

FEATURES

- 10µs Short Circuit Withstand
- Non Punch Through Silicon
- Isolated Cu Base With Al₂O₃ Substrates
- Lead Free Construction

APPLICATIONS

- High Reliability Inverters
- Motor Controllers

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 DIM800DCS12-A000 is a dual switch 1200V, 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.

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:

DIM800DCS12-A000

Note: When ordering, please use the complete part number

KEY PARAMETERS

V_{CES}	1200V
$V_{CE(sat)}$ * (typ)	2.2V
I_C (max)	800A
$I_{C(PK)}$ (max)	1600A

* Measured at the power busbars, not the auxiliary terminals

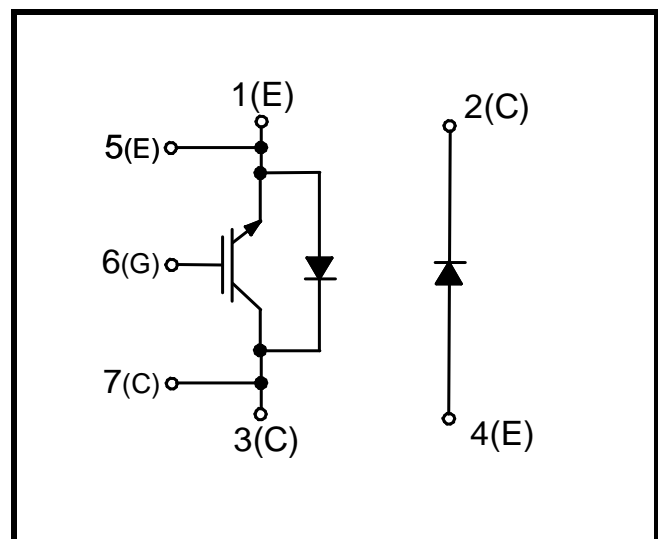


Fig. 1 Circuit configuration

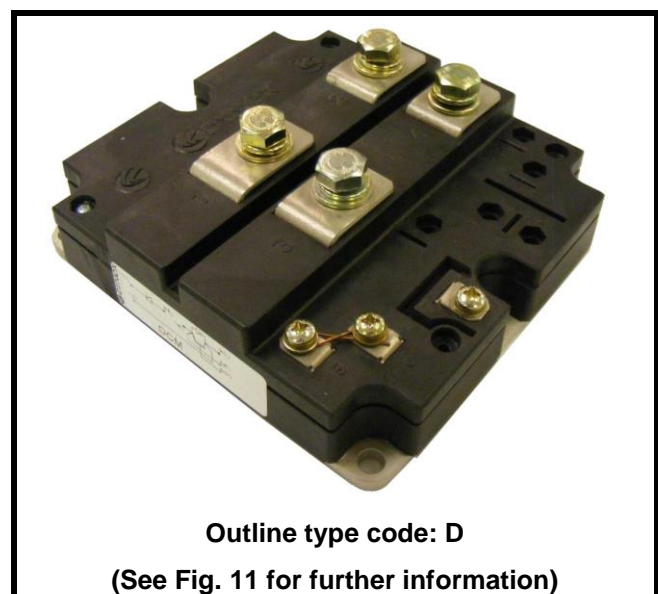


Fig. 2 Package

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_{CES}	Collector-emitter voltage	$V_{GE} = 0\text{V}$	1200	V
V_{GES}	Gate-emitter voltage		± 20	V
I_C	Continuous collector current	$T_{case} = 85^{\circ}\text{C}$	800	A
$I_{C(PK)}$	Peak collector current	1ms, $T_{case} = 115^{\circ}\text{C}$	1600	A
P_{max}	Max. transistor power dissipation	$T_{case} = 25^{\circ}\text{C}$, $T_j = 150^{\circ}\text{C}$	6940	W
I^2t	Diode I^2t value (IGBT arm)	$V_R = 0$, $t_p = 10\text{ms}$, $T_j = 125^{\circ}\text{C}$	100	kA^2s
	Diode I^2t value (Diode arm)		225	kA^2s
V_{isol}	Isolation voltage – per module	Commoned terminals to base plate. AC RMS, 1 min, 50Hz	2500	V

THERMAL AND MECHANICAL RATINGS

Internal insulation material:	Al_2O_3
Baseplate material:	Cu
Creepage distance:	20mm
Clearance:	10mm
CTI (Comparative Tracking Index):	>600

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$R_{th(j-c)}$	Thermal resistance – transistor (per arm)	Continuous dissipation – junction to case	-	-	18	$^{\circ}\text{C}/\text{kW}$
$R_{th(j-c)}$	Thermal resistance – diode (IGBT arm)	Continuous dissipation – junction to case	-	-	40	$^{\circ}\text{C}/\text{kW}$
	Thermal resistance – diode (Diode arm)				27	
$R_{th(c-h)}$	Thermal resistance – case to heatsink (per module)	Mounting torque 5Nm (with mounting grease)	-	-	8	$^{\circ}\text{C}/\text{kW}$
T_j	Junction temperature	Transistor	-	-	150	$^{\circ}\text{C}$
		Diode	-	-	125	$^{\circ}\text{C}$
T_{stg}	Storage temperature range	-	-40	-	125	$^{\circ}\text{C}$
	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		2.2	2.8	V
		V _{GE} = 15V, I _C = 800A, T _{VJ} = 125°C		2.6	3.2	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 (IGBT arm)	I _F = 800A		2.1	2.4	V
	Diode forward voltage (Diode arm)			1.8	2.1	V
	Diode forward voltage (IGBT arm)	I _F = 800A, T _{VJ} = 125°C		2.1	2.4	V
	Diode forward voltage (Diode arm)			1.7	2.0	V
C _{ies}	Input capacitance	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz		90		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 arm			20		nH
R _{INT}	Internal transistor resistance – per arm			270		μΩ
SC _{Data}	Short circuit current, I _{SC}	T _j = 125°C, V _{CC} = 900V t _p ≤ 10μs, V _{GE} ≤ 15V V _{CE(max)} = V _{CES} - L* x di/dt IEC 60747-9		4500		A

Note:

 * L is the circuit inductance + L_M

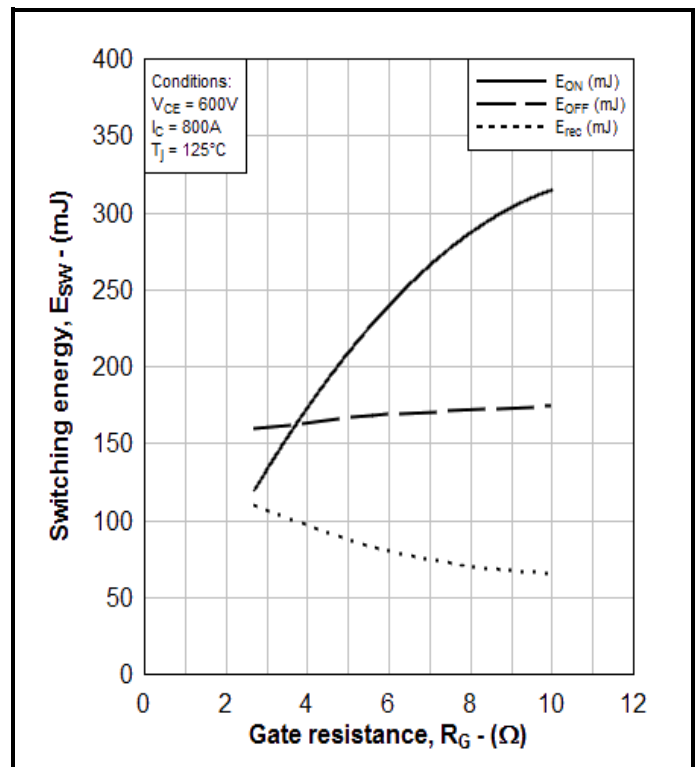
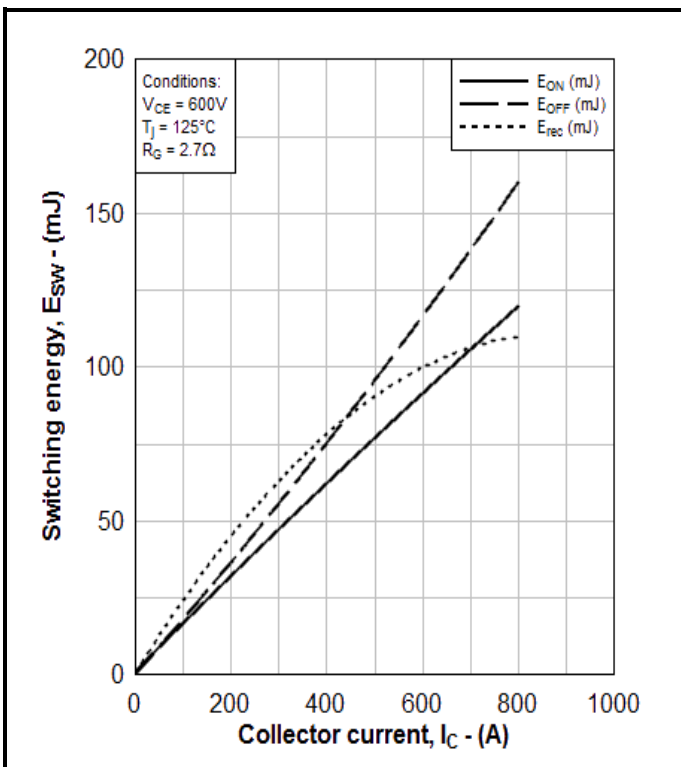
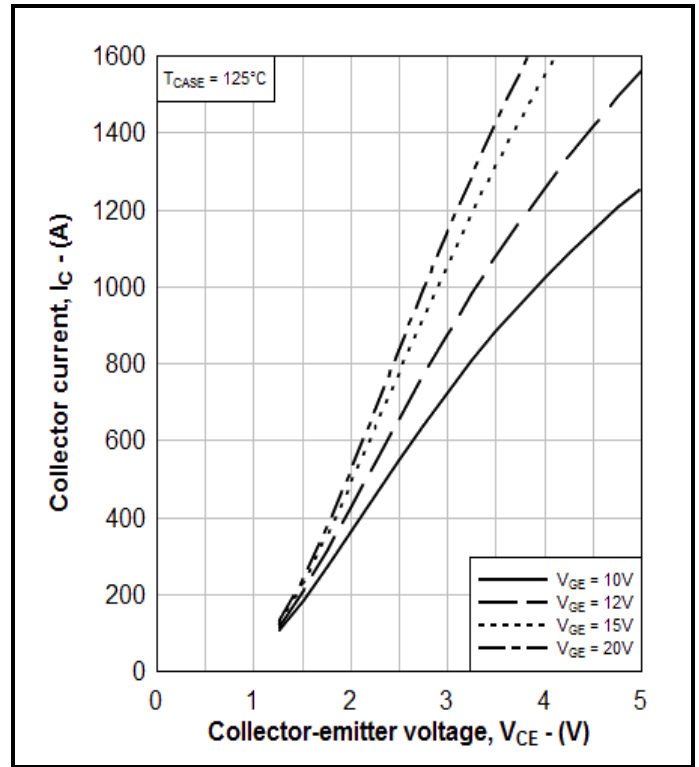
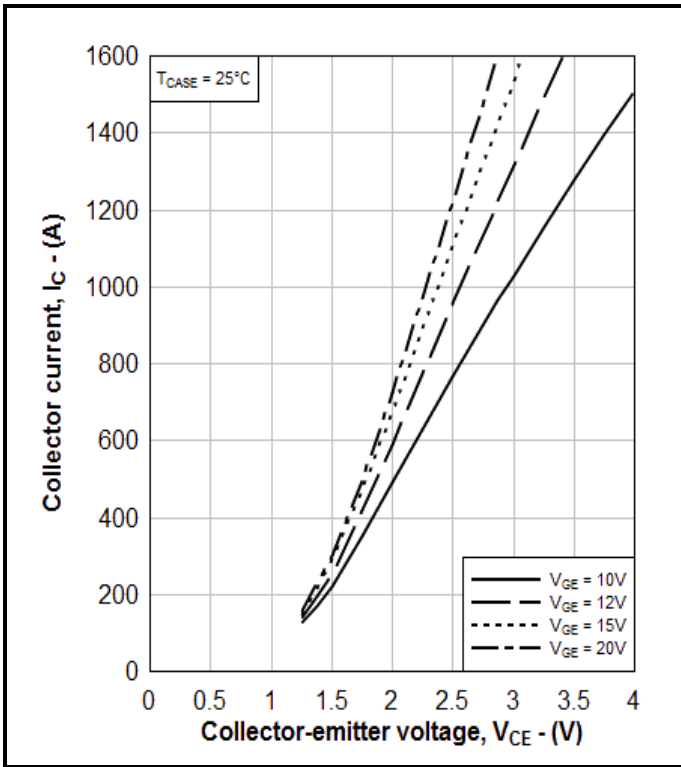
ELECTRICAL CHARACTERISTICS

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

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$t_{d(off)}$	Turn-off delay time	$I_C = 800\text{A}$ $V_{GE} = \pm 15\text{V}$ $V_{CE} = 600\text{V}$ $R_{G(ON)} = 2.7\Omega$ $R_{G(OFF)} = 2.7\Omega$ $L_S \sim 100\text{nH}$		1250		ns
t_f	Fall time			170		ns
E_{OFF}	Turn-off energy loss			130		mJ
$t_{d(on)}$	Turn-on delay time			250		ns
t_r	Rise time			250		ns
E_{ON}	Turn-on energy loss			80		mJ
Q_{rr}	Diode reverse recovery charge	Diode arm		12		μC
I_{rr}	Diode reverse recovery current	$I_F = 800\text{A}$		570		A
E_{rec}	Diode reverse recovery energy	$V_{CE} = 600\text{V}$ $di_F/dt = 4200\text{A}/\mu\text{s}$		60		mJ

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

Symbol	Parameter	Test Conditions	Min	Typ.	Max	Units
$t_{d(off)}$	Turn-off delay time	$I_C = 800\text{A}$ $V_{GE} = \pm 15\text{V}$ $V_{CE} = 600\text{V}$ $R_{G(ON)} = 2.7\Omega$ $R_{G(OFF)} = 2.7\Omega$ $L_S \sim 100\text{nH}$		1500		ns
t_f	Fall time			200		ns
E_{OFF}	Turn-off energy loss			160		mJ
$t_{d(on)}$	Turn-on delay time			400		ns
t_r	Rise time			220		ns
E_{ON}	Turn-on energy loss			120		mJ
Q_{rr}	Diode reverse recovery charge	Diode arm		240		μC
I_{rr}	Diode reverse recovery current	$I_F = 800\text{A}$		680		A
E_{rec}	Diode reverse recovery energy	$V_{CE} = 600\text{V}$ $di_F/dt = 4000\text{A}/\mu\text{s}$		110		mJ



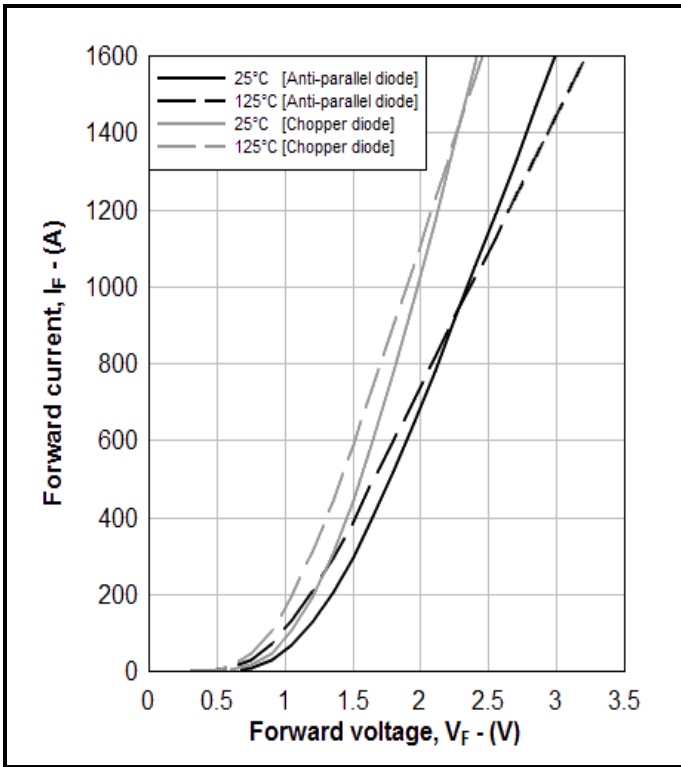


Fig. 7 Diode typical forward characteristics

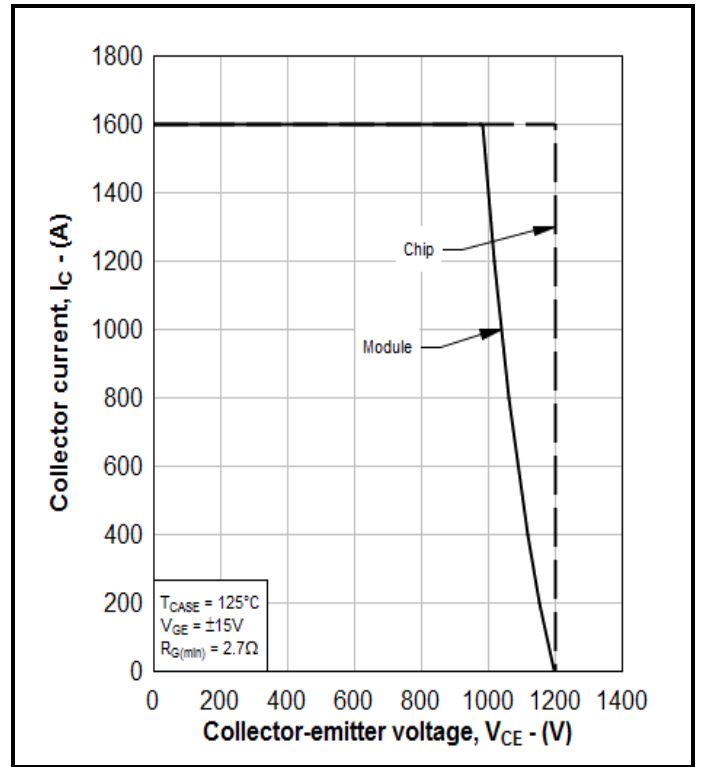


Fig. 8 Reverse bias safe operating area

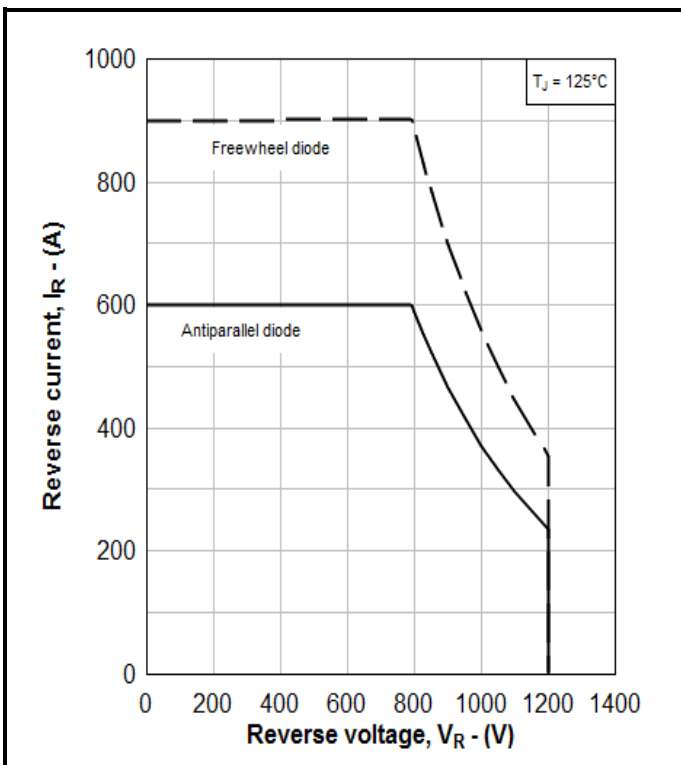


Fig. 9 Diode reverse bias safe operating area

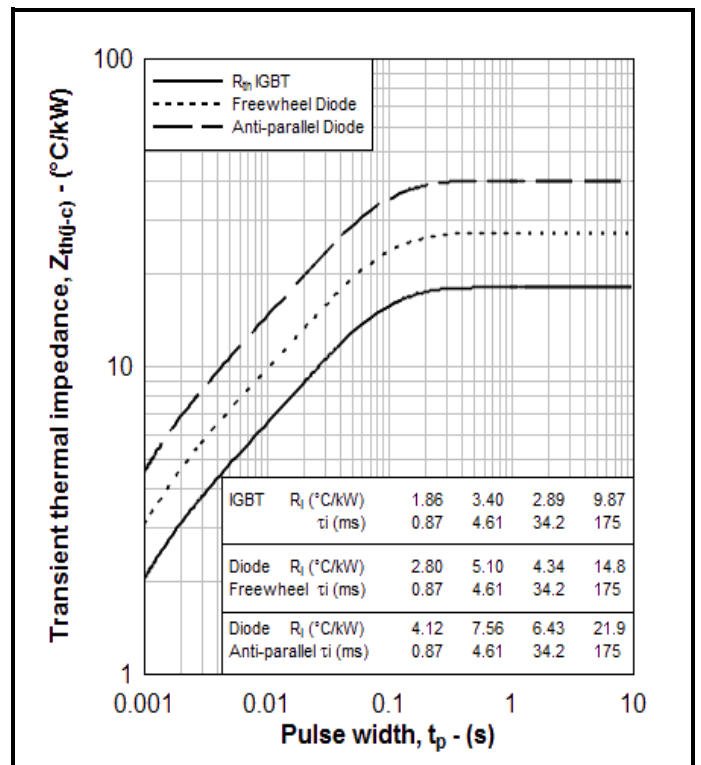
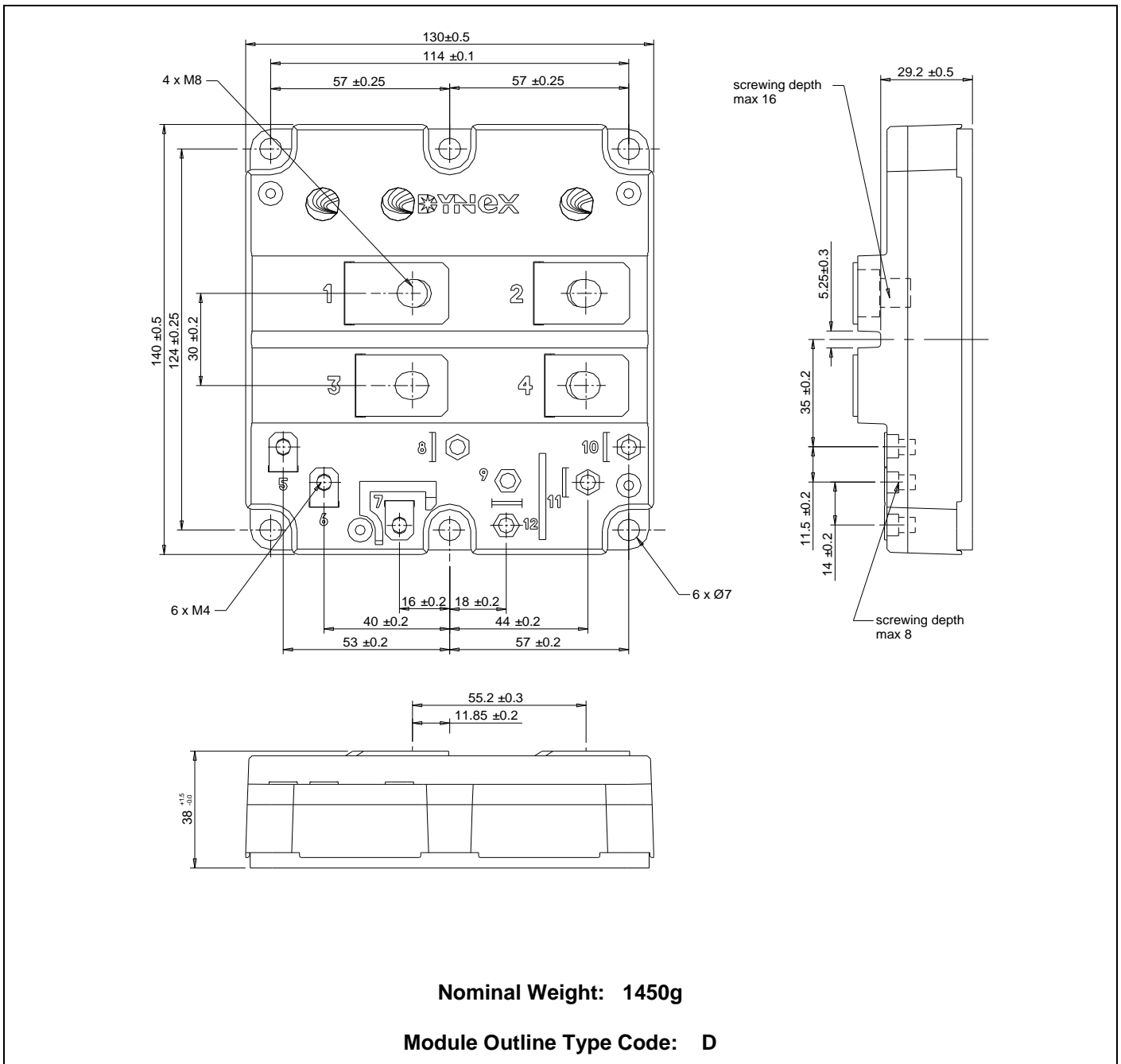


Fig. 10 Transient thermal impedance

PACKAGE DETAILS

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


Fig. 11 Module outline drawing

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