

High Current TrenchMV™ Power MOSFETs in 5-lead ISOPLUS i4-Paks™

NEXT GENERATION 55V TO 100V TRENCH POWER MOSFETS

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Description

IXYS new High Current TrenchMV Power MOSFETs capitalize on the benefits of IXYS Trench MOSFET technology and on proprietary ISOPLUS packaging technology, in this case the ISOPLUS i4-Pak. IXYS Trench MOSFETs provide for very low conduction and switching losses, and are avalanche rated for hard-switching applications. The principal feature of this line of products arises from the joining of IXYS Trench MOSFETs with the reliable, high power handling capability of IXYS discrete ISOPLUS i4-Pak. Silicon current handling has outpaced the ability of most traditional discrete packaging, which typically limits steady state current to 75A. The powerful ISOPLUS i4-Pak is used to full effect in this instance by combining its superior isolation, thermal and power cycling capabilities and flexible configuration. In this case, the ISOPLUS i4-Pak is configured with 5 heavy-gage leads to provide a high current drain and source paired lead set with joined copper webs and backside heat sinking, all of which conservatively improve the lead current rating to 160A. All IXYS ISOPLUS packages are manufactured with internal direct-copper-bonded (DCB) isolation, are UL certified and provide integral backside case isolation.

TrenchMV Power MOSFETS find homes in many applications. These devices are designed to withstand even the most robust switching conditions commonly required by the automotive market, as well as the industrial sector. Other applications include DC/DC converters, battery chargers, motor drives and others. Additional Trench products and package options are in process, including options for lower and higher voltages. With voltages ranging from 55V to 100V and currents ranging from 5.4A to 280A, the Trench cell design is optimized to outperform other technologies to date in this arena at a very competitive price position.

IXYS ISOPLUS packages provide high isolation capability (up to 2500V), improve creepage distance and dramatically reduce total thermal resistance. Additionally, the ceramic alumina substrates used also dramatically enhance device reliability due to their superior thermal and power cycling. The DCB can be patterned like a printed circuit board, which enables the unique integration capabilities of IXYS ISOPLUS packages. Kunze high performance phase change materials can be used to further enhance ISOPLUS package thermal performance.



Features

- Low $R_{DS(ON)}$
- Dual Source and Drain Leads
- UL Recognized
- 2500V isolation voltage rating
- DCB Substrate gives lower thermal isolated resistance
- Flexible platform, enabling multiple chip solution
- Superior thermal cycling capabilities

Benefits

- Rugged operation
- 150A of useable current (75A/lead)
- Reduced component count
- Reduces parasitic inductance and capacitance
- Cost-effective

Applications

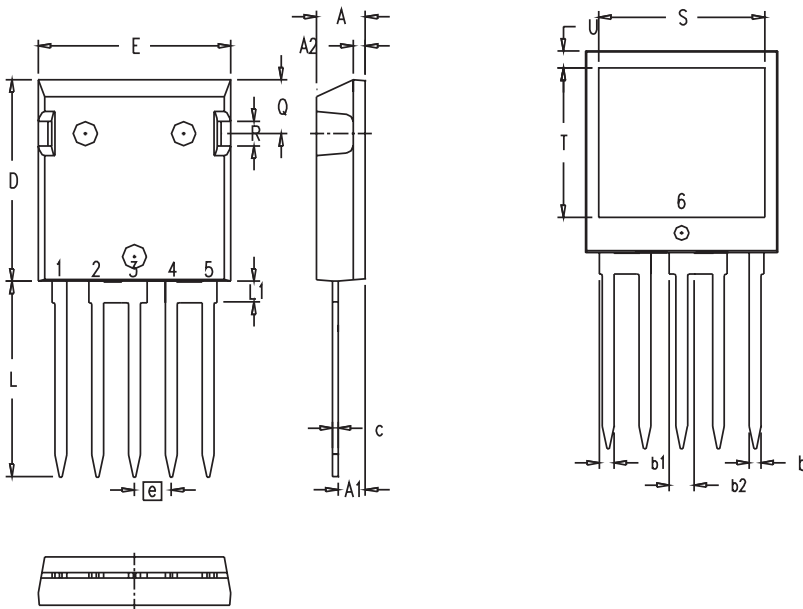
- Automotive/Industrial applications
- DC/DC power conversion
- Battery chargers
- Motor drives

SUMMARY TABLE

Part Number	V _{DSS} Max (V)	I _D (Non-isolated) T _C =25°C (A)	I _D (Isolated) T _C =25°C (A)	R _{DS(on)} Max T _C =25°C (mΩ)	C _{iss} Typ (pF)	Q _g Typ (nC)	t _{rr} Max (ns)	R _{thJC} * (°C/W)	P _d (W)	V _f Diode (V)	Package Type
IXTF280N055T	55	280	150	3.5	9800	200	70	0.9	167	1	ISOPLUS i4-Pak
IXTF250N075T	75	250	130	4.4	9900	200	80	0.9	168	1	ISOPLUS i4-Pak
IXTF230N085T	85	230	125	4.9	9900	187	90	0.9	169	1	ISOPLUS i4-Pak
IXTF200N10T	100	200	103	6.0	8500	152	100	0.9	170	1	ISOPLUS i4-Pak

* Thermal impedance with isolation

ISOPLUS i4-Pak (5-Leads) (IXTF) Package Outline Drawing

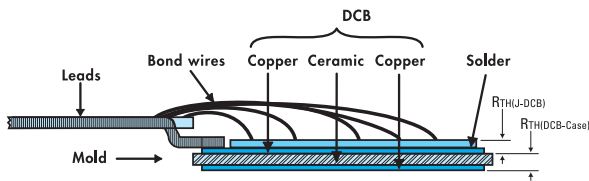


- Leads:
 1. Gate
 2, 3. Source
 4, 5. Drain
 6. Isolated

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.085	1.17	2.16
b	.045	.055	1.14	1.40
b1	.058	.068	1.47	1.73
b2	.100	.110	2.54	2.79
C	.020	.029	0.51	0.74
D	.819	.840	20.80	21.34
E	.770	.799	19.56	20.29
e	.150 BSC		3.81 BSC	
L	.780	.840	19.81	21.34
L1	.083	.102	2.11	2.59
Q	.210	.244	5.33	6.20
R	.100	.180	2.54	4.57
S	.660	.690	16.76	17.53
T	.590	.620	14.99	15.75
U	.065	.080	1.65	2.03

All leads and tabs are tin plated

ISOPLUS™ Packages with Internal Alumina DCB Isolation*



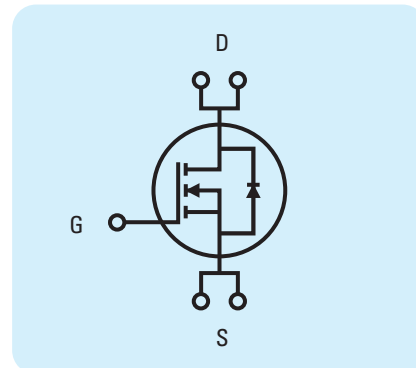
- Provides 2500V, UL recognized isolation with superior thermal performance (E153432).
- Improves temperature and power cycling capability.
- Cost effective clip mounting.

* IXYS Patented Packages, Patent No. 6,404,065

Example Part + Isolation Medium	R _{th(J-C)}	R _{th(C-S)}	R _{th(J-S)}
IXFP14N60P with SIL-PAD 2000™	0.42 C/W	2.37 C/W	2.79 C/W
IXFC14N60P (ISOPLUS247™ with Internal DCB Isolation)	R _{th(J-DCB)} 0.75 C/W	R _{th(DCB-Case)} 0.50 C/W	0.21 C/W, 1.46 C/W

□ – Denotes Inclusion of Isolation Boundary.

Schematic of High Current TrenchMV™ Power MOSFET in 5-lead ISOPLUS i4-Pak™



- For more information regarding IXYS ISOPLUS Packages, visit www.ixys.com/AN505.pdf
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