IXYS

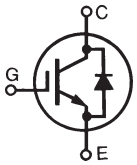
Preliminary Technical Information

High-Gain IGBT w/ Diode

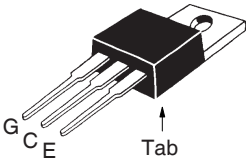
IXGP30N60B4D1

V_{CES} = 600V
I_{C110} = 30A
$V_{CE(sat)}$ ≤ 1.7V
$t_{fi(typ)}$ = 88ns

High-Speed PT Trench IGBT



TO-220



G = Gate C = Collector
E = Emitter Tab = Collector

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} = 1MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	56	A
I_{C110}	T_C = 110°C	30	A
I_{F110}	T_C = 110°C	10	A
I_{CM}	T_C = 25°C, 1ms	156	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 10Ω Clamped Inductive Load	I_{CM} = 48 @ ≤ V_{CES}	A
P_C	T_C = 25°C	190	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
M_d	Mounting Torque	1.13/10	Nm/lb.in.
Weight		3	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	4.0		6.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			10	μA
	T_J = 125°C			500	μA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 24A, V_{GE} = 15V, Note 1		1.5	1.7	V
	T_J = 125°C		1.5		V

Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- Anti-Parallel Ultra Fast Diode
- International Standard Package

Advantages

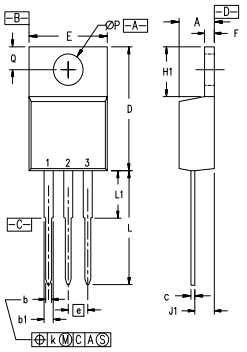
- High Power Density
- Low Gate Drive Requirement

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- DC Choppers
- AC Motor Speed Drives
- DC Servo and Robot Drives
- PFC Circuits

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 24A, V_{CE} = 10V, Note 1	10	17		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		860		pF
C_{oes}			70		pF
C_{res}			29		pF
Q_g	I_C = 24A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		77		nC
Q_{ge}			9		nC
Q_{gc}			33		nC
$t_{d(on)}$	**Inductive Load, T_J = 25°C**		21		ns
t_{ri}	I_C = 24A, V_{GE} = 15V		34		ns
E_{on}	V_{CE} = 400V, R_G = 10Ω		0.44		mJ
$t_{d(off)}$	Note 2		200		ns
t_{fi}			88		ns
E_{off}			0.70	1.30	mJ
$t_{d(on)}$	**Inductive Load, T_J = 125°C**		20		ns
t_{ri}	I_C = 24A, V_{GE} = 15V		33		ns
E_{on}	V_{CE} = 400V, R_G = 10Ω		0.75		mJ
$t_{d(off)}$	Note 2		288		ns
t_{fi}			223		ns
E_{off}			1.50		mJ
R_{thJC}				0.66	°C/W
R_{thCS}			0.50		°C/W

TO-220 (IXGP) Outline



Pins: 1 - Gate 2 - Collector
3 - Emitter

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 10A, V_{GE} = 0V, Note 1			2.66	V
	T_J = 150°C			1.66	V
I_{RM}	I_F = 12A, V_{GE} = 0V,		2.5		A
t_{rr}	$-di_F/dt$ = 100A/µs, V_R = 100V, T_J = 125°C		110		ns
t_{rr}	I_F = 1A, V_{GE} = 0V, $-di_F/dt$ = 100A/µs, V_R = 30V		30		ns
R_{thJC}				2.5	°C/W

Notes:

1. Pulse test, t ≤ 300µs, duty cycle, d ≤ 2%.
2. Switching times & energy losses may increase for higher V_{CE}(clamp), T_J or R_G.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.