

# DRD710G50

## Rectifier Diode



DS5980 – 1 January 2011(LN28001)

### FEATURES

- Double Side Cooling
- High Surge Capability

### KEY PARAMETERS

$V_{RRM}$	<b>5000V</b>
$I_{F(AV)}$	<b>710A</b>
$I_{FSM}$	<b>11500A</b>

### VOLTAGE RATINGS

Part and Ordering Number	Repetitive Peak Voltages $V_{RRM}$ V	Conditions
DRD710G50 DRD710G48 DRD710G46	5000 4800 4600	$V_{RSM} = V_{RRM} + 100V$

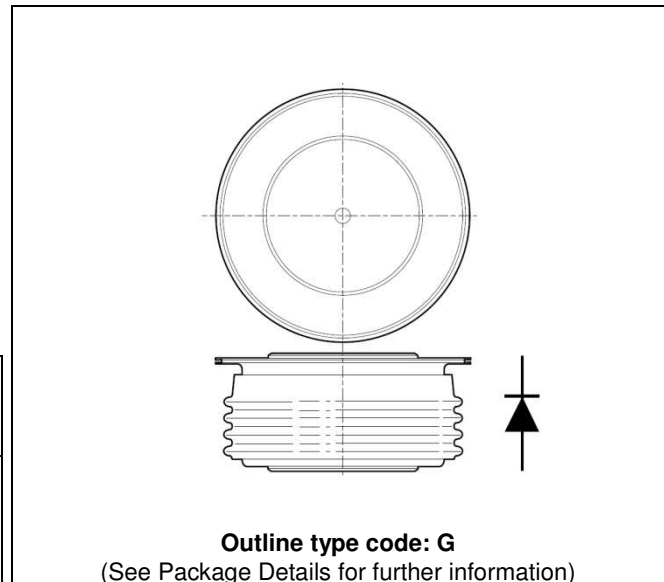


Fig. 1 Package outline

### ORDERING INFORMATION

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

For example:

**DRD710G46** for a 4600V device

## CURRENT RATINGS

$T_{case} = 75^{\circ}\text{C}$  unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	910	A
$I_{F(RMS)}$	RMS value	-	1430	A
$I_F$	Continuous (direct) on-state current	-	1314	A
<b>Single Side Cooled (Anode side)</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	599	A
$I_{F(RMS)}$	RMS value	-	941	A
$I_F$	Continuous (direct) on-state current	-	814	A

$T_{case} = 100^{\circ}\text{C}$  unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
<b>Double Side Cooled</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	710	A
$I_{F(RMS)}$	RMS value	-	1115	A
$I_F$	Continuous (direct) on-state current	-	1000	A
<b>Single Side Cooled (Anode side)</b>				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	450	A
$I_{F(RMS)}$	RMS value	-	706	A
$I_F$	Continuous (direct) on-state current	-	570	A

**SURGE RATINGS**

Symbol	Parameter	Test Conditions	Max.	Units
$I_{FSM}$	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 150^{\circ}C$	9.2	kA
$I^2t$	$I^2t$ for fusing	$V_R = 50\% V_{RRM} - 1/4$ sine	0.422	MA <sup>2</sup> s
$I_{FSM}$	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 150^{\circ}C$	11.5	kA
$I^2t$	$I^2t$ for fusing	$V_R = 0$	0.66	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	-	0.032	°C/W
		Single side cooled	Anode DC	-	0.064	°C/W
			Cathode DC	-	0.064	°C/W
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Clamping force 12kN	Double side	-	0.008	°C/W
		(with mounting compound)	Single side	-	0.016	°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		11.5	13.5	kN	

## CHARACTERISTICS

Symbol	Parameter	Test Conditions	Min.	Max.	Units
$V_{FM}$	Forward voltage	At 1800A peak, $T_{case} = 25^{\circ}C$	-	1.8	V
$I_{RM}$	Peak reverse current	At $V_{RRM}$ , $T_{case} = 150^{\circ}C$	-	50	mA
$Q_S$	Total stored charge	$I_F = 1000A$ , $dI_{RR}/dt = 3A/\mu s$	-	2600	$\mu C$
$I_{rr}$	Peak reverse recovery current	$T_{case} = 150^{\circ}C$ , $V_R = 100V$	-	80	A
$V_{TO}$	Threshold voltage	At $T_{vj} = 150^{\circ}C$	-	0.88	V
$r_T$	Slope resistance	At $T_{vj} = 150^{\circ}C$	-	0.687	$m\Omega$

## CURVES

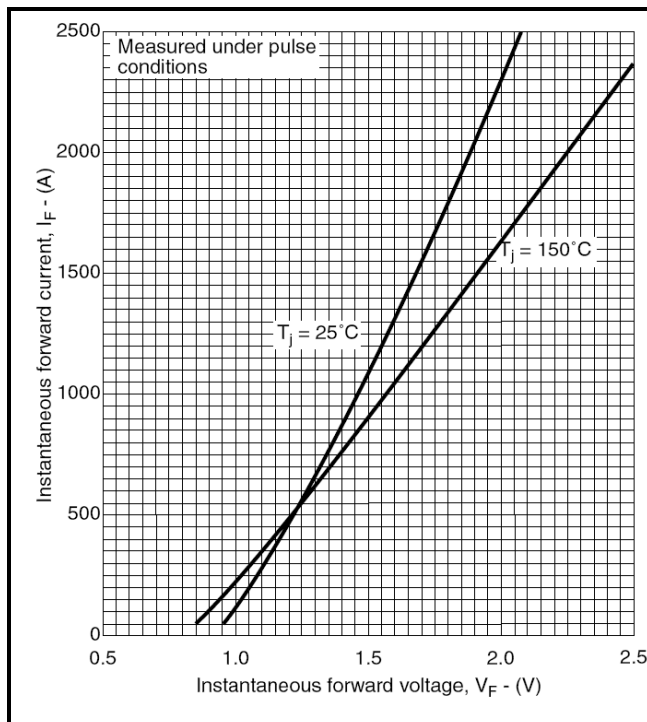


Fig.2 Maximum (limit) on-state characteristics

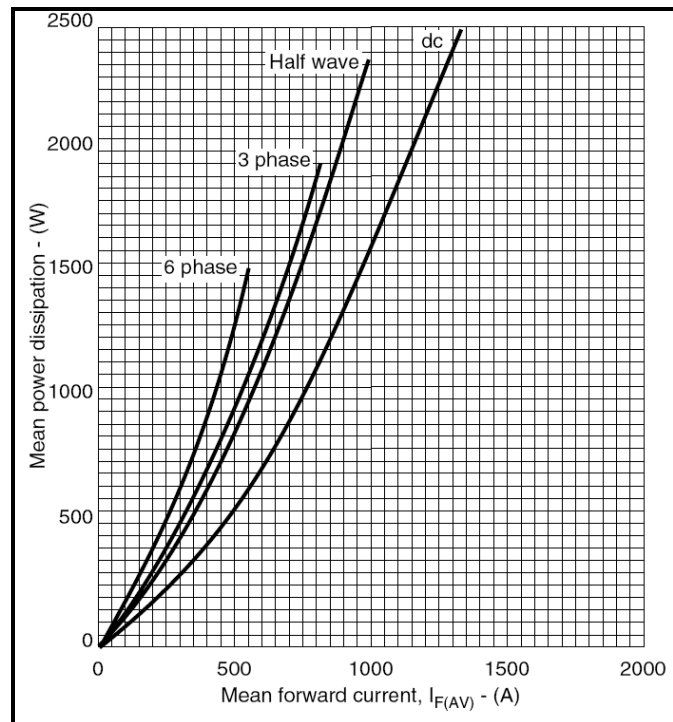


Fig.3 Dissipation curves

### $V_{TM}$ EQUATION

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

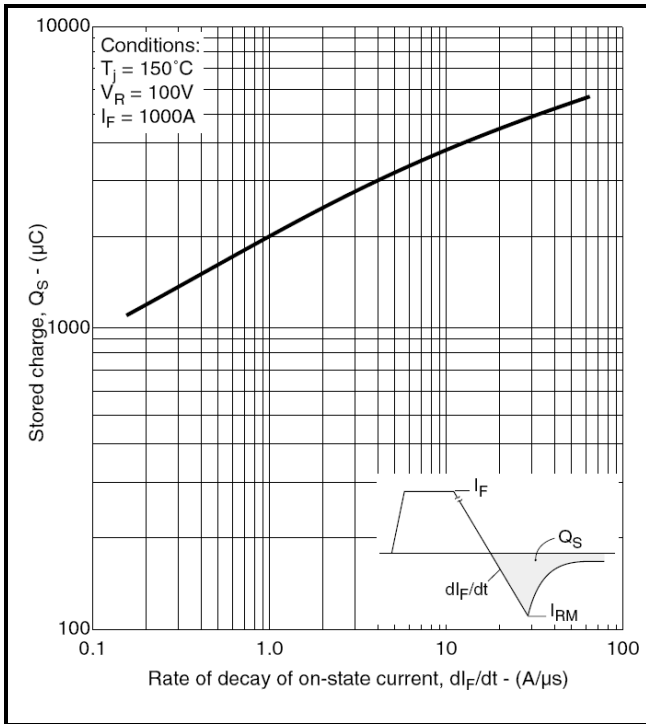
Where  $A = 1.183601$

$B = -0.13593$

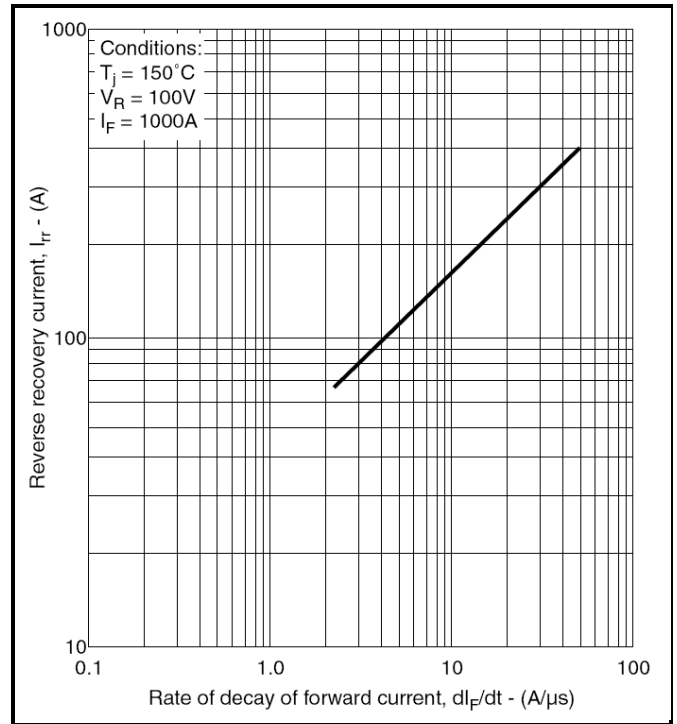
$C = 0.000384$

$D = 0.030400$

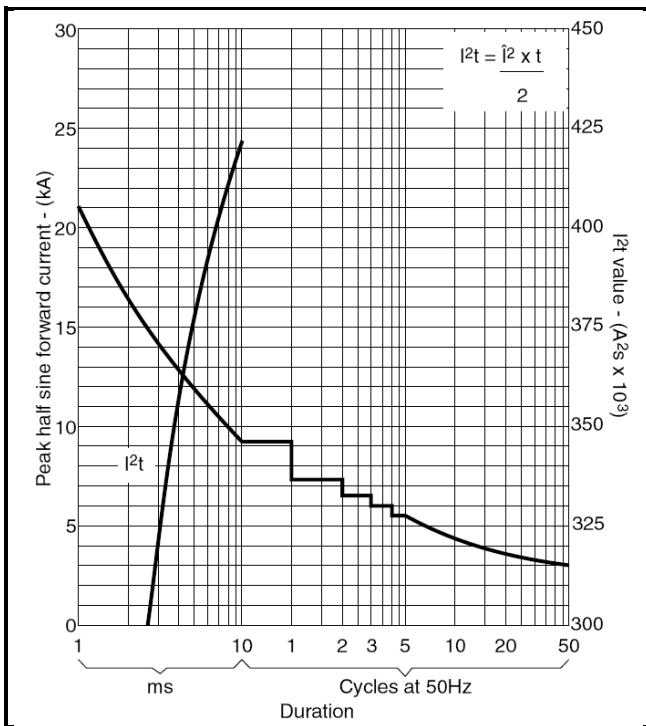
these values are valid for  $T_j = 150^{\circ}C$  for  $I_F$  100A to 2500A



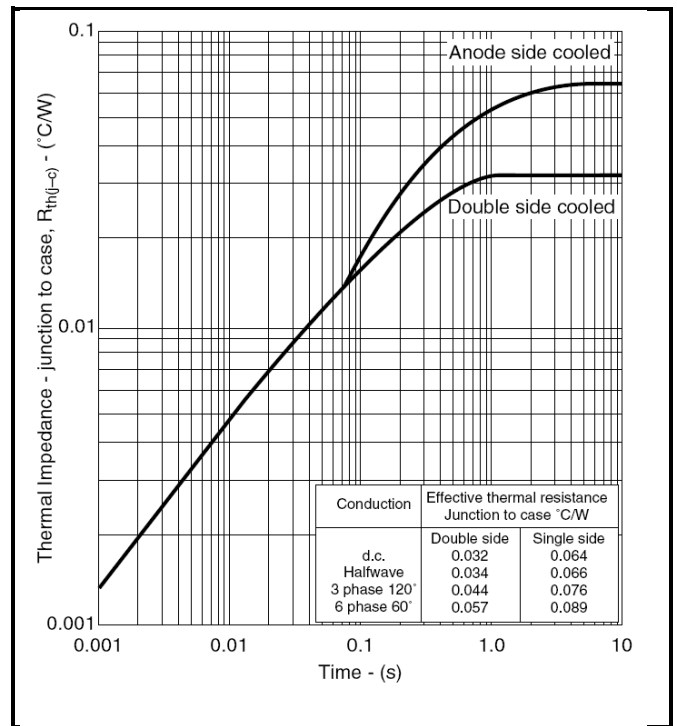
**Fig.4 Total stored charge**



**Fig.5 Maximum reverse recovery current**



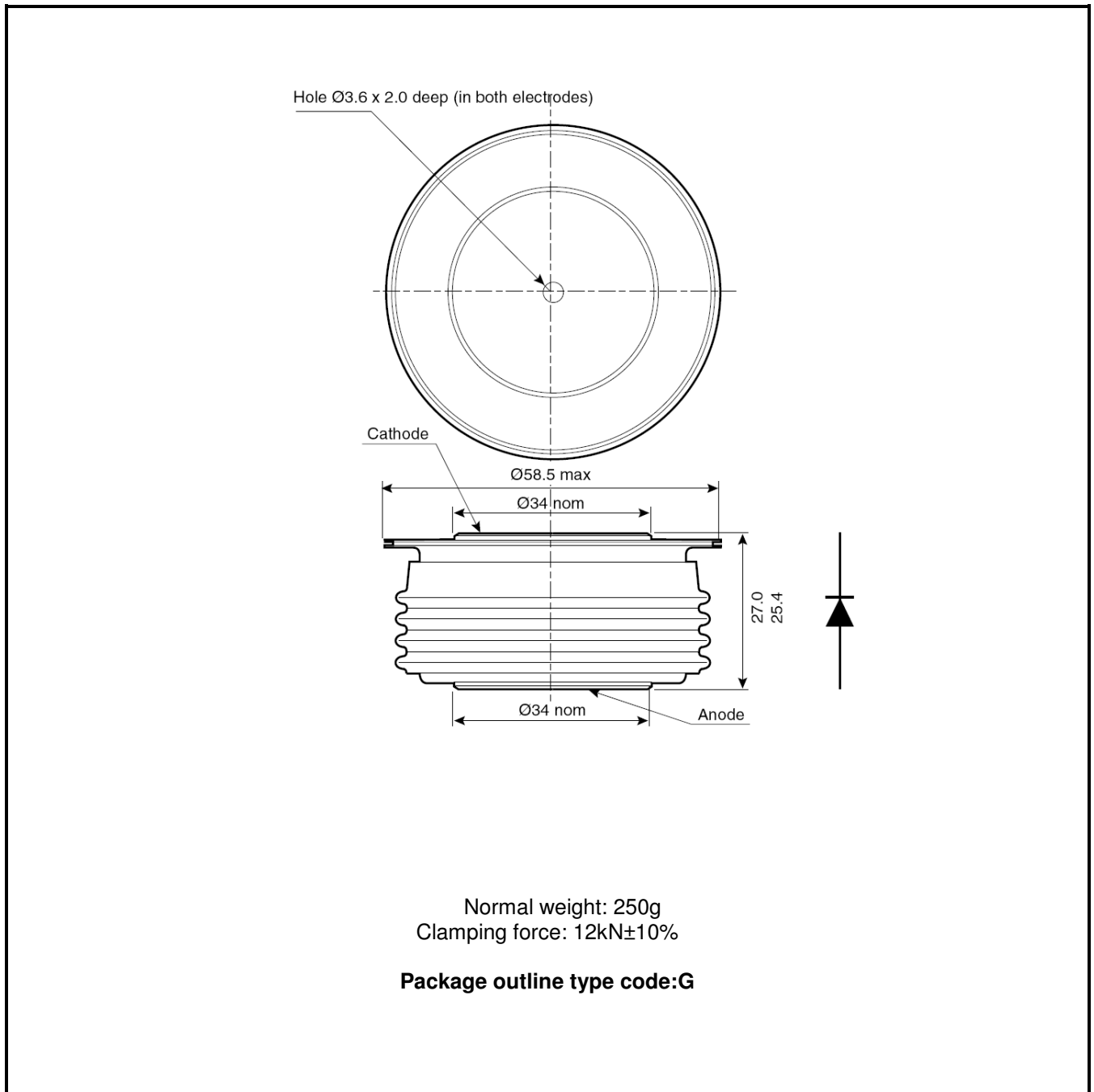
**Fig.6 Surge (non-repetitive) forward current vs time (with 50%  $V_{RRM}$  at  $T_{case} 150^\circ\text{C}$ )**



**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.



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

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