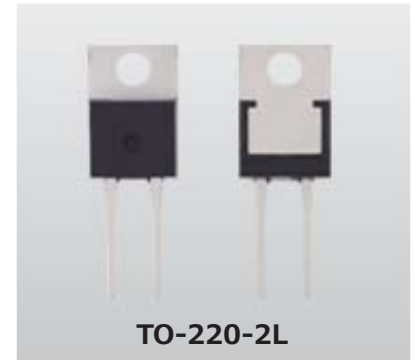


## Expanded lineup of the second generation of SiC SBD products with a TO-220-2L package

“TRS2E65F” and “TRS3E65F” are the second generation 650 V Silicon Carbide Schottky Barrier Diodes (SiC SBD). The new products, of which forward direct current rating is 2 A or 3 A, join the lineup of products using the TO-220-2L package.

The second generation products are less likely to break down with their increased peak forward surge current ( $I_{FSM}$ ) of absolute maximum ratings which is about 1.7 times higher than the first generation product, and feature lower loss with their decreased figure of merit ( $V_F \cdot Q_C^{[1]}$ ), about 2/3 of the first generation products. They will contribute to making power supplies smaller and more efficient.



### Features

- Forward DC current rating:  $I_{F(DC)}=2\text{ A}/3\text{ A}$   
(Applicable to small capacity power supplies)
- High peak forward surge current  
(Second generation products: About 1.7 times higher than the first generation products)
- Low  $V_F \cdot Q_C^{[1]}$ , figure of merit  
(Second generation products: About 2/3 of the first generation products)

### Applications

- High efficiency power supply for consumer products and OA equipment (4K LCD TV, OLED TV, Projector, Multi-function printer etc.)
- High efficiency power supply for industrial equipment (Base station, PC server etc.)
- Photovoltaic inverters



Power supplies

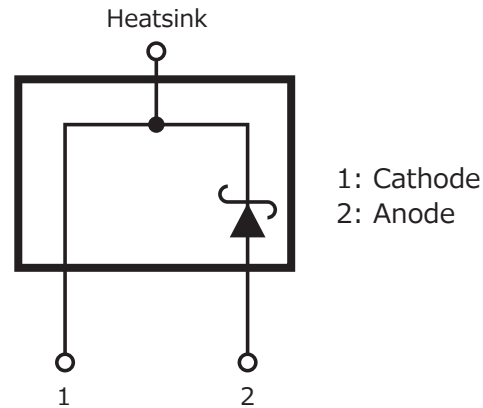
### Product Specifications

(@ $T_a=25^\circ\text{C}$ )

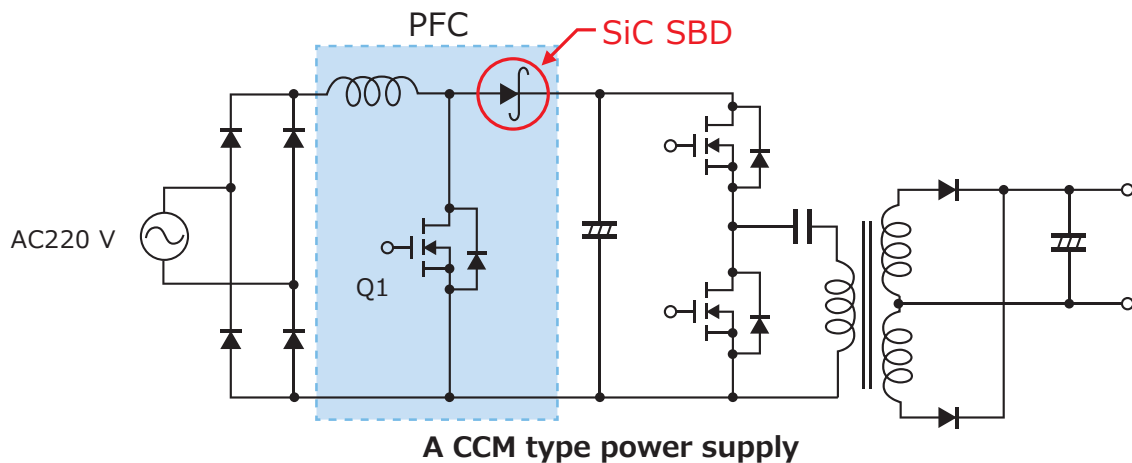
| Package   | Part number | Absolute maximum ratings                 |   |   | Electrical characteristics      |  |   |   |
|-----------|-------------|--|---|---|---------------------------------|--|---|---|
|           |             | Forward DC current<br>$I_{F(DC)}$<br>(A) | Non-repetitive peak forward surge current<br>$I_{FSM}$<br>(A) | Total power dissipation<br>$P_{tot}$<br>(W) | Forward voltage<br>$V_F$<br>(V) | Junction capacitance<br>$C_j$ typ.<br>(pF) | Total capacitive charge<br>$Q_C$ typ.<br>(nC) | Figure of merit<br>$V_F \cdot Q_C$ typ.<br>(V·nC) |
|           |             | –  | @Half-sine wave<br>$t=10\text{ ms}$                           | –   | @ $I_{F(DC)}$                   | @ $V_R=1\text{ V}$                         | @ $V_R=0.1\text{ to }400\text{ V}$            | –   |
| TO-220-2L | TRS2E65F    | 2  | 21  | 41.6  | 1.45 (typ.),<br>1.60 (max)      | 85   | 5.8   | 8.4   |
|           | TRS3E65F    | 3  | 27  | 48.3  |                                 | 120  | 8.1   | 11.7  |

Notes: [1]  $V_F \cdot Q_C$  (a product of forward voltage and total capacitive charge) is an index representing the loss performance of a SiC SBD, and the lower the value, the lower the loss of the SiC SBD when compared among products with the same current rating.

## Internal Circuit



## Application Circuit Example



SiC SBDs are often used in PFC parts in Continuous Current Mode (CCM). When an AC power is applied (for example, when the power is turned on) with Q1 in OFF state, a large current may flow in a diode of the PFC part.  $I_{FSM}$  is surge capability in commercial frequencies, and it is important item not to damage the product.

The application circuits shown in this document are provided for reference purposes only. Thorough evaluation is required, especially at the mass-production design stage. Toshiba Electronic Devices & Storage Corporation does not grant any license to any industrial property rights by providing these examples of application circuits.

Before creating and producing designs and using, customers must also refer to and comply with the latest versions of all relevant information of this document and the instructions for the application that Product will be used with or for.

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