

2500V/4000V Very High Voltage (VHV) IGBTs

SIMPLIFY DESIGN, REDUCE COST AND IMPROVE RELIABILITY FOR HIGH VOLTAGE APPLICATIONS

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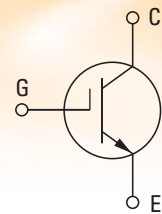
Description

IXYS offers a unique series of discrete 2500V and 4000V VHV IGBTs providing a myriad of benefits to system designers in high voltage applications. The very high voltage and current ratings of these parts, coupled with simplified MOS Gate-Control greatly reduce the complexity of high voltage switching. These parts are offered in IXYS ISOPLUS™ packaging to enable simpler mounting with improved reliability.

IXYS VHV IGBTs vastly simplify the circuitry needed for switching in high voltage designs. They can enable the use of a single device in systems whose circuits use multiple cascoded lower voltage switches. This device consolidation reduces the numbers of power devices, while also improving cost and efficiency by eliminating complex drive and voltage balancing components. In those applications using high voltage thyristors, designers sacrifice the ability to easily turn-off the switch without greatly increasing circuit complexity. VHV IGBTs have the ability to turn switch current on and off, enabling the designer to implement signal modulation schemes for improved efficiency and wave shaping, as well as enabling load disconnect for improved systems safety.

IXYS proprietary ISOPLUS discrete packaging improves the simplicity, reliability and efficiency of high voltage systems. The previously offered IXL19N250A comes in IXYS ISOPLUS i4-Pac™, while the IXL40N400 is offered in IXYS newly designated ISOPLUS i5-PAC™. All of IXYS ISOPLUS packages are manufactured with an internal DCB isolated substrate, are UL registered and provide integral backside case isolation. These packages provide for improved creepage distance to simplify compliance with regulatory spacing requirements. Their ceramic substrate enhances device reliability by greatly improving thermal and power cycling. An isolated backside simplifies mounting and with superior isolated thermal impedance. Thermal performance can be further improved by combining IXYS ISOPLUS package use with clip mounting and next generation phase change interface materials. More information on the IXYS ISOPLUS™ technology can be found on the IXYS website or the IXYS 2004/5 Selector Guide, page 23.

A broad range of high voltage applications stand to benefit from the simplicity offered by these convenient, discrete VHV IGBTs. Automated Test Equipment generating or measuring high voltage, pulse circuits and capacitor discharge applications, high voltage power supplies, laser and x-ray generation systems can all be designed more simply, with reduced cost and complexity. Traditional high voltage EMRs and discharge relays also can be replaced, reducing system complexity and improving overall reliability.



IGBT

IXLF19N250A
IXEL40N400

Features

- Very High Voltage Ratings – 2500V, 4000V
- High Current Ratings – 19A, 40A
- ISOPLUS i4-Pac™ and i5-Pac™ – Superior Isolated Packaging
- MOS Gate Turn-on

Applications

- Pulsed Circuits, Capacitor Discharge
- High Voltage Power Supplies
- High Voltage EMR, Discharge Relay Replacement
- High Voltage Test Equipment
- Laser and X-Ray Generators

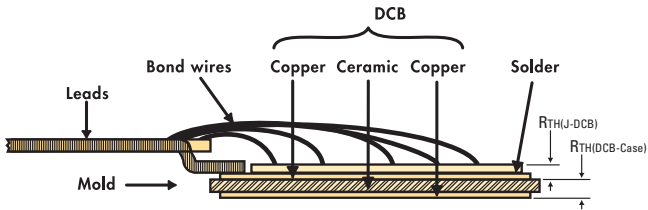
Benefits

- Replace Multiple Cascoded MOSFETs or IGBTs
- Replace High Voltage Thyristors, Enabling True Switching
- Simplify Package Isolation With 2500VRMS Isolation
- Improved Lead to Lead Creepage Distance
- UL Registered Packages
- Superior Isolated Thermal Impedance in Discrete Packaging
- Improved Reliability, Power Cycling

SUMMARY TABLE

Part Number	V _{CES}	I _C @ T _C = 90°C, (I _{C90})	V _{CE(sat, max)} @ 25°C, I _{C90}	E _{off(inductive, typ)} ™ T _J = 125°C, I _{C90} / V _{CE}	R _{TH,JC}	Package
IXLF19N250A	2500V	19A	3.90V	30mJ / 1500V	0.50°C/W	ISOPLUS i4-PAC™
IXEL40N400	4000V	40A	4.00V	220mJ / 2800V	0.33°C/W	ISOPLUS i5-PAC™

ISOPLUS™ Packages with Internal Alumina DCB Isolation*



Provides 2500V, UL recognized isolation with superior thermal performance (E153432).

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

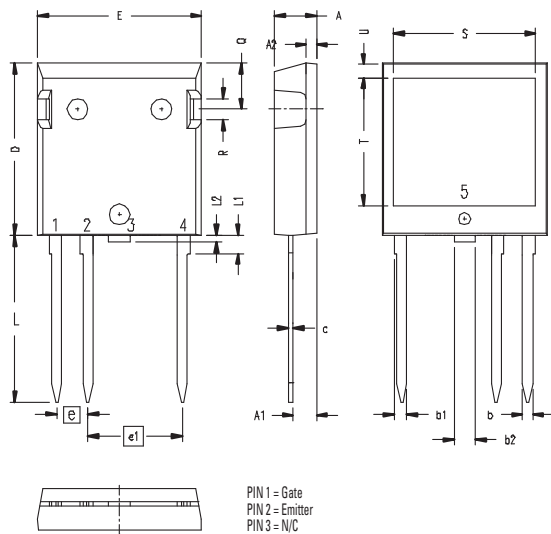
Example Part + Isolation Medium	R _{TH(J-C)}	R _{TH(C-S)}	R _{TH(J-S)}
IXFX55N50 + SIL-PAD 2000™	0.22 K/W	1.02 K/W	1.24 K/W
IXFR55N50 (ISOPLUS247™ with Internal DCB Isolation)	R _{TH(J-DCB)} 0.22 K/W	R _{TH(DCB-Case)} 0.15 K/W	0.15 K/W

□ – Denotes Inclusion of Isolation Boundary.

- Improves temperature cycling and power cycling capability.
- Cost effective clip mounting.

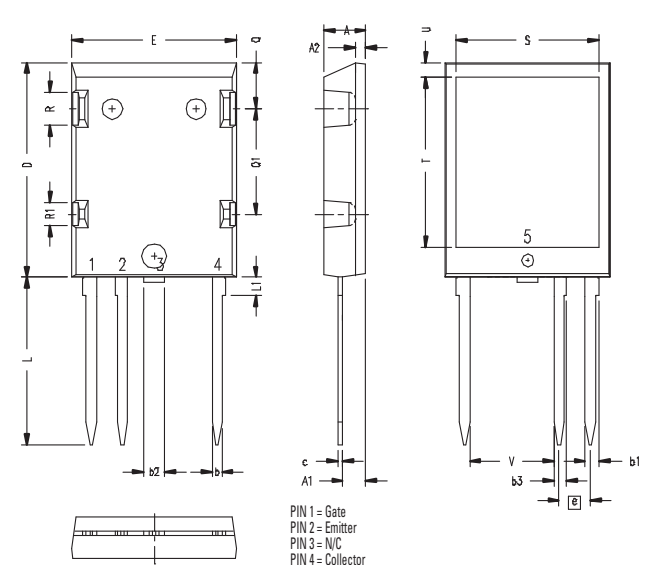
Package Outline Drawings

ISOPLUS i4-Pac™



PIN 1 = Gate
 PIN 2 = Emitter
 PIN 3 = N/C
 PIN 4 = Collector
 TAB 5 = Electrically isolated 2,500V-

ISOPLUS i5-Pac™



PIN 1 = Gate
 PIN 2 = Emitter
 PIN 3 = N/C
 PIN 4 = Collector
 TAB 5 = Electrically isolated 2,500V-

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	
e1	.450 BSC		11.43 BSC	

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
L	.780	.840	19.81	21.34
L1	.083	.102	2.11	2.59
L2	0	.050	0	1.27
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

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.102	.118	2.59	3.00
A2	.046	.055	1.17	1.40
b	.045	.065	1.14	1.40
b1	.063	.072	1.60	1.83
b2	.100	.110	2.54	2.79
b3	.058	.068	1.47	1.73
c	.020	.029	0.51	0.74
D	1.020	1.040	25.91	26.42
E	.770	.799	19.56	20.29

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
e	.150 BSC		3.81 BSC	
L	.780	.820	19.81	20.83
L1	.080	.102	2.03	2.59
Q	.210	.235	5.33	5.97
Q1	.490	.513	12.45	13.03
R	.150	.180	3.81	4.57
R1	.100	.130	2.54	3.30
S	.668	.690	16.97	17.53
T	.801	.821	20.34	20.85
U	.065	.080	1.65	2.03
V	.398	.406	10.11	10.31

LEAD FINISH: Pb FREE SOLDER DIP

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