

### FEATURES

- Low Reverse Recovery Charge
- High Switching Speed
- Low Forward Volt Drop
- Isolated AISiC Base With AlN Substrates
- Lead Free Construction
- Low FIT Rate

### APPLICATIONS

- Chopper Diodes
- Boost and Buck Converters
- Free-wheel Circuits
- Snubber Circuits
- Resonant Converters
- Induction Heating
- Multi-level Switch Inverters

The DFM400PXM33-F000 is a series pair 3300V, 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.

The 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-F000

Note: When ordering, please use the complete part number

### KEY PARAMETERS

$V_{RRM}$		<b>3300V</b>
$V_F$	(typ)	<b>2.9V</b>
$I_F$	(max)	<b>400A</b>
$I_{FM}$	(max)	<b>800A</b>

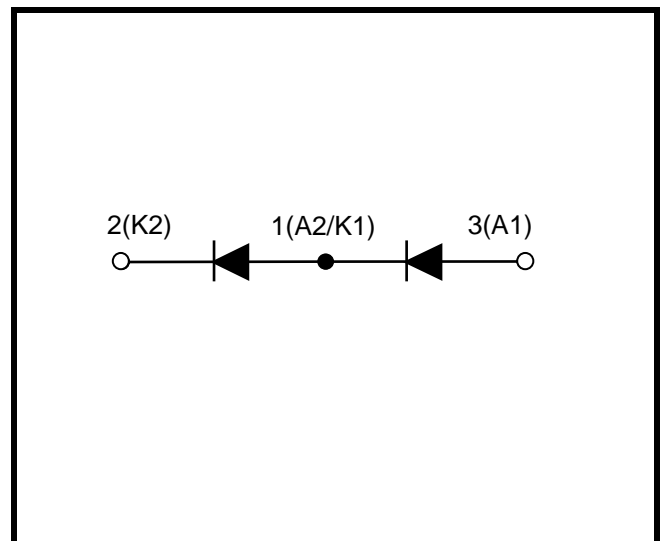


Fig. 1 Circuit configuration

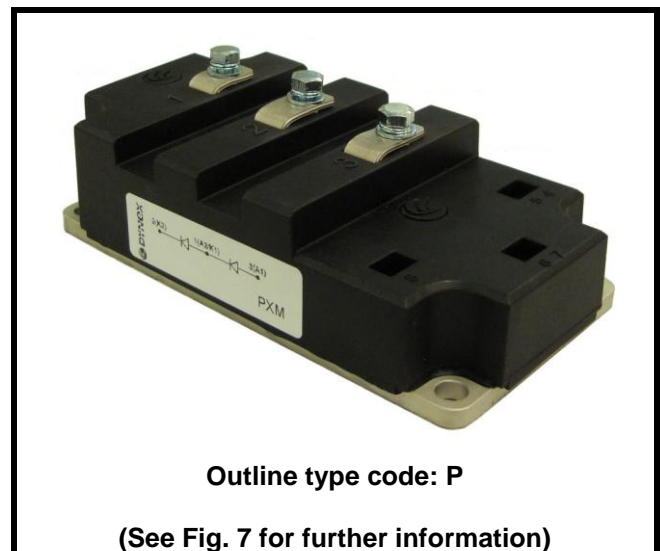


Fig. 2 Package

## 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	$T_j = 125^{\circ}\text{C}$	3300	V
$I_F$	Forward current (per arm)	DC, $T_{case} = 70^{\circ}\text{C}$	400	A
$I_{FM}$	Max. forward current (per arm)	$T_{case} = 105^{\circ}\text{C}$ , $t_p = 1\text{ms}$	800	A
$I^2t$	$I^2t$ value fuse current rating	$V_R = 0$ , $t_p = 10\text{ms}$ , $T_j = 125^{\circ}\text{C}$	80	$\text{kA}^2\text{s}$
$P_{max}$	Max. power dissipation	$T_{case} = 25^{\circ}\text{C}$ , $T_j = 125^{\circ}\text{C}$	2080	W
$V_{isol}$	Isolation voltage – per module	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	6000	V
$Q_{PD}$	Partial discharge – per module	IEC1287, $V_1 = 3500\text{V}$ , $V_2 = 2600\text{V}$ , 50Hz RMS	10	pC
$V_{RRM\ DC}$	DC Voltage stability	$25^{\circ}\text{C}$ at sea level, 100 FITs	2200	V

## THERMAL AND MECHANICAL RATINGS

Internal insulation material:	AlN
Baseplate material:	AlSiC
Creepage distance:	33mm
Clearance:	20mm
CTI (Comparative Tracking Index):	>600

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$R_{th(j-c)}$	Thermal resistance (per arm)	Continuous dissipation – junction to case	-	-	48	$^{\circ}\text{C}/\text{kW}$
$R_{th(c-h)}$	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		-40	-	125	$^{\circ}\text{C}$
	Screw Torque	Mounting – M6	-	-	5	Nm
		Electrical connections – M5	-	-	4	Nm

**STATIC ELECTRICAL CHARACTERISTICS – PER ARM**

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$I_{RM}$	Peak reverse current	$V_R = 3300V, T_j = 125^{\circ}C$			30	mA
$V_F$	Forward voltage	$I_F = 400A$		2.9		V
		$I_F = 400A, T_j = 125^{\circ}C$		3.0		V
$L_M$	Inductance	-		40		nH

**DYNAMIC ELECTRICAL CHARACTERISTICS – PER ARM**

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

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$Q_{rr}$	Reverse recovery charge	$I_F = 400A$ $V_R = 1800V$ $di_F/dt = 2000A/\mu s$		160		$\mu C$
$I_{rr}$	Peak reverse recovery current			330		A
$E_{rec}$	Reverse recovery energy				150	

$T_{case} = 125^{\circ}C$  unless stated otherwise

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$Q_{rr}$	Reverse recovery charge	$I_F = 400A$ $V_R = 1800V$ $di_F/dt = 2000A/\mu s$		300		$\mu C$
$I_{rr}$	Peak reverse recovery current			400		A
$E_{rec}$	Reverse recovery energy				300	

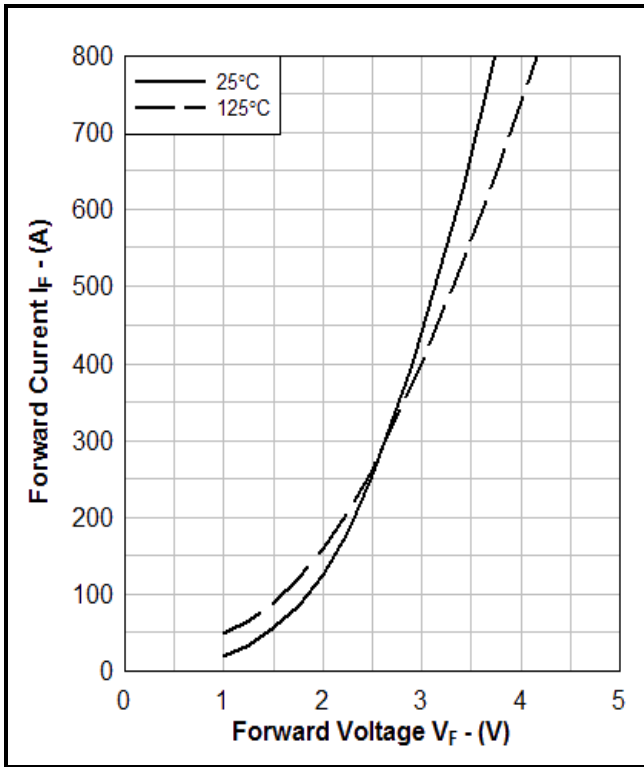


Fig. 3 Diode typical forward characteristics

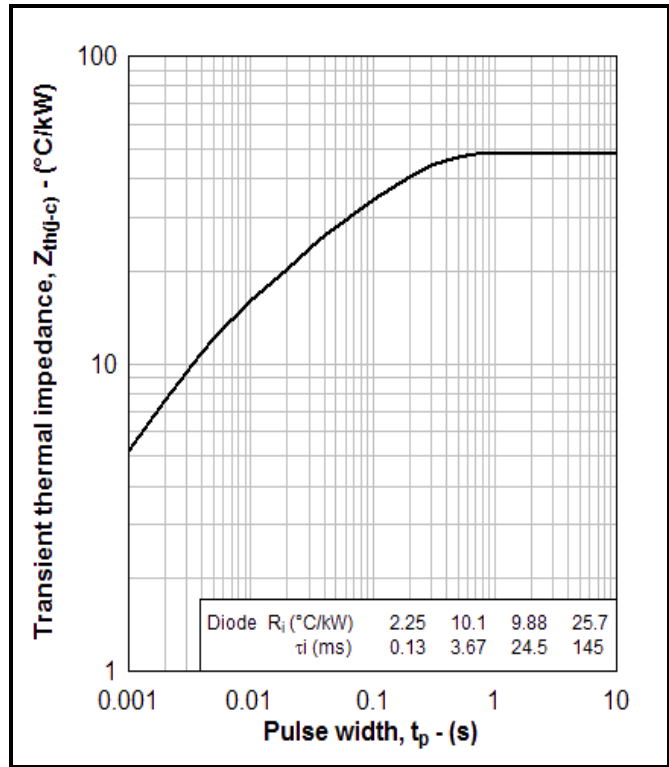


Fig. 4 Transient thermal impedance

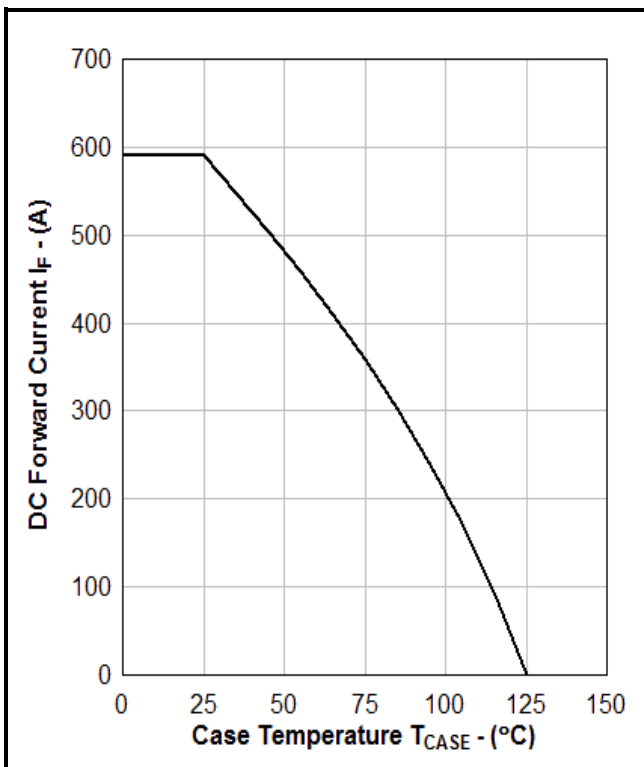


Fig. 5 DC current rating vs case temperature

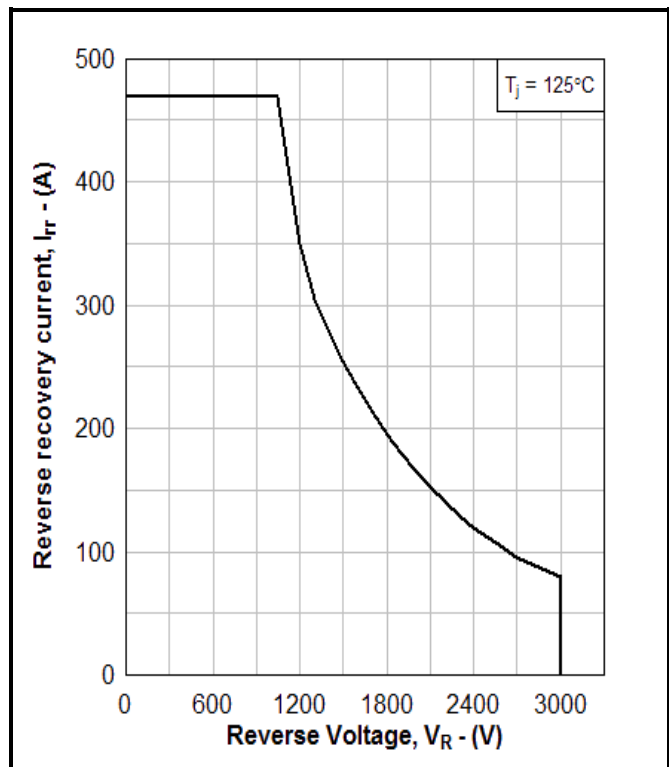


Fig. 6 Reverse Bias Safe Operating Area (RBSOA)



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The products must not be touched when operating because there is a danger of electrocution or severe burning. Always use protective safety equipment such as appropriate shields for the product and wear safety glasses. Even when disconnected any electric charge remaining in the product must be discharged and allowed to cool before safe handling using protective gloves.

Extended exposure to conditions outside the product ratings may affect reliability leading to premature product failure. Use outside the product ratings is likely to cause permanent damage to the product. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture, a large current to flow or high voltage arcing, resulting in fire or explosion. Appropriate application design and safety precautions should always be followed to protect persons and property.

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