DRD1010F60

Rectifier Diode

DS5984-1 January 2011(LN28005)

FEATURES

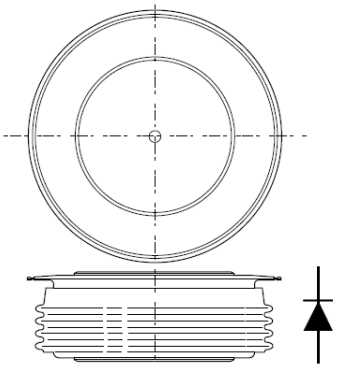
- Double Side Cooling
- High Surge Capability

APPLICATIONS

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

KEY PARAMETERS

V_{RRM}	**6000V**
$I_{F(AV)}$	**1015A**
I_{FSM}	**16500A**



Outline type code: F

(See Package Details for further information)

Fig. 1 Package outlines

VOLTAGE RATINGS

Part and Ordering Number	Repetitive Peak Voltages V_{DRM} and V_{DRM} V	Conditions
DRD1010F60	6000	$V_{RSM} = V_{RRM}+100V$
DRD1010F59	5900	
DRD1010F58	5800	
DRD1010F57	5700	
DRD1010F56	5600	
DRD1010F55	5500	

Lower voltage grades available.

ORDERING INFORMATION

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

DRD1010F59

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

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	1320	A
$I_{F(RMS)}$	RMS value	-	2073	A
I_F	Continuous (direct) on-state current	-	1897	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	947	A
$I_{F(RMS)}$	RMS value	-	1487	A
I_F	Continuous (direct) on-state current	-	1283	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	1015	A
$I_{F(RMS)}$	RMS value	-	1594	A
I_F	Continuous (direct) on-state current	-	1480	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	680	A
$I_{F(RMS)}$	RMS value	-	1067	A
I_F	Continuous (direct) on-state current	-	920	A

SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) on-state current	10ms half sine, T_{case} = 150°C	13.5	kA
I^2t	I^2t for fusing	V_R = 50% V_{RRM} - ¼ sine	0.92	MA^2s
I_{FSM}	Surge (non-repetitive) on-state current	10ms half sine, T_{case} = 150°C	16.5	kA
I^2t	I^2t for fusing	V_R = 0	1.425	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	-	0.022	°C/W
		Single side cooled	Anode DC	-	0.038	°C/W
			Cathode DC	-	0.052	°C/W
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Clamping force 19.5kN	Double side	-	0.004	°C/W
		(with mounting compound)	Single side	-	0.008	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)		-	160	°C
		Reverse (blocking)		-	150	°C
T_{stg}	Storage temperature range			-55	175	°C
F_m	Clamping force			18.0	22.0	kN

CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
V_{FM}	Forward voltage	At 3400A peak, T_{case} = 25°C	-	2.1	V
I_{RM}	Peak reverse current	At V_{DRM}, T_{case} = 150°C	-	75	mA
Q_S	Total stored charge	I_F = 2000A, dI_{RR}/dt =3A/µs	-	4500	µC
I_{rr}	Peak reverse recovery current	T_{case} = 150°C, V_R =100V	-	120	A
V_{TO}	Threshold voltage	At T_{vj} = 150°C	-	1.0	V
r_T	Slope resistance	At T_{vj} = 150°C	-	0.42	mΩ

CURVES

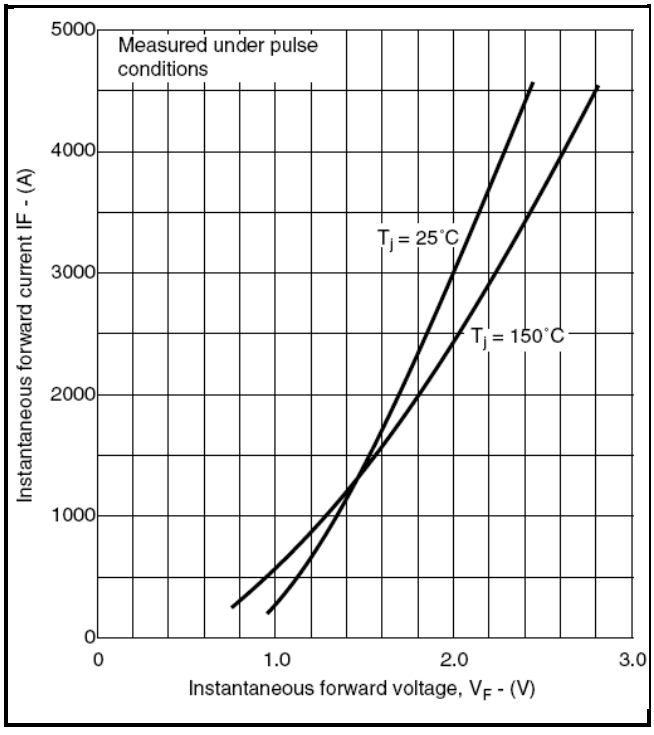


Fig.2 Maximum (limit) on-state characteristics

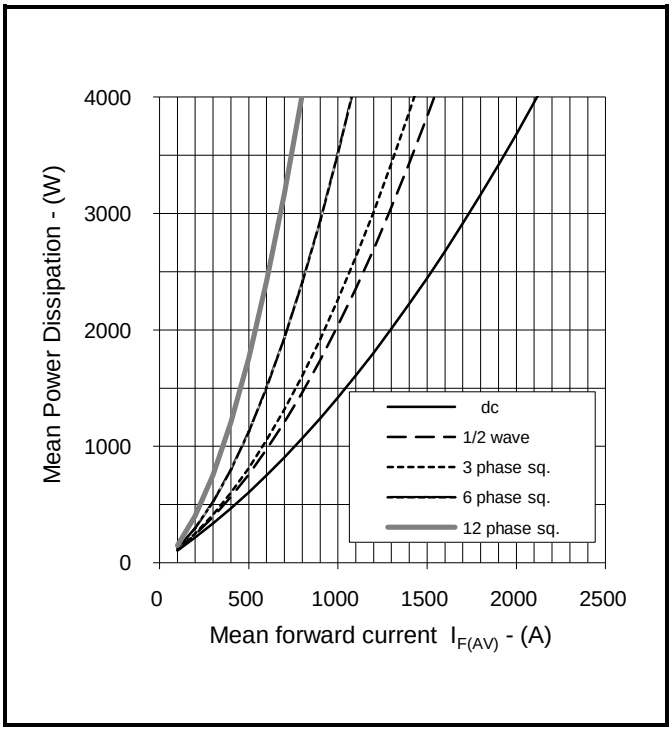


Fig.3 Dissipation curves

V_{TM} EQUATION

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

Where A = 0.819645
B = -0.13673
C = 5.73×10^{-5}
D = 0.042435

these values are valid for T_j = 150 °C for I_F 500A to 5000A

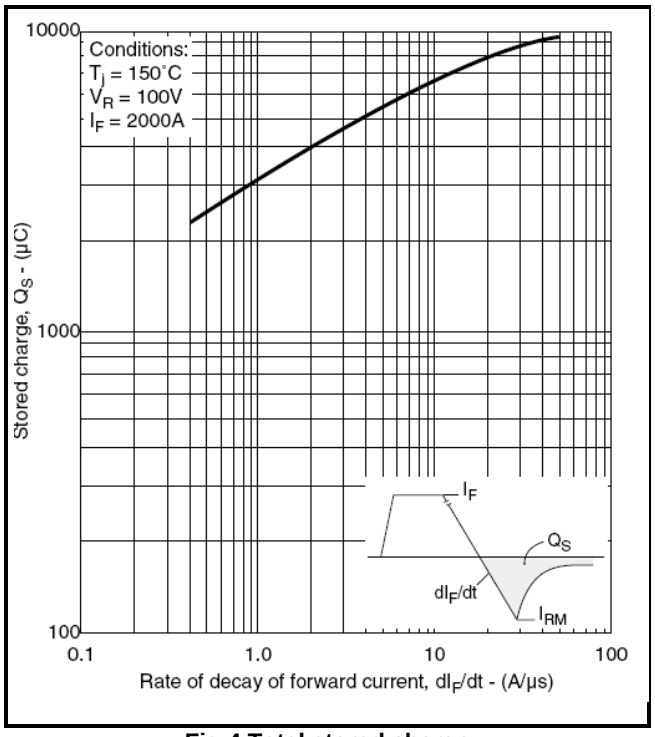


Fig.4 Total stored charge

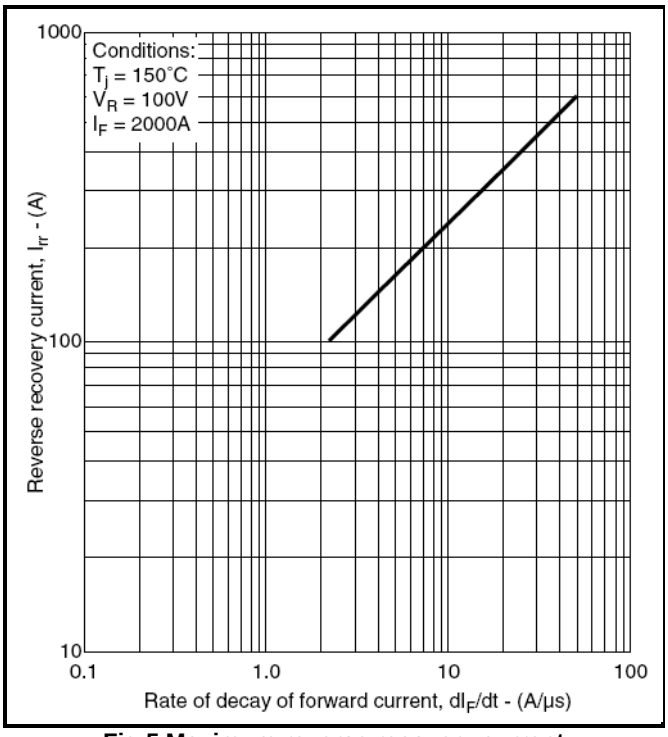


Fig.5 Maximum reverse recovery current

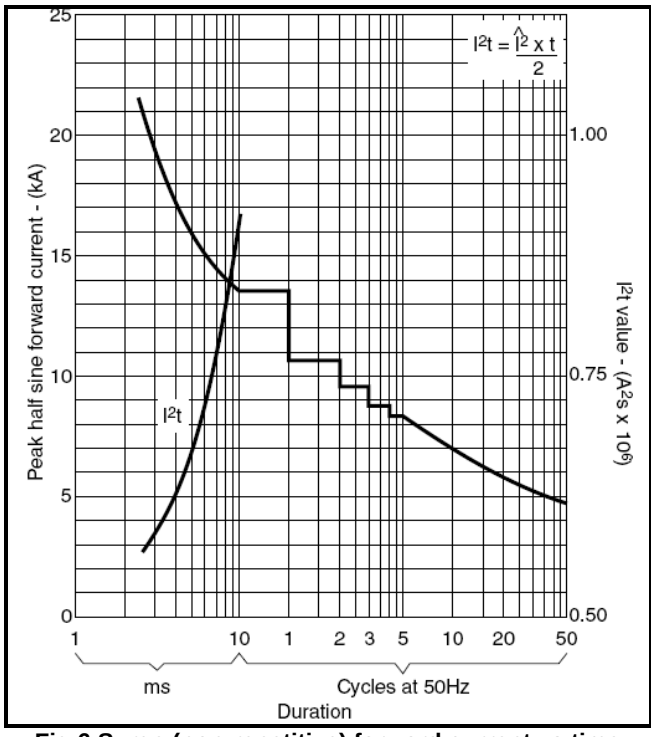
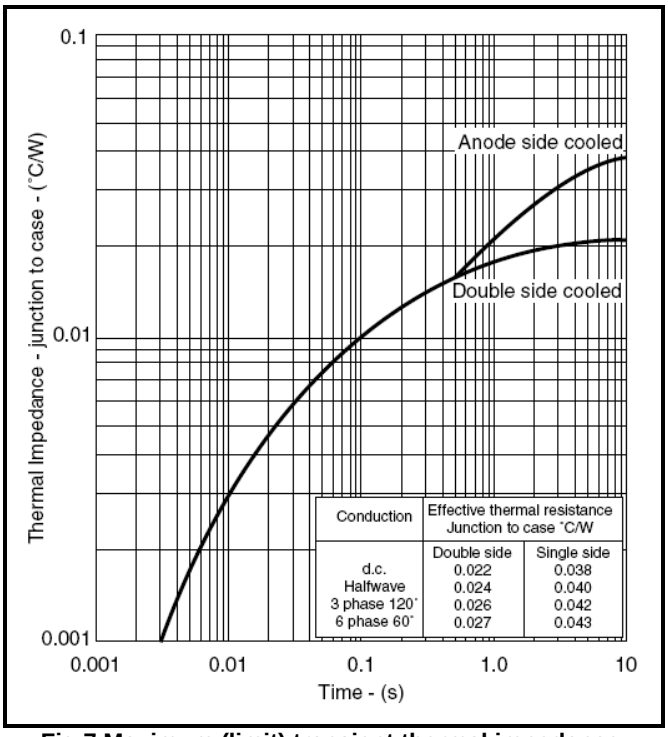


Fig.6 Surge (non-repetitive) forward current vs time (with 50% V_{RRM} at T_{case} 150°C)

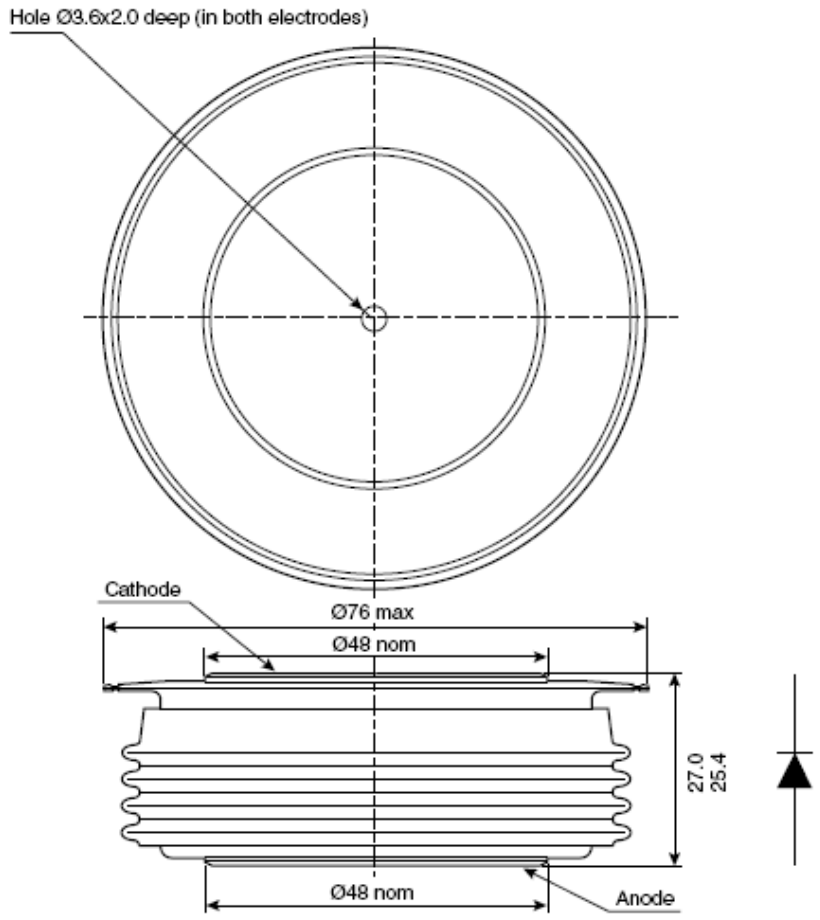


Conduction	Effective thermal resistance Junction to case °C/W	
	Double side	Single side
d.c.	0.022	0.038
Halfwave	0.024	0.040
3 phase 120°	0.026	0.042
6 phase 60°	0.027	0.043

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.



Normal weight: 450g

Pakage outline type code:F

Note:
Some packages may be supplied with gate and or tags.

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