

900V Polar HiPerFET™ Power MOSFETs

RUGGED, ENERGY EFFICIENT MOSFET SOLUTIONS FOR POWER CONVERSION SYSTEMS

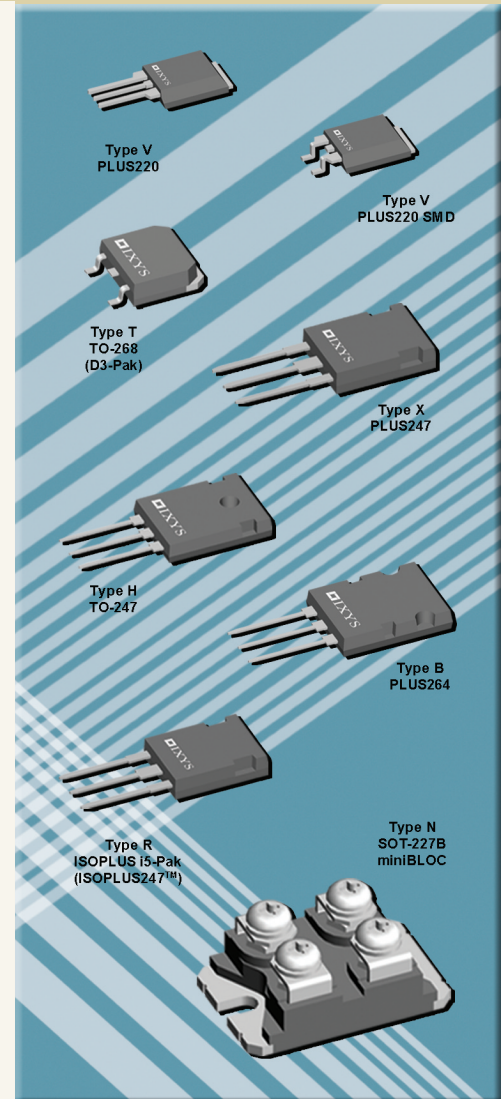
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OVERVIEW

IXYS expands its Polar HiPerFET™ MOSFET product portfolio with the introduction of its new 900V HiPerFET™ Power MOSFETs. Available with drain current ratings from 10.5 Amperes to 56 Amperes, these new 900V additions compliment IXYS' high-voltage Polar HiPerFET™ MOSFET product line (Available from 500V to 1200V), providing the end-customer a broader selection range of robust, energy-efficient high-voltage MOSFET solutions to choose from. These new 900V devices combine advantages derived from IXYS' Polar Technology platform and HiPerFET™ process to provide improved power efficiency and reliability in today's demanding high-voltage conversion systems that require bus voltage operation of up to 700V.

IXYS' Polar Technology platform has been especially tailored to minimize on-state resistance while maintaining low gate charge, thus providing a FOM (Figure of Merit: $R_{ds(on)}$ multiplied by Q_g) as low as 480ohm/nanocoulomb, resulting in a substantial reduction in conduction and switching losses of the device. Lower thermal impedances are also achieved due to reduced chip thicknesses, increasing total power density of the device. Power switching capabilities and device ruggedness of these devices is further enhanced through the utilization of IXYS' HiPerFET™ process, yielding a device with a fast intrinsic diode for low reverse recovery charge (Q_{rr}) and improved turn-off dV/dt immunity. The enhanced dV/dt withstand capability of these devices offer significant safety margins for the stresses encountered in high-voltage switching applications. These combined device attributes allow for improved efficient topologies in hard-switching inverters, switch-mode/resonant-mode power supplies, high voltage lighting, AC/DC motor drives, Robotics/servo controls, industrial machinery, and active power factor correction circuits.

IXYS offers a full range of discrete standard thru-hole and surface mount packages for these new 900V Polar HiPerFET™ devices. In addition, versions will be offered in IXYS proprietary ISOPLUS packages, providing UL recognized 2500V isolation with superior thermal cycling and thermal performance.



FEATURES

- International standard packages
- ISOPLUS™ high performance package options (2500V electrical isolation)
- Fast intrinsic diode
- Avalanche rated
- Low package inductance
- Excellent ruggedness and dV/dt capability
- High power density

APPLICATIONS

- Switch-mode and resonant-mode power supplies
- DC/DC converters
- Laser drivers
- AC and DC motor drives
- Robotics and servo controls
- Industrial machinery
- Active PFC circuits
- IT & Telecom applications

BENEFITS

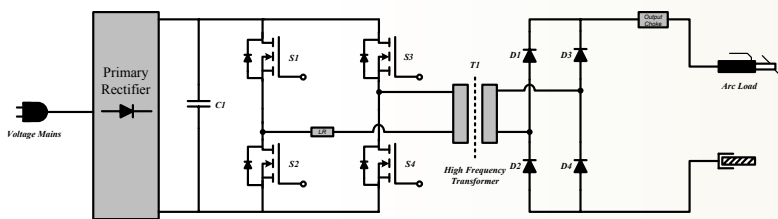
- Increased current handling capability
- Maximized package efficiency
- Reduced component count
- Reduce circuit complexity
- Greater reliability
- Low gate drive requirement
- Easy to mount
- High power density

900V Polar HiPerFET™ Power MOSFETs Summary Table

Part Number	V _{dss} max (V)	I _{D(cont)} T _c =25°C (A)	R _{ds(on)} max T _J =25°C (Ω)	C _{iss} typ (pf)	Q _g typ (nC)	t _{rr} typ (ns)	R _{thJC} max (°C/W)	P _d (W)	Configuration	Package Type
IXFR18N90P	900	10.5	0.660	5230	97	300	0.620	200	Single	ISOPLUS247™
IXFH12N90P	900	12.0	0.900	3080	56	300	0.330	380	Single	TO-247
IXFV12N90P	900	12.0	0.900	3080	56	300	0.330	380	Single	PLUS220
IXFV12N90PS	900	12.0	0.900	3080	56	300	0.330	380	Single	PLUS220SMD
IXFR24N90P	900	13.0	0.460	7200	130	300	0.540	230	Single	ISOPLUS247™
IXFH18N90P	900	18.0	0.600	5230	97	300	0.230	540	Single	TO-247
IXFT18N90P	900	18.0	0.600	5230	97	300	0.230	540	Single	TO-268
IXFV18N90P	900	18.0	0.600	5230	97	300	0.230	540	Single	PLUS220
IXFV18N90PS	900	18.0	0.600	5230	97	300	0.230	540	Single	PLUS220SMD
IXFR40N90P	900	21.0	0.230	14000	230	300	0.420	300	Single	ISOPLUS247™
IXFH24N90P	900	24.0	0.420	7200	130	300	0.190	660	Single	TO-247
IXFT24N90P	900	24.0	0.420	7200	130	300	0.190	660	Single	TO-268
IXFN40N90P	900	33.0	0.210	14000	230	300	0.180	695	Single	SOT-227
IXFK40N90P	900	40.0	0.210	14000	230	300	0.130	960	Single	TO-264
IXFX40N90P	900	40.0	0.210	14000	230	300	0.130	960	Single	PLUS247
IXFN52N90P	900	43.0	0.160	19000	308	300	0.140	890	Single	SOT-227
IXFB52N90P	900	52.0	0.160	19000	308	300	0.100	1250	Single	PLUS264
IXFN56N90P	900	56.0	0.135	23000	375	300	0.125	1000	Single	SOT-227

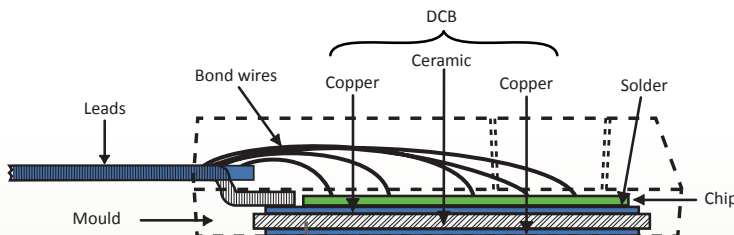
Application Circuits

Full Bridge Welding Converter



The figure on the left illustrates a general full-bridge phase-shift ZVT (zero-voltage transition) welding converter circuit. This circuit topology consists of a primary rectifier, full-bridge converter, high frequency transformer, and secondary rectifier stage. 900V Polar HiPerFET™ Power MOSFETs are ideally suited for use in the full bridge converter stage of this circuit topology, providing fast switching capabilities and low conduction losses.

ISOPLUS™ Packages with Internal Alumina DCB Isolation*



PACKAGE ADVANTAGES

- Provides 2500V, UL recognized isolation with superior thermal performance (E153432).
- Improves temperature and power cycling capability.
- Cost effective clip mounting.

* Patent No. 6,404,065; 6,404,065; 6,534,343; 6,583,505; 6,710,463; 6,731,002; 7,005,734

* For information regarding IXYS ISOPLUS packages, visit <http://www.ixys.com/IXAN0022.pdf>

The figure on the right illustrates an ISOPLUS™ 247 cross-section. ISOPLUS™ package provides improved creepage distance to simplify compliance with regulatory high-voltage spacing requirements. The copper-bonded, isolated ceramic substrate enhances overall device reliability by greatly improving thermal and power cycling, and the isolated backside simplifies mounting while yielding superior thermal impedance. The molding epoxies utilized meet the UL 94V-0 flammability classification.

Backed up with multiple U.S. Patents and UL recognition, the ISOPLUS™ packaging advantage is available only from IXYS.