

APPLICATIONS

- Rectification
- Freewheel Diode
- DC Motor Control
- Power Supplies
- Welding
- Battery Chargers

FEATURES

- Double Side Cooling
- High Surge Capability

VOLTAGE RATINGS

Type Number	Repetitive Peak Reverse Voltage V_{RRM} V	Conditions
DS2002SF18	1800	$V_{RSM} = V_{RRM} + 100V$
DS2002SF17	1700	
DS2002SF16	1600	
DS2002SF15	1500	
DS2002SF14	1400	
DS2002SF13	1300	

Lower voltage grades available.

ORDERING INFORMATION

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

DS2002SF16

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

KEY PARAMETERS

V_{RRM} 1800V

$I_{F(AV)}$ 2996A

I_{FSM} 41250A

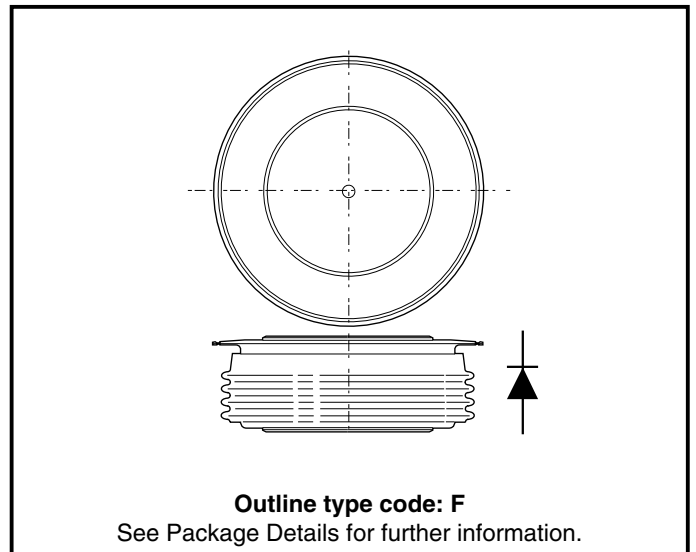


Fig. 1 Package outline

CURRENT RATINGS

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

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	2996	A
$I_{F(RMS)}$	RMS value	-	4707	A
I_F	Continuous (direct) forward current	-	4122	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	2093	A
$I_{F(RMS)}$	RMS value	-	3288	A
I_F	Continuous (direct) forward current	-	2693	A

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

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	2320	A
$I_{F(RMS)}$	RMS value	-	3644	A
I_F	Continuous (direct) forward current	-	3300	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load	1345	A
$I_{F(RMS)}$	RMS value	-	2110	A
I_F	Continuous (direct) forward current	-	1630	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; $T_{case} = 175^{\circ}C$	33.0	kA
I^2t	I^2t for fusing	$V_R = 50\% V_{RRM} - 1/4$ sine	5.44×10^6	A ² s
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; $T_{case} = 175^{\circ}C$	41.25	kA
I^2t	I^2t for fusing	$V_R = 0$	8.5×10^6	A ² s

THERMAL AND MECHANICAL DATA

Symbol	Parameter	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	Forward (conducting)	-	185	$^{\circ}C$	
		Reverse (blocking)	-	175	$^{\circ}C$	
T_{stg}	Storage temperature range		-55	200	$^{\circ}C$	
-	Clamping force		18.0	22.0	kN	

CHARACTERISTICS

Symbol	Parameter	Conditions	Min.	Max.	Units
V_{FM}	Forward voltage	At 3400A peak, $T_{case} = 25^{\circ}C$	-	1.18	V
I_{RRM}	Peak reverse current	At V_{RRM} , $T_{case} = 175^{\circ}C$	-	50	mA
Q_S	Total stored charge	$I_F = 2000A$, $di_{RR}/dt = 3A/\mu s$	-	1500	μC
I_{RR}	Peak recovery current	$T_{case} = 175^{\circ}C$, $V_R = 100V$	-	90	A
V_{TO}	Threshold voltage	At $T_{vj} = 175^{\circ}C$	-	0.74	V
r_T	Slope resistance	At $T_{vj} = 175^{\circ}C$	-	0.088	m Ω

CURVES

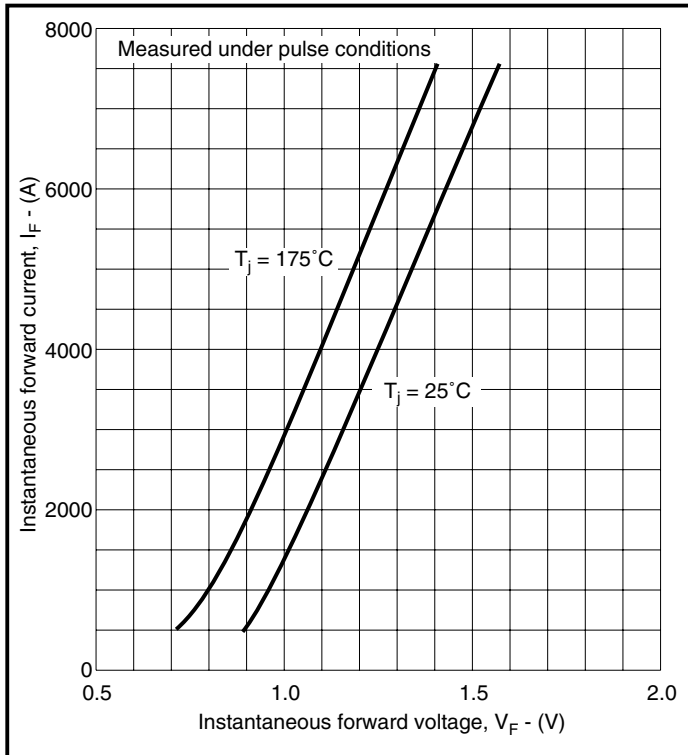


Fig.2 Maximum (limit) forward characteristics

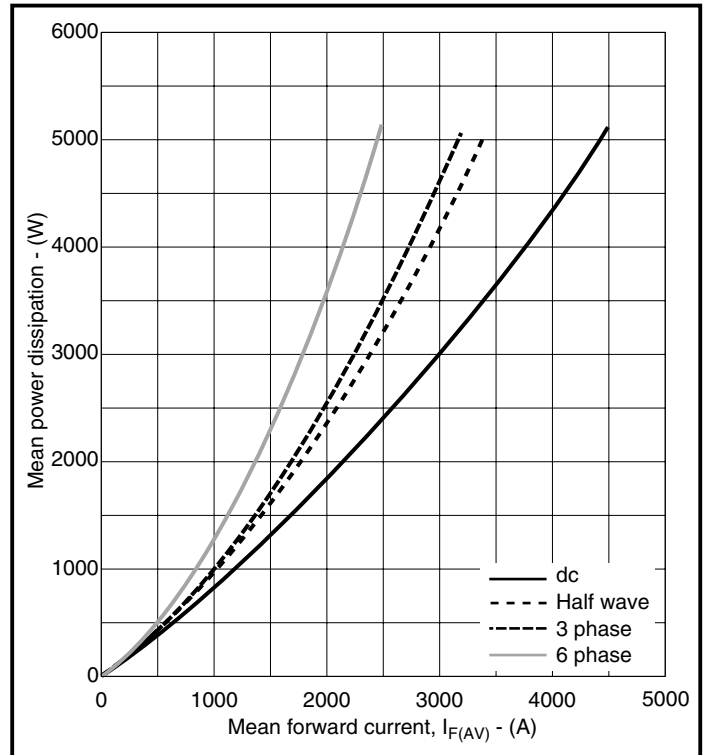


Fig.3 Dissipation curves

V_{FM} Equation:-

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

Where

$$A = -0.64773$$

$$B = 0.268581$$

$$C = 0.00016$$

$$D = -0.01796$$

these values are valid for $T_{vj} = 125^{\circ}C$ for I_F 500A to 8000A

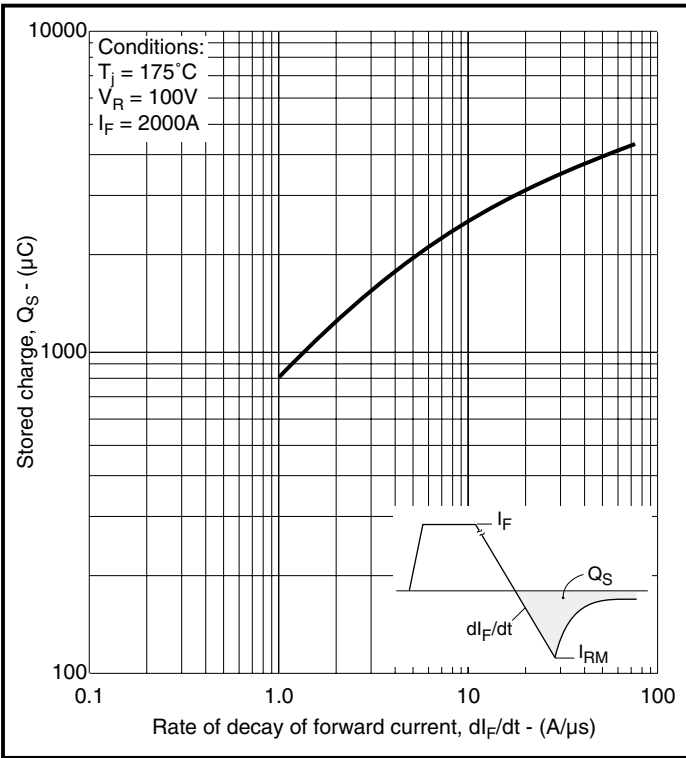


Fig.4 Total stored charge

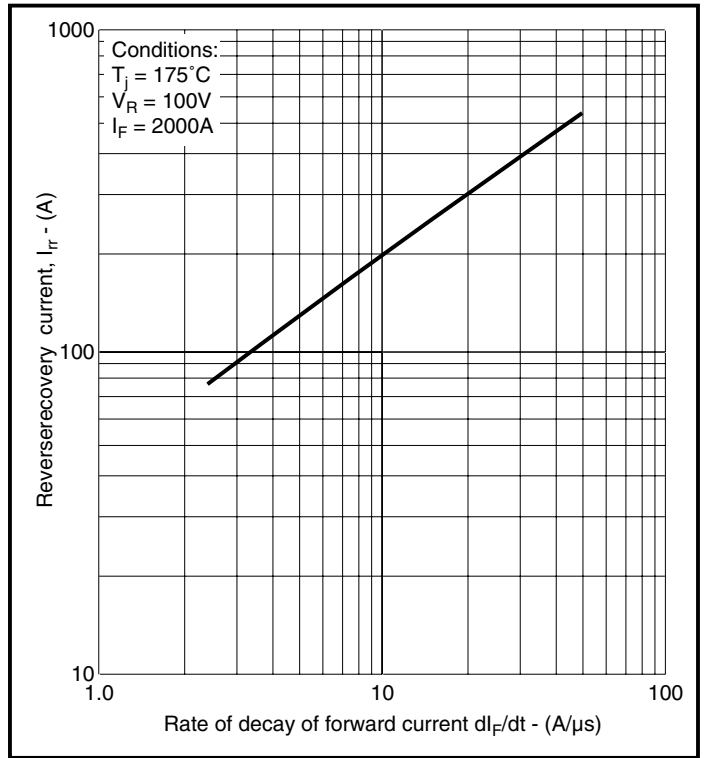


Fig.5 Maximum reverse recovery current

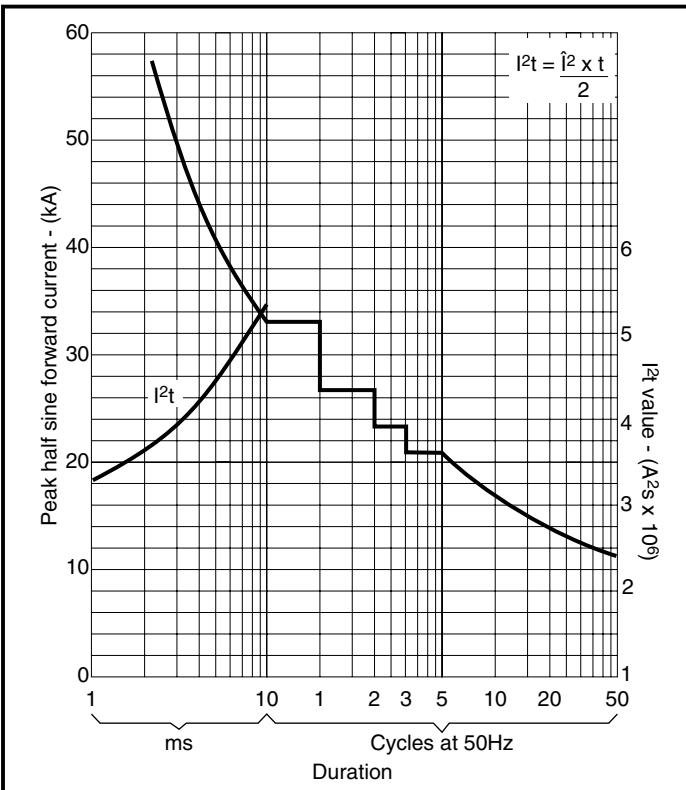


Fig.6 Surge (non-repetitive) forward current vs time (with 50% V_{RRM} at $T_{case} 175^\circ\text{C}$)

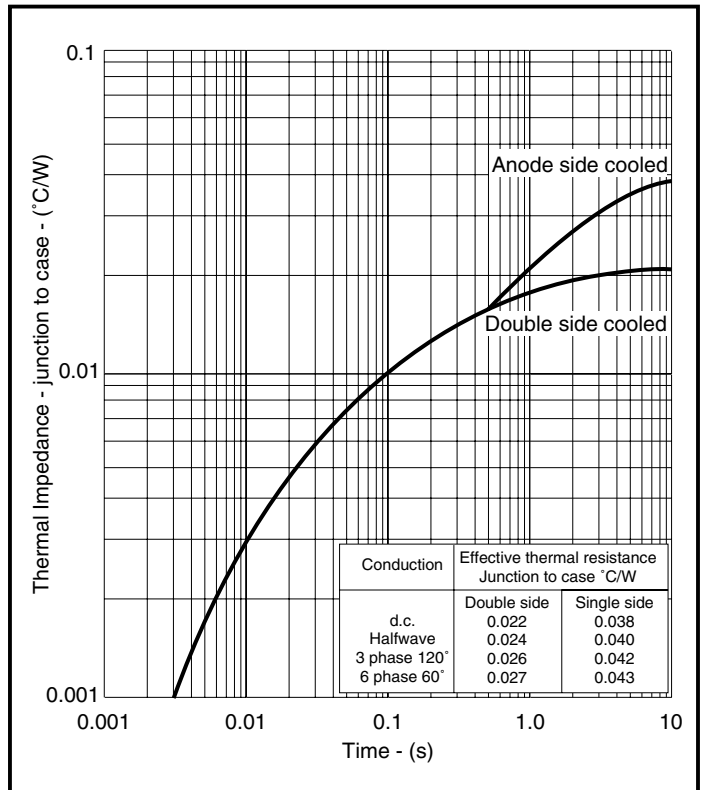
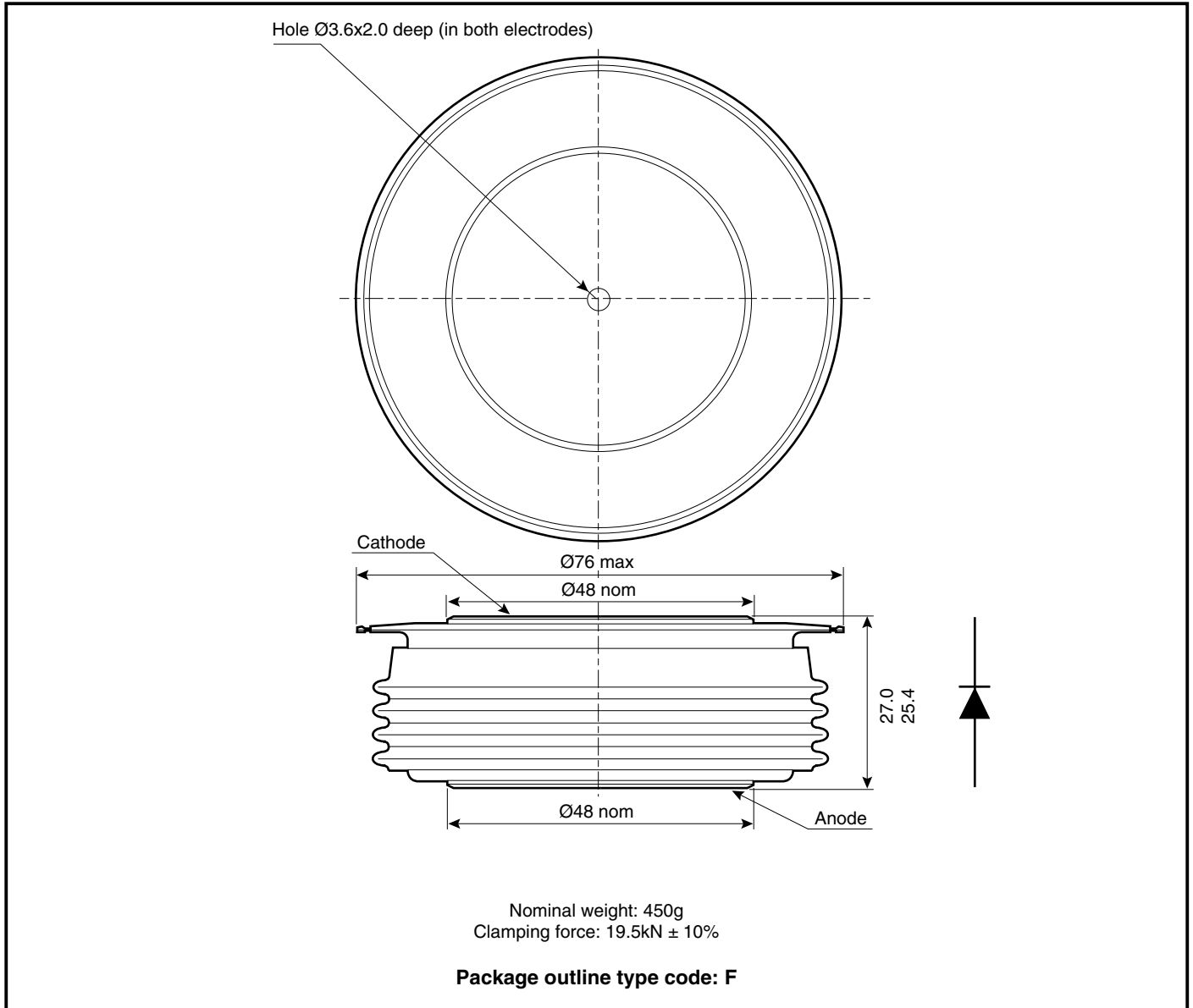


Fig.7 Maximum (limit) transient thermal impedance - junction to case

PACKAGE DETAILS

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



- Note:**
1. Package maybe supplied with pins 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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