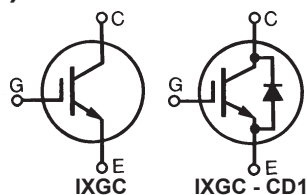


HiPerFAST™ IGBT ISOPLUS247™

IXGC 12N60C
IXGC 12N60CD1

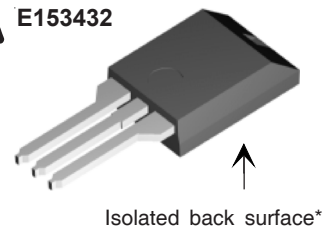
(Electrically Isolated Back Surface)

$$\begin{aligned} V_{CES} &= 600 \text{ V} \\ I_{C25} &= 15 \text{ A} \\ V_{CE(sat)} &= 2.7 \text{ V} \\ t_{fi(typ)} &= 55 \text{ ns} \end{aligned}$$



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	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$	15	A
I_{C90}	$T_C = 90^\circ\text{C}$	8	A
I_{CM}	$T_C = 25^\circ\text{C}, 1 \text{ ms}$	48	A
SSOA (RBSOA)	$V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 33 \Omega$ Clamped inductive load, $L = 300 \mu\text{H}$	$I_{CM} = 24$ @ $0.8 V_{CES}$	A
P_c	$T_C = 25^\circ\text{C}$	85	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
Weight		2	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$

ISOPLUS220™
E153432



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

See IXGA12N60C data sheet for IGBT characteristic curves

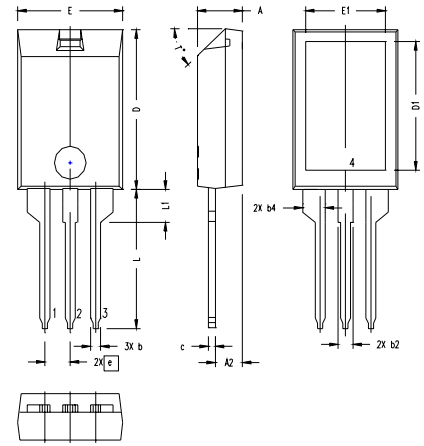
Symbol	Test Conditions	Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
		min.	typ.	max.
BV_{CES}	$I_C = 250 \mu\text{A}, V_{GE} = 0 \text{ V}$	600		V
$V_{GE(th)}$	$I_C = 250 \mu\text{A}, V_{GE} = V_{GE}$	2.5		5.0 V
I_{CES}	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$ $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$			200 μA 1.5 mA
I_{GES}	$V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_T, V_{GE} = 15 \text{ V}$	2.1	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, $t \leq 300\text{ }\mu\text{s}$, 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
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = I_T, V_{GE} = 15\text{ V}, L = 300\text{ }\mu\text{H}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = R_{off} = 18\text{ }\Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, 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
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = I_T, V_{GE} = 15\text{ V}, L = 300\text{ }\mu\text{H}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = R_{off} = 18\text{ }\Omega$ Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$, 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}				1.6 K/W
R_{thCK}			0.25	K/W

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

Reverse Diode (FRED) (IXGC12N60CD1 ONLY)		Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified)		
Symbol	Test Conditions	min.	typ.	max.
V_F	$I_F = 15\text{ A}; T_{VJ} = 150^\circ\text{C}$ $T_{VJ} = 25^\circ\text{C}$		1.7	V 2.5 V
I_{RM}	$V_R = 100\text{ V}; I_F = 25\text{ A}; -di_F/dt = 100\text{ A}/\mu\text{s}$ $L \leq 0.05\text{ }\mu\text{H}; T_{VJ} = 100^\circ\text{C}$		2	2.5 A
t_{rr}	$I_F = 1\text{ A}; -di_F/dt = 50\text{ A}/\mu\text{s};$ $V_R = 30\text{ V}; T_J = 25^\circ\text{C}$		35	ns
R_{thJC}	Diode			1.6 K/W

ISOPLUS 220 Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.157	.197	4.00	5.00
A2	.098	.118	2.50	3.00
b	.035	.051	0.90	1.30
b2	.049	.065	1.25	1.65
b4	.093	.100	2.35	2.55
c	.028	.039	0.70	1.00
D	.591	.630	15.00	16.00
D1	.472	.512	12.00	13.00
E	.394	.433	10.00	11.00
E1	.295	.335	7.50	8.50
e	.100 BASIC		2.55 BASIC	
L	.512	.571	13.00	14.50
L1	.118	.138	3.00	3.50
T*			42.5°	47.5°

Notes:

- Lead 1 = Gate
- Lead 2 = Collector
- Lead 3 = Emitter
- Back surface 4 is electrically isolated from leads 1, 2 & 3

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 6,259,123B1 6,306,728B1
 4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025 6,404,065B1 6,162,665 6,534,343