

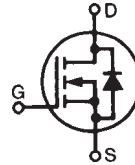
**Polar™ HiperFET™  
Power MOSFET**
**IXFP4N100PM**

$$V_{DSS} = 1000V$$

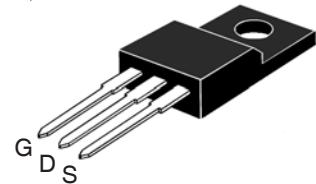
$$I_{D25} = 2.1A$$

$$R_{DS(on)} \leq 3.3\Omega$$

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



| Symbol        | Test Conditions  | Maximum Ratings |                  |
|---------------|--|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                             | 1000            | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GS} = 1 \text{ M}\Omega$ | 1000            | V                |
| $V_{GSS}$     | Continuous   | $\pm 20$        | V                |
| $V_{GSM}$     | Transient  | $\pm 30$        | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$   | 2.1             | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$                 | 8.0             | A                |
| $I_A$         | $T_C = 25^\circ\text{C}$   | 4.0             | A                |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$   | 200             | mJ               |
| $dv/dt$       | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J = 150^\circ\text{C}$      | 10              | V/ns             |
| $P_D$         | $T_C = 25^\circ\text{C}$   | 40              | 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.        |
| <b>Weight</b> |  | 2.5             | g                |

**OVERMOLDED**


G = Gate      D = Drain  
S = Source

**Features**

- Plastic Overmolded Tab for Electrical Isolation
- Avalanche Rated
- Fast Intrinsic Diode
- Low Package Inductance

**Advantages**

- High Power Density
- Easy to Mount
- Space Savings

**Applications**

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- Laser Drivers
- AC and DC Motor Drives
- Robotics and Servo Controls

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                                       |
|--------------|---|-----------------------|------|---------------------------------------|
|              |   | Min.                  | Typ. | Max.                                  |
| $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu\text{A}$   | 1000                  |      | V                                     |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$                                     | 3.0                   |      | 6.0 V                                 |
| $I_{GSS}$    | $V_{GS} = \pm 20V, V_{DS} = 0V$   |                       |      | $\pm 100 \text{ nA}$                  |
| $I_{DSS}$    | $V_{DS} = V_{DSS}, V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$                |                       |      | 10 $\mu\text{A}$<br>750 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 2A$ , Note 1   |                       |      | 3.3 $\Omega$                          |

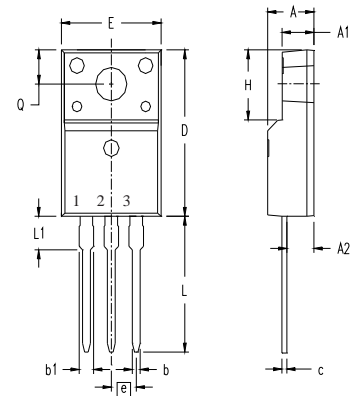
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)  | Characteristic Values |      |                        |
|--------------|--|-----------------------|------|------------------------|
|              |  | Min.                  | Typ. | Max.                   |
| $g_{fs}$     | $V_{DS} = 20\text{V}, I_D = 2\text{A}$ , Note 1  | 1.8                   | 3.0  | S                      |
| $C_{iss}$    | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$   |                       | 1456 | pF                     |
| $C_{oss}$    |  |                       | 90   | pF                     |
| $C_{rss}$    |  |                       | 16   | pF                     |
| $R_{Gi}$     | Gate Input Resistance  |                       | 1.6  | $\Omega$               |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 2\text{A}$<br>$R_G = 5\Omega$ (External) |                       | 24   | ns                     |
| $t_r$        |  |                       | 36   | ns                     |
| $t_{d(off)}$ |  |                       | 37   | ns                     |
| $t_f$        |  |                       | 50   | ns                     |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 2\text{A}$   |                       | 26   | nC                     |
| $Q_{gs}$     |  |                       | 9    | nC                     |
| $Q_{gd}$     |  |                       | 12   | nC                     |
| $R_{thJC}$   |  |                       |      | 3.1 $^\circ\text{C/W}$ |

### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                    | Characteristic Values |      |               |
|----------|--|-----------------------|------|---------------|
|          |  | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$   |                       |      | 4 A           |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$  |                       |      | 16 A          |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{V}$ , Note 1   |                       |      | 1.3 V         |
| $t_{rr}$ | $I_F = 2\text{A}, -di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}, V_{GS} = 0\text{V}$ |                       |      | 300 ns        |
| $Q_{RM}$ |  |                       | 0.34 | $\mu\text{C}$ |
| $I_{RM}$ |  |                       | 5.30 | A             |

Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

### OVERMOLDED TO-220 (IXFP...M)



Terminals: 1 - Gate  
2 - Drain  
3 - Source

| 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

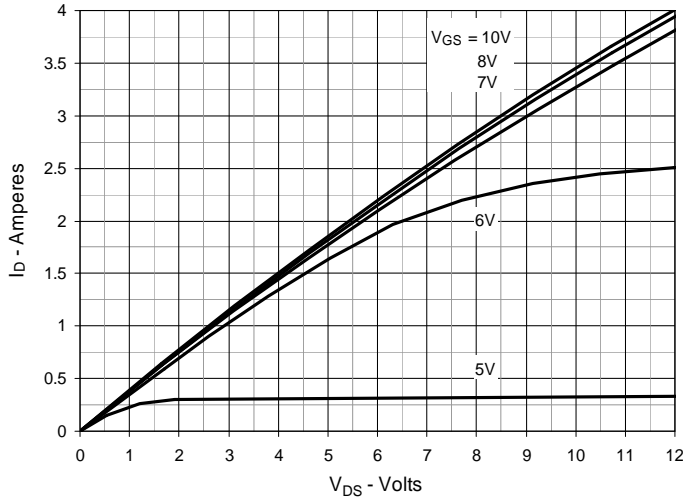
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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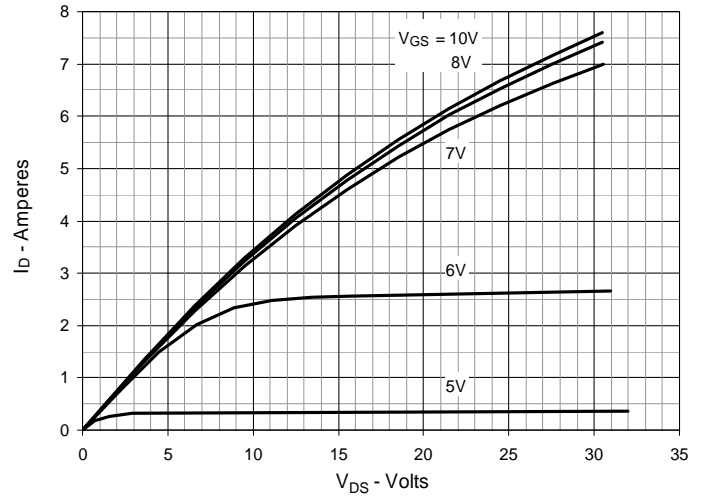
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 4,835,592 | 4,931,844 | 5,049,961 | 5,237,481 | 6,162,665    | 6,404,065 B1 | 6,683,344    | 6,727,585    | 7,005,734 B2 | 7,157,338B2 |
| 4,860,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343    | 6,710,405 B2 | 6,759,692    | 7,063,975 B2 |             |
| 4,881,106 | 5,034,796 | 5,187,117 | 5,486,715 | 6,306,728 B1 | 6,583,505    | 6,710,463    | 6,771,478 B2 | 7,071,537    |             |

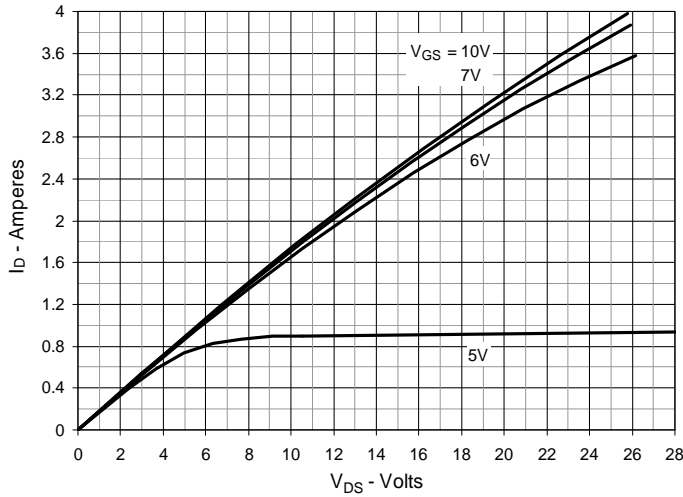
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



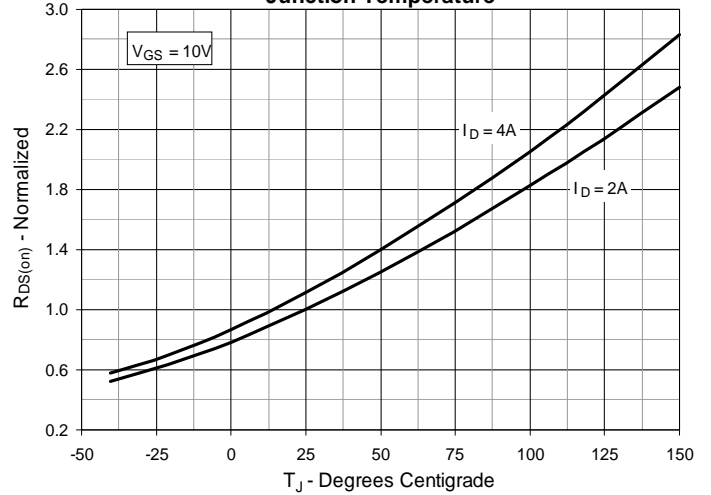
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



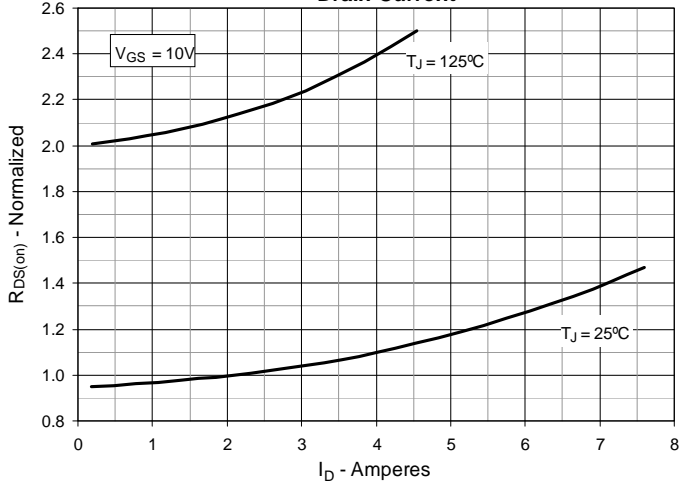
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



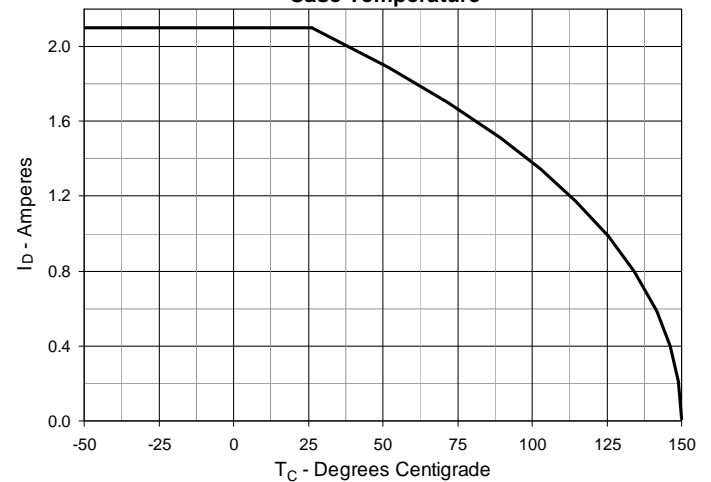
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 2\text{A}$  Value vs. Junction Temperature**



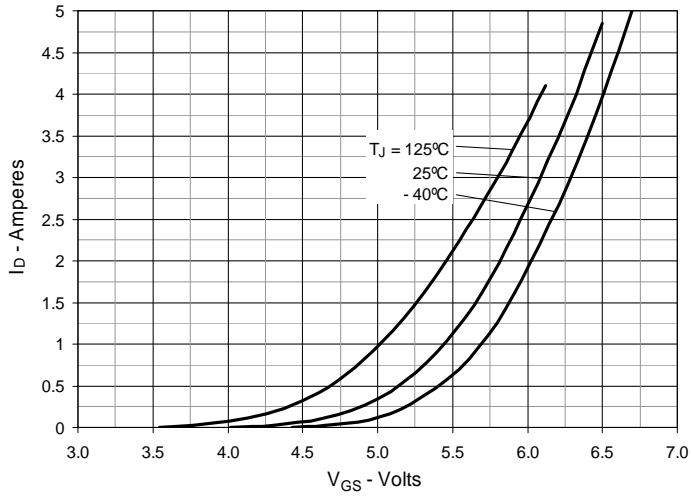
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 2\text{A}$  Value vs. Drain Current**



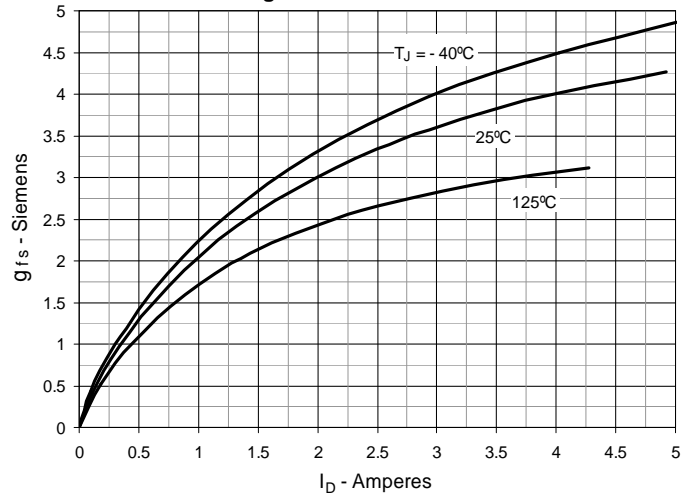
**Fig. 6. Maximum Drain Current vs. Case Temperature**



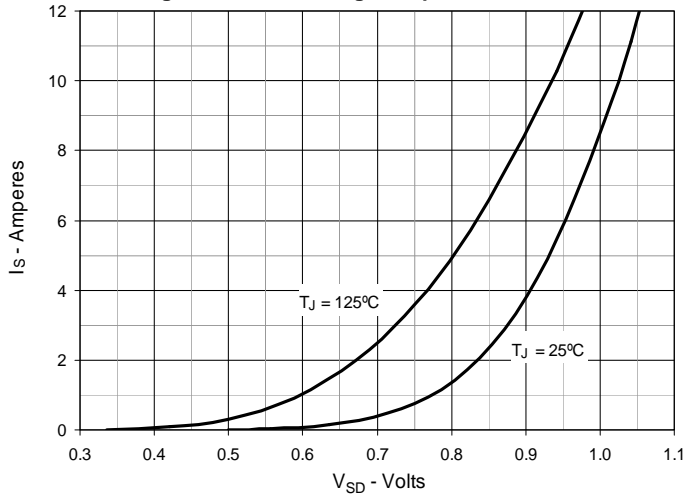
**Fig. 7. Input Admittance**



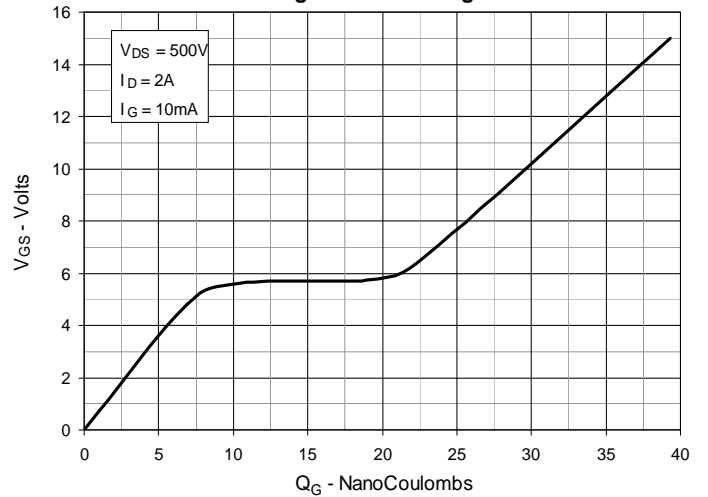
**Fig. 8. Transconductance**



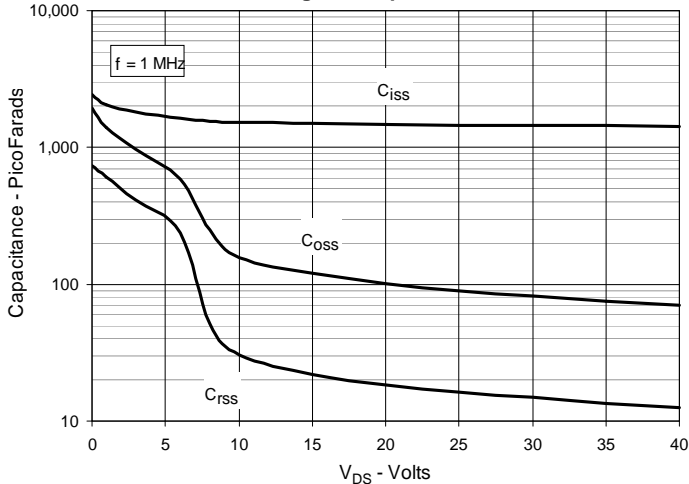
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



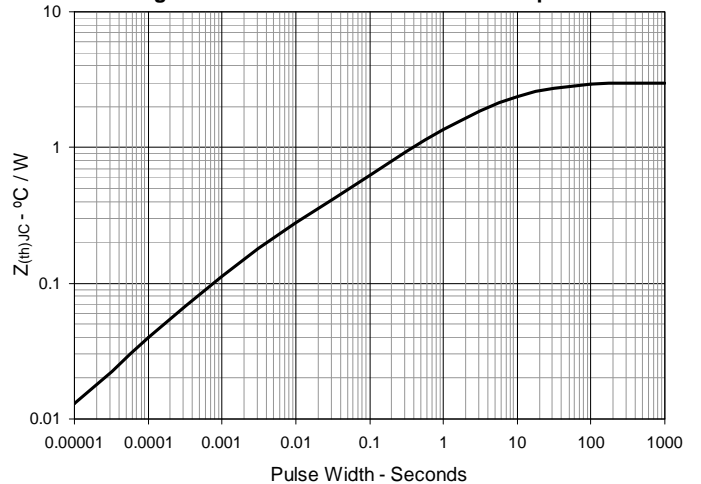
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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





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