DFM400NXM33-A000

Fast Recovery Diode Module

Target Information

DS5474-1.3 October 2001

FEATURES

- Low Reverse Recovery Charge
- High Switching Speed
- Low Forward Voltage Drop
- Isolated Base
- Dual Diodes Can Be Paralleled for 800A Rating
- MMC Baseplate With AlN Substrates

APPLICATIONS

- Brake Chopper Diode
- Boost and Buck Converters
- Free-wheel Circuits
- Motor Drives
- Resonant Converters
- Induction Heating
- Multi-level Switch Inverters

The DFM400NXM33-A000 is a dual 3300 volt, fast recovery diode (FRD) module. Designed for low power loss, the module is suitable for a variety of high voltage applications in motor drives and power conversion.

Fast switching times and low reverse recovery losses allow high frequency operation making the device suitable for the latest drive designs employing pwm and high frequency switching.

These modules incorporate electrically isolated base plates and low inductance construction enabling circuit designers to optimise circuit layouts and utilise grounded heat sinks for safety.

ORDERING INFORMATION

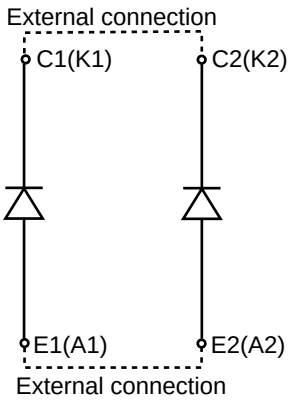
Order As:

DFM400NXM33-A000

Note: When ordering, please use the complete part number.

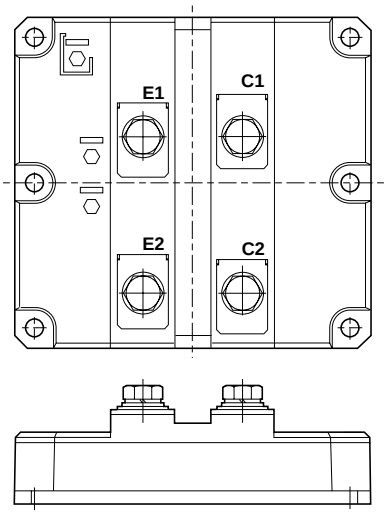
KEY PARAMETERS

V_{RRM}		**3300V**
V_F	**(typ)**	**2.5V**
I_F	**(max)**	**400A**
I_{FM}	**(max)**	**800A**



External connection for single 800A diode application

Fig. 1 Circuit diagram



Outline type code: N

(See package details for further information)

Fig. 2 Electrical connections - (not to scale)

ABSOLUTE MAXIMUM RATINGS - PER ARM

Stresses above those listed under 'Absolute Maximum Ratings' 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. Exposure to Absolute Maximum Ratings may affect device reliability.

T_{case} = 25˚C unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
V_{RRM}	Repetitive peak reverse voltage	T_{vj} = 125˚C	3300	V
I_F	Forward current (per arm)	DC, T_{case} = 70˚C	400	A
I_{FM}	Max. forward current	T_{case} = 115˚C, t_p = 1ms	800	A
I^2t	I^2t value fuse current rating	V_R = 0, t_p = 10ms, T_{vj} = 125˚C	80	A^2s
Pmax	Maximum power dissipation	T_{case} = 25˚C, T_{vj} = 125˚C	1.92	kW
V_{isol}	Isolation voltage	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	6	kV
Q_{pd}	Partial discharge	IEC1287. V_1 = 2400V, V_2 = 1800V, 50Hz RMS	10	pC

THERMAL AND MECHANICAL RATINGS

Internal insulation: AlN
Baseplate material: AlSiC
Creepage distance: 33mm
Clearance: 20mm
CTI (Critical Tracking Index): 175

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$R_{th(j-c)}$	Thermal resistance - diode (per arm)	Continuous dissipation - junction to case	-	-	52	˚C/kW
$R_{th(c-h)}$	Thermal resistance - case to heatsink (per module)	Mounting torque 5Nm (with mounting grease)	-	-	6	˚C/kW
T_j	Junction temperature	-	–40	-	125	˚C
T_{stg}	Storage temperature range	-	-	-	125	˚C
-	Screw torque	Mounting - M6	-	-	5	Nm
		Electrical connections - M8	-	-	10	Nm

STATIC ELECTRICAL CHARACTERISTICS - PER ARM

T_{vj} = 25˚C unless stated otherwise.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_{RM}	Peak reverse current	V_R = 3300V, T_{vj} = 125˚C	-	-	30	mA
V_F	Forward voltage	I_F = 400A	-	2.5	-	V
		I_F = 400A, T_{vj} = 125˚C	-	2.5	-	V
L	Inductance	-	-	25	-	nH

DYNAMIC ELECTRICAL CHARACTERISTICS - PER ARM

T_{vj} = 25˚C unless stated otherwise.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_{rr}	Peak reverse recovery current	I_F = 400A,	-	400	-	A
Q_{rr}	Reverse recovery charge	dI_F/dt = 2800A/µs,	-	280	-	µC
E_{rec}	Reverse recovery energy	V_R = 1800V	-	300	-	mJ

T_{vj} = 125˚C unless stated otherwise.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
I_{rr}	Peak reverse recovery current	I_F = 400A,	-	430	-	A
Q_{rr}	Reverse recovery charge	dI_F/dt = 2000A/µs,	-	450	-	µC
E_{rec}	Reverse recovery energy	V_R = 1800V	-	550	-	mJ

TYPICAL CHARACTERISTICS

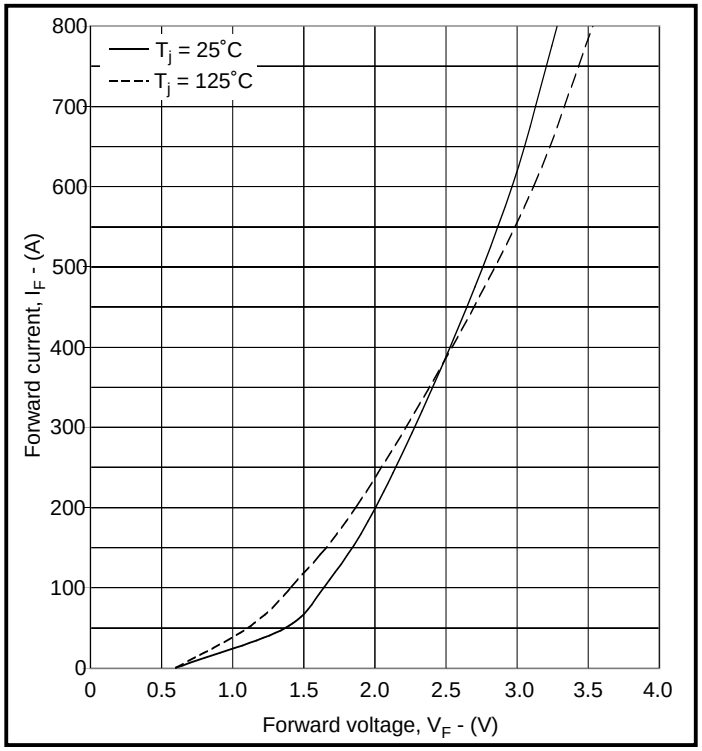


Fig. 2 Diode typical forward characteristics

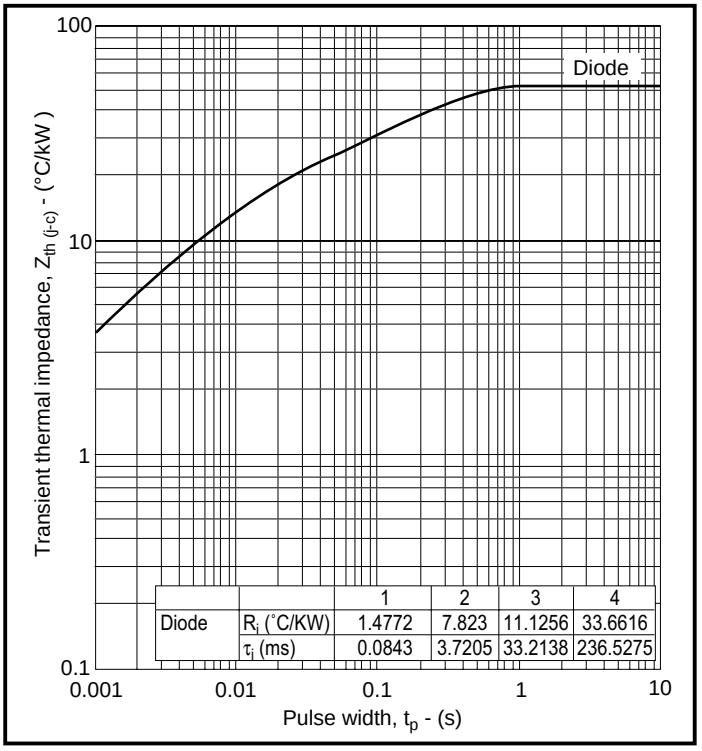


Fig. 4 Transient thermal impedance

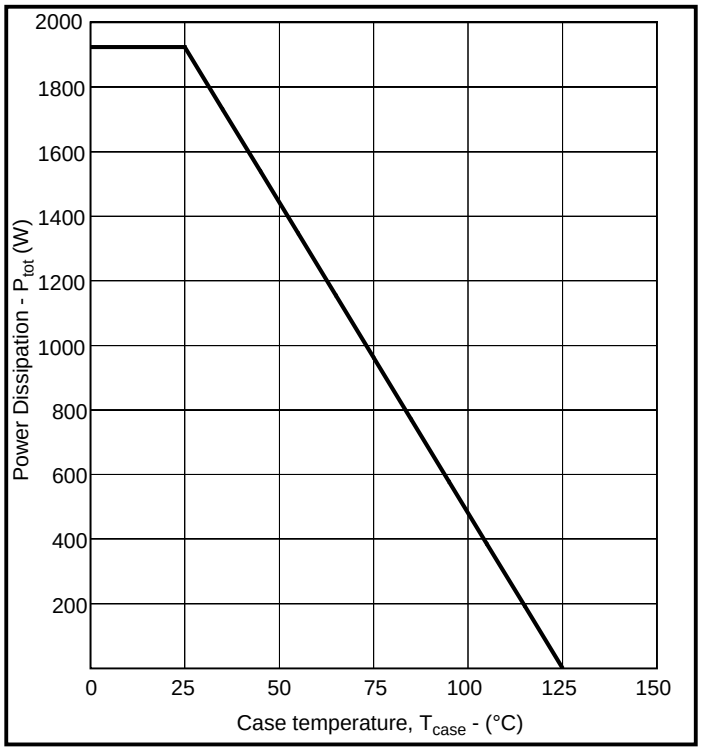


Fig. 5 Power dissipation

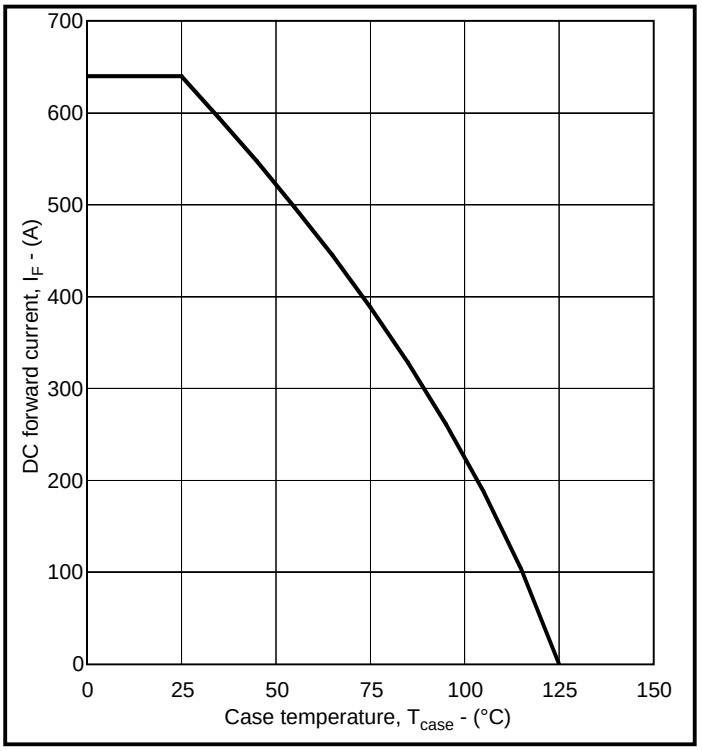


Fig. 6DC current rating vs case temperature

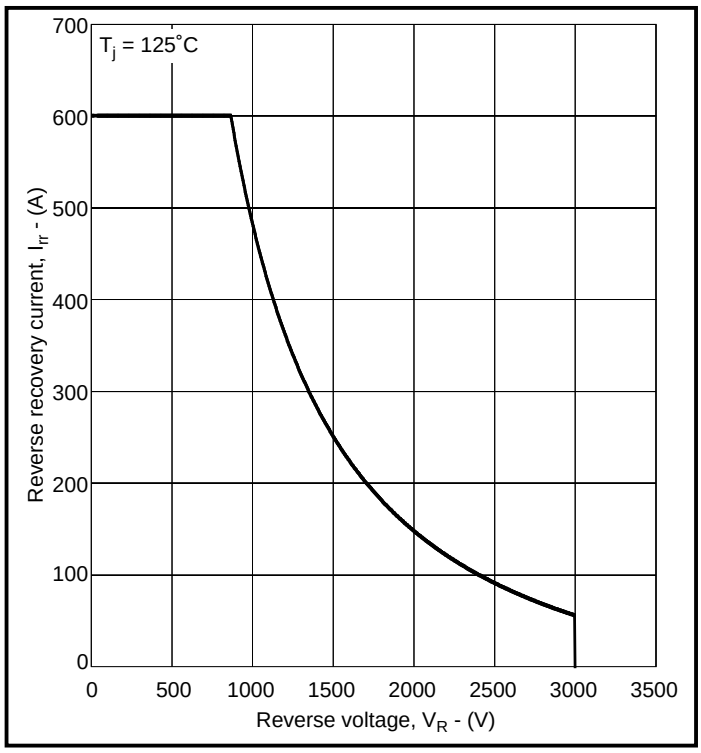
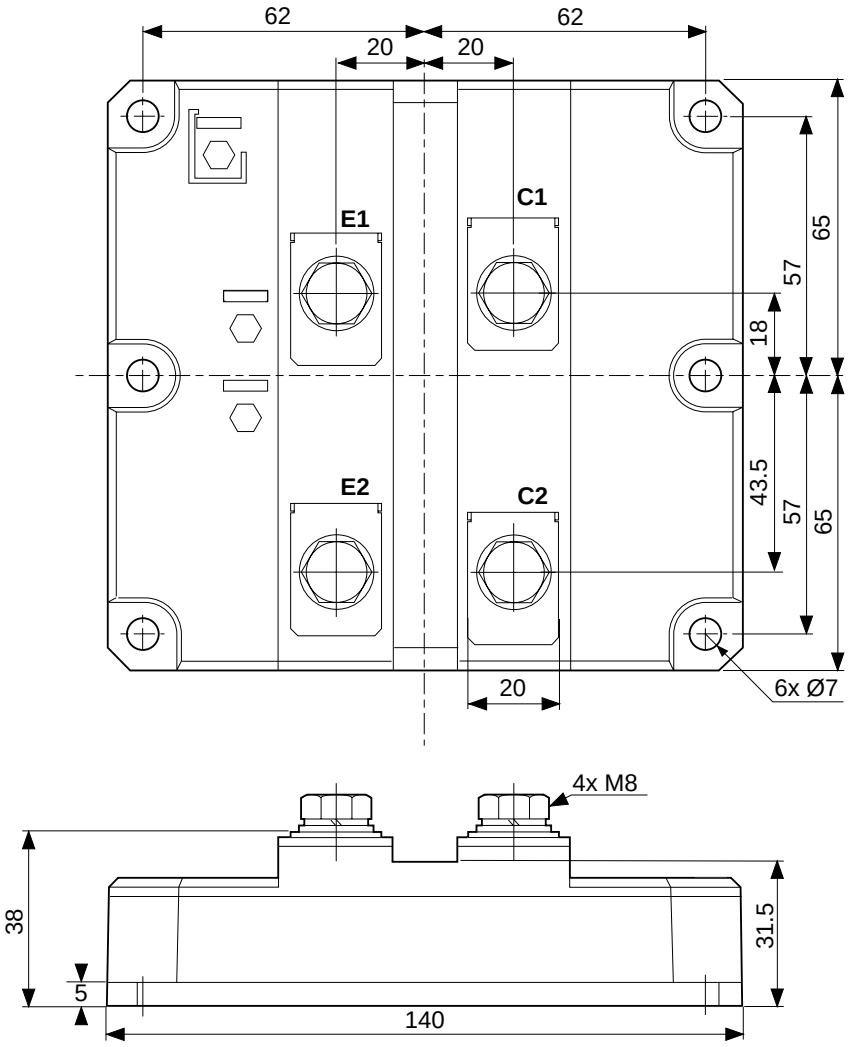

700
600
500
400
300
200
100
0
T_j = 125˚C
Reverse recovery current, I_{rr} - (A)
0
500
1000
1500
2000
2500
3000
3500
Reverse voltage, V_R - (V)

Fig. 7 RBSOA

PACKAGE DETAILS

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



Nominal weight: 1000g

Module outline type code: N

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 continues to offer 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. They 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 service office.

DYNEX SEMICONDUCTOR

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Preliminary Information: The product is in design and development. The datasheet represents the product as it is understood but details may change.

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