

FEATURES

- Double Side Cooling
- High Surge Capability

APPLICATIONS

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

VOLTAGE RATINGS

Part and Ordering Number	Repetitive Peak Voltages V_{DRM} and V_{DRM} V	Conditions
DS2012SF60	6000	$V_{RSM} = V_{RRM} + 100V$
DS2012SF59	5900	
DS2012SF58	5800	
DS2012SF57	5700	
DS2012SF56	5600	
DS2012SF55	5500	

Lower voltage grades available.

KEY PARAMETERS

V_{RRM}	6000V
$I_{F(AV)}$	1320A
I_{FSM}	16500A

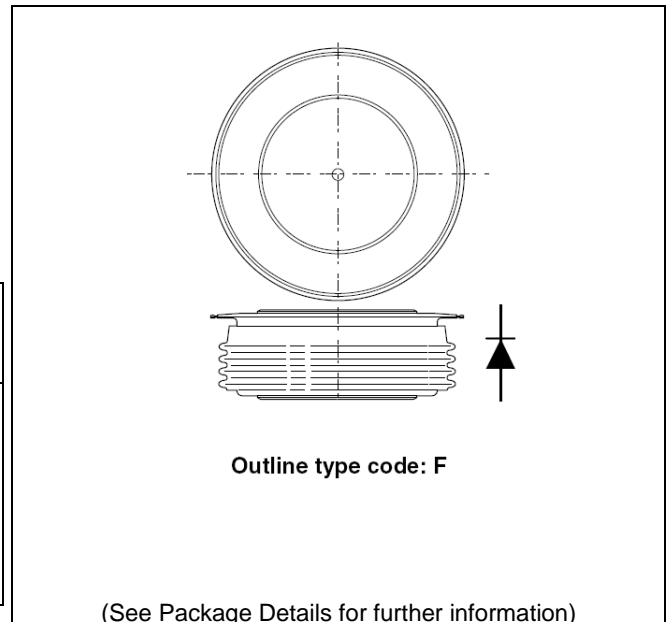


Fig. 1 Package outlines

ORDERING INFORMATION

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

DS2012SF59

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, $T_{case} = 150^{\circ}C$ $V_R = 50\% V_{RRM} - \frac{1}{4}$ sine	13.5	kA
I^2t	I^2t for fusing		0.92	MA ² s
I_{FSM}	Surge (non-repetitive) on-state current	10ms half sine, $T_{case} = 150^{\circ}C$ $V_R = 0$	16.5	kA
I^2t	I^2t for fusing		1.425	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	-	0.022	$^{\circ}C/W$
		Single side cooled	Anode DC	-	0.038	$^{\circ}C/W$
			Cathode DC	-	0.052	$^{\circ}C/W$
$R_{th(c-h)}$	Thermal resistance – case to heatsink	Clamping force 19.5kN (with mounting compound)	Double side	-	0.004	$^{\circ}C/W$
			Single side	-	0.008	$^{\circ}C/W$
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			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

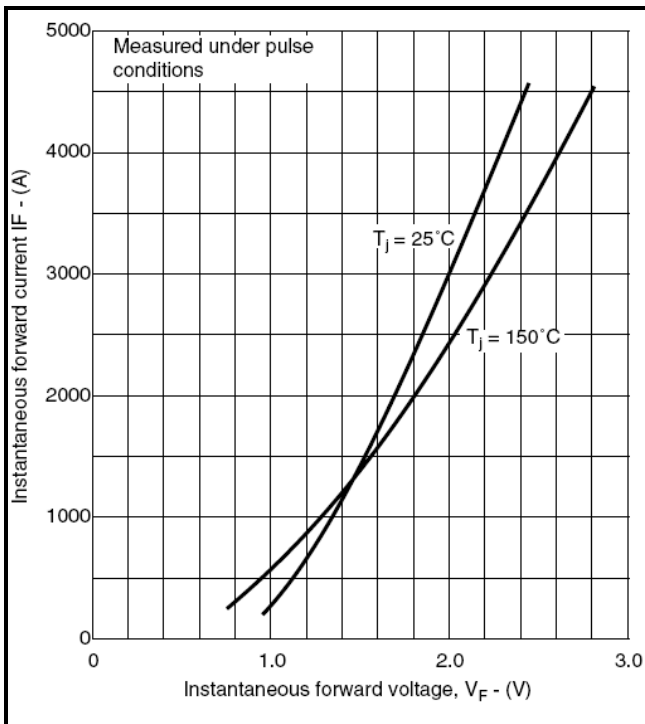


Fig.2 Maximum on-state characteristics

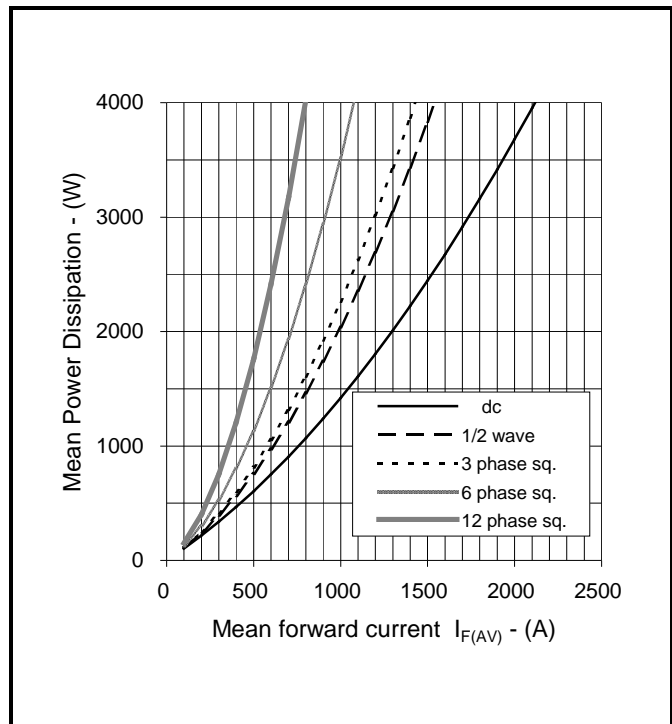


Fig.3 Dissipation curves

V_{TM} EQUATION

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

Where A = 0.819645
 B = -0.13673
 C = 5.73x10⁻⁵
 D = 0.042435

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

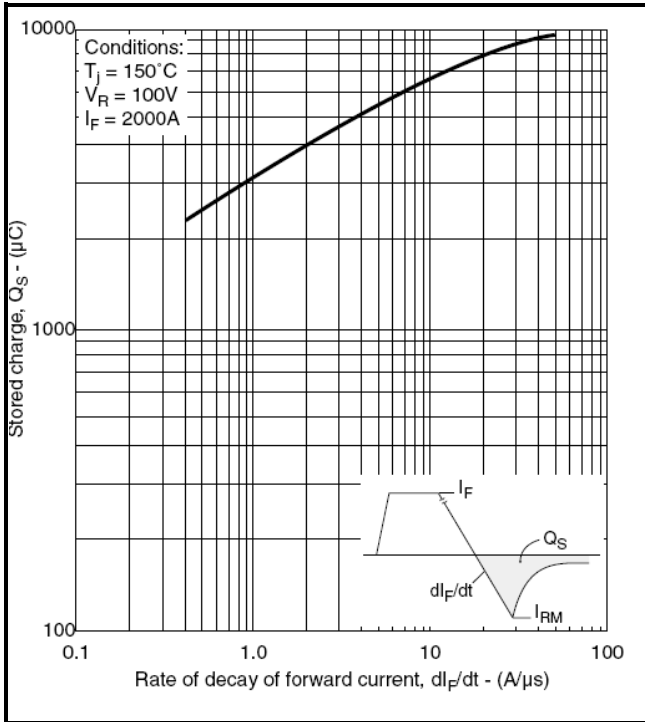


Fig.4 Total stored charge

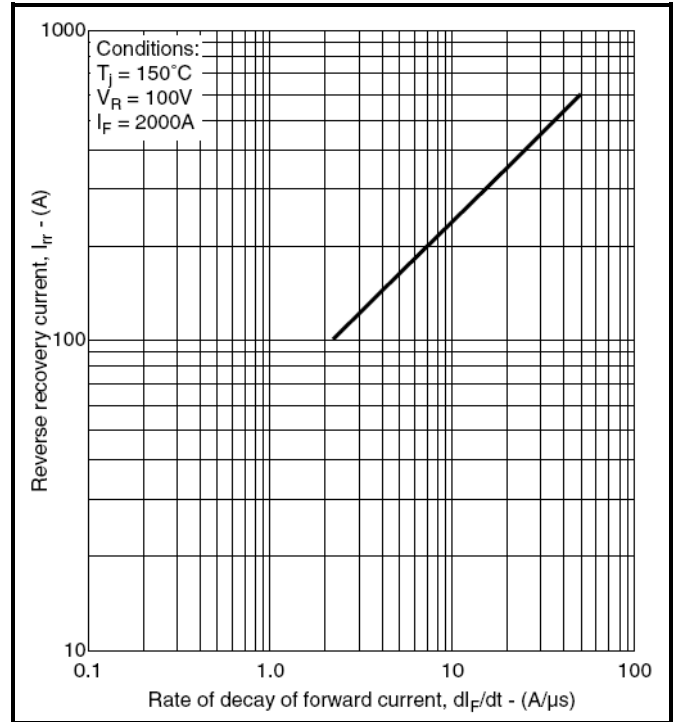


Fig.5 Maximum reverse recovery current

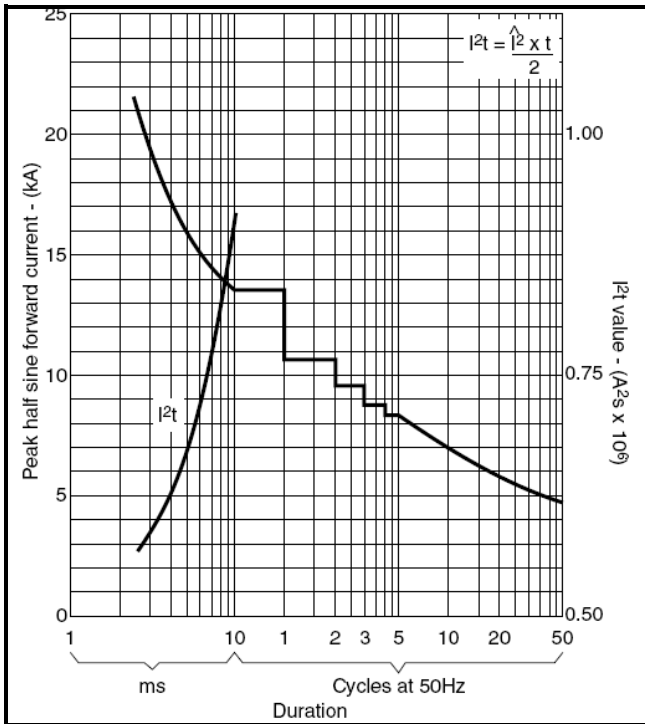


Fig.6 Surge (non-repetitive) forward current vs time (with 50% V_{RRM} at T_{case} 150°C)

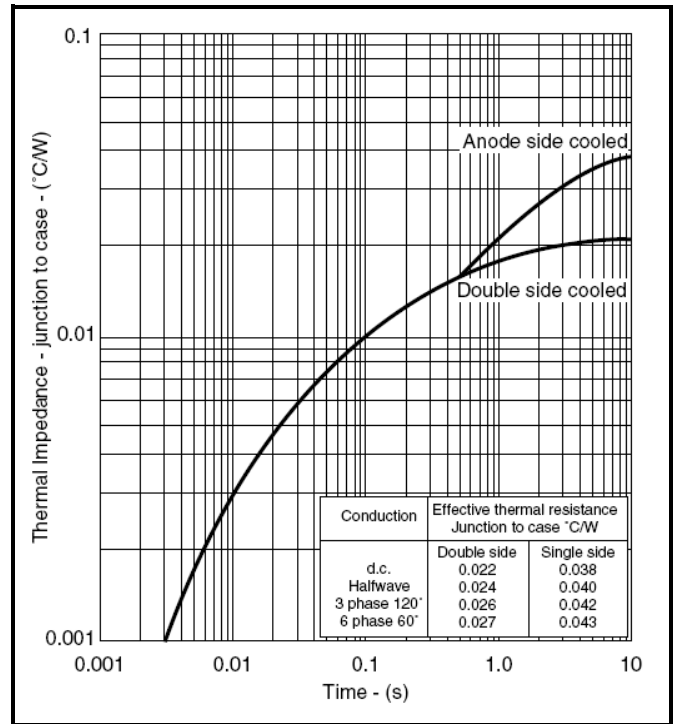
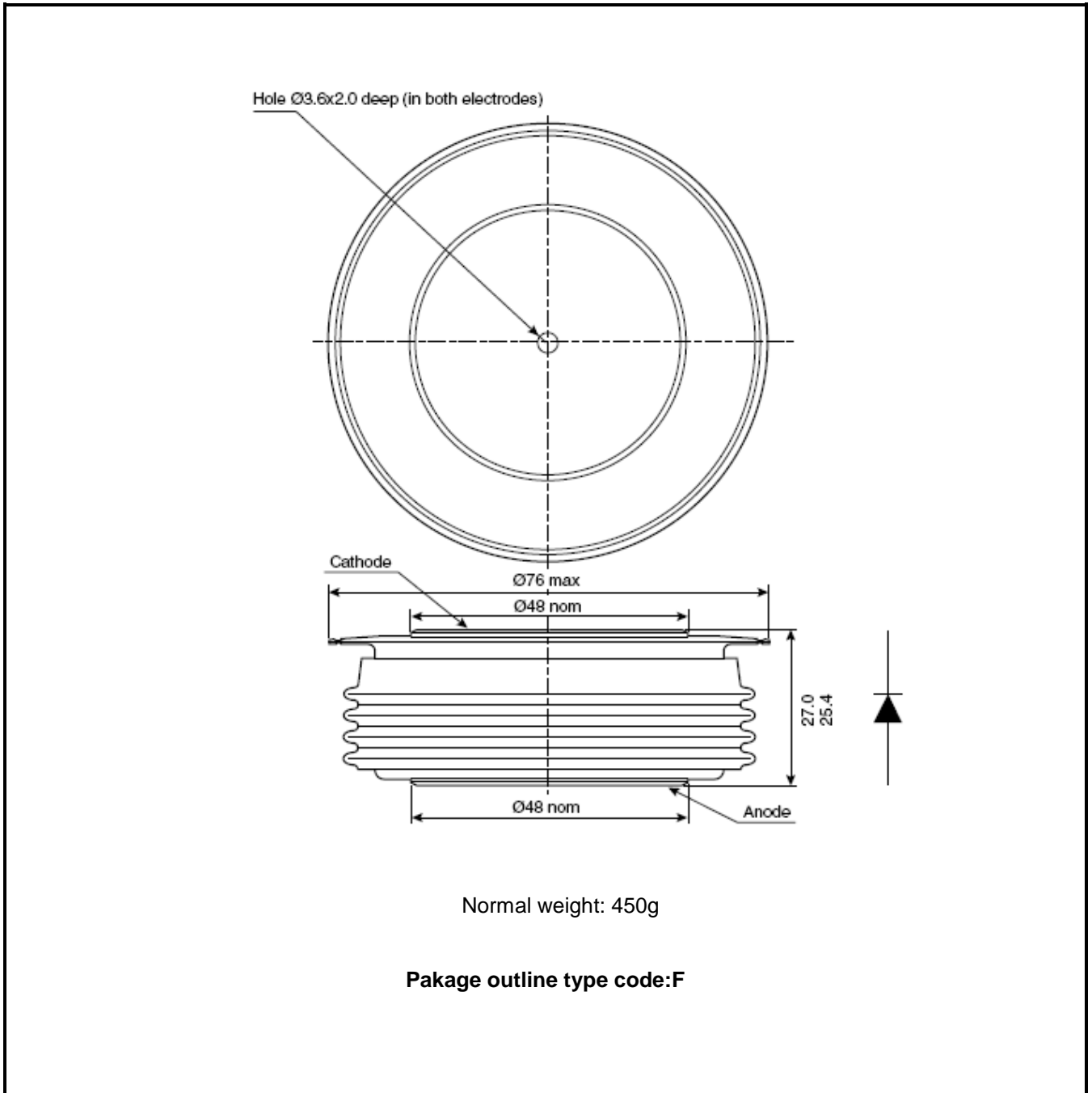


Fig.7 Maximum (limit) transient thermal impedance-junction to case

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.

POWER ASSEMBLY CAPABILITY

The Power Assembly group was set up to provide a support service for those customers requiring more than the basic semiconductor, and has developed a flexible range of heatsink and clamping systems in line with advances in device voltages and current capability of our semiconductors.

We offer an extensive range of air and liquid cooled assemblies covering the full range of circuit designs in general use today. The Assembly group offers high quality engineering support dedicated to designing new units to satisfy the growing needs of our customers.

Using the latest CAD methods our team of design and applications engineers aim to provide the Power Assembly Complete Solution (PACs).

HEATSINKS

The Power Assembly group has its own proprietary range of extruded aluminium heatsinks which have been designed to optimise the performance of Dynex semiconductors. Data with respect to air natural, forced air and liquid cooling (with flow rates) is available on request.

For further information on device clamps, heatsinks and assemblies, please contact your nearest sales representative or Customer Services.

Stresses above those listed in this data sheet may cause permanent damage to the device. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture of the package. Appropriate safety precautions should always be followed.



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