

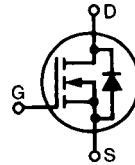
# HiPerFET™ Power MOSFETs Q-Class

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

IXFH 40N30Q  
IXFT 40N30Q

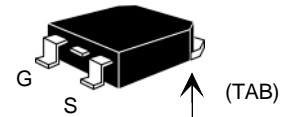
$V_{DSS} = 300 \text{ V}$   
 $I_{D25} = 40 \text{ A}$   
 $R_{DS(on)} = 80 \text{ m}\Omega$   
 $t_{rr} \leq 250 \text{ ns}$

Preliminary data sheet

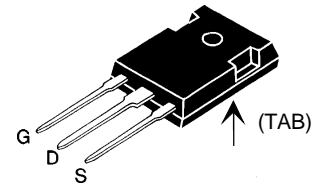


| Symbol    | Test Conditions   | Maximum Ratings |                  |
|-----------|---|-----------------|------------------|
| $V_{DSS}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$   | 300             | V                |
| $V_{DGR}$ | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$  | 300             | V                |
| $V_{GS}$  | Continuous  | $\pm 20$        | V                |
| $V_{GSM}$ | Transient   | $\pm 30$        | V                |
| $I_{D25}$ | $T_C = 25^\circ\text{C}$  | 40              | A                |
| $I_{DM}$  | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$  | 160             | A                |
| $I_{AR}$  | $T_C = 25^\circ\text{C}$  | 40              | A                |
| $E_{AR}$  | $T_C = 25^\circ\text{C}$  | 30              | mJ               |
| $E_{AS}$  | $T_C = 25^\circ\text{C}$  | 1.0             | J                |
| $dv/dt$   | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2 \Omega$ | 5               | V/ns             |
| $P_D$     | $T_C = 25^\circ\text{C}$  | 300             | W                |
| $T_J$     |   | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$  |   | 150             | $^\circ\text{C}$ |
| $T_{stg}$ |   | -55 ... +150    | $^\circ\text{C}$ |
| $T_L$     | 1.6 mm (0.062 in.) from case for 10 s   | 300             | $^\circ\text{C}$ |
| $M_d$     | Mounting torque   | 1.13/10         | Nm/lb.in.        |
| Weight    |   | TO-247          | 6 g              |
|           |   | TO-268          | 4 g              |

### TO-268 (IXFT) Case Style



### TO-247 AD (IXFH)



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

### Features

- IXYS advanced low  $Q_g$  process
- International standard packages
- Low gate charge and capacitance
  - easier to drive
  - faster switching
- Low  $R_{DS(on)}$
- Unclamped Inductive Switching (UIS) rated
- Molding epoxies meet UL 94 V-0 flammability classification

### Advantages

- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                     | Characteristic Values |      |                      |
|--------------|---|-----------------------|------|----------------------|
|              |   | Min.                  | Typ. | Max.                 |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$  | 300                   |      | V                    |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4 \text{ mA}$  | 2.0                   |      | V                    |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$   |                       |      | $\pm 100 \text{ nA}$ |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $T_J = 25^\circ\text{C}$   |                       |      | 25 $\mu\text{A}$     |
|              | $V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$  |                       |      | 1 mA                 |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 I_{D25}$<br>Pulse test, $t \leq 300 \mu\text{s}$ , duty cycle $d \leq 2\%$ |                       |      | 80 $\text{m}\Omega$  |

| Symbol       | Test Conditions   | Characteristic Values  |      |          |
|--------------|---|--|------|----------|
|              |   | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ |      |          |
|              |   | Min.   | Typ. | Max.     |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ , pulse test  | 22   | 30   | S        |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                     |  | 3100 | pF       |
| $C_{oss}$    |   |  | 650  | pF       |
| $C_{rss}$    |   |  | 150  | pF       |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$<br>$R_G = 1.5\ \Omega$ (External) |  | 20   | ns       |
| $t_r$        |   |  | 35   | ns       |
| $t_{d(off)}$ |   |  | 40   | ns       |
| $t_f$        |   |  | 12   | ns       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$                                   |  | 95   | 140 nC   |
| $Q_{gs}$     |   |  | 25   | 35 nC    |
| $Q_{gd}$     |   |  | 54   | 70 nC    |
| $R_{thJC}$   | (TO-247)  |  |      | 0.42 K/W |
| $R_{thCK}$   |   |  | 0.25 | K/W      |

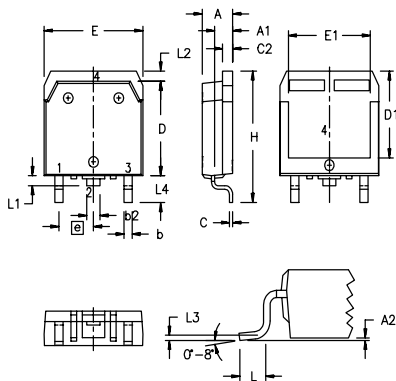
### TO-247 AD (IXFH) Outline



| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | Min.       | Max.  | Min.   | Max.  |
| A    | 19.81      | 20.32 | 0.780  | 0.800 |
| B    | 20.80      | 21.46 | 0.819  | 0.845 |
| C    | 15.75      | 16.26 | 0.610  | 0.640 |
| D    | 3.55       | 3.65  | 0.140  | 0.144 |
| E    | 4.32       | 5.49  | 0.170  | 0.216 |
| F    | 5.4        | 6.2   | 0.212  | 0.244 |
| G    | 1.65       | 2.13  | 0.065  | 0.084 |
| H    | -          | 4.5   | -      | 0.177 |
| J    | 1.0        | 1.4   | 0.040  | 0.055 |
| K    | 10.8       | 11.0  | 0.426  | 0.433 |
| L    | 4.7        | 5.3   | 0.185  | 0.209 |
| M    | 0.4        | 0.8   | 0.016  | 0.031 |
| N    | 1.5        | 2.49  | 0.087  | 0.102 |

| Symbol   | Test Conditions   | Characteristic Values  |      |               |
|----------|---|--|------|---------------|
|          |   | $(T_J = 25^\circ\text{C}, \text{ unless otherwise specified})$ |      |               |
|          |   | min.   | typ. | max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$   |  |      | 40 A          |
| $I_{SM}$ | Repetitive;   |  |      | 160 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         |
| $t_{rr}$ | $I_F = I_S$ -di/dt = 100 A/ $\mu\text{s}$ , $V_R = 100\text{ V}$                                      |  | 0.85 | 250 ns        |
| $Q_{RM}$ |   |  |      | $\mu\text{C}$ |
| $I_{RM}$ |   |  | 8    | A             |

### TO-268AA (D<sup>3</sup> PAK)



| 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 |
| L <sub>1</sub> | 1.20       | 1.40  | .047     | .055 |
| L <sub>2</sub> | 1.00       | 1.15  | .039     | .045 |
| L <sub>3</sub> | 0.25 BSC   |       | .010 BSC |      |
| L <sub>4</sub> | 3.80       | 4.10  | .150     | .161 |

### Min. Recommended Footprint

