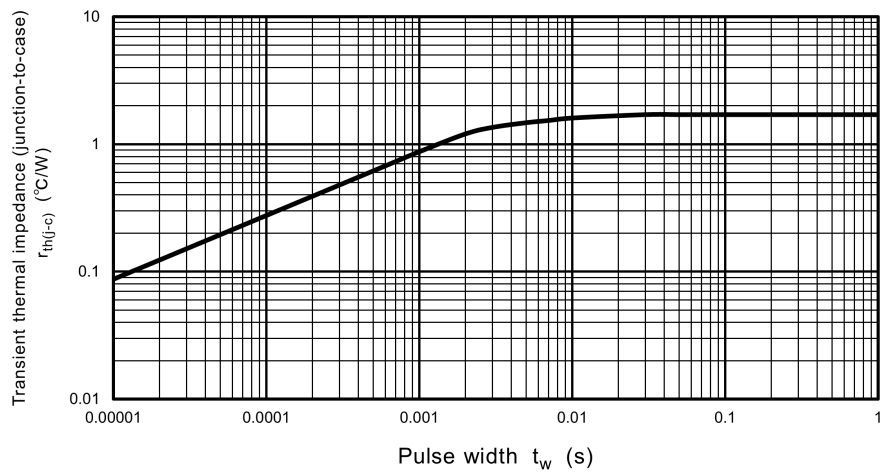


Fig. 9.6  $r_{th(j-c)} - t_w$   
(Guaranteed Maximum)

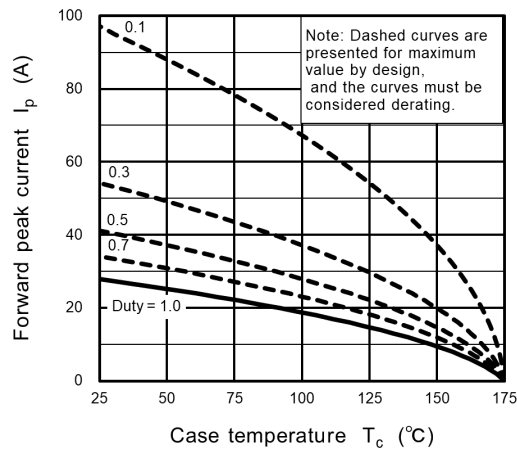


Fig. 9.7  $I_p - T_c$

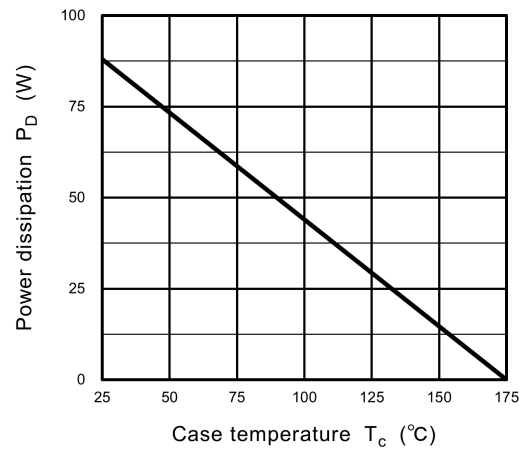
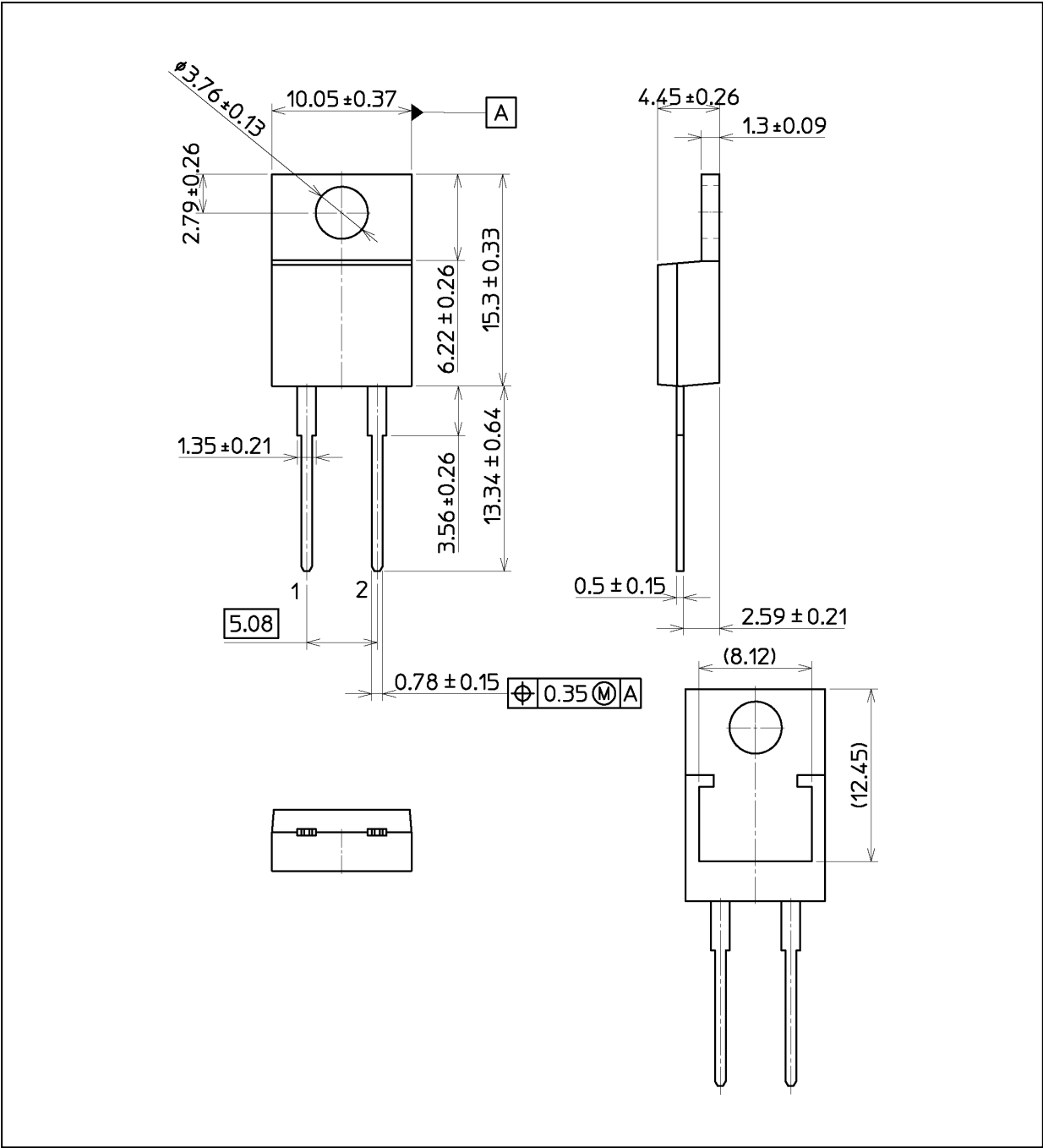


Fig. 9.8  $P_D - T_c$   
(Guaranteed Maximum)

Note: The above characteristics curves are presented for reference only and not guaranteed by production test, unless otherwise noted.

Package Dimensions

Unit: mm



Weight: 1.9 g (typ.)

| Package Name(s)     |
|---------------------|
| TOSHIBA: 2-10AE1A   |
| Nickname: TO-220-2L |

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