DIM800DDM17-A000

Dual Switch IGBT Module

Replaces DS5433-4.1 July 2002

DS5433-5 June 2009 (LN26751)

FEATURES

- 10µs Short Circuit Withstand
- High Thermal Cycling Capability
- Non Punch Through Silicon
- Isolated AlSiC Base with AlN Substrates
- Lead Free construction

APPLICATIONS

- High Reliability Inverters
- Motor Controllers
- Traction Drives

The Powerline range of high power modules includes half bridge, chopper, dual, single and bi-directional switch configurations covering voltages from 1200V to 6500V and currents up to 2400A.

The DIM800DDM17-A000 is a dual switch 1700V, n-channel enhancement mode, insulated gate bipolar transistor (IGBT) module. The IGBT has a wide reverse bias safe operating area (RBSOA) plus 10µs short circuit withstand. This device is optimised for traction drives and other applications requiring high thermal cycling capability.

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:

DIM800DDM17-A000

Note: When ordering, please use the complete part number

KEY PARAMETERS

V_{CES}		**1700V**
$V_{CE(sat)}$ *	**(typ)**	**2.7 V**
I_C	**(max)**	**800A**
$I_{C(PK)}$	**(max)**	**1600A**

* Measured at the power busbars, not the auxiliary terminals

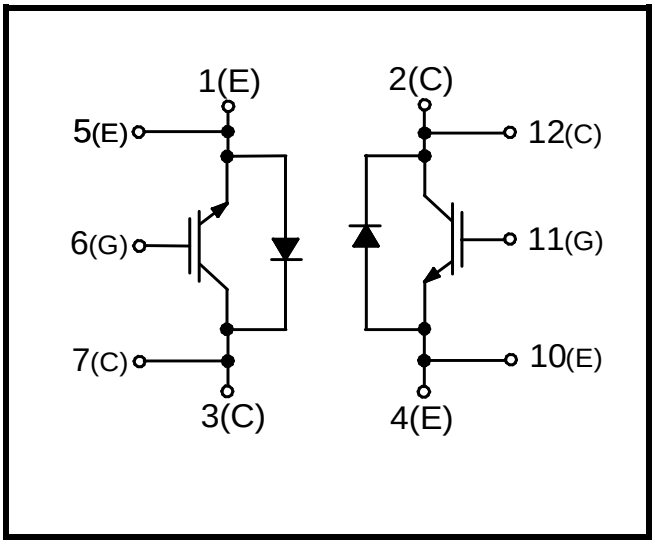
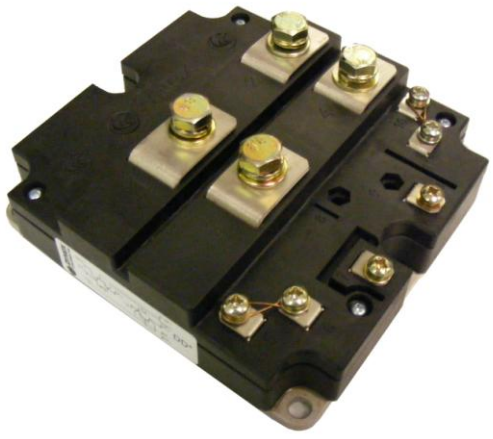


Fig. 1 Circuit configuration



Outline type code: D

(See Fig. 11 for further information)

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°C unless stated otherwise

Symbol	Parameter	Test Conditions	Max.	Units
V_{CES}	Collector-emitter voltage	V_{GE} = 0V	1700	V
V_{GES}	Gate-emitter voltage		±20	V
I_C	Continuous collector current	T_{case} = 75°C	800	A
$I_{C(PK)}$	Peak collector current	1ms, T_{case} = 110°C	1600	A
P_{max}	Max. transistor power dissipation	T_{case} = 25°C, T_j = 150°C	6940	W
I^2t	Diode I^2t value	V_R = 0, t_p = 10ms, T_j = 125ºC	120	kA^2s
V_{isol}	Isolation voltage – per module	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	4000	V
Q_{PD}	Partial discharge – per module	IEC1287, V_1 = 1800V, V_2 = 1300V, 50Hz RMS	10	pC

THERMAL AND MECHANICAL RATINGS

Internal insulation material: AlN

Baseplate material: AlSiC

Creepage distance: 20mm

Clearance: 10mm

CTI (Comparative Tracking Index): 350

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$R_{th(j-c)}$	Thermal resistance – transistor (per switch)	Continuous dissipation - junction to case		-	18	°C/kW
$R_{th(j-c)}$	Thermal resistance – diode (per switch)	Continuous dissipation - junction to case		-	40	°C/kW
$R_{th(c-h)}$	Thermal resistance – case to heatsink (per module)	Mounting torque 5Nm (with mounting grease)		-	8	°C/kW
T_j	Junction temperature	Transistor	-	-	150	°C
		Diode	-	-	125	°C
T_{stg}	Storage temperature range	-	-40	-	125	°C
	Screw torque	Mounting – M6	-	-	5	Nm
		Electrical connections – M4	-	-	2	Nm
		Electrical connections – M8	-	-	10	Nm

ELECTRICAL CHARACTERISTICS

T_{case} = 25°C unless stated otherwise.

Symbol	Parameter	Test Conditions		Min	Typ	Max	Units
I_{CES}	Collector cut-off current	V_{GE} = 0V, V_{CE} = V_{CES}				1	mA
		V_{GE} = 0V, V_{CE} = V_{CES}, T_{case} = 125°C				25	mA
I_{GES}	Gate leakage current	V_{GE} = ± 20V, V_{CE} = 0V				4	µA
$V_{GE(TH)}$	Gate threshold voltage	I_C = 40mA, V_{GE} = V_{CE}		4.5	5.5	6.5	V
$V_{CE(sat)}$ †	Collector-emitter saturation voltage	V_{GE} = 15V, I_C = 800A			2.7	3.2	V
		V_{GE} = 15V, I_C = 800A, T_j = 125°C			3.4	4.0	V
I_F	Diode forward current	DC				800	A
I_{FM}	Diode maximum forward current	t_p = 1ms				1600	A
V_F †	Diode forward voltage	I_F = 800A			2.2	2.5	V
		I_F = 800A, T_j = 125°C			2.3	2.6	V
C_{ies}	Input capacitance	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz			60		nF
Q_g	Gate charge	±15V			9		µC
C_{res}	Reverse transfer capacitance	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz			-		nF
L_M	Module inductance – per switch	-			20		nH
R_{INT}	Internal transistor resistance – per switch	-			270		µΩ
SC_{Data}	Short circuit current, I_{SC}	T_j = 125°C, V_{CC} = 1000V t_p ≤ 10µs, V_{GE} ≤ 15V $V_{CE\ (max)}$ = V_{CES} – L* x dI/dt IEC 60747-9	I_1		3700		A
			I_2		3200		A

Note:
† Measured at the power busbars, not the auxiliary terminals
* L is the circuit inductance + L_M

ELECTRICAL CHARACTERISTICS

T_{case} = 25°C unless stated otherwise

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$t_{d(off)}$	Turn-off delay time	I_C = 800A V_{GE} = ±15V V_{CE} = 900V $R_{G(ON)}$ = 2.2Ω $R_{G(OFF)}$ = 2.2Ω L_S ~ 100nH		1250		ns
t_f	Fall time			170		ns
E_{OFF}	Turn-off energy loss			230		mJ
$t_{d(on)}$	Turn-on delay time			250		ns
t_r	Rise time			250		ns
E_{ON}	Turn-on energy loss			220		mJ
Q_{rr}	Diode reverse recovery charge	I_F = 800A V_{CE} = 900V dI_F/dt = 4000A/µs		200		µC
I_{rr}	Diode reverse recovery current			460		A
E_{rec}	Diode reverse recovery energy			130		mJ

T_{case} = 125°C unless stated otherwise

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$t_{d(off)}$	Turn-off delay time	I_C = 800A V_{GE} = ±15V V_{CE} = 900V $R_{G(ON)}$ = 2.2Ω $R_{G(OFF)}$ = 2.2Ω L_S ~ 100nH		1500		ns
t_f	Fall time			200		ns
E_{OFF}	Turn-off energy loss			360		mJ
$t_{d(on)}$	Turn-on delay time			400		ns
t_r	Rise time			250		ns
E_{ON}	Turn-on energy loss			340		mJ
Q_{rr}	Diode reverse recovery charge	I_F = 800A V_{CE} = 900V dI_F/dt = 4000A/µs		330		µC
I_{rr}	Diode reverse recovery current			530		A
E_{rec}	Diode reverse recovery energy			200		mJ

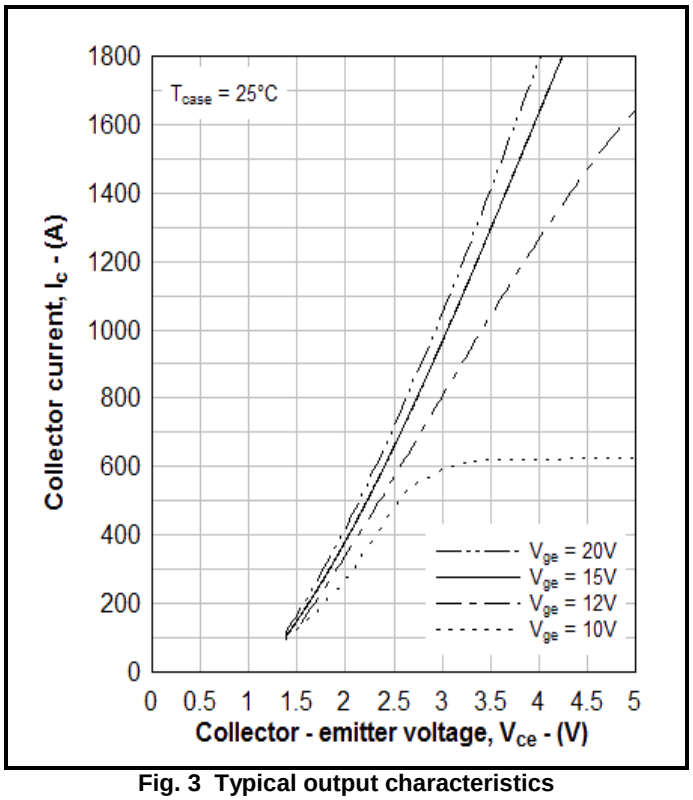


Fig. 3 Typical output characteristics

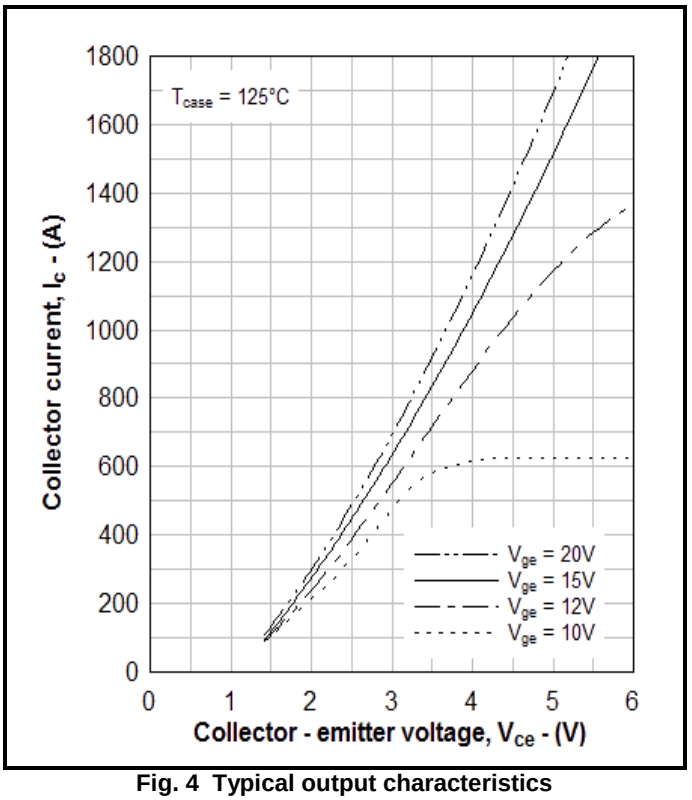


Fig. 4 Typical output characteristics

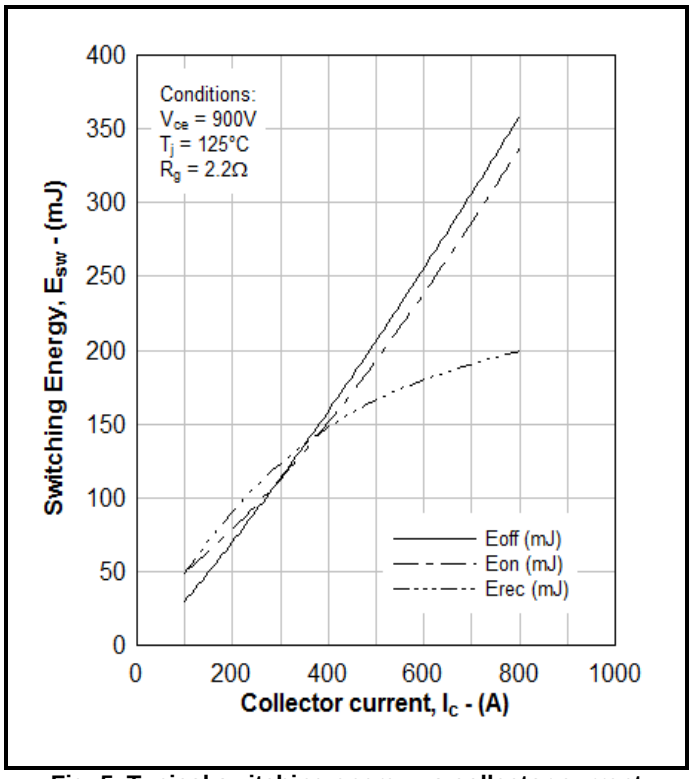


Fig. 5 Typical switching energy vs collector current

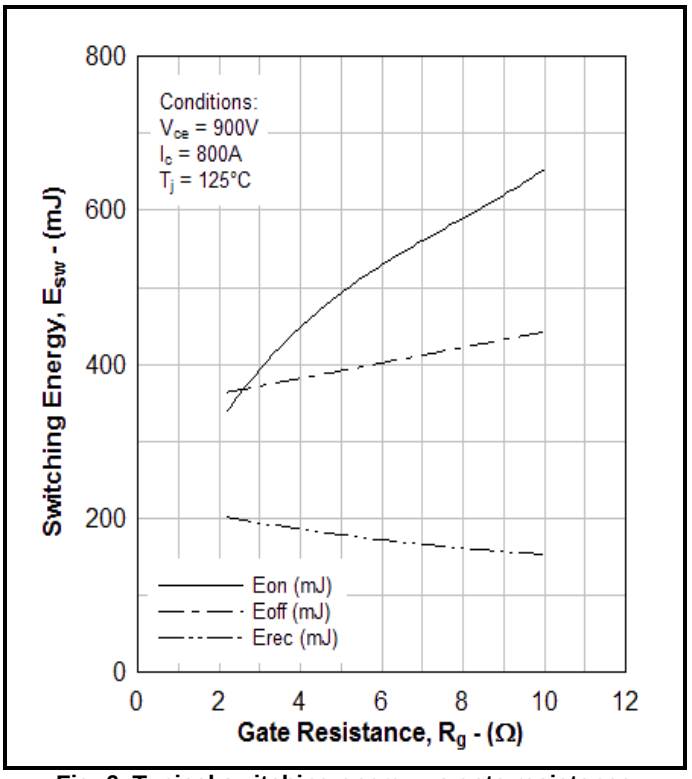


Fig. 6 Typical switching energy vs gate resistance

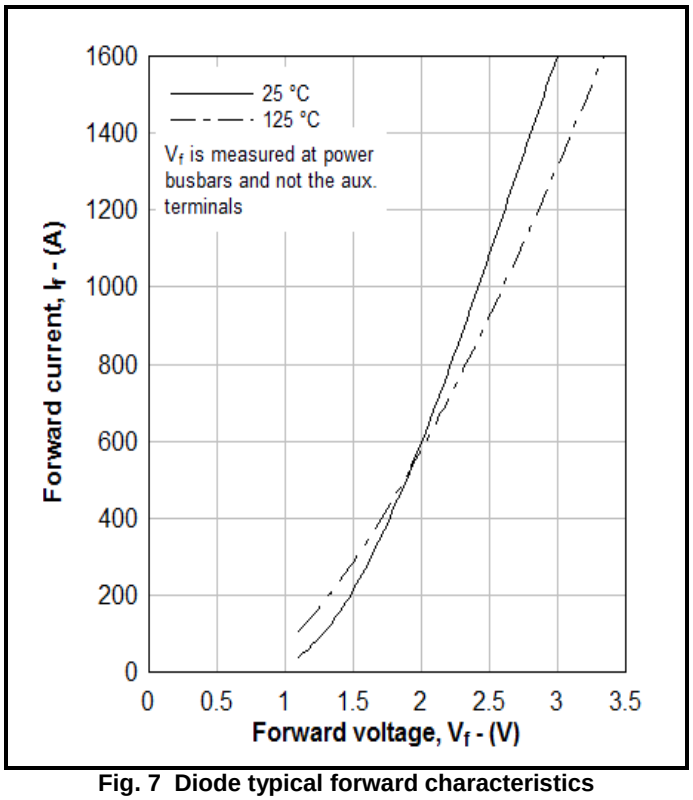


Fig. 7 Diode typical forward characteristics

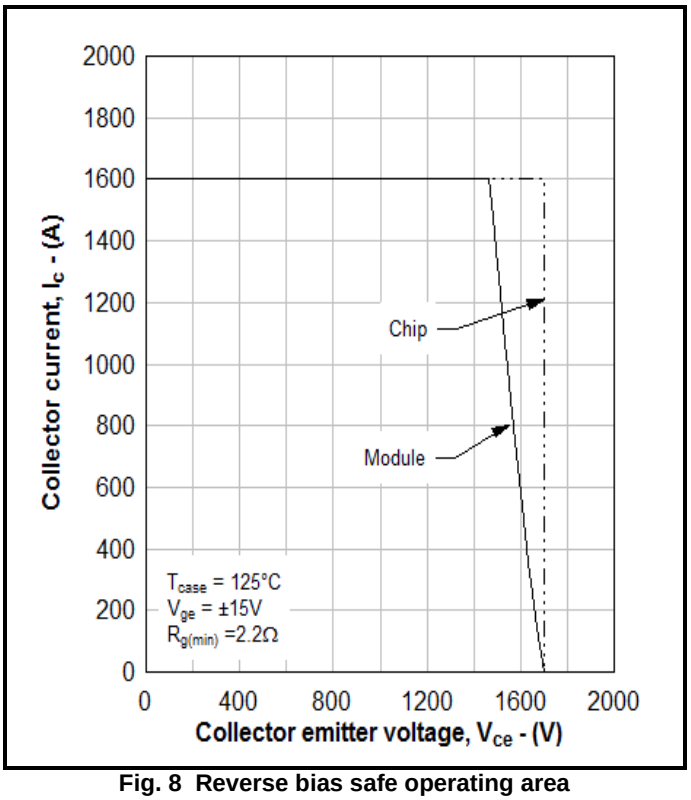


Fig. 8 Reverse bias safe operating area

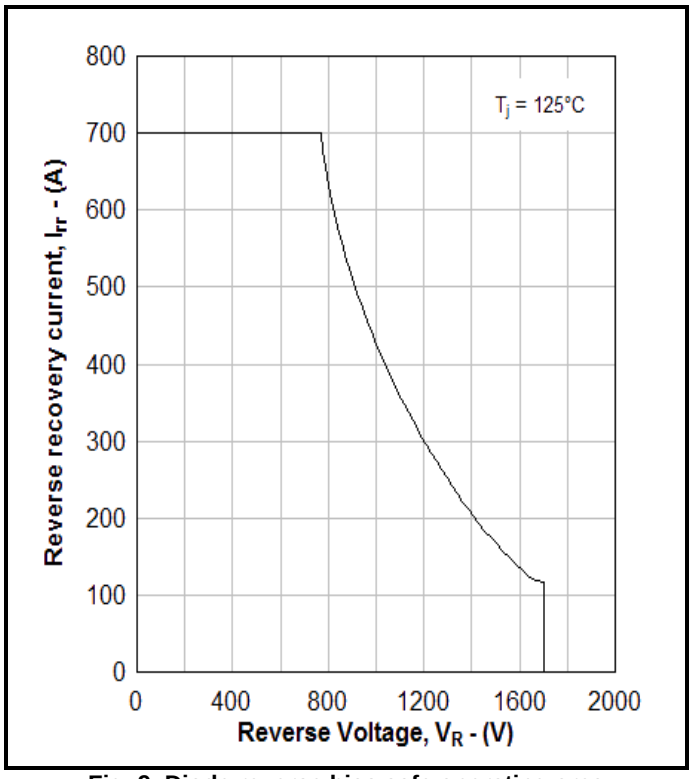


Fig. 9 Diode reverse bias safe operating area

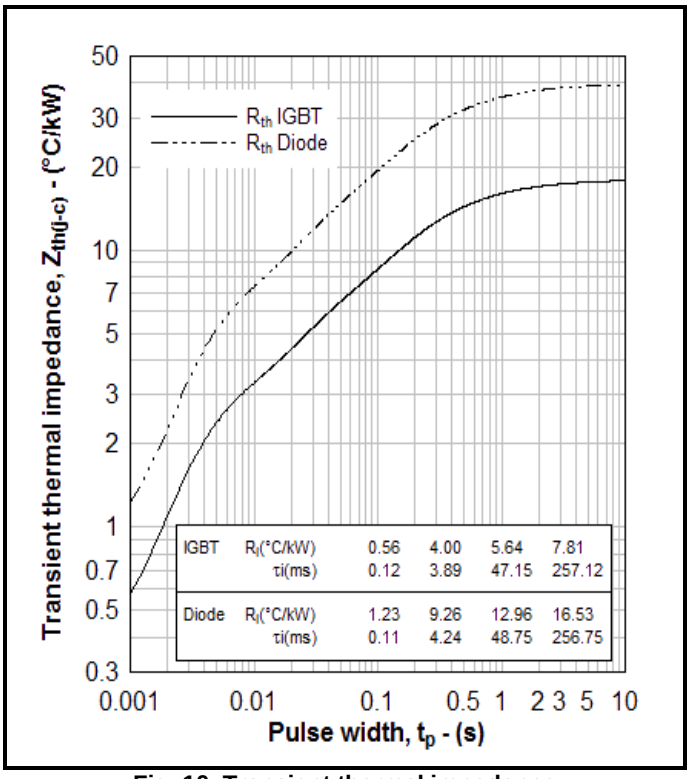
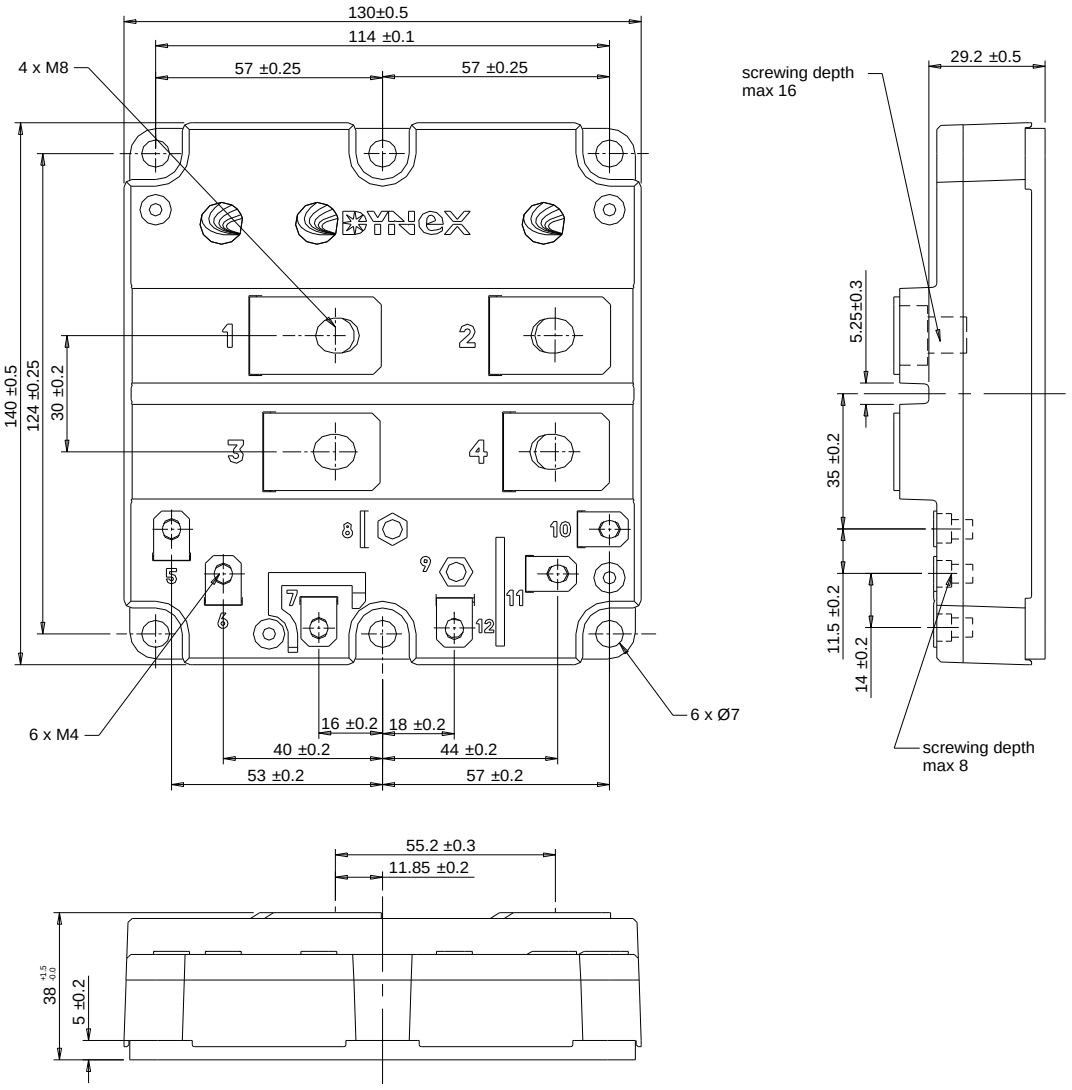


Fig. 10 Transient thermal impedance

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: 900g

Module Outline Type Code: D

Fig. 11 Module outline drawing

HEADQUARTERS OPERATIONS

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Target Information:	This is the most tentative form of information and represents a very preliminary specification. No actual 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 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.

Caution: This device is sensitive to electrostatic discharge. Users should follow ESD handling procedures.