

### FEATURES

- Low Reverse Recovery Charge
- High Switching Speed
- Low Forward Volt Drop
- Isolated AlSiC Base with AlN Substrates
- Dual Diodes can be paralleled for 800A Rating
- Lead Free Construction
- 10.2kV Isolation Package

### APPLICATIONS

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

The DFM400XXM65-F000 is a dual 6500V, 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:

### DFM400XXM65-F000

Note: When ordering, please use the complete part number

### KEY PARAMETERS

$V_{RRM}$		6500V
$V_F$	(typ)	3.6V
$I_F$	(max)	400A
$I_{FM}$	(max)	800A

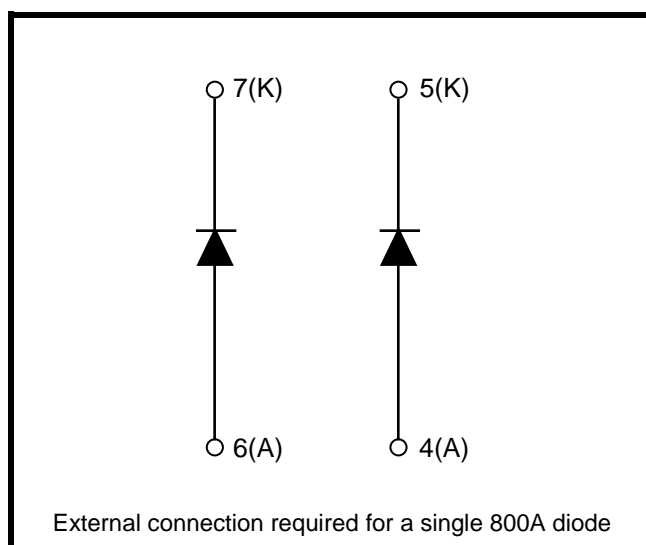


Fig. 1 Circuit configuration

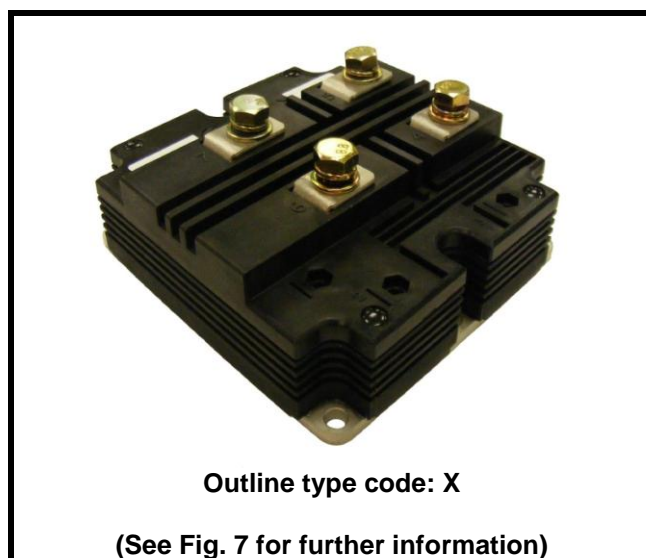


Fig. 2 Package

## 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	$T_j = 125^{\circ}\text{C}$	6500	V
		$T_j = 25^{\circ}\text{C}$	6300	V
		$T_j = -40^{\circ}\text{C}$	5800	V
$I_F$	Forward current (per arm)	DC, $T_{case} = 75^{\circ}\text{C}$ , $T_j = 125^{\circ}\text{C}$	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	$V_R = 0$ , $t_p = 10\text{ms}$ , $T_j = 125^{\circ}\text{C}$	97	$\text{kA}^2\text{s}$
$P_{max}$	Max. power dissipation	$T_{case} = 25^{\circ}\text{C}$ , $T_j = 125^{\circ}\text{C}$	3300	W
$V_{isol}$	Isolation voltage – per module	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	10200	V
$Q_{PD}$	Partial discharge – per module	IEC1287, $V_1 = 6900\text{V}$ , $V_2 = 5100\text{V}$ , 50Hz RMS	10	pC

## THERMAL AND MECHANICAL RATINGS

Internal insulation material:	AlN
Baseplate material:	AlSiC
Creepage distance:	56mm
Clearance:	26mm
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	-	-	30	$^{\circ}\text{C}/\text{kW}$
$R_{th(c-h)}$	Thermal resistance – case to heatsink (per module)	Mounting torque 5Nm (with mounting grease)	-	-	8	$^{\circ}\text{C}/\text{kW}$
$T_j$	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 – M8	-	-	10	Nm

**STATIC ELECTRICAL CHARACTERISTICS – PER ARM**

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$I_{RM}$	Peak reverse current	$V_R = 6500\text{V}$ , $T_j = 125^{\circ}\text{C}$			40	mA
$V_F$	Forward voltage	$I_F = 400\text{A}$		3.6		V
		$I_F = 400\text{A}$ , $T_j = 125^{\circ}\text{C}$		4.1		V
$L_M$	Inductance	-		40		nH

**STATIC ELECTRICAL CHARACTERISTICS**

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
$L_M$	Module inductance (externally connected in parallel)	-		20		nH
$R_{INT}$	Internal resistance (per arm)	-		370		$\mu\Omega$

**DYNAMIC ELECTRICAL CHARACTERISTICS – PER ARM**

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

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$Q_{rr}$	Reverse recovery charge	$I_F = 400\text{A}$ $V_R = 3600\text{V}$ $di_F/dt = 1300\text{A}/\mu\text{s}$		700		$\mu\text{C}$
$I_{rr}$	Peak reverse recovery current			300		A
$E_{rec}$	Reverse recovery energy			1300		mJ

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

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$Q_{rr}$	Reverse recovery charge	$I_F = 400\text{A}$ $V_R = 3600\text{V}$ $di_F/dt = 1600\text{A}/\mu\text{s}$		1000		$\mu\text{C}$
$I_{rr}$	Peak reverse recovery current			370		A
$E_{rec}$	Reverse recovery energy			2000		mJ

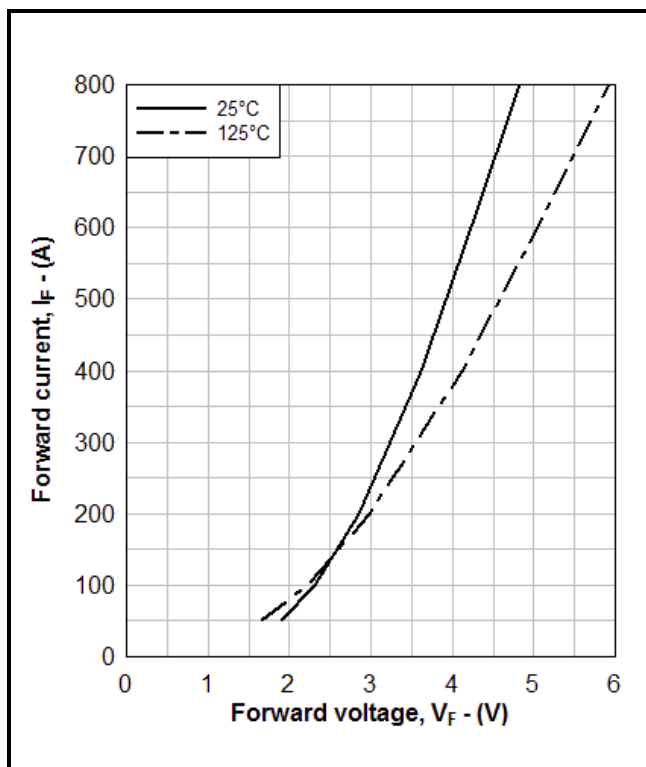


Fig. 3 Diode typical forward characteristics

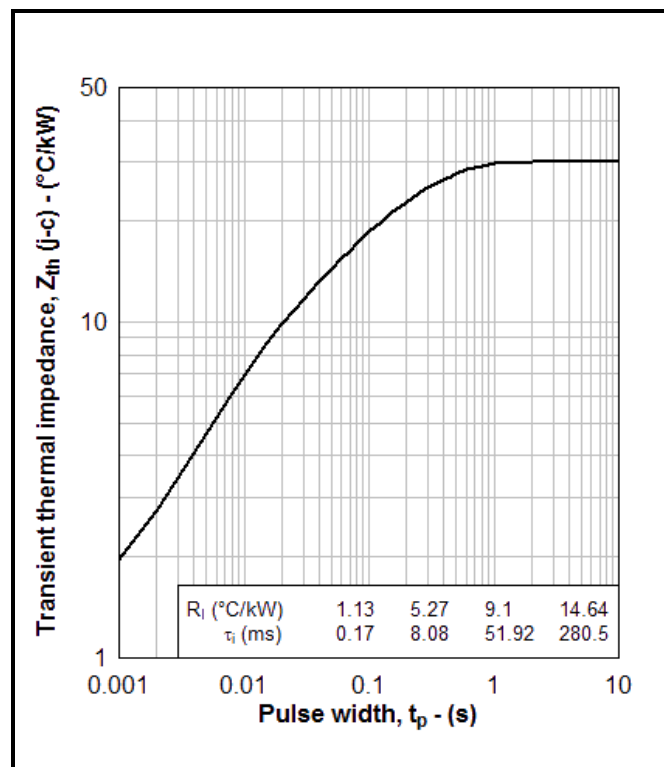


Fig. 4 Transient thermal impedance

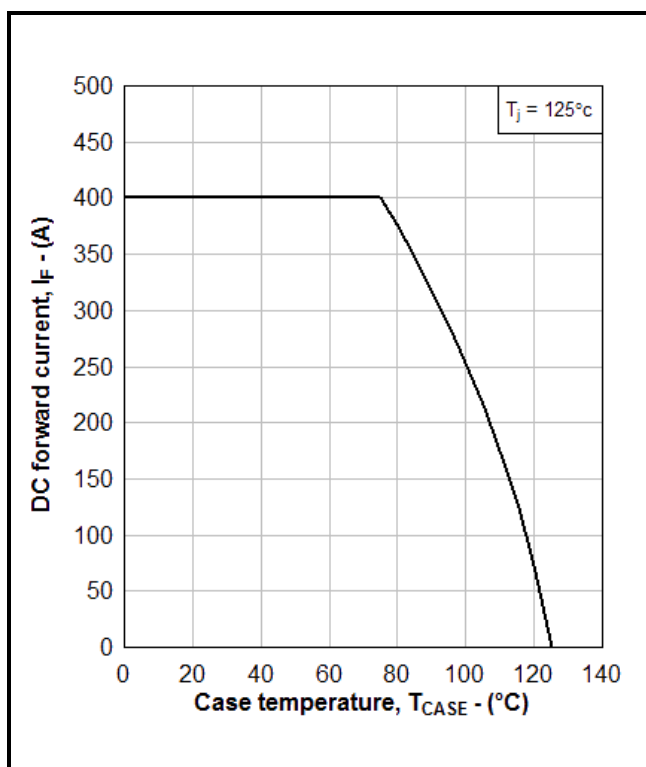


Fig. 5 DC current rating vs case temperature

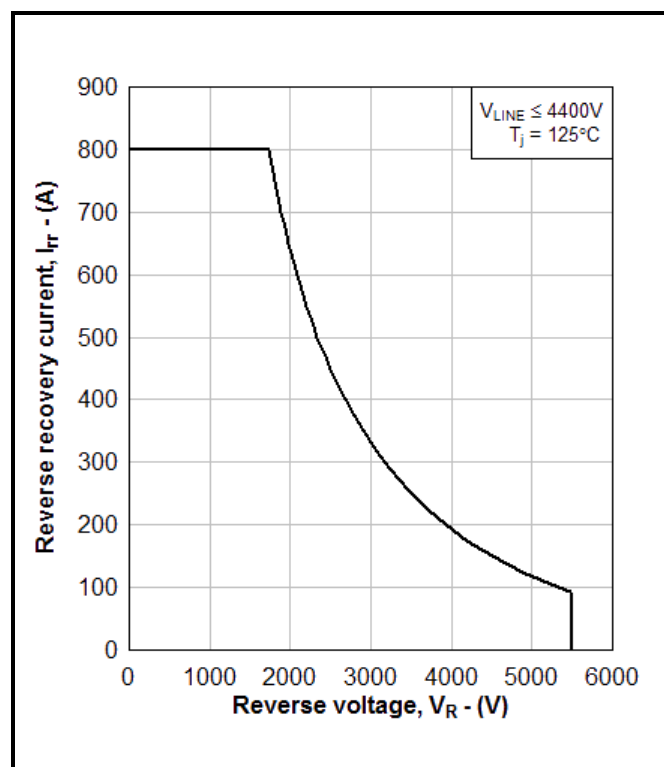
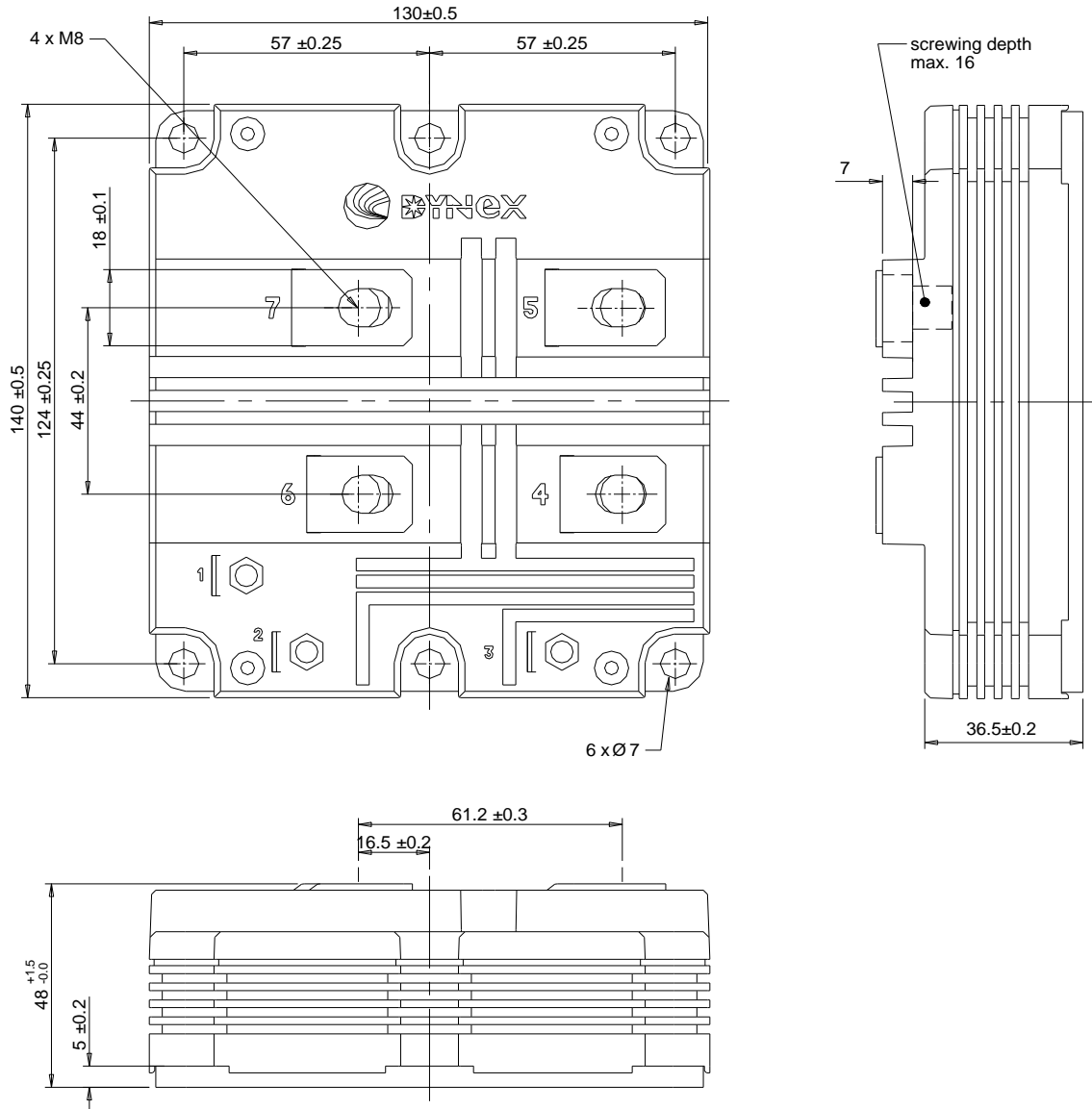


Fig. 6 Reverse Bias Safe Operating Area (RBSOA)

## 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: 1100g**

**Module Outline Type Code: X**

**Fig. 7 Module outline drawing**

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<b>Preliminary Information:</b>	The product is in design and development. The datasheet represents the product as it is understood but may change.
<b>Advance Information:</b>	The product design is complete and final characterisation for volume production is well in hand.
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