DRD3770A52

Rectifier Diode

DS5988-1 January 2011 (LN28009)

FEATURES

- Double Side Cooling
- High Surge Capability

APPLICATIONS

- Rectification
- Free-wheel Diode
- DC Motor Control
- Power Supplies
- Welding
- Battery Chargers

KEY PARAMETERS

V_{RRM}	**5200V**
$I_{F(AV)}$	**3768A**
I_{FSM}	**70000A**

VOLTAGE RATINGS

Part and Ordering Number	Repetitive Peak Voltages V_{DRM} and V_{DRM} V	Conditions
DRD3770A52 DRD3770A50 DRD3770A48 DRD3770A44	5200 5000 4800 4400	$V_{RSM} = V_{RRM}+100V$

Lower voltage grades available.

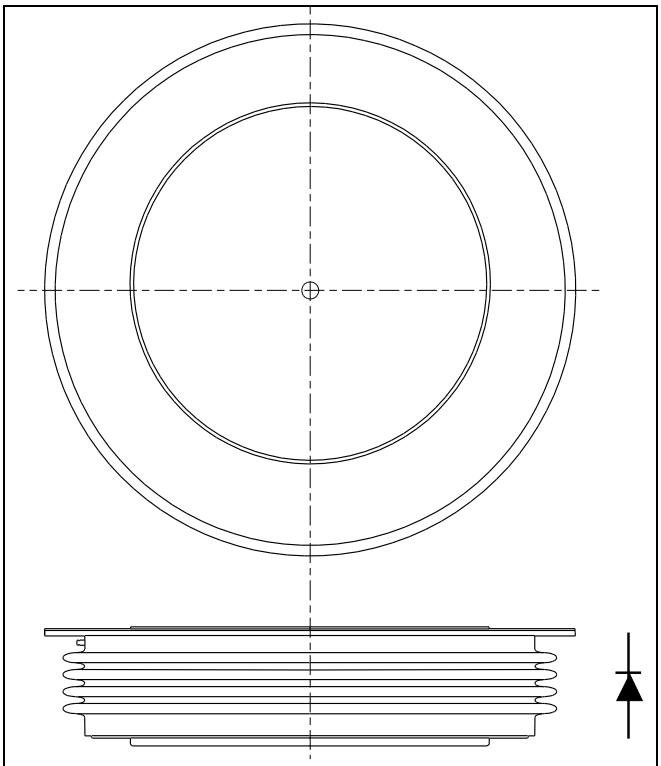
ORDERING INFORMATION

When ordering, select the required part number shown in the Voltage Ratings selection table.

For example:

DRD3770A50 for a 5000V device

Note: Please use the complete part number when ordering and quote this number in any future correspondence relating to your order.



Outline type code: A
(See Package Details for further information)

Fig. 1 Package outlines

CURRENT RATINGS

T_{case} = 75°C unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	4914	A
$I_{F(RMS)}$	RMS value	-	7715	A
I_F	Continuous (direct) on-state current	-	7150	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	3213	A
$I_{F(RMS)}$	RMS value	-	5044	A
I_F	Continuous (direct) on-state current	-	4407	A

T_{case} = 100°C unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	3768	A
$I_{F(RMS)}$	RMS value	-	5916	A
I_F	Continuous (direct) on-state current	-	5414	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	2433	A
$I_{F(RMS)}$	RMS value	-	3820	A
I_F	Continuous (direct) on-state current	-	3256	A

SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) on-state current	10ms half sine, T_{case} = 150°C	56	kA
I^2t	I^2t for fusing	V_R = 50% V_{RRM} - ¼ sine	15.8	MA^2s
I_{FSM}	Surge (non-repetitive) on-state current	10ms half sine, T_{case} = 150°C	70	kA
I^2t	I^2t for fusing	V_R = 0	24.5	MA^2s

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Test Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance – junction to case	Double side cooled	DC	-	0.0065	°C/W
		Single side cooled	Anode DC	-	0.013	°C/W
			Cathode DC	-	0.013	°C/W
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Clamping force 83.0kN	Double side	-	0.001	°C/W
		(with mounting compound)	Single side	-	0.002	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)		-	160	°C
		Reverse (blocking)		-	150	°C
T_{stg}	Storage temperature range			-55	150	°C
F_m	Clamping force			75.0	91.0	kN

CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
V_{FM}	Forward voltage	At 3000A peak, T_{case} = 25°C	-	1.17	V
I_{RM}	Peak reverse current	At V_{DRM}, T_{case} = 150°C	-	200	mA
V_{TO}	Threshold voltage	At T_{vj} = 150°C	-	0.82	V
r_T	Slope resistance	At T_{vj} = 150°C	-	0.111	mΩ

CURVES

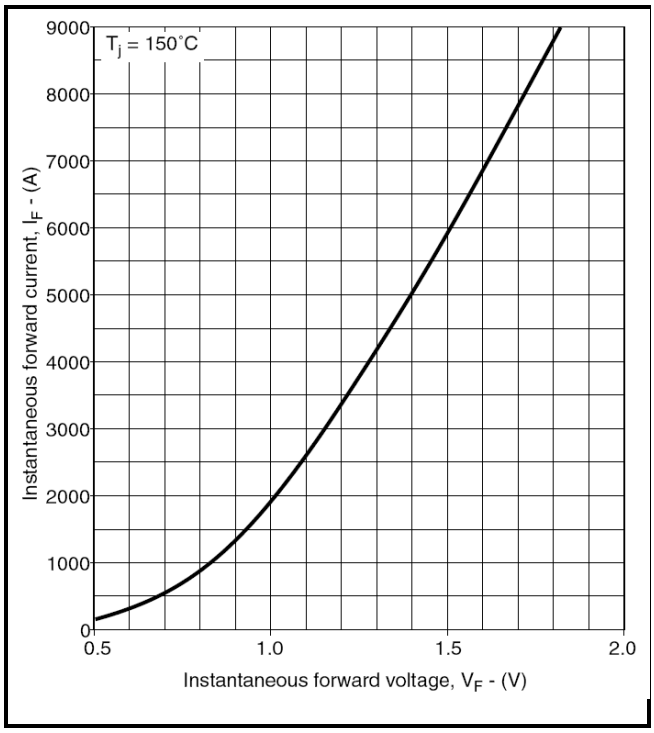


Fig.2 Maximum (limit) forward characteristics

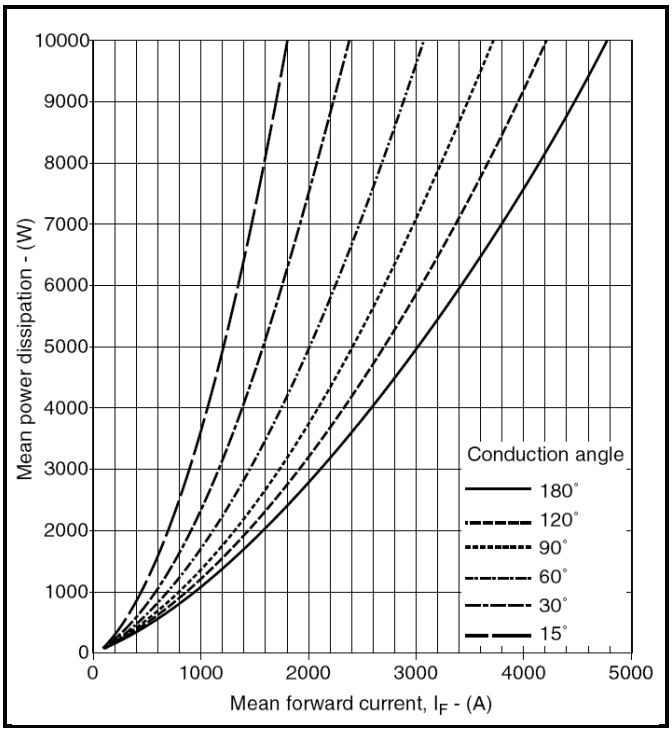


Fig.3 Power loss curves – sine wave

V_{TM} EQUATION

$V_{TM} = A + B\ln(I_T) + C.I_T + D.\sqrt{I_T}$

Where A = - 0.0436
B = 0.10422
C = 7.6×10^{-5}
D = 0.00243

these values are valid for T_j = 150°C for I_F 400A to 9000A

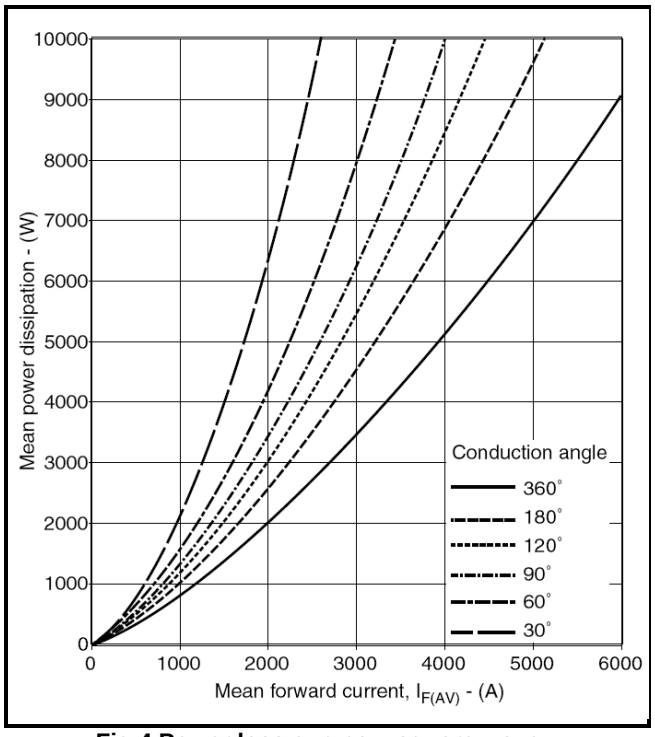


Fig.4 Power loss curves – square wave

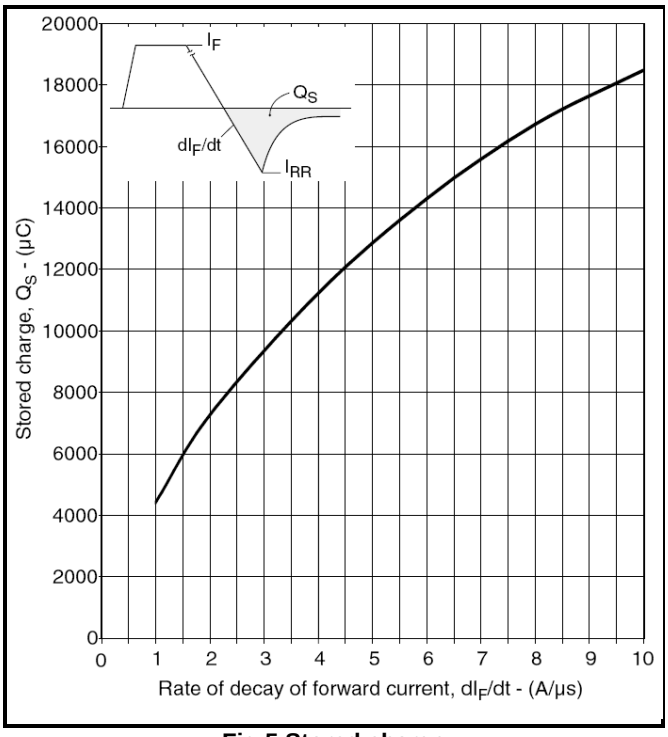


Fig.5 Stored charge

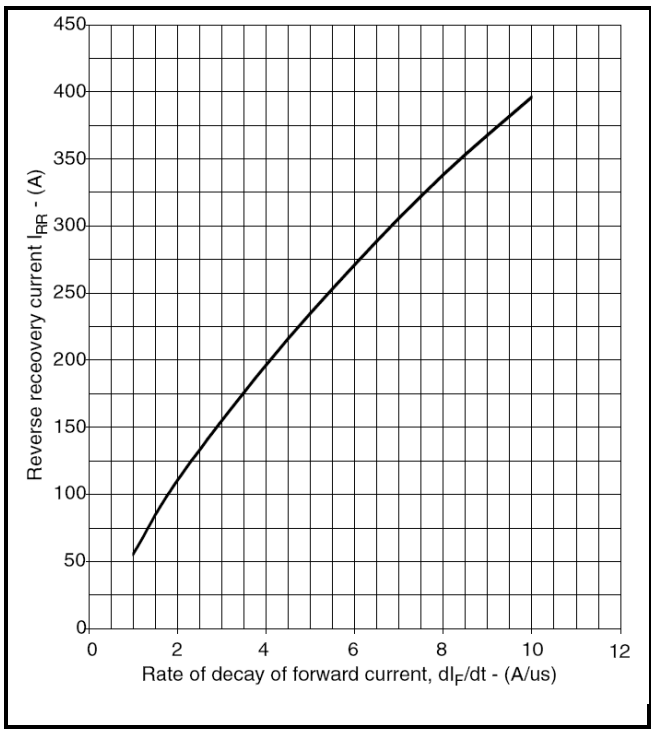


Fig.6 Reverse recovery current

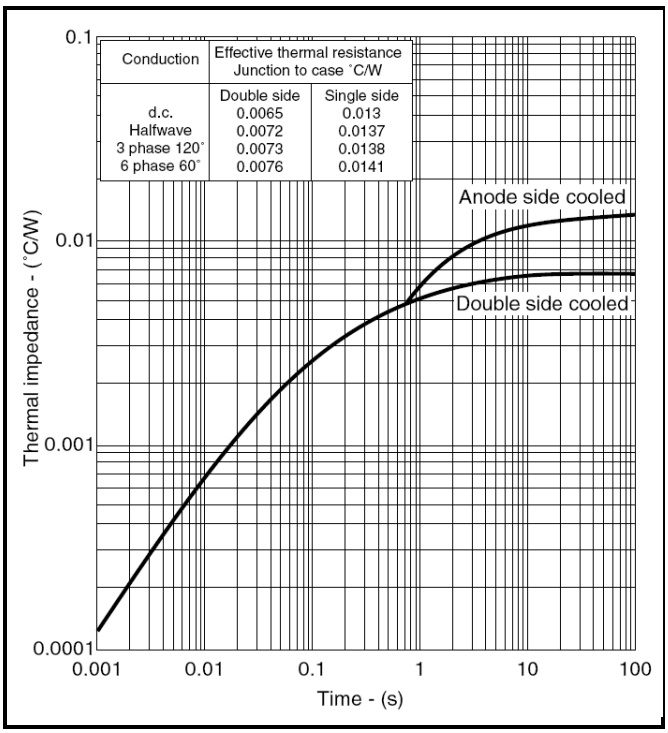
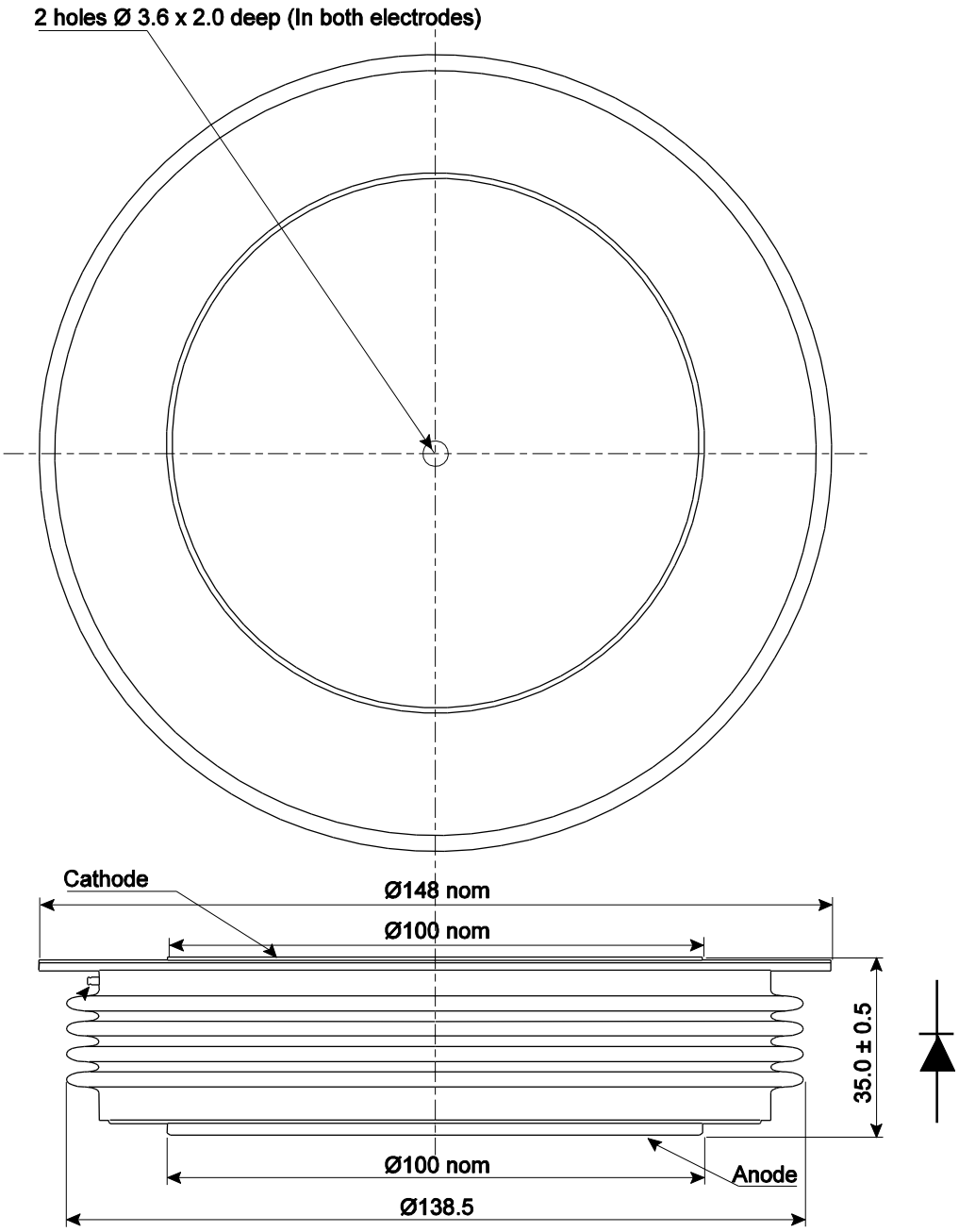


Fig.7 Maximum (limit) transient thermal impedance – junction to case

PACKAGE DETAILS

For further package information, please contact Customer Services. All dimensions in mm, unless stated otherwise. DO NOT SCALE.



Nominal weight: 2575g
Clamping force: 83kN ±10%

Package outline type code: A

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