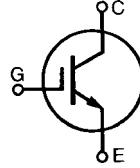


# IGBT

**IXGH 20N120**  
**IXGT 20N120**

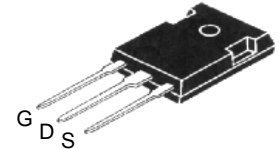
**$V_{CES} = 1200 \text{ V}$**   
 **$I_{C25} = 40 \text{ A}$**   
 **$V_{CE(sat)} = 2.5 \text{ V}$**   
 **$t_{fi(typ)} = 380 \text{ ns}$**

## Preliminary Data Sheet

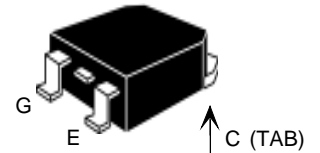


| Symbol  | Test Conditions  | Maximum Ratings                  |                  |
|---|--|----------------------------------|------------------|
| $V_{CES}$   | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$   | 1200                             | V                |
| $V_{CGR}$   | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GE} = 1 \text{ M}\Omega$                     | 1200                             | V                |
| $V_{GES}$   | Continuous   | $\pm 20$                         | V                |
| $V_{GEM}$   | Transient  | $\pm 30$                         | V                |
| $I_{C25}$   | $T_C = 25^\circ\text{C}$   | 40                               | A                |
| $I_{C90}$   | $T_C = 90^\circ\text{C}$   | 20                               | A                |
| $I_{CM}$  | $T_C = 25^\circ\text{C}, 1 \text{ ms}$   | 80                               | A                |
| <b>SSOA</b><br><b>(RBSOA)</b>   | $V_{GE} = 15 \text{ V}, T_{VJ} = 125^\circ\text{C}, R_G = 47 \Omega$<br>Clamped inductive load | $I_{CM} = 40$<br>@ $0.8 V_{CES}$ | A                |
| $P_C$   | $T_C = 25^\circ\text{C}$   | 150                              | 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   |  | 260                              | $^\circ\text{C}$ |
| $M_d$   | Mounting torque (TO-247)   | 1.13/10                          | Nm/lb.in.        |
| <b>Weight</b>   | TO-247   | 6                                | g                |
|   | TO-268   | 5                                | g                |

### TO-247 (IXGH)



### TO-268 (IXGT)



### Features

- International standard packages  
JEDEC TO-247 and TO-268
- High current handling capability
- MOS Gate turn-on  
- drive simplicity

### Applications

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

### Advantages

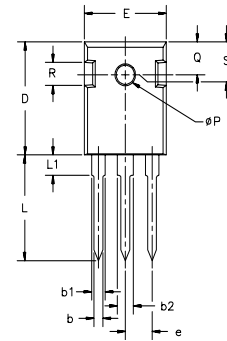
- Easy to mount with one screw
- Reduces assembly time and cost
- High power density

| Symbol        | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) | Characteristic Values     |      |                      |
|---------------|---|---------------------------|------|----------------------|
|               |   | Min.                      | Typ. | Max.                 |
| $BV_{CES}$    | $I_C = 1 \text{ mA}, V_{GE} = 0 \text{ V}$                                  | 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>$V_{GE} = 0 \text{ V}$                                | $T_J = 25^\circ\text{C}$  |      | 250 $\mu\text{A}$    |
|               |   | $T_J = 125^\circ\text{C}$ |      | 1 mA                 |
| $I_{GES}$     | $V_{CE} = 0 \text{ V}, V_{GE} = \pm 20 \text{ V}$                           |                           |      | $\pm 100 \text{ nA}$ |
| $V_{CE(sat)}$ | $I_C = I_{C90}, V_{GE} = 15 \text{ V}$                                      |                           | 2.0  | 2.5 V                |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)   | Characteristic Values |      |      |    |
|--------------|---|-----------------------|------|------|----|
|              |   | 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 $\leq 2\%$  | 12                    | 16   | S    |    |
| $C_{ies}$    | $V_{CE} = 25\text{ V}, V_{GE} = 0\text{ V}, f = 1\text{ MHz}$   |                       | 1750 | pF   |    |
| $C_{oes}$    |   |                       | 90   | pF   |    |
| $C_{res}$    |   |                       | 31   | pF   |    |
| $I_{C(ON)}$  | $V_{GE} = 10\text{ V}, V_{CE} = 10\text{ V}$  |                       | 90   | A    |    |
| $Q_g$        | $I_C = I_{C90}; V_{GE} = 15\text{ V}, V_{CE} = 0.5 V_{CES}$   |                       | 63   | 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>$I_C = I_{C90}; V_{GE} = 15\text{ V}$<br>$V_{CE} = 800\text{ V}, R_G = R_{off} = 47\ \Omega$<br>Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 V_{CES}$ , higher $T_J$ or increased $R_G$  |                       | 28   | ns   |    |
| $t_{ri}$     |   |                       | 20   | ns   |    |
| $t_{d(off)}$ |   |                       | 400  | 800  | ns |
| $t_{fi}$     |   |                       | 380  | 700  | ns |
| $E_{off}$    |   |                       | 6.5  | 10.5 | 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>$V_{CE} = 800\text{ V}, R_G = R_{off} = 47\ \Omega$<br>Remarks: Switching times may increase for $V_{CE}$ (Clamp) $> 0.8 V_{CES}$ , higher $T_J$ or increased $R_G$ |                       | 30   | ns   |    |
| $t_{ri}$     |   |                       | 27   | ns   |    |
| $E_{on}$     |   |                       | 0.90 | mJ   |    |
| $t_{d(off)}$ |   |                       | 700  | ns   |    |
| $t_{fi}$     |   |                       | 550  | ns   |    |
| $E_{off}$    |   | 9.5                   | mJ   |      |    |
| $R_{thJC}$   |   |                       | 0.83 | K/W  |    |
| $R_{thCK}$   | TO-247  |                       | 0.25 | K/W  |    |

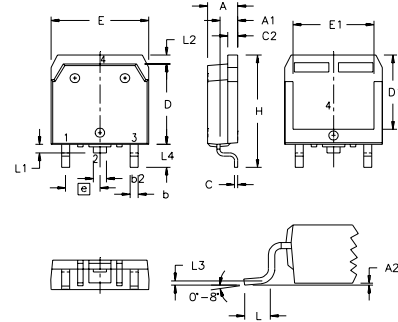
### TO-247

#### TO-247 Outline

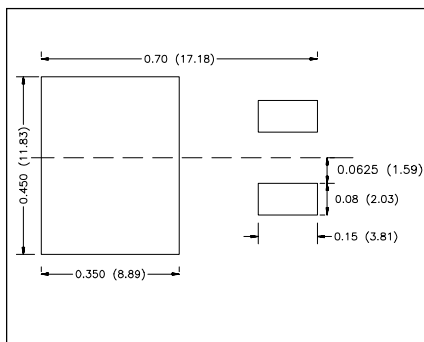


| Dim.           | Millimeter |       | Inches |       |
|----------------|------------|-------|--------|-------|
|                | Min.       | Max.  | Min.   | Max.  |
| A              | 4.7        | 5.3   | .185   | .209  |
| A <sub>1</sub> | 2.2        | 2.54  | .087   | .102  |
| A <sub>2</sub> | 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  |
| ØP             | 3.55       | 3.65  | .140   | .144  |
| Q              | 5.89       | 6.40  | 0.232  | 0.252 |
| R              | 4.32       | 5.49  | .170   | .216  |

### TO-268 Outline



| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .193     | .201 | 4.90        | 5.10  |
| A1  | .106     | .114 | 2.70        | 2.90  |
| A2  | .001     | .010 | 0.02        | 0.25  |
| b   | .045     | .057 | 1.15        | 1.45  |
| b2  | .075     | .083 | 1.90        | 2.10  |
| C   | .016     | .026 | 0.40        | 0.65  |
| C2  | .057     | .063 | 1.45        | 1.60  |
| D   | .543     | .551 | 13.80       | 14.00 |
| D1  | .488     | .500 | 12.40       | 12.70 |
| E   | .624     | .632 | 15.85       | 16.05 |
| E1  | .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  |
| L1  | .047     | .055 | 1.20        | 1.40  |
| L2  | .039     | .045 | 1.00        | 1.15  |
| L3  | .010 BSC |      | 0.25 BSC    |       |
| L4  | .150     | .161 | 3.80        | 4.10  |



#### Min. Recommended Footprint (Dimensions in inches and mm)

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 |             |