IXYS

Preliminary Technical Information

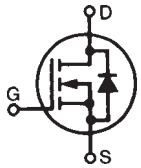
# PolarHV™ Power MOSFET

# IXTP18N60PM

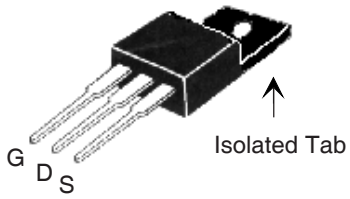
$V_{DSS}$ = 600V
$I_{D25}$ = 9A
$R_{DS(on)}$ ≤ 420mΩ

## (Electrically Isolated Tab)

N-Channel Enhancement Mode
Avalanche Rated




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




G = Gate D = Drain
S = Source

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | 600 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C, $R_{GS}$ = 1MΩ | 600 | V |
| $V_{GSS}$ | Continuous | ± 30 | V |
| $V_{GSM}$ | Transient | ± 40 | V |
| $I_{D25}$ | $T_C$ = 25°C | 9 | A |
| $I_{DM}$ | $T_C$ = 25°C, pulse width limited by $T_{JM}$ | 54 | A |
| $I_{AR}$ | $T_C$ = 25°C | 18 | A |
| $E_{AR}$ | $T_C$ = 25°C | 30 | mJ |
| $E_{AS}$ | $T_C$ = 25°C | 1 | J |
| dv/dt | $I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J$ =150°C | 10 | V/ns |
| $P_D$ | $T_C$ = 25°C | 90 | 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 | | 2.5 | g |

| Symbol | Test Conditions ($T_J$ = 25°C, unless otherwise specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 600 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 250μA | 3.0 | | 5.5 | V |
| $I_{GSS}$ | $V_{GS}$ = ±30V, $V_{DS}$ = 0V | | | ±100 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$ | | | 25 | μA |
| | $V_{GS}$ = 0V, $T_J$ = 125°C | | | 250 | μA |
| $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 9A, Note 1 | | | 420 | mΩ |

### Features

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

### Advantages

- Easy to mount
- Space savings

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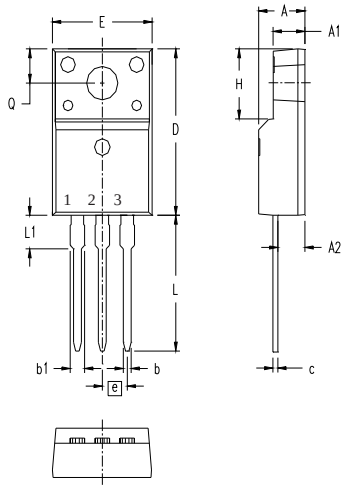
| Symbol | Test Conditions ($T_J$ = 25°C, unless otherwise specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 10V, $I_D$ = 9A, Note 1 | 9 | 16 | | S |
| $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | | 2500 | | pF |
| $C_{oss}$ | | | 278 | | pF |
| $C_{rss}$ | | | 23 | | pF |
| $t_{d(on)}$ | $V_{GS}$ = 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 10A<br>$R_G$ = 10Ω (External) | | 21 | | ns |
| $t_r$ | | | 22 | | ns |
| $t_{d(off)}$ | | | 62 | | ns |
| $t_f$ | | | 22 | | ns |
| $Q_{g(on)}$ | $V_{GS}$= 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 5A | | 49 | | nC |
| $Q_{gs}$ | | | 15 | | nC |
| $Q_{gd}$ | | | 17 | | nC |
| $R_{thJC}$ | | | | 1.39 | °C/W |

**Source-Drain Diode**

| Symbol | Test Conditions ($T_J$ = 25°C unless otherwise specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0V | | | 18 | A |
| $I_{SM}$ | Repetitive, pulse width limited by $T_{JM}$ | | | 54 | A |
| $V_{SD}$ | $I_F$ = $I_S$, $V_{GS}$ = 0V, Note 1 | | | 1.5 | V |
| $t_{rr}$ | $I_F$ = 18A, -di/dt = 100A/μs,<br>$V_R$ = 100V, $V_{GS}$ = 0V | | 500 | | ns |

**ISOLATED TO-220 (IXTP...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 |

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

**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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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 7,157,338B2

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

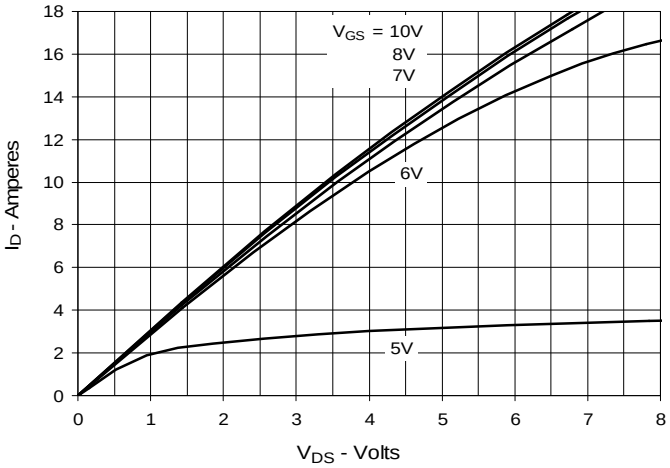


**Fig. 2. Extended Output Characteristics @ 25ºC**

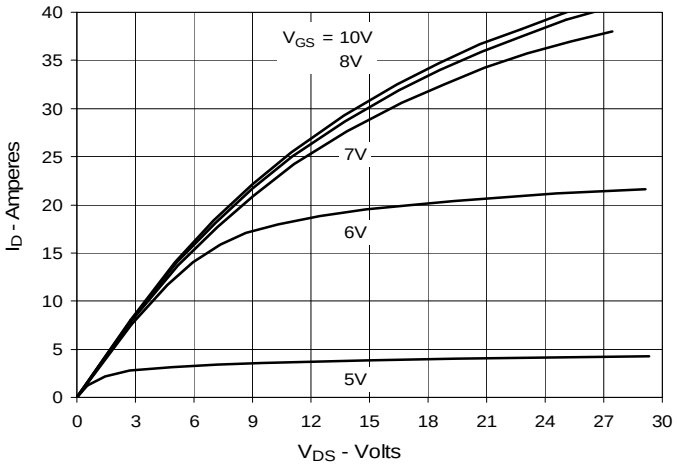


**Fig. 3. Output Characteristics @ 125ºC**

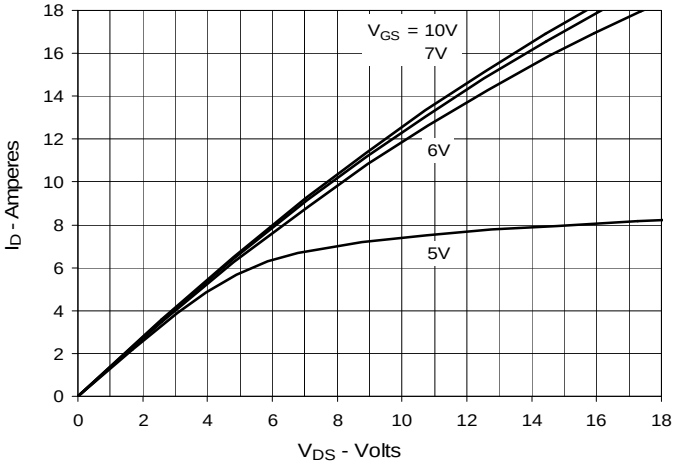


**Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 9A Value vs. Junction Temperature**

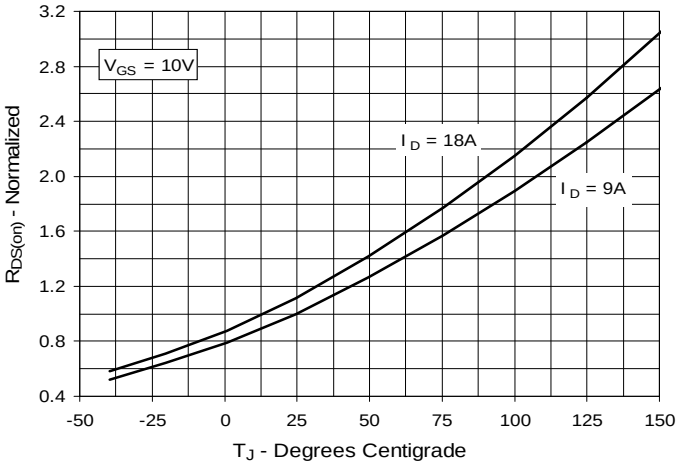


**Fig. 5. $R_{DS(on)}$ Normalized to $I_D$ = 9A Value vs. Drain Current**

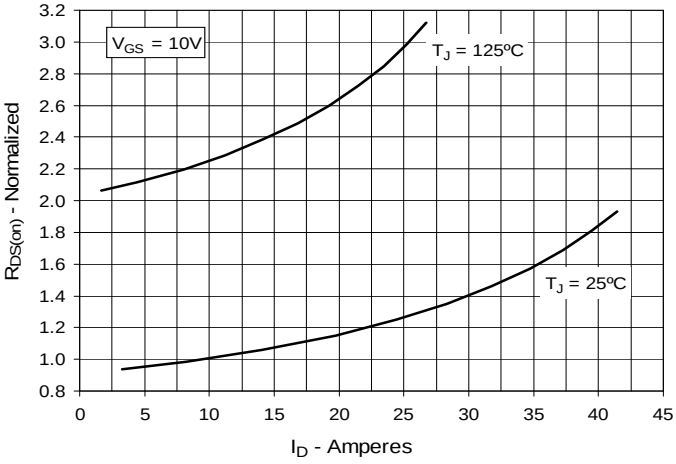


**Fig. 6. Maximum Drain Current vs. Case Temperature**

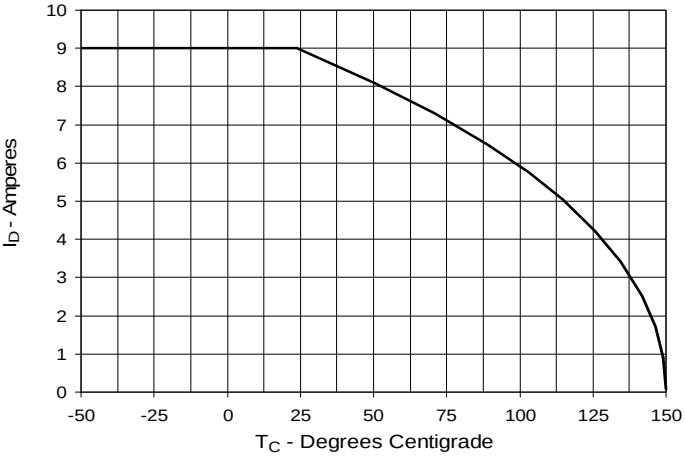


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**Fig. 7. Input Admittance**

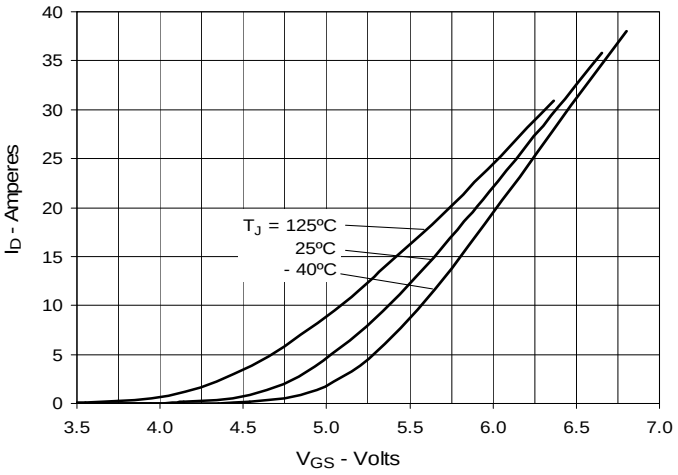



**Fig. 8. Transconductance**

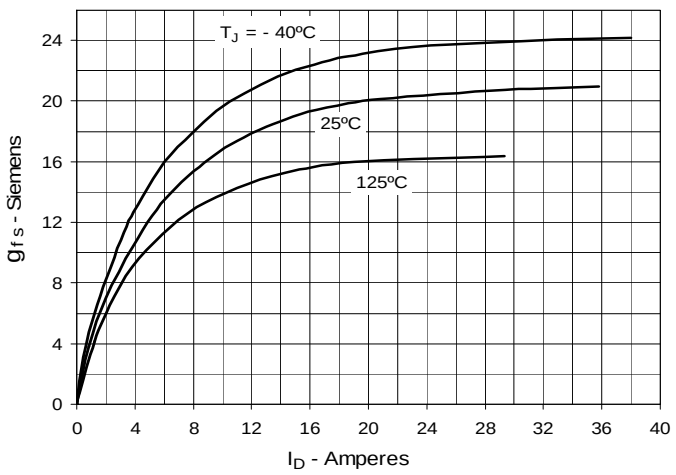



**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

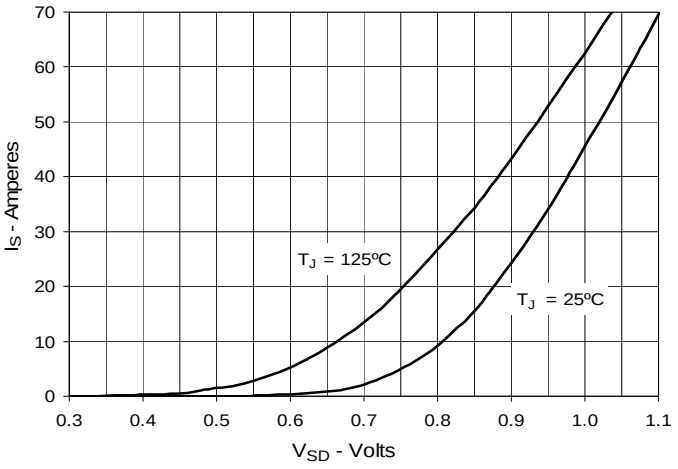



**Fig. 10. Gate Charge**

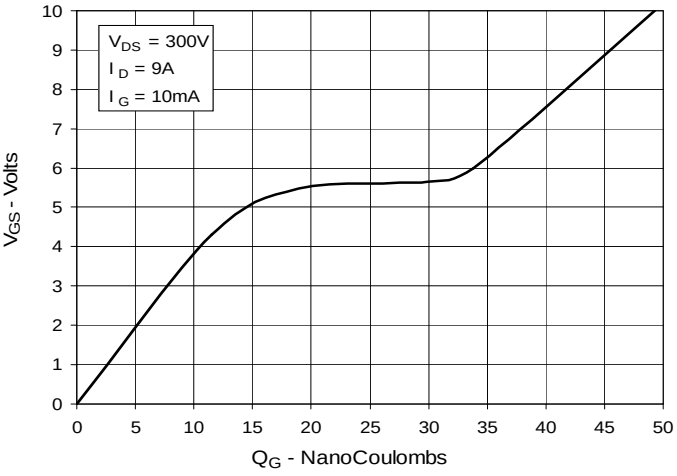



**Fig. 11. Capacitance**

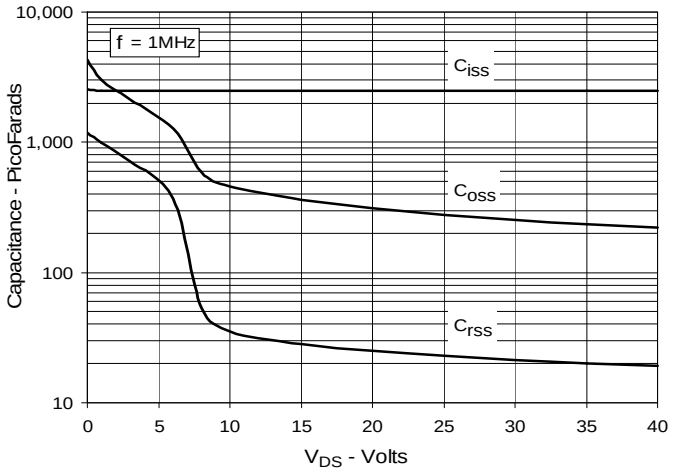
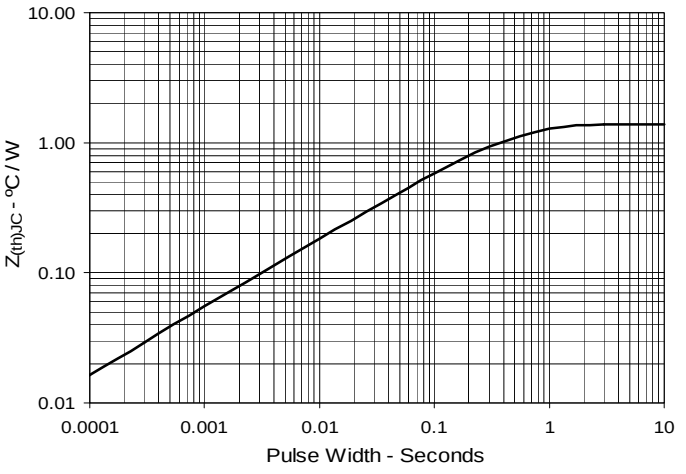



**Fig. 12. Maximum Transient Thermal Impedance**

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