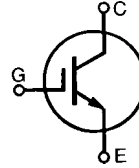


# HiPerFAST™ IGBT ISOPLUS247™

## IXGR 12N60C

(Electrically Isolated Back Surface)



$$V_{CES} = 600 \text{ V}$$

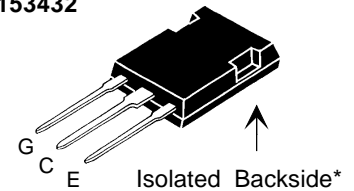
$$I_{C25} = 15 \text{ A}$$

$$V_{CE(sat)} = 2.7 \text{ V}$$

$$t_{fi(typ)} = 55 \text{ ns}$$

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	600	V
$V_{CGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GE} = 1 \text{ M}\Omega$	600	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	15	A
$I_{C90}$	$T_C = 90^\circ\text{C}$	8	A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1 ms	48	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15 \text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 33 \Omega$ Clamped inductive load, $L = 300 \mu\text{H}$	$I_{CM} = 24$ @ $0.8 V_{CES}$	A
$P_C$	$T_C = 25^\circ\text{C}$	55	W
$T_J$		-40 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-40 ... +150	$^\circ\text{C}$
$V_{ISOL}$	Isolation Voltage	2500	V
<b>Weight</b>		5	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$

### ISOPLUS 247



G = Gate      C = Drain  
E = Source

\* Patent pending

### Features

- Silicon chip on Direct-Copper-Bond substrate
- High power dissipation
- Isolated mounting surface
- 2500V electrical isolation
- Low collector to tab capacitance (<35pF)
- 3rd generation HDMOS™ process
- $V_{CE(sat)}$
- Rugged polysilicon gate cell structure

### Applications

- PFC circuits
- AC motor control
- Switched-mode and resonant-mode power supplies, UPS, no screws, or isolation foils
- DC choppers

### Advantages

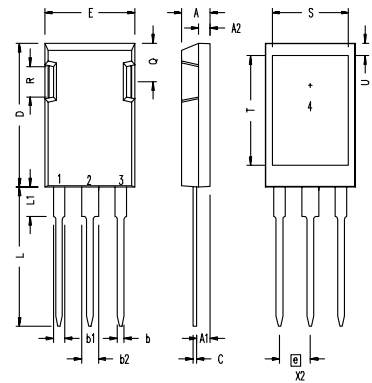
- Easy assembly
- Low capacitance to ground, low EMI

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 250 \mu\text{A}$ , $V_{GE} = 0 \text{ V}$	600		V
$V_{GE(th)}$	$I_C = 250 \mu\text{A}$ , $V_{CE} = V_{GE}$	2.5		V
$I_{CES}$	$V_{CE} = 0.8 V_{CES}$ , $T_J = 25^\circ\text{C}$ $V_{GE} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$			200 $\mu\text{A}$ 1.5 mA
$I_{GES}$	$V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_T$ , $V_{GE} = 15 \text{ V}$			2.7 V

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$g_{fs}$	$I_C = I_T; V_{CE} = 10\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$	7	11	S
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		860	pF
$C_{oes}$			64	pF
$C_{res}$			15	pF
$Q_g$	$I_C = I_T, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		32	nC
$Q_{ge}$			10	nC
$Q_{gc}$			10	nC
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = I_T, V_{GE} = 15\text{ V}, L = 300\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 18\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 V_{CES}$ , higher $T_J$ or increased $R_G$		20	ns
$t_{ri}$			20	ns
$t_{d(off)}$			60	ns
$t_{fi}$			55	ns
$E_{off}$			0.09	mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = I_T, V_{GE} = 15\text{ V}, L = 300\ \mu\text{H}$ $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 18\ \Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 V_{CES}$ , higher $T_J$ or increased $R_G$		20	ns
$t_{ri}$			20	ns
$E_{on}$			0.15	mJ
$t_{d(off)}$			85	180 ns
$t_{fi}$			85	180 ns
$E_{off}$			0.27	0.60 mJ
$R_{thJC}$			2.27	KW
$R_{thCK}$		0.15		KW

Note:  $I_T = 12\text{ A}$

### ISOPLUS247 OUTLINE



1 Gate, 2 Drain (Collector)  
3 Source (Emitter)  
4 no connection

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A <sub>1</sub>	2.29	2.54	.090	.100
A <sub>2</sub>	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b <sub>1</sub>	1.91	2.13	.075	.084
b <sub>2</sub>	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	.244
R	4.32	4.83	.170	.190

IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETS and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715 6,306,728B1  
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025