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IXYS Corporation
IXGP12N60C

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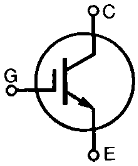
sales@integrated-circuit.com

IXYS

HiPerFAST™ IGBT

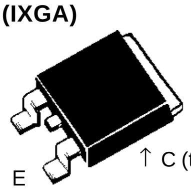
IXGA 12N60C
IXGP 12N60C

V_{CES}	=	600	V
I_{C25}	=	24	A
$V_{CE(sat)}$	=	2.7	V
$t_{fi(typ)}$	=	55	ns

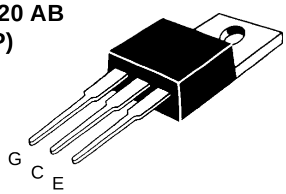


Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	600	V
V_{CGR}	T_J = 25°C to 150°C; R_{GE} = 1 MΩ	600	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	24	A
I_{C90}	T_C = 90°C	12	A
I_{CM}	T_C = 25°C, 1 ms	48	A
SSOA (RBSOA)	V_{GE} = 15 V, T_{VJ} = 125°C, R_G = 33 Ω Clamped inductive load, L = 300 µH	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 0.55/5	Nm/lb.in. Nm/lb.in.
Weight		4	g
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	°C

TO-263 AA (IXGA)



TO-220 AB (IXGP)



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

Symbol	Test Conditions		Characteristic Values Min.	Typ.	Max.	
(T_J = 25°C, unless otherwise specified)						
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			200	µA
	V_{GE} = 0 V	T_J = 125°C			1	mA
I_{GES}	V_{CE} = 0 V, V_{GE} = ±20 V				±100	nA
$V_{CE(sat)}$	I_C = I_{CE90}, V_{GE} = 15			2.1	2.7	V

Features

- Very high freqency IGBT
- New generation HDMOS™ process
- International standard package JEDEC TO-220AB and TO-263AA
- High peak current handling capability

Applications

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

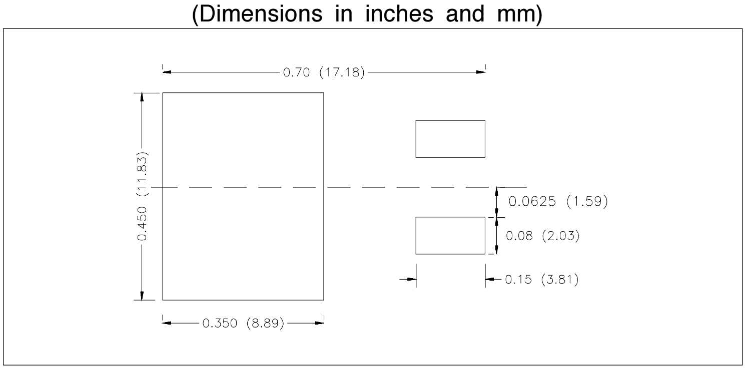
Advantages

- Fast switching speed
- High power density

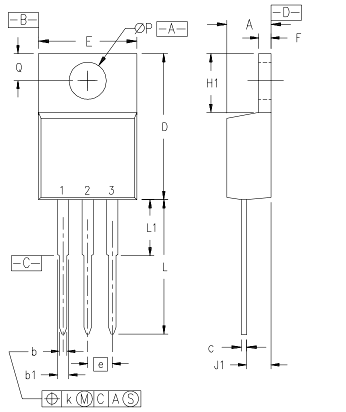
IXYS IXGA12N60C IXGP12N60C

Symbol	Test Conditions (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 %	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	$I_C = I_{C90}$, 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** $I_C = I_{C90}$, V_{GE} = 15 V, L = 300 µH V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 18 Ω Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 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°C** $I_C = I_{C90}$, V_{GE} = 15 V, L = 300 µH V_{CE} = 0.8 V_{CES}, $R_G = R_{off}$ = 18 Ω Remarks: Switching times may increase for V_{CE} (Clamp) > 0.8 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}				1.25	K/W
R_{thCK}			0.25		K/W

Min. Recommended Footprint
(Dimensions in inches and mm)



TO-220 AB Dimensions

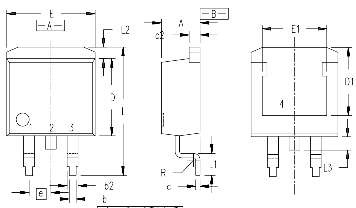


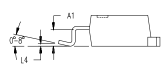
Pins: 1 - Gate 2 - Collector
3 - Emitter 4 - Collector
Bottom Side

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
∅P	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-220 AB.

TO-263 AA Outline





1. Gate
2. Collector
3. Emitter
4. Collector
Bottom Side

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.06	4.83	.160	.190
A1	2.03	2.79	.080	.110
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.46	0.74	.018	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	7.11	8.13	.280	.320
E	9.65	10.29	.380	.405
E1	6.86	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070
L4	0	0.38	0	.015
R	0.46	0.74	.018	.029

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

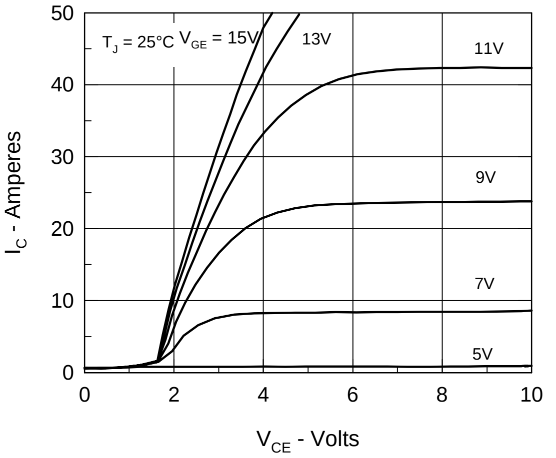


Fig. 1. Saturation Voltage Characteristics

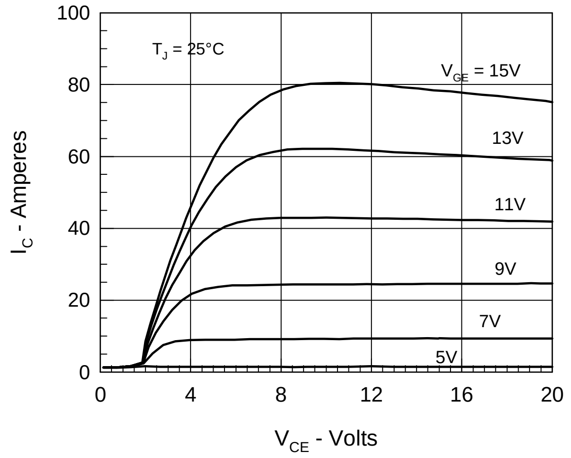


Fig. 2. Extended Output Characteristics

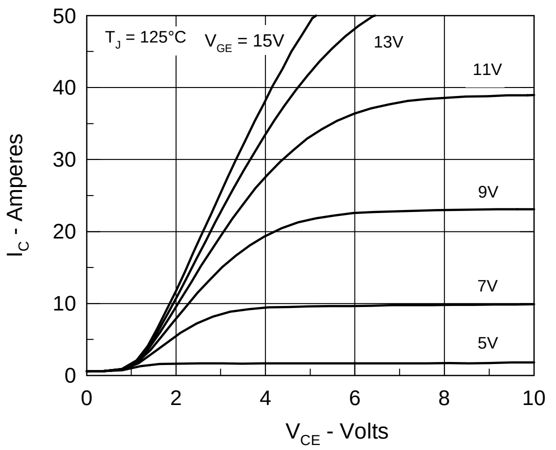


Fig. 3. Saturation Voltage Characteristics

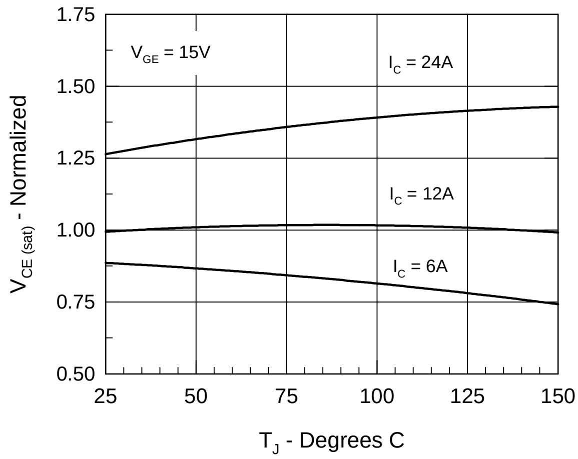


Fig. 4. Temperature Dependence of $V_{CE(sat)}$

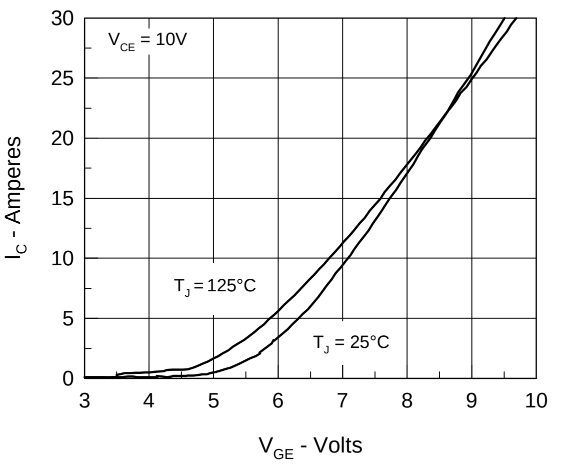


Fig. 5. Saturation Voltage Characteristics

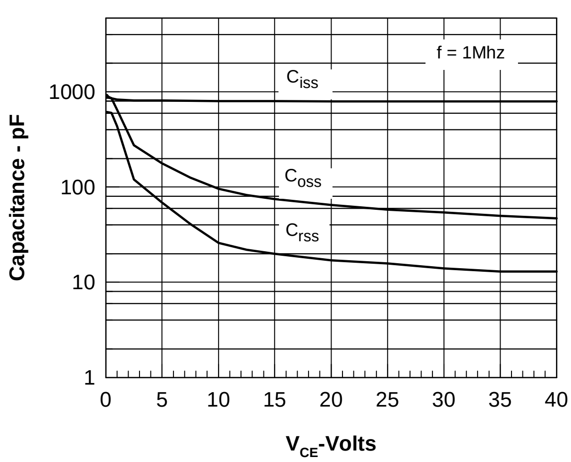


Fig. 6. Junction Capacitance Curves

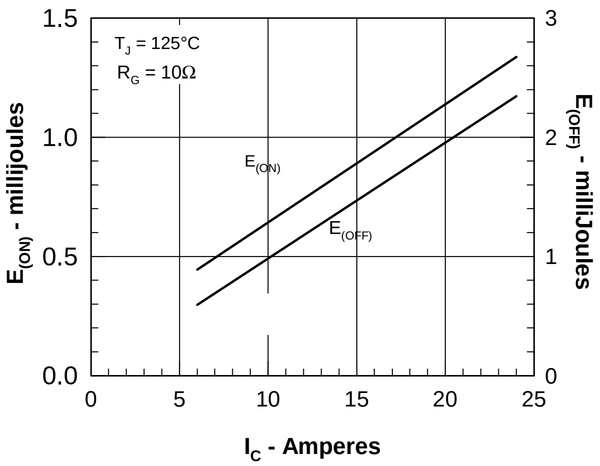


Fig. 7. Dependence of E_{ON} and E_{OFF} on I_C.

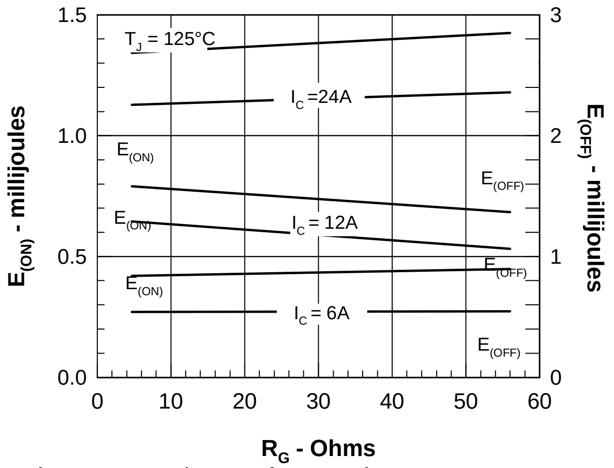


Fig. 8. Dependence of E_{ON} and E_{OFF} on R_G.

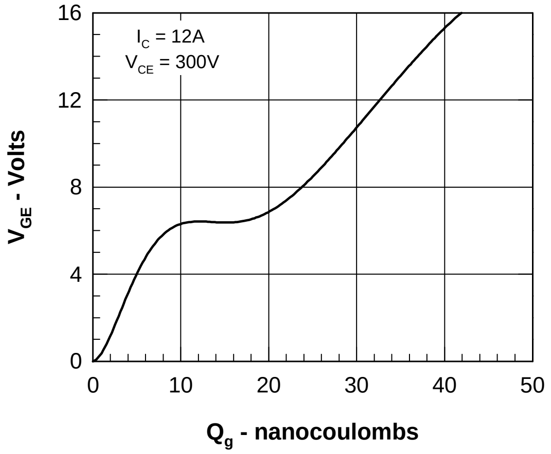


Fig. 9. Gate Charge

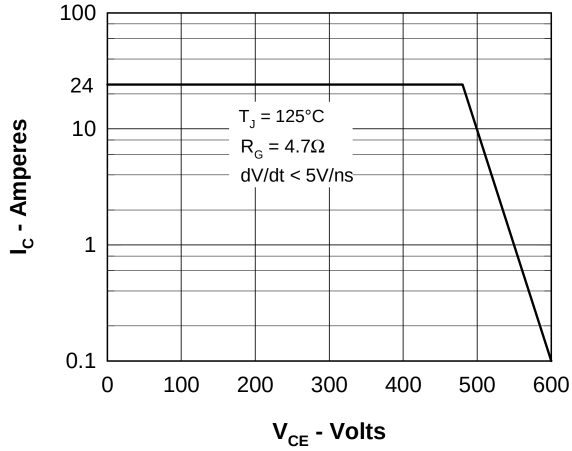


Fig. 10. Turn-off Safe Operating Area

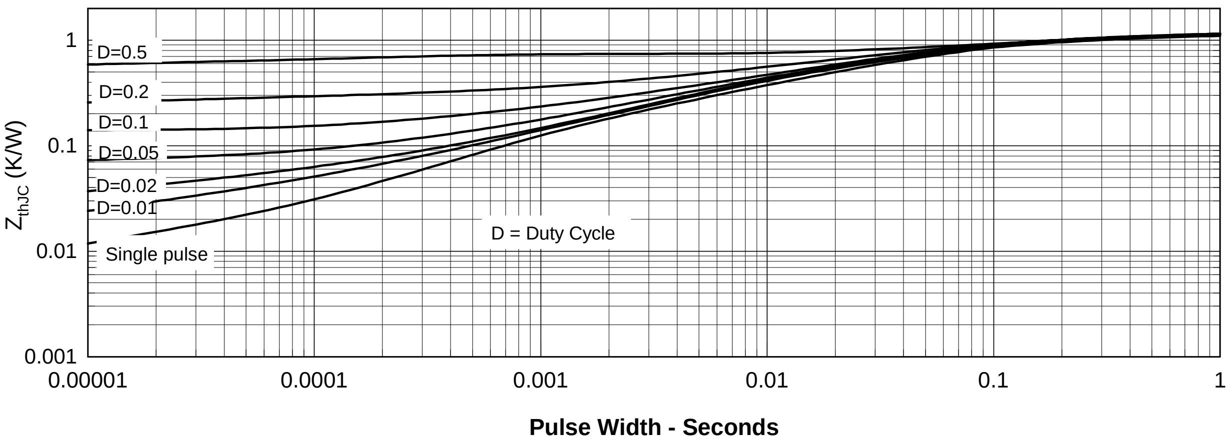


Fig. 11. Transient Thermal Resistance