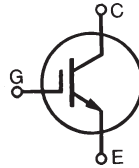


# HiPerFAST™ IGBT

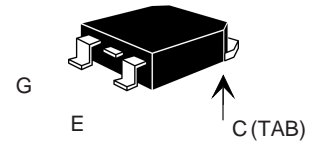
**IXGH 15N120B**  
**IXGT 15N120B**

**$V_{CES} = 1200 \text{ V}$**   
 **$I_{C25} = 30 \text{ A}$**   
 **$V_{CE(sat)} = 3.2 \text{ V}$**   
 **$t_{fi(typ)} = 160 \text{ ns}$**

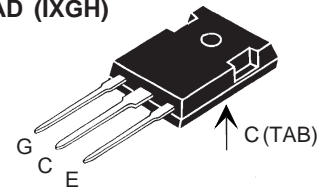


| Symbol   | Test Conditions  | Maximum Ratings                  |                  |
|--|--|----------------------------------|------------------|
| $V_{CES}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$   | 1200                             | V                |
| $V_{CGR}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$                     | 1200                             | V                |
| $V_{GES}$  | Continuous   | $\pm 20$                         | V                |
| $V_{GEM}$  | Transient  | $\pm 30$                         | V                |
| $I_{C25}$  | $T_C = 25^\circ\text{C}$   | 30                               | A                |
| $I_{C110}$   | $T_C = 110^\circ\text{C}$  | 15                               | A                |
| $I_{CM}$   | $T_C = 25^\circ\text{C}, 1 \text{ ms}$   | 60                               | A                |
| <b>SSOA (RBSOA)</b>  | $V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 10 \Omega$<br>Clamped inductive load | $I_{CM} = 40$<br>@ $0.8 V_{CES}$ | A                |
| $P_C$  | $T_C = 25^\circ\text{C}$   | 180                              | 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                     |  | 300                              | $^\circ\text{C}$ |
| 1.6 mm (0.062 in.) from case for 10 s                      |  |                                  |                  |
| 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 surface and JEDEC TO-247 AD
- Low switching losses, low  $V_{(sat)}$
- MOS Gate turn-on - drive simplicity

## Applications

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

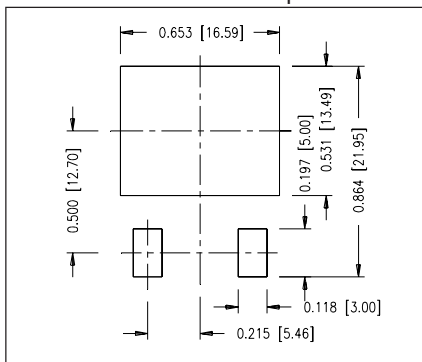
## Advantages

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

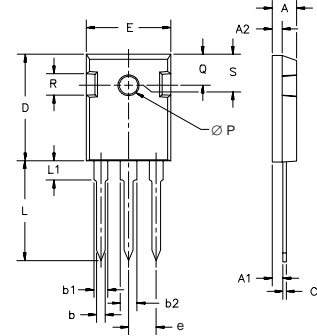
| Symbol        | Test Conditions                                   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                      |
|---------------|---|---|------|----------------------|
|               |   | min.  | typ. | max.                 |
| $BV_{CES}$    | $I_C = 250 \mu\text{A}, V_{GE} = 0 \text{ V}$     | 1200  |      | V                    |
| $V_{GE(th)}$  | $I_C = 250 \mu\text{A}, V_{CE} = V_{GE}$          | 2.5   |      | V                    |
| $I_{CES}$     | $V_{CE} = V_{CES}$<br>$V_{GE} = 0 \text{ V}$      | $T_J = 25^\circ\text{C}$  |      | 100 $\mu\text{A}$    |
|               |   | $T_J = 125^\circ\text{C}$   |      | 3.5 mA               |
| $I_{GES}$     | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$ |   |      | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = I_{C90}, V_{GE} = 15 \text{ V}$            |   | 2.5  | 3.2 V                |
|               |   |   |      | V                    |

| Symbol       | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |          |    |
|--------------|---|---|------|----------|----|
|              |   | min.  | typ. | max.     |    |
| $g_{fs}$     | $I_C = I_{C110}; V_{CE} = 10\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $\leq 2\%$   | 12  | 15   | S        |    |
| $C_{ies}$    | $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$   |   | 1720 | pF       |    |
| $C_{oes}$    |   |   | 95   | pF       |    |
| $C_{res}$    |   |   | 35   | pF       |    |
| $Q_g$        | $I_C = I_{C110}, V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$  |   | 69   | nC       |    |
| $Q_{ge}$     |   |   | 13   | nC       |    |
| $Q_{gc}$     |   |   | 26   | nC       |    |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = I_{C110}, V_{GE} = 15\text{ V}$<br>$V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 10\ \Omega$<br>Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$  |   | 25   | ns       |    |
| $t_{ri}$     |   |   | 15   | ns       |    |
| $t_{d(off)}$ |   |   | 180  | 280      | ns |
| $t_{fi}$     |   |   | 160  | 320      | ns |
| $E_{off}$    |   |   | 1.75 | 3.0      | mJ |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = I_{C110}, V_{GE} = 15\text{ V}$<br>$V_{CE} = 0.8 V_{CES}, R_G = R_{off} = 10\ \Omega$<br>Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$ |   | 25   | ns       |    |
| $t_{ri}$     |   |   | 18   | ns       |    |
| $E_{on}$     |   |   | 0.60 |          | mJ |
| $t_{d(off)}$ |   |   | 300  |          | ns |
| $t_{fi}$     |   |   | 360  |          | ns |
| $E_{off}$    |   | 3.5   |      | mJ       |    |
| $R_{thJC}$   |   |   |      | 0.65 K/W |    |
| $R_{thCK}$   | (TO-247)  |   | 0.25 | K/W      |    |

### Min Recommended Footprint

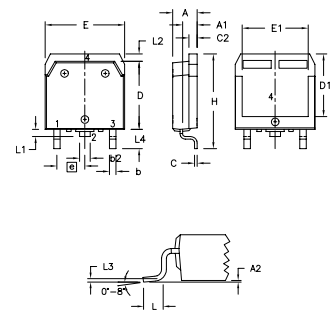


### TO-247 AD Outline



| 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  |
| ∅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 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 | 6,306,728B1 |
| 4,850,072 | 4,931,844 | 5,034,796 | 5,063,307 | 5,237,481 | 5,381,025 |             |

Fig. 1. Saturation Voltage Characteristics @ 25°C

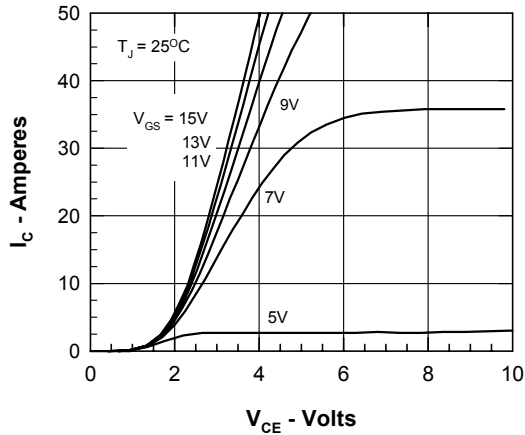


Fig. 2. Extended Output Characteristics

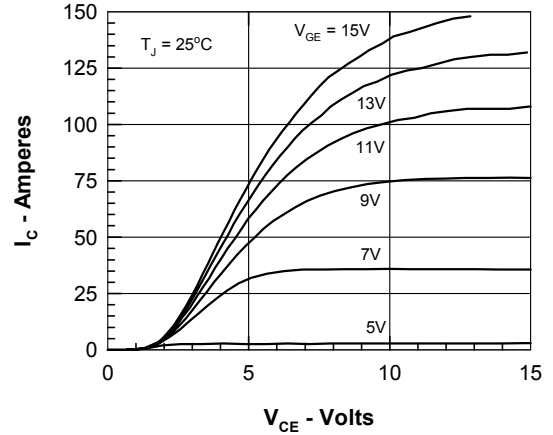


Fig. 3. Saturation Voltage Characteristics @ 125°C

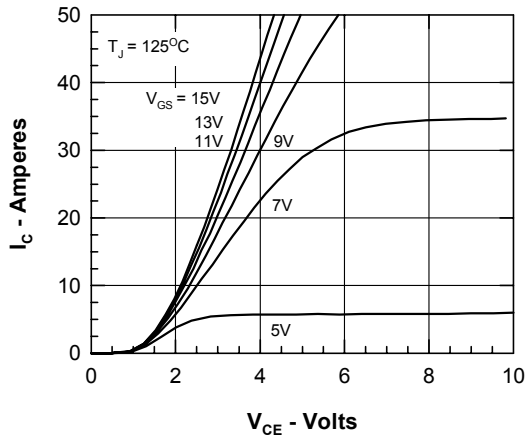


Fig. 4. Temperature Dependence of  $V_{CE(SAT)}$

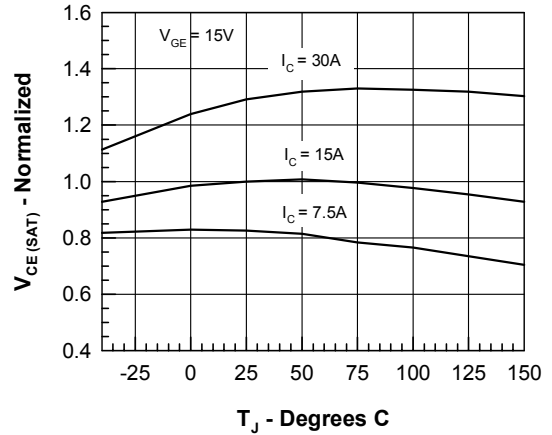


Fig. 5. Admittance Curves

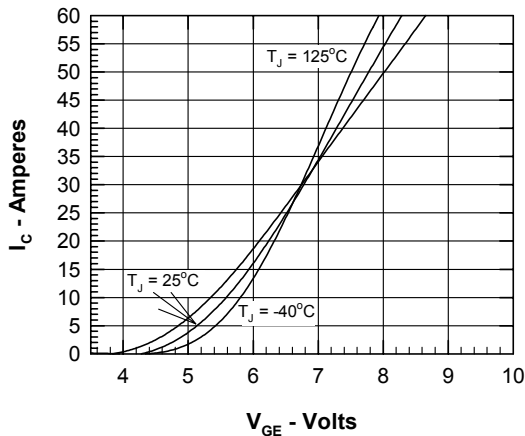


Fig. 6. Capacitance Curves

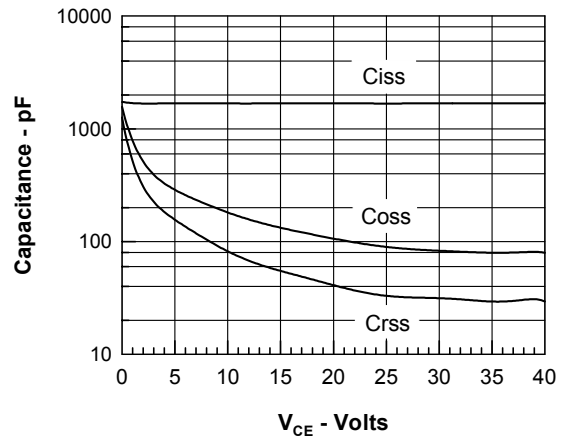


Fig. 7. Dependence of  $E_{OFF}$  on  $I_C$ .

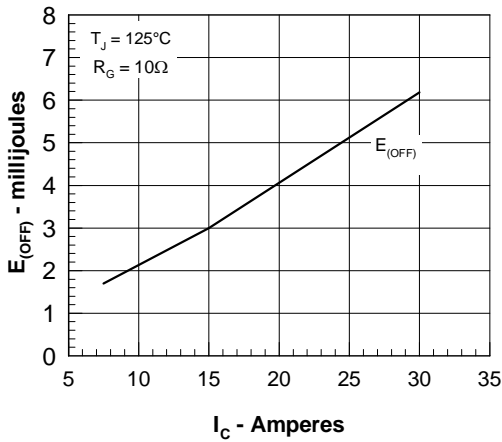


Fig. 8. Dependence of  $E_{OFF}$  on  $R_G$ .

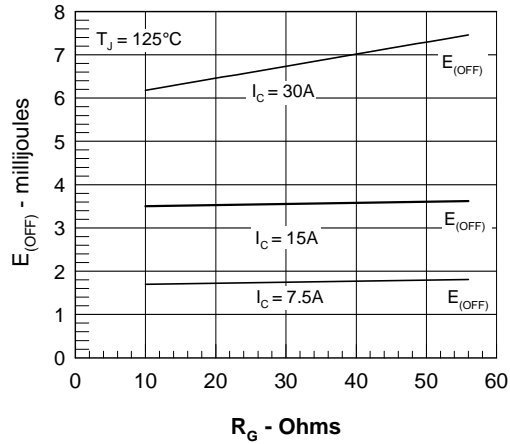


Fig. 9. Gate Charge

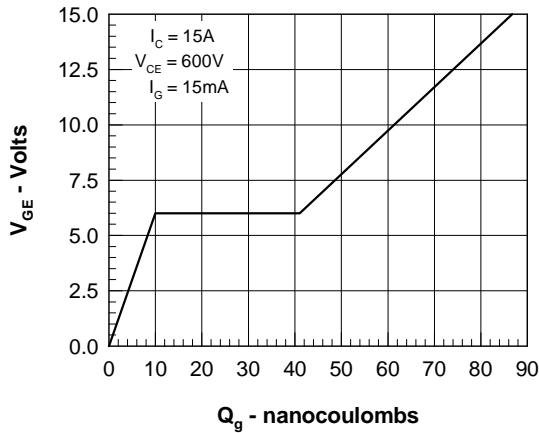


Fig. 10. Turn-off Safe Operating Area

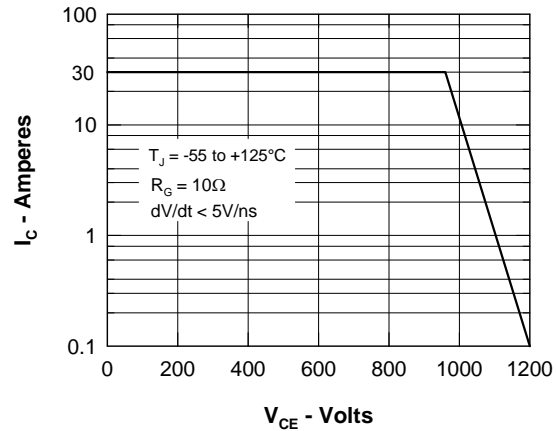


Fig. 11. Thermal Impedance

