

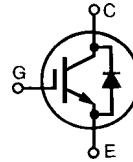
# High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

**IXBH 6N170**  
**IXBT 6N170**

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

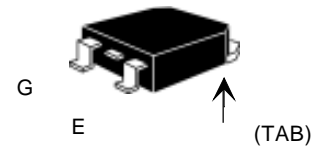
$$I_{C25} = 12 \text{ A}$$

$$V_{CE(sat)} = 3.6 \text{ V}$$

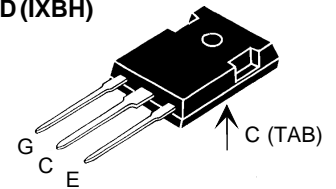


| Symbol  | Test Conditions  | Maximum Ratings                   |                  |
|---|--|-----------------------------------|------------------|
| $V_{CES}$   | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$  | 1700                              | V                |
| $V_{CGR}$   | $T_J = 25^\circ\text{C}$ 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                |
| $I_{C25}$   | $T_C = 25^\circ\text{C}$   | 12                                | A                |
| $I_{C90}$   | $T_C = 90^\circ\text{C}$   | 6                                 | A                |
| $I_{CM}$  | $T_C = 25^\circ\text{C}$ , 1 ms  | 24                                | A                |
| <b>SSOA</b><br><b>(RBSOA)</b>   | $V_{GE} = 15 \text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 33 \Omega$<br>Clamped inductive load | $I_{CM} = 16$<br>$V_{CES} = 1350$ | A<br>V           |
| $P_C$   | $T_C = 25^\circ\text{C}$   | 75                                | 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<br>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 (IXBT)



## TO-247 AD (IXBH)



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

## Features

- High Blocking Voltage
- JEDEC TO-268 surface and JEDEC TO-247 AD
- Low conduction losses
- High current handling capability
- MOS Gate turn-on - drive simplicity
- Molding epoxies meet UL 94 V-0 flammability classification

## Applications

- AC motor speed control
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- Capacitor discharge circuits

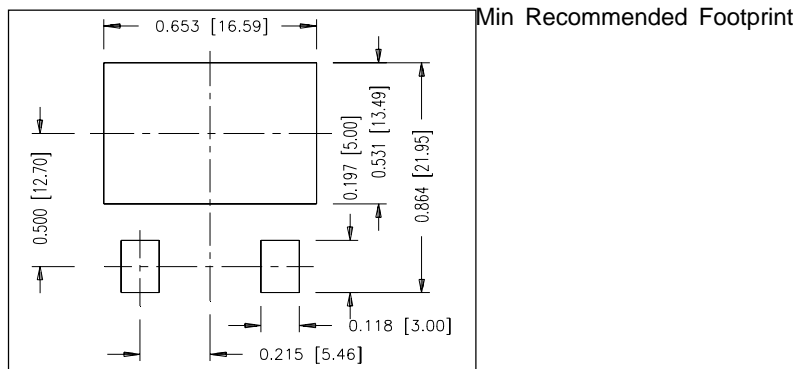
## Advantages

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

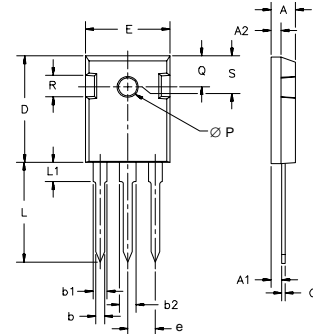
| Symbol        | Test Conditions                                      | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                      |   |
|---------------|--|---|------|----------------------|---|
|               |  | min.  | typ. | max.                 |   |
| $BV_{CES}$    | $I_C = 250 \mu\text{A}$ , $V_{GE} = 0 \text{ V}$     | 1700  |      | V                    |   |
| $V_{GE(th)}$  | $I_C = 250 \mu\text{A}$ , $V_{CE} = V_{GE}$          | 3.0   |      | 6 V                  |   |
| $I_{CES}$     | $V_{CE} = 0.8 V_{CES}$<br>$V_{GE} = 0 \text{ V}$     | $T_J = 25^\circ\text{C}$<br>$T_J = 125^\circ\text{C}$                             |      | 10 $\mu\text{A}$     |   |
|               |  |   |      | 100 $\mu\text{A}$    |   |
| $I_{GES}$     | $V_{CE} = 0 \text{ V}$ , $V_{GE} = \pm 20 \text{ V}$ |   |      | $\pm 100 \text{ nA}$ |   |
| $V_{CE(sat)}$ | $I_C = I_{C90}$ , $V_{GE} = 15 \text{ V}$            | $T_J = 125^\circ\text{C}$   | 3.0  | 3.6                  | V |
|               |  |   | 3.3  |                      | V |

| Symbol       | Test Conditions   | Characteristic Values  |      |          |    |
|--------------|---|--|------|----------|----|
|              |   | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ |      |          |    |
|              |   | min.   | typ. | max.     |    |
| $g_{fs}$     | $I_C = I_{C90}, V_{CE} = 10\text{ V},$<br>Pulse test, $t \leq 300\ \mu\text{s},$ duty cycle $\leq 2\%$  | 3  | 4    | S        |    |
| $C_{ies}$    | $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$   |  | 330  | pF       |    |
| $C_{oes}$    |   |  | 23   | pF       |    |
| $C_{res}$    |   |  | 6    | pF       |    |
| $Q_g$        | $I_C = I_{C90}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$   |  | 20   | nC       |    |
| $Q_{ge}$     |   |  | 3.6  | nC       |    |
| $Q_{gc}$     |   |  | 8    | nC       |    |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = I_{C90}, V_{GE} = 15\text{ V}$<br>$V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 120\ \Omega$  |  | 25   | ns       |    |
| $t_{ri}$     |   |  | 18   | ns       |    |
| $t_{d(off)}$ |   |  | 600  | 1000     | ns |
| $t_{fi}$     |   |  | 1110 | 1600     | ns |
| $E_{off}$    |   |  | 4    | 6        | mJ |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = I_{C90}, V_{GE} = 15\text{ V}$<br>$V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 120\ \Omega$ |  | 25   | ns       |    |
| $t_{ri}$     |   |  | 20   | ns       |    |
| $E_{on}$     |   |  | 0.7  | mJ       |    |
| $t_{d(off)}$ |   |  | 660  | ns       |    |
| $t_{fi}$     |   |  | 1600 | ns       |    |
| $E_{off}$    |   | 5  | mJ   |          |    |
| $R_{thJC}$   |   |  |      | 1.65 K/W |    |
| $R_{thCK}$   | (TO-247)  | 0.25   |      | K/W      |    |

| Symbol   | Test Conditions   | Characteristic Values  |      |       |
|----------|---|--|------|-------|
|          |   | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ |      |       |
|          |   | min.   | typ. | max.  |
| $V_F$    | $I_F = I_{C90}, V_{GE} = 0\text{ V},$ Pulse test,<br>$t < 300\ \mu\text{s},$ duty cycle $d < 2\%$ |  |      | 3.0 V |
| $I_{RM}$ | $I_F = 6\text{ A}, V_{GE} = 0\text{ V}, -di_F/dt = 50\text{ A/us}$<br>$V_R = 100\text{ A}$        |  | 6    | A     |
| $t_{rr}$ |   |  | 360  | ns    |

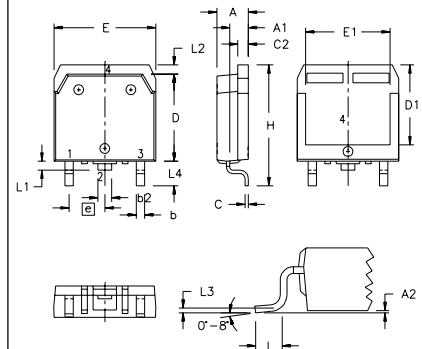


### TO-247 AD Outline



| 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



| SYM            | INCHES |          | MILLIMETERS |          |
|----------------|--------|----------|-------------|----------|
|                | MIN    | MAX      | MIN         | MAX      |
| A              | .193   | .201     | 4.90        | 5.10     |
| A <sub>1</sub> | .106   | .114     | 2.70        | 2.90     |
| A <sub>2</sub> | .001   | .010     | 0.02        | 0.25     |
| b              | .045   | .057     | 1.15        | 1.45     |
| b <sub>2</sub> | .075   | .083     | 1.90        | 2.10     |
| C              | .016   | .026     | 0.40        | 0.65     |
| C <sub>2</sub> | .057   | .063     | 1.45        | 1.60     |
| D              | .543   | .551     | 13.80       | 14.00    |
| D <sub>1</sub> | .488   | .500     | 12.40       | 12.70    |
| E              | .624   | .632     | 15.85       | 16.05    |
| E <sub>1</sub> | .524   | .535     | 13.30       | 13.60    |
| e              |        | 215 BSC  |             | 5.45 BSC |
| H              | .736   | .752     | 18.70       | 19.10    |
| L              | .094   | .106     | 2.40        | 2.70     |
| L <sub>1</sub> | .047   | .055     | 1.20        | 1.40     |
| L <sub>2</sub> | .039   | .045     | 1.00        | 1.15     |
| L <sub>3</sub> |        | .010 BSC |             | 0.25 BSC |
| L <sub>4</sub> | .150   | .161     | 3.80        | 4.10     |

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