

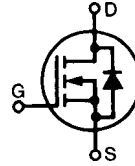
# HiPerFET™ Power MOSFETs

**IXFH 60N20**  
**IXFT 60N20**

**V<sub>DSS</sub> = 200 V**  
**I<sub>D25</sub> = 60 A**  
**R<sub>DS(on)</sub> = 33 mΩ**

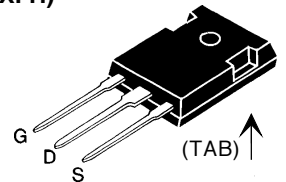
N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt

**t<sub>rr</sub> ≤ 250 ns**

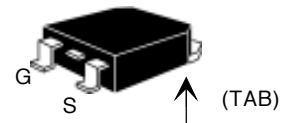


| Symbol           | Test Conditions   | Maximum Ratings |           |
|------------------|---|-----------------|-----------|
| V <sub>DSS</sub> | T <sub>J</sub> = 25°C to 150°C  | 200             | V         |
| V <sub>DGR</sub> | T <sub>J</sub> = 25°C to 150°C; R <sub>GS</sub> = 1 MΩ  | 200             | V         |
| V <sub>GS</sub>  | Continuous  | ±20             | V         |
| V <sub>GSM</sub> | Transient   | ±30             | V         |
| I <sub>D25</sub> | T <sub>C</sub> = 25°C   | 60              | A         |
| I <sub>DM</sub>  | T <sub>C</sub> = 25°C, pulse width limited by T <sub>JM</sub>   | 240             | A         |
| I <sub>AR</sub>  | T <sub>C</sub> = 25°C   | 60              | A         |
| E <sub>AR</sub>  | T <sub>C</sub> = 25°C   | 50              | mJ        |
| E <sub>AS</sub>  |   | 2.5             | J         |
| dv/dt            | I <sub>S</sub> ≤ I <sub>DM</sub> , di/dt ≤ 100 A/μs, V <sub>DD</sub> ≤ V <sub>DSS</sub> ,<br>T <sub>J</sub> ≤ 150°C, R <sub>G</sub> = 2 Ω | 5               | V/ns      |
| P <sub>D</sub>   | T <sub>C</sub> = 25°C   | 300             | W         |
| T <sub>J</sub>   |   | -55 to +150     | °C        |
| T <sub>JM</sub>  |   | 150             | °C        |
| T <sub>stg</sub> |   | -55 to +150     | °C        |
| T <sub>L</sub>   | 1.6 mm (0.063 in) from case for 10 s  | 300             | °C        |
| M <sub>d</sub>   | Mounting torque   | 1.13/10         | Nm/lb.in. |
| Weight           | TO-247  | 6               | g         |
|                  | TO-268  | 4               | g         |

TO-247 AD (IXFH)



TO-268 (IXFT) Case Style



G = Gate    D = Drain  
S = Source    TAB = Drain

| Symbol              | Test Conditions   | Characteristic Values<br>(T <sub>J</sub> = 25°C, unless otherwise specified) |      |         |
|---------------------|---|--|------|---------|
|                     |   | min.   | typ. | max.    |
| V <sub>DSS</sub>    | V <sub>GS</sub> = 0 V, I <sub>D</sub> = 250μA   | 200  |      | V       |
| V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 4 mA   | 2.0  |      | V       |
| I <sub>GSS</sub>    | V <sub>GS</sub> = ±20 V <sub>DC</sub> , V <sub>DS</sub> = 0   |  |      | ±100 nA |
| I <sub>DSS</sub>    | V <sub>DS</sub> = V <sub>DSS</sub><br>V <sub>GS</sub> = 0 V   | T <sub>J</sub> = 25°C  |      | 25 μA   |
|                     |   | T <sub>J</sub> = 125°C   |      | 1 mA    |
| R <sub>DS(on)</sub> | V <sub>GS</sub> = 10 V, I <sub>D</sub> = 0.5 I <sub>D25</sub><br>Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % |  |      | 33 mΩ   |

### Features

- International standard packages
- Low R<sub>DS(on)</sub>
- Rated for unclamped Inductive load switching (UIS)
- Molding epoxies meet UL 94 V-0 flammability classification

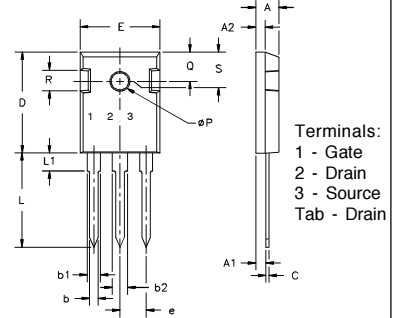
### Advantages

- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |          |
|--------------|--|---|------|----------|
|              |  | min.  | typ. | max.     |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test   | 30  | 40   | S        |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$  |   | 5200 | pF       |
| $C_{oss}$    |  |   | 880  | pF       |
| $C_{rss}$    |  |   | 260  | pF       |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$<br>$R_G = 2.5\ \Omega$ (External), |   | 38   | ns       |
| $t_r$        |  |   | 63   | ns       |
| $t_{d(off)}$ |  |   | 85   | ns       |
| $t_f$        |  |   | 26   | ns       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$                                    |   | 155  | nC       |
| $Q_{gs}$     |  |   | 38   | nC       |
| $Q_{gd}$     |  |   | 55   | nC       |
| $R_{thJC}$   | (TO-247)   |   |      | 0.42 K/W |
| $R_{thCK}$   |  |   | 0.25 | K/W      |

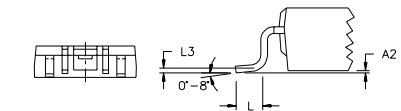
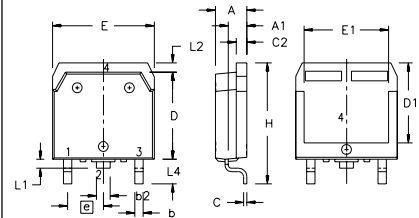
| Symbol   | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|---|---|------|---------------|
|          |   | min.  | typ. | max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$   |   | 60   | A             |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$   |   | 240  | A             |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |   | 1.5  | V             |
| $t_{rr}$ | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 50\text{ V}$                             |   | 0.7  | ns            |
| $Q_{RM}$ |   |   | 8    | $\mu\text{C}$ |
| $I_{RM}$ |   |   |      | A             |

### TO-247 AD (IXFH) 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  |
| $\varnothing P$ | 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



Terminals: 1 - Gate  
2 - Drain  
3 - Source  
Tab - Drain

| 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.

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