

## High Voltage IGBT

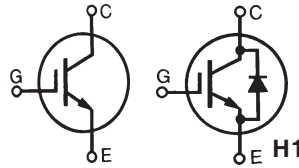
### IXGH/IXGT 16N170A IXGH/IXGT 16N170AH1

$$V_{CES} = 1700 \text{ V}$$

$$I_{C25} = 16 \text{ A}$$

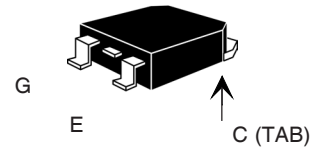
$$V_{CE(sat)} = 5.0 \text{ V}$$

$$t_{fi(typ)} = 40 \text{ ns}$$

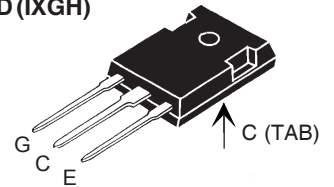


Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	1700	V
$V_{CGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GE} = 1 \text{ M}\Omega$	1700	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ\text{C}$	16	A
$I_{C90}$	$T_C = 90^\circ\text{C}$	8	A
$I_{CM}$	$T_C = 25^\circ\text{C}$ , 1 ms	40	A
<b>SSOA (RBSOA)</b>	$V_{GE} = 15 \text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 10\Omega$ Clamped inductive load	$I_{CM} = 40$ @ $0.8 V_{CES}$	A
$t_{SC}$	$T_J = 125^\circ\text{C}$ , $V_{CE} = 1200 \text{ V}$ ; $V_{GE} = 15 \text{ V}$ , $R_G = 22\Omega$	10	$\mu\text{s}$
$P_C$	$T_C = 25^\circ\text{C}$	190	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$M_d$	Mounting torque (M3)	TO-247	1.13/10Nm/lb.in.
Maximum lead temperature for soldering 1.6 mm (0.062 in.) from case for 10 s		300	$^\circ\text{C}$
Plastic body for 10s		250	$^\circ\text{C}$
<b>Weight</b>		TO-247	6 g
		TO-268	4 g

#### TO-268 (IXGT)



#### TO-247 AD (IXGH)



G = Gate,  
E = Emitter,

C = Collector,  
TAB = Collector

#### Features

- International standard packages JEDEC TO-268 and JEDEC TO-247 AD
- High current handling capability
- MOS Gate turn-on - drive simplicity
- Rugged NPT structure
- Molding epoxies meet UL 94 V-0 flammability classification
- SONIC™ fast recovery copack diode

#### Applications

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

#### Advantages

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

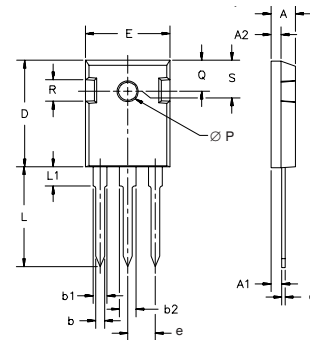
Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$BV_{CES}$	$I_C = 250 \mu\text{A}$ , $V_{GE} = 0 \text{ V}$	1700		V
$V_{GE(th)}$	$I_C = 250 \mu\text{A}$ , $V_{CE} = V_{GE}$	3.0		V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0 \text{ V}$ , Note 1 $T_J = 125^\circ\text{C}$	16N170A		50 $\mu\text{A}$
		16N170AH1		100 $\mu\text{A}$
		16N170A		750 $\mu\text{A}$
		16N170AH1		1.5 mA
$I_{GES}$	$V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$			$\pm 100 \text{ nA}$
$V_{CE(sat)}$	$I_C = I_{C90}$ , $V_{GE} = 15 \text{ V}$ $T_J = 125^\circ\text{C}$		4.0	V
			4.8	V

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)			
		min.	typ.	max.	
$g_{fs}$	$I_C = I_{C25}; V_{CE} = 10\text{ V}$ Note 2	6	10	S	
$C_{ies}$ $C_{oes}$	$V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$	16N170A	1700	pF	
		16N170AH1	83	pF	
$C_{res}$	$I_C = I_{C90}; V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$		30	pF	
$Q_g$			65	nC	
$Q_{ge}$ $Q_{gc}$			13 24	nC	
$t_{d(on)}$ $t_{ri}$ $t_{d(off)}$ $t_{fi}$ $E_{off}$	<b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = I_{C25}, V_{GE} = 15\text{ V}$ $R_G = 10\ \Omega, V_{CE} = 0.5 V_{CES}$ Note 3		36	ns	
			57	ns	
			200	350	ns
			40	150	ns
			0.9	1.5	mJ
$t_{d(on)}$ $t_{ri}$ $E_{on}$ $t_{d(off)}$ $t_{fi}$ $E_{off}$	<b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = I_{C25}, V_{GE} = 15\text{ V}$ $R_G = 10\ \Omega, V_{CE} = 0.5 V_{CES}$ Note 3	16N170A	38	ns	
		16N170AH1	59	ns	
			1.5	mJ	
			2.5	mJ	
			200	ns	
			55	ns	
$R_{thJC}$ $R_{thCK}$	(TO-247)			0.65 KW	
		0.25		KW	

Symbol	Test Conditions	Characteristic Values ( $T_J = 25^\circ\text{C}$ , unless otherwise specified)		
		min.	typ.	max.
$V_F$	$I_F = 20\text{ A}, V_{GE} = 0\text{ V}$ $T_J = 125^\circ\text{C}$		2.5	2.95
			2.5	V
$I_{RM}$ $t_{rr}$ $I_{RM}$ $t_{rr}$	$I_F = 20\text{ A}; -di_F/dt = 150\text{ A}/\mu\text{s}$ $V_{GE} = 0\text{ V}; V_R = 1200\text{ V}$ $T_J = 125^\circ\text{C}$		15	A
			80	ns
			20	A
			200	ns
$R_{thJC}$				0.9
				KW

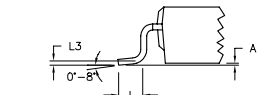
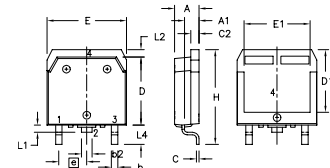
- Notes: 1. Device must be heatsunk for high temperature leakage current measurements to avoid thermal runaway.  
2. Pulse test,  $t \leq 300\ \mu\text{s}$ , duty cycle  $\leq 2\%$   
3. Switching times may increase for  $V_{CE}$  (Clamp)  $> 0.8 \cdot V_{CES}$ , higher  $T_J$  or increased  $R_G$ .

### 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
∅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>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		.010
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	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065B1	6,683,344	6,727,585
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123B1	6,534,343	6,710,405B2	6,759,692
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	