



Power Semiconductor Product Guide



Dynex Semiconductor Ltd
www.dynexsemi.com

INTRODUCTION

TO DYNEX SEMICONDUCTOR LTD

Dynex Semiconductor Ltd has a rich history in the design, development and production of High Power Semiconductor modules and Power Assemblies. Throughout the years, Dynex products have been applied in projects that vary from transportation, power grid, renewables, industrial, custom equipment, hydrogen electrolyser and other specialist applications.

The Power Semiconductor and Power Assemblies operation is located in Lincoln, England, manufacturing a range of high power IGBT modules, Bipolar capsule devices and power assemblies.

End-user Applications



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IGBT Modules

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Single Switches, Discreet

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Single Switches

NEW UK ASSEMBLED IGBT MODULES
Half Bridge and Single Switches

PRESS PACK IGBT

DESIGN TOOL

FRD MODULES

1200V - 4500V FRD MODULES
Dual Diode, Triple Diode

EXPLANATION OF PART NUMBERS

PACKAGE OUTLINES

SYMBOLS AND DEFINITIONS

IMPORTANT INFORMATION





IGBT Modules

Power Cycling with the latest generation IGBT die

The Dynex manufacturing plant is a vertically integrated facility with device design, wafer fab, packaging, qualification and testing available on site.

The modules work with high reliability at temperature conditions from -40/-50°C up to +150°C.

Great emphasis is placed on low inductance power bus bar designs, enabling the modules to function under fast switching transients such as, those of next generation Trench Gate IGBT's and SiC MOSFET.

KEY FEATURES

- ✓ High DC stability via advanced edge termination design and passivation
- ✓ High short circuit capability-wide SCSOA
- ✓ Self-limiting short circuit current
- ✓ Low switching losses
- ✓ $T(vj\ op) = 150^{\circ}\text{C}$
- ✓ AlSiC Baseplate for increased thermal cycling capability
- ✓ Package design with CTI > 600
- ✓ Isolated base plate
- ✓ 200A to 3600A at 950V to 6500V

APPLICATIONS

- ✓ High reliability inverters
- ✓ Motor controllers
- ✓ Traction drives
- ✓ Different circuit topologies (half bridge, single switch, chopper)



Scan this for a list of IGBT Modules to download data-sheets and application notes

IGBT Modules

1200V IGBT Modules

Part Number	Configuration	Production Status	IC (A)	at T _C (°C)	VCE (sat) @ T _C =25°C (V)	Total E _{sw} @ T _C =150°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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W1 Module

DIM800WHS12-PG500	Half Bridge	New	800	90	1.4	264	48.5	106 x 61	4kV	STMOS
DIM800WHS12-PF500	Half Bridge	New	800	90	1.2	301.1	48.5	106 x 61	4kV	RTMOS
DIM600WHS12-PC500	Half Bridge	New	600	100	1.2	209.5	48.5	106 x 61	4kV	TMOS
DIM600WBHS12-PA500	Half Bridge	New	600	100	1.75	209.5	48.5	106 x 61	4kV	TMOS
DIM300WHS12-PH500	Half Bridge	MP	300	100	1.65	106.9	80.6	106 x 61	4kV	TMOS
DIM300WHS12-PA500	Half Bridge	MP	300	100	1.2	86	97	106 x 61	4kV	TMOS

H1 Module

DIM1400H1HS12-PA500	Half Bridge	New	1400	100	1.8	486	20	250 x 89	4kV	TMOS
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H2 Module

DIM900H2HS12-PA500	Half Bridge	MP	900	90	1.8	300	29.5	172 x 89	4kV	TMOS
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Part Number	Configuration	Production Status	IC (A)	at T _C (°C)	VCE (sat) @ T _C =25°C (V)	Total E _{sw} @ T _C =175°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Isolation Voltage	Gate Thres-hold Voltage VGE _(TH)	Tech
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Discrete IGBT Device

TG340SW08L6-S5A00	Discrete	New	340	120	1.45	47.0	97	4.2kV		TMOS
TG140SW12B2-S501	Discrete	New	140	100	1.50	22.2	115		6.3V	TMOS
TG100SW12B2-S500	Discrete	New	100	100	1.70	38.9	180			TMOS

Part Number	Configuration	Production Status	IC (A)	at T _C (°C)	VCE (sat) @ T _C =25°C (V)	Total E _{sw} @ T _C =175°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Isolation Voltage	Gate Thres-hold Voltage VGE _(TH)	Tech
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Discrete IGBT Device

TG340SW08L6-S5A00	Discrete	New	340	120	1.45	47.0	97	4.2kV		TMOS
TG140SW12B2-S501	Discrete	New	140	100	1.50	22.2	115		6.3V	TMOS
TG100SW12B2-S500	Discrete	New	100	100	1.70	38.9	180			TMOS

Scan this for a list of 1200V IGBT Modules to download datasheets and application notes



Automotive IGBT Modules - 1200V

Part Number	Configuration	Production Status	IC (A)	at TC (°C)	VCE (sat) @ TC=25°C (V)	Total Esw @ TC=175°C (mJ)	Rth(j-c) (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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Automotive

TG1200FF08S3-R6A12	Six Pack	New	1200	100	1.18	59.8	85	154 x 126	4.2kV	RC Trench
TG950FF08S3-S5A01	Six Pack	New	950	95	1.10	50.3	100	154 x 126	4.2kV	STMOS
DIM820S3FP08-PG500	Six Pack	New	820	80	1.10	39.8	110	154 x 126	4.2kV	STMOS
TG820FF08S6-S5A12	Six Pack	New	820	60	1.10	30.0	120	154 x 126	2.5kV	STMOS
TG650FF08S2-S5A02	Six Pack	New	650	75	1.10	40.2	165	140 x 112	2.5kV	STMOS
TG600FF13S3-S5A03	Six Pack	New	600	25	1.40	230.5	85	154 x 126	4.2kV	STMOS
TG600FF12S3L-S5A03	Six Pack	New	600	25	1.40	147.0	85	154 x 126	4.2kV	STMOS
TG600FF12S3-S5A03	Six Pack	New	600	25	1.40	147.0	85	154 x 126	4.2kV	STMOS
TG600FF12S3-S5A02	Six Pack	New	600	25	1.40	147.0	85	154 x 126	4.2kV	STMOS
TG600FF08S3-S5A02	Six Pack	New	600	85	1.10	33.5	160	154 x 126	4.2kV	TMOS
TG600FF08S3-S3A01	Six Pack	New	600	65	1.55	70*	120	154 x 126	2.5kV	TMOS
TG400FF08S2-S3A11	Six Pack	New	400	60	1.70	55*	165	154 x 126	2.5kV	TMOS
DIM400S3FP12-PG500	Six Pack	New	400	25	1.40	67.4	133	140 x 112	4.2kV	STMOS
DIM400S0FS08-PF500	Six Pack	New	400	80	1.35	54.0	120	154 x 126	2.5kV	RTMOS

* @TC=150°C (mJ)

Part Number	Configuration	Production Status	IC (A)	at TC (°C)	VCE (sat) @ TC=25°C (V)	Total Esw @ TC=150°C (mJ)	Rth(j-c) (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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M1 Module

DIM450M1HS12-PB500	Half Bridge	MP	450	100	1.7	133	52	152 x 62	2.5kV	TMOS
DIM300M1HS12-PA500	Half Bridge	New	300	100	1.7	86.5	78	152 x 62	3.4kV	TMOS

Part Number	Configuration	Production Status	IC (A)	at TC (°C)	VCE (sat) @ TC=25°C (V)	Total Esw @ TC=175°C (mJ)	Rth(j-c) (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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M1 Module Generation 7

TG1000HF12M1-S5A00	Half Bridge	New	1000		1.60	413	35	152 x 62	3.4kV	STMOS
DIM900M1HP12-PG500	Half Bridge	New	900		1.45	327	75	152 x 62	3.4kV	STMOS
DIM900M1HS12-PG500	Half Bridge	New	900		1.45	327	52	152 x 62	3.4kV	STMOS
TG750HF12M1-S5A00	Half Bridge	New	750		1.6	266	55	152 x 62	3.4kV	STMOS
DIM600M1HS12-PG500	Half Bridge	New	600		1.4	182	90	152 x 62	3.4kV	STMOS
DIM600M1HP12-PG500	Half Bridge	New	600		1.4	182	90	152 x 62	3.4kV	STMOS
TG450HF12M1-S500	Half Bridge	New	450		1.45	210.3	52	152 x 62	3.4kV	STMOS

Automotive IGBT Modules - 1700V

Part Number	Configuration	Production Status	IC (A)	at TC (°C)	VCE (sat) @ TC=25°C (V)	Total Esw @ TC=150°C (mJ)	Rth(j-c) (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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MI Modules

DIM600M1HS17-PA500	Half Bridge	MP	600	100	1.8	235	75	152 X 62	3.4kV	TMOS
DIM450M1HS17-PA510	Half Bridge	MP	450	95	1.8	381	55	152 X 62	3.4kV	TMOS
DIM450M1HS17-PA500	Half Bridge	MP	450	100	1.8	432	55	152 X 62	3.4kV	TMOS
DIM300M1HS17-PA500	Half Bridge	MP	300	100	1.7	537	46	152 X 62	3.4kV	TMOS

Part Number	Configuration	Production Status	IC (A)	at TC (°C)	VCE (sat) @ TC=25°C (V)	Total Esw @ TC=175°C (mJ)	Rth(j-c) (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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M1 Module - 7th Generation

DIM800M1HS17-PG500	Half Bridge	New	800	80	1.7	738	37	152 x 62	3.4kV	STMOS
TG800HF17M1-S521	Half Bridge	New	800	80	1.7	760	6	137 x 57	3.4kV	TMOS
TG800HF17M1-S520	Half Bridge	New	800	80	1.7	760	37	152 x 62	3.4kV	TMOS

1700V IGBT Modules

Part Number	Configuration	Production Status	IC (A)	at T _C (°C)	VCE (sat) @ T _C =25°C (V)	Total Esw @ T _C =150°C (mJ)	Rth(j-c) (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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H1 Module

DIM1000H1HS17-PA500	Half Bridge	MP	1000	104	1.85	980	20	250 x 89	4kV	TMOS
DIM1800H1S17-PH500	Half Bridge	New	1800	85	1.7	1790	16	250 x 89	4kV	STMOS

H2 Module

DIM650H2HS17-PA500	Half Bridge	MP	650	105	1.85	610	30	172 x 89	4kV	TMOS
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Part Number	Configuration	Production Status	IC (A)	at T _C (°C)	VCE (sat) @ T _C =25°C (V)	Total Esw @ T _C =150°C (mJ)	Rth(j-c) (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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Standard Range

DIM3600ESM17-PT500	Single	New	3600	95	1.95	3680	8	190 x 140	4kV	TMOS
DIM2400ESM17-PT500	Single	New	2400	118	1.75	2840	6	190 x 140	4kV	TSPT
DIM1600FSM17-PS500	Single	New	1600	80	2.3	1800	9	140 x 130	4kV	DMOS
DIM1200NSM17-RT500	Single	MP	1200	95	1.8	1615	24	140 x 130	4kV	TMOS+
DIM800DDM17-PS500	Single	MP	800	80	2.3	800	18	140 x 130	4kV	DMOS+

Scan this for a list of 1700V IGBT Modules to download datasheets and application notes



2300V IGBT Modules

Part Number	Configuration	Production Status	IC (A)	at T _C (°C)	VCE (sat) @ T _C =25°C (V)	Total Esw @ T _C =150°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
DIM1300UHM23-PG500	Half Bridge	New	1300	80	1.7	1760	21.2	122 x 86	6kV	TMOS

3300V IGBT Modules

Part Number	Configuration	Production Status	IC (A)	at T _C (°C)	VCE (sat) @ T _C =25°C (V)	Total Esw @ T _C =150°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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Standard Range

DIM2400ESM33-RT500	Single	New	2400	100	2.0	13274	7	190 x 140	6kV	TMOS
DIM1800ESM33-PU400	Single	New	1800	110	2.3	10050	8	190 x 140	6kV	TMOS
DIM1600NSM33-RT500	Single	New	1600	100	2.0	8025	10	140 x 130	6kV	TMOS
DIM1500ESM33-PS500	Single	MP	1500	110	2.1	9300	8	190 x 140	6kV	DMOS+
DIM1500ESM33-RR500	Single	MP	1500	95	2.6	7800	8	190 x 140	10.2kV	DMOS+
DIM1000NSM33-PS500	Single	MP	1000	112	2.4	5770	12	190 x 140	6kV	DMOS+
DIM1000ECM33-PS500	Chopper	MP	1000	115	2.1	6500	12	190 X 140	6kV	DMOS+
DIM500GDM33-PS500	Dual	MP	500	110	2.4	2850	24	160 X 130	6kV	DMOS+
DIM450VHM33-PT500	Half Bridge	MP	450	95	2.5	1695	31	144 X 100	6kV	TMOS
DIM250PHM33-PS500	Half Bridge	MP	250	100	2.5	1375	48	140 X 73	6kV	DMOS+

Scan this for a list of 3300V IGBT Modules to download datasheets and application notes



IGBT Modules

4500V IGBT Modules

Part Number	Configuration	Production Status	IC (A)	at T _C (°C)	VCE (sat) @ T _C =25°C (V)	Total E _{sw} @ T _C =150°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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Standard Range

DIM1500ASM45-RT501	Single	New	1500	80	2.5	15290	8	190 x 140	10.2kV	TMOS
DIM1200ASM45-PS400	Single	New	1200	91	2.8	13050	8	190 x 140	7.4kV	DMOS+
DIM1200ASM45-PS500	Single	MP	1200	85	2.3	14060	8	190 x 140	10.2kV	DMOS+
DIM1200ASM45-PR501	Single	MP	1200	80	2.7	13400	8	190 x 140	10.2kV	DMOS+
DIM1200ESM45-PS500	Single	MP	1200	85	2.3	14060	8	190 x 140	6.0kV	DMOS+
DIM800XSM45-PS501	Single	MP	800	85	2.3	9425	13	140 x 130	10.2kV	DMOS+

6500V IGBT Modules

Part Number	Configuration	Production Status	IC (A)	at T _C (°C)	VCE (sat) @ T _C =25°C (V)	Total E _{sw} @ T _C =150°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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Standard Range

DIM1000ASM65-RT500	Single	New	1000	80	2.45	21133	8.4	190 x 140	10.2kV	TMOS
DIM750ASM65-PS400	Single	MP	750	80	3.1	5050	9	190 x 140	10.2kV	DMOS+
DIM750ASM65-PS500	Single	MP	750	80	3.0	14280	9	190 x 140	10.2kV	DMOS+
DIM500XSM65-PS400	Single	MP	500	80	3.1	11250	12.8	140 x 130	10.2kV	DMOS+
DIM250LSM65-RR500	Single	MP	250	80	3.2	4890	26	140 x 73	10.2kV	DMOS+

Press Pack IGBT

Part Number	Configuration	Production Status	VCES (V)	IC (A)	VCE (sat) @ T _C =25°C (V)	T _j (max)°C	R _{th(j-c)} (per switch) (°C/kW)	Clamping Force (kN)
DPI5000SG45ZF-P200	Co-Pack	New	4500	5000	2.4	125	1.5	85 - 100
DPI2500SW45ZF-P200	Co-Pack	New	4500	2500	2.4	125	3.5	70 - 85
DPC1500SW45ZF-P200	Co-Pack	New	4500	1500	2.6	135	5	65 - 80
DPC2000SW45ZF-P200	Co-Pack	New	4500	2000	2.35	135	3.6	65 - 80
DPC2000SW45ZC-P200	Co-Pack	New	4500	2000	2.3	125	4.3	70 - 85
DPC3000SW45ZC-P200	Co-Pack	New	4500	3000	2.5	135	3	85 - 100
DPC3000SW45ZF-P200	Co-Pack	New	4500	3000	2.3	135	3	85 - 100
DPC3000SW65ZF-T200	Co-Pack	New	6500	3000	2.3	125	3	85 - 100

Press Pack IGBT-Diode

Part Number	Configuration	Production Status	VCES (V)	IC (A)	VCE (sat) @ T _C =25°C (V)	V _F (V) @ T _C =25°C	IFSM (kA)	T _j (max)°C	R _{th(j-c)} (per switch) (°C/kW)	Contact OD/ Flange OD/ Height (mm)
DPC1500SW45YB-P200	Co-Pack	New	4500	1500	2.3	2.45	11.2	125	6.0	190/140/34

Scan this for a list of 4500V IGBT Modules to download datasheets and application notes



Scan this for a list of 6500V IGBT Modules to download datasheets and application notes



* V_{ce(sat)} is measured across both arms of the bi-directional switch.

MP: Mass Production NEW: New Products

UK Assembled IGBT Modules

Part Number	Configuration	Production Status	IC (A)	at TC (°C)	VCE (sat) @ TC=25°C (V)	Total E _{sw} @ TC=150°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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3300V IGBT Modules

DIM1000NSM33-PS400	Single	New	1000	80	2.5	15290	8	190 x 140	10.2kV	TMOS
DIM1000XSM33-PS401	Single	New	1000	91	2.8	13050	8	190 x 140	7.4kV	DMOS+
DIM1500ESM33-PS400	Single	New	1500	85	2.3	14060	8	190 x 140	10.2kV	DMOS+
DIM1800ESM33-PS400	Single	New	1800	80	2.7	13400	8	190 x 140	10.2kV	DMOS+

Part Number	Configuration	Production Status	IC (A)	at TC (°C)	VCE (sat) @ TC=25°C (V)	Total E _{sw} @ TC=125°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech
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4500V IGBT Modules

DIM800XSM45-PS400	Single	New	800	91	2.8	8720	12	140 x 130	7.4kV	DMOS+
DIM800XSM45-PS401	Single	New	800	91	2.8	8720	12	140 x 130	10.2kV	DMOS+
DIM1200ASM45-PS400	Single	New	1200	91	2.8	13050	8	190 x 140	7.4kV	DMOS+
DIM1200ASM45-PS4001	Single	New	1200	91	2.8	13050	8	190 x 140	10.2kV	DMOS+

DIM200KHM45-PS400	Half Bridge	New	200	91	2.8	2300	48	124 x 57	7.4 kV	DMOS+
Part Number	Configuration	Production Status	IC (A)	at TC (°C)	VCE (sat) @ TC=25°C (V)	Total E _{sw} @ TC=150°C (mJ)	R _{th(j-c)} (per switch) (°C/kW)	Baseplate Dims (mm)	Isolation Voltage	Tech

6500V IGBT Modules

DIM500XSM65-PS400	Single	New	500	80	3.1	11250	12.8	140 x 130	10.2kV	DMOS+
DIM750XSM33-PS401	Single	New	750	80	3.1	5050	8.5	190 x 140	10.2kV	DMOS+



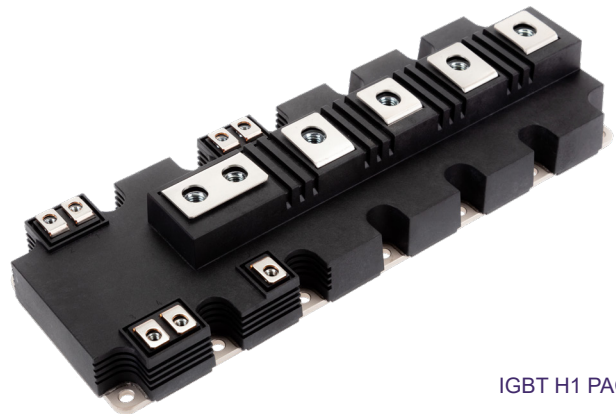
IGBT A PACKAGE



IGBT E PACKAGE



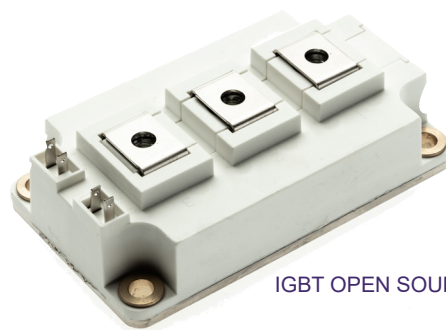
IGBT G PACKAGE



IGBT H1 PACKAGE



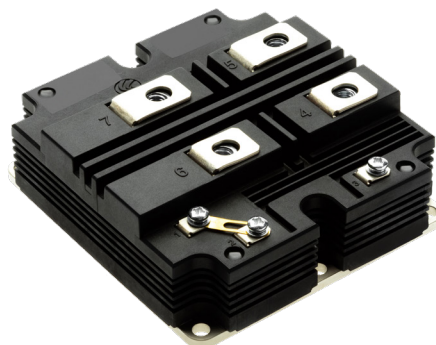
IGBT H2 PACKAGE



IGBT OPEN SOURCE SHV PACKAGE



IGBT N PACKAGE



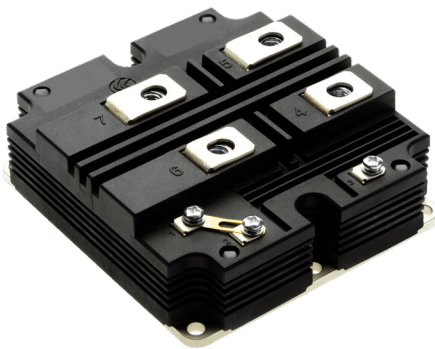
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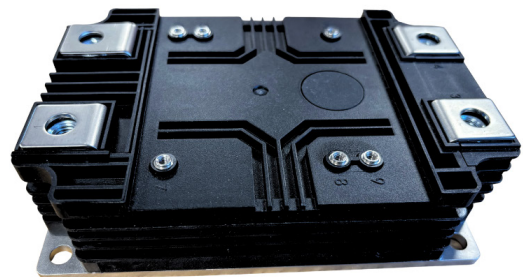
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IGBT W1 PACKAGE



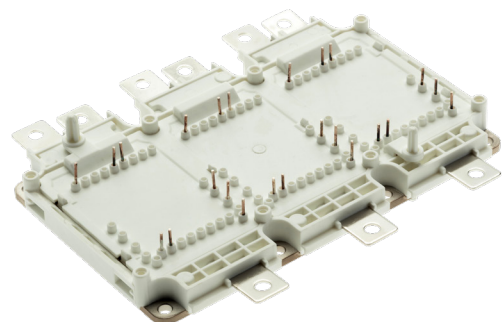
IGBT X PACKAGE



IGBT K PACKAGE



IGBT M1 PACKAGE

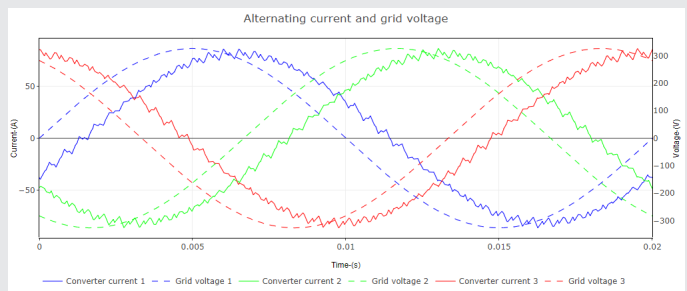
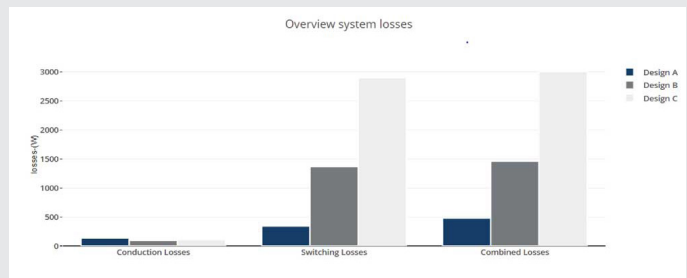
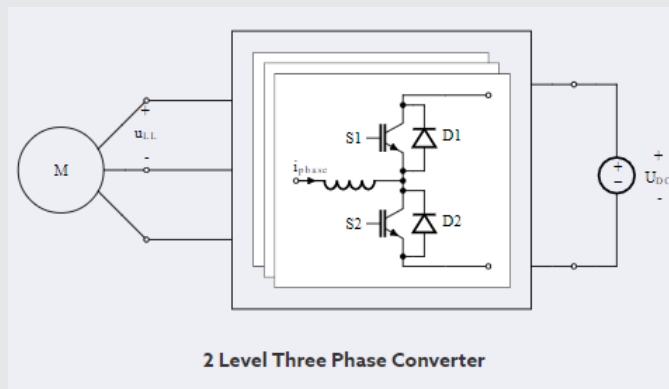
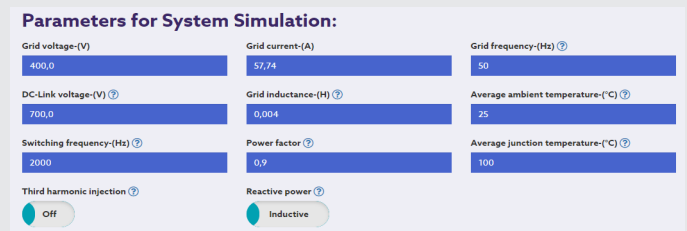
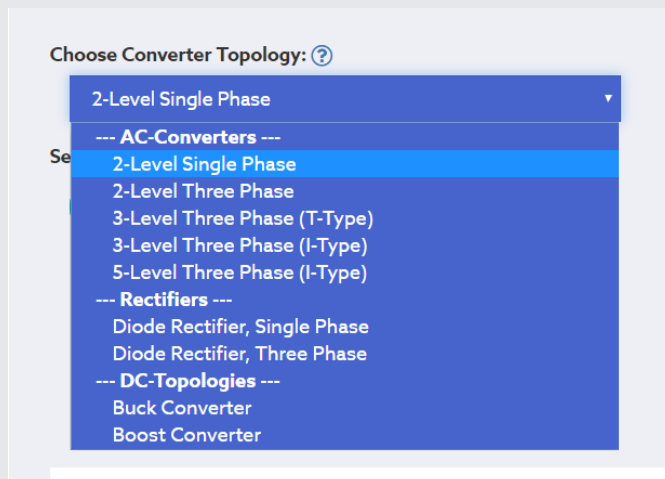


IGBT S3 PACKAGE

DESIGN TOOL

Easy selection of the Dynex device most applicable to your application

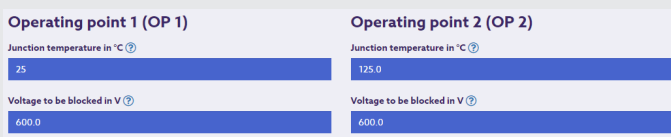
Our Design Tool contains a topology simulator, that provides an analysis of the behavior of our components in your specific application. All typical power electronic typologies are available with system losses, current ripple, and a maximum thermal resistance as a starting point for your thermal design. The Design Tool offers the comparison of different component configurations in each topology within a few clicks.



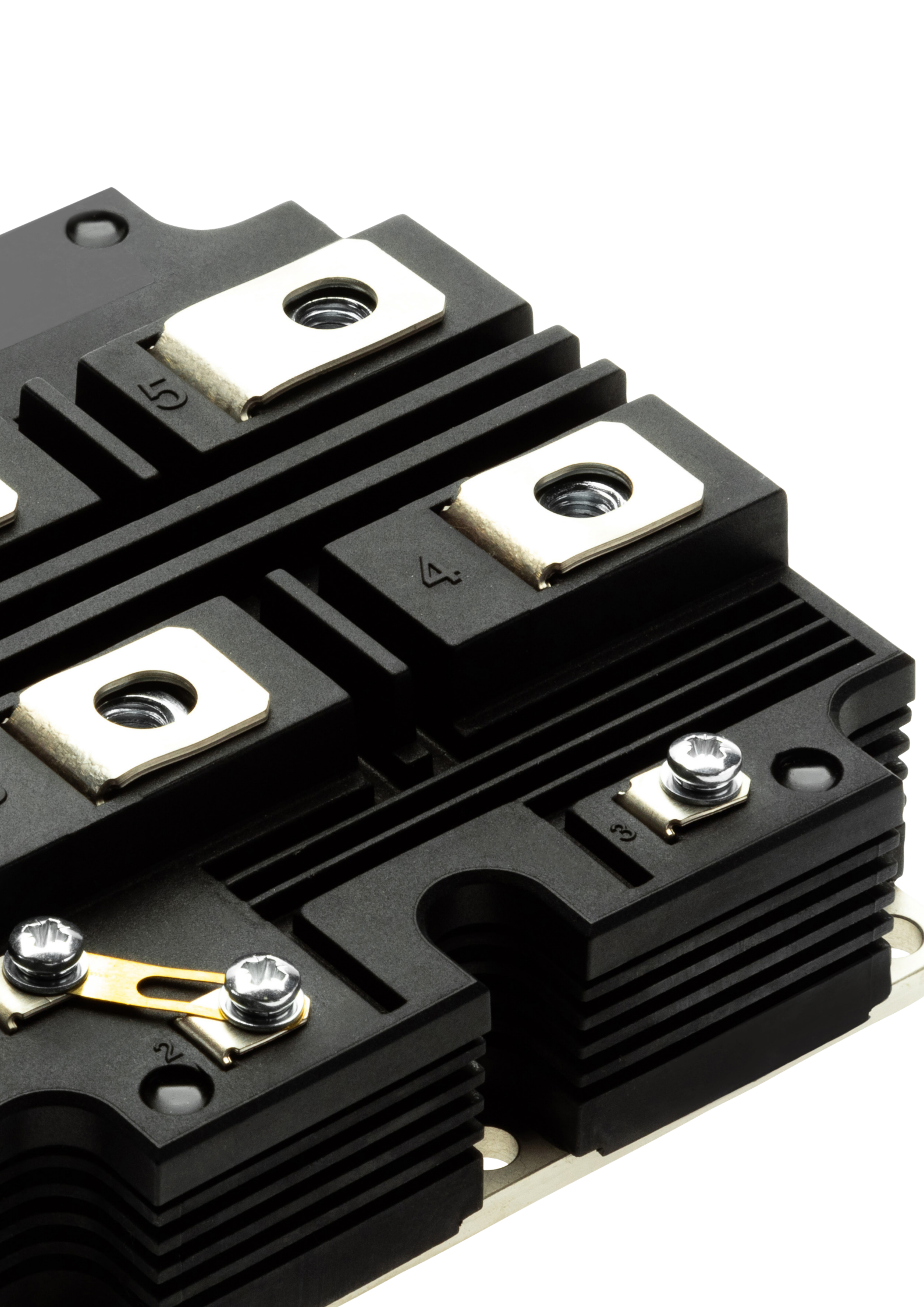
Our Design Tool is designed to assist you in selecting the right Dynex products, using an integrated interactive datasheet, which allows you to analyse our component's properties and performance at a specific operation point considering current, voltage and junction temperature.

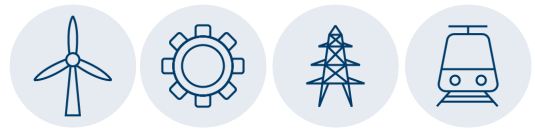
The instantaneous and average power losses in each semiconductor component of the circuit are displayed for each topology, selected alongside other outputs shown below.

- Converter output (pulsed and fundamental) & grid voltage
- Alternating current & grid voltage
- Current separated into actual conducting devices
- Conduction losses
- Switching energies



Access the tool via www.dynexsemi.com or directly through <https://dynex.pe-finder.de/>





FRD Modules

Regulate electricity flow to ensure higher reliability and increased efficiency

Dynex FRD modules regulate electricity flow to ensure high reliability and increased efficiency in motor drives and other variable speed processes.

The family of high-voltage Fast Recovery Diode modules have been designed for use in rail traction, industrial motor drives, induction heating and power generation.

The FRD modules are designed to match and work as the input rectifiers for the existing Dynex range of IGBT modules.

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.

KEY FEATURES

- ✓ Low reverse recovery charge
- ✓ High switching speed
- ✓ Low forward volt drop
- ✓ Isolated AISiC base with AlN substrates
- ✓ Single, double and triple diode configurations available with current ratings up to 1500A

APPLICATIONS

- ✓ Chopper diodes
- ✓ Boost and buck circuits
- ✓ Free-wheel circuits
- ✓ Multi-level switch inverters
- ✓ Rail traction
- ✓ Industrial motor drives
- ✓ Induction heating
- ✓ Power generation

FRD Modules

1200V FRD Modules

Part Number	Configuration	Production Status	IF (A per arm)	at TC (°C)	Baseplate Dims (mm)	Isolation Voltage	IF (A as single diode with external connection)	Vf@ Tvj =25 °C	I ² t (kA ² s)	Qrr@ Tvj	Erec@ Tvj	Rth(j-c) (per arm) (°C/kW)
-------------	---------------	-------------------	----------------	------------	---------------------	-------------------	---	----------------	--------------------------------------	----------	-----------	----------------------------

TF100HF12T1-D300	Diode	New	100	25	94 x 35	2.5kV	100	1.6	3.2			280
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1700V FRD Modules

Part Number	Configuration	Production Status	IF (A per arm)	at TC (°C)	Baseplate Dims (mm)	Isolation Voltage	IF (A as single diode with external connection)	Vf@ Tvj =25 °C	I ² t (kA ² s)	Qrr@ Tvj	Erec@ Tvj	Rth(j-c) (per arm) (°C/kW)
-------------	---------------	-------------------	----------------	------------	---------------------	-------------------	---	----------------	--------------------------------------	----------	-----------	----------------------------

PS Range

DFM1200EXM17-PS500	Triple	New	1200		190 x 140	4.0kV	1200	2.1	245	540	375	11
--------------------	--------	-----	------	--	-----------	-------	------	-----	-----	-----	-----	----

3300V FRD Modules

Part Number	Configuration	Production Status	IF (A per arm)	at TC (°C)	Baseplate Dims (mm)	Isolation Voltage	IF (A as single diode with external connection)	Vf@ Tvj =25 °C	I ² t (kA ² s)	Qrr@ Tvj	Erec@ Tvj	Rth(j-c) (per arm) (°C/kW)
-------------	---------------	-------------------	----------------	------------	---------------------	-------------------	---	----------------	--------------------------------------	----------	-----------	----------------------------

TF1500SF33K1-D200	Diode	New	1500	25	130 x 90	6kV	1500	1.6	32	1700	2200	15
DFM1500NXM33-PS500	Diode	New	1500	25	140 x 130	6kV	1500	2.4	720	1710	2600	15

4500V FRD Modules

Part Number	Configuration	Production Status	IF (A per arm)	at TC (°C)	Baseplate Dims (mm)	Isolation Voltage	IF (A as single diode with external connection)	Vf@ Tvj =25 °C	I ² t (kA ² s)	Qrr@ Tvj	Erec@ Tvj	Rth(j-c) (per arm) (°C/kW)
-------------	---------------	-------------------	----------------	------------	---------------------	-------------------	---	----------------	--------------------------------------	----------	-----------	----------------------------

PS Range

DFM1500XXM45-PS501	Dual Diode	MP	1500	65	140 x 130	10.2kV	3000	2.6	720	1400	2300	16
DFM1200XXM45-PS501	Dual Diode	MP	1200	65	140 x 130	10.2kV	2400	2.7	530	2200	1750	16

6500V FRD Modules

Part Number	Configuration	Production Status	IF (A per arm)	at TC (°C)	Baseplate Dims (mm)	Isolation Voltage	IF (A as single diode with external connection)	Vf@ Tvj =25 °C	I ² t (kA ² s)	Qrr@ Tvj	Erec@ Tvj	Rth(j-c) (per arm) (°C/kW)
-------------	---------------	-------------------	----------------	------------	---------------------	-------------------	---	----------------	--------------------------------------	----------	-----------	----------------------------

PS Range

DFM750XXM65-PS500	Dual Diode	New	750	65	140 x 130	10.2 kV	750	2.7	460	1200	2450	18
-------------------	------------	-----	-----	----	-----------	---------	-----	-----	-----	------	------	----

DFM750XXM65-PS500

Scan this QR code for Fast Recovery Diode Module datasheets



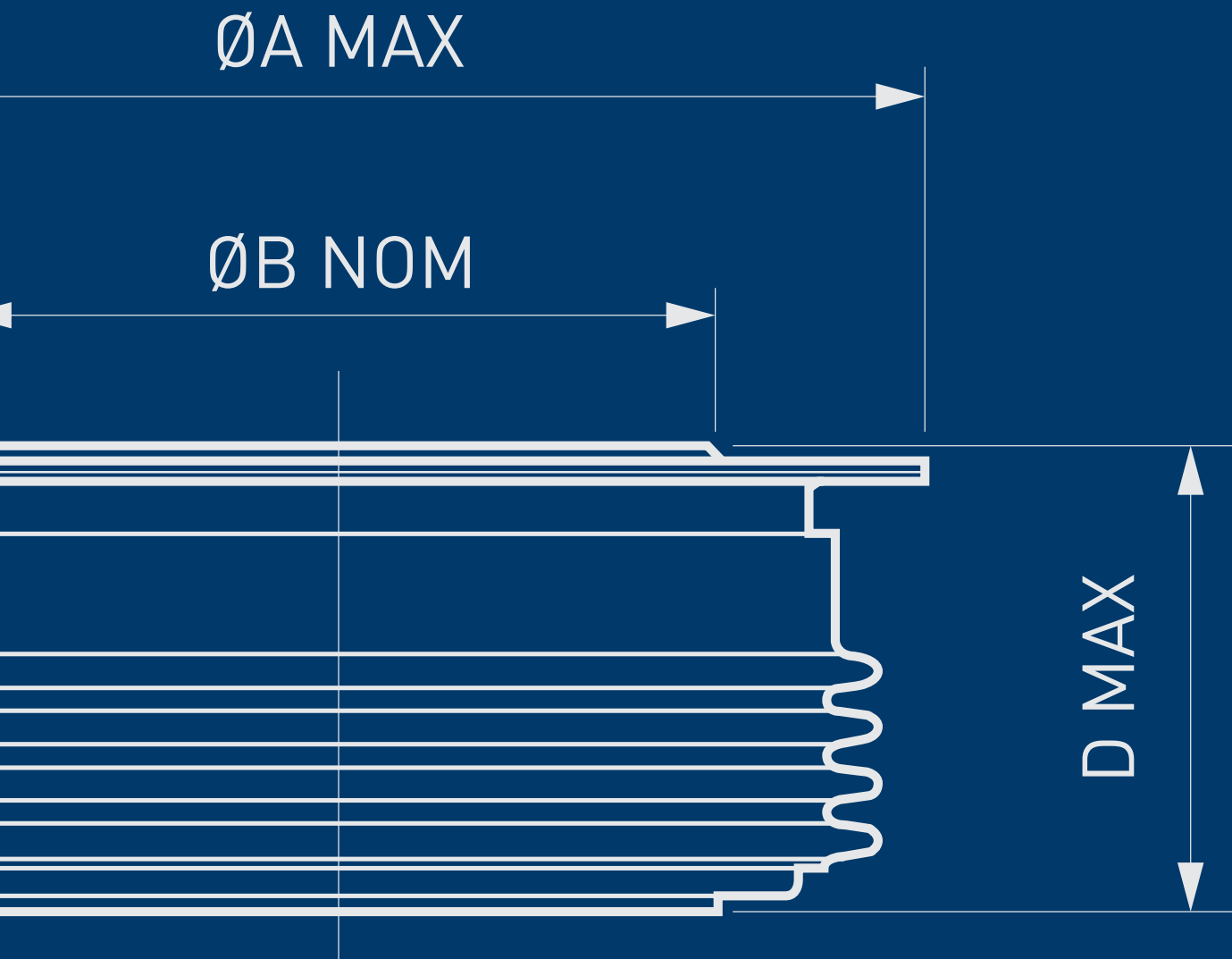
Notes:

* Refer to datasheets for Tvj max values www.dynexsemi.com/products/semiconductors/frd-modules

* V_{ce(sat)} is measured across both arms of the bi-directional switch.

MP: Mass Production NEW: New Products, Samples

Explanation of Part Numbers



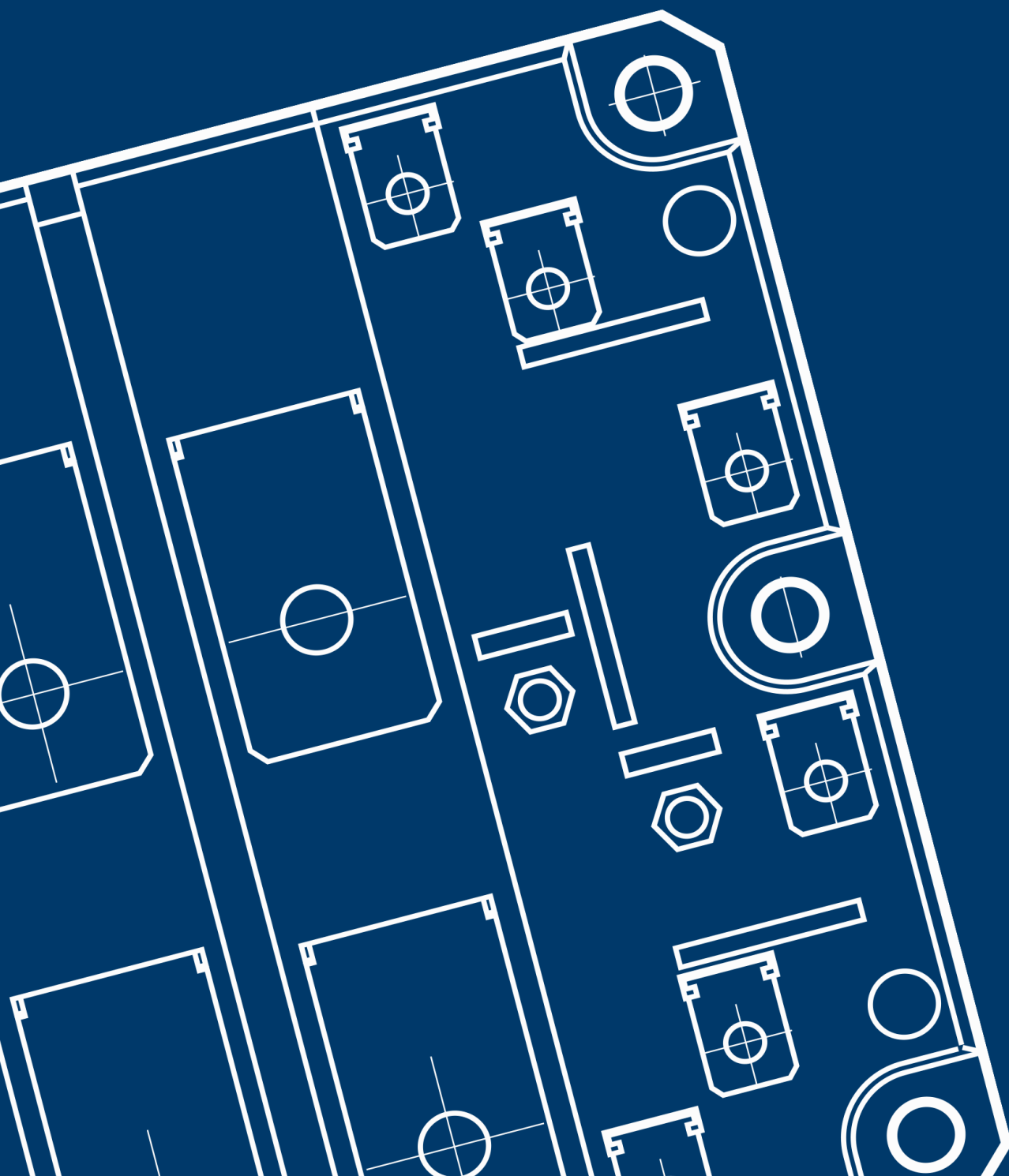
High Power IGBT & FRD Modules

Example Part Number: DFM800DDM18-A000

D	Dynex Semiconductor Identifier
I/F	I = IGBT / F = FRD
M	Module Generic Identifier
800	IC Current Rating
D/X/A/S/M	Package Outline/Power Terminal layout
D/S/C	Circuit configuration
S/M	Base plate technology S=Copper/M=Metal Matrix
18	Voltage rating divided by 100
(-)	
A/TS/TF/TL	Silicon Technology Identifier
US/UF/UL	
MS/MF/ML	
0	Special Selection Number (defaults to 000 for standard product)

***See page 29, 30, 31 for Package outlines**

Package Outlines



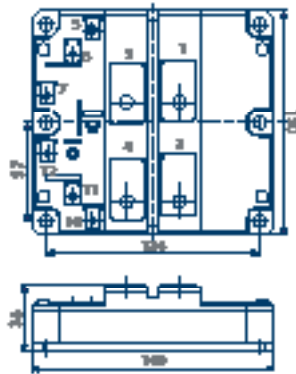
Package Outlines - IGBT Modules

Module Outlines and Circuit Configurations

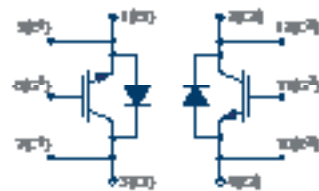
All dimensions shown in mm unless stated otherwise.

Package Type: D

Nominal weight: 1050g/1500g

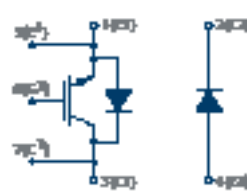


Dual Switch - DCMH0



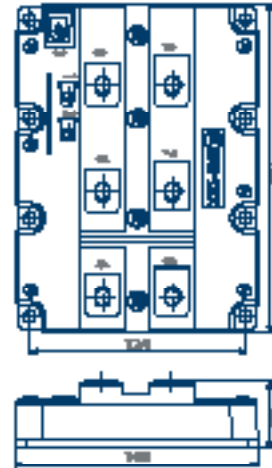
Q1 and Q2 - Aux Collector
D1 and D2 - Aux Diode
Q1 and Q2 - Gate

Chopper switch - DCMH0

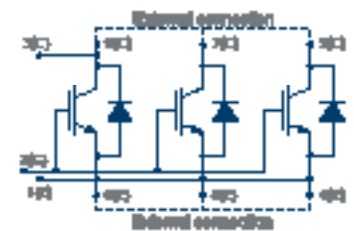


Package Type: E

Nominal weight: 1700g



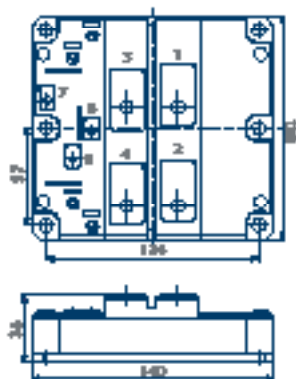
Single Switch - EGM



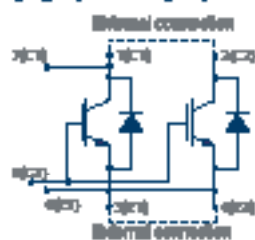
Q1 - Aux Collector
D1 - Aux Diode
Q1 - Gate

Package Type: F

Nominal weight: 1050g/1500g



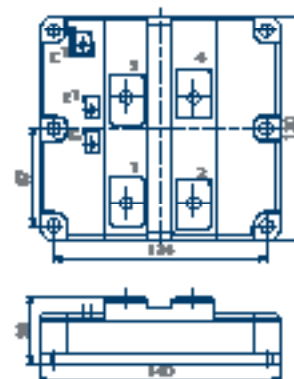
Single Switch - FGMH0



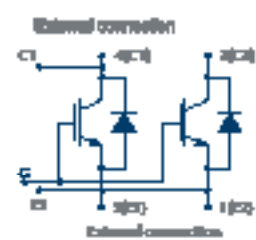
Q1 - Aux Collector
D1 - Aux Diode
Q1 - Gate

Package Type: N

Nominal weight: 1000g



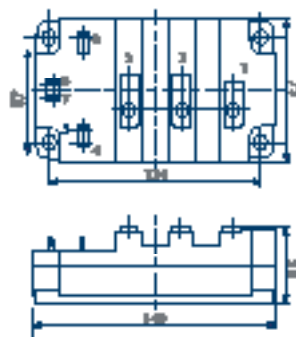
Single Switch - NGMH0



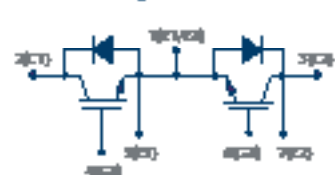
Q1 - Aux Collector
D1 - Aux Diode
Q1 - Gate

Package Type: P

Nominal weight: 500g/750g

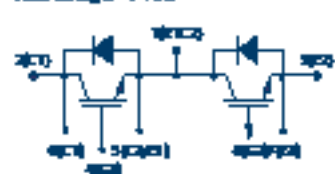


Bi-directional Switch - PEM



Q1 - Aux Collector
Q2 and D1 - Aux Diode
Q1 and Q2 - Gate

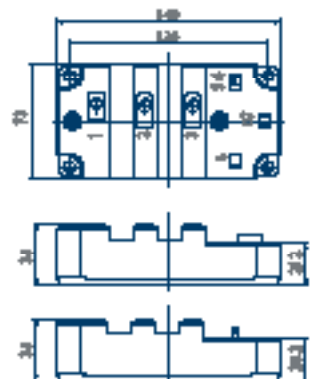
Half Bridge - PHM



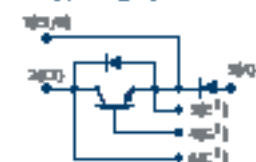
Q1 - Aux Collector
Q2 and D1 - Aux Diode
Q1 and Q2 - Gate

Package Type: P

Nominal weight: 500g



Clamper High Side - PHM



Clamper Low Side - PLM



Notes:

1. Mounting recommendations are given in the application note AN4505 'Heatsink Issues For IGBT Modules' available from our website.

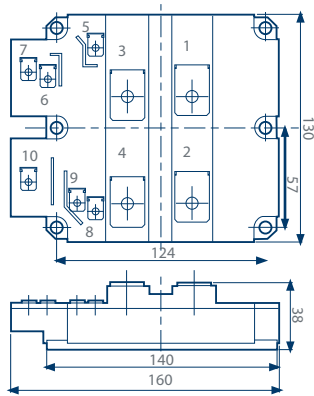
Package Outlines - IGBT Modules

Module Outlines and Circuit Configurations

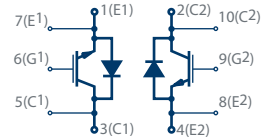
All dimensions shown in mm unless stated otherwise.

Package Type: G

Nominal weight: 1000g

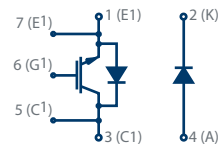


Dual Switch - GDM



C¹ and C² - Aux Collector
E¹ and E² - Aux Emitter
G¹ and G² - Gate

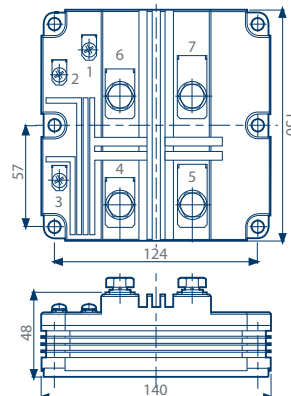
Chopper Switch - GCM



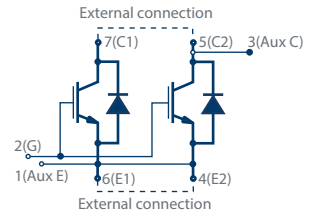
C¹ and C² - Aux Collector
E¹ and E² - Aux Emitter
G¹ and G² - Gate

Package Type: X

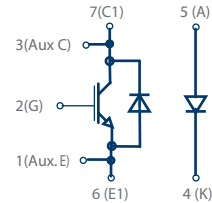
Nominal weight: 1100g



Single Switch - XSM

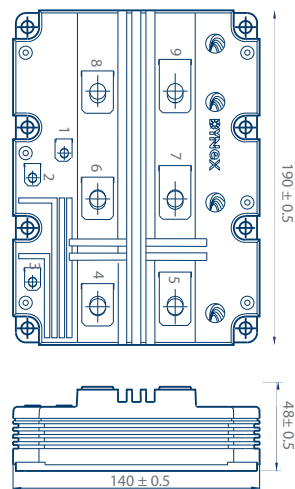


Chopper Switch - XCM

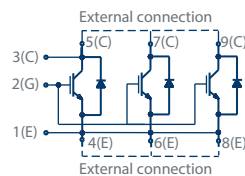


Package Type: A

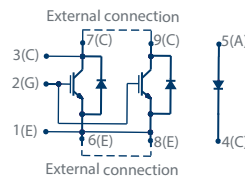
Nominal weight: 1700g



Single Switch - ASM



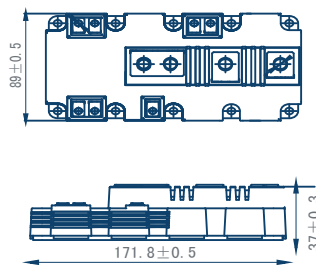
Chopper Switch - ACM



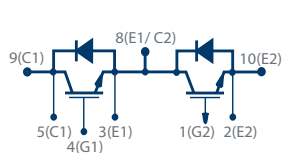
3 - Aux Collector
2 - Gate
1 - Aux Emitter

Package Type: H2

Nominal weight: 900g



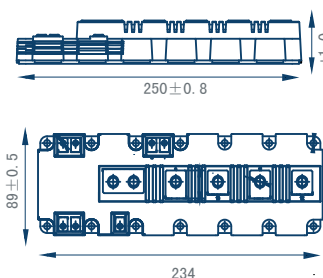
Half Bridge - H2HM



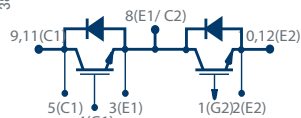
C¹ - Aux Collector
E¹ and E² - Aux Emitter
G¹ and G² - Gate

Package Type: H1

Nominal weight: 1700g



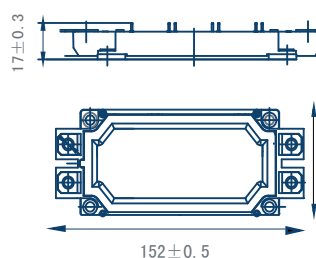
Half Bridge - H1HM



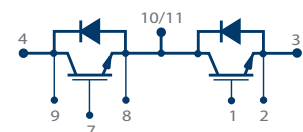
C¹ - Aux Collector
E¹ and E² - Aux Emitter
G¹ and G² - Gate

Package Type: M1

Nominal weight: 345g



Half Bridge - M1HM



Notes:

1. Mounting recommendations are given in the application note AN4505 'Heatsink Issues For IGBT Modules' available from our website.

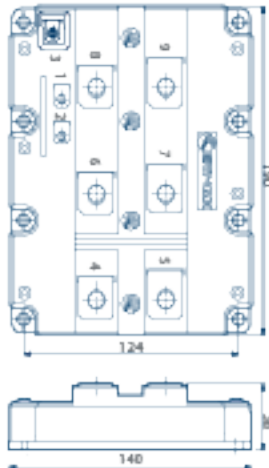
Package Outlines - FRD Modules

Module Outlines and Circuit Configurations

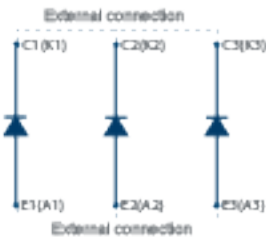
All dimensions shown in mm unless stated otherwise.

Package Type: E

Nominal weight: 1700g



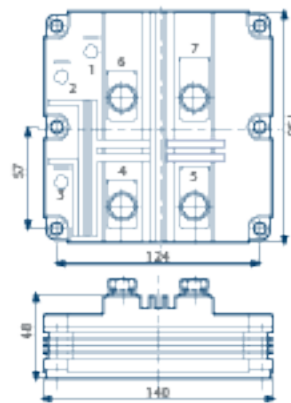
Triple Diode - EXM



External connection for single diode application

Package Type: X

Nominal weight: 1100g



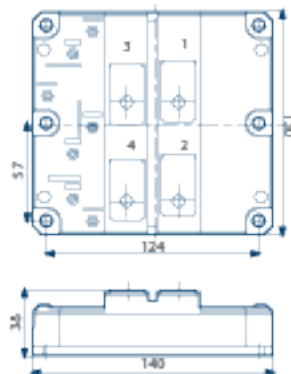
Dual Diode - XXM



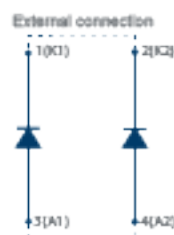
External connection for single diode application

Package Type: F

Nominal weight: 1000g/1600g



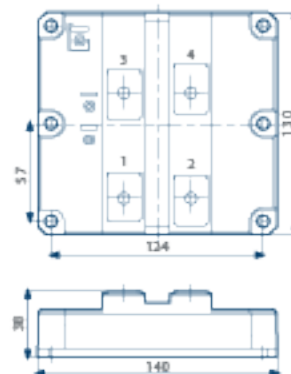
Dual Diode - FXM/S



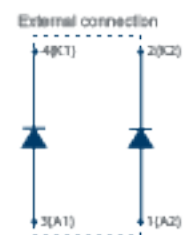
External connection for single diode application

Package Type: N

Nominal weight: 1000g



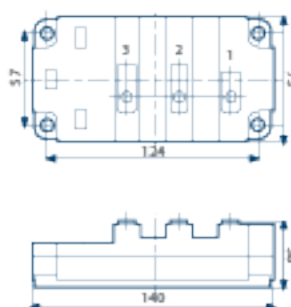
Dual Diode - NXM



External connection for single diode application

Package Type: P

Nominal weight: 500g

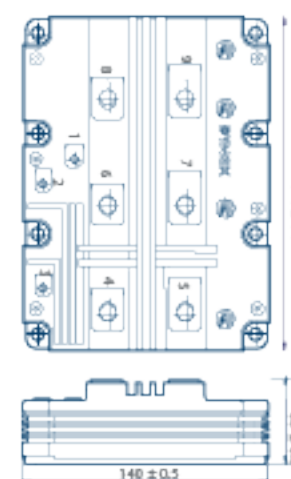


Series Diode - PXM

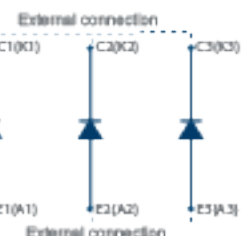


Package Type: A

Nominal weight: 1700g



Triple Diode - AXM



External connection for single diode application

3 - Aux Collector
2 - Gate
1 - Aux Emitter

Notes:

1. Mounting recommendations are given in the application note AN4505 'Heatsink Issues For IGBT Modules' available from our website.

Symbols and Definitions

C_S	Snubber capacitance	P_G	Gate power dissipation
di/dt	Critical rate of rise of on-state/forward current	P_{G(AV)}	Mean gate power dissipation
dI_{FG}/dt	Rate of rise of positive gate current	P_{GM}	Peak gate power dissipation
dI_{GQ}/dt	Rate of rise of reverse gate current (GTO)	Q_r	Recovered charge
dIT/dt	Critical rate of rise of on-state current (GTO)	Q_{rr}	Reverse recovery charge
dsc	Double side cooled	r_T	On-state/forward slope resistance
dV/dt	Critical rate of rise of off-state voltage	R_{th(c-hs)}	Thermal resistance – case to heatsink
dIV_D/dt	Rate of rise of off-state voltage (GTO)	R_{th(j-c)}	Thermal resistance – junction to case
E_{OFF}	Turn-off energy loss	R_{th(j-hs)}	Thermal resistance – junction to heatsink
E_{rec}	Reverse recovery energy	R_{th(j-w)}	Thermal resistance – junction to water
E_{sw(TOT)}	Total switching energy	T_c	Case temperature
F_m/F	Clamping force/mounting torque	t_{gq}	Gate controlled turn-off time
I²t	I ² t value	t_q	Turn-off time
I_C	Collector current	t_{rr}	Reverse recovery time
I_{C(PK)}	Peak collector current	T_{HS}	Heatsink temperature
I_{DRM}	On-state leakage current (thyristor)	T_{vj}	Virtual junction temperature
I_F	Forward current (diode)	T_{vjm}	Maximum virtual junction temperature
I_{F(AV)}	Mean forward current (diode)	T_{water}	Water temperature
I_{FM}	Peak forward current (diode)	V_{CE(sat)}	Collector-emitter saturation voltage (IGBT)
I_{F(RMS)}	RMS forward current (diode)	V_{CES}	Collector-emitter voltage (IGBT)
I_{FSM}	Single cycle surge current (diode), (10ms half sinewave)	V_{DRM}	Repetitive peak off-state voltage
I_{G(ON)}	Gate turn-on current (GTO)	V_{DSM}	Non-repetitive peak off-state voltage
I_{GT}	Gate trigger current	V_F	Forward voltage (diode)
I_{RMS}	RMS line current	V_{FM}	Peak forward voltage (diode)
I_{PK}	Peak current	V_{isol}	Isolation voltage
I_{RRM}	Peak reverse recovery current	V_{GT}	Gate trigger voltage
I_{T(RMS)}	RMS on-state current (thyristor)	V_R	Reverse voltage
I_T/I_{TM}	On-state current	V_{RRM}	Repetitive peak reverse voltage
I_{T(AV)}	Mean on-state current (thyristor)	V_{RSM}	Non-repetitive peak reverse voltage
I_{TCM}	Maximum repetitive controllable current (GTO)	V_T	On-state voltage
I_{TSM}	Single cycle surge current (thyristor), (10ms half sinewave)	V_{TM}	Peak on-state voltage
		V_{TO}	Threshold voltage (diode)
		V_{T(TO)}	Threshold voltage (thyristor)

IMPORTANT INFORMATION

The products and information in this publication are intended for use by appropriately trained technical personnel. Due to the diversity of product applications, the information contained herein is provided as a general guide only and does not constitute any guarantee of suitability for use in a specific application. The user must evaluate the suitability of the product and the completeness of the product data for the application. The user is responsible for product selection and ensuring all safety and any warning requirements are met. Should additional product information be needed please contact our Customer Service team. Although we have endeavoured to carefully compile the information in this publication it may contain inaccuracies or typographical errors. The information is provided without any warranty or guarantee of any kind.

This publication is an uncontrolled document and is subject to change without notice. When referring to it please ensure that it is the most up to date version and has not been superseded. The products are not intended for use in medical or other applications where a failure or malfunction may cause loss of life, injury or damage to property. The user must ensure that appropriate safety precautions are taken to prevent or mitigate the consequences of a product failure or malfunction. The products must not be touched when operating because there is a danger of electrocution or severe burning. Always use protective safety equipment such as appropriate shields for the product and wear safety glasses. Even when disconnected any electric charge remaining in the product must be discharged and allowed to cool before safe handling using protective gloves. Extended exposure to conditions outside the product ratings may affect reliability leading to premature product failure. Use outside the product ratings is likely to cause permanent damage to the product. In extreme conditions, as with all semiconductors, this may include potentially hazardous rupture, a large current to flow or high voltage arcing, resulting in fire or explosion. Appropriate application design and safety precautions should always be followed to protect persons and property.

Product Status and Product Ordering:

We annotate datasheets in the top right hand corner of the front page, to indicate product status if it is not yet fully approved for production. The annotations are as follows:

Target Information:

This is the most tentative form of information and represents a very preliminary specification. No actual design work on the product has been started.

Preliminary Information:

The product design is complete and final characterisation for volume production is in progress. The datasheet represents the product as it is now understood but details may change.

No Annotation:

The product has been approved for production and unless otherwise notified by Dynex any product ordered will be supplied

to the current version of the data sheet prevailing at the time of our order acknowledgement.

All products and materials are sold and services provided subject to Dynex's conditions of sale, which are available on request.

Any brand names and product names used in this publication are trademarks, registered trademarks or trade names of their respective owners.

Warning Counterfeit Products:

There are counterfeit products on the semiconductor marketplace. Unfortunately, many of these products will have markings and labels that closely resemble those from Dynex's genuine products, making it difficult to realise the difference. Dynex has extensive, proven controls to ensure its products are properly manufactured, tested, handled, and stored to prevent failures. Counterfeit products will not have been subjected to these processes. Therefore, Dynex does not warrant any parts purchased through unauthorised channels nor do we accept any liability for failure of counterfeit products.

Dynex's Advice to customer is as follows:

Only purchase from Dynex directly or from one of Dynex's authorised distributors. Our Customer Services team can advise you whether a distributor is authorised via the details below.

Dynex products should not be purchased if the outer appearance differs from Dynex products you normally receive unless Dynex or a Dynex authorised distributor has provided you with a product change notification or can be seen on datasheets from the Dynex Website. We strongly advise against purchasing extraordinarily low priced Dynex products from unauthorised distributors. Dynex does not support the sale of Dynex products via online auction houses. We will be pleased to confirm the authenticity of the products. To do so please contact Dynex's Customer Services (see reverse for contact information) with the following information:

- Part number, quantity purchased, unit cost
- Name and contact name of the supplier with address, phone, and web/e-mail addresses
- Digital photos of inner and outer label, inner and outer packaging, and front and back of product
- Copy of purchase order and invoice

This is intended to provide you with additional information on counterfeiting and steps that can be taken to better recognize counterfeit products.

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