IXYS

IGBT & Rectifier Modules

MAY 2007



Selector Guide incl.:

Product Overview Tables

Application Overview

Technology Overview

MiniPack 2 NEW

Press-Pack IGBTs

POWER DEVICES
- Power MOSFET Discreets
- RF Power MOSFETs
- IGBT Discreets
- >>> IGBT Modules
- Ultra Fast Rectifiers
- Silicon Schottky Rectifiers
- GaAs Schottky Rectifiers
- SCRs and Thyristors
- >>> Rectifier Bridges

ICS AND GATE DRIVERS
- MOSFET and IGBT Gate Drivers
- RF Power MOSFETs
- PWM Controllers

FUNCTIONAL SOLUTIONS
- PFC Modules
- Converter/Brake/Inverter Modules
- Boost & Buck Power Modules



IXYS Corporation is a global supplier of Power and Control Semiconductors with a wide range of Power MOSFETs, IGBTs, Bipolar products, GaAs RF devices, Mixed-Signal ICs, Modules and subsystem solutions that provide higher efficiency, reduced energy cost and improved performance in a wide range of power management and system applications. For over 20 years, IXYS has been at the forefront of Power Semiconductor and IC technologies having over 120 patents and innovations in the development of the IGBTs, High Current Power MOSFETs, Fast Recovery Diodes, BiMOSFETs, Reverse Blocking IGBTs, Gate Driver ICs, SOI technology, Opto-coupled ICs for telecommunication and VOIP, flat and flexible Display Driver ICs, Solar cells and GaAs RF PHEMT.

Since the beginning of the Internet boom, IXYS has been recognized as the leader in the Telecom and IT infrastructure Power Supply market with its family of »ruggedized« Power MOSFETs known as HiPerFETs™. IXYS also achieved a leadership position in the burgeoning Factory Automation market with its innovation in Direct Bond Copper (DCB) module technology and a family of industrial rated Power Semiconductors and Integrated Power Modules.

IXYS serves a variety of consumers and industries, including energy management and conservation, wind power, medical, automotive, transportation, military and aerospace, through an extensive product portfolio produced by its seven divisions. Headquartered in Santa Clara, California, IXYS is a public company trading on the **NASDAQ**. IXYS continually focuses on serving the global market through its divisions: IXYS Corp and IXYS Semiconductor GmbH for power products, Westcode for high power bipolar products, Clare and Micronix for Mixed Signal ICs and ASICs, MwT for GaAs RF products, and IXYS COLORADO for RF POWER systems and RF Silicon products.

To date, IXYS has substantially grown its business around its key strategic objective to become a more diversified supplier of medium to high power devices, mixed signal ICs, optoelectronic and RF semiconductors, keeping the emphasis on »power« as the company's strategic theme.

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For further products see main catalog 2006/2007

Please note:

IXYS offers the broadest line of IGBT technology, including our PT line of IGBT's that we introduced in 1986, which we improved on.

Please refer to factory for your special requirement of our Fast PT IGBT based products.



Sales Representatives and Distributors: See „Sales Offices" at

www.ixys.com

IGBT & Rectifier Modules Catalog, Edition 2007

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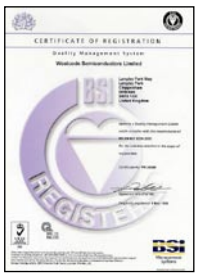
Note

As far as patents or other rights of third parties are concerned, liability is only assumed for components per se, not for applications, processes and circuits implemented with components or assemblies. The information describes the type of component and shall not be considered as assured characteristics. Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability. Terms of delivery and rights to change design or specifications are reserved. Changes have been made to earlier published specifications. The data herein supersedes all previously published informations.

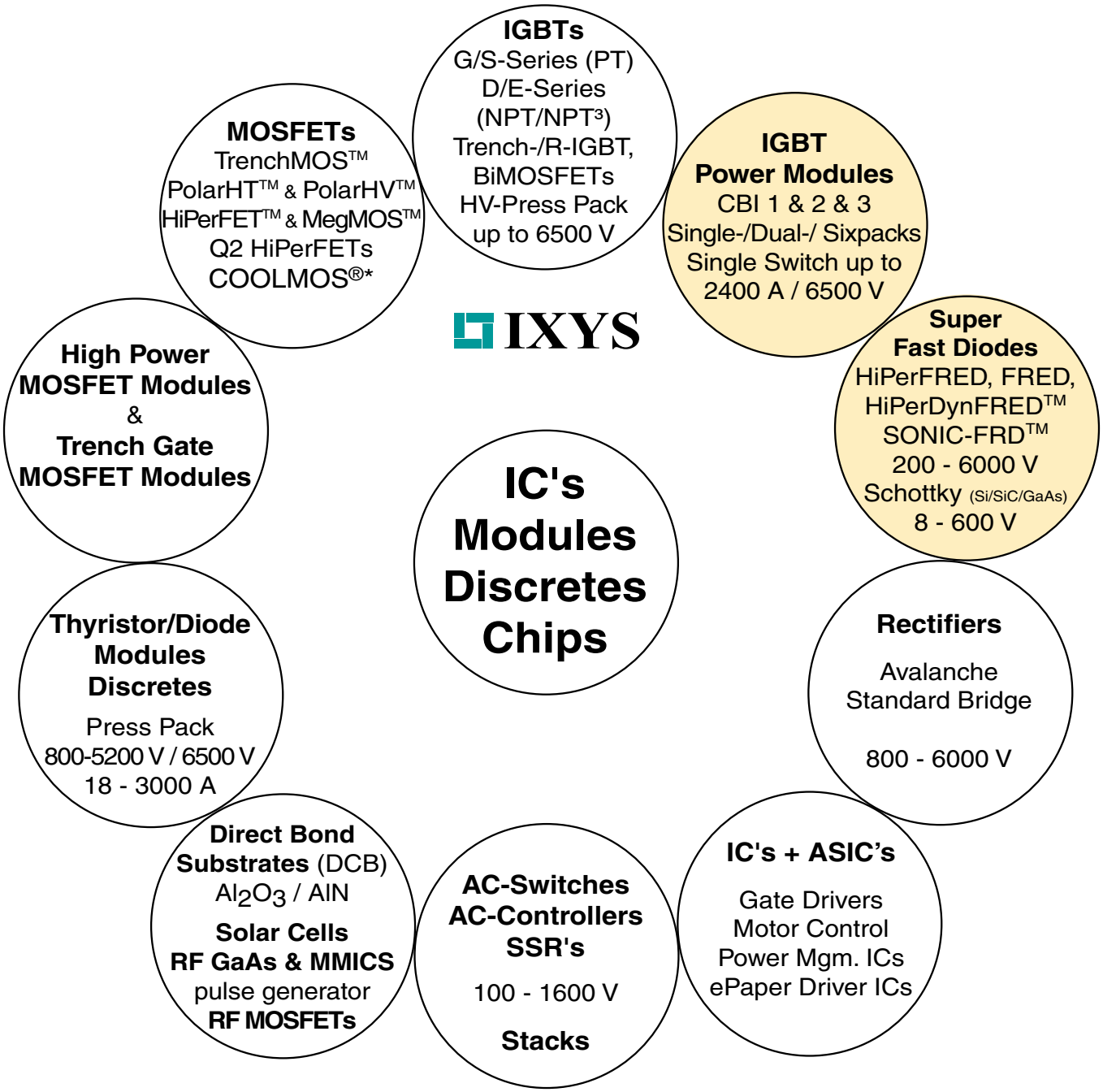
Life support applications

IXYS products used in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury must be expressly authorized for such purposes.

QA and Environmental Management Systems

		Certificates	
IXYS Corporation	ISO 9001:2000		
IXYS Semiconductor GmbH	ISO/TS 16949:2002 (includes ISO 9001:2000) ISO 14001:2004		
CLARE	ISO 9001:2000		
micronix	ISO 9001:2000		
WESTCODE	BS EN 9001:2000		
MwT MicroWave Technology	ISO 9001:2000		

IXYS Product Portfolio



* COOLMOS is a trademark of Infineon Technologies AG.

Symbols and Terms

(-)di/dt	Rate of change of current
E_{off}	Turn-off energy per pulse
E_{on}	Turn-on energy per pulse
I_C	Collector current
I_{CES}	Leakage current
I_{GES}	Gate - emitter leakage current
I_{C25}	Continuous DC collector current at T_C = 25°C
I_{C90}	Continuous DC collector current at T_C = 90°C
I_{CM}	Maximum pulsed collector current in on state
I_{DAV}	Average DC output current (rectifier output)
$I_{D(AV)M}$	Maximum average DC output current
I_F	Forward current (diode)
I_{FAV}	Average forward current
I_{FSM}	Maximum surge forward current
I_{RM}	Maximum reverse recovery current
I^2t	I^2t value for fusing
NTC	Thermistor
Q_r	Reverse recovery charge
r_T , R_0	Slope resistance (for power loss calculation)
R_{thJC}	Thermal resistance junction to case
R_{thJK}; R_{thJH}	Thermal resistance junction to heatsink
T_C	Case temperature
T_{Jmax}, T_{VJM}	Maximum virtual junction temperature
t_{rr}	Reverse recovery time
$V_{CE(sat)}$	Collector emitter saturation voltage
V_{CES}	Collector emitter voltage
V_{RRM}	Maximum repetitive reverse voltage
V_{T0} , V_0	Threshold voltage (for power loss calculation)
$V_{GE(th)}$	Threshold voltage

Nomenclature

IGBT Modules

M	W	I	100	-12	T	8	T	(Example)
F								ISOPLUS-I4
M								Module
V								Module
	C							Thyristor
	D							Diode
	I							IGBT with SCSOA capability
	M							MOSFET
	W							Three phase bridge
	U							Uncontrolled 3 phase input rectifier
		C						Thyristor
		D						Diode
		I						IGBT with SCSOA capability
		K						Common cathode
		M						MOSFET
		O						No meaning. Reserved for future function
		BW						Brake chopper and IGBT sixpack
			100					Current rating 100 = 100 A
				-12				Voltage class, 12 = 1200 V
					A			NPT IGBT
					E			NPT³ IGBT
					F			Fast NPT IGBT
					G			PT IGBT
					T			Trench IGBT
						6K		E1 Package
						7		E2 Package
						8		E3 Package
						9		E+ Package
						10		High Power Module
						11		High Power Module with enlarged clearance and creepage distance
							T	NTC temperature sensor

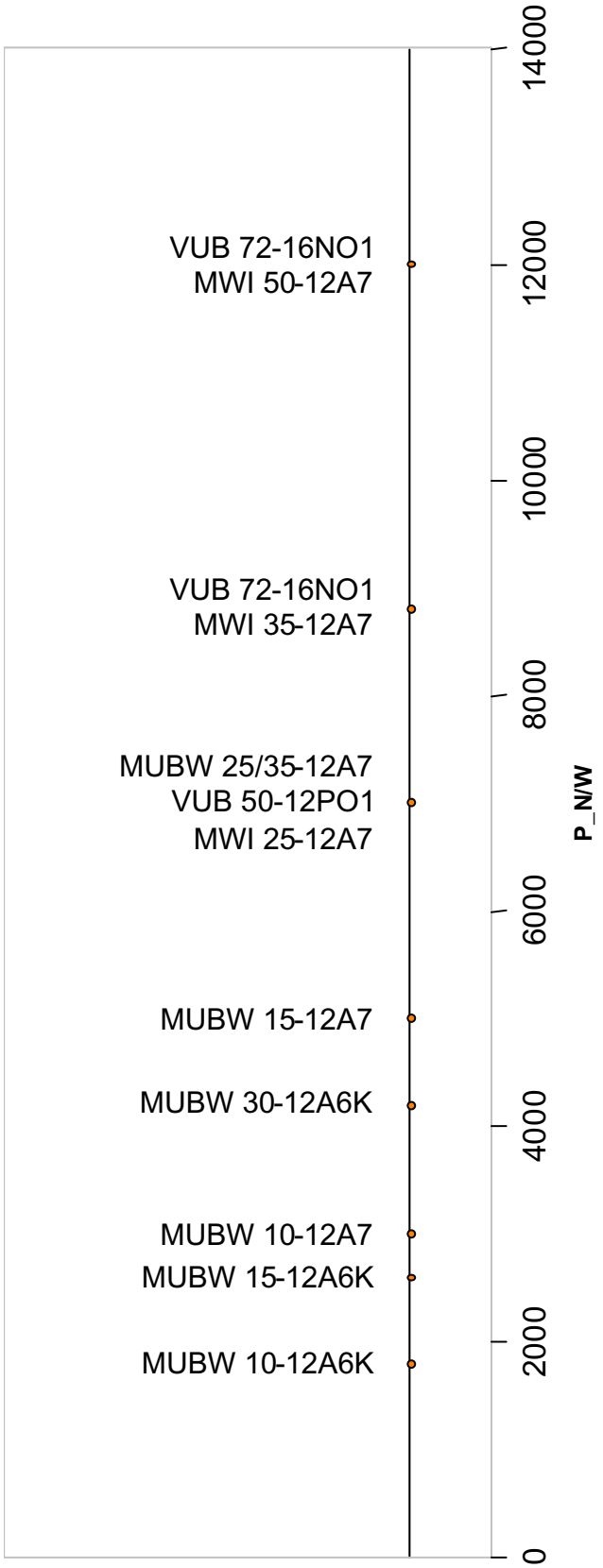
New nomenclature

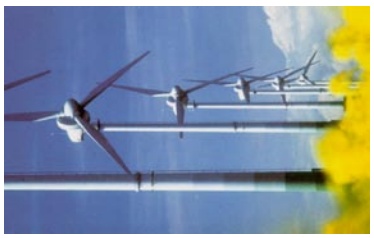
M	I	AA	10	WB	600	T	MH	Example
M								Module
	I							IGBT
		AA						NPT
		TA						Trench standard version
		TB						Trench fast version
			10					Current
				W				Six-Pack
				WB				Six-Pack with 3~ bridge and brake
				WD				Six-Pack with 1~ bridge
				WE				Six-Pack with 1~ bridge and brake
				WF				Six-Pack with 3~ bridge
					600			Voltage
						T		NTC inside
							MH	MiniPack 2 housing

Product Overview

CBI-Modules 1200 V

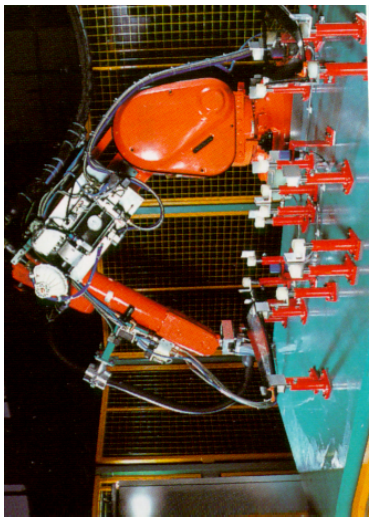
Estimation of typ. nom. power of the drive connection to 230/400 V 3~











Product Overview

Sixpack Modules

I_{C80} [A]	NPT	NPT³	SPT+	Trench IGBT	PT IGBT	Package
➢ New			**600 V**			
41					MWI 60 - 06 G6K	E1
30	MWI 30 - 06 A7(T)					
50	MWI 50 - 06 A7(T)					E2
60	MWI 75 - 06 A7(T)					
88	MWI 100 - 06 A8 (T)					
115	MWI 150 - 06 A8 (T)					E3
155	MWI 200 - 06 A8 (T)					
			1200 V			
13	MWI 15 - 12 A6K					
21		➢ MWI 30 - 12 E6K				
31				MWI 45 - 12 T6K		E1
36		➢ MWI 50 - 12 E6K				
41				MWI 60 - 12 T6K		
56				MWI 80 - 12 T6K		
20	MWI 15 - 12 A7					
35	MWI 25 - 12 A7(T)	MWI 25 - 12 E7				
44	MWI 35 - 12 A7(T)					
50				MWI 50-12T7T*		E2
60	MWI 50 - 12 A7(T)					
62		MWI 50 - 12 E7				
75				MWI 75-12T7T*		
75				MWI 75-12T8T*		
85	MWI 75 - 12 A8 (T)					
90		MWI 75 - 12 E8				
100				MWI 100-12T8T*		E3
110	MWI 100 - 12 A8 (T)					
115		MWI 100 - 12 E8				
150				MWI 150-12T8T*		
250		➢ MWI 225 - 12 E9				
375		➢ MWI 300 - 12 E9				E9
440		➢ MWI 450 - 12 E9				
			1700 V			
235		➢ MWI 225 - 17 E9				
350		➢ MWI 300 - 17 E9				E9
440			➢ MWI 451 - 17 E9			

* different pin-out compared to NPT and NPT³ modules

Product Overview

CBI Modules

I_{C80} [A]	NPT	NPT[3]	Trench Standard	Trench Fast	Package
➢ New			600 V		
13 16 20 27	➢ MIAA10WB600TMH ➢ MIAA15WB600TMH ➢ MIAA20WB600TMH ➢ MIAA30WB600TMH				MiniPack2
8 14 17 21 29	MUBW 10 - 06 A6K MUBW 15 - 06 A6K MUBW 20 - 06 A6K MUBW 25 - 06 A6K MUBW 35 - 06 A6K				E1
15 18 25 35 50	MUBW 10 - 06 A7 MUBW 15 - 06 A7 MUBW 20 - 06 A7 MUBW 30 - 06 A7 MUBW 50 - 06 A7				E2
50 65 85	MUBW 50 - 06 A8 MUBW 75 - 06 A8 MUBW 100 - 06 A8				E3
			1200 V		
11 17			➢ MITA10WB1200TMH ➢ MITA15WB1200TMH	➢ MITB10WB1200TMH ➢ MITB15WB1200TMH	MiniPack2
13 21 32	MUBW 15 - 12 A6K MUBW 30 - 12 A6K	➢ MUBW 30 - 12 E6K	➢ MUBW 45 - 12 T6K		E1
15 25 35 35 40	MUBW 10 - 12 A7 MUBW 15 - 12 A7 MUBW 25 - 12 A7 MUBW 35 - 12 A7	MUBW 35 - 12 E7	➢ MUBW 15-12T7 ➢ MUBW 25-12T7	➢ MUBW 40-12T7	E2
35 50 60 75	MUBW 35 - 12 A8 MUBW 50 - 12 A8	MUBW 50 - 12 E8	➢ MUBW 50 - 12 T8 ➢ MUBW 75 - 12 T8		E3
			1700 V		
53 80			MUBW 50 - 17 T8 MUBW 80 - 17 T8		E 3

Full Bridge Modules (Four Pack)

I_{C80} [A]	NPT	Fast NPT	NPT[3]	Trench Standard	Package
			600 V		
67				MWI 80 - 06 T6K	E1
45 67 85	MKI 50 - 06 A7(T) MKI 65 - 06 A7 (T) MKI 75 - 06 A7				E2
			1200 V		
45 62		MKI 50 - 12 F7	MKI 50 - 12 E7		E2
85 90 115		MKI 100 - 12 F8	MKI 75 - 12 E8 MKI 100 - 12 E8		E3

Insulated Gate Bipolar Transistor (IGBT) Modules

The IGBT is a combination of bipolar and MOS technologies. The best features of bipolar transistors are merged with the voltage-controlled properties of MOSFETs.

Advantages to the user:
- rugged, short-circuit-proof device (S-series, D-series and E-series)
- operation without protective snubber networks possible
- frequency range to well above 100 kHz
- low switching losses
- compact equipment design
- high efficiency

The IGBT is suitable for numerous applications in power electronics, especially in Pulse Width Modulated servo and three-phase drives requiring high dynamic range control and low noise. It also can be used in Uninterruptible Power Supplies (UPS), Switch Mode Power Supplies (SMPS), and other power circuits requiring high switch repetition rates. IGBTs improve dynamic performance and efficiency and reduce the level of audible noise. IGBTs are equally suitable in resonant converter circuits. Optimized IGBTs are available for both low conduction loss and low switching loss. See table 1 and 2.

Discrete standard „G“ series IGBTs are characterized by a high control gain, which limits their short-circuit withstand time. Newer „S“, „D“ and „E“ series products utilize newly developed IGBT chips capable of withstanding up to 10 ms in short-circuit, even with a 15 V gate drive.
A switch is only as good as its companion freewheeling diode. For this reason, all IGBTs with integrated diodes incorporate ultra-fast-recovery epitaxial diodes (FREDs) with very low reverse recovery charge (Q_{rr}). These same diodes are also available as separate elements for use in IGBT circuits or any other application requiring high diode switching speeds.
The IGBT modules use **D**irect **C**opper **B**onded (DCB) substrates, which consist of an aluminium oxide (Al_2O_3) insulator to which copper is directly bonded using the latest techniques developed by IXYS.

Chip Type	Low V_{CEsat}	Low Switching Losses	R_{thJC}	Short Circuit Rated	Optimized Operation Frequency
Low loss NPT	-	-	++	yes	up to 20 kHz
Fast NPT	- -	++	++	yes	up to 30 kHz
NPT³	o	+	++	yes	10 to 20 kHz
Standard Trench	++	o	+	yes	up to 8 kHz
Fast Trench	++	+	+	yes	up to 12 kHz
PT IGBT	-	+++	++	no/yes	up to 50 kHz
PT IGBT LV*	+++	++++	++	no	up to 200 kHz

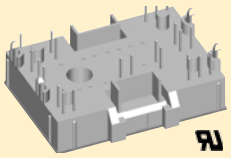
IGBT Modules

PT IGBT	punch through IGBT, very low switching losses, someone short circuit rated
PT IGBT LV*	punch through IGBT 250 - 300 V, very fast, low V_{SAT} up to 200 kHz switching, *for new products consult factory*
NPT IGBT	non-punch through insulated gate bipolar transistor; square RBSOA, short circuit rated
NPT³ IGBT	improved NPT IGBT • reduced Vcesat • reduced switching losses • optimized for switching frequencies from 10 kHz up to 25 kHz
Trench IGBT	improved NPT IGBT • very low Vcesat • reduced switching losses • optimized for switching frequencies up to 10 kHz
SPT+	soft punch through IGBT, improved NPT³ IGBT

CBI Modules

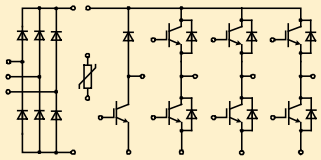
CBI = Converter Brake Inverter
Rectifier, IGBT brake chopper, three phase IGBT inverter, temperature sensor
* PT IGBT (LV 250 V, 300 V, 600 V) are available too, *consult factory*

CBI



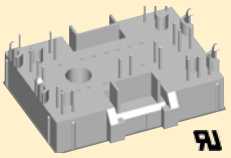
X110 MiniPack2
Package style
Outline drawings on pages O-1...O-3

See data sheet for pin arrangement



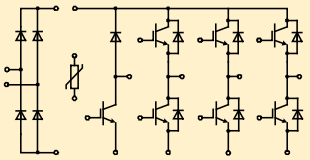
Type	Rectifier 3~			Inverter 3~					Brake chopper		
	V_{RRM} V	I_{DAVM} T_H = 80°C A	R_{thJC} typ. K/W	V_{CES} V	I_C T_C = 25°C A	I_C T_C = 80°C A	$V_{CE(sat)}$ typ. V	R_{thJC} typ. K/W	V_{CES} V	I_C T_C = 80°C A	R_{thJC} typ. K/W
600 V NPT IGBT											
MIAA10WB600TMH	1600	62	2.1	600	18	13	2.1	1.8	600	13	1.8
MIAA10WF600TMH		62	2.1		18	13	2.1	1.8	no brake chopper included		
MIAA15WB600TMH		62	2.1		23	16	2.1	1.6	600	16	1.6
MIAA20WB600TMH		62	2.1		29	20	2.1	1.3		20	1.3
600 V Trench IGBT											
MITA30WB600TMH	1600	90	1.4	600	40	27	1.5	1.4	600	27	1.4
1200 V Trench IGBT											
MITA10WB1200TMH	1600	62	2.1	1200	17	12	1.8	1.9	1200	12	1.9
MITA15WB1200TMH		62	2.1		30	21	1.8	1.1		21	1.1
MITB10WB1200TMH		62	2.1		17	12	1.9	1.85		12	1.85
MITB15WB1200TMH		62	2.1		29	20	1.7	1.2		17	1.6

CBI



X110 MiniPack2
Package style
Outline drawings on pages O-1...O-3

See data sheet for pin arrangement



Type	Rectifier			Inverter					Brake chopper		
	V_{RRM} V	I_{DAVM} T_H = 80°C A	R_{thJC} typ. K/W	V_{CES} V	I_C T_C = 25°C A	I_C T_C = 80°C A	$V_{CE(sat)}$ typ. V	R_{thJC} typ. K/W	V_{CES} V	I_C T_C = 80°C A	R_{thJC} typ. K/W
600 V NPT IGBT											
MIAA10WE600TMH	1600	23	2.1	600	18	13	2.1	1.8	600	13	1.8
MIAA10WD600TMH		23	2.1		18	13	2.1	1.8	no brake chopper included		
MIAA15WE600TMH		23	2.1		23	16	2.1	1.6	600	16	1.6
MIAA15WD600TMH		23	2.1		23	16	2.1	1.6	no brake chopper included		
MIAA20WE600TMH		23	2.1		29	20	2.1	1.3	600	20	1.3
MIAA20WD600TMH		23	2.1		29	20	2.1	1.3	no brake chopper included		

Mechanical mounting part



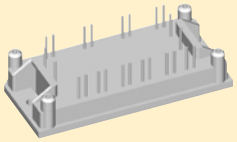
IXKU 5-505

CBI Modules

CBI = Converter Brake Inverter
Rectifier, IGBT brake chopper, three phase IGBT inverter, temperature sensor

CBI 1

IGBT Modules

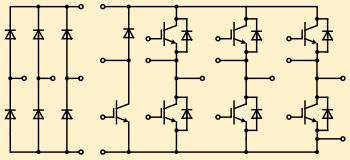


X111 E1-pack

Package style

Outline drawings on pages O-1...O-3

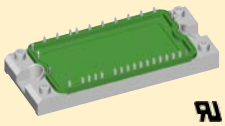
See data sheet for pin arrangement



Type	Rectifier 3~			Inverter 3~					Brake chopper		
	V_{RRM}	I_{DAVM} T_H = 80°C	R_{thJC} typ.	V_{CES}	I_C T_C = 25°C	I_C T_C = 80°C	$V_{CE(sat)}$ typ.	R_{thJC} typ.	V_{CES}	I_C T_C = 80°C	R_{thJC} typ.
	V	A	K/W	V	A	A	V	K/W	V	A	K/W
600 V NPT IGBT											
MUBW 10-06A6K		61	2.1		12	8	2.5	2.8		8	2.8
MUBW 15-06A6K		65	1.9		19	14	2.4	1.7		8	2.8
MUBW 20-06A6K	1600	65	1.9	600	25	17	2	1.5	600	8	2.8
MUBW 25-06A6K		65	1.9		31	21	2.1	1.25		14	1.7
MUBW 35-06A6K		89	1.4		42	29	2.3	0.95		17	1.5
1200 V NPT IGBT											
MUBW 15-12A6K	1600	89	1.4	1200	19	13	3	1.35	1200	13	1.35
MUBW 30-12A6K		89	1.4		30	21	3	0.95		13	1.35
1200 V NPT³ IGBT											
MUBW 30-12E6K	1600	89	1.4	1200	30	21	3.1	0.95	1200	13	1.35
1200 V Trench IGBT											
MUBW 45-12T6K	1600	104	1.1	1200	43	31	2.5	0.8	1200	13	1.35

CBI 2

IGBT Modules

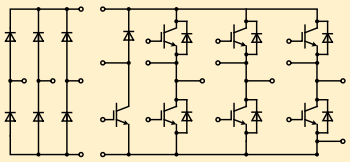


X112 E2-pack

Package style

Outline drawings on pages O-1...O-3

See data sheet for pin arrangement



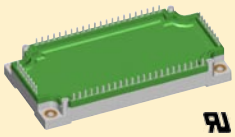
Type	Rectifier 3~			Inverter 3~					Brake chopper		
	V_{RRM}	I_{DAVM} T_H = 80°C	R_{thJC} typ.	V_{CES}	I_C T_C = 25°C	I_C T_C = 80°C	$V_{CE(sat)}$ typ.	R_{thJC} typ.	V_{CES}	I_C T_C = 80°C	R_{thJC} typ.
	V	A	K/W	V	A	A	V	K/W	V	A	K/W
600 V NPT IGBT											
MUBW 10-06A7		18	1.5		20	15	1.9	1.5		15	1.5
MUBW 15-06A7		18	1.5		25	18	1.9	1.3		15	1.5
MUBW 20-06A7	1600	24	1.3	600	35	25	1.9	1	600	18	1.4
MUBW 30-06A7		24	1.3		50	35	1.9	0.7		18	1.3
MUBW 50-06A7		29	1.1		75	50	1.9	0.5		25	1
1200 V NPT IGBT											
MUBW 10-12A7		18	1.5		20	15	2.3	1.2		15	1.2
MUBW 15-12A7	1600	24	1.3	1200	35	25	2	0.7	1200	15	1.2
MUBW 25-12A7		24	1.3		50	35	2.2	0.55		15	1.2
MUBW 35-12A7		29	1.1		50	35	2.5	0.55		25	0.7
1200 V NPT³ IGBT											
MUBW 35-12E7	1600	29	1.1	1200	52	36	2.2	0.55	1200	25	0.7
1200 V Trench IGBT											
MUBW15-12T7		24	1.3		25	15	1.7	1.2		15	1.2
MUBW25-12T7	1600	24	1.3	1200	40	25	1.7	0.8	1200	15	1.2
MUBW40-12T7		80	1.3		62	44	2.0	0.8		25	0.7

CBI Modules

CBI = Converter Brake Inverter
Rectifier, IGBT brake chopper, three phase IGBT inverter, temperature sensor

CBI 3

IGBT Modules

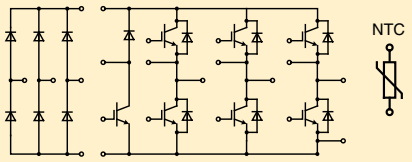


X113 E3-pack

Package style

Outline drawings on pages O-1...O-3

See data sheet for pin arrangement



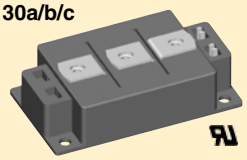
Type	Rectifier 3~			Inverter 3~					Brake chopper		
	V_{RRM} V	I_{DAVM} T_H = 80°C A	R_{thJC} typ. K/W	V_{CES} V	I_C T_C = 25°C A	I_C T_C = 80°C A	$V_{CE(sat)}$ typ. V	R_{thJC} typ. K/W	V_{CES} V	I_C T_C = 80°C A	R_{thJC} typ. K/W
600 V NPT IGBT											
MUBW 50-06A8	1600	40	1.1	600	75	50	1.9	0.5	600	25	1
MUBW 75-06A8		46	0.94		100	65	2	0.39		35	0.75
MUBW 100-06A8		60	0.73		125	85	1.9	0.3		50	0.55
1200 V NPT IGBT											
MUBW 35-12A8	1600	27	1.3	1200	50	35	2.5	0.55	1200	25	0.7
MUBW 50-12A8		46	0.94		85	60	2.2	0.35		35	0.55
1200 V NPT³ IGBT											
MUBW 50-12E8	1600	50	0.94	1200	90	62	1.9	0.35	1200	35	0.55
1200 V Trench IGBT											
MUBW 50-12T8	1600	50	0.94	1200	75	50	1.7	0.45	1200	35	0.55
MUBW 75-12T8		50	0.94		105	75	1.7	0.35		35	0.55
1700 V Trench IGBT											
MUBW 50-17T8	2200	120	1.1	1700	74	53	2.0	0.43	1700	34	0.62
MUBW 75-17T8		140	0.95		113	80	2.0	0.48		34	0.62

Phase-Leg Modules

NPT

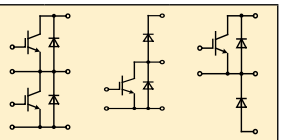
IGBT Modules

X130a/b/c



Outline drawings on pages O-1...O-3

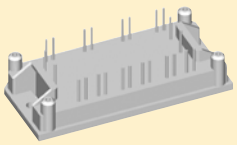
See data sheet for pin arrangement



Type ➢ New	V_{CES} V	I_{C25} A T_C = 25°C IGBT	I_{C80} A T_C = 80°C IGBT	$V_{CE(sat)}$ typ V T_J = 25°C IGBT	E_{off} mJ T_J = 125°C IGBT	R_{thJC} K/W IGBT	I_{F25} A T_C = 25°C diode	I_{F80} A T_C = 80°C diode	Fig.
1200 V Half Bridge with 3rd generation NPT³									
➢ **MII 300-12E4**	1200	280	200	2.0	20	0.11	300	190	X130a
➢ **MII 400-12E4**		420	300	2.2	30	0.08	450	290	
1200 V Boost chopper with 3rd generation NPT³									
➢ **MID 400-12E4**	1200	420	300	2.2	30	0.08	450	290	X130b
1200 V Buck chopper with 3rd generation NPT³									
➢ **MDI 400-12E4**	1200	420	300	2.2	30	0.08	450	290	X130c

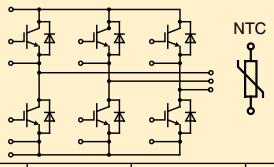
Sixpack configuration

Sixpack
IGBT Modules



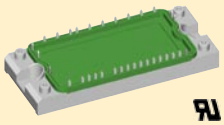
X111 E1-pack
Package style
Outline drawings on pages O-1...O-3

See data sheet for pin arrangement



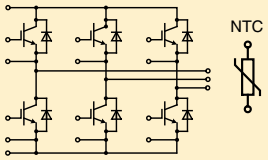
Type	V_{CES} V	I_{C25} A T_C = 25°C IGBT	I_{C80} A T_C = 80°C IGBT	$V_{CE(sat)\ typ}$ V T_J = 25°C IGBT	E_{off} mJ T_J = 125°C IGBT	R_{thJC} K/W IGBT	I_{F25} A T_C = 25°C diode	I_{F80} A T_C = 80°C diode	NTC
600 V PT IGBT									
MWI 60-06G6K	600	60	41	2.3	0.5	0.7	48	33	•
1200 V NPT IGBT									
MWI 15-12A6K	1200	19	13	3	1.1	1.37	24	16	•
1200 V NPT³ IGBT									
MWI 30-12E6K	1200	29	21	2.5	1.8	0.95	24	16	•
MWI 50-12E6K		51	36	2.4	2.6	0.6	49	32	•
1200 V Trench IGBT									
MWI 45-12T6K	1200	43	31	1.9	3.4	0.8	49	32	•
MWI 60-12T6K		58	41	1.9	4.8	0.62	49	32	•
MWI 80-12T6K		80	56	2	6.5	0.46	80	51	•

Sixpack
IGBT Modules



X112 E2-pack
Package style
Outline drawings on pages O-1...O-3

See data sheet for pin arrangement

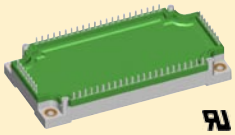


Type	V_{CES} V	I_{C25} A T_C = 25°C IGBT	I_{C80} A T_C = 80°C IGBT	$V_{CE(sat)\ typ}$ V T_J = 25°C IGBT	E_{off} mJ T_J = 125°C IGBT	R_{thJC} K/W IGBT	I_{F25} A T_C = 25°C diode	I_{F80} A T_C = 80°C diode	NTC
600 V NPT IGBT									
MWI 30-06A7	600	45	30	1.9	1	0.88	36	24	
MWI 30-06A7T		45	30	1.9	1	0.88	36	24	•
MWI 50-06A7		75	50	1.9	1.7	0.55	72	45	
MWI 50-06A7T		75	50	1.9	1.7	0.55	72	45	•
MWI 75-06A7		90	60	2.1	2.5	0.44	140	85	
MWI 75-06A7T		90	60	2.1	2.5	0.44	140	85	•
1200 V NPT IGBT									
MWI 15-12A7	1200	30	20	1	1.8	0.88	25	17	
MWI 25-12A7		50	35	2.2	2.8	0.55	50	33	
MWI 25-12A7T		50	35	2.2	2.8	0.55	50	33	•
MWI 35-12A7		62	44	2.2	4.2	0.44	50	33	
MWI 35-12A7T		62	44	2.2	4.2	0.44	50	33	•
MWI 50-12A7		85	60	2.2	5.6	0.35	110	70	
MWI 50-12A7T		85	60	2.2	5.6	0.35	110	70	•
1200 V NPT³ IGBT									
MWI 25-12E7	1200	52	36	1.9	2.5	0.55	50	33	
MWI 50-12E7		90	62	2.1	4	0.35	110	70	
1200 V Trench IGBT									
MWI 50-12T7T	1200	75	50	1.7	6.5	0.49	110	70	•
MWI 75-12T7T		105	75	1.7	9.5	0.35	150	100	•

Sixpack configuration

Sixpack

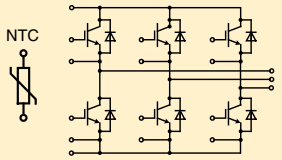
IGBT Modules



X113 E3-pack
Package style

Outline drawings on pages O-1...O-3

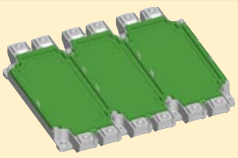
See data sheet for pin arrangement



Type	V_{CES} V	I_{C25} A T_C = 25°C IGBT	I_{C80} A T_C = 80°C IGBT	$V_{CE(sat)\ typ}$ V T_J = 25°C IGBT	E_{off} mJ T_J = 125°C IGBT	R_{thJC} K/W IGBT	I_{F25} A T_C = 25°C diode	I_{F80} A T_C = 80°C diode	NTC
600 V NPT IGBT									
MWI 100-06A8	600	130	88	2	2.9	0.3	140	88	
MWI 100-06A8T		130	88	2	2.9	0.3	140	88	•
MWI 150-06A8		170	115	2	4.6	0.24	210	130	
MWI 150-06A8T		170	115	2	4.6	0.24	210	130	•
MWI 200-06A8		215	155	2	6.3	0.18	260	165	
MWI 200-06A8T		215	155	2	6.3	0.18	260	165	•
1200 V NPT IGBT									
MWI 75-12A8	1200	125	85	2.2	10.5	0.25	150	100	
MWI 75-12A8T		125	85	2.2	10.5	0.25	150	100	•
MWI 100-12A8		160	110	2.2	14.6	0.19	200	130	
MWI 100-12A8T		160	110	2.2	14.6	0.19	200	130	•
1200 V NPT³ IGBT									
MWI 75-12E8	1200	130	90	2	7.5	0.25	150	100	
MWI 100-12E8		165	115	2	10.0	0.19	200	130	
1200 V Trench IGBT									
MWI 75-12T8T	1200	100	75	1.7	9.5	0.35	150	100	•
MWI 100-12T8T		140	100	1.7	12.0	0.26	200	130	•
MWI 150-12T8T		200	150	1.7	17.0	0.18	tbd	tbd	•

Sixpack

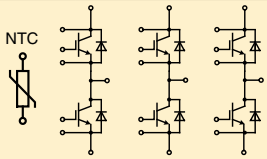
IGBT Modules



X114 E9-pack
Package style

Outline drawings on pages O-1...O-3

See data sheet for pin arrangement

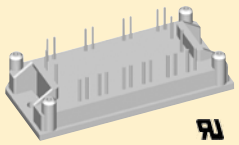


Type	V_{CES} V	I_{C25} A T_C = 25°C IGBT	I_{C80} A T_C = 80°C IGBT	$V_{CE(sat)\ typ}$ V T_J = 25°C IGBT	E_{off} mJ T_J = 125°C IGBT	R_{thJC} K/W IGBT	I_{F25} A T_C = 25°C diode	I_{F80} A T_C = 80°C diode	NTC
1200 V NPT³ IGBT									
MWI 225-12E9	1200	355	250	2.1	20	0.09		205	•
MWI 300-12E9		530	375	2	30	0.06		300	•
MWI 450-12E9		640	440	2.2	45	0.057		450	•
1700 V NPT³ IGBT									
MWI 225-17E9	1700	335	235	2.5	54	0.085		200	•
MWI 300-17E9		500	350	2.3	80	0.057		290	•
1700 V SPT⁺ IGBT									
MWI 451-17E9	1700	580	475	2.25	90	0.057		450	•

Full Bridge configuration

Full Bridge

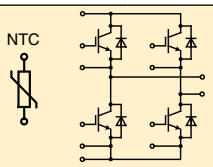
IGBT Modules



X111 E1-pack
Package style

Outline drawings on pages O-1...O-3

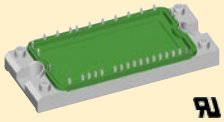
See data sheet for pin arrangement



Type ➢ New	V_{CES} V	I_{C25} A T_C = 25°C IGBT	I_{C80} A T_C = 80°C IGBT	$V_{CE(sat)\ typ}$ V T_J = 25°C IGBT	E_{off} mJ T_J = 125°C IGBT	R_{thJC} K/W IGBT	I_{F25} A T_C = 25°C diode	I_{F80} A T_C = 80°C diode	NTC
600 V Trench IGBT									
➢ **MKI 80-06T6K**	600	89	67	1.8	2.8	0.6	105	67	•

Full Bridge

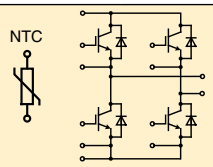
IGBT Modules



X112 E2-pack
Package style

Outline drawings on pages O-1...O-3

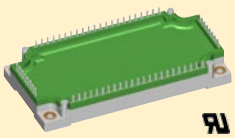
See data sheet for pin arrangement



Type	V_{CES} V	I_{C25} A T_C = 25°C IGBT	I_{C80} A T_C = 80°C IGBT	$V_{CE(sat)\ typ}$ V T_J = 25°C IGBT	E_{off} mJ T_J = 125°C IGBT	R_{thJC} K/W IGBT	I_{F25} A T_C = 25°C diode	I_{F80} A T_C = 80°C diode	NTC
600 V NPT IGBT									
MKI 50-06A7		72	50	1.9	1.7	0.55	72	45	
MKI 50-06A7T		72	50	1.9	1.7	0.55	72	45	•
➢ **MKI 65-06A7T**	600	100	67	2.0	2.3	0.39	140	85	•
MKI 75-06A7		90	60	2.5	6.3	0.44	140	85	
MKI 75-06A7T		90	60	2.5	6.3	0.44	140	85	•
1200 V Fast NPT IGBT									
MKI 50-12F7	1200	65	45	3.2	2.5	0.35	110	70	
1200 V NPT³ IGBT									
MKI 50-12E7	1200	90	62	1.9	4.0	0.35	110	70	

Full Bridge

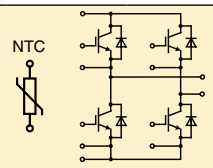
IGBT Modules



X113 E3-pack
Package style

Outline drawings on pages O-1...O-3

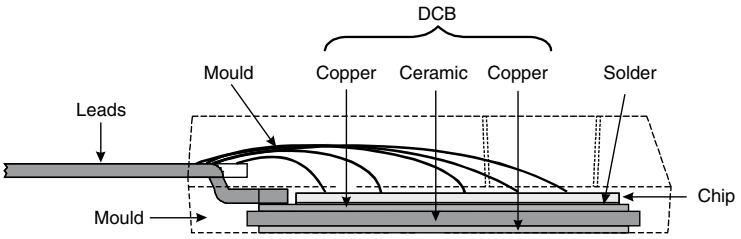
See data sheet for pin arrangement

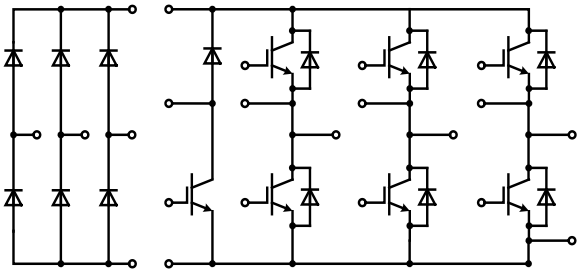


Type	V_{CES} V	I_{C25} A T_C = 25°C IGBT	I_{C80} A T_C = 80°C IGBT	$V_{CE(sat)\ typ}$ V T_J = 25°C IGBT	E_{off} mJ T_J = 125°C IGBT	R_{thJC} K/W IGBT	I_{F25} A T_C = 25°C diode	I_{F80} A T_C = 80°C diode	NTC
1200 V Fast NPT IGBT									
MKI 100-12F8	1200	65	45	3.2	2.5	0.35	110	70	
1200 V NPT³ IGBT									
MKI 75-12E8	1200	130	90	2.0	7.5	0.25	150	100	
MKI 100-12E8		150	115	2.0	10	0.19	200	130	

IXYS *ISOPLUS Technology*

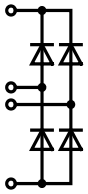
DCB base plate
- 2500 V electrical isolation
- low thermal resistance
- increased power & temperature cycling
- saves space
- replaces multiple discretes
- reduces parasitic inductance and capacitance
- reduces EMI
- heat spreading



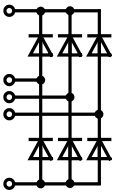


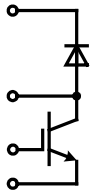
Rectifier Bridge **Brake (Boost)** **Converter (3x phaseleg)**

FBO 16-12N
FBO 40-12N

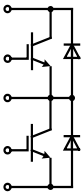


FUO 22-12N
FUO 22-16N
FUO 50-16N





FID 35-06C
FID 36-06D
FID 60-06D



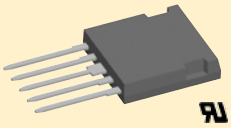
FII 30-06D
FII 40-06D
FII 30-12E
FII 50-12E

* PT IGBT LV alvailable too
(*inquire factory*)

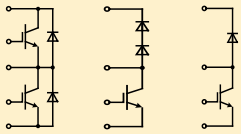
Building blocks for your ideal converter

ISOPLUS i4-PAC™

Package



X024a
Package style
Outline drawings on pages O-1...O-4



FII **FID** HiPerDyn **FID** HiPerFRED

Type	Configu-ration	Technology	V_{RRM} / V_{CES} V	I_{C25} @ 25°C A	$I_{D(AV)M}$ / I_{C80} @ 90°C A	$V_{CE(sat)}$ typ. T_C = 25°C V
FBO 16-12N	*1~*	Rectifier Bridge	1200		22	
FBO 40-12N					40	
FUO 22-12N	*3~*	Rectifier Bridge	1200		27	
FUO 22-16N			1600		27	
FUO 50-16N			1600		50	
FID 35-06C	*boost*	NPT IGBT & HiPerDynFRED	600	38	24	1.9
FID 36-06D		NPT IGBT & HiPerFRED		38	24	1.9
FID 60-06D		NPT IGBT & HiPerFRED		65	40	1.6
FII 30-06D	*phaseleg*	NPT IGBT	600	30	18	1.9
FII 40-06D		NPT IGBT	600	40	25	1.8
FII 30-12E		NPT³ IGBT	1200	32	20	2.4
FII 50-12E		NPT³ IGBT	1200	50	32	2.0

Thyristor / Diode Modules

One of the essential advantages of power semiconductor modules compared to discrete designs is the electrical isolation between the baseplate of the module and the parts subject to voltage (3.6 kV_{RMS} tested). This makes possible the mount-down of any number of the same or different modules on a common heatsink. It is feasible to use standard housings with appropriate accessories for designing compact power converter operating from AC mains up to 690 V.

Plastic Housing with DCB Substrate

IXYS has succeeded in simplifying the conventional multilayer module construction by the DCB (Direct Copper Bonding) technique.

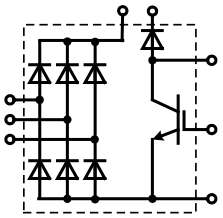
Other features are:

- top-side electrical terminals with captured nuts;
- series-connected diode/diode, thyristor/diode and thyristor/thyristor modules;
- easy assembly.

All thyristor modules with DCB ceramic base contacts are available in volume with two standardized twin plugs (2.8 mm x 0.8 mm) for gate and auxiliary cathode control terminals (version 1). Modules in TO-240 housing of the version 8 are delivered with gate plugs only (without auxiliary cathode terminal; mounting srews available on request). The module housing is designed for adequate clearance and creepage distance resulting in recognition by Underwriters Laboratories, Inc., USA for all types.

3~ Rectifier Bridges

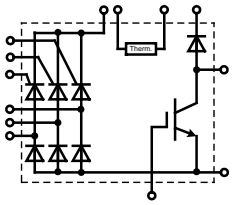
with IGBT and Diode for Brake Unit



Type	Rectifier			IGBT		fast Diode				Package style
	V_{RRM}	I_{dAV} @ T_C		V_{CES}	I_{C80}	V_{RRM}	$I_{F(AV)}$	t_{rr}	Fig. No.	Outline drawings on pages O-1...O-3
	V	A	°C	V	A	V	A	ns		
VUB 50-12PO1	1200	56	100	1200	14	1200	10	110	X102	**X102 ECO-PAC 2** Weight = 24 g See data sheet for pin arrangement
VUB 50-16PO1	1600									
VUB 72-12NO1	1200	110	80	1200	35	1200	15	130	X103	
VUB 72-16NO1	1600									
VUB 116-16NO1	1600	116	100	1200	67	1200	27	40	X112	
VUB 120-12NO2	1200	188	80	1200	100	1200	32	40	X104	
VUB 120-16NO2	1600									
VUB 135-16NO1	2200	135	100	1700	50	1800	50	40	X112	**X103 V1-Package** Weight = 35 g
VUB 145-16NO1	1600	145	100	1200	100	1200	27	40		
VUB 160-12NO2	1200	188	80	1200	125	1200	34	40	X104	
VUB 160-16NO2	1600									

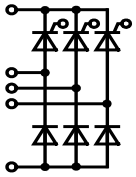
3~ Half Controlled Rectifier Bridges

with IGBT and Diode for Brake Unit



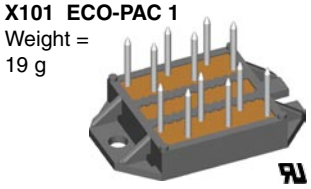
VVZB 120-12io1	1200	120	80	1200	100	1200	27	40	X104	**X104 V2-Package** Weight = 80 g
VVZB 120-16io1	1600									
VVZB 135-16NO1	1600	135	85		67				X112	**X112 V2-Package** Weight = 180 g
VVZB 170-16NO1		170			100					

3~ Rectifier Bridges

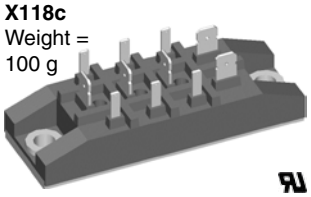


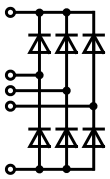
3~ Half Controlled Rectifier Bridges, B6HK

Type	V_{RRM} V	V_{vRMS} V	I_{dAV} T_H = 100°C A	I_{FSM} 45°C 10 ms A	V_{T0} V	r_T mΩ	T_{VJM} °C	R_{thJC} per Chip K/W	R_{thJH} per Chip K/W	Fig. No.	Package style Outline drawings on pages O-5...O-17
VVZ 12-12io1	1200	400	15	110	1.1	30	125	2.5	3.1	X106a	**X101 ECO-PAC 1** Weight = 19 g
VVZ 12-14io1	1400	440									
VVZ 12-16io1	1600	500									
VVZ 24-12io1	1200	400	21	300	1	16	125	2.1	2.7		
VVZ 24-14io1	1400	440									
VVZ 24-16io1	1600	500									
VVZ 39-08ho7	800	250	39 T_C = 85°C	200	0.85	27	125	1.3	1.8	X101	See data sheet for pin arrangement
VVZ 39-12ho7	1200	400									
VVZ 40-12io1	1200	400	34	320	0.85	15	125	1.0	1.6	X106a	**X106a** Weight = 28 g
VVZ 40-14io1	1400	440									
VVZ 40-16io1	1600	500									
VVZ 70-08io7	800	250	70 T_C = 85°C	550	0.85	11	125	0.9	1.1	X118c	
VVZ 70-12io7	1200	400									
VVZ 70-14io7	1400	440									
VVZ 70-16io7	1600	500									
VVZ 110-12io7	1200	400	110 T_C = 85°C	1150	0.85	6	125	0.65	0.8	X123b	**X118c** Weight = 100 g
VVZ 110-14io7	1400	440									
VVZ 175-12io7	1200	400	167 T_C = 85°C	1500	0.85	3.5	125	0.46	0.55		
VVZ 175-14io7	1400	440									
VVZ 175-16io7	1600	500									







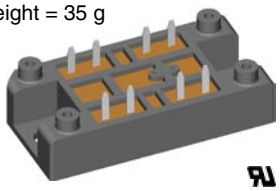


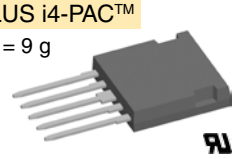
X123b
Weight = 300 g



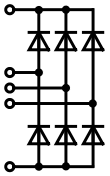
3~ Rectifier Bridges, B6U

Type	V_{RRM} V	V_{vRMS} V	I_{dAV} A	T_C °C	I_{FSM} 45°C 10 ms A	V_{T0} V	r_T mΩ	T_{VJM} °C	R_{thJC} per Chip K/W	R_{thJH} per Chip K/W	Fig. No.	Package style Outline drawings on pages O-5...O-17
VUO 16-08NO1	800	250	15 T_H = 90°C		100	0.8	50	130	-	4.5	X103	**X103 V1-Package** Weight = 35 g
VUO 16-12NO1	1200	400										
VUO 16-14NO1	1400	440										
VUO 16-16NO1	1600	500										
VUO 16-18NO1	1800	575										
FUO 22-12N	1200	400	27	90	100	0.83	28	150	4	5	X024a	
FUO 22-16N	1600	500										
VUO 22-08NO1	800	250	22 T_H = 90°C		100	0.8	40	130	-	3.1	X103	**X024a V1-Package** ISOPLUS i4-PAC™ Weight = 9 g
VUO 22-12NO1	1200	400										
VUO 22-14NO1	1400	440										
VUO 22-16NO1	1600	500										
VUO 22-18NO1	1800	575										
VUO 34-08NO1	800	250	36		300	0.8	15	130	-	2.5	X103	
VUO 34-14NO1	1400	440										
VUO 34-16NO1	1600	500										
VUO 34-18NO1	1800	575										
FUO 50-16N	1600	500	50	90	200 $_{25°C}$	tbd	tbd	150	2.1	3.2	X024a	





3~ Rectifier Bridges, B6U

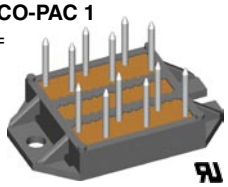


Type	V_{RRM} V	V_{vRMS} V	I_{dAV} A	T_C °C	I_{FSM} 45°C 10 ms A	V_{T0} V	r_T mΩ	T_{VJM} °C	R_{thJC} per Chip K/W	R_{thJH} per Chip K/W	Fig. No.
VUO 52-08NO1	800	250	54	T_H = 90°C	350	0.8	12.5	130	-	1.5	X103
VUO 52-12NO1	1200	400									
VUO 52-14NO1	1400	440									
VUO 52-16NO1	1600	500									
VUO 52-18NO1	1600	500									
VUO 52-20NO1	1800	575									
VUO 68-08NO7	800	250	68	100	300	0.8	13	150	1.1	1.6	X101
VUO 68-12NO7	1200	400									
VUO 68-14NO7	1400	440									
VUO 68-16NO7	1600	500									
VUO 80-08NO1	800	250	82	T_H = 90°C	600	0.8	7.5	150	-	1.42	X103
VUO 80-12NO1	1200	400									
VUO 80-14NO1	1400	440									
VUO 80-16NO1	1600	500									
VUO 80-18NO1	1800	575									
VUO 86-08NO7	600	125	86	90	530	0.8	7.5	150	1.2	1.5	X101
VUO 86-12NO7	1200	400									
VUO 86-14NO7	1400	440									
VUO 86-16NO7	1600	500									
VUO 98-08NO7	800	250	95	85	750	0.8	6	150	1.2	1.5	X102
VUO 98-12NO7	1200	400									
VUO 98-14NO7	1400	440									
VUO 98-16NO7	1600	500									
VUO 100-08NO7	800	250	100	100	1000	0.8	5	150	1.12	1.5	X118d
VUO 100-12NO7	1200	400									
VUO 100-14NO7	1400	440									
VUO 100-16NO7	1600	500									
VUO 120-12NO1	1200	1200	121	75	650	0.8	6.1	150	1	1.3	X104
VUO 120-16NO1	1600	1600									
VUO 121-16NO1	1600	575	118	100	650	0.8	5	150	0.8	0.9	X112
VUO 122-08NO7	800	250	117	100	900	0.8	4	150	0.85	1.15	X102
VUO 122-12NO7	1200	400									
VUO 122-14NO7	1400	440									
VUO 122-16NO7	1600	500									
VUO 122-18NO7	1800	575									
VUO 155-12NO1	1200	1200	157	75	850	0.75	4.6	150	0.8	1.1	X104
VUO 155-16NO1	1600	1600									
VUO 160-08NO7	800	250	175	90	1800	0.8	3	150	0.65	0.83	X123a
VUO 160-12NO7	1200	400									
VUO 160-14NO7	1400	440									
VUO 160-16NO7	1600	500									
VUO 160-18NO7	1800	575									
VUO 190-08NO7	800	250	248	110	2800	0.8	2.2	150	0.45	0.6	X123c
VUO 190-12NO7	1200	400									
VUO 190-14NO7	1400	440									
VUO 190-16NO7	1600	500									
VUO 190-18NO7	1800	575									

Package style

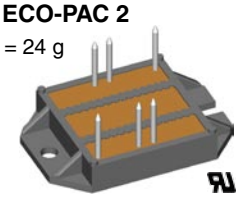
Outline drawings on pages O-1...O-4

X101 ECO-PAC 1
Weight = 19 g



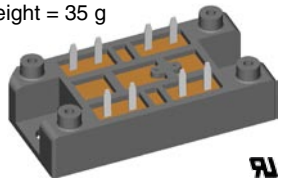
See data sheet for pin arrangement

X102 ECO-PAC 2
Weight = 24 g

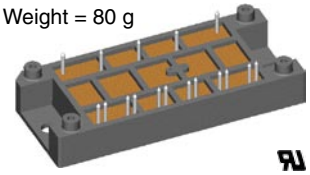


See data sheet for pin arrangement

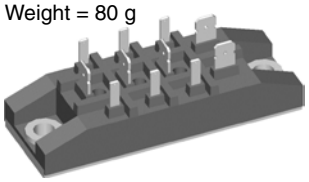
X103 V1-Package
Weight = 35 g



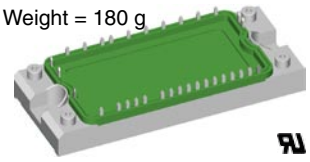
X104 V2-Package
Weight = 80 g



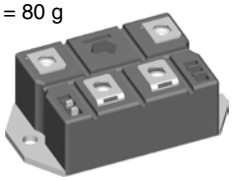
X118d
Weight = 80 g



X112
Weight = 180 g



X123a/c
Weight = 80 g



Product Overview

Press-Pack IGBTs (T Types) 1.7kV, 2.5kV, and 4.5kV 160A to 2500A

4.5kV	2.5kV	1.7kV	
		TX116TA17E	**2500A**
T2400GA45E			**2400A**
		TX115TA16A	**1900A**
T1800GA45A			**1800A**
T1500EA45E	T1500TA25E		**1500A**
	T1200TA25A		**1200A**
T0900EA45A			**900A**
T0800TA45A		TX167NA17E	**800A**
T0600TA45A		TX168NA17A	**600A**
	T0500NA25E		**500A**
	T0360NA25A		**360A**
T0240NA45E			**240A**
T0160NA45A			**160A**



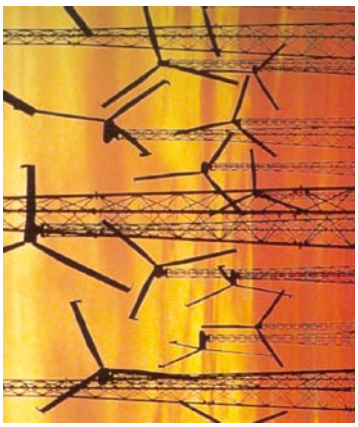
HSR-350X - Korean Rail



E10 Shunting Locomotive - Polish Rail



Induction Heating



Wind Power

Press-Pack IGBTs - 1.7kV, 2.5kV and 4.5kV

As a pioneer of Press-Pack IGBT technology, we are able to offer a range of class leading devices with voltage ratings of 2.5kV (1.25kV DC link), 4.5kV (2.8kV DC link) and 1.7kV.

The construction of these devices is totally free from wire and solder bonds which all but eliminates the problems of mechanical fatigue associated with conventional modules. Internal stray inductance in both the gate connections and emitter connections is vastly reduced when compared to conventional modules leading to improved ruggedness and short circuit behaviour, which is further enhanced by direct cooling of the emitter side of the chip. Double sided cooling allows full use of the nominal rated collector current without derating of voltage or frequency.

Devices are available with or without integral anti-parallel diode – a range of complementary HP Sonic-FRDs™ optimised for use with these IGBTs are outlined below.

The press pack construction offers several advantages over conventional IGBT modules:

- exceptional power cycling performance – typically an order of magnitude better than modules – making them highly suited to applications such as transportation and induction heating where there are repeated cyclic power demands.
- high rupture ratings making them a good choice in critical applications such as transportation applications, mining, and the petro-chemical industry.
- stable short circuit failure mode which, as well as safety benefits, makes them an ideal choice for medium and high voltage applications where series connection is required. Press-pack construction is the obvious choice where series connection is needed and the short circuit failure mode allows for the design in of n+1 redundancy. Typical examples include medium voltage drives, HVDC, and active VAr controllers.



125 mm 85 mm 75 mm 47 mm

- largely backwardly compatible with standard 2.5kV and 4.5kV Gate Turn-Off thyristors (including GCTs) in many applications such as transportation and AC drives. This makes these parts a simple and economical path to upgrade or refurbish equipment that previously used Gate Turn-Off thyristors, such as locomotives or medium voltage drives.
- suitable for all cooling options including direct liquid immersion.

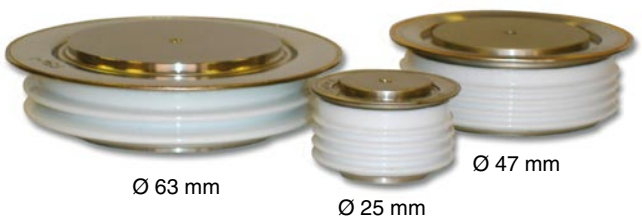
Complementary gate drives (shown on Page 15), mounting clamps and passive components are available by contacting the UK Factory.

HP Sonic-FRDs

Anti-parallel Diodes for IGBTs and IGCTs - 1.7kV to 4.5kV

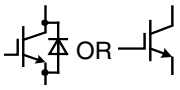
New world-leading class of ultra fast and ultra soft recovery diode available from 1.7kV to 4.5kV in current ratings from 300 to 2500A.

These high power super fast, soft recovery diodes incorporate a unique manufacturing process and novel lifetime control to offer a class leading trade-off between conduction and switching loses. Their exceptionally wide safe operating area (SOA) makes them the number one choice for freewheeling diodes for snubberless IGBT and IGCT applications. In fact, most applications which require a fast, low loss diode can benefit from this new technology - for example, traction, medium voltage drives, induction heating and pulsed power applications.



Ø 63 mm Ø 25 mm Ø 47 mm

Press-Pack IGBTs



Type Part No. ➢ New	V_{CES} V	I_C A	I_{CM} A	$V_{CE(sat)}$ $I_F = I_C$ V	IGBT Switching Typical E_{ON} J	E_{OFF} J	V_F $I_F = I_C$ V	Diode Recovery Typical I_{rm} A	t_{rr} µs	Q_r µC	$T_{j\,max}$ °C	R_{thJK} IGBT K/W	Diode K/W	Fig. No.
T0160NA45A	4500	160	310	4.6	0.50	0.42	3.8	400	0.96	340	125	0.058	0.095	W40
T0240NA45E	4500	240	400	4.7	0.73	0.88	N/A	N/A	N/A	N/A	125	0.042	N/A	W40
T0360NA25A	2500	360	720	3.6	0.75	0.34	2.1	250	0.93	285	125	0.054	0.087	W40
T0500NA25E	2500	500	1000	3.6	0.80	0.50	N/A	N/A	N/A	N/A	125	0.039	N/A	W40
T0600TA45A	4500	600	1000	4.7	1.75	1.50	3.6	1400	0.92	650	125	0.016	0.039	W41
T0800TA45E	4500	800	1500	4.6	2.20	1.92	N/A	N/A	N/A	N/A	125	0.012	N/A	W41
T0900EA45A	4500	900	1500	4.6	2.80	2.60	3.6	1800	0.85	800	125	0.014	0.026	W44
T1200TA25A	2500	1200	2400	3.6	2.50	1.40	2.5	670	1.50	830	125	0.017	0.029	W41
T1200EA45E	4500	1200	2100	4.6	3.20	3.80	N/A	N/A	N/A	N/A	125	0.010	N/A	W44
T1500TA25E	2500	1500	3000	3.6	3.30	1.70	N/A	N/A	N/A	N/A	125	0.013	N/A	W41
➢ T1800GA45A	4500	1800	3000	4.7	5.60	6.40	3.6	2150	2.20	3500	125	0.008	0.014	W45
➢ T2400GA45E	4500	2400	4200	4.7	7.20	7.80	N/A	N/A	N/A	N/A	125	0.005	N/A	W45
• TX168NA17A	1700	600	900	4.0	• Products Under Development							0.054	0.073	W40
• TX167NA17E	1700	840	1260	4.0								0.039	N/A	W40
• TX115TA17A	1700	1900	2850	4.0								0.017	0.029	W41
• TX116TA17E	1700	2500	3750	4.0								0.013	N/A	W41

Press-Pack IGBT Outlines on page O - 5

HP Sonic-FRDs™



Type Part No. ➢ New	Old Part No.	V_{RRM} V	I_{FAV} T_K = 55°C A	I_{FSM} 10 ms ½ sine $V_R \le 60\%\ V_{RRM}$ A	I^2t A²s	Typ. Reverse Recovery Parameters T_{jmax} (50% Chord) I_{rm} A	t_{rr} µs	Q_r µC	@I_{FM} A	@-di_F/dt A/µs	V_{T0} @T_{jmax} V	r_T @T_{jmax} mΩ	T_{jmax} °C	R_{thJK} 180° Sine K/W	Fig. No.
E0300YH400	N/A	4000	277	2630	$34.58x10^3$	605	0.75	245	300	2000	2.170	3.800	150	0.073	W3
E0300YH450	N/A	4500	277	2630	$34.58x10^3$	605	0.75	245	300	2000	2.170	3.800	150	0.073	W3
E0400YH200	N/A	2000	348	3542	$62.7x10^3$	572	0.74	175	400	1500	1.770	2.290	150	0.073	W3
E0400YH250	N/A	2500	348	3542	$62.7x10^3$	572	0.74	175	400	1500	1.770	2.290	150	0.073	W3
E0900NC400	N/A	4000	969	15270	$1.17x10^6$	1340	2.20	1440	900	2000	2.140	1.150	150	0.020	W5
E0900NC450	N/A	4500	969	15270	$1.17x10^6$	1340	2.20	1440	900	2000	2.140	1.150	150	0.020	W5
E1500NC200	N/A	2000	1557	15180	$1.15x10^6$	1450	2.30	1550	1500	2000	1.670	0.360	150	0.020	W5
E1500NC250	N/A	2500	1557	15180	$1.15x10^6$	1450	2.30	1550	1500	2000	1.670	0.360	150	0.020	W5
E1500VF400	N/A	4000	1995	23600	$2.78x10^6$	1730	3.00	2700	1500	2000	2.350	0.270	150	0.013	W43
E1500VF450	N/A	4500	1995	23600	$2.78x10^6$	1730	3.00	2700	1500	2000	2.350	0.270	150	0.013	W43
E2000NC140	N/A	1400	1568	16500	$1.13x10^6$	1880	1.00	950	2000	4000	1.770	0.350	150	0.020	W5
E2000NC170	N/A	1700	1568	16500	$1.13x10^6$	1880	1.00	950	2000	4000	1.770	0.350	150	0.020	W5
E2500VF200	N/A	2000	2516	28600	$4.10x10^6$	1750	1.40	1350	2500	3000	1.630	0.210	150	0.013	W43
E2500VF250	N/A	2500	2516	28600	$4.10x10^6$	1750	1.40	1350	2500	3000	1.630	0.210	150	0.013	W43
➢ E2400TC400	N/A	4000	2227	25600	$3.29x10^6$	2400	1.12	1330	2400	4000	2.039	0.598	150	0.008	W28
➢ E2400TC450	N/A	4500	2227	25600	$3.29x10^6$	2400	1.12	1330	2400	4000	2.039	0.598	150	0.008	W28

HP Sonic-FRD Outlines on page O - 6

High Voltage IGBT Gate Drive Units – C0030BG400

The C0030BG400 is a single channel 30A peak rated gate drive unit (GDU), suitable for low and high side applications with DC link voltages of up to 3.5kV (5kV available on request) and with dv/dt immunity of over 100kV/µs.

This GDU performs all of the necessary supervisory functions including under voltage lockout and SCSOA protection with user configurable response and feedback. The unit requires a simple 15V DC power supply and features fibre optic command and feedback signals.

This GDU is capable of driving virtually all IGBTs including our range of press-pack devices at frequencies from DC up to 20kHz with no duty cycle limitations.

Options include standard variants set up for use with each of Westcode's range of IGBTs (see table) and the core module for integration into end user PCBs. Additionally our application engineers can develop semi-custom solutions based around the standard core module.

Features

- 30A peak drive current (500ns rise time)
- 10kV AC rms isolation test
- Partial discharge free up to 4kV AC rms
- 100kV/µs dv/dt immunity
- Temperature range –40°C up to +70°C (–55°C up to +80°C available)
- ±15V gate drive voltage
- Standard HP Versatile Link™ Fibre optic links
- Status feedback signal
- User configurable SCSOA protection

IGBT Part Number	$R_{g(on)}$ (W)	$R_{g(off)}$ (W)	C_g (nF)	GDU Part Number
T0160NA45A	15	8.2	100	C0030BG400SAK
T0240NA45E	10	5.6	100	C0030BG400SAL
T0360NA25A	33	18	100	C0030BG400SAA
T0500NA25E	22	15	100	C0030BG400SAB
T0600TA45A	5.6	3.3	100	C0030BG400SAM
T0800TA45E	4.7	3.3	100	C0030BG400SAN
T0900EA45A	4.7	2.7	100	C0030BG400SAP
T1200EA45E	3.3	2.2	100	C0030BG400SAR
T1200TA25A	4.7	6.8	100	C0030BG400SAC
T1500TA25E	3.3	6.8	100	C0030BG400SAD
T1800GA45A	3.3	2.2	100	C0030BG400SAS
T2400GA45E	2.2	1.5	100	C0030BG400SAT



The launch of this complementary product demonstrates our continued commitment to provide our customers with complete solutions for power electronics and further strengthens our assemblies' capability.

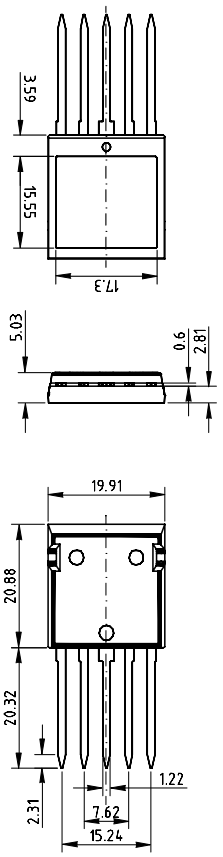
This GDU also provides our customers with a rapid route to prototype with our range of high voltage press-pack IGBTs without having to solve the additional problems associated with high isolation voltage gate drives.

Outline drawings

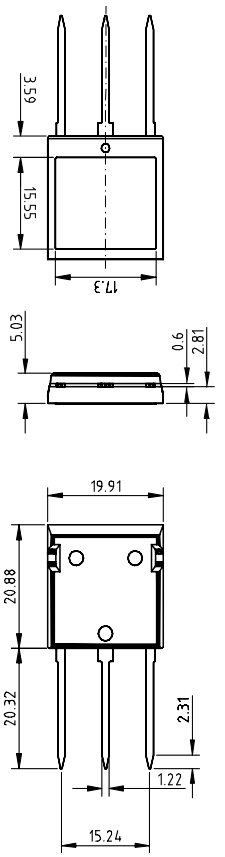
IXYS

Dimensions in mm and inches (1 mm = 0.0394“)

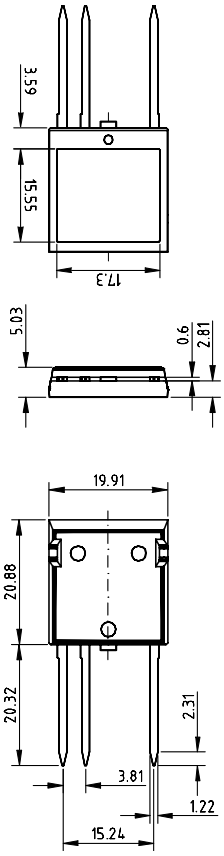
X024a ISOPLUS i4-Pac™



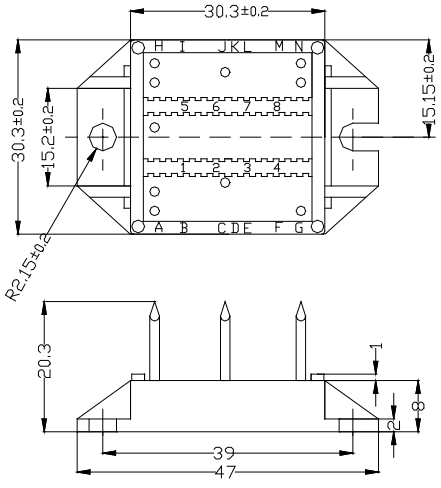
X024b ISOPLUS i4-Pac™



X024c ISOPLUS i4-Pac™

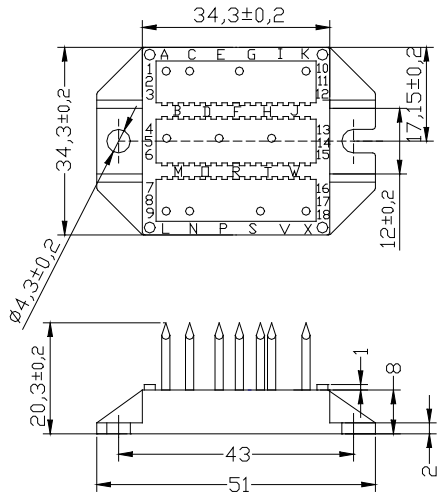


X101 ECO-PAC1



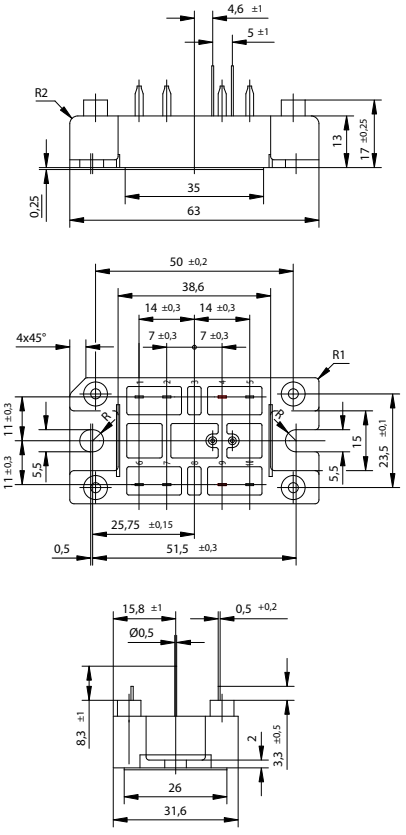
See data sheet for pin arrangement

X102 ECO-PAC2



See data sheet for pin arrangement

X103 V1-A-Pack



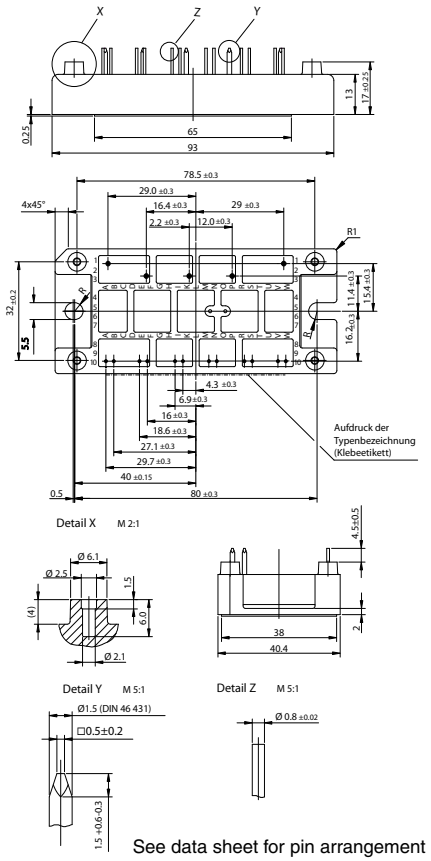
See data sheet for pin arrangement

Outline drawings

IXYS

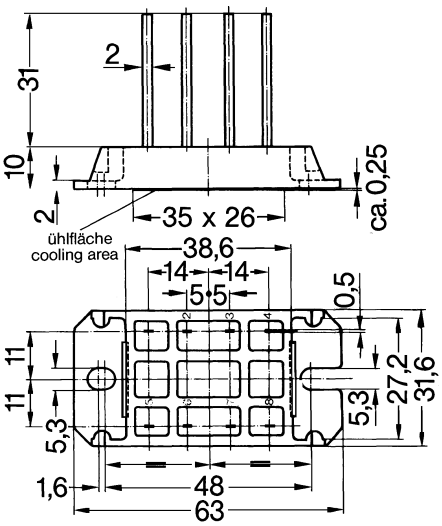
Dimensions in mm and inches (1 mm = 0.0394“)

X104 V2-Pack

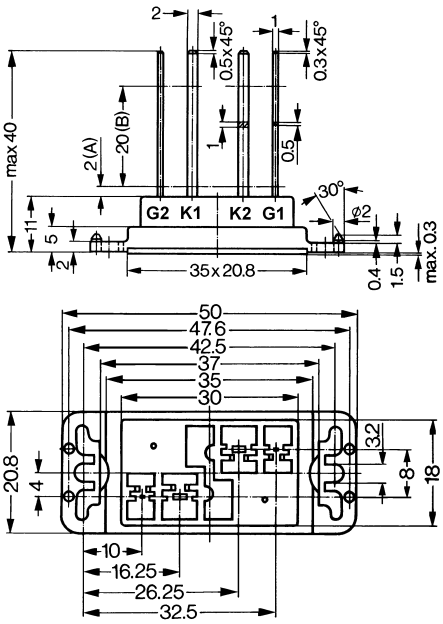


See data sheet for pin arrangement

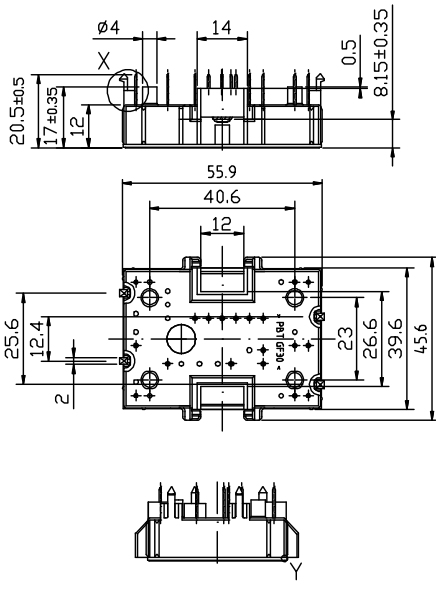
X105 V1-B-Pack
a: pin length = 31 mm
b: pin length = 15 mm



X106 Kamm-Modul
a: with gate pin G2
b: without gate pin G2

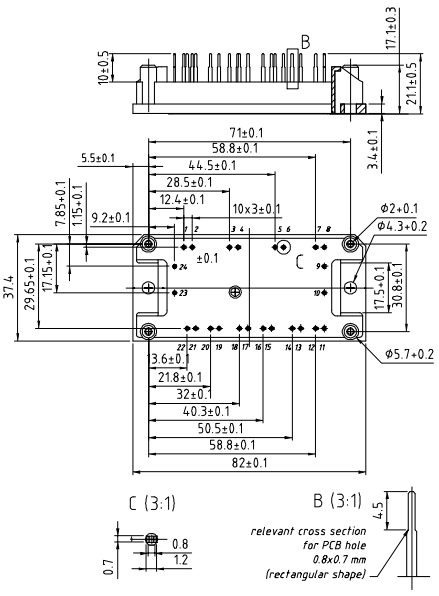


X110 Mini-Pack 2



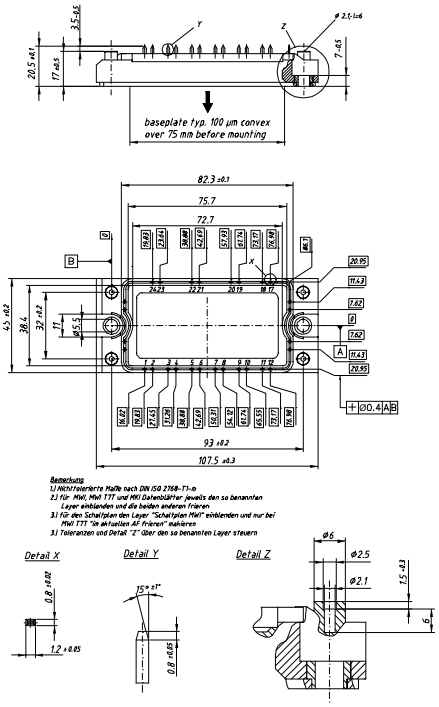
See data sheet for pin arrangement

X111 E1-Pack



See data sheet for pin arrangement

X112 E2-Pack



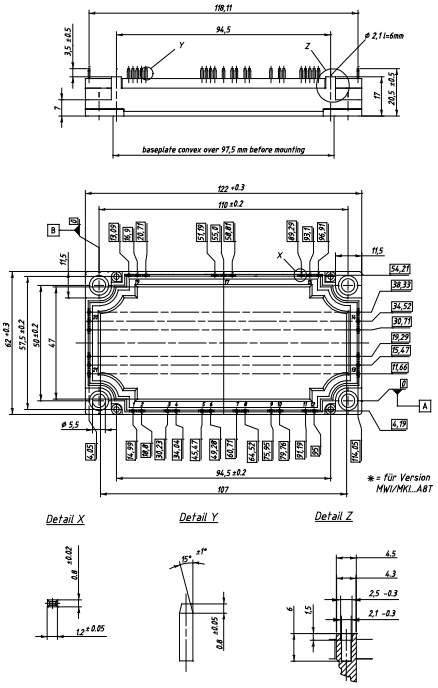
See data sheet for pin arrangement

Outline drawings

IXYS

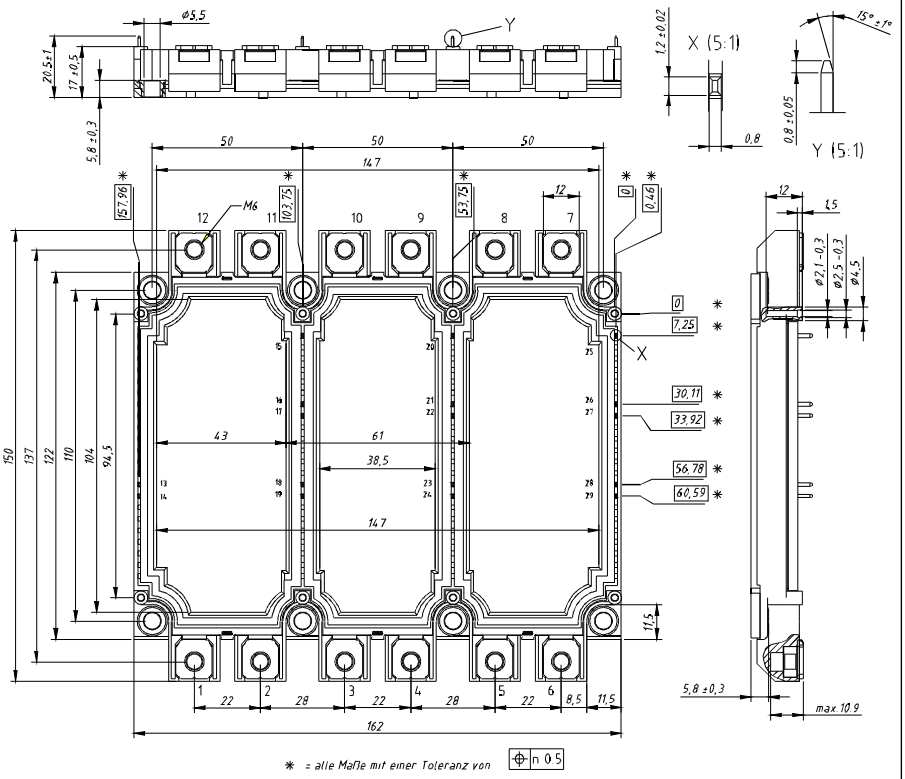
Dimensions in mm and inches (1 mm = 0.0394“)

X113 E3-Pack



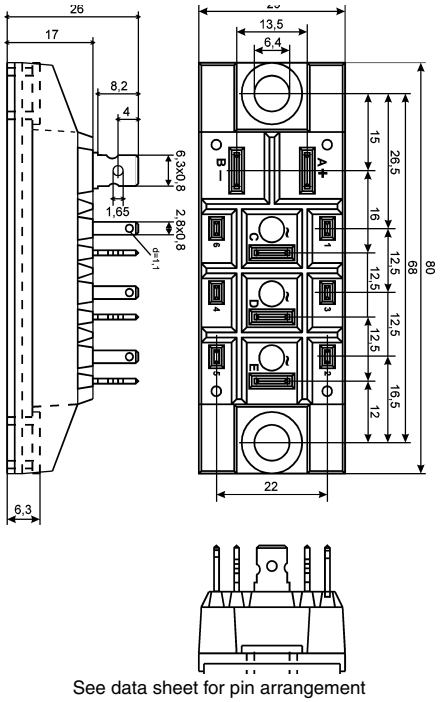
See data sheet for pin arrangement

X114 E9-Pack



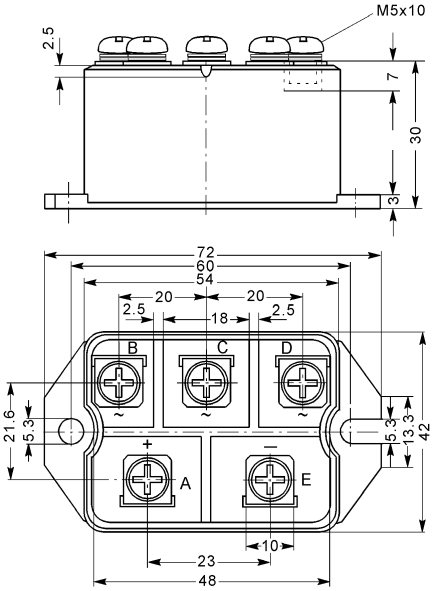
X118 FO-T-A

a: VTO & VTOF
c: w/o terminal 4, 5, & 6 (VVZ & VVZF)
d: w/o terminal 1, 2, 3, 4, 5, & 6 (VUO)
e: w/o terminal D, 4 & 5 (VKF & VKO)
f: w/o terminal D, 2, 3, 4 & 5 (VGO)
g: w/o terminal D, 3, 4, 5, & 6 (VHF & VHO)
h: w/o terminal D, 1, 2, 3, 4, 5, & 6 (VBO)



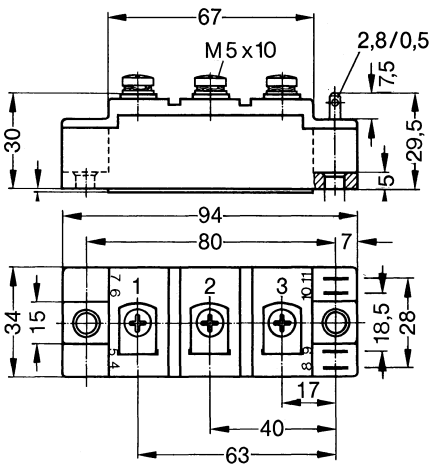
See data sheet for pin arrangement

X122 PWS-D
a: VUO
b: w/o terminal d (VBO)



X127 Y4-M5

a: MII
b: w/o pin 6 & 7 (MID)
c: w/o pin 4 & 5 (MDI)

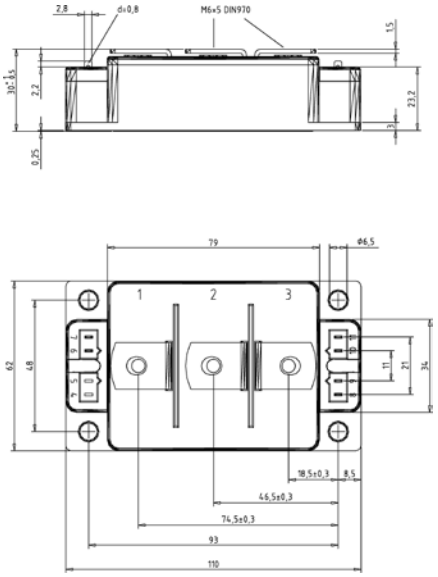


Outline drawings

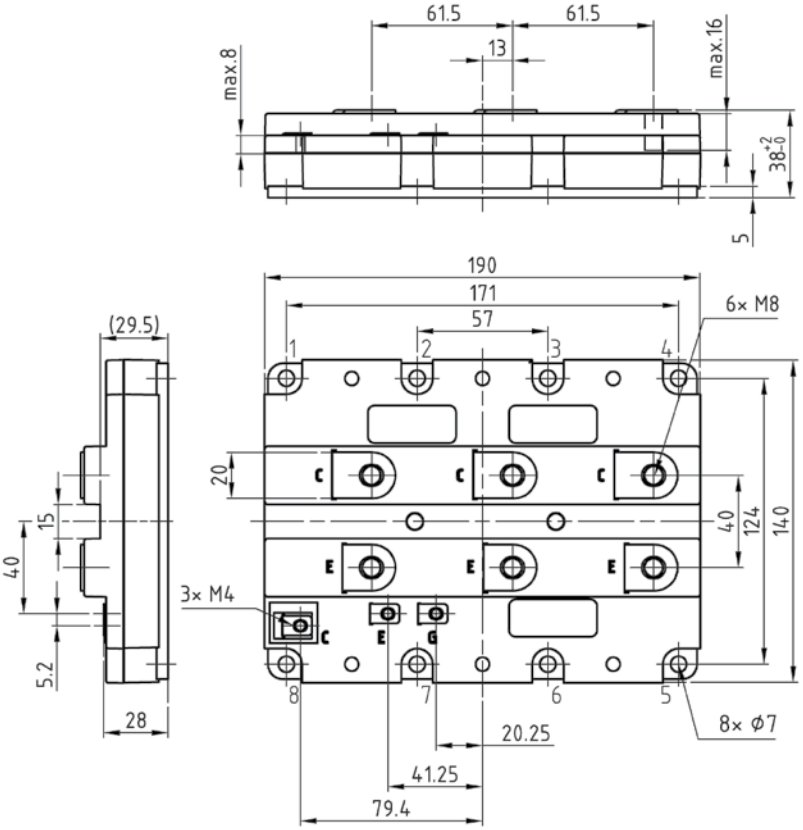
IXYS

Dimensions in mm and inches (1 mm = 0.0394“)

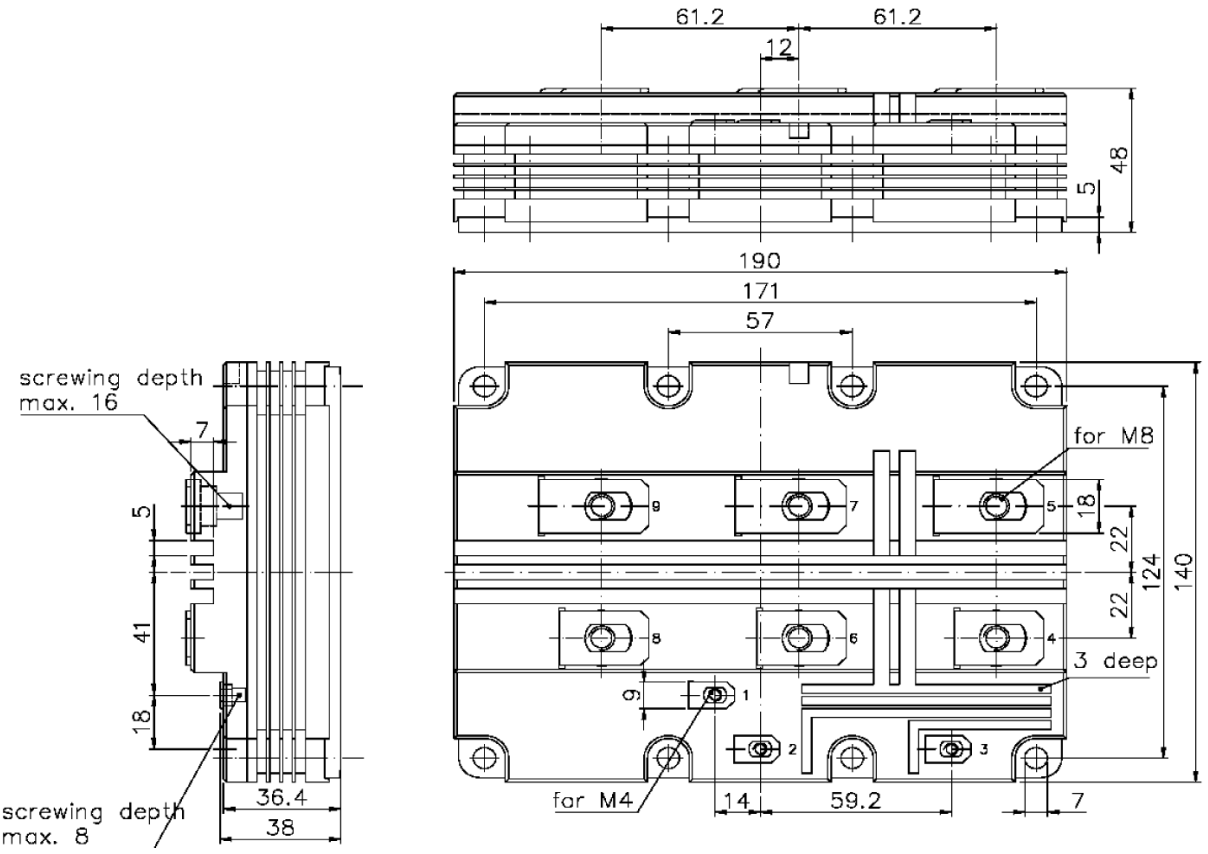
X130 Y3-Li
a: low inductance (VMM, MII)
b: w/o pin 8 & 9, low inductance (MID)
c: w/o pin 10 & 11, low inductance (MDI)
d: w/o terminal 1, low inductance (VMO)



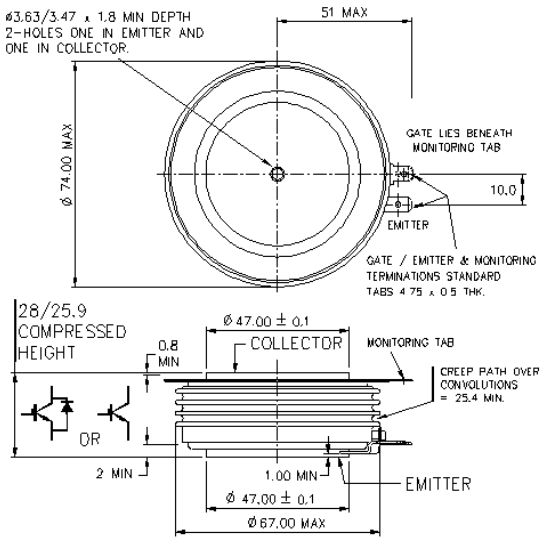
X134 E10-Pack



X135 E11-Pack

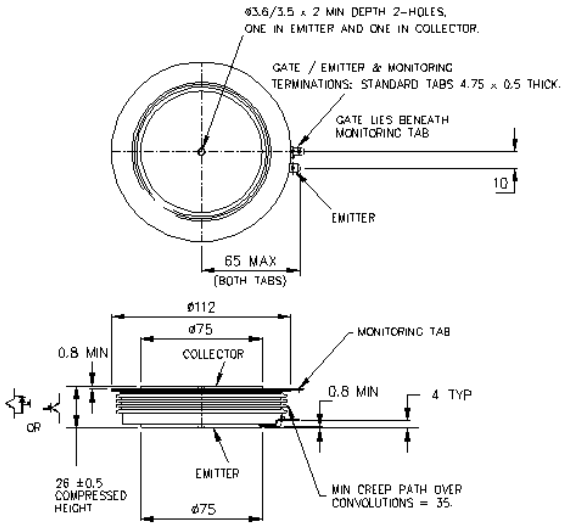


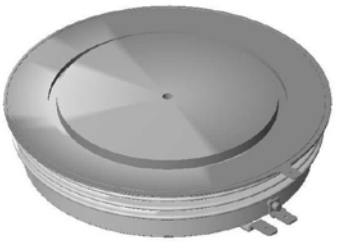
W40 - 171A107 - 47mm - Weight 430g



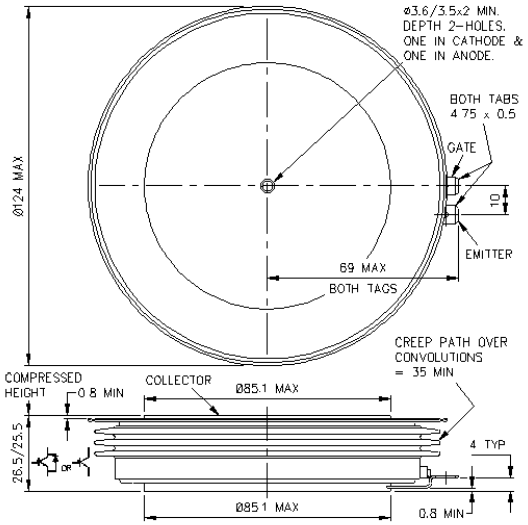


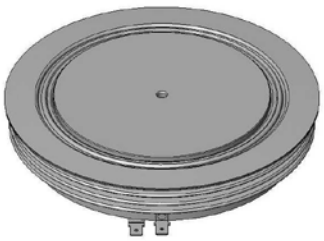
W41 - 171A108 - 75mm - Weight 1100g



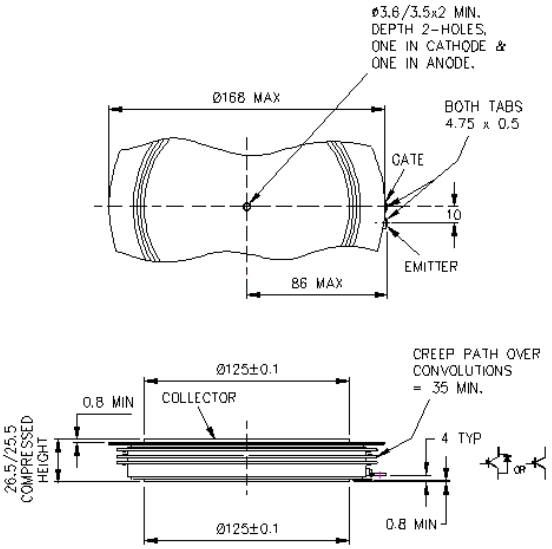


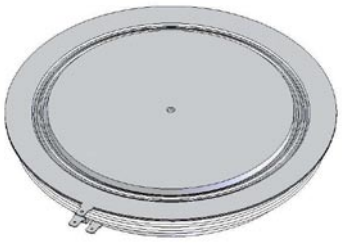
W44 - 101A340 - 85mm - Weight 1200g



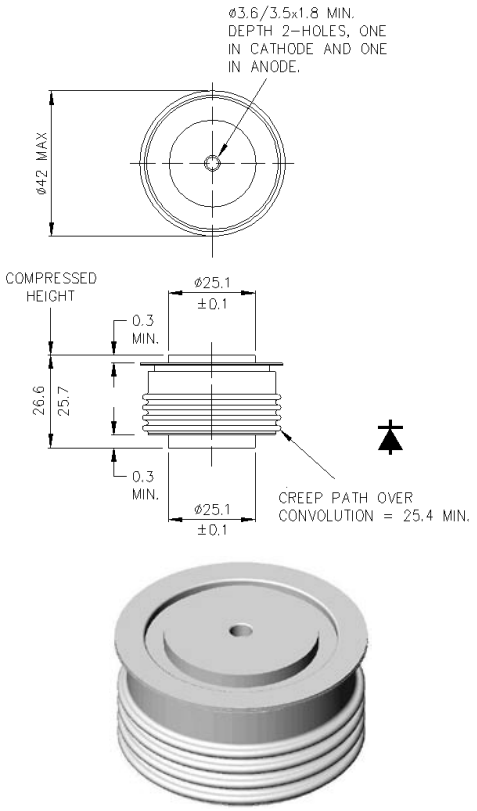


W45 - 101A359 - 125mm - Weight 2000g

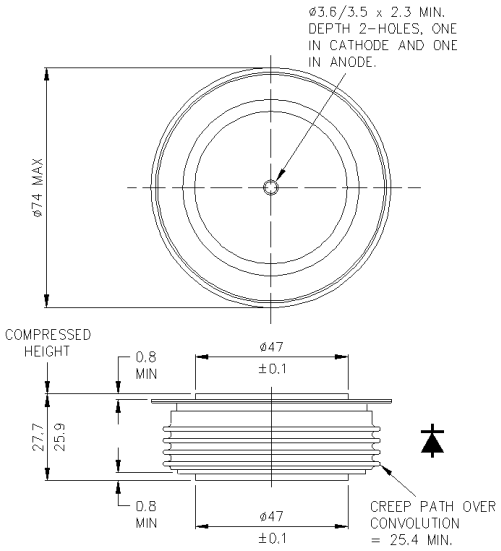




W3 - 100A317 - 25mm - Weight 140g

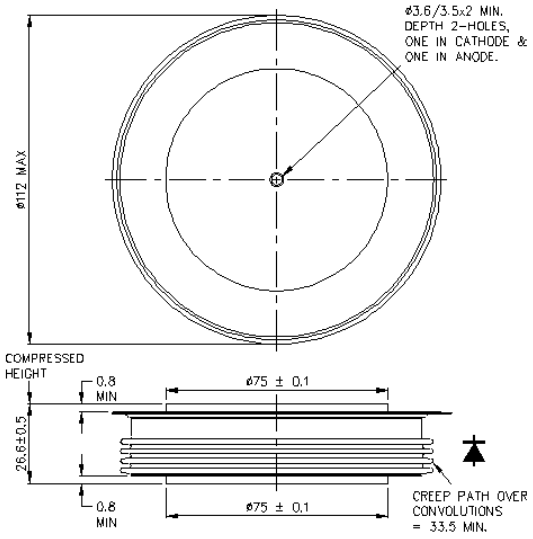


W5 - 100A249 - 47mm - Weight 510g



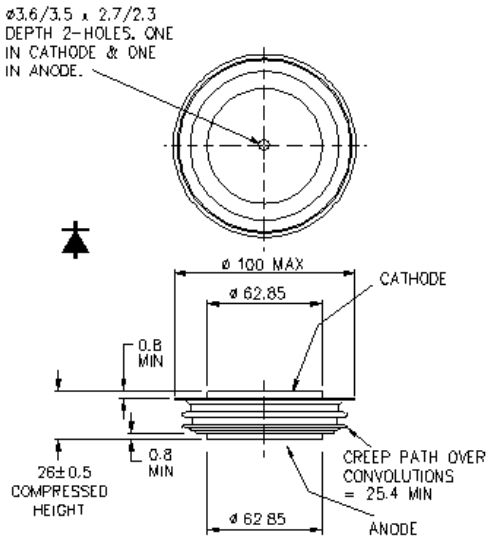


W28 - 100A330 - 73mm - Weight 1240g

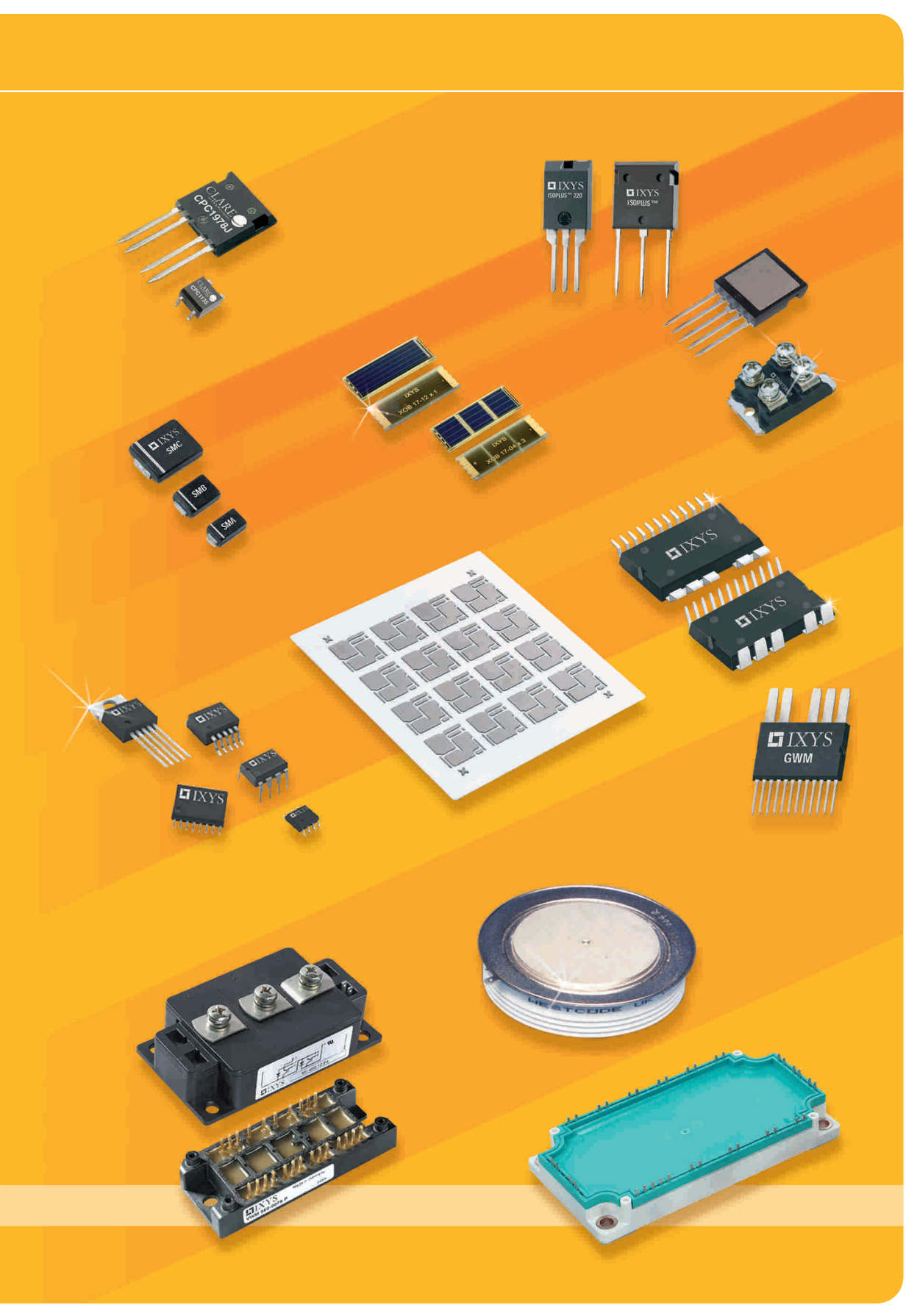




W43 - 100A320 - 63mm - Weight 1000g






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