

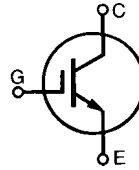
# IGBT

High Voltage, Low  $V_{CE(sat)}$

**IXGH 45N120**  
**IXGT 45N120**

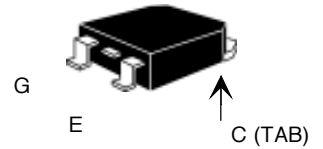
$V_{CES} = 1200 \text{ V}$   
 $I_{C25} = 75 \text{ A}$   
 $V_{CE(sat)} = 2.5 \text{ V}$   
 $t_{fi(typ)} = 390 \text{ ns}$

Preliminary data sheet

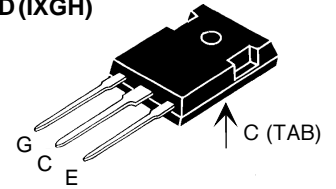


Symbol	Test Conditions	Maximum Ratings
$V_{CES}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}$	1200 V
$V_{CGR}$	$T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$	1200 V
$V_{GES}$	Continuous	$\pm 20 \text{ V}$
$V_{GEM}$	Transient	$\pm 30 \text{ V}$
$I_{C25}$	$T_C = 25^\circ\text{C}$ , limited by leads	75 A
$I_{C90}$	$T_C = 90^\circ\text{C}$	45 A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1 ms	180 A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15 \text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 5 \Omega$ Clamped inductive load	$I_{CM} = 90 \text{ A}$ @ $0.8 V_{CES}$
$P_C$	$T_C = 25^\circ\text{C}$	300 W
$T_J$		-55 ... +150 $^\circ\text{C}$
$T_{JM}$		150 $^\circ\text{C}$
$T_{stg}$		-55 ... +150 $^\circ\text{C}$
Maximum Lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300 $^\circ\text{C}$
Maximum Tab temperature for soldering SMD devices for 10 s		260 $^\circ\text{C}$
$M_d$	Mounting torque (M3)	1.13/10Nm/lb.in.
<b>Weight</b>	TO-247 AD	6 g
	TO-268	4 g

TO-268 (IXGT)



TO-247 AD (IXGH)



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

## Features

- International standard packages JEDEC TO-268 and JEDEC TO-247 AD
- High current handling capability
- MOS Gate turn-on - drive simplicity
- Molding epoxies meet UL 94 V-0 flammability classification

## Applications

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- Capacitor discharge

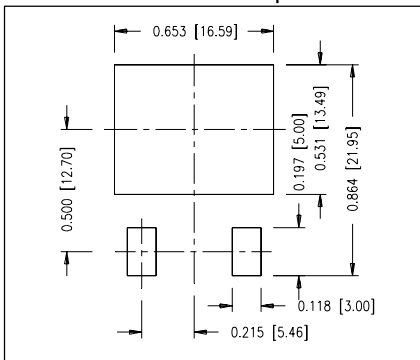
## Advantages

- High power density
- Suitable for surface mounting
- Easy to mount with 1 screw, (isolated mounting screw hole)

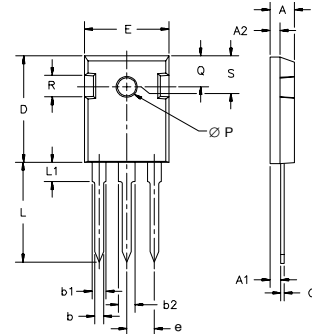
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 1 \text{ mA}$ , $V_{GE} = 0 \text{ V}$	1200		V
$V_{GE(th)}$	$I_C = 750 \mu\text{A}$ , $V_{CE} = V_{GE}$	2.5		5 V
$I_{CES}$	$V_{CE} = V_{CES}$ $V_{GE} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		250 $\mu\text{A}$
				2 mA
$I_{GES}$	$V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}$ , $V_{GE} = 15 \text{ V}$			2.5 V

Symbol	Test Conditions	Characteristic Values			
		$(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$			
		min.	typ.	max.	
$g_{fs}$	$I_C = I_{C90}, V_{CE} = 10\text{ V}$ , Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$	33	44	S	
$I_{C(ON)}$	$V_{GE} = 10\text{ V}, V_{CE} = 10\text{ V}$		220	A	
$C_{ies}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$		4700	pF	
$C_{oes}$		255	pF		
$C_{res}$		89	pF		
$Q_g$	$I_C = I_{C90}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		170	nC	
$Q_{ge}$		28	nC		
$Q_{gc}$		57	nC		
$t_{d(on)}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = I_{C90}, V_{GE} = 15\text{ V}$ $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 5\ \Omega$ Remarks: Switching times may increase for $V_{CE} (\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		55	ns	
$t_{ri}$		28	ns		
$t_{d(off)}$		370	800	ns	
$t_{fi}$		390	700	ns	
$E_{off}$		14	25	mJ	
$t_{d(on)}$		<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = I_{C90}, V_{GE} = 15\text{ V}$ $V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 5\ \Omega$ Remarks: Switching times may increase for $V_{CE} (\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$		64	ns
$t_{ri}$	32		ns		
$E_{on}$	3.0		mJ		
$t_{d(off)}$	660		ns		
$t_{fi}$	740		ns		
$E_{off}$	25		mJ		
$R_{thJC}$				0.42	KW
$R_{thCK}$	(TO-247)		0.25		KW

### Min Recommended Footprint

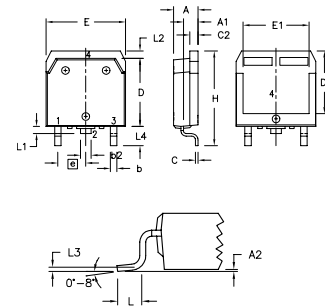


### TO-247 AD Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	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 Outline



Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.9	5.1	.193	.201
A <sub>1</sub>	2.7	2.9	.106	.114
A <sub>2</sub>	.02	.25	.001	.010
b	1.15	1.45	.045	.057
b <sub>2</sub>	1.9	2.1	.75	.83
C	.4	.65	.016	.026
D	13.80	14.00	.543	.551
E	15.85	16.05	.624	.632
E <sub>1</sub>	13.3	13.6	.524	.535
e	5.45	BSC	.215	BSC
H	18.70	19.10	.736	.752
L	2.40	2.70	.094	.106
L1	1.20	1.40	.047	.055
L2	1.00	1.15	.039	.045
L3		0.25 BSC		.010 BSC
L4	3.80	4.10	.150	.161

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  
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025



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