

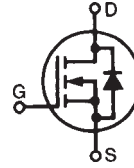
PolarHV™ HiPerFET IXFP 3N50PM

Power MOSFET

(Electrically Isolated Tab)

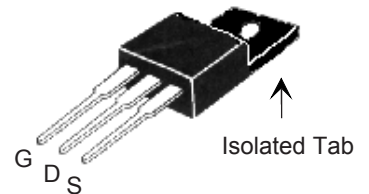
$$\begin{aligned}
 V_{DSS} &= 500 \text{ V} \\
 I_{D25} &= 2.7 \text{ A} \\
 R_{DS(on)} &\leq 2.0 \ \Omega \\
 t_{rr} &\leq 200 \text{ ns}
 \end{aligned}$$

N-Channel Enhancement Mode
 Avalanche Rated
 Fast Intrinsic Diode



| Symbol | Test Conditions | Maximum Ratings | |
|---------------|--|-----------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 500 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$ | 500 | V |
| V_{GSS} | Continuous | ± 30 | V |
| V_{GSM} | Transient | ± 40 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 2.7 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 8 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 3 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 10 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 100 | mJ |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 50 \ \Omega$ | 10 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 36 | 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 | $^\circ\text{C}$ |
| T_{SOLD} | Plastic body for 10 s | 260 | $^\circ\text{C}$ |
| M_d | Mounting torque | 1.13/10 | Nm/lb.in. |
| Weight | | 4 | g |

OVERMOLDED TO-220 (IXTP...M) OUTLINE



G = Gate D = Drain
 S = Source

Features

- † Plastic overmolded tab for electrical isolation
- † Fast intrinsic diode
- † International standard package
- † Unclamped Inductive Switching (UIS) rated
- † Low package inductance
 - easy to drive and to protect

Advantages

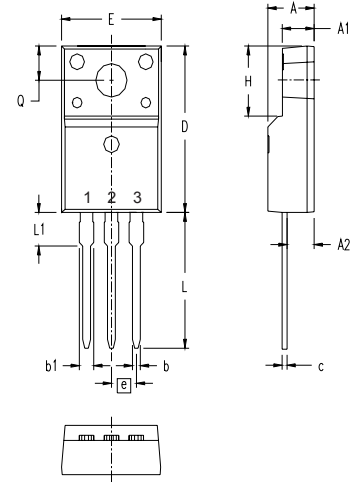
- † Easy to mount
- † Space savings
- † High power density

| Symbol | Test Conditions | Characteristic Values | | |
|--------------|---|-----------------------|------|--------------------------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 250 \ \mu\text{A}$ | 500 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250 \ \mu\text{A}$ | 3.0 | | 5.5 V |
| I_{GSS} | $V_{GS} = \pm 30 \text{ V}_{DC}$, $V_{DS} = 0$ | | | $\pm 100 \text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ $T_J = 125^\circ\text{C}$ | | | 5 μA 200 μA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = 1.8 \text{ A}$ Note 1 | | | 2.0 Ω |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|---------------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 1.8\text{ A}$, Note 1 | | 3.5 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 409 | pF |
| C_{oss} | | | 48 | pF |
| C_{rss} | | | 6.1 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 3.6\text{ A}$ $R_G = 50\ \Omega$ (External) | | 25 | ns |
| t_r | | | 28 | ns |
| $t_{d(off)}$ | | | 63 | ns |
| t_f | | | 29 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 1.8$ | | 9.3 | nC |
| Q_{gs} | | | 3.3 | nC |
| Q_{gd} | | | 3.4 | nC |
| R_{thJC} | | | 3.5 | $^\circ\text{C}/\text{W}$ |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$ unless otherwise specified) | | |
|----------|--|---|------|---------------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 3.6 A |
| I_{SM} | Repetitive | | | 5 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}$, Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 3.6\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}$, $V_R = 100\text{ V}, V_{GS} = 0\text{ V}$ | | | 200 ns |
| Q_{RM} | | | 0.1 | μC |
| I_{RM} | | | 0.5 | A |

- Notes:
- 1) Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$
 - 2) Test current $I_T = 2.5\text{ A}$

ISOLATED TO-220 (IXTP...M)


Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)

| SYM | INCHES | | MILLIMETERS | |
|---------------|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .177 | .193 | 4.50 | 4.90 |
| A1 | .092 | .108 | 2.34 | 2.74 |
| A2 | .101 | .117 | 2.56 | 2.96 |
| b | .028 | .035 | 0.70 | 0.90 |
| b1 | .050 | .058 | 1.27 | 1.47 |
| c | .018 | .024 | 0.45 | 0.60 |
| D | .617 | .633 | 15.67 | 16.07 |
| E | .392 | .408 | 9.96 | 10.36 |
| e | .100 BSC | | 2.54 BSC | |
| H | .255 | .271 | 6.48 | 6.88 |
| L | .499 | .523 | 12.68 | 13.28 |
| L1 | .119 | .135 | 3.03 | 3.43 |
| $\emptyset P$ | .121 | .129 | 3.08 | 3.28 |
| Q | .126 | .134 | 3.20 | 3.40 |

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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