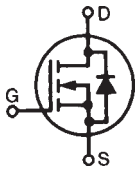
# IXYS

## PolarHV™ HiPerFET Power MOSFET
## (Electrically Isolated Tab)

**IXFP7N80PM**

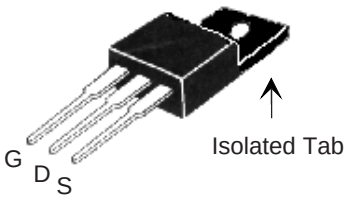
$V_{DSS}$ = 800 V
$I_{D25}$ = 3.5 A
$R_{DS(on)}$ ≤ 1.44 Ω
$t_{rr}$ ≤ 250 ns

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode




| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | 800 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C; $R_{GS}$ = 1 MΩ | 800 | V |
| $V_{GSS}$ | Continuous | ± 30 | V |
| $V_{GSM}$ | Transient | ± 40 | V |
| $I_{D25}$ | $T_C$ = 25°C | 3.5 | A |
| $I_{DM}$ | $T_C$ = 25°C, pulse width limited by $T_{JM}$ | 18 | A |
| $I_{AR}$ | $T_C$ = 25°C | 4 | A |
| $E_{AR}$ | $T_C$ = 25°C | 20 | mJ |
| $E_{AS}$ | $T_C$ = 25°C | 300 | mJ |
| dv/dt | $I_S \le I_{DM}$, di/dt ≤ 100 A/μs, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$, $R_G$ = 10 Ω | 10 | V/ns |
| $P_D$ | $T_C$ = 25°C | 50 | W |
| $T_J$ | | -55 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | -55 ... +150 | °C |
| $T_L$ | 1.6 mm (0.062 in.) from case for 10 s | 300 | °C |
| $T_{SOLD}$ | Plastic body for 10 s | 260 | °C |
| $M_d$ | Mounting torque | 1.13/10 | Nm/lb.in. |
| Weight | | 3.0 | 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 ($T_J$ = 25°C, unless otherwise specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0 V, $I_D$ = 250 μA | 800 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 1 mA | 3.0 | | 5.0 | V |
| $I_{GSS}$ | $V_{GS}$ = ±30 V, $V_{DS}$ = 0 V | | | ±100 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$, $V_{GS}$ = 0 V | | | 25 | μA |
| | $T_J$ = 125°C | | | 500 | μA |
| $R_{DS(on)}$ | $V_{GS}$ = 10 V, $I_D$ = 3.5 A, Note 1 | | | 1.44 | Ω |

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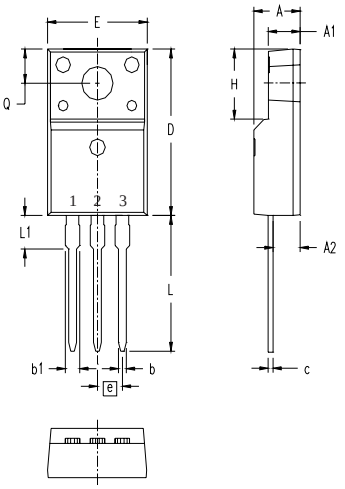
| Symbol | Test Conditions | Characteristic Values ($T_J$ = 25°C, unless otherwise specified) Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$= 20 V; $I_D$ = 3.5 A, Note 1 | 5 | 9.5 | | S |
| $C_{iss}$ | $V_{GS}$ = 0 V, $V_{DS}$ = 25 V, f = 1 MHz | | 1890 | | pF |
| $C_{oss}$ | | | 133 | | pF |
| $C_{rss}$ | | | 13 | | pF |
| $t_{d(on)}$ | $V_{GS}$ = 10 V, $V_{DS}$ = 0.5 $V_{DSS}$, $I_D$ = 4 A<br>$R_G$ = 10 Ω (External) | | 28 | | ns |
| $t_r$ | | | 32 | | ns |
| $t_{d(off)}$ | | | 55 | | ns |
| $t_f$ | | | 24 | | ns |
| $Q_{g(on)}$ | $V_{GS}$= 10 V, $V_{DS}$ = 0.5 $V_{DSS}$, $I_D$ = 6 A | | 32 | | nC |
| $Q_{gs}$ | | | 12 | | nC |
| $Q_{gd}$ | | | 9 | | nC |
| $R_{thJC}$ | | | | 2.5 | °C/W |

**Source-Drain Diode**

| Symbol | Test Conditions | Characteristic Values ($T_J$ = 25°C unless otherwise specified) Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0 V | | | 7 | A |
| $I_{SM}$ | Repetitive | | | 18 | A |
| $V_{SD}$ | $I_F$ = $I_S$, $V_{GS}$ = 0 V, Note 1 | | | 1.5 | V |
| $t_{rr}$ | $I_F$ = 7 A, -di/dt = 100 A/µs,<br>$V_R$ = 100 V, $V_{GS}$ = 0 V | | | 250 | ns |
| $Q_{RM}$ | | | 0.3 | | µC |
| $I_{RM}$ | | | 3 | | A |

Notes: 1) Pulse test, t ≤ 300 µs, duty cycle d ≤ 2 %

**ISOLATED TO-220 (IXFP...M)**




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

| SYM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS 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 |
| ØP | .121 | .129 | 3.08 | 3.28 |
| Q | .126 | .134 | 3.20 | 3.40 |

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

IXYS MOSFETs and IGBTs are covered by one or moreof the following U.S. patents: 4,835,592 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537

**Fig. 1. Output Characteristics @ 25ºC**

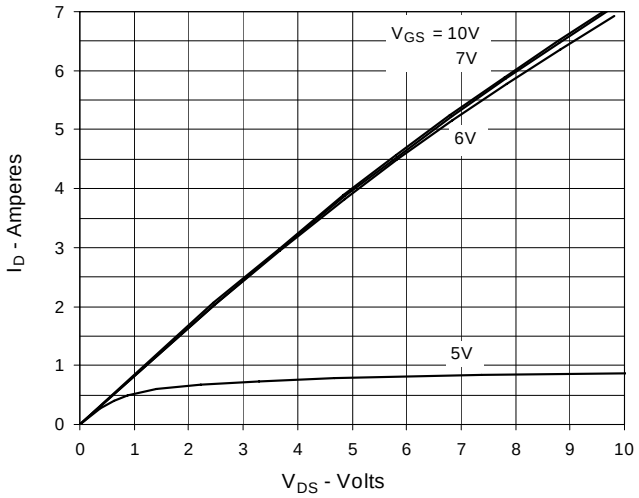



**Fig. 2. Extended Output Characteristics @ 25ºC**

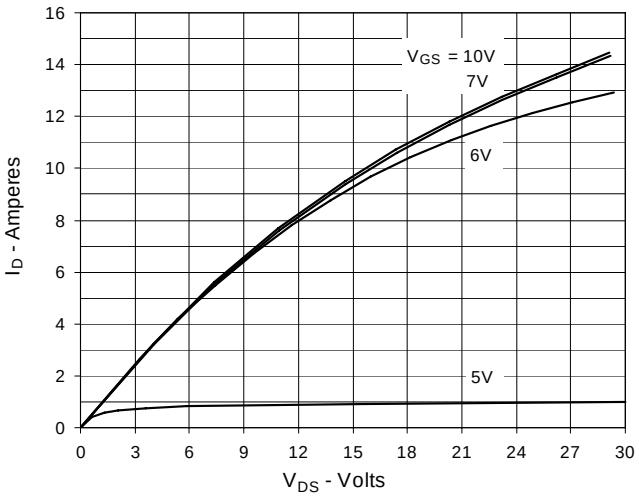



**Fig. 3. Output Characteristics @ 125ºC**

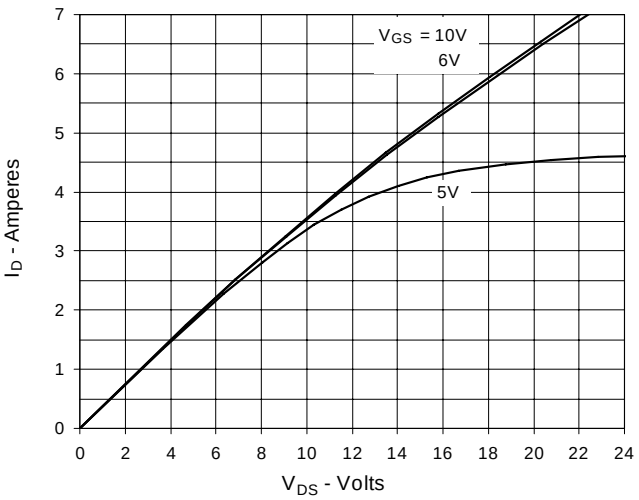



**Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 3.5A Value vs. Junction Temperature**

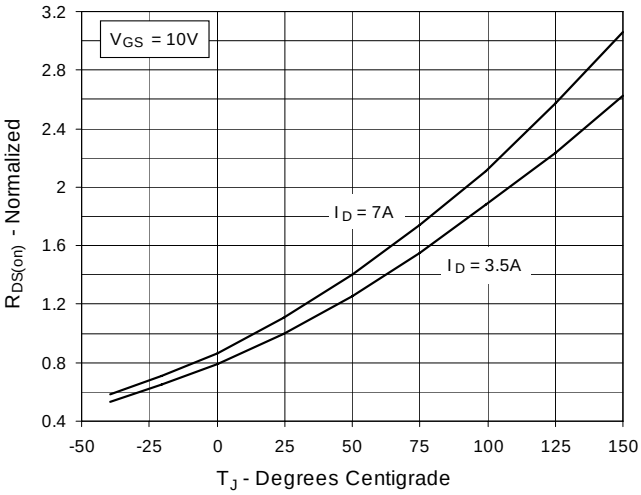



**Fig. 5. $R_{DS(on)}$ Normalized to $I_D$ = 3.5A Value vs. Drain Current**

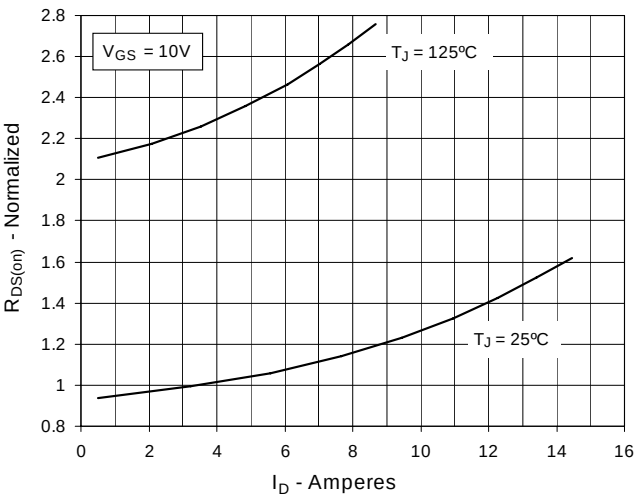
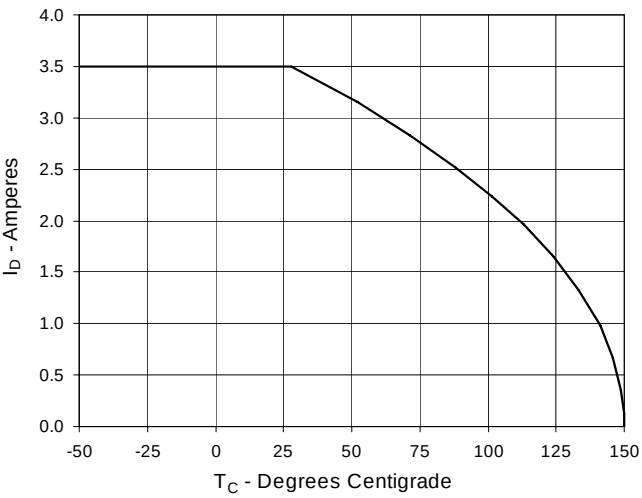



**Fig. 6. Maximum Drain Current vs. Case Temperature**




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**Fig. 7. Input Admittance**

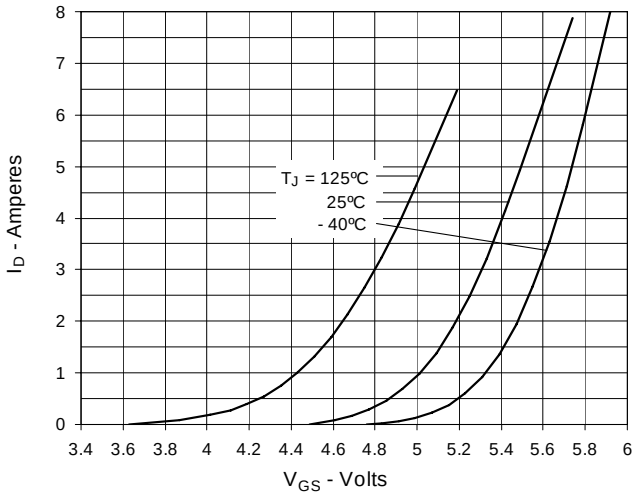



**Fig. 8. Transconductance**

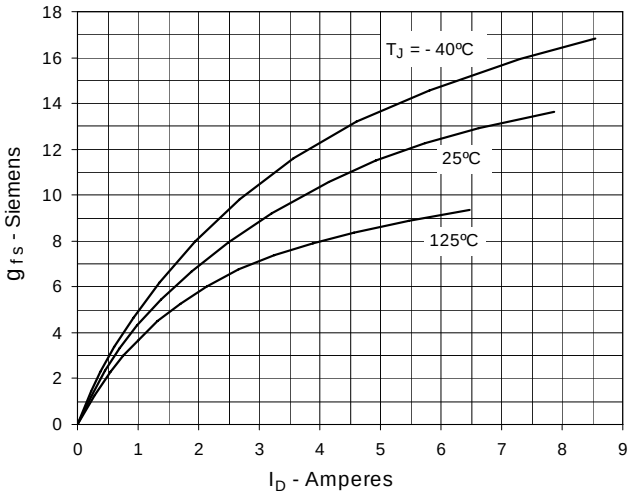



**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

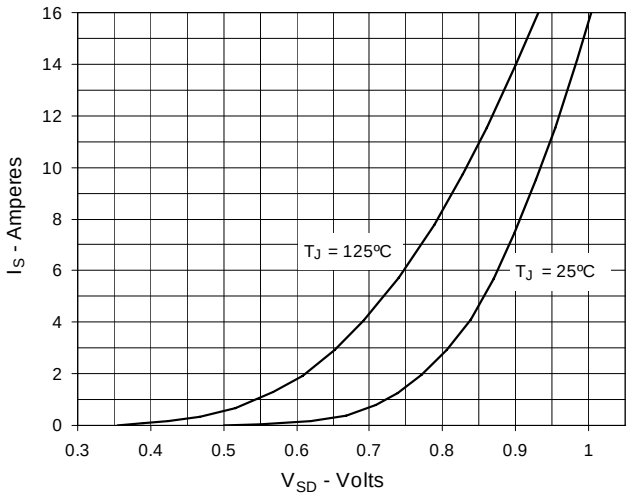



**Fig. 10. Gate Charge**

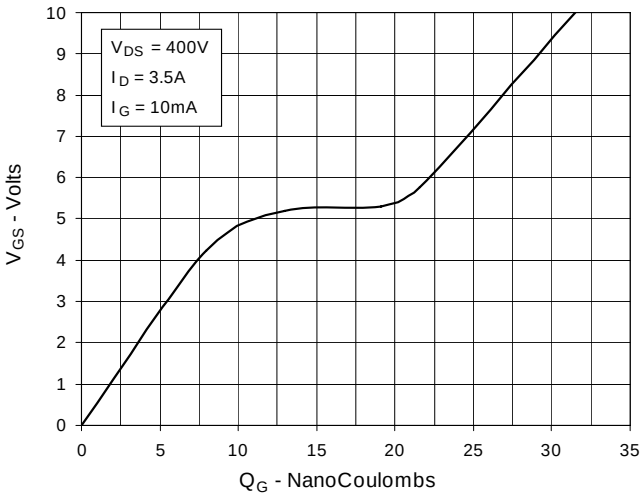



**Fig. 11. Capacitance**

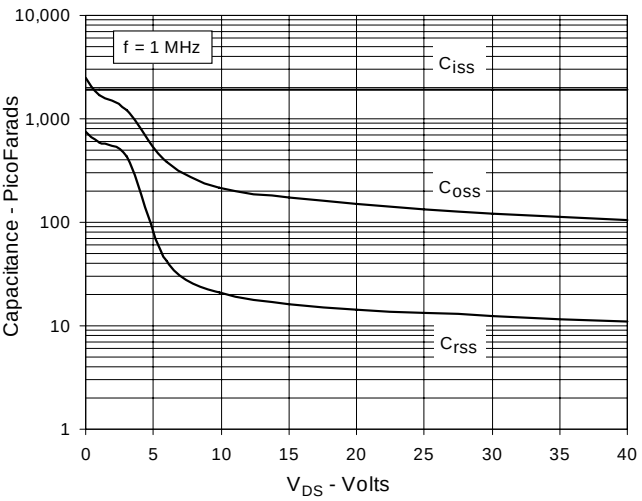
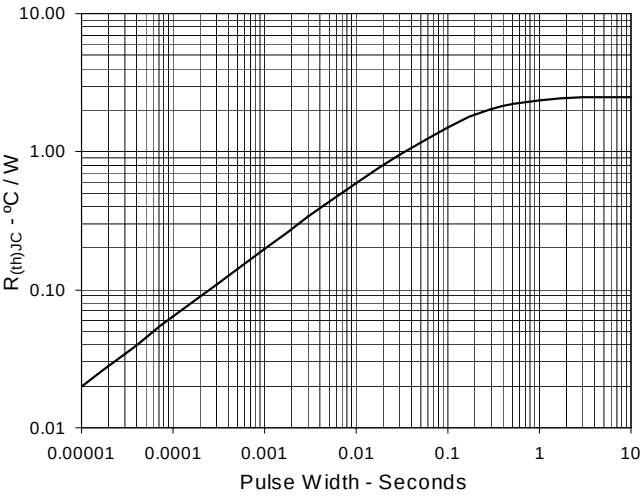



**Fig. 12. Maximum Transient Thermal Resistance**




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