

IGBT Module Line to include Economical Small 6Pack Incorporating Latest NPT3 and Trench IGBT Technologies

IXYS announced that in keeping up with ambitious growth plans in the IGBT market, its European Operation, a leader in Direct Copper Bond (DCB) module packaging technology, located in Lampertheim, Germany has extended its portfolio of IGBT modules down in power to cover the high volume cost sensitive segment of the market. This new family of DCB based IGBT Modules are housed in the industry standard low profile "Econo-style" module outline which cost effectively covers the current ranges from 10 to 60 Amps depending on configuration and voltage ratings.

IXYS has now made available in volume production both 6 Pack and Converter-Brake-inverter (CBI) configurations in the Econo-style



module utilizing both low loss NPT3 and Trench IGBT technologies. "The combination of improved higher efficiency IGBTs with this

low cost DCB module package enables IXYS to serve high volume "micro-packaged" AC Drives and UPS markets up to 5KW, the fastest

growing segment of these markets", according to Peter Ingram, President of IXYS Europe.

6 Pack versions of these IGBT modules include the MWI15 and MWI60 rated at 1200V with current capabilities varying from 19-58 Amp at 25C. The CBI versions include the MUBW10 and MUBW35 offered at 600V with current ratings of 12- 42 Amp at 25C and the MUBW15 and MUBW30 with current ratings of 19-30 Amp at 25C rated at 1200V.

Typical applications for this product include AC drives, UPS, AC servo and robotic drives. All modules are UL approved and are readily available on stock. Datasheets and detailed information are available at www.ixys.com.

IXYS Offers Discrete 1700V IGBT Copacks With New Soft Recovery SONIC-FRD Diodes



IXYS announced the availability of a new line of 1700V IGBT Copacks and Isolated Package 1700V IGBT Phase Leg products with its proprietary 1800V SONIC-FRD™ ultrasoft, fast recovery diodes.

These new Copack and Phase Leg products provide unique, cost effective options for customers with applications requiring 1700V power switching. IXYS is offering its fast switching „A“ Version 1700V NPT IGBTs in Copack and Phase Leg configurations for PWM applica-

tions with switching frequencies up to 50kHz.

These high voltage NPT IGBT discretely can enable more costly, lower performance solutions such as thyristors or series connected MOSFETs or IGBTs typically used at voltages above 1200V. Offered as Copacks, they offer a more complete solution for power conversion applications to improve efficiency and reliability due to reduced voltage drop, lower switching losses and the need for fewer components.

Enhancing the efficiency and noise performance of these Copacks and Phase Legs is the use of IXYS 1800V SONIC-FRD ultrasoft, fast recovery diodes. IXYS SONIC-FRD fast and ultrafast recovery diodes are designed for temperature stability with low forward voltage and ultra-low, ultra-soft reverse recovery characteristics. In addition, IXYS SONIC-FRD diodes are optimized to provide excellent dynamic avalanche ruggedness. These diodes minimize losses in hard switching applications, while maintaining superior soft recovery characteristics

to minimize switching noise and eliminate the need for costly snubber circuits.

Copacks will be offered in 16A and 24A versions with TO-247, TO-268, PLUS247™ and ISOPLUS247™ package options. A 24A rated Phase Leg configuration is offered in IXYS proprietary ISOPLUS i4-PAC™. The i4-PAC is a UL recognized isolated package incorporating a DCB ceramic isolator which provides 2500Vrms isolation with superior isolated thermal performance. Two ISOPLUS i4-PAC™ versions are offered, including a solderable, leaded version and a surface-mountable version.

IXYS' new 1700V discrete IGBTs provide a lower cost solution using standard PCB assembly for a broad range of high voltage applications. These high speed „A“ Copacks and Phase Legs are intended for high voltage, fast switching applications such as induction heating, induction cooking, 480 to 575VAC offline inverters, flyback power supplies, UPS and microwave ovens.

Next Generation B2-Class Short Circuit Rated IGBTs for Appliance and White Goods Applications

IXYS has introduced a new family of Next Generation Short Circuit Rated IGBTs for appliance and white goods motor drive applications. These 600V, Short Circuit Rated B2-Class Medium Speed IGBTs are ideal for high volume, small drive applications. This family applies IXYS Next Generation IGBT Technology to its Short Circuit rated family of 600V IGBTs to provide significant improvements in efficiency for off-line small drive applications requiring this class of 600V device with switching frequency ranging up to 30kHz. The B2-Class IGBTs have up to 25% improvement in saturation voltage and lower turn-off energy versus IXYS prior generation of B-Class IGBTs.

These performance improvements are further enhanced by a 25% reduction in thermal resistance, providing significant increases in power handling and reliability.

IXYS' new Short-Circuit Rated B2-Class of IGBTs offer significant reductions in conduction and switching losses, which when coupled with the improvements in thermal performance, greatly extend their performance and thus cost efficiency. This family of IGBTs possesses a lower saturation voltage at elevated temperature, as compared to the saturation voltage of other NPT type IGBTs used for small drive applications. Initial products will be offered for applications ranging from 10A to 40A in TO-220, TO-247 and TO-3P discrete packages,

as well as surface mountable TO-263 and TO-268 packages.

IXYS has also recently taken steps to decrease its manufacturing costs on all its products, including IGBTs. These manufacturing improvements are of particular benefit for very high volume applications, particularly the cost sensitive small drive applications of the appliance and white goods markets. Its pursuit of cost improvements has significant impact on enabling IXYS to aggressively pursue new business in these markets, for which IXYS S-B2 Class IGBTs are the first. Additional products will be developed in the future to address the unique requirements of these high volume markets.



S-B2 Class Short-Circuit Rated Medium Speed IGBT Copacks

Part Number	V _{CES}	I _C (110°C)	V _{CE(ON, 25°C)} @ I _p , MAX / I _t	E _{off} @ T _J = 125°C I _C = I _p , V _{CE} = 480V Typ.	R _{s(J-C)}	Package
IXSP10N60B2D1	600 V	10 A	2.50 V / 10 A	0.79 mJ	0.83 °C/W	TO-220
IXSA10N60B2D1	600 V	10 A	2.50 V / 10 A	0.79 mJ	0.83 °C/W	TO-263
IXSH10N60B2D1*	600 V	10 A	2.50 V / 10 A	0.79 mJ	0.83 °C/W	TO-247
IXSQ10N60B2D1*	600 V	10 A	2.50 V / 10 A	0.79 mJ	0.83 °C/W	TO-3P
IXSP20N60B2D1	600 V	20 A	2.50 V / 16 A	0.97 mJ	0.65 °C/W	TO-220
IXSA20N60B2D1	600 V	20 A	2.50 V / 16 A	0.97 mJ	0.65 °C/W	TO-263
IXSH20N60B2D1	600 V	20 A	2.50 V / 16 A	0.97 mJ	0.65 °C/W	TO-247
IXSQ20N60B2D1*	600 V	20 A	2.50 V / 16 A	0.97 mJ	0.65 °C/W	TO-3P
IXSH30N60B2D1*	600 V	30 A	2.50 V / 30 A	1.50 mJ	0.42 °C/W	TO-247
IXST30N60B2D1*	600 V	30 A	2.50 V / 30 A	0.50 mJ	0.42 °C/W	TO-268
IXSH40N60B2D1*	600 V	40 A	2.50 V / 40 A	1.90 mJ	0.31 °C/W	TO-247
IXST40N60B2D1*	600 V	40 A	2.50 V / 40 A	1.90 mJ	0.31 °C/W	TO-268

* Samples and datasheets available 1/05.

New single Thyristor Family in miniBLOC™ Housing

IXYS Corporation, a leader in power semiconductors for power conversion and motion control applications, announces the extension of its thyristor (SCR) portfolio in the standard package miniBLOC (SOT-227B).



Next to its easy mounting with just two screws the robust package

The 'Single Thyristor' family with miniBLOC package now has a current range of 25 to 150A with V_{RRM} ratings of 1200 and 1600 V. The planar passivated SCR-dies are the basis of high reliability and performance in many different applications and systems as in soft-starters, motor controlling, solid state switches, light and temperature control and several rectifying circuits.

miniBLOC offers also an isolation voltage of 2500V and high current capability.

With the introduction of this new range of single SCRs IXYS makes a further step to supply customers with a very comprehensive range of solutions for power semiconductors from MW to MW at one service.

Product	I _{TAV} / A @ T _C = 80 °C	V _{RRM} V	I _{TSM} A
MCO 25-12/16io6	31	1200 - 1600	370
MCO 50-12/16io6	54	1200 - 1600	740
MCO 75-12/16io6	77	1200 - 1600	1070
MCO 100-12/16io6	99	1200 - 1600	1400
MCO 150-12/16io6	149	1200 - 1600	2000

GaAs MESFET in low cost SOT89 package

The MwT-1789 is a high linearity GaAs MESFET device in low cost SOT89 package that is ideally suited for high linearity driver, PA (Power Amplifier), and high dynamic range LNA applications. The applications include 2G, 2.5G, and 3G wireless infrastructure standards, such as GSM, TDMA, cdma, Edge, cdma2000, WCDMA, TD-SCDMA, and UMTS base stations.

This product is also ideal for high data rate wireless LAN infrastructure applications, such as high QAM rate 802.11 WiFi and 802.16 WiMax base stations and APs (Access Points). In addition, the product can be used for point-to-point microwave communications links. The third order intercept performance of the MwT-1789 is excellent, typically 18 dB above the 1 dB power gain compression point. The noise figure is as low as 0.8 dB at 900 MHz.

The chip is produced using MwT's proprietary high linearity device design. It also uses MwT's reliable metallization process. All chips are passivated using MwT's patented „Diamond-Like Carbon“ process for increased durability.

650V 3-Phase and Half-Bridge Driver IC Family Offering Superior Performance for Full Range of Consumer, Automotive and Industrial Applications

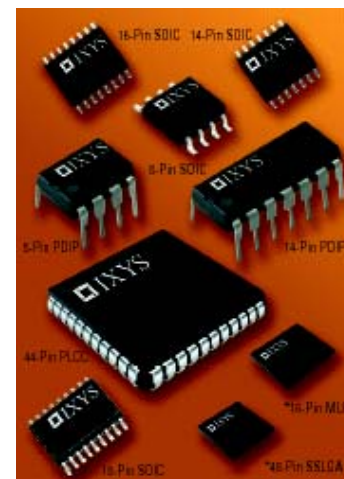
IXYS expanded its new family of 3-Phase and Half-Bridge Drivers optimized for gate drive applications up to 650V. This family provides a complete spectrum of solutions with 0.6A peak to 6.0A peak output drive current capability for applications ranging from 1kHz to 1MHz. These Drivers draw upon a newly optimized architecture first introduced with the IX6R11, building on and enhancing its superior performance and high-end current handling capability of the IX6R11. As with the original IX6R11, IXYS 650V Driver IC Family gives better matching of propagation delays, enhanced fault tolerance and reliability, with improved efficiency and cooler operation. This 3-Phase and Half-Bridge Driver Family was planned to provide compatibility with similar Drivers from other suppliers, while offering the superior performance of our architecture. The Family includes unique customer options in

packaging and configurations. Several Drivers are offered in packages that offer size (16-Pin MLP, 48-Pin SSLGA) or thermal advantages (18-Pin SOIC-CT). A unique product configuration is the IX6S11 offered for split-rail circuit configurations (+300V/-200V), with control logic ground referenced.

Performance advantages common to IXYS 3-Phase and Half-Bridge Driver ICs include 50kV/ μ s dV/dt noise immunity and 200V negative voltage transient immunity, 8 times that of competing Half-Bridge Drivers. Noise immunity is further enhanced by the use of non-latching level translation. IXYS level translation technique exhibits lower power dissipation versus techniques using high-voltage transistors typical of competing Half-Bridge Drivers. Lower dissipation enables the use of IXYS Drivers for larger loads, higher bus voltages or for faster switching frequency. Lower

dissipation means also that IXYS Drivers can be pushed to higher temperatures with greater reliability.

This Family of Drivers offers a wide mix of user options for input logic options, output current ratings and packages. The high peak current capability of the IX6R11 enables the drive of larger MOSFET and IGBT die sizes at higher frequency without additional discrete transistors and components. 600mA Drivers, such as the IXD611, are used in lower power/lower frequency applications such as small power tools. Other user options covered by this Family include fixed and programmable delays, shutdown options, protection features, as well as high and low side under voltage protection. Performance advantages include extended voltage range operation, and extended temperature operation from -55°C to $+125^{\circ}\text{C}$.



3-Phase and Half-Bridge Driver Summary Table

IXYSPN	UVLO Level IGBT MOSFET, LOGIC	Special Features				Package(1)
		Shutdown	Inputs/Keying	Protection Features	Deadtime	
IXA611(1)	MOSFET	Yes (High)	Dual/In Phase	No	No	P7(2),S3(2),S3T/R(5),M6(3),M6T/R(6)
IXB611(1)	MOSFET	No	Dual/High-In Phase/Low-Inv	Cross-Conduct	Fixed - 520ns Typ	P1(3),S1(3),S1T/R(6)
IXC611(1)	MOSFET	No	Single/High Side	Cross-Conduct	Fixed - 650ns Typ	P1(3),S1(3),S1T/R(6)
IXD611(1)	MOSFET	No	Dual/In Phase	No	No	P1(3),P7(3),S1(3),S1T/R(5),S7(3),S7T/R (5)
IXE611(1)	Logic	No	Dual/In Phase	No	No	P1(4),S1(4),S1T/R(7)
IXF611(1)	Logic	Yes (Low)	Single/High Side	Cross-Conduct	Fixed - 540ns Typ	P1(4),S1(4),S1T/R(7)
IXG611(1)	MOSFET	No	Dual/In Phase	Cross-Conduct	Fixed - 100ns Typ	P1(3),S1(3),S1T/R(6)
IXH611(1)	MOSFET	No	Dual/In Phase	Cross-Conduct	Fixed - 540ns Typ	P1(3),S1(3),S1T/R(6)
IXJ611(1)	MOSFET	No	Dual/In Phase	No	No	P1(4),S1(4),S1T/R(7)
IXK611(1)	MOSFET	No	Dual/Out of Phase	No	No	P1(4),S1(4),S1T/R(7)
600mA 3-Phase Drivers						
IXA531(1)	IGBT	Yes (Low)	Six/Out of Phase	Cross-Conduct,OCP (Prog. Reset)	No	L4(3),L4T/R(5),S10(2),S10T/R(5)
2A Half-Bridge Drivers						
IX2A11(1)	MOSFET	Yes (Low)	Single/High Side	Cross-Conduct	Fixed - 500ns Typ	P1(3),S1(3),S1T/R(6)
IX2B11(1)	MOSFET	Yes (Low)	Single/High Side	Cross-Conduct	Programmable	P7(3),S7(3),S7T/R(6)
IX2C11(1)	MOSFET	No	Dual/In Phase	No	No	P1(3),S1(3),S1T/R(6)
IX2D11(1)	MOSFET	No	Dual/In Phase	No	No	P7(3),S7(3),S7T/R(6)
IX2R11(1)	MOSFET	Yes (High)	Dual/In Phase	No	No	P7(2),S3(2),S3T/R(5),M6(2),M6T/R(5)
4A Half-Bridge Drivers						
IX4R11(1)	MOSFET	Yes (High)	Dual/In Phase	No	No	P7(2),S3(2),S3T/R(5),M6(2),M6T/R(5)
6A Half-Bridge Drivers						
IX6R11(1)	MOSFET	Yes (High)	Dual/In Phase	No	No	P7(2),S3(2),S3T/R(5),S6(2),S6T/R(5),M6(2),M6T/R(5)
IX6S11(1,8)	MOSFET	No	Dual/In Phase	No	No	S6,S6T/R(3)

(1) Package designation. L4 - 44-Pin PLCC S1T/R - 8-Pin SOIC on Tape and Reel L4T/R - 44-Pin PLCC on Tape and Reel S3 - 16-Pin SOIC M6 - 16-Pin MLP S3T/R - 16-Pin SOIC on Tape and Reel M6T/R - 16-Pin MLP on Tape and Reel S6 - 16-Pin SOIC-CT (Heatsinkable Package) P1 - 8-Pin PDIP S6T/R - 16-Pin SOIC-CT (Heatsinkable Package) on Tape and Reel P7 - 14-Pin PDIP S10 - 48-Pin SSLGA S1 - 8-Pin SOIC S10T/R - 48-Pin SSLGA on Tape and Reel Consult datasheet for Tube or Tape and Reel package quantities.

(2) Samples available Nov 2004. (3) Samples available Dec 2004. (4) Samples available Jan 2005.
 (5) Samples available Feb 2005. (6) Samples available Mar 2005. (7) Samples available Apr 2005. (8) Half-Bridge Driver configured for Split-Rail circuits, (+300/-200V).

PolarHV™ 500V and 600V Standard and HiPerFET™ Power MOSFETs

IXYS has developed a new technology platform of Power MOSFET products, called PolarHT and PolarHV, for the voltage range from 55V to 600V. These new families of Power MOSFETs include cost-efficient, Standard Power MOSFETs and high-performance, HiPerFET Power MOSFETs. IXYS has now extended this MOSFET Family to include PolarHV™ 500V and 600V rated parts.

IXYS' proven HiPerFET process yields Power MOSFETs with a fast intrinsic body diode with low Q_{rr} and enhanced dV/dt ruggedness. IXYS' HiPerFETs are targeted for hard switching inverter and power

supply applications. They are used in demanding and high reliability IT and telecom infrastructure applications that require efficient switching and energy conversion in tight enclosures as well as products where reduced size and weight are important features.

PolarHT and PolarHV Power MOSFETs are designed with a proprietary cell design (patent pending) and process improvements that dramatically enhance the power handling capability and system efficiency. These design and process changes provide „best-in-class“ on resistance, gate charge, thermal resistance and power handling capability.

The PolarHV line is offered in 500V and 600V versions plus 800V and higher versions are in development. This higher voltage product line brings the same benefits of enhanced performance and cost-effectiveness to key market applications in the mid-voltage range. Example applications are off-line switch-mode power supplies of all sizes, from small wall socket style ranging to rack mount power systems for IT, UPS and Telecom applications.

Package type designations:

Letter	Package Type
Symbol	
A	TO-263
C	ISOLPLUS220
H	TO-247
I	Leaded TO-263
K	TO-264
N	SOT-227B
P	TO-220
P..M	Overmolded TO-220
Q	TO-3P
R	ISOLPLUS247
T	TO-268
V	PLUS220
X	PLUS247
Y	TO-252

PolarHT™ – 500V and 600V Standard Power MOSFET Table

Part Number	V _{DSS} Min. V	I ₂₅ Tc=25°C A	R _{DS(on)} Tc=25°C Ω	Qg nC	R _{thJC} °C/W	Package Type
IXT(1)1R6N50P	500	1.6	6	2	3	Y
IXT(1)2R4N50P	500	2.4	3.5	4	2.5	Y, P
IXT(1)3N50P	500	3.6	2.0	8	1.8	Y, P, A
IXT(1)5N50P	500	5	1.3	12	1.5	P, A
IXT(1)6N50P	500	6	1.0	15	1.3	P, A
IXT(1)8N50P	500	8	0.8	21	1.0	P, A
IXT(1)12N50P	500	12	0.50	30	0.75	P, A, I
IXT(1)16N50P	500	16	0.40	40	0.42	P, A, Q
IXT(1)22N50P(2)	500	22	0.27	50	0.35	V, Q
IXT(1)26N50P(2)	500	26	0.23	60	0.31	V, Q
IXT(1)30N50P(2)	500	30	0.20	72	0.27	V, H, Q, T
IXT(1)36N50P(2)	500	36	0.17	82	0.23	V, H, Q, T
IXT(1)1R4N60P	600	1.4	8	2	3	Y
IXT(1)2N60P	600	2	4.7	4	2.25	Y, P
IXT(1)3N60P	600	3	2.8	8	1.8	Y, P, A
IXT(1)4N60P	600	4	1.9	12	1.5	P, A
IXT(1)5N60P	600	5	1.6	14	1.2	P, A
IXT(1)7N60P	600	7	1.10	20	1	P, A
IXT(1)10N60P	600	9	0.74	30	0.75	P, A, I
IXT(1)14N60P	600	14	0.55	40	0.42	P, A, Q
IXT(1)18N60P(2)	600	18	0.42	50	0.35	V, Q
IXT(1)22N60P(2)	600	22	0.33	60	0.31	V, Q
IXT(1)26N60P(2)	600	26	0.27	72	0.27	V, H, Q, T
IXT(1)30N60P(2)	600	30	0.24	82	0.23	V, H, Q, T

PolarHV™ – 500V and 600V HiPerFET Power MOSFET Table

Part Number	V _{DSS} Min. V	I ₂₅ Tc=25°C A	R _{DS(on)} Tc=25°C Ω	Qg nC	R _{thJC} °C/W	Package Type
IXFC16N50P	500	10	0.44	40	1.25	C†
IXF(1)12N50P	500	12	0.50	30	0.75	P, A
IXFC26N50P	500	15	0.26	60	0.95	C†
IXF(1)16N50P	500	16	0.40	40	0.42	P, A, H
IXF(1)22N50P(2)	500	22	0.27	50	0.35	V, H
IXF(1)36N50P	500	23	0.19	82	0.6	C†, R†
IXF(1)26N50P(2)	500	26	0.23	60	0.31	V, H
IXFR44N50P	500	28	0.15	104	0.5	R†
IXF(1)30N50P(2)	500	30	0.20	72	0.27	V, H, T
IXF(1)36N50P(2)	500	36	0.17	82	0.23	V, H, T
IXFR64N50P	500	37	0.1	150	0.45	R†
IXF(1)44N50P	500	44	0.14	104	0.19	H, T, K
IXF(1)64N50P	500	64	0.10	150	0.15	X, K, N
IXFC14N60P	600	9	0.60	40	1.25	C†
IXF(1)10N60P	600	10	0.74	30	0.62	P, A
IXFC22N60P	600	13	0.36	60	0.95	C†
IXF(1)14N60P	600	14	0.55	40	0.42	P, A, H
IXF(1)18N60P(2)	600	18	0.42	50	0.35	V, H
IXF(1)30N60P	600	18	0.27	82	0.85	C†, R†
IXFR36N60P	600	20	0.21	103	0.60	R†
IXF(1)22N60P(2)	600	22	0.33	60	0.31	V, H
IXF(1)26N60P(2)	600	26	0.27	72	0.27	V, H, T
IXFR48N60P	600	27	0.15	150	0.50	R†
IXF(1)30N60P(2)	600	30	0.24	82	0.23	V, H, T
IXF(1)36N60P	600	36	0.19	103	0.19	H, T, K
IXF(1)48N60P	600	48	0.14	150	0.15	X, K, N

Notes:

* - best estimated values; † - ISOLPLUS package type. (1) Place holder in part number for package designator; (2) Add suffix letter 'S' to part number for Surface Mountable PLUS220 package, e.g. IXTV22N50PS.