# IXYS

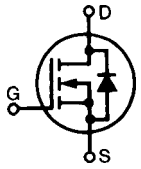
## HiPerFET™ Power MOSFETs Q-Class

N-Channel Enhancement Mode
Avalanche Rated, High dv/dt, Low $t_{rr}$
Low Gate Charge and Capacitances

Preliminary data

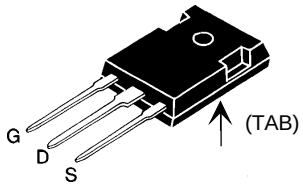
**IXFH 52N30Q**
**IXFK 52N30Q**
**IXFT 52N30Q**

$V_{DSS}$ = 300 V
$I_{D25}$ = 52 A
$R_{DS(on)}$ = 60 mΩ
$t_{rr}$ ≤ 250 ns

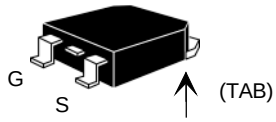



| Symbol | Test Conditions | | Maximum Ratings | |
|---|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | | 300 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C; $R_{GS}$ = 1 MΩ | | 300 | V |
| $V_{GS}$ | Continuous | | ±20 | V |
| $V_{GSM}$ | Transient | | ±30 | V |
| $I_{D25}$ | $T_C$ = 25°C, Chip capability | | 52 | A |
| $I_{DM}$ | $T_C$ = 25°C, pulse width limited by $T_{JM}$ | | 208 | A |
| $I_{AR}$ | $T_C$ = 25°C | | 52 | A |
| $E_{AR}$ | $T_C$ = 25°C | | 30 | mJ |
| $E_{AS}$ | $T_C$ = 25°C | | 1.5 | J |
| dv/dt | $I_S \le I_{DM}$, di/dt ≤ 100 A/μs, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$, $R_G$ = 2 Ω | | 5 | V/ns |
| $P_D$ | $T_C$ = 25°C | | 360 | W |
| $T_J$ | | | -55 ... +150 | °C |
| $T_{JM}$ | | | 150 | °C |
| $T_{stg}$ | | | -55 ... +150 | °C |
| $T_L$ | 1.6 mm (0.063 in) from case for 10 s | | 300 | °C |
| $M_d$ | Mounting torque | TO-247 | 1.13/10 | Nm/lb.in. |
| | | TO-264 | 0.9/6 | Nm/lb.in. |
| Weight | | TO-247 | 6 | g |
| | | TO-264 | 10 | g |
| | | TO-268 | 4 | g |

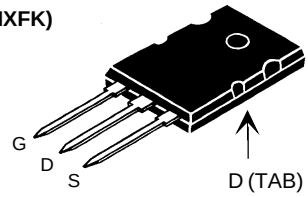
**TO-247 AD (IXFH)**




**TO-268 (D3) ( IXFT)**




**TO-264 AA (IXFK)**




G = Gate
S = Source
TAB = Drain

| Symbol | Test Conditions | | Characteristic Values ($T_J$ = 25°C, unless otherwise specified) min. | typ. | max. | |
|---|---|---|---|---|---|---|
| $V_{DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 1 mA | | 300 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 4 mA | | 2 | | 4 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20 $V_{DC}$, $V_{DS}$ = 0 | | | | ±200 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$ | $T_J$ = 25°C | | | 50 | μA |
| | $V_{GS}$ = 0 V | $T_J$ = 125°C | | | 1 | mA |
| $R_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D = 0.5 \bullet I_{D25}$ Pulse test, t ≤ 300 μs, duty cycle d ≤ 2 % | | | | 60 | mΩ |

**Features**

- Low gate charge
- International standard packages
- Epoxy meet UL 94 V-0, flammability classification
- Low $R_{DS\ (on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Avalanche energy and current rated
- Fast intrinsic Rectifier

**Advantages**

- Easy to mount
- Space savings
- High power density

IXYS reserves the right to change limits, test conditions, and dimensions.



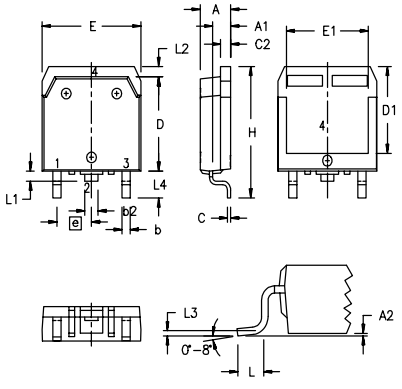
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| Symbol | Test Conditions ($T_J$ = 25°C, unless otherwise specified) | min. | typ. | max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 10 V; $I_D$ = 0.5 • $I_{D25}$, pulse test | 22 | 35 | | S |
| $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | | 5300 | | pF |
| $C_{oss}$ | | | 1010 | | pF |
| $C_{rss}$ | | | 200 | | pF |
| $t_{d(on)}$ | $V_{GS}$ = 10 V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 0.5 • $I_{D25}$<br>$R_G$ = 1.5 Ω (External), | | 27 | | ns |
| $t_r$ | | | 60 | | ns |
| $t_{d(off)}$ | | | 80 | | ns |
| $t_f$ | | | 25 | | ns |
| $Q_{g(on)}$ | $V_{GS}$ = 10 V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 0.5 • $I_{D25}$ | | 150 | | nC |
| $Q_{gs}$ | | | 34 | | nC |
| $Q_{gd}$ | | | 75 | | nC |
| $R_{thJC}$ | | | | 0.35 | K/W |
| $R_{thCK}$ | TO-247 | | 0.25 | | K/W |
| | TO-264 | | 0.15 | | K/W |

**Source-Drain Diode**

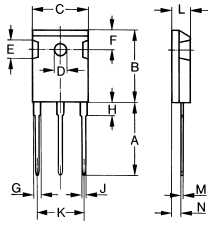
| Symbol | Test Conditions ($T_J$ = 25°C, unless otherwise specified) | min. | typ. | max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0 V | | | 52 | A |
| $I_{SM}$ | Repetitive; pulse width limited by $T_{JM}$ | | | 208 | A |
| $V_{SD}$ | $I_F$ = $I_S$, $V_{GS}$ = 0 V,<br>Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 % | | | 1.5 | V |
| $t_{rr}$ | $I_F$ = $I_S$ -di/dt = 100 A/µs, $V_R$ = 100 V | | | 250 | ns |
| $Q_{RM}$ | | | 1 | | µC |
| $I_{RM}$ | | | 8 | | A |

**TO-268AA ($D^3$ PAK)**



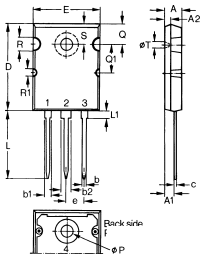

| Dim. | Millimeter Min. | Max. | Inches Min. | Max. |
|---|---|---|---|---|
| A | 4.9 | 5.1 | .193 | .201 |
| $A_1$ | 2.7 | 2.9 | .106 | .114 |
| $A_2$ | .02 | .25 | .001 | .010 |
| b | 1.15 | 1.45 | .045 | .057 |
| $b_2$ | 1.9 | 2.1 | .75 | .83 |
| C | .4 | .65 | .016 | .026 |
| D | 13.80 | 14.00 | .543 | .551 |
| E | 15.85 | 16.05 | .624 | .632 |
| $E_1$ | 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 BSC | | .010 BSC | |
| L4 | 3.80 | 4.10 | .150 | .161 |

**TO-247 AD (IXFH) Outline**



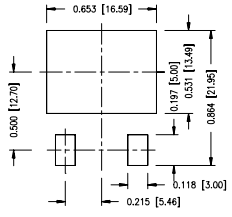

| Dim. | Millimeter Min. | Max. | Inches Min. | Max. |
|---|---|---|---|---|
| A | 19.81 | 20.32 | 0.780 | 0.800 |
| B | 20.80 | 21.46 | 0.819 | 0.845 |
| C | 15.75 | 16.26 | 0.610 | 0.640 |
| D | 3.55 | 3.65 | 0.140 | 0.144 |
| E | 4.32 | 5.49 | 0.170 | 0.216 |
| F | 5.4 | 6.2 | 0.212 | 0.244 |
| G | 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 |

**TO-264 AA Outline**




| Dim. | Millimeter Min. | Max. | Inches Min. | Max. |
|---|---|---|---|---|
| A | 4.82 | 5.13 | .190 | .202 |
| A1 | 2.54 | 2.89 | .100 | .114 |
| A2 | 2.00 | 2.10 | .079 | .083 |
| b | 1.12 | 1.42 | .044 | .056 |
| b1 | 2.39 | 2.69 | .094 | .106 |
| b2 | 2.90 | 3.09 | .114 | .122 |
| c | 0.53 | 0.83 | .021 | .033 |
| D | 25.91 | 26.16 | 1.020 | 1.030 |
| E | 19.81 | 19.96 | .780 | .786 |
| e | 5.46 BSC | | .215 BSC | |
| J | 0.00 | 0.25 | .000 | .010 |
| K | 0.00 | 0.25 | .000 | .010 |
| L | 20.32 | 20.83 | .800 | .820 |
| L1 | 2.29 | 2.59 | .090 | .102 |
| P | 3.17 | 3.66 | .125 | .144 |
| Q | 6.07 | 6.27 | .239 | .247 |
| Q1 | 8.38 | 8.69 | .330 | .342 |
| R | 3.81 | 4.32 | .150 | .170 |
| R1 | 1.78 | 2.29 | .070 | .090 |
| S | 6.04 | 6.30 | .238 | .248 |
| T | 1.57 | 1.83 | .062 | .072 |

**Min. Recommended Footprint**




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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




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