SiC Schottky Barrier Diode

TRS20N65D

1. Applications

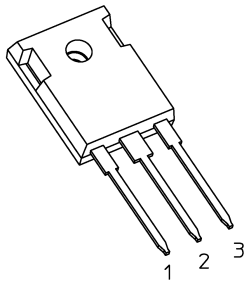
- Power Factor Correction
- Solar Inverters
- Uninterruptible Power Supplies
- DC-DC Converters

2. Features

(1) Forward DC current(Per Leg/Both Legs) $I_{F(DC)}$ = 10/20 A

(2) Repetitive peak reverse voltage V_{RRM} = 650 V

3. Packaging and Internal Circuit Pin Assignment



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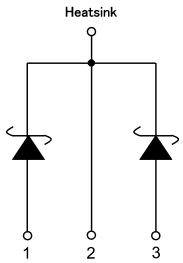


1: Anode
2: Cathode
3: Anode

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	Per Leg	$I_{F(DC)}$		10	A
Forward DC current	Both Legs			20	
Forward pulse current	Per Leg	I_{FP}	(Note 1)	100	
Forward pulse current	Both Legs			200	
I^2t limit value	Per Leg	I^2t	(Note 2)	12.5	A^2s
I^2t limit value	Both Legs			50.0	
Junction temperature		T_j		175	°C
Storage temperature		T_{stg}		-55 to 175	
Mounting torque		TOR		0.8	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 = 100 μs

Note 2: f = 50 Hz

Start of commercial production
2014-02

2014-04-25
Rev.4.0

5. Thermal Characteristics

Characteristics	Symbol	Test Condition	Max	Unit
Thermal resistance (junction-to-case)	$R_{th(j-c)}$	Per Leg	1.8	°C/W
		Both Legs	0.9	
Thermal resistance (junction-to-ambient)	$R_{th(j-a)}$	—	50	

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak forward voltage	V_{FM}(1)	I_F = 5 A Per Leg (pulse measurement)	—	1.24	—	V
	V_{FM}(2)	I_F = 10 A Per Leg (pulse measurement)	—	1.5	1.7	
	V_{FM}(3)	I_F = 20 A Both Legs (pulse measurement)	—	1.5	1.7	
Repetitive peak reverse current	I_{RRM}	V_{RRM} = 650 V Per Leg (pulse measurement)	—	0.42	90	μA
Junction capacitance	C_j	V_R = 650 V, f = 1 MHz Per Leg	—	55	—	pF

7. Marking

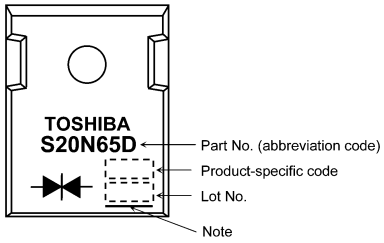


Fig. 7.1 Marking

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
S20N65D	TRS20N65D

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 %/°C.
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 $I_{F(DC)}$ and that the worst-case junction temperature, T_j, be kept below 140 °C.

I_{FP}: We recommend that the worst-case current be no greater than 80 % of the absolute maximum rating of I_{FP} and that the worst-case junction temperature, T_j, be kept below 140 °C.

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 °C.

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

9. Characteristics Curves (Note)

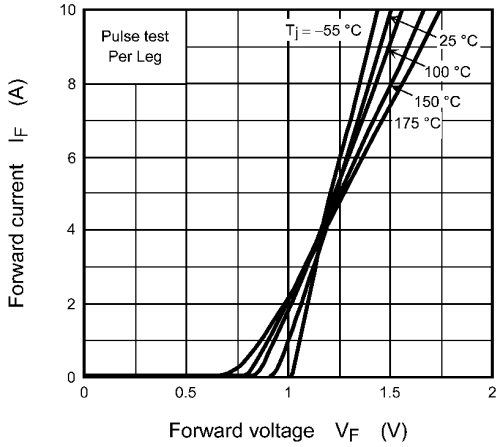


Fig. 9.1 I_F - V_F

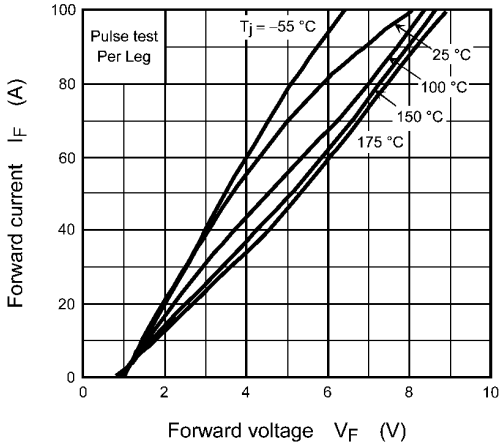


Fig. 9.2 I_F - V_F

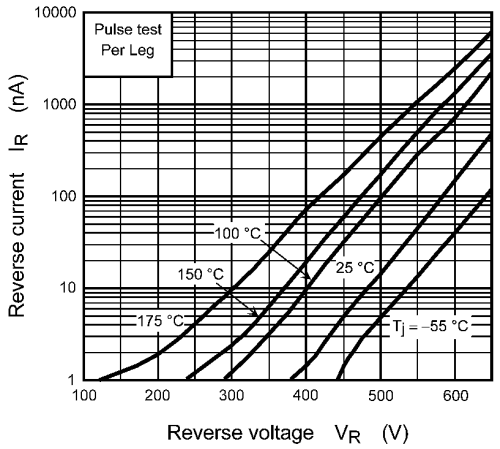


Fig. 9.3 I_R - V_R

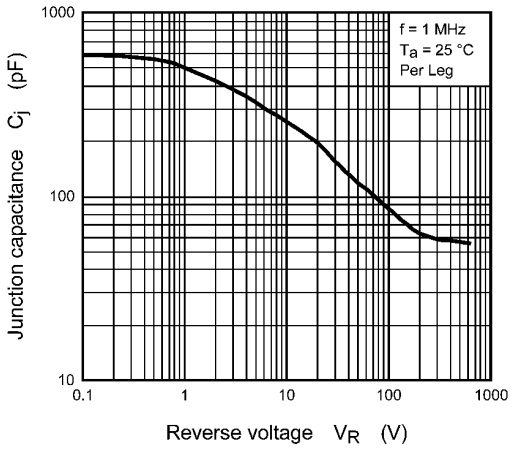


Fig. 9.4 C_j - V_R

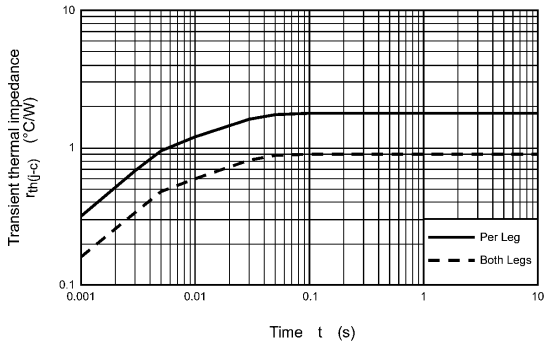
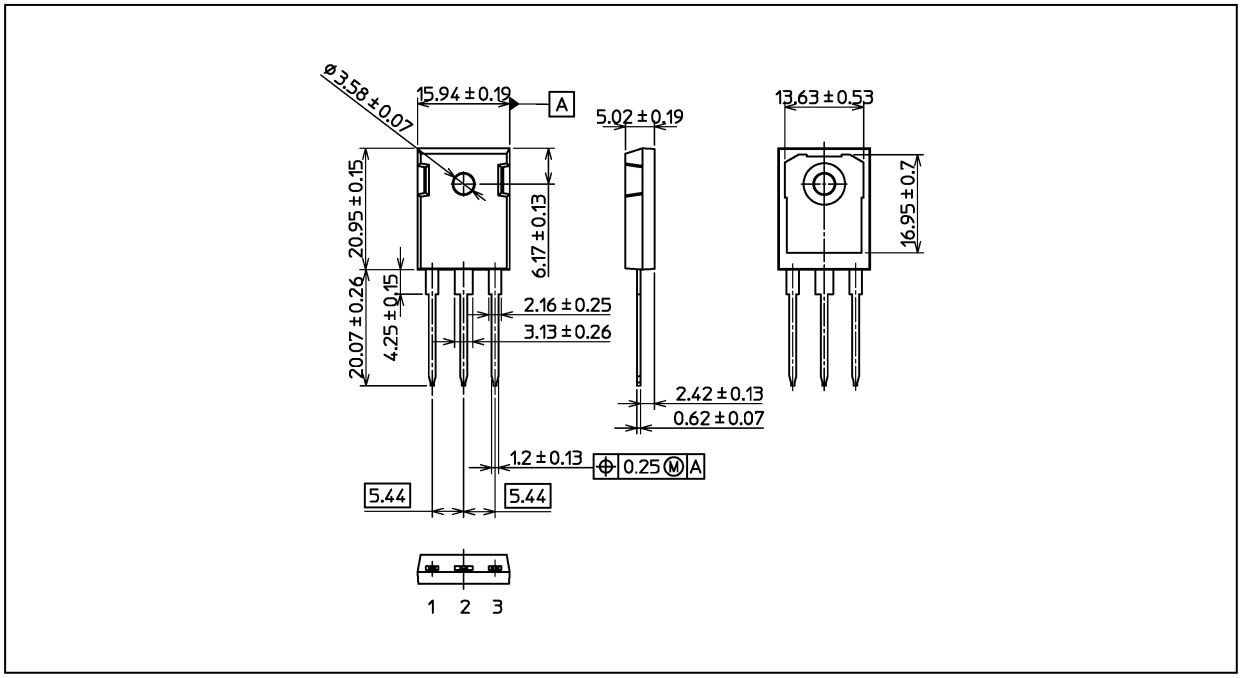


Fig. 9.5 $r_{th(j-c)}$ - t
(Guaranteed Maximum)

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

Package Dimensions

Unit: mm



Weight: 6.15 g (typ.)

Package Name(s)
TOSHIBA: 2-16L1A
Nickname: TO-247

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