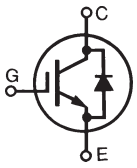
IXYS

Preliminary Technical Information

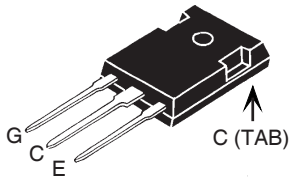
High Voltage IGBTs w/Diode

IXGH24N170AH1
IXGT24N170AH1

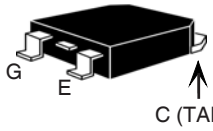
V_{CES} = 1700V
I_{C25} = 24A
$V_{CE(sat)}$ ≤ 6.0V
$t_{fi(typ)}$ = 40ns



TO-247 (IXGH)



TO-268 (IXGT)



G = Gate C = Collector
E = Emitter TAB = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	1700	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1700	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	24	A
I_{C90}	T_C = 90°C	16	A
I_{CM}	T_C = 25°C, 1ms	75	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 10Ω Clamped Inductive Load	I_{CM} = 50 0.8 • V_{CES}	A V
t_{SC}	T_J = 125°C, V_{CE} = 1200V, V_{GE} = 15V, R_G = 22Ω	10	µs
P_C	T_C = 25°C	250	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10 seconds	260	°C
M_d	Mounting Torque (TO-247)	1.13/10	Nm/lb.in.
Weight	TO-247	6	g
	TO-268	4	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{GE} = 0V	1700			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = 0.8 • V_{CES}, V_{GE} = 0V			100	µA
	T_J = 125°C			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = 16A, V_{GE} = 15V, Note 1		4.5	6.0	V
	T_J = 125°C		4.8		V

Features

- Optimized for Low Conduction and Switching Losses
- Anti-Parallel Ultra Fast Diode
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

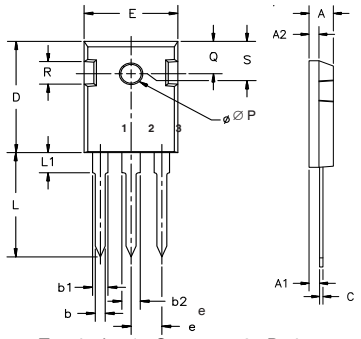
Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Welding Machines

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Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 24A, V_{CE} = 10V, Note 2	13	22		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		2860		pF
C_{oes}			198		pF
C_{res}			58		pF
Q_g	I_C = 16A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		140		nC
Q_{ge}			18		nC
Q_{gc}			60		nC
$t_{d(on)}$	**Inductive Load, T_J = 25°C**		21		ns
t_{ri}	I_C = 24A, V_{GE} = 15V		36		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 10Ω		2.97		mJ
$t_{d(off)}$	Note 1		336		ns
t_{fi}			40	80	ns
E_{off}			0.79	1.50	mJ
$t_{d(on)}$	**Inductive Load, T_J = 125°C**		23		ns
t_{ri}	I_C = 24A, V_{GE} = 15V		31		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 10Ω		3.60		mJ
$t_{d(off)}$	Note 1		360		ns
t_{fi}			96		ns
E_{off}			1.47		mJ
R_{thJC}				0.50	°C/W
R_{thCK}	(TO-247)		0.21		°C/W

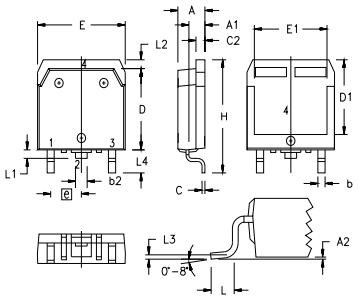
TO-247 (IXGH) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source Tab - Drain

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
ØP	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

TO-268 (IXGT) Outline



SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 20A, V_{GE} = 0V		2.5	2.95	V
	T_J = 125°C		2.5		V
I_{RM}	I_F = 20A, -di_F/dt = 150A/µs,		15		A
t_{rr}			80		ns
I_{RM}	V_R = 1200V, V_{GE} = 0V T_J = 125°C		20		A
t_{rr}			200		ns
R_{thJC}				0.9	°C/W

Notes:
1. Switching times may increase for V_{CE} (Clamp) > 0.5 • V_{CES}, higher T_J or increased R_G.
2. Pulse Test, t ≤ 300µs; Duty Cycle, d ≤ 2%.

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.

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 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ 25ºC

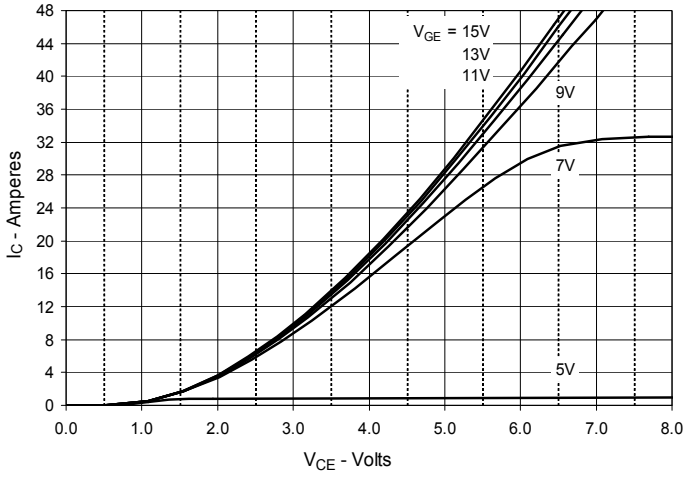


Fig. 2. Extended Output Characteristics @ 25ºC

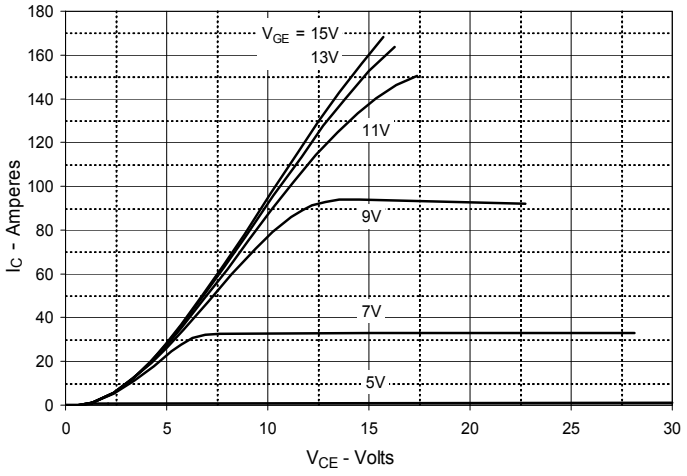


Fig. 3. Output Characteristics @ 125ºC

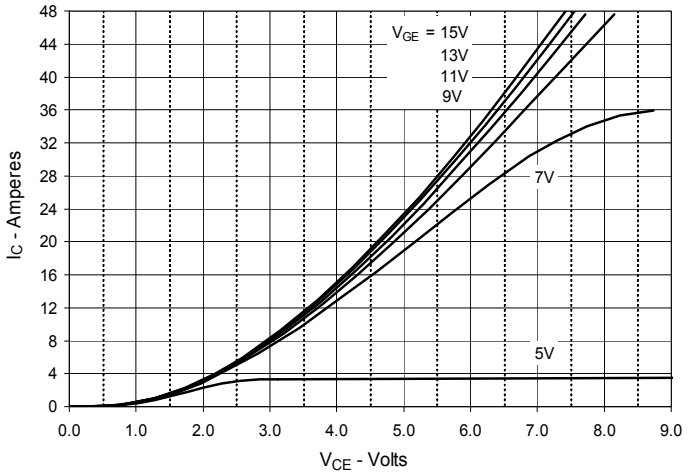


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

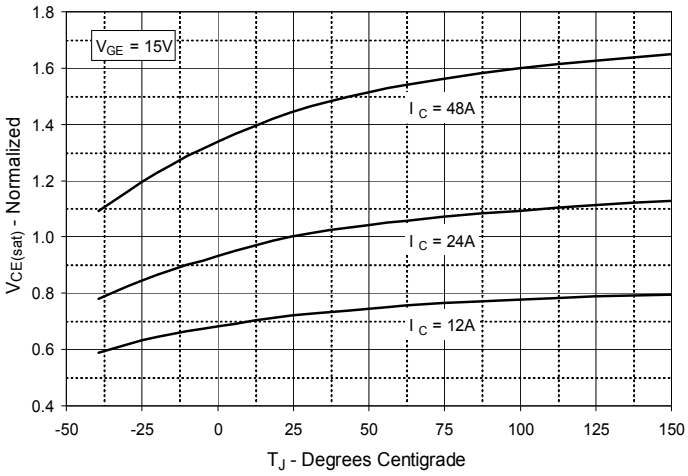


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

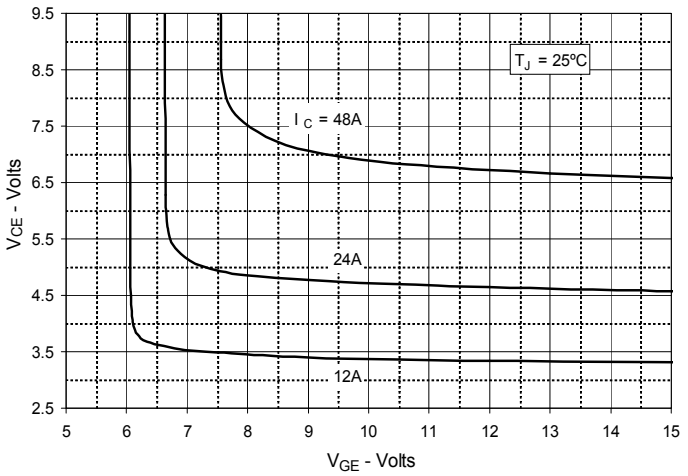
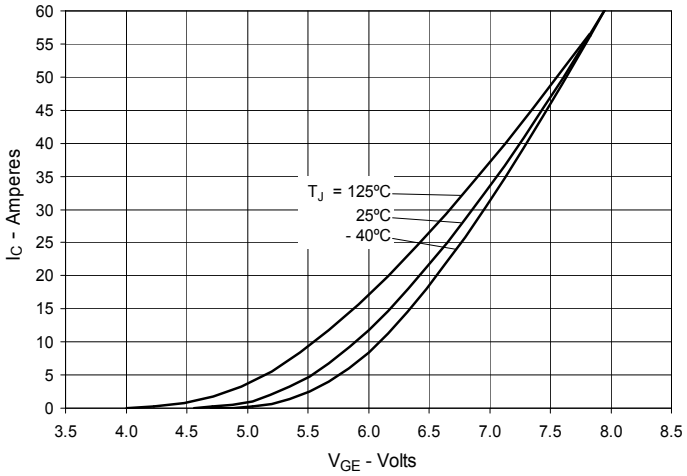


Fig. 6. Input Admittance



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Fig. 7. Transconductance

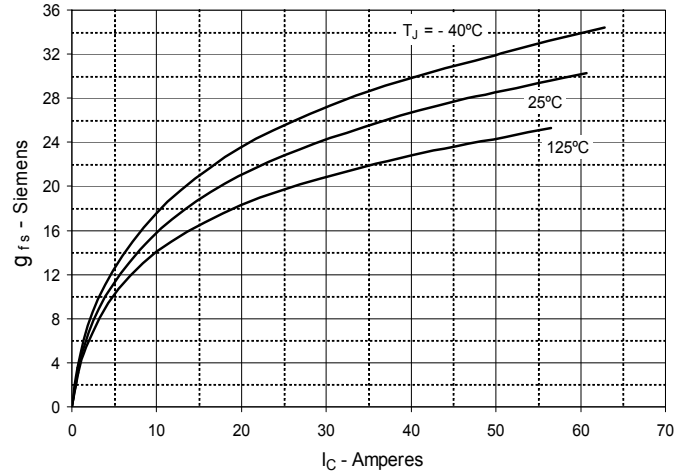


Fig. 8. Gate Charge

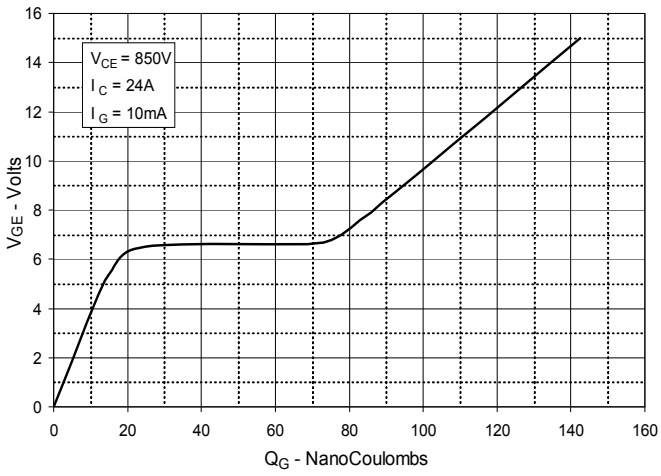


Fig. 9. Capacitance

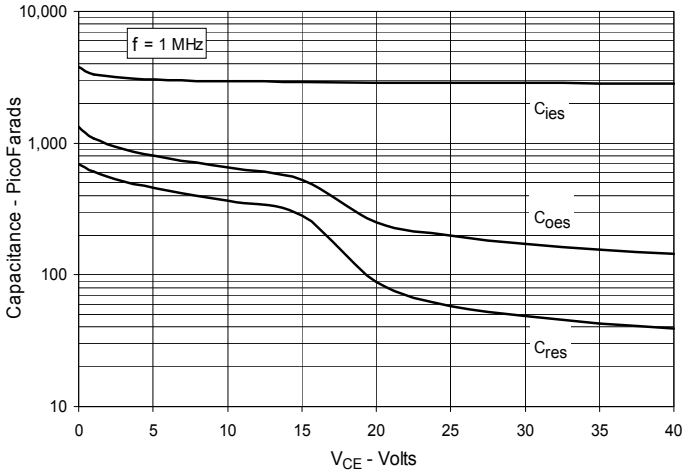


Fig. 10. Reverse-Bias Safe Operating Area

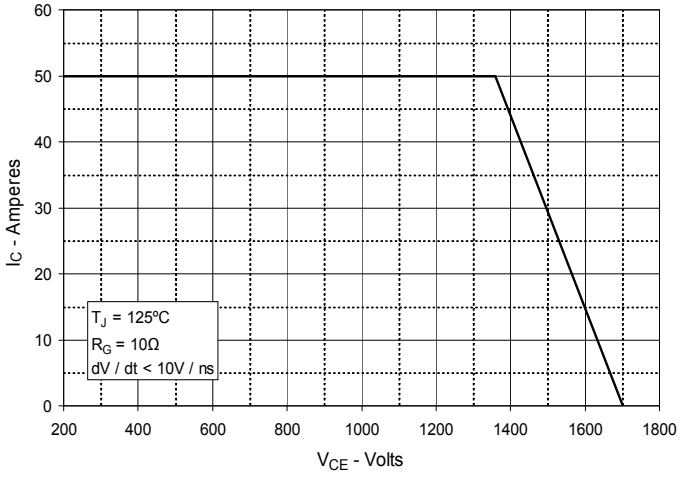
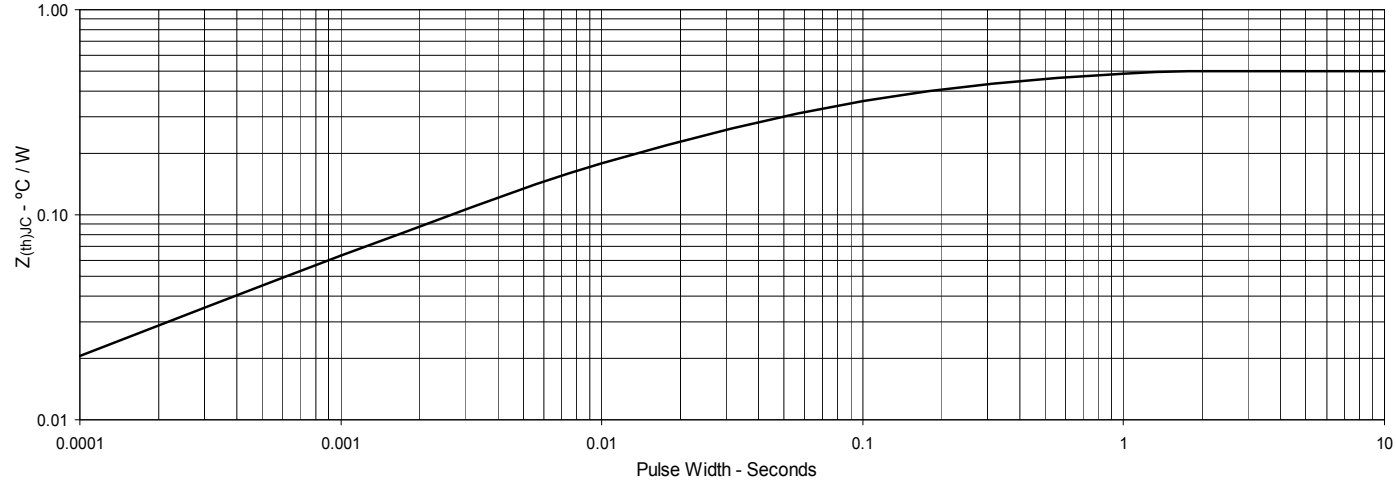


Fig. 11. Maximum Transient Thermal Impedance



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