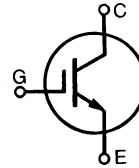


**Low  $V_{CE(sat)}$   
High speed IGBT**

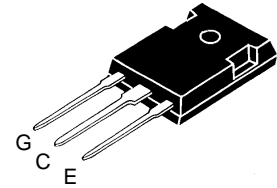
**IXGH 25 N120  
IXGH 25 N120A**

| $V_{CES}$     | $I_{C25}$   | $V_{CE(sat)}$ |
|---------------|-------------|---------------|
| <b>1200 V</b> | <b>50 A</b> | <b>3 V</b>    |
| <b>1200 V</b> | <b>50 A</b> | <b>4 V</b>    |



| 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                |
| $I_{C25}$                                                                       | $T_C = 25^\circ\text{C}$                                                                                                     | 50                               | A                |
| $I_{C90}$                                                                       | $T_C = 90^\circ\text{C}$                                                                                                     | 25                               | A                |
| $I_{CM}$                                                                        | $T_C = 25^\circ\text{C}$ , 1 ms                                                                                              | 100                              | A                |
| <b>SSOA<br/>(RBSOA)</b>                                                         | $V_{GE} = 15\text{ V}$ , $T_{VJ} = 125^\circ\text{C}$ , $R_G = 33\ \Omega$<br>Clamped inductive load, $L = 100\ \mu\text{H}$ | $I_{CM} = 50$<br>@ $0.8 V_{CES}$ | A                |
| $P_C$                                                                           | $T_C = 25^\circ\text{C}$                                                                                                     | 200                              | 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)                                                                                                         | 1.13/10                          | Nm/lb.in.        |
| <b>Weight</b>                                                                   |                                                                                                                              | 6                                | g                |
| Maximum lead temperature for soldering<br>1.6 mm (0.062 in.) from case for 10 s |                                                                                                                              | 300                              | $^\circ\text{C}$ |

**TO-247 AD**



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

**Features**

- International standard package JEDEC TO-247 AD
- 2nd generation HDMOS™ process
- Low  $V_{CE(sat)}$ 
  - for low on-state conduction losses
- MOS Gate turn-on
  - drive simplicity

**Applications**

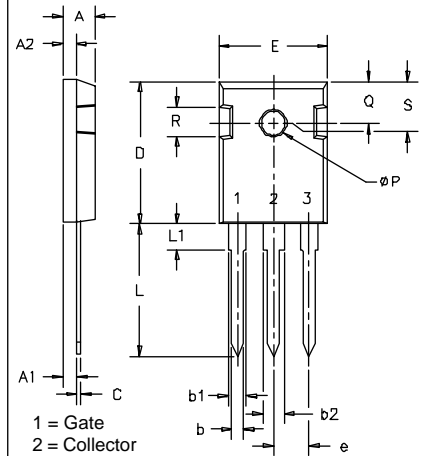
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies
- Capacitor discharge systems
- Solid state relays

**Advantages**

- Easy to mount with 1 screw (TO-247) (isolated mounting screw hole)
- High power density

| Symbol        | Test Conditions                                       | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                                                                                    |
|---------------|-------------------------------------------------------|-----------------------------------------------------------------------------------|------|------------------------------------------------------------------------------------|
|               |                                                       | min.                                                                              | typ. | max.                                                                               |
| $BV_{CES}$    | $I_C = 3\text{ mA}$ , $V_{GE} = 0\text{ V}$           | 1200                                                                              |      | V                                                                                  |
| $V_{GE(th)}$  | $I_C = 250\ \mu\text{A}$ , $V_{CE} = V_{GE}$          | 2.5                                                                               |      | V                                                                                  |
| $I_{CES}$     | $V_{CE} = 0.8 \cdot V_{CES}$<br>$V_{GE} = 0\text{ V}$ |                                                                                   |      | $T_J = 25^\circ\text{C}$<br>250 $\mu\text{A}$<br>$T_J = 125^\circ\text{C}$<br>1 mA |
| $I_{GES}$     | $V_{CE} = 0\text{ V}$ , $V_{GE} = \pm 20\text{ V}$    |                                                                                   |      | $\pm 100\text{ nA}$                                                                |
| $V_{CE(sat)}$ | $I_C = I_{C90}$ , $V_{GE} = 15\text{ V}$              |                                                                                   |      | 25N120<br>3 V<br>25N120A<br>4 V                                                    |

| Symbol       | Test Conditions                                                                                                                                                                                                                                                                                                       | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , 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 $\leq 2\%$                                                                                                                                                                                                           | 8                                                                                 | 15      | S       |
| $C_{ies}$    | $V_{CE} = 25\text{ V}$ , $V_{GE} = 0\text{ V}$ , $f = 1\text{ MHz}$                                                                                                                                                                                                                                                   |                                                                                   | 2750    | pF      |
| $C_{oes}$    |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 200     | pF      |
| $C_{res}$    |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 50      | pF      |
| $Q_g$        | $I_C = I_{C90}$ ; $V_{GE} = 15\text{ V}$ , $V_{CE} = 0.5 V_{CES}$                                                                                                                                                                                                                                                     |                                                                                   | 130     | 180 nC  |
| $Q_{ge}$     |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 25      | 50 nC   |
| $Q_{gc}$     |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 55      | 90 nC   |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 25^\circ\text{C}</math></b><br>$I_C = I_{C90}$ ; $V_{GE} = 15\text{ V}$ , $L = 100\ \mu\text{H}$ ,<br>$V_{CE} = 0.8 V_{CES}$ ; $R_G = R_{off} = 33\ \Omega$<br>Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$  |                                                                                   | 100     | ns      |
| $t_{ri}$     |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 250     | ns      |
| $t_{d(off)}$ |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 650     | 1000 ns |
| $t_{fi}$     |                                                                                                                                                                                                                                                                                                                       | 25N120                                                                            | 700     | ns      |
|              |                                                                                                                                                                                                                                                                                                                       | 25N120A                                                                           | 600     | 800 ns  |
| $E_{off}$    | 25N120A                                                                                                                                                                                                                                                                                                               | 11                                                                                | mJ      |         |
| $t_{d(on)}$  | <b>Inductive load, <math>T_J = 125^\circ\text{C}</math></b><br>$I_C = I_{C90}$ ; $V_{GE} = 15\text{ V}$ , $L = 100\ \mu\text{H}$ ,<br>$V_{CE} = 0.8 V_{CES}$ ; $R_G = R_{off} = 33\ \Omega$<br>Remarks: Switching times may increase for $V_{CE}(\text{Clamp}) > 0.8 \cdot V_{CES}$ , higher $T_J$ or increased $R_G$ |                                                                                   | 100     | ns      |
| $t_{ri}$     |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 250     | ns      |
| $E_{on}$     |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 4.2     | mJ      |
| $t_{d(off)}$ |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 720     | 1000 ns |
| $t_{fi}$     |                                                                                                                                                                                                                                                                                                                       | 25N120                                                                            | 1200    | ns      |
|              | 25N120A                                                                                                                                                                                                                                                                                                               | 800                                                                               | 1200 ns |         |
| $E_{off}$    | 25N120A                                                                                                                                                                                                                                                                                                               | 15                                                                                | mJ      |         |
| $R_{thJC}$   |                                                                                                                                                                                                                                                                                                                       |                                                                                   | 0.62    | K/W     |
| $R_{thCK}$   |                                                                                                                                                                                                                                                                                                                       | 0.25                                                                              |         | K/W     |

**TO-247 AD Outline**


| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .185     | .209 | 4.7         | 5.3   |
| A1  | .087     | .102 | 2.2         | 2.54  |
| A2  | .059     | .098 | 2.2         | 2.6   |
| b   | .040     | .055 | 1.0         | 1.4   |
| b1  | .065     | .084 | 1.65        | 2.13  |
| b2  | .113     | .123 | 2.87        | 3.12  |
| C   | .016     | .031 | .4          | .8    |
| D   | .819     | .845 | 20.80       | 21.46 |
| E   | .610     | .640 | 15.75       | 16.26 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| L   | .780     | .800 | 19.81       | 20.32 |
| L1  | .177     |      | 4.50        |       |
| ØP  | .140     | .144 | 3.55        | 3.65  |
| Q   | .212     | .244 | 5.4         | 6.2   |
| R   | .170     | .216 | 4.32        | 5.49  |
| S   | .242 BSC |      | 6.15 BSC    |       |

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