

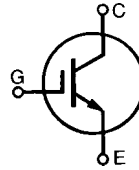
# IGBT

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

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

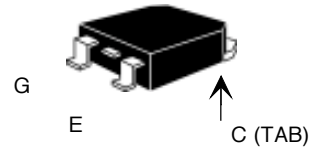
$V_{CES} = 1200 \text{ V}$   
 $I_{C25} = 75 \text{ A}$   
 $V_{CE(sat)} = 2.5 \text{ V}$   
 $t_{fi(typ)} = 390 \text{ ns}$

Preliminary data sheet

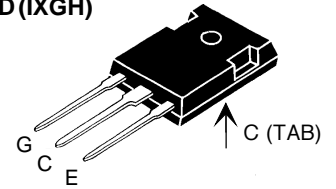


Symbol	Test Conditions	Maximum Ratings
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1200 V
$V_{CGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GE} = 1 \text{ M}\Omega$	1200 V
$V_{GES}$	Continuous	$\pm 20 \text{ V}$
$V_{GEM}$	Transient	$\pm 30 \text{ V}$
$I_{C25}$	$T_C = 25^\circ\text{C}$ , 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
$T_J$		$-55 \dots +150^\circ\text{C}$
$T_{JM}$		150 $^\circ\text{C}$
$T_{stg}$		$-55 \dots +150^\circ\text{C}$
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

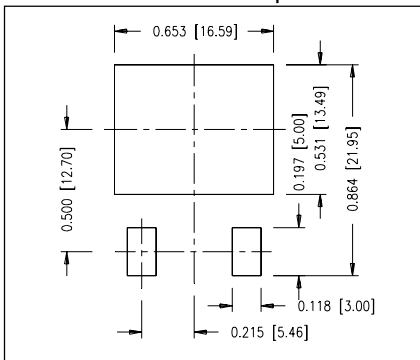
## Advantages

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

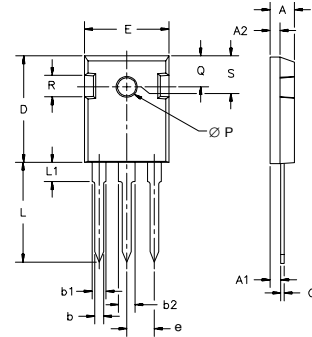
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 1 \text{ mA}$ , $V_{GE} = 0 \text{ V}$	1200		V
$V_{GE(th)}$	$I_C = 750 \mu\text{A}$ , $V_{CE} = V_{GE}$	2.5		V
$I_{CES}$	$V_{CE} = V_{CES}$ $V_{GE} = 0 \text{ V}$	$T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$		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>		55	ns
$t_{ri}$	$I_C = I_{C90}, V_{GE} = 15\text{ V}$		28	ns
$t_{d(off)}$	$V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 5\ \Omega$		370	800 ns
$t_{fi}$	Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ ,		390	700 ns
$E_{off}$	higher $T_J$ or increased $R_G$		14	25 mJ
$t_{d(on)}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b>		64	ns
$t_{ri}$	$I_C = I_{C90}, V_{GE} = 15\text{ V}$		32	ns
$E_{on}$	$V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 5\ \Omega$		3.0	mJ
$t_{d(off)}$	Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 \cdot V_{CES}$ ,		660	ns
$t_{fi}$	higher $T_J$ or increased $R_G$		740	ns
$E_{off}$			25	mJ
$R_{thJC}$				0.42 KW
$R_{thCK}$	(TO-247)		0.25	KW

### Min Recommended Footprint

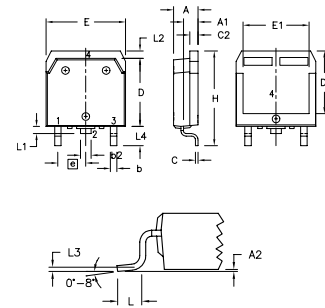


### TO-247 AD Outline



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
L <sub>1</sub>		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

### 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>1</sub>	1.9	2.1	.75	.83
b <sub>2</sub>	.4	.65	.016	.026
C				
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
L <sub>1</sub>	1.20	1.40	.047	.055
L <sub>2</sub>	1.00	1.15	.039	.045
L <sub>3</sub>		0.25 BSC		.010 BSC
L <sub>4</sub>	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