

### FEATURES

- Low Reverse Recovery Charge
- High Switching Speed
- Low Forward Voltage Drop
- Isolated Base
- MMC Baseplate With AlN Substrates

### APPLICATIONS

- Free-wheel Circuits
- Motor Drives
- Resonant Converters
- Multi-level Switch Inverters

The DFM400PXM33-A000 is a series pair 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 make the device suitable for the latest drive designs employing pwm and high frequency switching.

These module incorporates an electrically isolated base plate and low inductance construction enabling circuit designers to optimise circuit layouts and utilise grounded heat sinks for safety.

### ORDERING INFORMATION

Order As:

**DFM400PXM33-A000**

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

### KEY PARAMETERS

$V_{RRM}$		<b>3300V</b>
$V_F$	(typ)	<b>2.5V</b>
$I_F$	(max)	<b>400A</b>
$I_{FM}$	(max)	<b>800A</b>

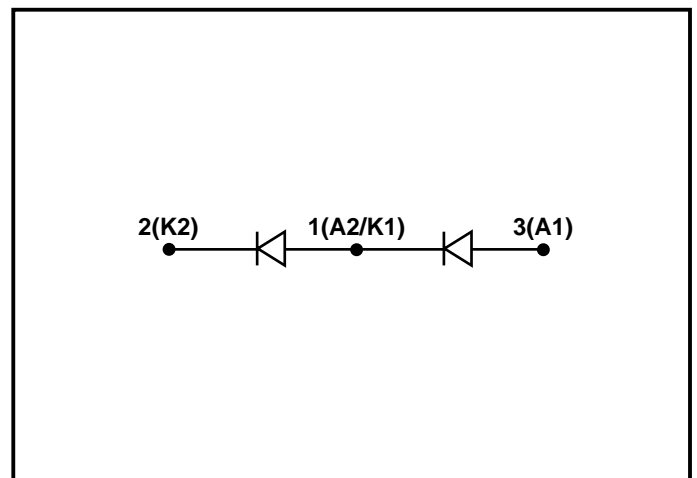


Fig. 1 Circuit diagram

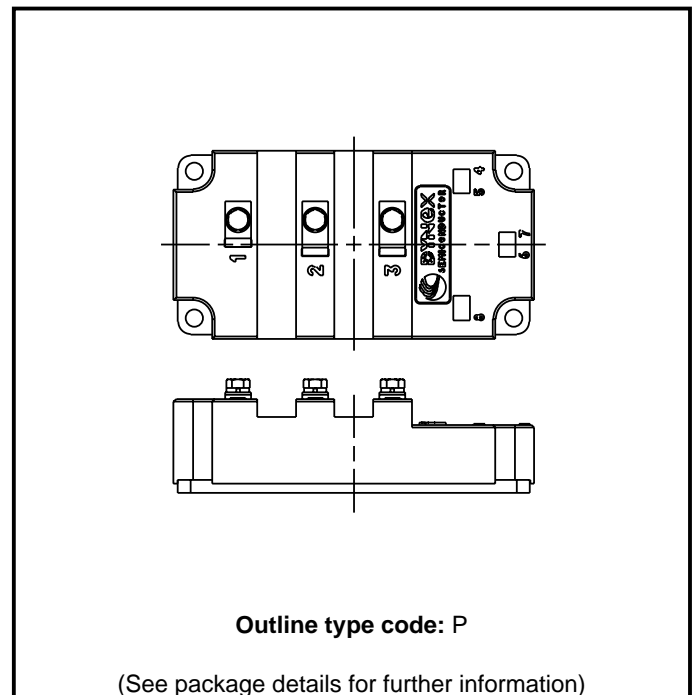


Fig. 2 Electrical connections - (not to scale)

## ABSOLUTE MAXIMUM RATINGS

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.

$T_{case} = 25^{\circ}\text{C}$  unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
$V_{RRM}$	Repetitive peak reverse voltage	$T_{vj} = 125^{\circ}\text{C}$	3300	V
$I_F$	Forward current (per arm)	DC, $T_{case} = 70^{\circ}\text{C}$	400	A
$I_{FM}$	Max. forward current	$T_{case} = 115^{\circ}\text{C}$ , $t_p = 1\text{ms}$	800	A
$I^2t$	$I^2t$ value fuse current rating	$V_R = 0$ , $t_p = 10\text{ms}$ , $T_{vj} = 125^{\circ}\text{C}$	80	$\text{A}^2\text{s}$
Pmax	Maximum power dissipation	$T_{case} = 25^{\circ}\text{C}$ , $T_{vj} = 125^{\circ}\text{C}$	1.85	kW
$V_{isol}$	Isolation voltage	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	6	kV
$Q_{pd}$	Partial discharge	IEC1287. $V_1 = 2400\text{V}$ , $V_2 = 1800\text{V}$ , 50Hz RMS	10	pC

## THERMAL AND MECHANICAL RATINGS

Internal insulation: AIN  
 Baseplate material: AISiC  
 Creepage distance: 20mm  
 Clearance: 10mm  
 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	-	-	54	$^{\circ}\text{C}/\text{kW}$
$R_{th(c-h)}$	Thermal resistance - case to heatsink (per module)	Mounting torque 5Nm (with mounting grease)	-	-	16	$^{\circ}\text{C}/\text{kW}$
$T_j$	Junction temperature	-	-40	-	125	$^{\circ}\text{C}$
$T_{stg}$	Storage temperature range	-	-	-	125	$^{\circ}\text{C}$
-	Screw torque	Mounting - M6	-	-	5	Nm
-		Electrical connections - M8	-	-	10	Nm

**STATIC ELECTRICAL CHARACTERISTICS**
 $T_{vj} = 25^{\circ}\text{C}$  unless stated otherwise.

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

**DYNAMIC ELECTRICAL CHARACTERISTICS**
 $T_{vj} = 25^{\circ}\text{C}$  unless stated otherwise.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$I_{rr}$	Peak reverse recovery current	$I_F = 400\text{A}$ , $di_F/dt = 2800\text{A}/\mu\text{s}$ , $V_R = 1800\text{V}$	-	400	-	A
$Q_{rr}$	Reverse recovery charge		-	280	-	$\mu\text{C}$
$E_{rec}$	Reverse recovery energy		-	300	-	mJ

 $T_{vj} = 125^{\circ}\text{C}$  unless stated otherwise.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
$I_{rr}$	Peak reverse recovery current	$I_F = 400\text{A}$ , $di_F/dt = 2000\text{A}/\mu\text{s}$ , $V_R = 1800\text{V}$	-	430	-	A
$Q_{rr}$	Reverse recovery charge		-	450	-	$\mu\text{C}$
$E_{rec}$	Reverse recovery energy		-	550	-	mJ

TYPICAL CHARACTERISTICS

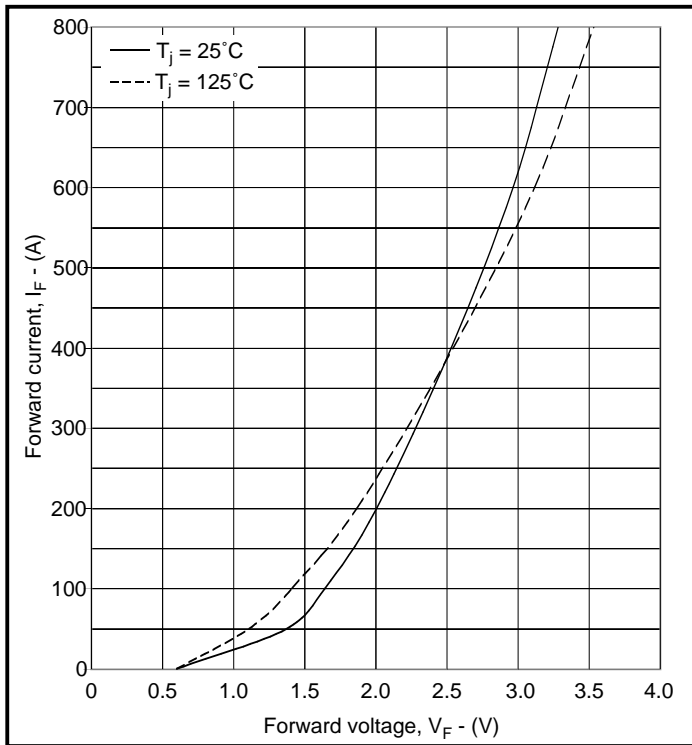


Fig. 2 Diode typical forward characteristics

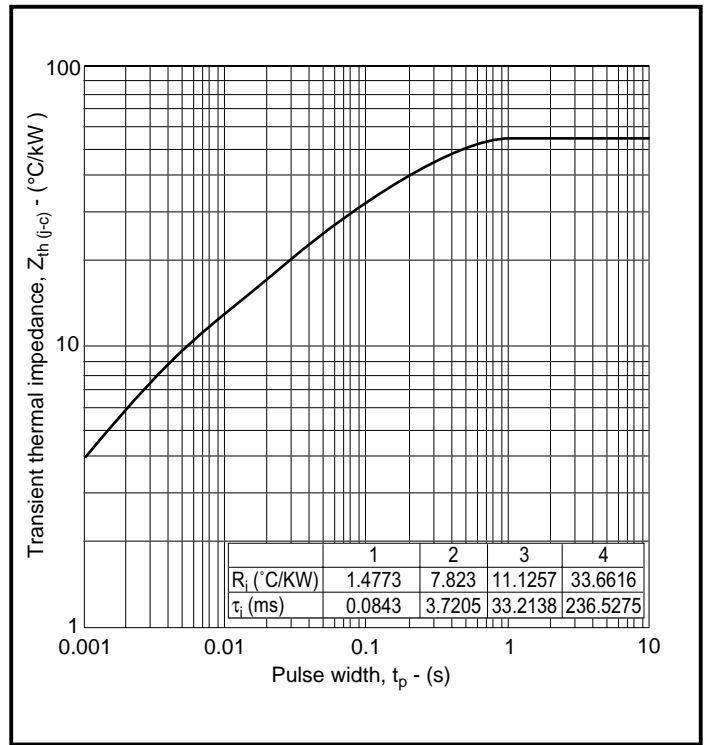


Fig. 4 Transient thermal impedance

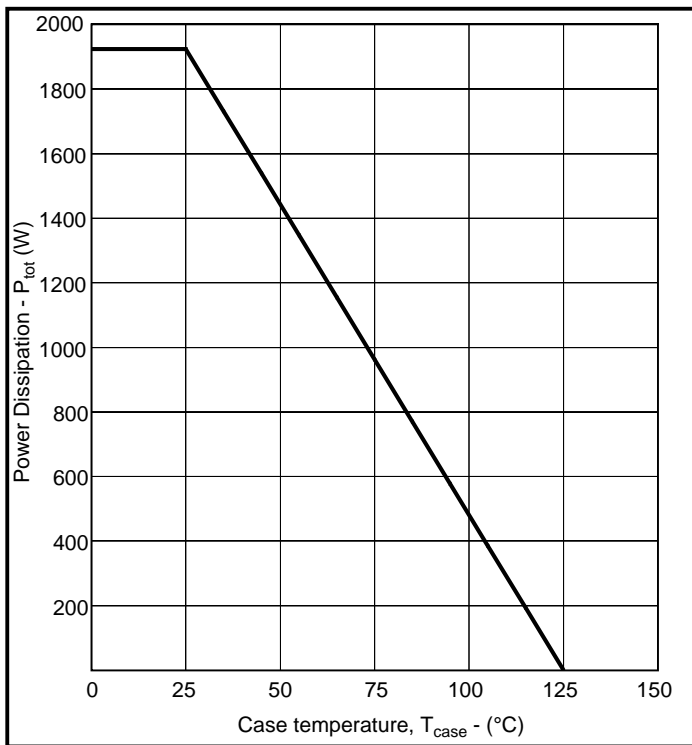


Fig. 5 Power dissipation

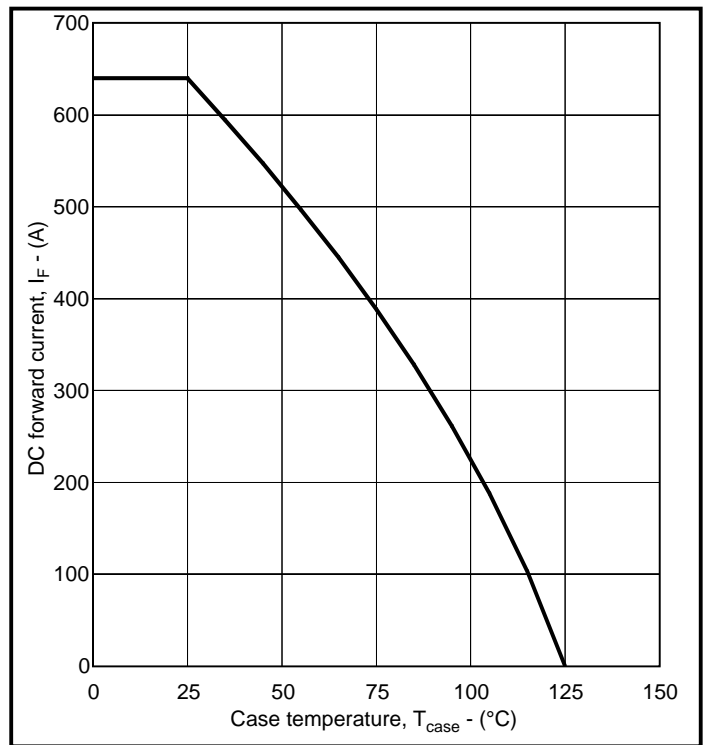
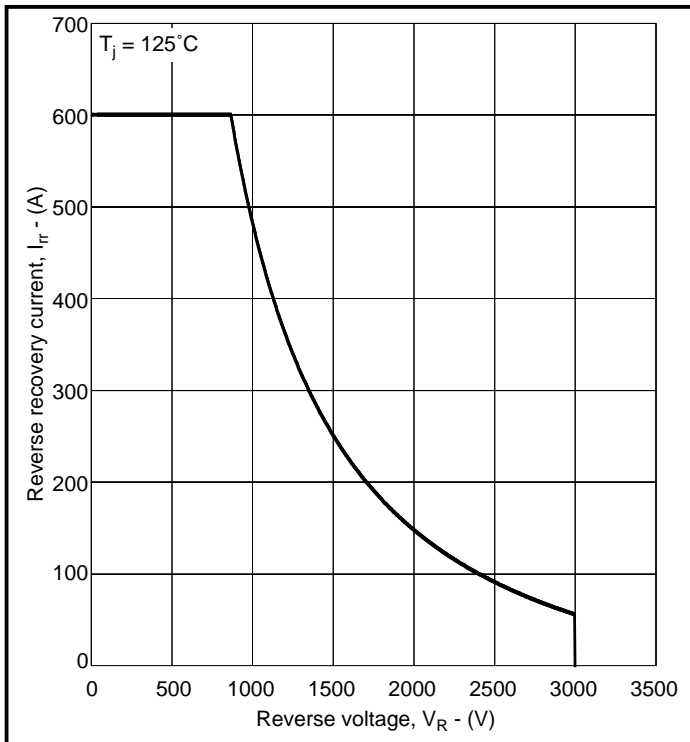


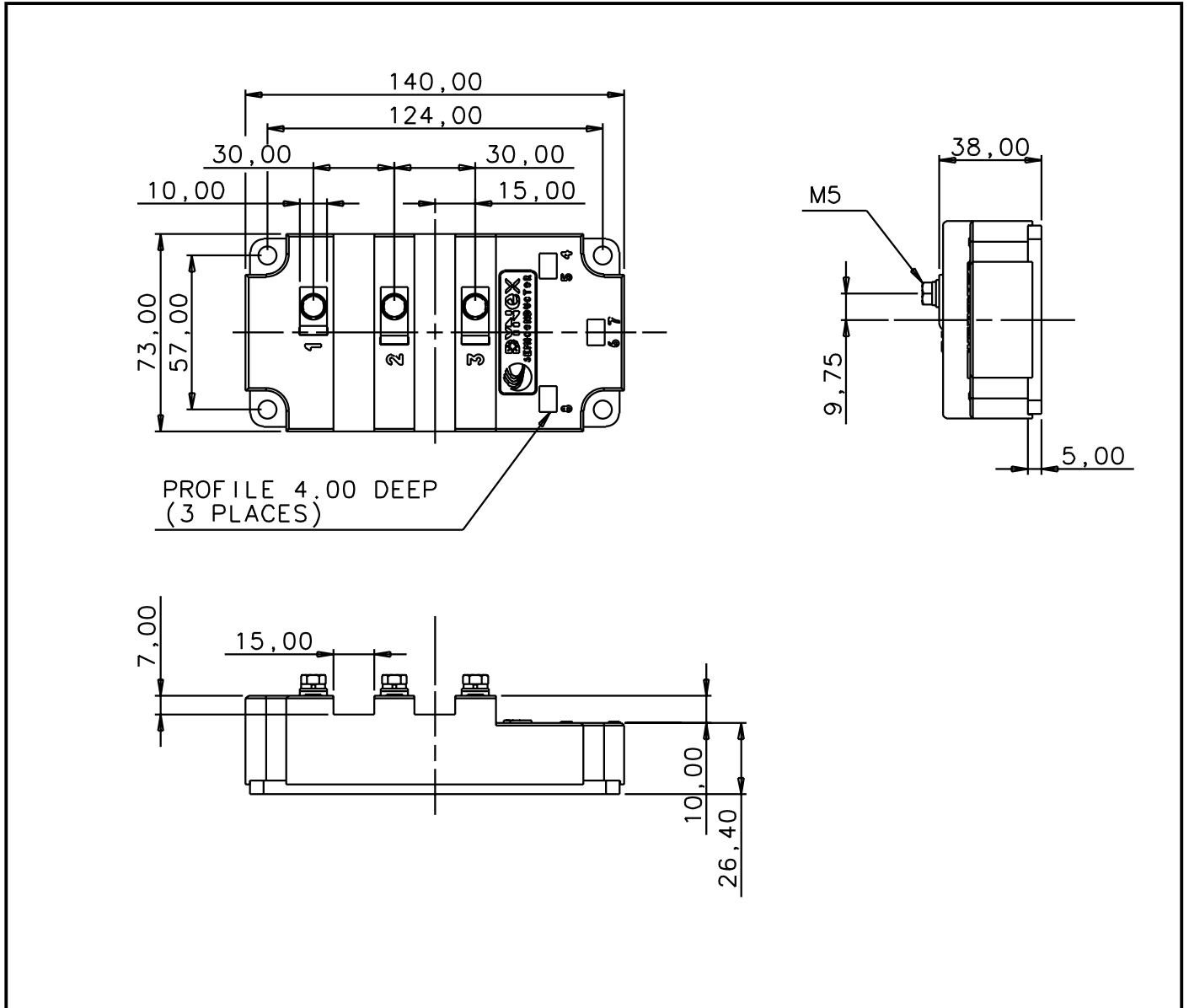
Fig. 6 DC current rating vs case temperature



**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.



## 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.



<http://www.dynexsemi.com>

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**Target Information:** This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.

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

**Advance Information:** The product design is complete and final characterisation for volume production is well in hand.

**No Annotation:** The product parameters are fixed and the product is available to datasheet specification.

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