Fast Recovery Diode (FRD)　Silicon Diffused Junction

3000GXHH32

1. Applications

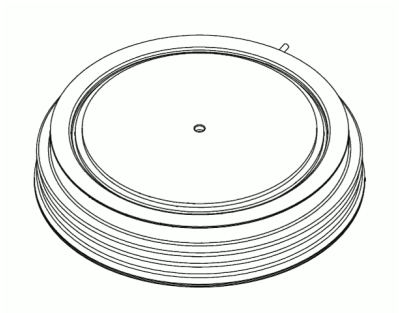
- Electric power transmission and distribution
- Motor Controllers

2. Features

(1) High reliability due to hermetic sealing structure.

(2) Double side cooling type.

3. Packaging and Internal Circuit



SR85D

①: Anode

②: Cathode

Start of commercial production

2022-03

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4. Absolute Maximum Ratings (Note) (T_c = 25 °C, unless otherwise specified)

Characteristics	Symbol	Note	Test Condition	Rating	Unit
Repetitive peak reverse voltage	V_{RRM}			4500	V
Forward current (DC)	I_F		T_f = 42 °C	3000	A
Forward current (pulsed)	I_{FP}	(Note 1)		6000	A
Non-repetitive peak forward surge current	I_{FSM}		10 ms half-sine wave, V_R = 0V, T_j = 150 °C	21	kA
I^2t limit value	I^2t			2.2×10^6	A^2s
Power dissipation	P_D	(Note 2)	T_f = 25 °C	12500	W
Junction temperature	T_j			-40 to 150	°C
Operating junction temperature	$T_{j(opr)}$			-40 to 125	°C
Storage temperature	T_{stg}			-40 to 125	°C
Mounting force	—			29 to 64	kN

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: Pulse width and repetition rate should be such that junction temperature (T_j) does not exceed maximum T_j rating.

Note 2: Refer to the application notes.

5. Thermal Characteristics (Note)

Characteristics	Symbol	Note	Test Condition	Max	Unit
Thermal resistance (junction-to-fin)	$R_{th(j-f)}$	(Note 3)	Anode side	26.6	K/kW
			Cathode side	16.1	
			Double side	10.0	

Note: Customers must also refer to and comply with the latest versions of all relevant TOSHIBA information, including without limitation, this document, the specifications, the data sheets and application notes for Product and the precautions and conditions set forth in the "TOSHIBA Semiconductor Reliability Handbook" and the instructions for the application with which the Product will be used with or for.

Note 3: Conductive thermal compound is added.

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6. Electrical Characteristics

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Repetitive peak reverse current	I_{RRM}	V_{RRM} = 4500V, T_j = 150 °C	—	—	100	mA
Forward voltage	V_F	I_F = 3000A, T_j = 25 °C	—	2.85	—	V
		I_F = 3000A, T_j = 150 °C	—	3.00	3.60	V
Peak reverse recovery current	I_{rr}	V_R = 2800V, I_F = 3000A, L_s ≈ 300nH, T_j = 150 °C Drive side: ST3000GXH31A di/dt ≈ 5000 A/μs, T_j = 150 °C Inductive load, See Fig. 6.1 and Fig. 6.2	—	2950	—	A
Reverse recovery time	t_{rr}		—	1.80	—	μs
Reverse recovery loss	E_{rr}		—	5.60	—	J

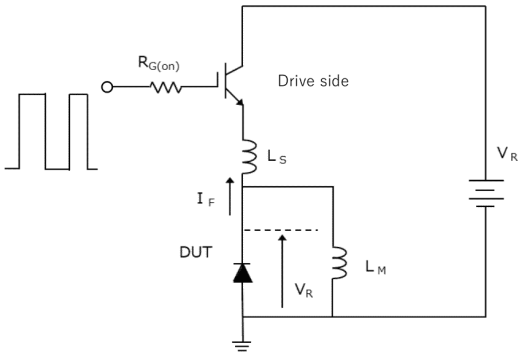
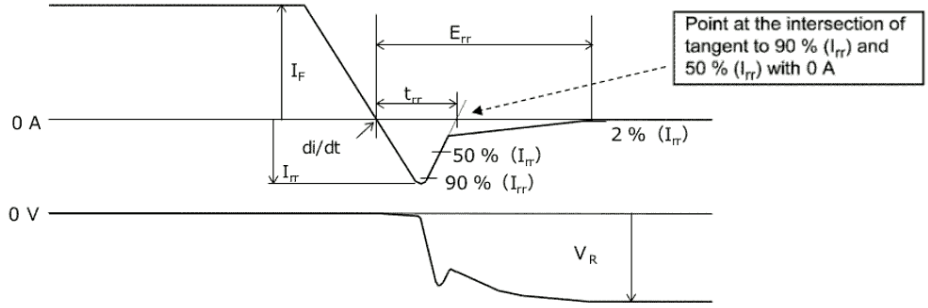


Fig. 6.1 Test Circuit



$$E_{rr} = \int I_F \times V_R \, dt$$

Fig. 6.2 Timing Chart

7. Characteristics Curves (Note)

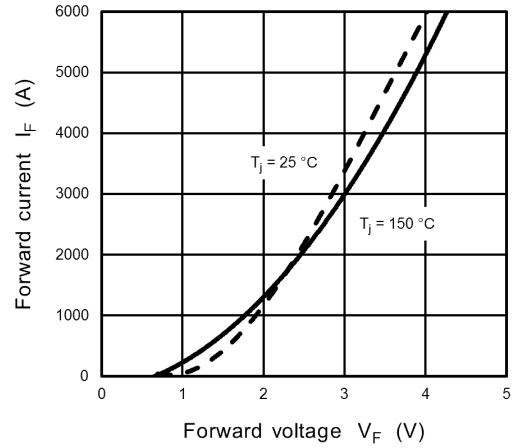


Fig. 7.1 I_F - V_F

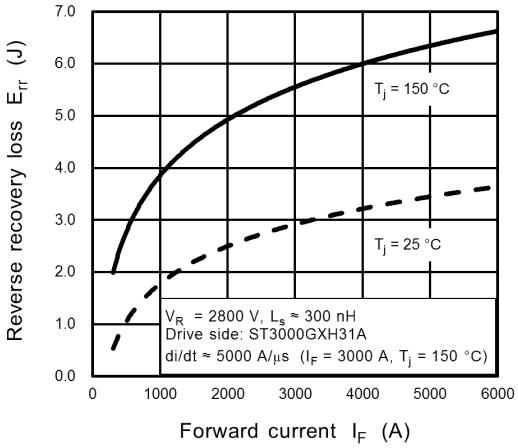


Fig. 7.2 E_{rr} - I_F

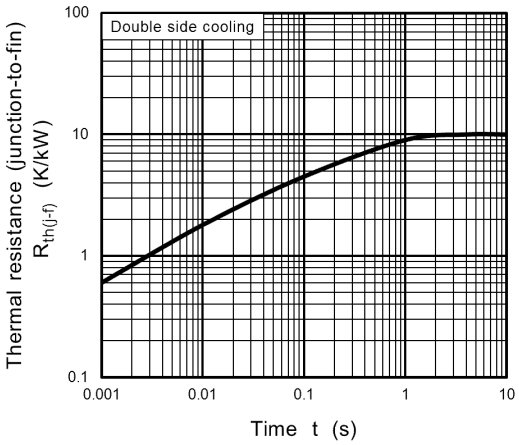


Fig. 7.3 $R_{th(j-f)}$ - t (Guaranteed value)

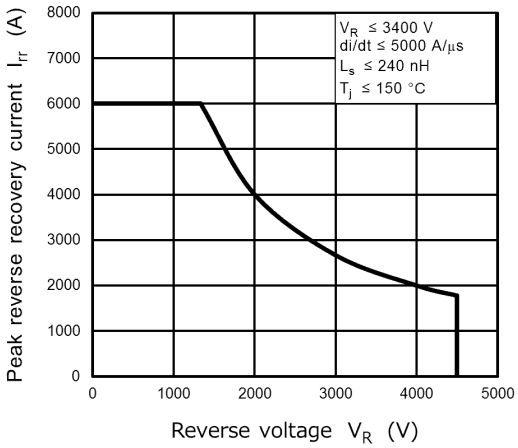


Fig. 7.4 RRSOA (Guaranteed value)

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

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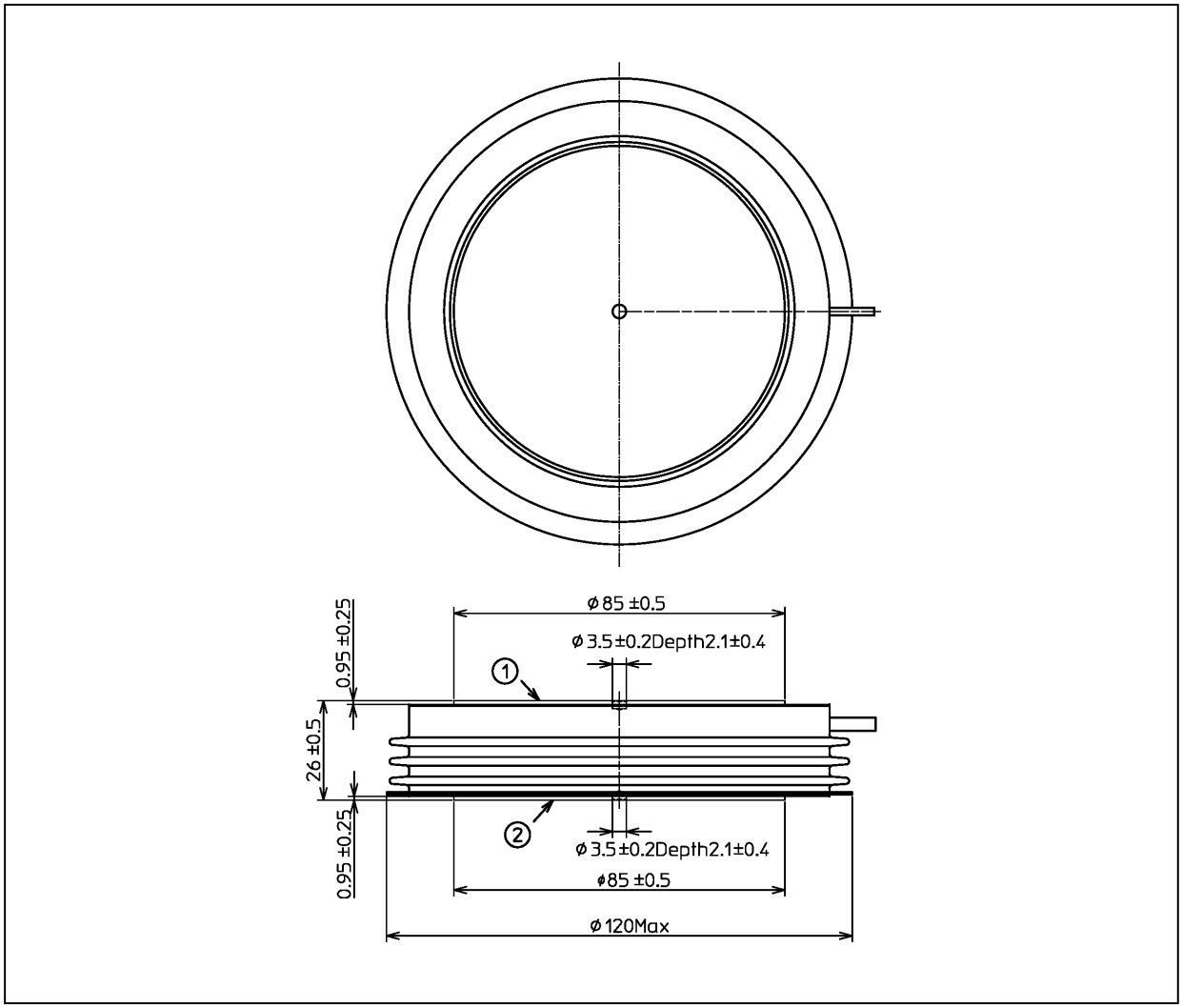
Package Dimensions

Unit: mm



Weight: 1400 g (typ.)

Package Name(s)
TOSHIBA: 3-120D2S
Nickname: SR85D

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