

## ComPack Thyristor Module Platform

### A new Design that reduces Parts and Material Costs with Higher Power Density

The new ComPack family represents a compact package with the highest power density. The ComPack design is a result from the implementation of the newest assembly methods in combination with the proprietary 'power metallization chip' technologies of IXYS. Advancement in the module design as well as the silicon die technology leads to a user-friendly product that fulfills the highest needs in reliability and functionality.

First products are dual die or phase-leg topology using both anode side and cathode side soldering options to make available dual thyristor, dual diode or thyristor/diode combinations. The modules

have a rated current of 700A per leg, improved surge rating and a maximum junction temperature of 140°C.

"The ComPack module is an excellent example of how innovations in design can provide benefits to our customers. Previous designs of a phase leg bi-polar module and similar competitive offerings are only rated between 500A and 570A. However, the ComPack is rated at 700A and up to 2,200V per die but



has a 33% reduced footprint and weight 67% less than current alternatives, significantly illustrating how IXYS' MORE POWER, LESS PACKAGE design philosophy can reduce transportation costs across the whole of the value chain," commented Bradley Green, the President of European Sales and Business Development.

"Modules of this size and power had previously had issues in high transportation cost and its associated carbon footprint both at the manufacturer and further when installed in our customers' equipment. By providing a much smaller module at far less weight but at improved reliability, power range and ruggedness, IXYS provides the perfect solution to our cost and environment sensitive customers," added Mr. Green.

Internally IXYS' Direct Copper Bonded (DCB) ceramic technology provides a high isolation voltage of 4800V which is in line with Underwriters Laboratory (UL) requirements. With the adapted copper base plate, the ComPack concept achieves very low thermal impedance and helps reduce the module weight

yet, supports long-term reliability under highest power output operation.

With this development, IXYS is allowing the designer to switch more power than historically available, thereby facilitating higher power densities, greater material efficiency and lower systems cost and lower weight in motor control, soft starter, UPS or input rectification applications.

Type	$I_{TAMV}$	$V_{RRM}$
MCMA 700 P 1600CA	700	1600
MCMA 700 PD 1600CB	700	1600
MDMA 700 P 1600CC	700	1600

#### Features

- Optimized creepage & clearance distances
- Clip-soldered die technology
- Less weight
- Optimized heatsink & DCB construction
- 93mm x 65mm x 50mm (L x W x H)
- M10 screw connections

#### Applications

- Motor control, softstarter
- AC-Control
- UPS
- Input rectification
- Supplies for DC power equipment
- Field supply for DC motors

## Anode Gated Thyristor (AGT) Technology Platform

The first product derived from this new technology platform is the CLB30I1200HB, a 30A / 1200V Single Thyristor in a TO-247 discrete package. The gate control of the CLB30I1200HB is connected to the Anode side of the silicon die instead of to the Cathode side, as done by a standard Thyristor.

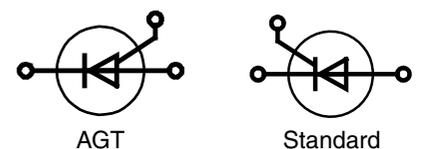
The combination of the Anode Gated Thyristor together with a standard Thyristor, e.g. the CLA30E1200HB, gives several interesting configurations. Thyristor Phase-leg configurations normally contain two separated gate driver potentials but, by replacing one Thyristor with the AGT, it will reduce to only one gate driver potential. This will save one complete gate driver circuit. Also an AC switch configuration be-

nefits from the AGT, also here the switch can be operated with only one gate drive circuit. This shows great cost saving possibilities by reducing the gate drive component count. Therefore it will also have a positive impact on the Mean Time To Failure (MTTF) in the final application.

The Anode Gated Thyristor platform has similar electrical specification as the standard Thyristor and is not limited to the 1200V/30A ratings of the CLB30I1200HB. In the future various die sizes with higher and lower Current/Voltage ratings are planned to complete the AGT product portfolio. This new thyristor platform is made possible by IXYS' known and proven thyristor technologies and in-house production methods.

Several applications are targeted by the Anode Gated Thyristor for example line rectifying, doft-starters, DC motor control, AC power / lighting and temperature control. Generally in all applications that use thyristors and / or TRIAC's the Anode Gate Thyristor will benefit.

The CLB30I1200HB and CLA30E1200HB discrete thyristors are available in production quantities.



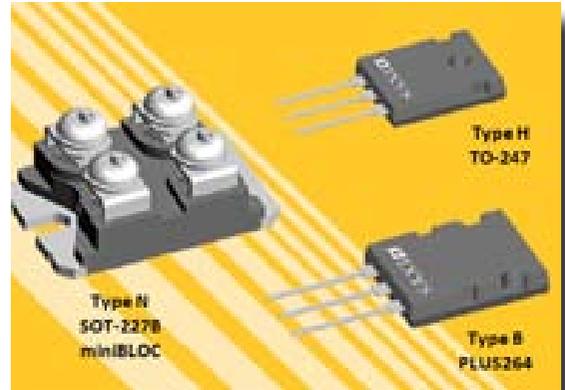
## IXYS expands Product Portfolio of 1200 V High-Speed Rugged XPT™ IGBTs

These new devices are designed to minimize switching losses in high-voltage, hardswitching applications. The high-speed switching capabilities (up to 50 kHz) of these IGBTs allow designers to use smaller and lighter components in their systems. For IXYS customers who need to lower turn-off losses and / or remove snubbers/clamps from their designs, IGBTs with co-packed ultra-fast recovery diodes in Sonic-FRD™ or HiPerFRED™ are available. Manufactured through the state-of-the-art IGBT process and the XPT™ design platform, these devices feature high-current handling capabilities, high-speed switching abilities, low total energy losses and low current fall times. They have a positive collector-to-emitter voltage temperature coefficient, making it possible for de-

signers to use multiple devices in parallel to meet high current requirements. Their low gate charges also help reduce gate drive requirements and switching losses. In addition to being avalanche rated, these devices have square Reverse Bias Safe Operating Areas (RBSOA) up to the breakdown voltage of 1200 V – a necessary ruggedness in snubberless hard-switching applications. The new 1200 V XPT™ devices with co-packed anti-parallel Sonic-FRD™ or HiPerFRED™ diodes are optimized to reduce turn-off losses and suppress ringing oscillations, thereby producing smooth switching waveforms and significantly lowering electromagnetic interference (EMI) in the process. Furthermore, due to the soft recovery characteristics of the diodes, the IGBTs can be switched on at

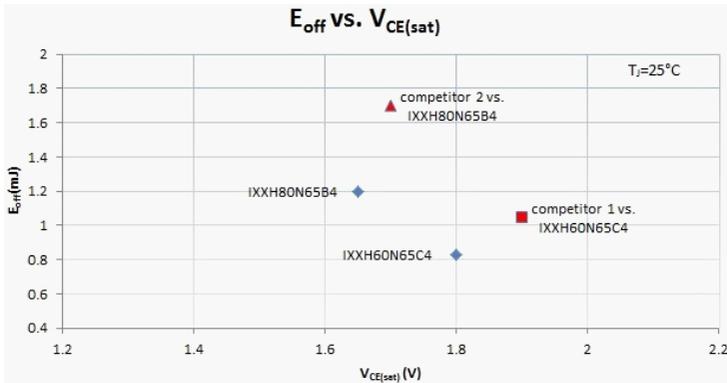
very high rates of change in current (di/dt), even in low current and temperature conditions.

There are various high-voltage and high-speed applications that the new IGBTs are well-suited for. Among these are power inverters, uninterruptible power supplies, motor drives, switch-mode power supplies, power factor correction circuits, battery chargers, welding machines and lamp ballasts. These 1200V XPT™ IGBTs are available in the following industry standard packages: TO-220, TO-



247, TO-264, SOT-227, SOT-227B, PLUS247, PLUS264 and ISO-PLUS247; and include part numbers IXYH30N120C3, IXYH50N120C3D1, IXYN100N120C3H1, and IXYX120N120C3, with collector current ratings of 66 A, 90 A, 134 A, and 220 A, respectively.

## IXYS Introduces Fast and Efficient 650V XPT™ Trench IGBTs



These 650V XPT™ Trench IGBTs are optimized to achieve low switching and conduction losses while maintaining low on-state voltages. The graph demonstrates a superior trade-off (turn-off energy loss vs. on-state voltage) of the new IGBTs (in particular, the IXXH60N65C4 against competitor 1 and IXXH80N65B4 against competitor 2).

The current ratings of IGBTs in this new product family range from 30A to 200A at a high temperature of 110°C. With on-stage voltages as low as 1.7V, these new XPT™ devices are designed to minimize conduction and switching losses, especially in hard-switching applications. Optimized for different switching speed ranges (up to 60kHz), these IGBTs provide designers with flexibility in device selection in terms of cost, saturation voltage, and switching frequency. Devices co-packed with IXYS ultra-fast Sonic-FRD™ diodes are also available.

Developed using the IXYS XPT™ thin wafers technology and advanced 4th generation (GenX4™) vertical IGBT process, these devices feature reduced thermal re-

sistance, low energy losses, fast switching, low tail current and high current densities. In addition, they display exceptional ruggedness under short-circuit conditions Short Circuit Safe Operating Area (SCSOA). Moreover these IGBTs have square Reverse Bias Safe Operating Areas (RBSOA) up to the breakdown voltage of 650V, making them ideal for snubberless hard-switching applications. Other qualities include a positive collector-to-emitter voltage temperature coefficient which enables designers to use multiple devices in parallel to meet high current requirements and low gate charges which help reduce gate drive energy and switching losses.

turn-off losses thanks to its speed and 'soft recovery' characteristics. It is optimized to suppress ringing oscillations and voltage spikes in recovery, thereby producing smooth switching waveforms and significantly lowering electromagnetic interference (EMI) in the process. The temperature stability of its forward voltage also helps lower switching losses when devices are operated in parallel.

The co-packed Sonic-FRD™ diode is an ideal match for these XPT™ IGBTs in reducing turn-on and

These IGBTs are well-suited for a wide variety of power conversion applications, lighting control, motor drives, power inverters, power factor correction circuits, switch-mode power supplies, uninterruptible power supplies, E-Bikes, automotive and welding equipment.

Part Number	V <sub>CE(sat)</sub> V	I <sub>C25</sub> T <sub>C</sub> = 25°C A	I <sub>C110</sub> T <sub>C</sub> = 110°C A	V <sub>CE(sat)</sub> max. T <sub>VJ</sub> = 25 °C V	t <sub>fi</sub> T <sub>VJ</sub> = 150°C ns	E <sub>off</sub> T <sub>VJ</sub> = 150°C mJ	R <sub>max</sub> max. K/W	Config.	Package Style
IXXH30N65B4	650	65	30	2.0	100	0.6	0.65	Single	TO-247
IXXH110N65C4		234	110	2.35	43	0.77	0.17	Single	TO-247
IXXN110N65B4H1		240	110	2.1	105	1.4	0.17	Copacked (Sonic-FRD™)	SOT-227B
IXXK160N65C4		290	160	2.1	57	1.3	0.16	Single	TO-264
IXXX160N65B4		310	160	1.8	160	2.36	0.16	Single	PLUS247
IXXK200N65B4		370	200	1.7	110	2.54	0.13	Single	TO-264

## New ZGATE Embedded Security Solution

The New ZGATE™ Embedded Security combines multiple technologies for safer, faster and better deployment of embedded communications applications. ZGATE™ Embedded Security incorporates Zilog's eZ80F91 MCU and full-featured TCP/IP stack with a unique world-class embedded firewall to produce an entirely new technology that offers an additional layer of embedded protection for smarter, safer devices and products.

The eZ80F91 MCU, a member of Zilog's eZ80Acclaim™ family of MCUs, is already well-suited to today's wired and wireless applications requiring internet connectivity. The addition of the ZGATE™ security layer offers significantly deeper protection against cyber threats and attacks. With many more applications, devices, products and processes demanding increased security, Zilog's eZ80F91 MCU, embedded with



ZGATE™ technology, reduces the incidence of security breaches in many types of products in defense, telecommunications, utilities, transportation, medical and industrial applications.

ZGATE™ is packed with features, including Ethernet, IP/UDP/TCP/ICMP filtering, extremely low latency, and APIs for event logging. ZGATE's easily configurable filtering rules offer static/rules-based filtering, which blocks packets based on configurable rules, and dynamic filtering/stateful packet inspection (SPI), which blocks packets based on the state of a connection. Tests of these packet-blocking filters show dramatically improved network throughput under load.

As more modern devices are exposed to denial of service attacks and emerging threats that affect the functionality of today's smarter connected devices, ZGATE™ provides an embedded solution that fits designers' needs.

Part Number	Firewall Package	Flash	SRAM	Temperature	Package
EZ80F91GAZ0AEG	Premium	265 KB	16 KB	-40°C to 105°C	144-pin LQFP
EZ80F91GAZ0BEG	Extended	265 KB	16 KB	-40°C to 105°C	144-pin LQFP
EZ80F91GAZ0CEG	Standard	265 KB	16 KB	-40°C to 105°C	144-pin LQFP
ZGATE0001000C0G	ZGATE Embedded Security Development Kit				

## IXYS Announces Robust Isolated Solid State Relay with Integrated Current Limit, Over-voltage Protection and Thermal Management

The CPC1593 is the first in a new family of triple stage protection solid state relays (SSRs) that incorporate load current-limiting with over-voltage protection and thermal management. These bidirectional relays are designed to survive in the harshest operating environments for off-AC line applications.

The CPC1593 normally open (1-Form-A) optically isolated SSR features a load voltage of 600V peak maximum, continuous load current of ±120mA maximum and an on-resistance of 35Ω maximum. In a fault condition, the CPC1593 relay features a unique over-voltage protection that is activated when the voltage across the switch is greater than 21V and the device is in current limit. The over-voltage protection deactivates the switch while allowing a restricted load current of less than 100 μA to flow. When the voltage across the switch falls below the

over-voltage threshold, the switch resumes normal operation. If the fault persists, the over-voltage response will repeat offering the best protection for the load and the switch itself.

Current limit specification for the CPC1593 in an AC/DC configuration is ±285mA maximum and 570mA in the DC configuration. A thermal management circuit in the CPC1593 monitors overall die temperature in a fault condition and further restricts load current to protect the relay and load.

Key applications for this device are for advanced power management applications where the reduction of "vampire power" consumption is desired by turning off the AC power when not needed. Other applications include in-rush current control, power supplies, industrial and process controllers, solenoid and valve controls and HVAC. The device is targeted for AC po-

## IXYS Integrated Circuits Division Introduces High Current Optically Isolated AC Power Relay with Zero-Cross Circuitry and Highest Isolation Voltage Rating

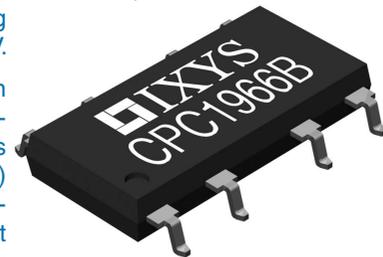
*The CPC1966B AC Power Switch is ideal for saving energy in power systems for Industrial, IT, Consumer and Medical Products*

The CPC1966B is an AC Solid State Switch utilizing dual power SCRs as an integrated alternative to discrete optocoupler and triac circuits. This device includes zero-cross turn-on circuitry to minimize the generation of transients, and has a blocking voltage of 800 V.

The new 8-Pin Power SOIC package provides 5000 V (rms) of isolation between the input control and the output while optically coupled circuitry provides exceptional noise immunity. Additionally, the 30 A surge rating enables the CPC1966B to handle a variety of resistive and reactive loads. As a result, the robust CPC1966B is well suited for industrial environments where electromagnetic interfe-

rence would disrupt the operation of plant facility communications and control systems.

Input control current for switching is 5 mA. Applications include: motor controls, AC power control, valve and solenoid controls, security door and gate latches, lighting, AC power generation and distribution, home automation and HVAC controls.



"This product expands the power range of our SSR's, and with our Zilog MCU's, provides a total system solution for digital power and load

management that our customers value in order to save energy and automate their equipment. Thus it is ideal for robotics, IT and server power supplies, medical equipment, railroad and traffic controls, consumer electronics, fitness equipment, industrial controls, and test and measurement equipment," commented Dr. Nathan Zommer, CEO of IXYS.

The CPC1966B, available in the 8-pin Power SOIC package, is pending certification to the UL 508 Standard for industrial control equipment.

The CPC1966B AC Power Relays are available in production quantities.

wer line environments where fault conditions can persist for extended periods of time & where, upon removal of the fault, return to normal operation is expected. The relay is designed to survive extended power cross conditions. The CPC1593 has UL, CSA and EN/IEC approval.

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## IXYS UK Introduces New 2.2 kV Rugged 15.4 kA Rectifier Diode with Record Power Density for High Power Management

IXYS UK introduces the first of a new range of 83mm diameter die rectifier diodes. The new 2.2kV rectifier, has a current rating of 15A, 450A, represent a new technology platform for bonded-wafer level construction with a favourable high power density-“more power less package”. This technology offers better electromechanical and thermal performance as compared to prior designs.

The 2.2kV rectifier diode has an average current rating (case temperature 55°C) of 8,570A and surge current rating of 78,000A, with a junction to heat sink thermal resistance of 0.008K/W.

“The thermal capacity of the metal disc and its direct fusion to the silicon enhances performance and gives excellent transient thermal and surge current ratings. The new package design, which retains an industry standard footprint, allows for the maximum silicon to package ratio and represents a 46% increase in current density

over older designs in a similar package outline. It is an extension of our proven 83mm Si technology that we introduced recently for our high performance 2.8kV and 4.5kV Phase Control Thyristors,” commented Frank Wakeman, Marketing and Technical Support Manager for IXYS UK.

The device is available in an industry standard 26mm thick package and two voltage grades. Designations: W8570TJ180 (1800V) and W8570TJ220 (2200V). Additional products with voltage ratings up to 6kV will be launched through 2013 as well as a 36mm thicker package option.

Typical applications for these devices include: track side rectifiers, chemical power supplies, Industrial rectifiers and all rectifier applications requiring very high power.

Data sheets at [www.ixysuk.com](http://www.ixysuk.com)  
Email: [sales@ixysuk.com](mailto:sales@ixysuk.com) or  
Telephone: +44 (0)1249 444524

## IXYS UK Launches New 2.8kV 10kA ‘Wespack’ Rectifier, Reduced Weight and Improved Efficiency

The new 2.8kV rectifier diode extends the upper voltage range of this revolutionary product group, offering maximum power rating for weight and volume, without compromising on quality and reliability. The diode has an RMS current rating of nearly 10,000A and a very low package thermal resistance of 0.013K/W. Constructed by using an all diffused silicon slice alloyed to a molybdenum disc, the die is encapsulated in a fully hermetic package. The high quality construction of the diode offers excellent transient thermal and surge current ratings.

“Instead of archaic conventions, the new diode follows the IXYS UK strategy of offering more power and less package with products designed for applications. When compared to conventionally packaged devices, the new Wespack diode offers around 50% more current with 35% less weight; thereby, allowing the user the opportunity to make both

energy and material efficient designs,” commented Frank Wakeman, IXYS UK’s Marketing and Technical Support Manager.

“This unique product with megawatts of rectifying power capability is part of our campaign of introducing products that enable our customers to reduce the weight of their power systems, namely, taking their products through a weight loss program, thus reducing the energy cost of shipping their products, and reducing their CO<sub>2</sub> footprint,” commented Dr. Nathan Zommer, Founder and CEO of IXYS Corporation.

The new diode is available in two voltage classes. Designation: W5130MK240 for the 2.4kV version and W5130MK280 for the 2.8kV device.

Typical applications for these devices include: front end rectifiers and bridges, DC power supplies, utilities and chemical power supplies.

## IXYS’ New Generation of Overvoltage Protection Devices that increase High Power System Reliability

IXYS’ Break-Over Diodes (BOD) are traditionally embedded in the control/gate drive units in order to detect high voltage transients that can destroy a vast range of high cost, power semiconductor switches. BODs are designed to self trigger when a preset voltage level is reached thus allowing protection against voltage spikes or line faults which can destroy many different system components. In AC operation these devices are also self resetting unlike a fuse or mechanical isolators which must be reset or manually replaced prior to system restart.

It is the most efficient and lowest cost solution for protecting high power systems that can be up to megawatts in power rating. The

applications include Smart Grid Systems, High Voltage Direct Current (HVDC) power transmission systems, windmill generators, UPS’s, Motor Drives and power generators in hydroelectric dams. “It is not often in high power applications that such a low cost component can be utilised to protect semiconductors with a value of thousands of dollars and a system of over hundreds of thousands of dollars,” commented Bradley Green, VP of International Sales for IXYS Corporation.

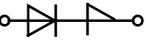
With this new development, IXYS has improved two important characteristics of the BOD. The temperature coefficient has been reduced by a factor of 3 improving the tolerance of the breakerover

voltage limit over the complete temperature range. This gives designers the benefit for a more precise and controllable design due to smaller tolerances. Additionally, the latest generation dramatically reduces switch-on-time of the BOD in reaction to an overvoltage event down to a few nanoseconds. This not only improves the safety of the system but also increases the relevant application space for this technology and gives designers a solid state alternative to older, more complicated and expensive protection solutions.

The extremely high rate of change of the voltage (dv/dt) makes the new generation attractive for ignition applications of high voltage impulse technology such as High

Intensity Discharge (HID) lighting. The latest generation is called the IXBOD2™ range and features extended voltage operating range over previous solutions thereby giving the designer options in single element ratings from 100V to 1400V. Series connection of the IXBOD2™ is also possible to extend the system voltage protected to over 10kV.

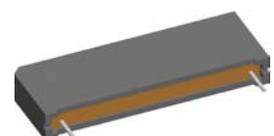
  
Version R

  
Version RD

X201 **FP-Case** (oil proof)



X202 **BOD-Package**



Type	V <sub>BO</sub>	I <sub>BO</sub>	I <sub>H</sub>	V <sub>H</sub>	I <sub>D</sub>	I <sub>AVM</sub>	I <sub>SM</sub>	dv/dt	R <sub>thJA</sub>	Fig. No.
	T <sub>VJ</sub> = 25°C K <sub>T</sub> = 0.7 · 10 <sup>-3</sup> K <sup>-1</sup> V	mA	T <sub>VJ</sub> = 25°C mA	V	T <sub>VJ</sub> = 125°C V <sub>D</sub> = 0.8 · V <sub>BO</sub> µA	T <sub>amb</sub> = 50°C A	A	V/µs	K/W	
IXBOD 2-01...14	100...1400	15	20	4-8	200	0.90	250	>1000	60	X201
IXBOD 2-15...28R(D)	1500...2800	15	20	4-8	200	0.90	250	>1500	20	X202

# IXYS expands its SMPD™ Products for higher Efficiency, smaller Footprint and lower Weight for Motor Drives, UPS and Inverters

The demand for higher power density in system design is continually driving innovation in semiconductor packaging technology. IXYS continues to be at the forefront of this development with its new isolated package family SMPD™ (Surface Mount Power Device). The IXYS design cornerstone of "MORE POWER - LESS PACKAGE" has resulted in the SMPD™ module range which efficiently provides solutions for applications where traditional offerings create problems such as larger module footprints, higher cost and longer cycle times in assembly and the problem that catalogue items rarely provide the best silicon content.

IXYS' ISOPLUS® isolation technology has for many years provided a UL recognized rugged isolation platform for a wide range of leading power modules. The SMPD™ range now extends its ISOPLUS® portfolio to include modules that can be assembled in standard surface mount (SMD) soldering processes and is pick-and-place ready to be assembled on customer's existing SMD assembly lines. The ISO-

PLUS® advantage also includes:

- Isolated package using IXYS' own Direct Copper Bonded substrates
- Voltage isolation up to 2500 V (UL Recognized)
- Lower junction-to-heat sink thermal resistance
- Improved temperature and power cycling performance
- Higher reliability than Cu based modules
- Very small coupling capacitance → Reduced EMI
- Reduced parasitic inductance → Optimized Switching Performance
- Replacement of multiple discrete reduces system size

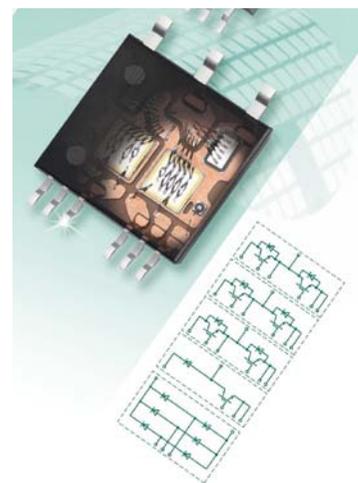
The IXYS SMPD™ range provides not only a large array of standard options in terms of topology or silicon varieties. Its simplicity by design and optimized manufacturing process can allow fast time to mar-

ket for customers that require differing die and circuit combinations effectively fast tracking product development. IXYS removes the need for more expensive competitive solutions and can successfully combine numerous discrete devices in one high reliability package that can then be easily assembled on current SMD assembly lines.

Added to this the IXYS SMPD™ provides the ideal modular circuit building blocks so that the designer can select the ideal solution. For instance one SMPD™ can provide a solution for each stage of a Motor Inverter – 1x SMPD™ for the three phase diode input rectifier, 1xSMPD™ for the Brake or PFC stage and 3xSMPD™ for the 3 phase IGBT inverter. The customer can then select where

to position each stage to optimize his heat sink or cooling solution often downsizing materials.

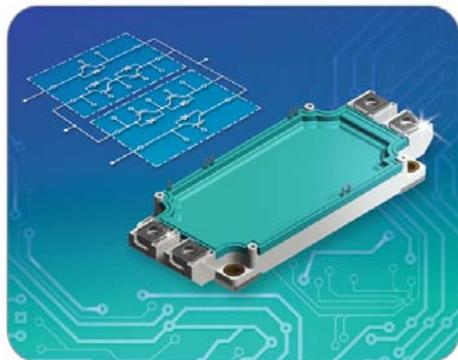
The IXYS SMPD™ range provides a solution-scale package reducing material waste and lowering power footprint for all the power electronic applications of today and those of the future. Its platform flexibility and ease in assembly provides cost efficiency not just in terms of module cost but in the important processes of system design, time to market and product assembly.



Type	Circuit diagram / Bipolar type	V <sub>RRM</sub> V	I <sub>TAV</sub> A	@ T <sub>c</sub> °C
◇ under development				
<b>DUAL</b>				
◇ CLA 60MU1200LB	2 x P Triac	1200	2 x 30	100
<b>PHASE-LEG</b>				
◇ CMA 50P1600LB	Q Thyristor	2x 1600	50	90

## Highest Power IGBT Module for Energy Efficient Power Conversion and Motor Control Applications, the "SIMBUS F" Module

SimBus F represents one of the newest package developments of IXYS. This new generation of DCB-isolated copper base modules provide several new features.



Combined with the benefits of well-proven technologies SimBus F is an optimized semiconductor product for power conversion with focus on 2-level and 3-level inverter applications. The outline of this package type using the industrial standard height of

17mm facilitates bus bar connections between the rectifier and inverter stages. Direct Copper Bonded (DCB) substrates – also manufactured at IXYS – allow the user 4800V isolation voltage between terminals and heat sink.

SimBus F is a standard module housing optimized for IGBT phase-leg configuration featuring high current density and low stray inductance. Equipped with IXYS XPT IGBTs and SONIC free wheeling diodes SimBus F gives the customer a reliable solution which is 100% sourced by IXYS. Common applications for the SimBus F are solar inverters, motor drives, DC to DC chopper systems and UPS power inverters. The first modules released are

the 450A, 300A and 225A dual IGBT and the 225A brake/boost modules equipped with 1200V IXYS XPT IGBTs. The voltage range is extended to 650V by the dual XPT IGBT 600A MIXA600PF650TSF and further expanded by the MIXA600AF650TSF (common emitter) and MIXA600CF650TSF (common collector) options. MIXA430LD1200TSF is one half

of a 3-level T-type (or NPC2 type) inverter topology using a combination of 650V and 1200V XPT IGBTs. Two of these modules in anti-parallel can form a simple solution for a T-type multi-level inverter featuring a reinforced switch to DC-neutral. With 1700V IGBTs and the combination of 1200V/1700V IGBTs, multi-level solutions will be available.

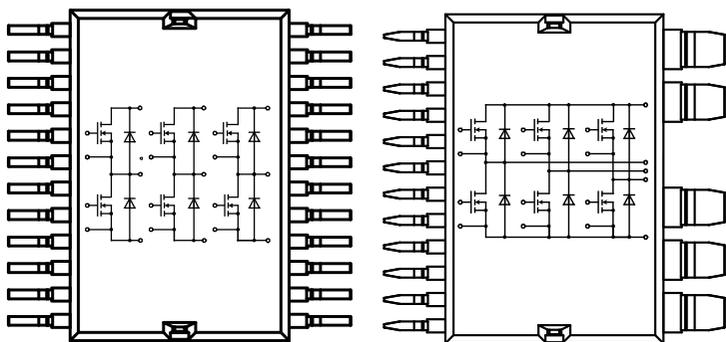
Products	V <sub>CE</sub> [V]	V <sub>C80</sub> [A]	Configuration
MIXA225PF1200TSF	1200	250	phase-leg
MIXA300PF1200TSF	1200	325	phase-leg
MIXA450PF1200TSF	1200	450	phase-leg
MIXA600PF1200TSF	1200	600	phase-leg
MIXA60PF650TSF	650	490	phase-leg
MIXA225RF1200TSF	1200	250	brake / boost
MIXA600AF650TSF	650	490	common emitter
MIXA600CF650TSF	650	490	common collector
MIXA430LD1200TSF	1200/650	430/345	NPC2

## New TrenchMOS in ISOPLUS®-DIL

IXYS' Corp. announces the expansion of its discrete ISOPLUS®-DIL (Dual-In-Line) package series by 3 new devices.

**MTI145WX100GD** offers 3 electrically isolated TrenchMOSFET phase-legs with 100V brake down voltage and an ultra low  $R_{DS(on)}$  of only 1.7mΩ and **MTI200WX75GD** with 75V and 1.1mΩ. The package option with 12 pins on either side allows real Kelvin gate connections for an optimised gate drive. **MTI85W100GC** equipped with 100V/3.2mΩ TrenchMOSFET gives the designer a complete 6-Pack solution.

The IXYS ISOPLUS® family is well known for its advantages: the expansion coefficient of the DCB is close to that of silicon which results in high temperature cycling reliability and the heat transfer through the ceramic is optimal. High integration and power density is achievable reducing current loops and parasitic capacities resulting in better EMI behaviour of the application. All in all especially ISOPLUS®-DIL package solution provides a very reliable and efficient alternative when compared to copper based leadframe devices. It is planned to qualify MTI series according to AEC-Q101.



Type	V <sub>DS</sub> V	I <sub>D90</sub> A	R <sub>DS(on) typ</sub> mΩ	Q <sub>G(on)</sub> nC	Circuit
MTI 200WX75GD	75	195	1.1	155	3 x phase legs
MTI 85W100GC	100	83	3.2	90	6-pack
MTI 145WX100GC	100	145	1.7	155	3 x phase legs

## IXYS' smallest 800V Half Bridge Rectifier in TO-252 SMD Package

**DLA5P800UC** is a diode phase-leg in a D-Pak housing (TO-252) for high efficiency AC to DC rectification application with proven ruggedness and high surge current capabilities.

“Our proven rectifier integration technology enables us to create this 800V phase-leg in a small SMD D-Pak with 60A of surge current rating at 175°C. This D-Pak as a phase-leg, is a standard building block in power supplies, UPSs and inverters to create single phase, three phase or other multiphase rectifying bridges. For example, it enables designers of a 1 kW electronic inverter to develop a very compact and competitive SMD rectification circuit with low profile, with full flexibility with standard PCB manufacturing processes,” commented Jeroen van Zeeland, head of marketing of IXYS Semiconductor, GmbH in Germany.

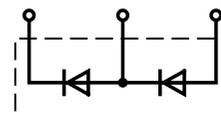
The **DLA5P800UC** is an example of such standard rectifier with an average forward current of 5A and a voltage of 800V. The maximum forward surge current is specified on 76A. This product family will be expanded and will

have a voltage range up to 1200V in the near future.

IXYS targets to reduce the energy consumption and to contribute to the inverterization of electrical motor drives. The micro inverter segment in the industrial and renewable markets is demanding power semiconductor solutions which supply more productivity. The **DLA5P800UC** shows the needed design simplifications.

The delivery form is in tape and reel. The tape and reel option enables automated pick and place mounting of these surface mountable device (SMD) half rectifier bridge.

**DLA5P800UC**



TO-252 (D-Pak)

## IXYS' Smallest Footprint Surface Mount Package for 1.2KV to 1.8KV Power Semiconductors

New: D2-Pak (TO-263) and D3-Pak (TO-268) packages with higher 'creepage' spacing which enables higher voltage power semiconductors to be used in these Surface Mount Devices (SMD).

“The market demands smaller footprint solutions for 1.2KV to 1.8KV power semiconductors. The main reason for this is the higher power demands which are realized by higher voltages instead of higher current. By using a higher voltage the conduction losses in copper wires are less for power control circuits; therefore, thinner copper conductors or traces on PCB circuits can be used.

These SMDs improve energy efficiency, reduce cost, reduce size and reduce weight when used in power electronics,” commented Mr. Jeroen van Zeeland, head of marketing at IXYS Germany.

SMDs are preferred for lower cost alternatives to modules and to other bulkier discrete components in integrated power designs. Until now there was no such solution for applications higher than 1.2KV. The new IXYS D2-Pak and D3-Pak designs now offer the standard footprint, but with compliance to the high voltage 'creepage' specifications.

For D3-Pak the creepage distance between the terminal to the copper of the backside is greater than or equal to 5.80mm. The same value for the D2-Pak is greater than or equal to 4.70mm. This enables the use of 1.2KV D3-Pak in pollution degree 2 industrial designs. In addition to industrial power control applications, these devices target other 1.2KV to 1.8KV power supply, UPS, renewable energy, motor drives and medical applications.

The following products are already available:

- CMA30E1600PZ (D2-PakHV, single SCR with 30A and 1600V)
- DMA10P1600PZ (D2-PakHV; phase-leg for diode bridges with 10A/1600V)
- CMA50E1600TZ (D3-PakHV, single SCR with 50A and 1600V)
- DSP45-16TZ (D3-PakHV; phase-leg for diode bridges with 45A and 1600V)
- Standard delivery mode for D2-Pak is Tape&Reel and tube for D3-Pak (T&R on request)

TO-268  
(D3-Pak)



TO-263  
(D2-Pak)



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