SiC Schottky Barrier Diode

TRS10E65F

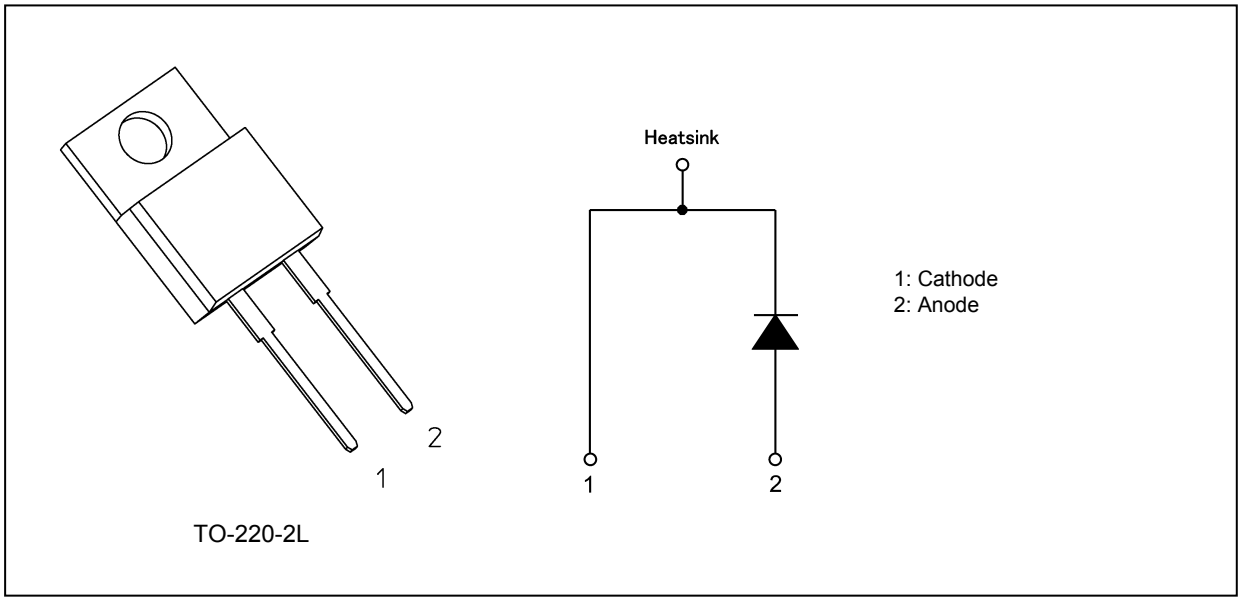
1. Applications

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

2. Features

(1) Chip design of 2nd generation.
(2) High surge current capability : I_{FSM} = 83A (Max)
(3) The junction capacitance is small : C_j = 36 pF (Typ.)
(4) The reverse current is small. : I_R = 0.5 μA (Typ.)

3. Packaging and Internal Circuit



Start of commercial production
2016-07

4. Absolute Maximum Ratings (Note) (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Note	Rating	Unit
Repetitive peak reverse voltage	V_{RRM}		650	V
Forward DC current	$I_{F(DC)}$		10	A
Forward pulse current	I_{FP}	(Note 1)	100	A
Non-repetitive peak forward surge current	I_{FSM}	(Note 2)	83	A
I^2t limit value	I^2t		34.5	A^2s
Junction temperature	T_j		175	°C
Storage temperature	T_{stg}		-55 to 175	°C
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 = 50 μs

Note 2: f = 50 Hz (half-sine wave t = 10 ms)

5. Thermal Characteristics

Characteristics	Symbol	Test Condition	Max	Unit
Thermal resistance (junction-to-case)	$R_{th(j-c)}$	—	1.4	°C/W
Thermal resistance (junction-to-ambient)	$R_{th(j-a)}$	—	89	°C/W

6. Electrical Characteristics (Unless otherwise specified, T_a = 25 °C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward voltage	V_F (1)	I_F = 5 A (pulse measurement)	—	1.2	—	V
Forward voltage	V_F (2)	I_F = 10 A (pulse measurement)	—	1.45	1.6	V
Reverse current	I_R	V_R = 650 V (pulse measurement)	—	0.5	50	μA
Junction capacitance	C_j	V_R = 650 V, f = 1 MHz	—	36	—	pF

7. Marking

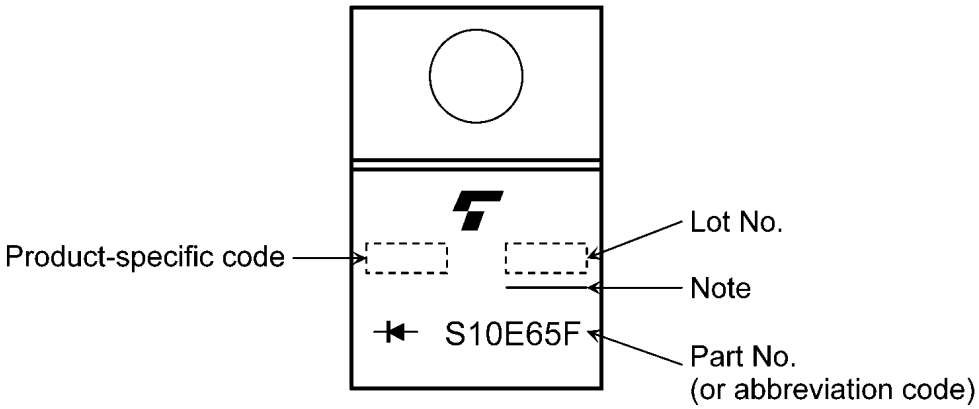


Fig. 7.1 Marking

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
S10E65F	TRS10E65F

8. Usage Considerations

(1) The absolute maximum ratings are rated values that must not be exceeded during operation, even for an instant.
The following are the recommended general derating methods for designing a circuit board using this device.

V_{RRM} : V_{RRM} has a temperature coefficient of 0.1 %/℃.
Take this coefficient into account when designing a circuit board that will be operated in a low-temperature environment.

$I_{F(DC)}$: We recommend that the worst-case current be no greater than 80 % of the absolute maximum rating of $I_{F(DC)}$.

I_{FP} : We recommend that the worst-case current be no greater than 80 % of the absolute maximum rating of I_{FP}.

I_{FSM} : This rating specifies a non-repetitive limit value.
This only applies to an abnormal operation, which seldom occurs during the lifespan of a device.

I^2t : This rating specifies a non-repetitive limit value.
This only applies to an abnormal operation, which seldom occurs during the lifespan of a device.

T_j : Derate device parameters in proportion to this rating in order to ensure high reliability.
We recommend that the junction temperature (T_j) of a device be kept below 140 ℃.

(2) For other design considerations, see the Toshiba Semiconductor website.

9. Characteristics Curves (Note)

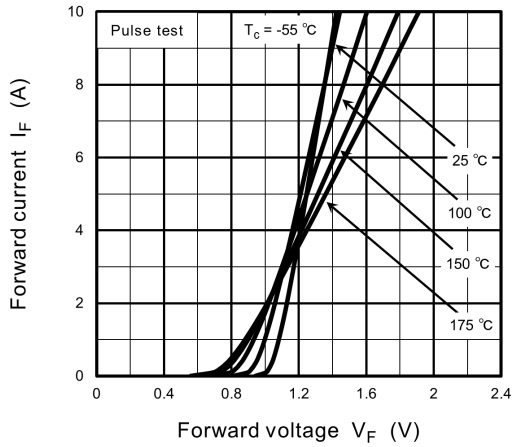


Fig. 9.1 I_F - V_F

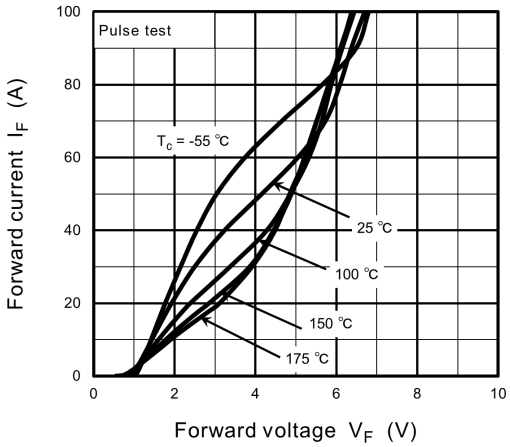


Fig. 9.2 I_F - V_F

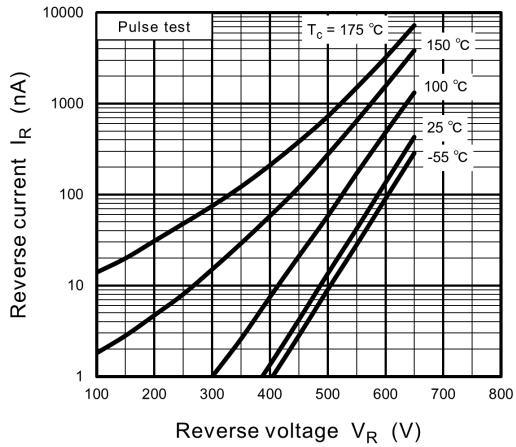


Fig. 9.3 I_R - V_R

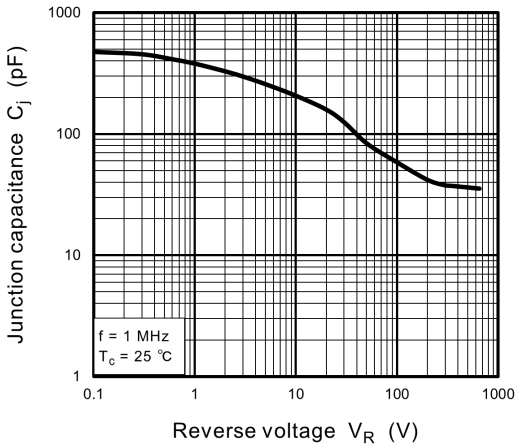


Fig. 9.4 C_j - V_R

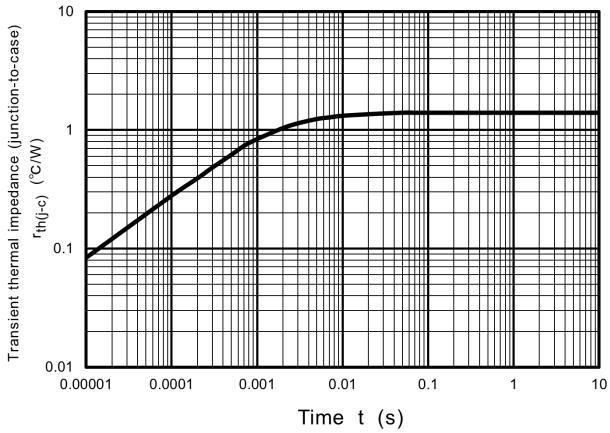
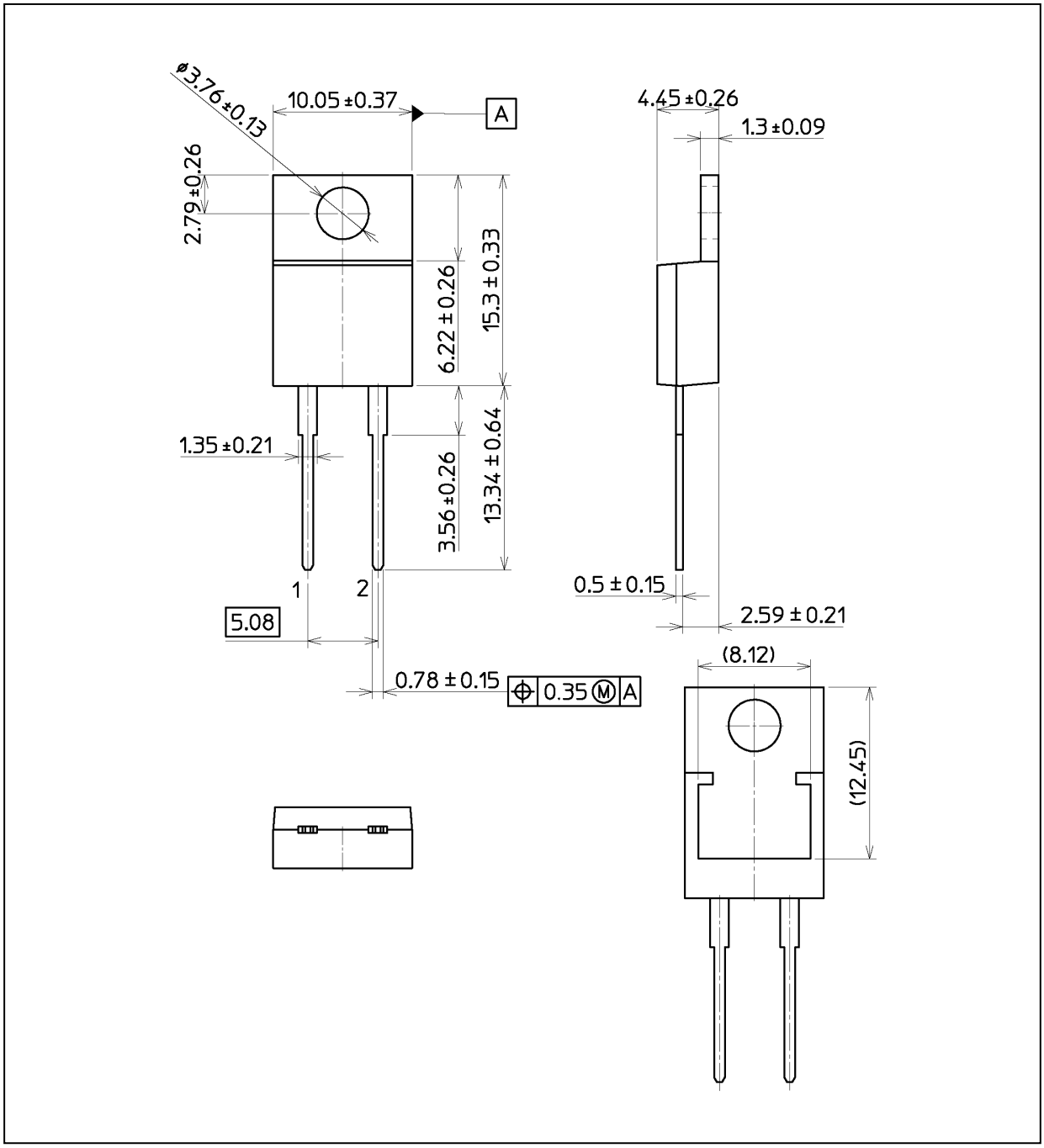


Fig. 9.5 $r_{th(j-c)}$ - t
(Guaranteed Maximum)

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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