

# DFM800XXM45-TS000

# **Fast Recovery Diode Module**

DS6101-1 May 2013 (LN30483)

#### **FEATURES**

- Low Reverse Recovery Charge
- High Switching Speed
- Low Forward Volt Drop
- Isolated AISiC Base With AIN Substrates
- Dual Diodes Can Be Paralleled For 1600A Rating

### **APPLICATIONS**

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

The DFM800XXM45-TS000 is a dual 4500V, 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:

## DFM800XXM45-TS000

Note: When ordering, please use the complete part number

## **KEY PARAMETERS**

$V_{RRM}$		4500V
$V_{F}$	(typ)	2.7V
I <sub>F</sub>	(max)	<b>A008</b>
I <sub>FM</sub>	(max)	1600A

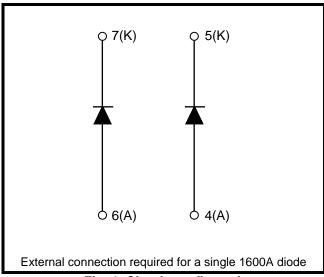


Fig. 1 Circuit configuration

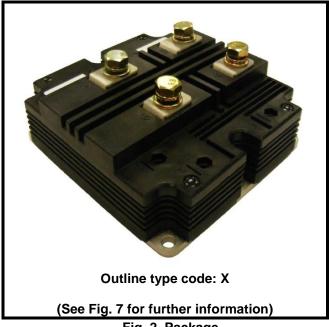


Fig. 2 Package



## **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
$V_{RRM}$	Repetitive peak reverse voltage	T <sub>j</sub> = 125°C	4500	V
I <sub>F</sub>	Forward current (per arm)	DC, T <sub>case</sub> = 70°C	800	Α
I <sub>FM</sub>	Max. forward current	$T_{case} = 115$ °C, $t_p = 1$ ms	1600	Α
l <sup>2</sup> t	I <sup>2</sup> t value fuse current rating	$V_R = 0$ , $t_p = 10$ ms, $T_j = 125$ °C	300	kA <sup>2</sup> s
P <sub>max</sub>	Max. power dissipation	$T_{case} = 25^{\circ}C, T_{j} = 125^{\circ}C$	4160	W
V <sub>isol</sub>	Isolation voltage – per module	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	7.4	kV
$Q_{PD}$	Partial discharge – per module	IEC1287, $V_1 = 4800V$ , $V_2 = 3500V$ , 50Hz RMS	10	pC

### THERMAL AND MECHANICAL RATINGS

Internal insulation material:

Baseplate material:

Creepage distance:

Clearance:

CTI (Comparative Tracking Index):

AIN

AISiC

56mm

26mm

> 600

Symbol	Parameter	Test Conditions	Min	Тур.	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)	-	ı	8	°C/kW
$T_j$	Junction temperature		-40	-	125	°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°C unless stated otherwise.

Symbol	Parameter	Test Conditions	Min	Тур	Max	Units
I <sub>RM</sub>	Peak reverse current	$V_R = 4500V, T_j = 125^{\circ}C$			60	mA
V <sub>F</sub>	Forward voltage	I <sub>F</sub> = 800A		2.7		V
		I <sub>F</sub> = 800A, T <sub>j</sub> = 125°C		2.9		V
L <sub>M</sub>	Inductance	-		40		nΗ

## **DYNAMIC ELECTRICAL CHARACTERISTICS - PER ARM**

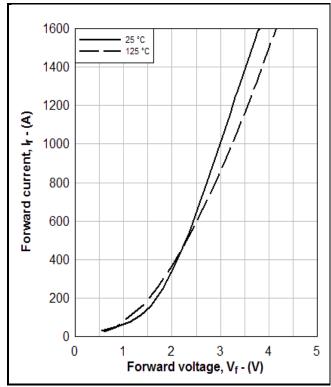
## T<sub>case</sub> = 25°C unless stated otherwise (when used with DIM800XSM45-T000)

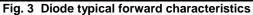
Symbol	Parameter	Test Conditions	Min	Тур.	Max	Units
$Q_{rr}$	Reverse recovery charge	I <sub>F</sub> = 800A		860		μC
I <sub>rr</sub>	Peak reverse recovery current	V <sub>R</sub> =2800V		650		Α
E <sub>rec</sub>	Reverse recovery energy	$dI_F/dt = 2000A/\mu s$		1480		mJ

## T<sub>case</sub> = 125°C unless stated otherwise (when used with DIM800XSM45-T000)

Symbol	Parameter	Test Conditions	Min	Тур.	Max	Units
$Q_{rr}$	Reverse recovery charge	$I_F = 800A$ $V_R = 2800V$ $dI_F/dt = 2000A/\mu s$		1500		μC
I <sub>rr</sub>	Peak reverse recovery current			730		Α
E <sub>rec</sub>	Reverse recovery energy			3650		mJ







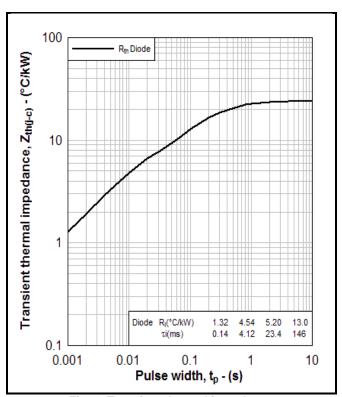


Fig. 4 Transient thermal impedance

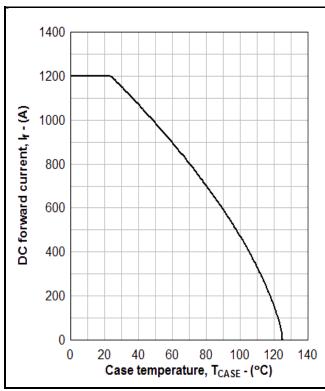


Fig. 5 DC current rating vs case temperature

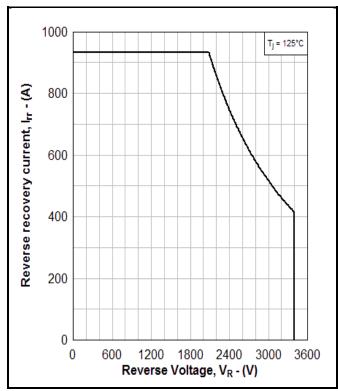


Fig. 6 Reverse Bias Safe Operating Area (RBSOA)



## **PACKAGE DETAILS**

For further package information, please visit our website or contact Customer Services. All dimensions in mm, unless stated otherwise.

## DO NOT SCALE.

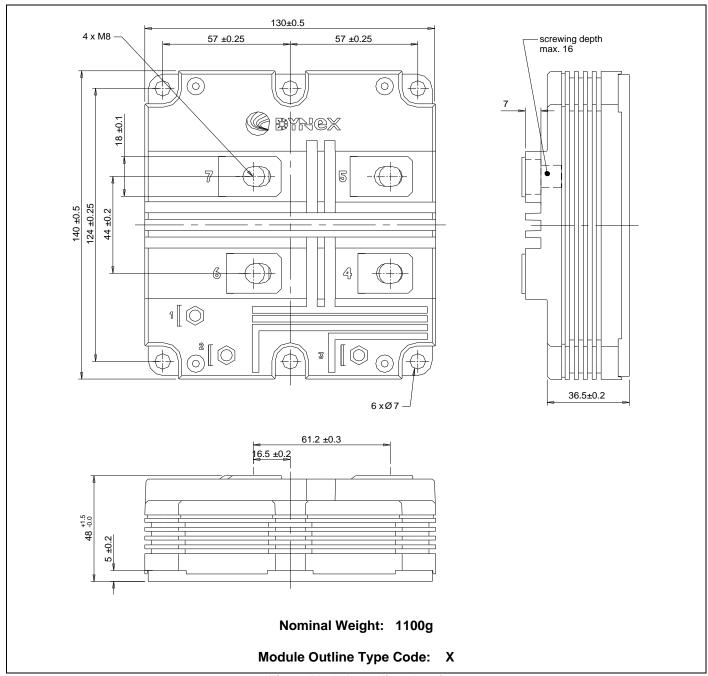


Fig. 7 Module outline drawing



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### DYNEX SEMICONDUCTOR LTD

Doddington Road, Lincoln, Lincolnshire, LN6 3LF, United Kingdom

Fax: +44(0)1522 500550 Tel: +44(0)1522 500500

Web: http://www.dynexsemi.com

### **CUSTOMER SERVICE**

### DYNEX SEMICONDUCTOR LTD

Doddington Road, Lincoln, Lincolnshire, LN6 3LF, United Kingdom

Fax: +44(0)1522 500020

Tel: +44(0)1522 502753 / 502901 Email: Power\_solutions@dynexsemi.com

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