

### FEATURES

- Low Reverse Recovery Charge
- High Switching Speed
- Low Forward Volt Drop
- Isolated AISiC Base With AlN Substrates
- Triple Diodes can be paralleled for 3000A rating
- Low FIT Rate

### APPLICATIONS

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

The DFM1000EXM33-TS000 is a triple 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

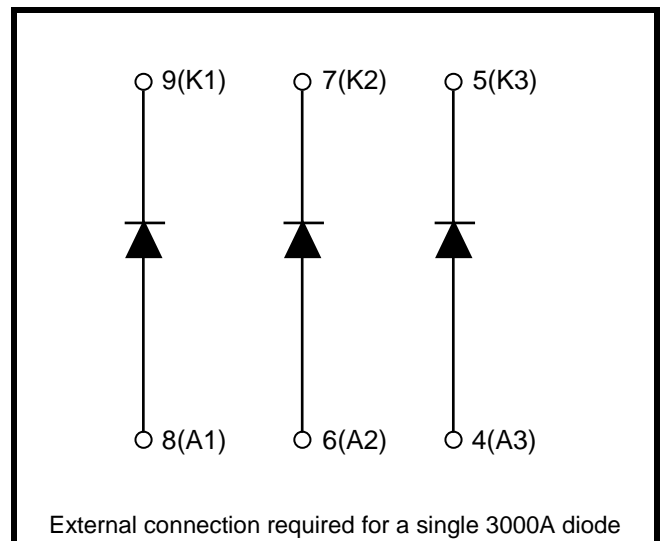
Order As:

### DFM1000EXM33-TS000

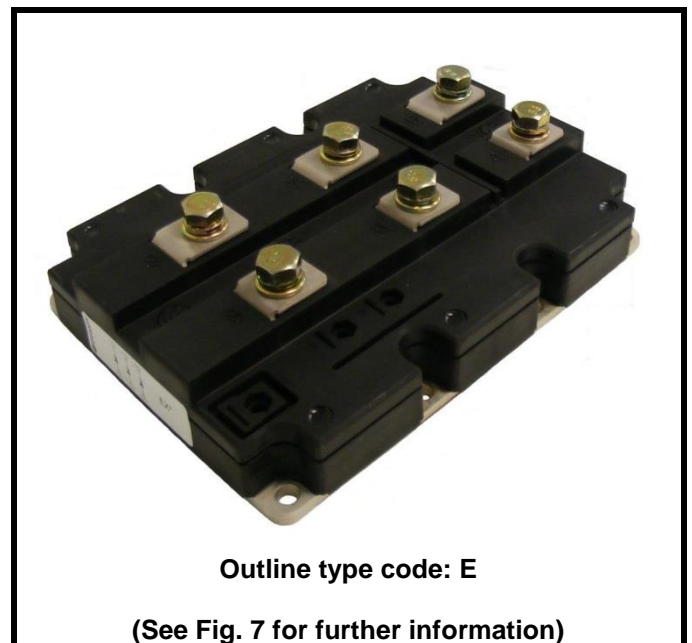
Note: When ordering, please use the complete part number

### KEY PARAMETERS

$V_{RRM}$		<b>3300V</b>
$V_F$	(typ)	<b>2.4V</b>
$I_F$	(max)	<b>1000A</b>
$I_{FM}$	(max)	<b>2000A</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<sub>case</sub> = 25°C unless stated otherwise**

Symbol	Parameter	Test Conditions	Max.	Units
V <sub>RRM</sub>	Repetitive peak reverse voltage	T <sub>j</sub> = 150°C	3300	V
I <sub>F</sub>	Forward current (per arm)	DC, T <sub>case</sub> = 90°C	1000	A
I <sub>FM</sub>	Max. forward current	T <sub>case</sub> = 135°C, t <sub>p</sub> = 1ms	2000	A
I <sup>2</sup> t	I <sup>2</sup> t value fuse current rating	V <sub>R</sub> = 0, t <sub>p</sub> = 10ms, T <sub>j</sub> = 150°C	320	kA <sup>2</sup> s
P <sub>max</sub>	Max. power dissipation	T <sub>case</sub> = 25°C, T <sub>j</sub> = 150°C	5.2	KW
V <sub>isol</sub>	Isolation voltage – per module	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	6000	V
Q <sub>PD</sub>	Partial discharge – per module	IEC1287, V <sub>1</sub> = 3500V, V <sub>2</sub> = 2600V, 50Hz RMS	10	pC
V <sub>RRM DC</sub>	DC Voltage stability	25°C at sea level, 100 FITs	2100	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 <sub>th(j-c)</sub>	Thermal resistance (per arm)	Continuous dissipation – junction to case	-	-	24	°C/kW
R <sub>th(c-h)</sub>	Thermal resistance – case to heatsink (per module)	Mounting torque 5Nm (with mounting grease)	-	-	6	°C/kW
T <sub>j</sub>	Junction temperature		-40	-	150	°C
T <sub>stg</sub>	Storage temperature range		-40	-	125	°C
	Screw Torque	Mounting – M6	-	-	5	Nm
		Electrical connections – M8	-	-	10	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	$V_R = 3300V, T_j = 150^{\circ}C$			60	mA
$V_F$	Forward voltage	$I_F = 1000A$		2.4		V
		$I_F = 1000A, T_j = 125^{\circ}C$		2.5		V
		$I_F = 1000A, T_j = 150^{\circ}C$		2.4		V
$L_M$	Inductance	-		25		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	$I_F = 1000A$ $V_R = 1800V$ $di_F/dt = 2700A/\mu s$		570		$\mu C$
$I_{rr}$	Peak reverse recovery current			615		A
$E_{rec}$	Reverse recovery energy			670		mJ

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

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$Q_{rr}$	Reverse recovery charge	$I_F = 1000A$ $V_R = 1800V$ $di_F/dt = 2700A/\mu s$		935		$\mu C$
$I_{rr}$	Peak reverse recovery current			775		A
$E_{rec}$	Reverse recovery energy			1150		mJ

 $T_{case} = 150^{\circ}C$  unless stated otherwise

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$Q_{rr}$	Reverse recovery charge	$I_F = 1000A$ $V_R = 1800V$ $di_F/dt = 2700A/\mu s$		1070		$\mu C$
$I_{rr}$	Peak reverse recovery current			800		A
$E_{rec}$	Reverse recovery energy			1300		mJ

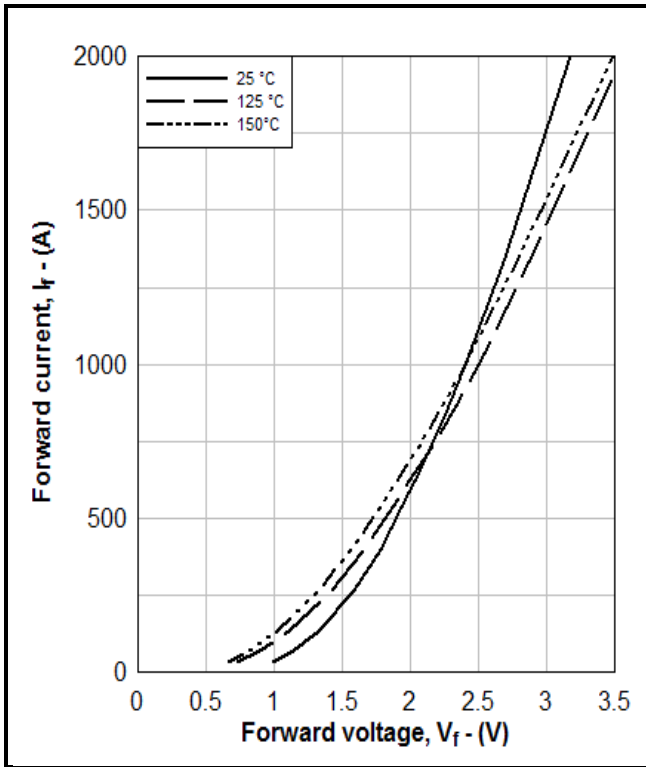


Fig. 3 Diode typical forward characteristics

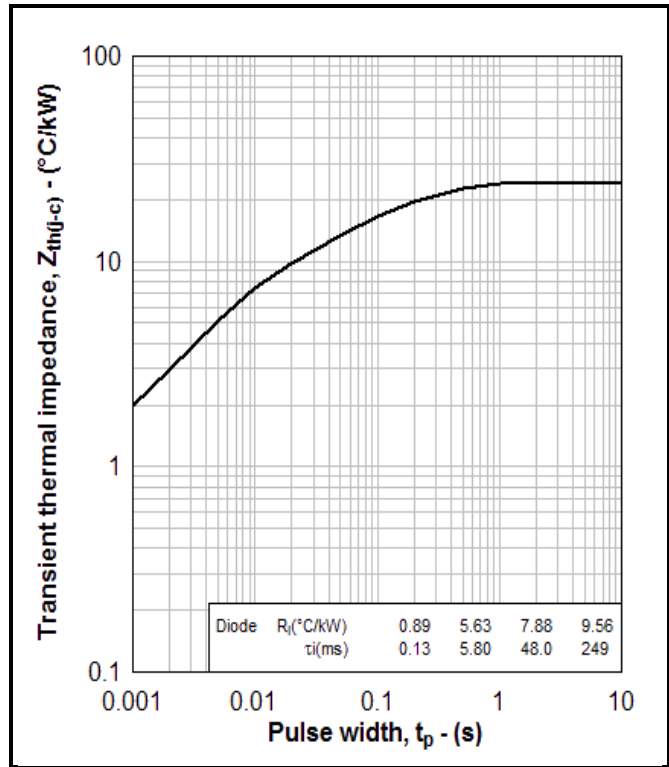


Fig. 4 Transient thermal impedance

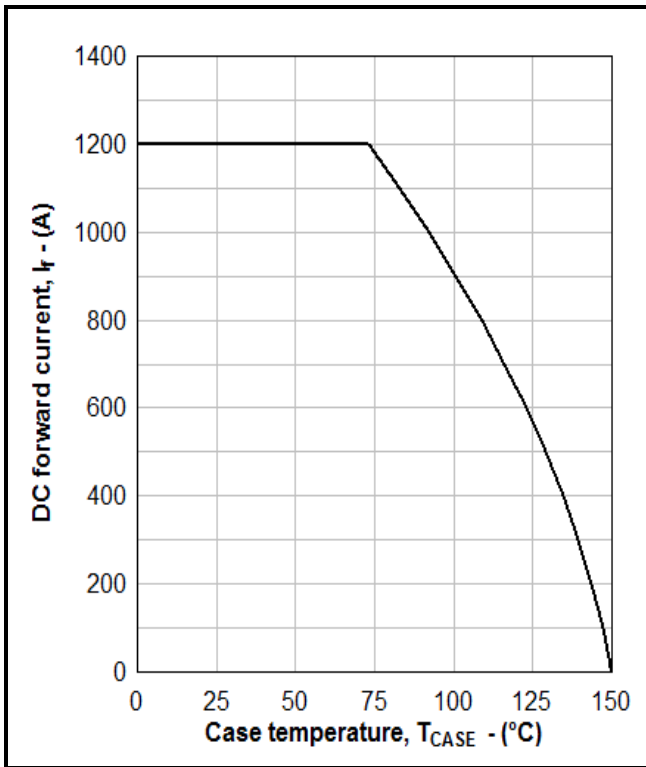


Fig. 5 DC current rating vs case temperature

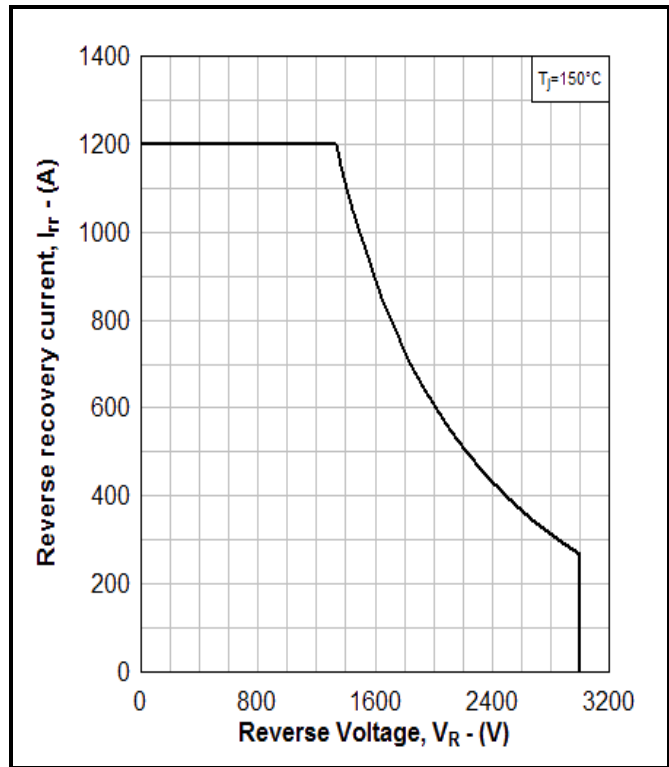
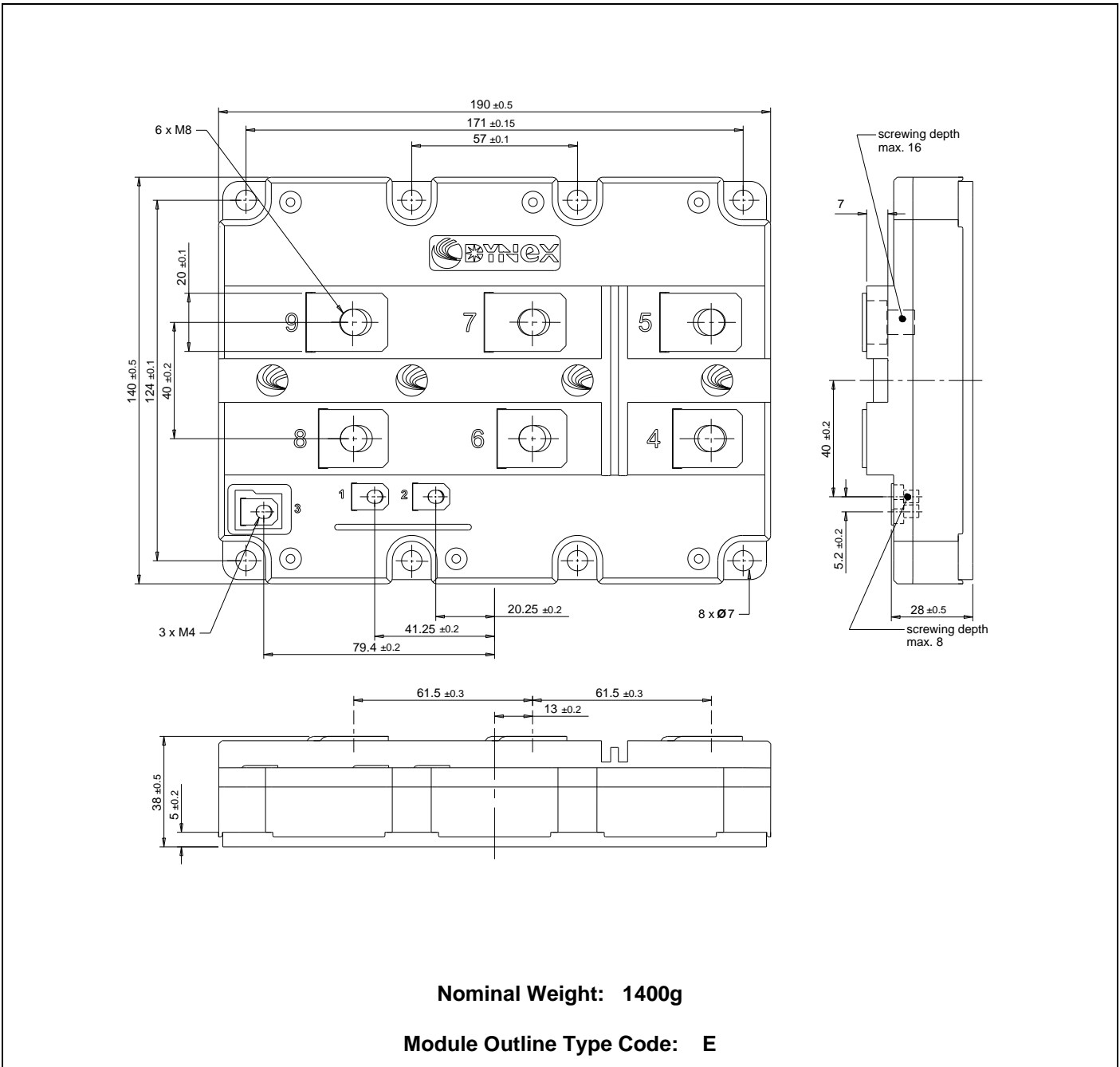


Fig. 6 Reverse Bias Safe Operating Area (RBSOA)

PACKAGE DETAILS

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



Nominal Weight: 1400g

Module Outline Type Code: E

Fig. 7 Module outline drawing

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