



DS5979 – 2 January 2014 (LN31197)

FEATURES

- Double Side Cooling
- High Surge Capability

KEY PARAMETERS

V_{RRM}	4500V
$I_{F(AV)}$	2000A
I_{FSM}	31000A

VOLTAGE RATINGS

Part and Ordering Number	Repetitive Peak Voltages V_{RRM} V	Conditions
DRD2000L45	4500	$V_{RSM} = V_{RRM} + 100V$
DRD2000L44	4400	
DRD2000L42	4200	
DRD2000L40	4000	

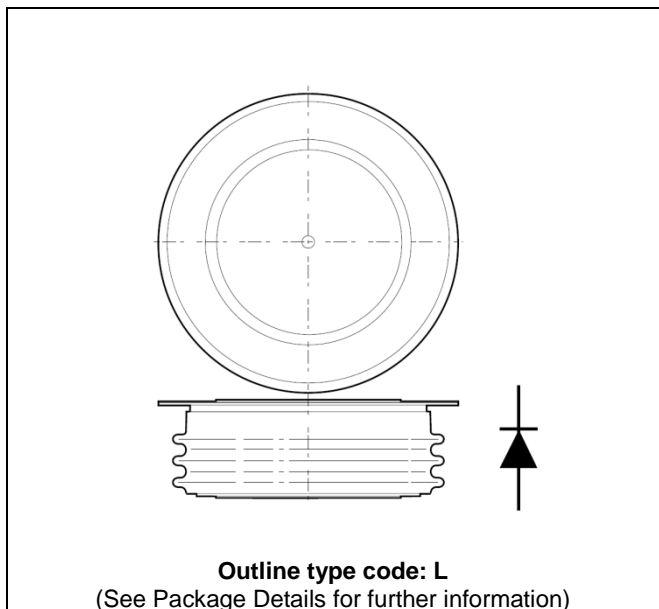


Fig. 1 Package outline

ORDERING INFORMATION

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

For example:

DRD2000L42 for a 4200V device

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	2590	A
I _{F(RMS)}	RMS value	-	4068	A
I _F	Continuous (direct) on-state current	-	3727	A
Single Side Cooled (Anode side)				
I _{F(AV)}	Mean forward current	Half wave resistive load	1940	A
I _{F(RMS)}	RMS value	-	3047	A
I _F	Continuous (direct) on-state current	-	2656	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	2000	A
I _{F(RMS)}	RMS value	-	3140	A
I _F	Continuous (direct) on-state current	-	2800	A
Single Side Cooled (Anode side)				
I _{F(AV)}	Mean forward current	Half wave resistive load	1284	A
I _{F(RMS)}	RMS value	-	2017	A
I _F	Continuous (direct) on-state current	-	1715	A

SURGE RATINGS

Symbol	Parameter	Test Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 150^{\circ}C$	24.8	kA
I^2t	I^2t for fusing	$V_R = 50\% V_{RRM} - 1/4$ sine	3.075	MA ² s
I_{FSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 150^{\circ}C$	31.0	kA
I^2t	I^2t for fusing	$V_R = 0$	4.8	MA ² s

THERMAL AND MECHANICAL RATINGS

Symbol	Parameter	Test Conditions	Min.	Max.	Units	
$R_{th(j-c)}$	Thermal resistance – junction to case	Double side cooled	DC	-	0.013	$^{\circ}C/W$
		Single side cooled	Anode DC	-	0.025	$^{\circ}C/W$
			Cathode DC	-	0.027	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Clamping force 45kN	Double side	-	0.003	$^{\circ}C/W$
		(with mounting compound)	Single side	-	0.006	$^{\circ}C/W$
T_{vj}	Virtual junction temperature	On-state (conducting)	-	160	$^{\circ}C$	
		Reverse (blocking)	-	150	$^{\circ}C$	
T_{stg}	Storage temperature range		-55	175	$^{\circ}C$	
F_m	Clamping force		40	48	kN	

CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
V_{FM}	Forward voltage	At 3000A peak, $T_{case} = 25^{\circ}C$	-	1.45	V
I_{RM}	Peak reverse current	At V_{RRM} , $T_{case} = 150^{\circ}C$	-	150	mA
Q_S	Total stored charge	$I_F = 1500A$, $dI_{RR}/dt = 25A/\mu s$	-	6000	μC
I_{rr}	Peak reverse recovery current	$T_{case} = 25^{\circ}C$, $V_R = 100V$	-	500	A
V_{TO}	Threshold voltage	At $T_{vj} = 150^{\circ}C$	-	0.84	V
r_T	Slope resistance	At $T_{vj} = 150^{\circ}C$	-	0.19	$m\Omega$

CURVES

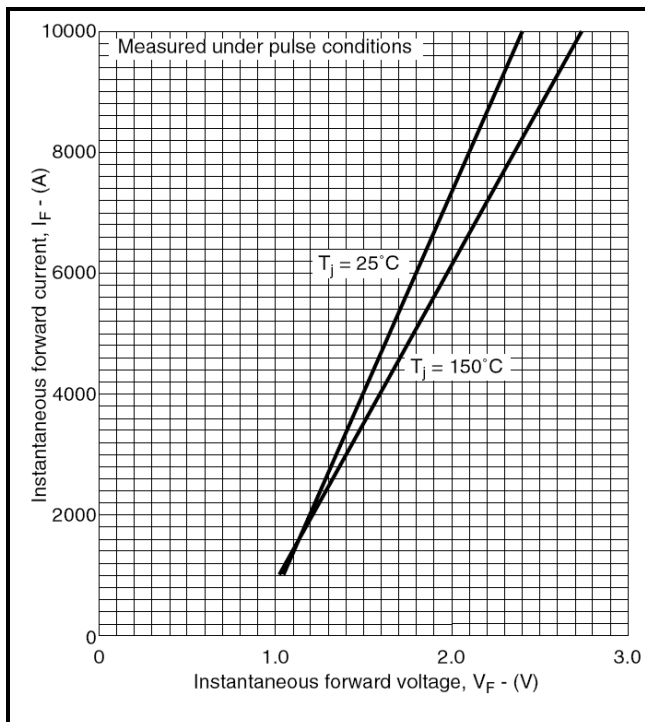


Fig.2 Maximum (limit) on-state characteristics

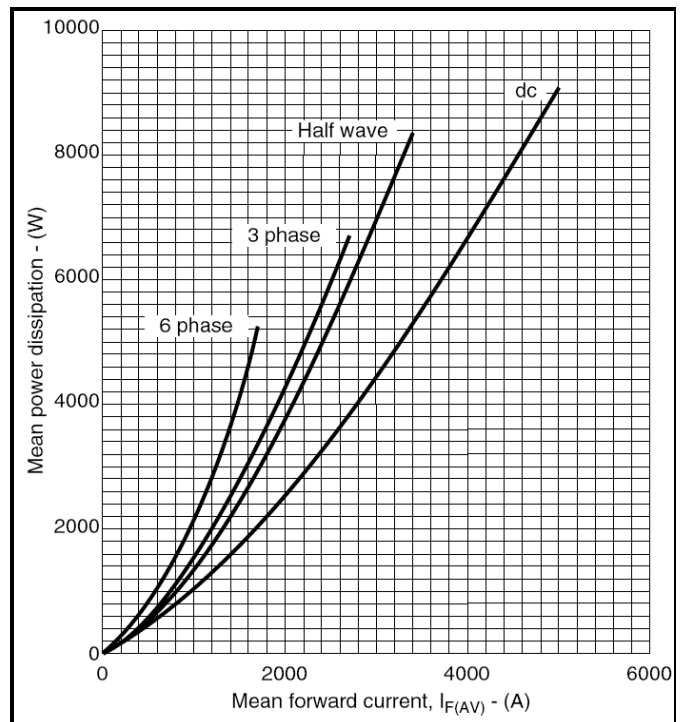


Fig.3 Dissipation curves

V_{TM} EQUATION

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

Where

$$A = -0.36984$$

$$B = 0.292197$$

$$C = 0.000354$$

$$D = -0.03111$$

these values are valid for $T_j = 150^{\circ}C$ for I_F 500A to 10000A

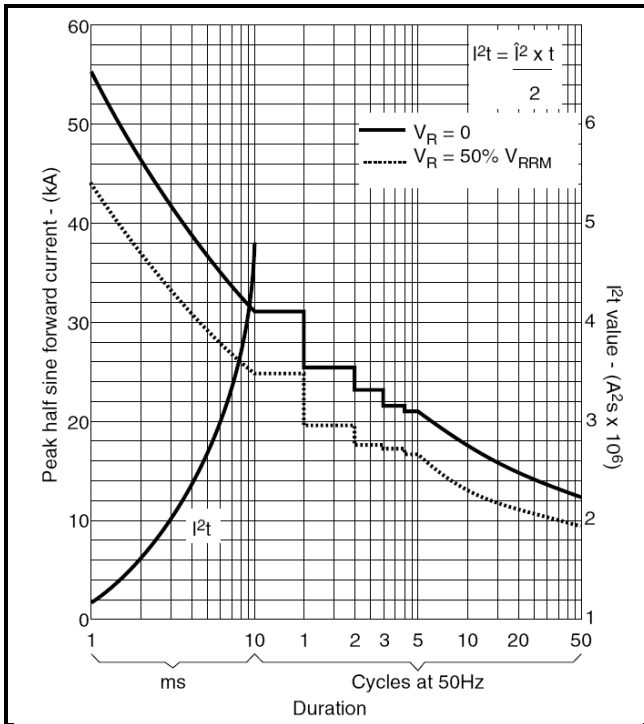


Fig.4 Surge (non-repetitive) forward current vs time
 ($T_{case} 150^{\circ}C$)

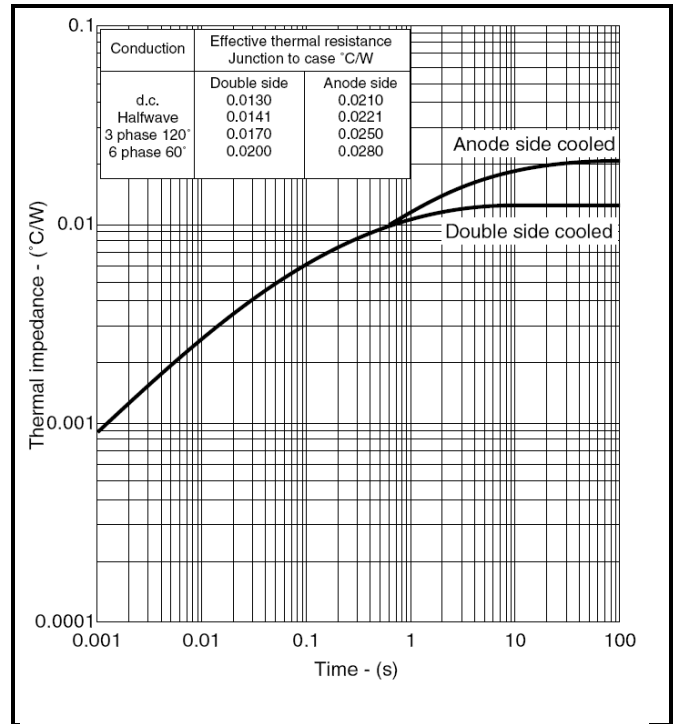
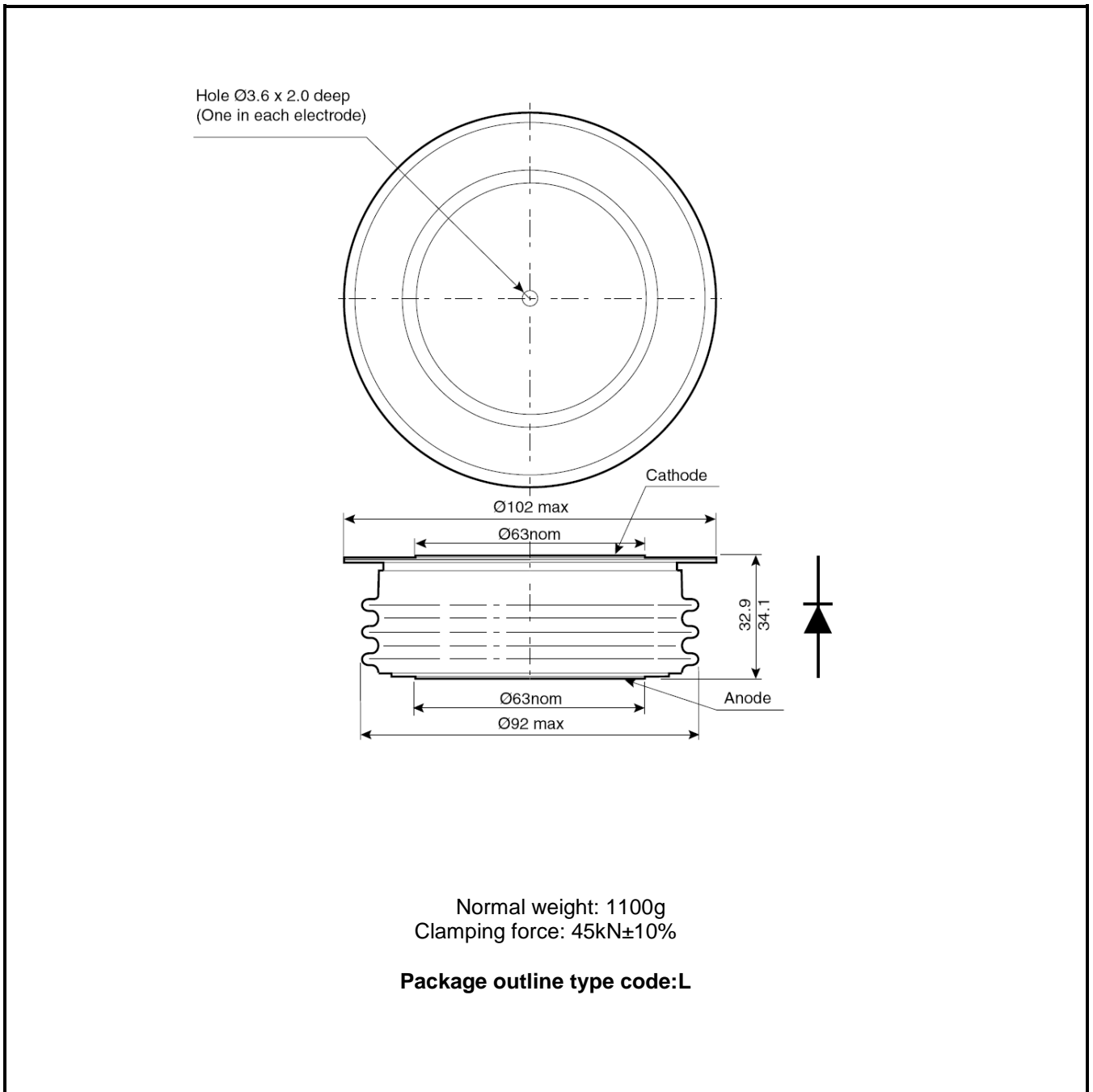


Fig.5 Maximum (limit) transient thermal impedance-junction to case

PACKAGE DETAILS

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



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

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