

SiC Schottky Barrier Diode

## TRS3E65H

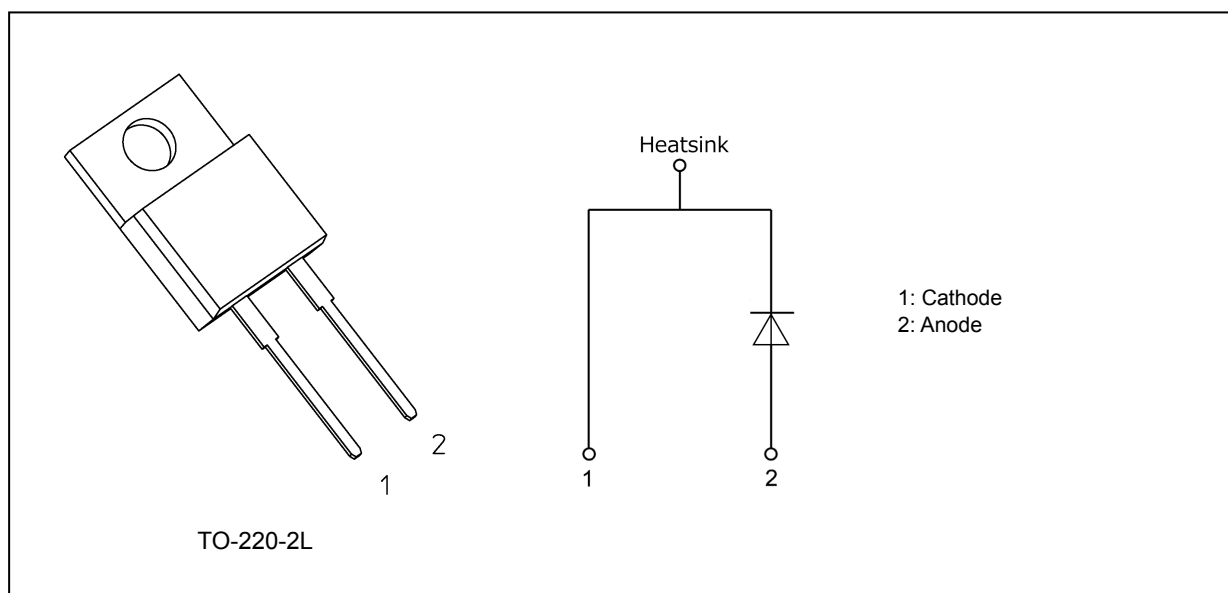
### 1. Applications

- 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:  $Q_c = 9 \text{ nC (typ.)}$
- (4) Low reverse current:  $I_R = 0.4 \text{ } \mu\text{A (typ.)}$

### 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)	3	A
		(Note 2)	12	
Non-repetitive peak forward surge current	$I_{FSM}$	(Note 3)	28	A
		(Note 4)	22	
		(Note 5)	170	
Power dissipation	$P_D$	(Note 2)	55	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:  $T_c = 161\text{ }^\circ\text{C}$

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)	2.70	$^\circ\text{C/W}$
Thermal resistance (junction-to-ambient)	$R_{th(j-a)}$	(Note 2)	50	

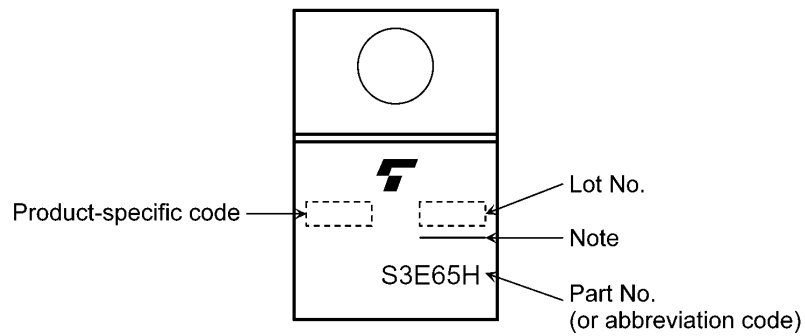
Note 1:  $T_c = 25\text{ }^\circ\text{C}$

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)	$V_F$	$I_F = 1.5\text{ A}$	—	1.0	—	V
		$I_F = 3\text{ A}$	—	1.2	1.35	
		$I_F = 3\text{ A}$ , $T_a = 150\text{ }^\circ\text{C}$	—	1.36	—	
Reverse current (pulse measurement)	$I_R$	$V_R = 650\text{ V}$	—	0.4	45	$\mu\text{A}$
		$V_R = 650\text{ V}$ , $T_a = 150\text{ }^\circ\text{C}$	—	5	—	
Total capacitance	$C_t$	$V_R = 1\text{ V}$ , $f = 1\text{ MHz}$	—	199	—	pF
		$V_R = 400\text{ V}$ , $f = 1\text{ MHz}$	—	14	—	
		$V_R = 650\text{ V}$ , $f = 1\text{ MHz}$	—	12	—	
Total capacitive charge	$Q_c$	$V_R = 400\text{ V}$ , $f = 1\text{ MHz}$	—	9	—	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.

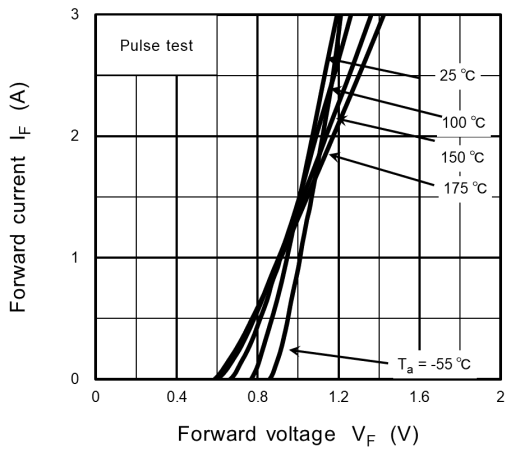
The RoHS is the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

Abbreviation Code	Part Number
S3E65H	TRS3E65H

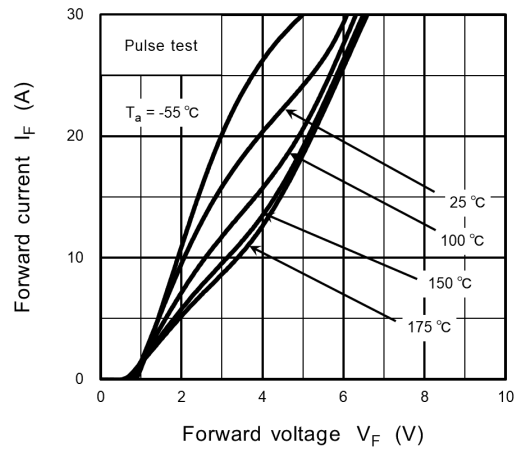
## 8. Usage Considerations

For other design considerations, see the Toshiba website.

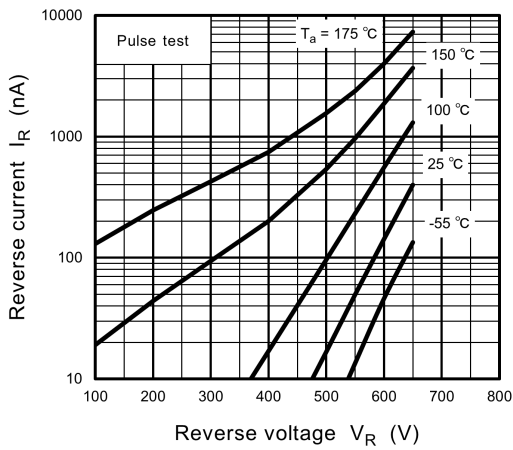
## 9. Characteristics Curves (Note)



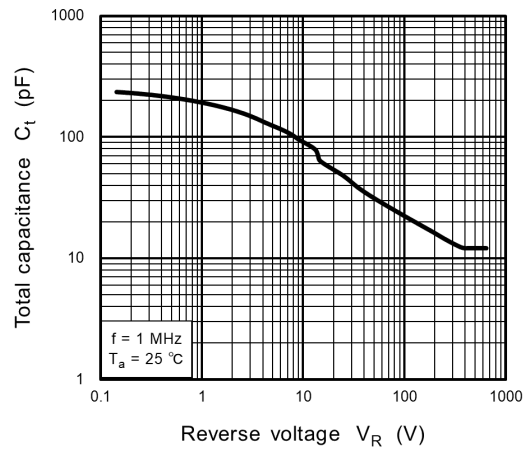
**Fig. 9.1  $I_F - V_F$**



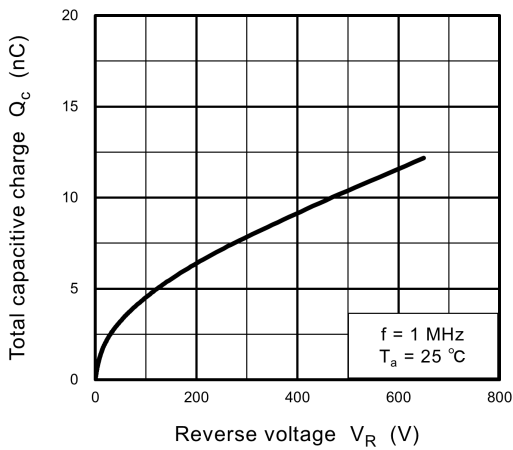
**Fig. 9.2  $I_F - V_F$**



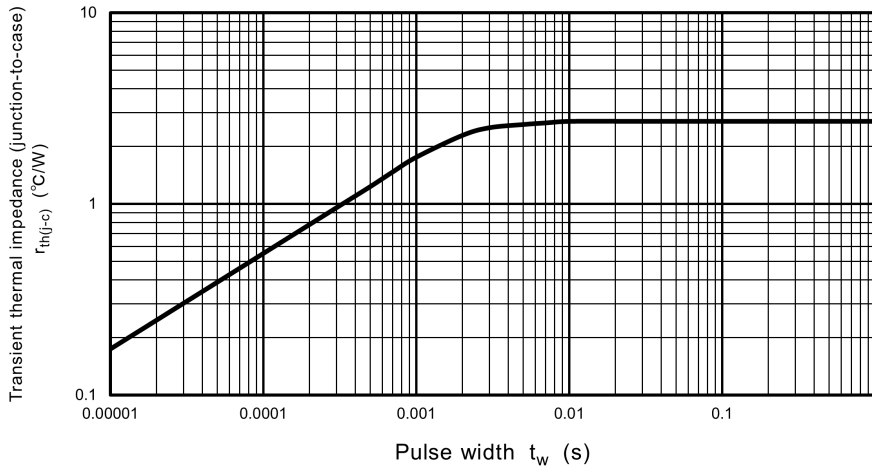
**Fig. 9.3  $I_R - V_R$**



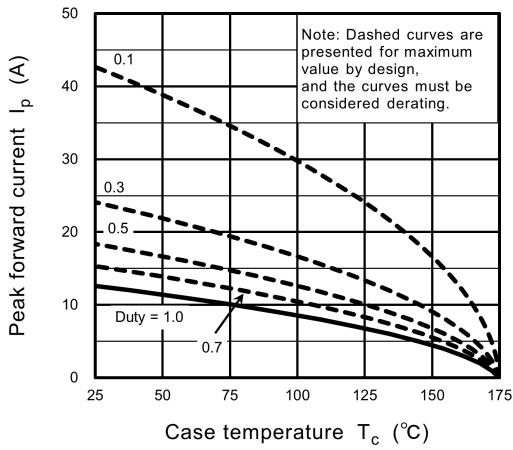
**Fig. 9.4  $C_t - V_R$**



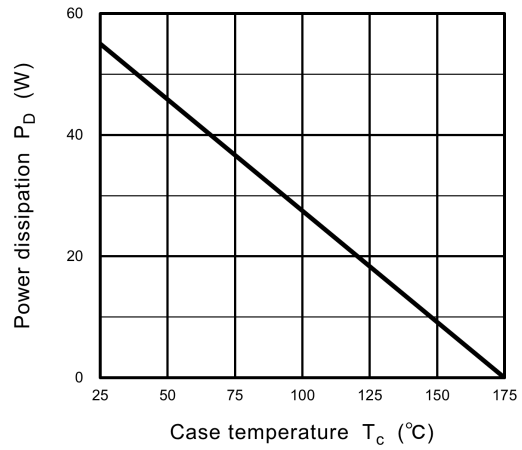
**Fig. 9.5  $Q_C - V_R$**



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



**Fig. 9.7  $I_p - T_c$**

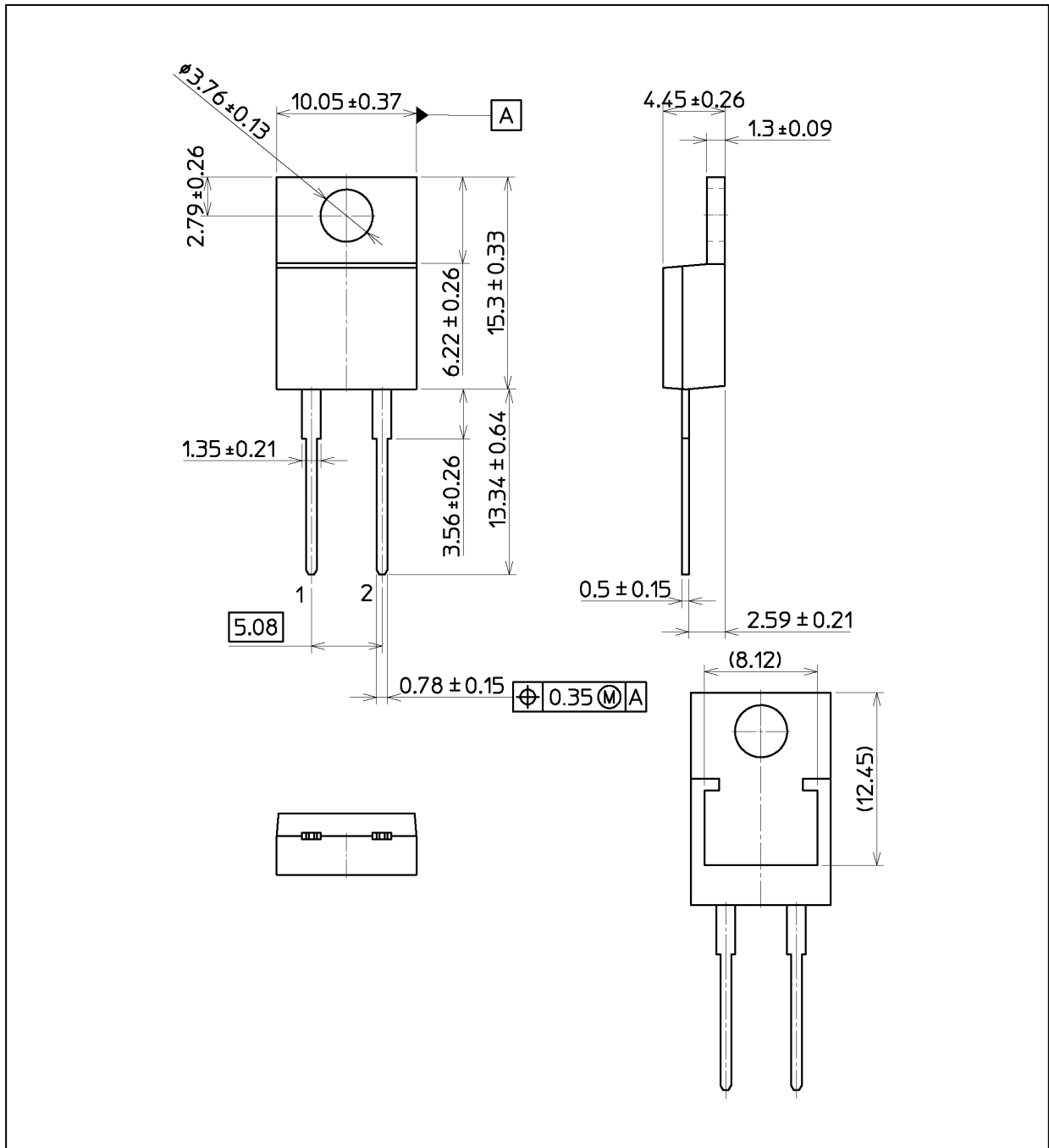


**Fig. 9.8  $P_D - T_c$**   
(Guaranteed Maximum)

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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