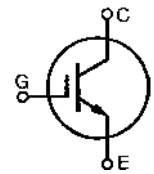
IXYS

HiPerFAST™ IGBT Lightspeed™ Series

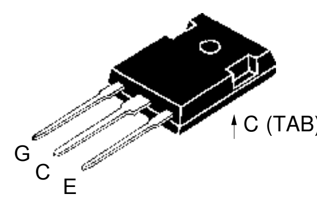
IXGH 12N90C
IXGX 12N90C

V_{CES}	=	900	V
I_{C25}	=	24	A
$V_{CES(sat)}$	=	3.0	V
$t_{fi(typ)}$	=	70	ns

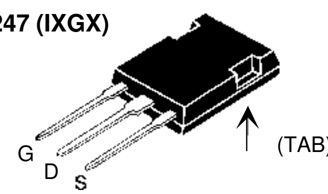


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	900	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	900	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	24	A
I_{C90}	T_C = 90°C	12	A
I_{CM}	T_C = 25°C, 1 ms	48	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 33 Ω Clamped inductive load	I_{CM} = 24 @ 0.8 V_{CES}	A
P_C	T_C = 25°C	100	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting torque with screw M3 Mounting torque with screw M3.5	0.45/4 Nm/lb.in. 0.55/5 Nm/lb.in.	
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C
Weight		6	g

TO-247 (IXGH)



PLUS 247 (IXGX)



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

Features

- Very high frequency IGBT
- New generation HDMOS™ process
- International standard package
- High peak current handling capability

Applications

- PFC circuit
- AC motor speed control
- DC servo and robot drives
- Switch-mode and resonant-mode power supplies
- High power audio amplifiers

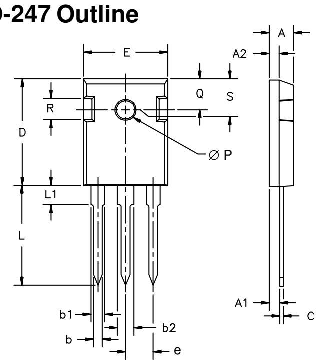
Advantages

- Fast switching speed
- High power density

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		900			V
$V_{GE(th)}$	I_C = 250 µA, V_{GE} = V_{GE}		2.5		5.0	V
I_{CES}	V_{CE} = V_{CES} V_{GE} = 0 V	T_J = 25°C T_J = 125°C			100 1.5	µA mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{CE90}, V_{GE} = 15 V				3.0	V

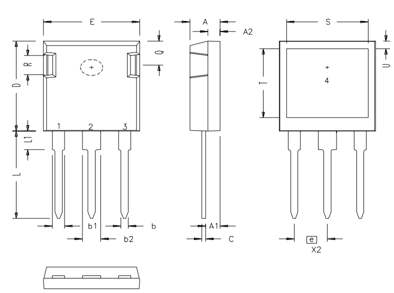
Symbol	Test Conditions	Characteristic Values (T_J = 25°C, unless otherwise specified) min.	typ.	max.	
g_{fs}	I_C = I_{C90}; V_{CE} = 10 V, Pulse test, t ≤ 300 µs, duty cycle ≤ 2 %	5	10		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		780		pF
C_{oes}			60		pF
C_{res}			15		pF
Q_g	I_C = I_{C90}, V_{GE} = 15 V, V_{CE} = 0.5 V_{CES}		33		nC
Q_{ge}			10		nC
Q_{gc}			12		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		20		ns
t_{ri}	I_C = I_{C90}, V_{GE} = 15 V		20		ns
$t_{d(off)}$	V_{CE} = 0.8 • V_{CES}, R_G = R_{off} = 22 Ω		135	200	ns
t_{fi}	Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or		70	180	ns
E_{off}	increased R_G		0.32	0.70	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		20		ns
t_{ri}	I_C = I_{C90}, V_{GE} = 15 V		20		ns
E_{on}	V_{CE} = 0.8 • V_{CES}, R_G = R_{off} = 22 Ω		0.15		mJ
$t_{d(off)}$	Remarks: Switching times may increase		200		ns
t_{fi}	for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or		150		ns
E_{off}	increased R_G		0.70		mJ
R_{thJC}				1.25	K/W
R_{thCK}	TO-247		0.25		K/W
	PLUS 247		0.15		K/W

TO-247 Outline



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
∅P	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	

PLUS 247 Outline



SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

1 – GATE
2 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)
4 – NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO–247AD except screw hole.

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

Fig. 1. Saturation Voltage Characteristics @ 25ºC

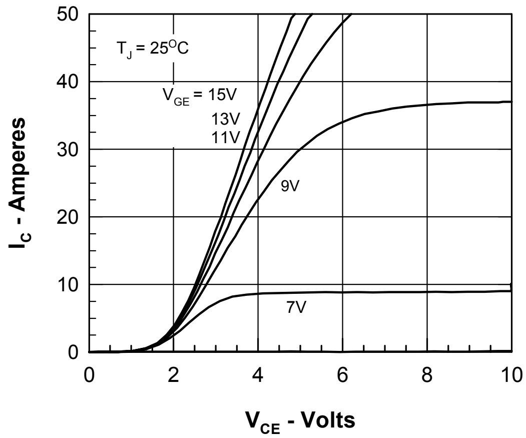


Fig. 2. Extended Output Characteristics

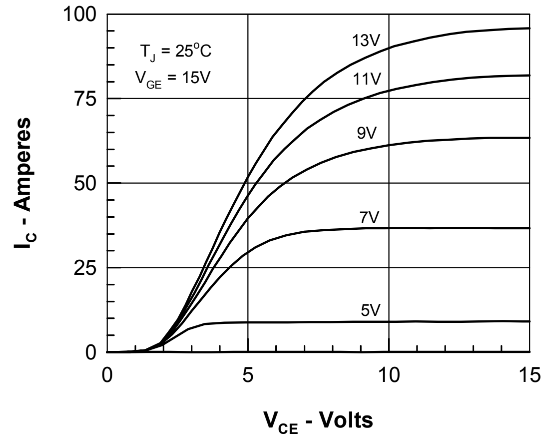


Fig. 3. Saturation Voltage Characteristics @ 125ºC

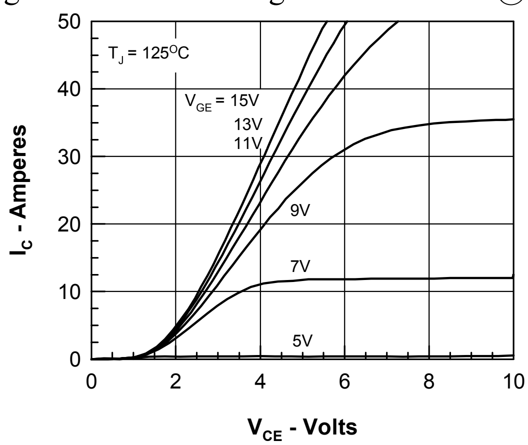


Fig. 4. Temperature Dependence of $V_{CE(SAT)}$

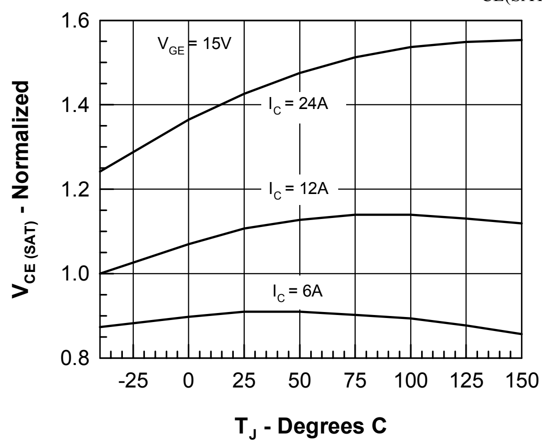


Fig. 5. Admittance Curves

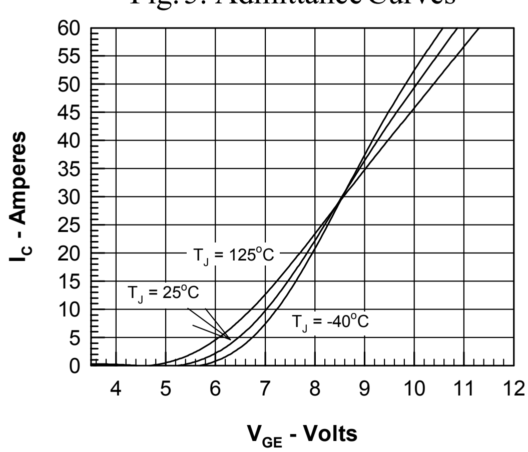


Fig. 6. Capacitance Curves

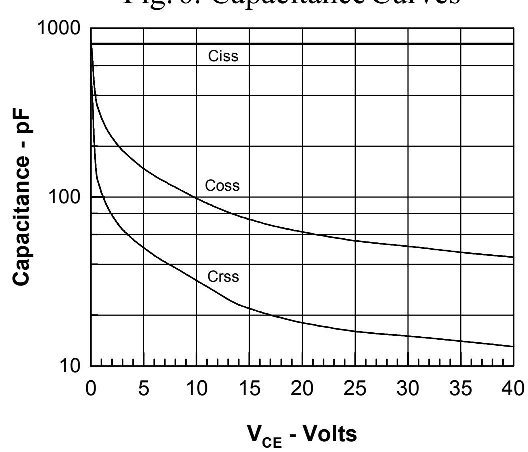


Fig. 7. Dependence of E_{OFF} on I_C

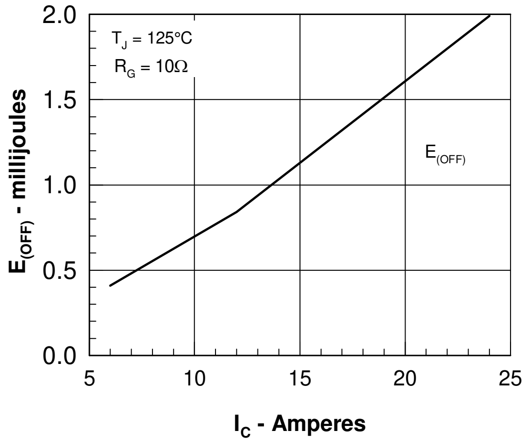


Fig. 8. Dependence of E_{OFF} on R_G

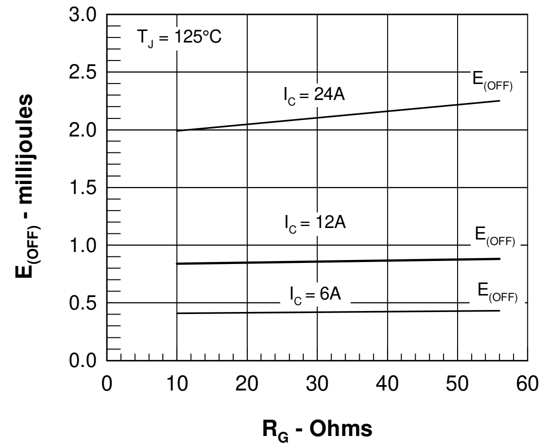


Fig. 9. Gate Charge

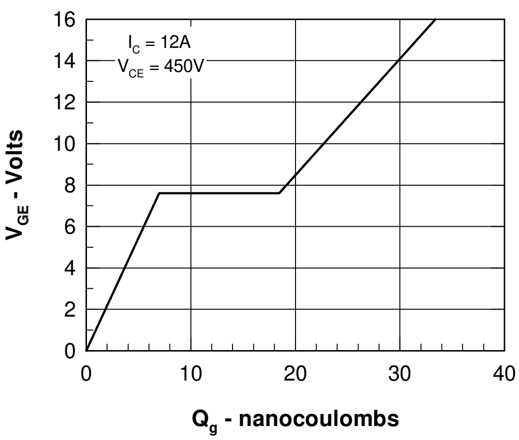


Fig. 10. Turn-off Safe Operating Area

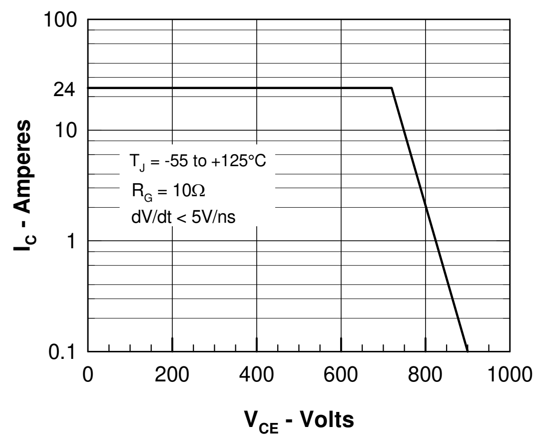
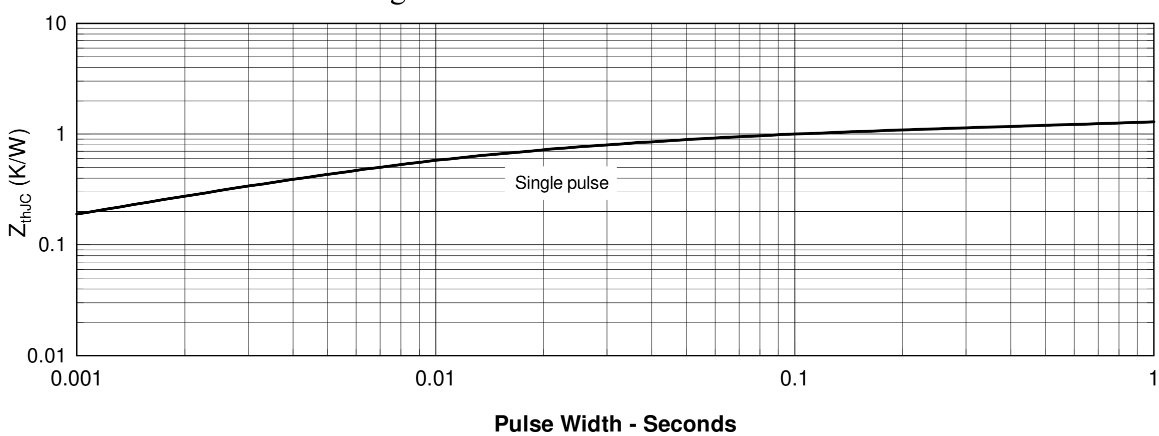


Fig. 11. Transient Thermal Resistance



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