



DS5979 – 2 January 2014 (LN31197)

### FEATURES

- Double Side Cooling
- High Surge Capability

### KEY PARAMETERS

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

### 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	

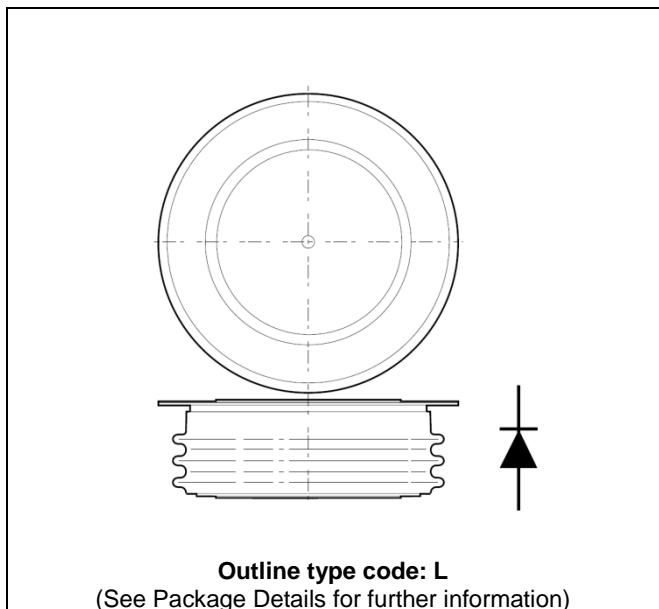


Fig. 1 Package outline

### 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<sub>case</sub> = 75°C unless stated otherwise**

Symbol	Parameter	Test Conditions	Max.	Units
<b>Double Side Cooled</b>				
I <sub>F(AV)</sub>	Mean forward current	Half wave resistive load	2590	A
I <sub>F(RMS)</sub>	RMS value	-	4068	A
I <sub>F</sub>	Continuous (direct) on-state current	-	3727	A
<b>Single Side Cooled (Anode side)</b>				
I <sub>F(AV)</sub>	Mean forward current	Half wave resistive load	1940	A
I <sub>F(RMS)</sub>	RMS value	-	3047	A
I <sub>F</sub>	Continuous (direct) on-state current	-	2656	A

**T<sub>case</sub> = 100°C unless stated otherwise**

Symbol	Parameter	Test Conditions	Max.	Units
<b>Double Side Cooled</b>				
I <sub>F(AV)</sub>	Mean forward current	Half wave resistive load	2000	A
I <sub>F(RMS)</sub>	RMS value	-	3140	A
I <sub>F</sub>	Continuous (direct) on-state current	-	2800	A
<b>Single Side Cooled (Anode side)</b>				
I <sub>F(AV)</sub>	Mean forward current	Half wave resistive load	1284	A
I <sub>F(RMS)</sub>	RMS value	-	2017	A
I <sub>F</sub>	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 <sup>2</sup> 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 <sup>2</sup> 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	$\mu C$
$I_{rr}$	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

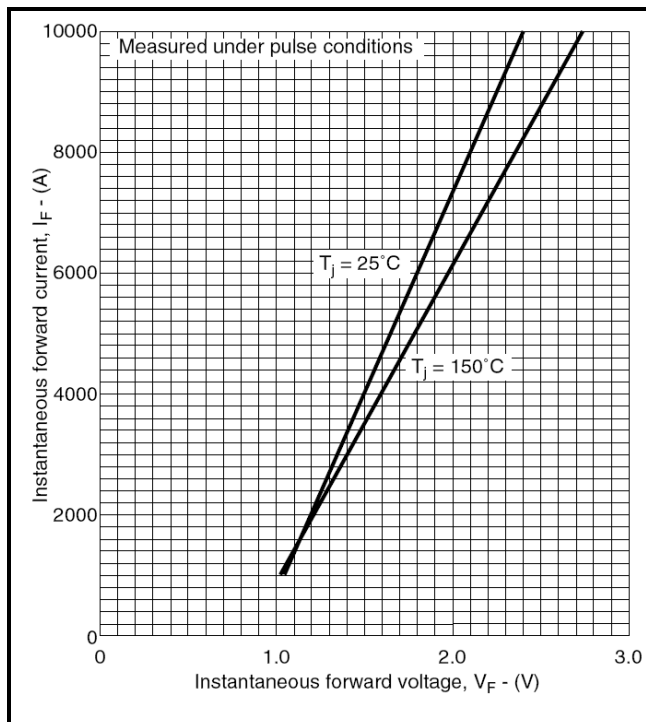


Fig.2 Maximum (limit) on-state characteristics

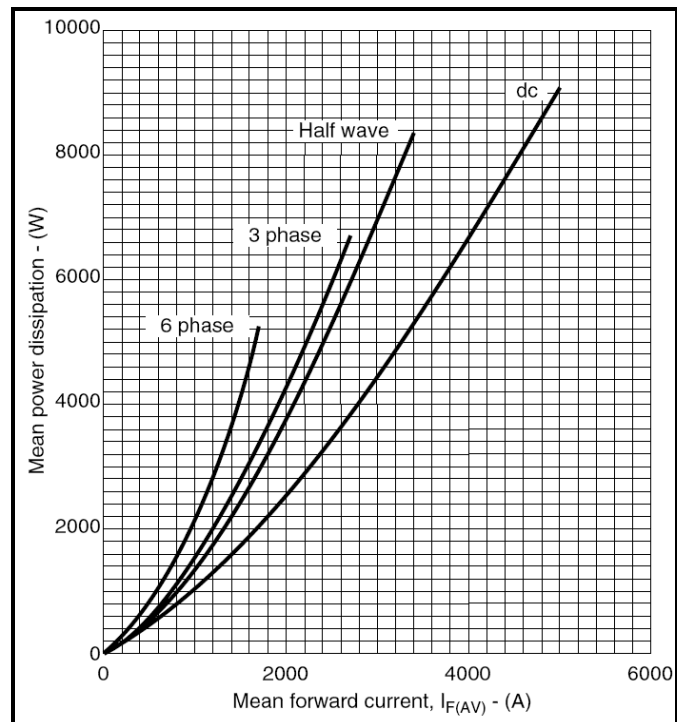


Fig.3 Dissipation curves

### $V_{TM}$ EQUATION

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

Where

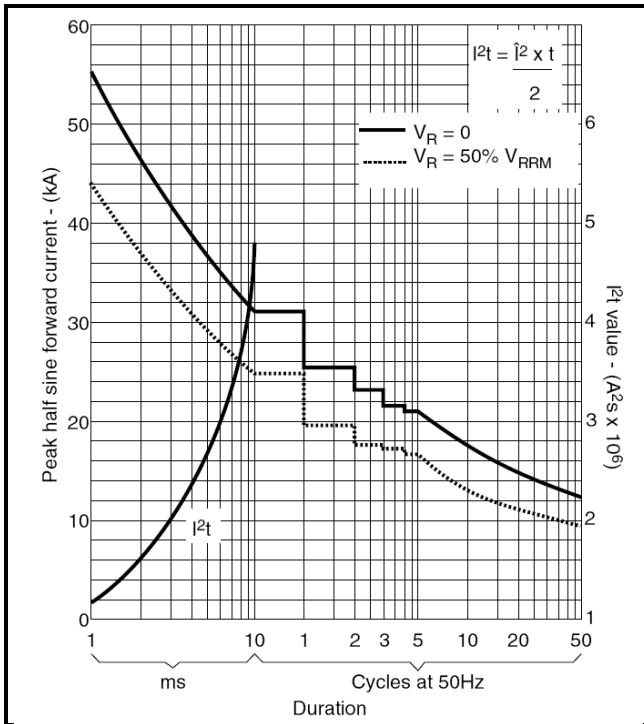
$$A = -0.36984$$

$$B = 0.292197$$

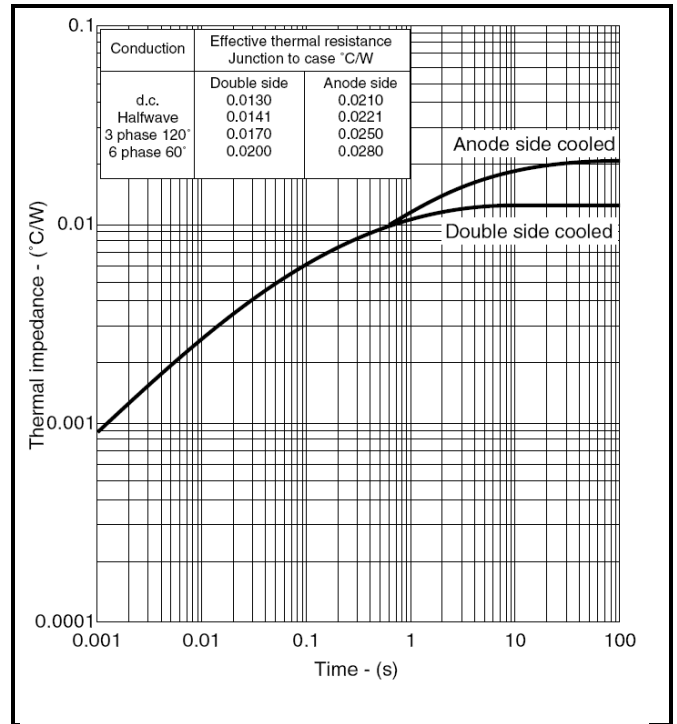
$$C = 0.000354$$

$$D = -0.03111$$

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



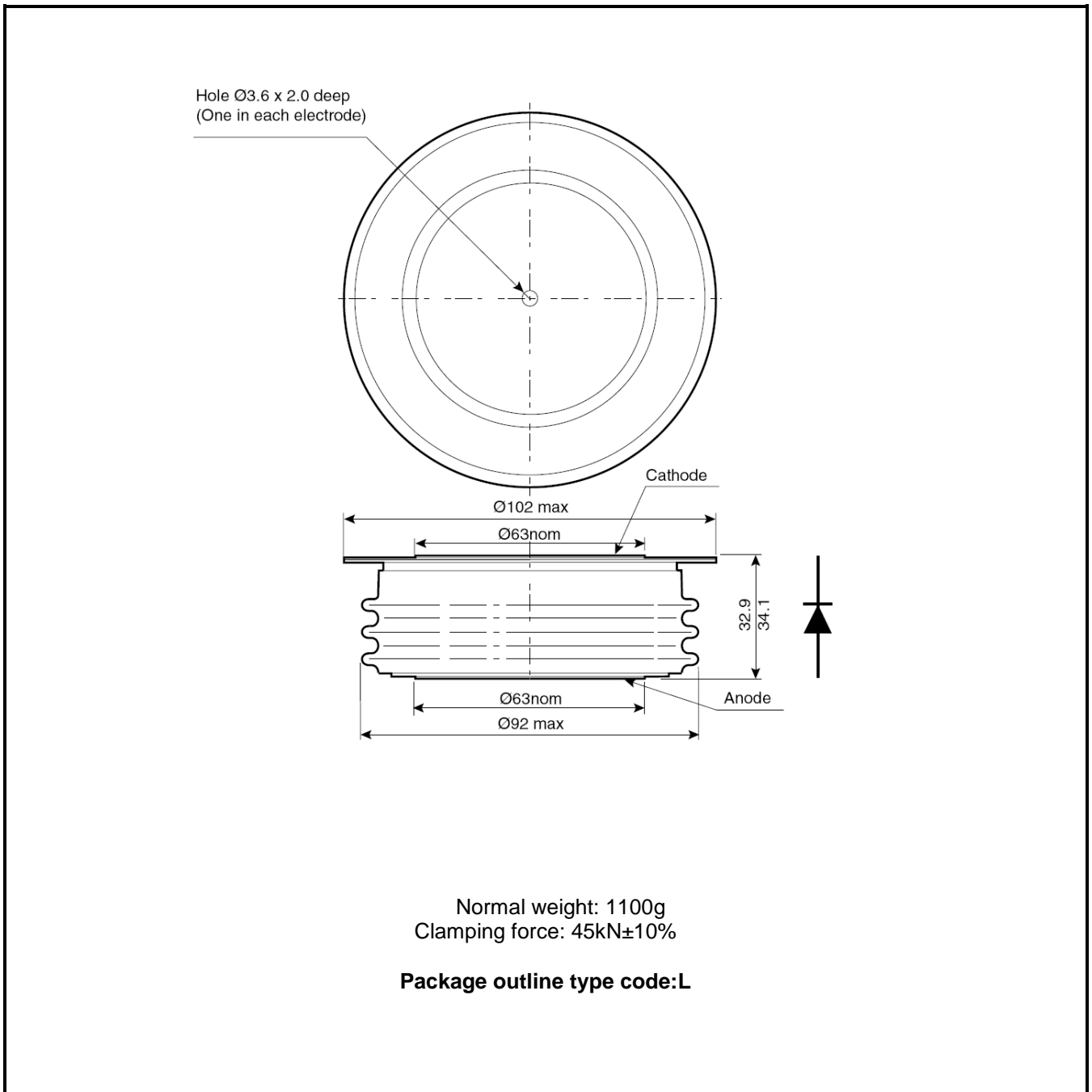
**Fig.4 Surge (non-repetitive) forward current vs time**  
( $T_{case} 150^{\circ}C$ )



**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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**HEADQUARTERS OPERATIONS**

DYNEX SEMICONDUCTOR LIMITED  
Doddington Road, Lincoln, Lincolnshire, LN6 3LF  
United Kingdom.  
Phone: +44 (0) 1522 500500  
Fax: +44 (0) 1522 500550  
Web: <http://www.dynexsemi.com>

**CUSTOMER SERVICE**

Phone: +44 (0) 1522 502753 / 502901  
Fax: +44 (0) 1522 500020  
e-mail: [power\\_solutions@dynexsemi.com](mailto:power_solutions@dynexsemi.com)