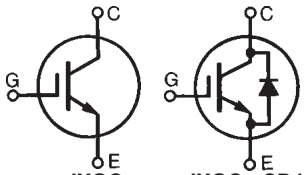
IXYS

ADVANCE TECHNICAL INFORMATION

HiPerFAST™ IGBT
ISOPLUS247™
(Electrically Isolated Back Surface)

IXGC 12N60C
IXGC 12N60CD1

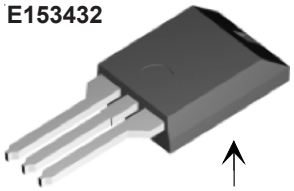
V_{CES} = 600 V
I_{C25} = 15 A
$V_{CE(sat)}$ = 2.7 V
$t_{fi(typ)}$ = 55 ns



IXGC IXGC - CD1

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	15	A
I_{C90}	T_C = 90°C	8	A
I_{CM}	T_C = 25°C, 1 ms	48	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 33 Ω Clamped inductive load, L = 300 μH	I_{CM} = 24 @ 0.8 V_{CES}	A
P_C	T_C = 25°C	85	W
T_J		-40 ... +150	°C
T_{JM}		150	°C
T_{stg}		-40 ... +150	°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	°C

ISOPLUS220™
E153432



Isolated back surface*

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

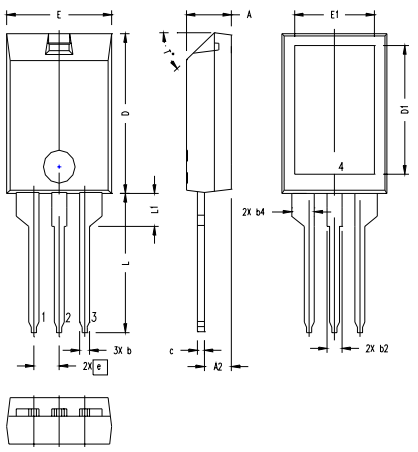
See IXGA12N60C data sheet for IGBT characteristic curves

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
BV_{CES}	I_C = 250 μA, V_{GE} = 0 V	600			V
$V_{GE(th)}$	I_C = 250 μA, V_{GE} = V_{GE}	2.5		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES} T_J = 25°C V_{GE} = 0 V T_J = 125°C			200 1.5	μA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V			±100	nA
$V_{CE(sat)}$	I_C = I_T, V_{GE} = 15 V		2.1	2.7	V

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	$I_C = I_T$; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	7	11		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		860		pF
C_{oes}			64		pF
C_{res}			15		pF
Q_g	$I_C = I_T$, V_{GE} = 15 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°C**		20		ns
t_{ri}	$I_C = I_T$, V_{GE} = 15 V, L = 300 µH		20		ns
$t_{d(off)}$	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 18 Ω		60		ns
t_{fi}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		55		ns
E_{off}			0.09		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		20		ns
t_{ri}	$I_C = I_T$, V_{GE} = 15 V, L = 300 µH		20		ns
E_{on}	V_{CE} = 0.8 • V_{CES}, $R_G = R_{off}$ = 18 Ω		0.15		mJ
$t_{d(off)}$	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G		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 = 12A

ISOPLUS 220 Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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:
1. Lead 1 = Gate
2. Lead 2 = Collector
3. Lead 3 = Emitter
4. Back surface 4 is electrically isolated from leads 1, 2 & 3

Reverse Diode (FRED) (IXGC12N60CD1 ONLY)

Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
V_F	I_F = 15A; T_{VJ} = 150°C		1.7		V
	T_{VJ} = 25°C			2.5	V
I_{RM}	V_R = 100 V; I_F =25A; -di_F/dt = 100 A/µs L ≤ 0.05 µH; T_{VJ} = 100°C		2	2.5	A
t_{rr}	I_F = 1 A; -di/dt = 50 A/µs; V_R = 30 V T_J = 25°C		35		ns
R_{thJC}	Diode			1.6	K/W