DF051

Fast Recovery Diode

Replaces January 2000 version, DS4147-5.0

DS4147-6.0 June 2004

APPLICATIONS

- Induction Heating
- A.C. Motor Drives
- Inverters And Choppers
- Welding
- High Frequency Rectification
- UPS

KEY PARAMETERS

V_{RRM}	2500V
$I_{F(AV)}$	1490A
I_{FSM}	14000A
Q_r	800μC
t_{rr}	5.0μs

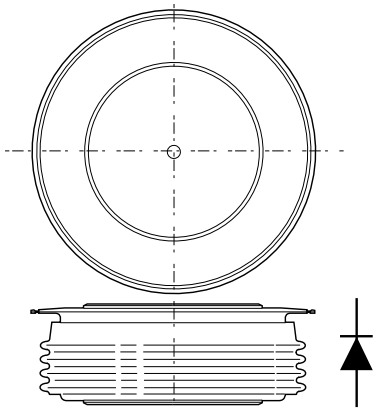
FEATURES

- Double side cooling
- High surge capability
- Low recovery charge

VOLTAGE RATINGS

Type Number	Repetitive Peak Reverse Voltage V_{RRM} V	Conditions
DF051 25	2500	$V_{RSM} = V_{RRM} + 100V$
DF051 24	2400	
DF051 22	2200	
DF051 20	2000	

Lower voltage grades available.



Outline type code: CB450.
See Package Details for further information.

Fig. 1 Package outline

ORDERING INFORMATION

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

DF051 22

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

CURRENT RATINGS

Symbol	Parameter	Conditions	Max.	Units
Double Side Cooled				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, T_{case} = 65°C	1490	A
$I_{F(RMS)}$	RMS value	T_{case} = 65°C	2340	A
I_F	Continuous (direct) forward current	T_{case} = 65°C	2160	A
Single Side Cooled (Anode side)				
$I_{F(AV)}$	Mean forward current	Half wave resistive load, T_{case} = 65°C	995	A
$I_{F(RMS)}$	RMS value	T_{case} = 65°C	1560	A
I_F	Continuous (direct) forward current	T_{case} = 65°C	1390	A

SURGE RATINGS

Symbol	Parameter	Conditions	Max.	Units
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; with 0% V_{RRM}, T_j = 150°C	14.0	kA
I^2t	I^2t for fusing		980 x 10^3	A^2s
I_{FSM}	Surge (non-repetitive) forward current	10ms half sine; with 50% V_{RRM}, T_j = 150°C	11.2	kA
I^2t	I^2t for fusing		627 x 10^3	A^2s

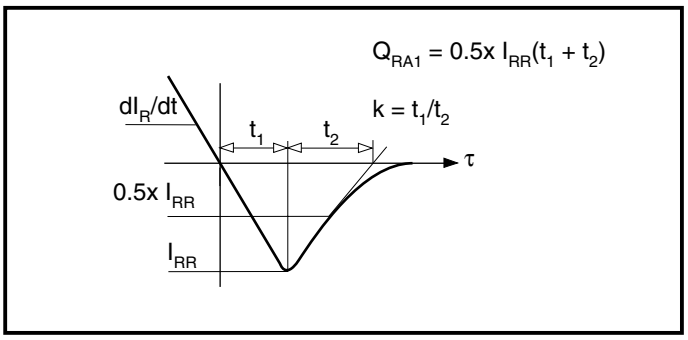
THERMAL AND MECHANICAL DATA

Symbol	Parameter	Conditions		Min.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - junction to case	Double side cooled	dc	-	0.018	°C/W
		Single side cooled	Anode dc	-	0.034	°C/W
			Cathode dc	-	0.038	°C/W
$R_{th(c-h)}$	Thermal resistance - case to heatsink	Clamping force 23.5kN with mounting compound	Double side	-	0.003	°C/W
			Single side	-	0.006	°C/W
T_{vj}	Virtual junction temperature	On-state (conducting)		-	150	°C
T_{stg}	Storage temperature range			-55	150	°C
-	Clamping force			21.0	25.0	kN

CHARACTERISTICS

Symbol	Parameter	Conditions	Typ.	Max.	Units
V_{FM}	Forward voltage	At 1500A peak, T_{case} = 25°C	-	1.85	V
I_{RRM}	Peak reverse current	At V_{RRM}, T_{case} = 150°C	-	100	mA
t_{rr}	Reverse recovery time	I_F = 1000A, di_{RR}/dt = 100A/µs T_{case} = 150°C, V_R = 100V	5.0	-	µs
Q_{RA1}	Recovered charge (50% chord)		-	800	µC
I_{RM}	Reverse recovery current		-	250	A
K	Soft factor		1.6	-	-
V_{TO}	Threshold voltage	At T_{vj} = 150°C	-	1.1	V
r_T	Slope resistance	At T_{vj} = 150°C	-	0.5	mΩ
V_{FRM}	Forward recovery voltage	di/dt = 1000A/µs, T_j = 125°C	-	-	V

DEFINITION OF K FACTOR AND Q_{RA1}



CURVES

CURVES

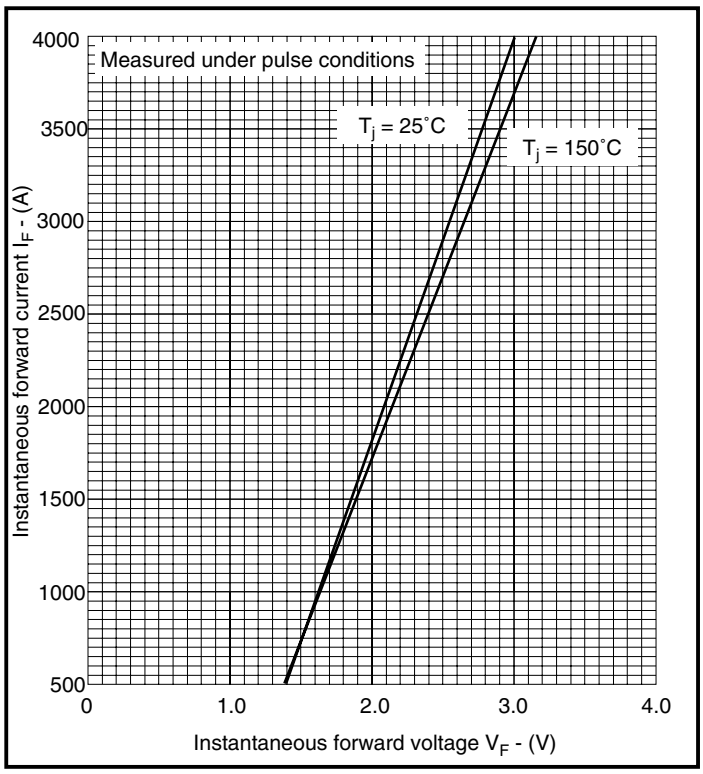


Fig.2 Maximum (limit) forward characteristics

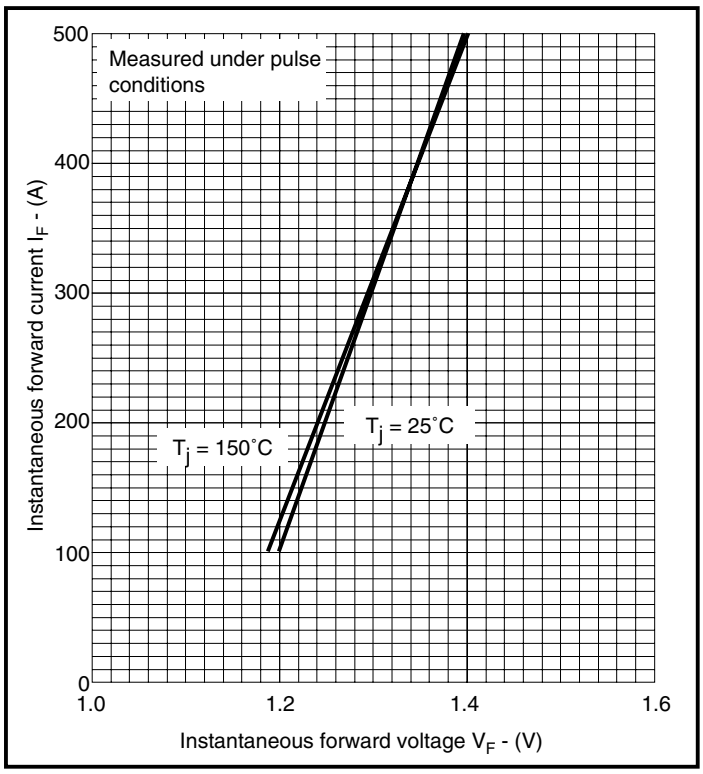


Fig.3 Maximum (limit) forward characteristics

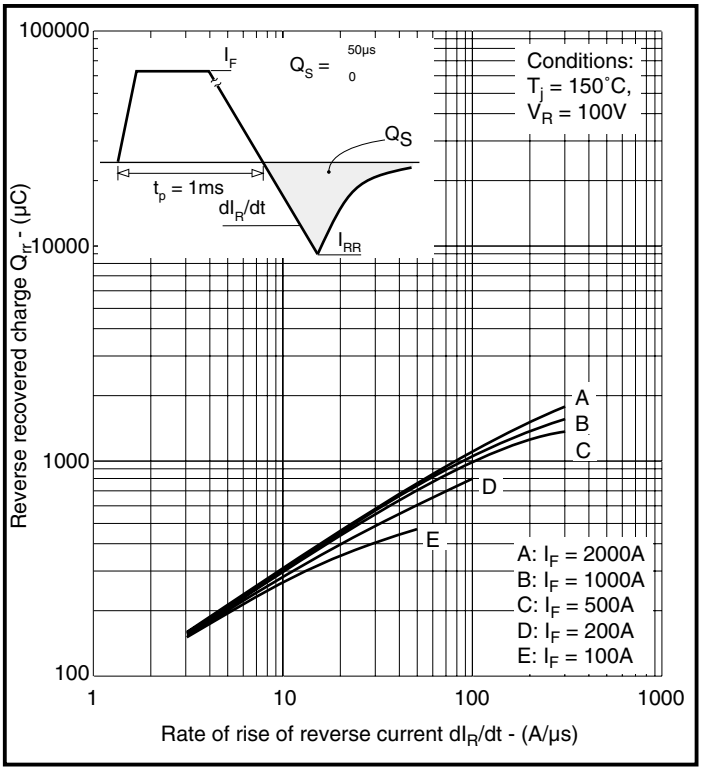


Fig.4 Recovered charge

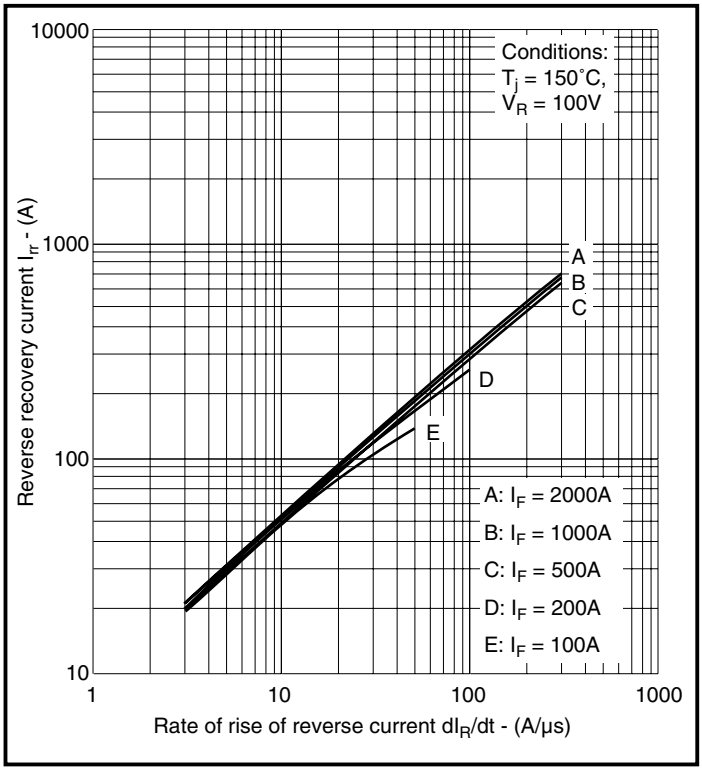


Fig.5 Typical reverse recovery current vs rate of rise of forward current

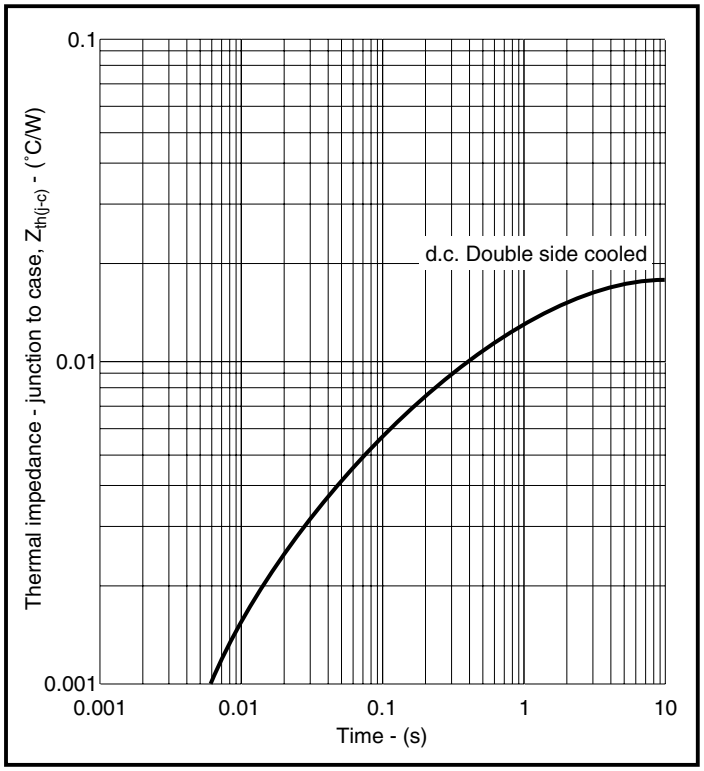
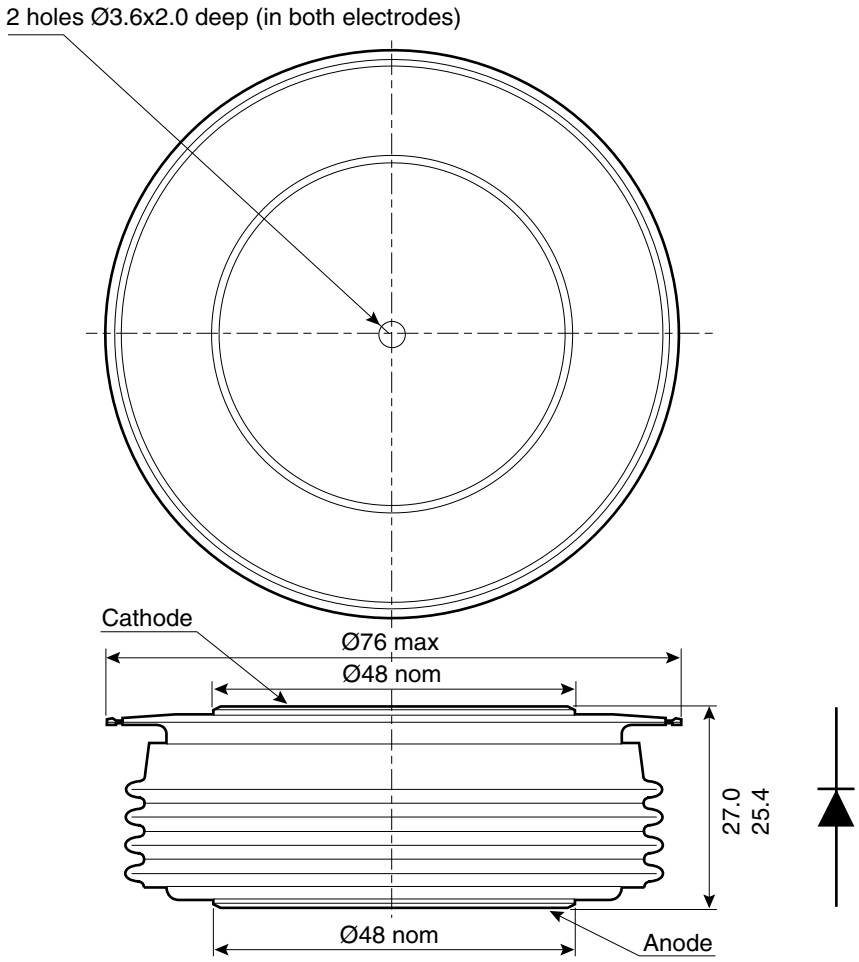


Fig.6 Maximum (limit) transient thermal impedance - junction to case - (°C/W)

PACKAGE DETAILS

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



Nominal weight: 500g
Clamping force: 19.6kN ± 10%

Package outline type code: CB450

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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