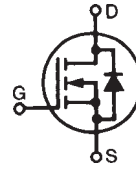


## PolarHV™ HiPerFET Power MOSFET

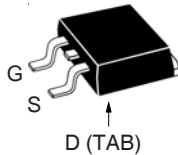
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

**IXFA10N80P**  
**IXFP10N80P**  
**IXFQ10N80P**  
**IXFH10N80P**

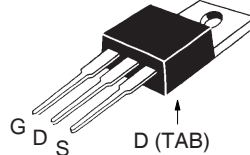


$V_{DSS} = 800V$   
 $I_{D25} = 10A$   
 $R_{DS(on)} \leq 1.1\Omega$   
 $t_{rr} \leq 250ns$

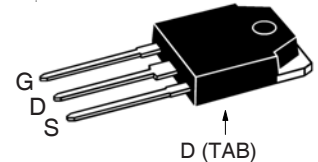
TO-263 AA (IXFA)



TO-220AB (IXFP)

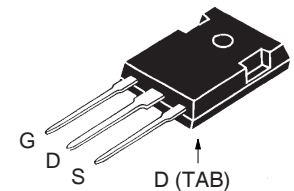


TO-3P (IXFQ)



| Symbol        | Test Conditions  | Maximum Ratings |            |
|---------------|--|-----------------|------------|
| $V_{DSS}$     | $T_J = 25^\circ C$ to $150^\circ C$                                | 800             | V          |
| $V_{DGR}$     | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 800             | V          |
| $V_{GSS}$     | Continuous   | $\pm 30$        | V          |
| $V_{GSM}$     | Transient  | $\pm 40$        | V          |
| $I_{D25}$     | $T_C = 25^\circ C$   | 10              | A          |
| $I_{DM}$      | $T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$               | 30              | A          |
| $I_A$         | $T_C = 25^\circ C$   | 5               | A          |
| $E_{AS}$      | $T_C = 25^\circ C$   | 600             | mJ         |
| $dV/dt$       | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 10              | V/ns       |
| $P_D$         | $T_C = 25^\circ C$   | 300             | W          |
| $T_J$         |  | -55 ... +150    | $^\circ C$ |
| $T_{JM}$      |  | 150             | $^\circ C$ |
| $T_{stg}$     |  | -55 ... +150    | $^\circ C$ |
| $T_L$         | 1.6mm (0.062) from Case for 10s                                    | 300             | $^\circ C$ |
| $T_{SOLD}$    | Plastic Body for 10s   | 260             | $^\circ C$ |
| $M_d$         | Mounting Torque (TO-220, TO-247)                                   | 1.13 / 10       | Nm/lb.in.  |
| <b>Weight</b> | TO-263   | 2.5             | g          |
|               | TO-220   | 3.0             | g          |
|               | TO-3P  | 5.5             | g          |
|               | TO-247   | 6.0             | g          |

TO-247 (IXFH)



G = Gate      D = Drain  
S = Source    TAB = Drain

### Features

- International Standard Packages
- Avalanche Rated
- Low Package Inductance
- Easy to Drive and to Protect

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

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

| Symbol       | Test Conditions<br>( $T_J = 25^\circ C$ Unless Otherwise Specified) | Characteristic Values |      |              |
|--------------|---|-----------------------|------|--------------|
|              |   | Min.                  | Typ. | Max.         |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu A$                                    | 800                   |      | V            |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 2.5mA$                                   | 3.0                   |      | V            |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                  |                       |      | $\pm 100$ nA |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 150^\circ C$           |                       |      | 25 $\mu A$   |
|              |   |                       |      | 500 $\mu A$  |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                 |                       |      | 1.1 $\Omega$ |

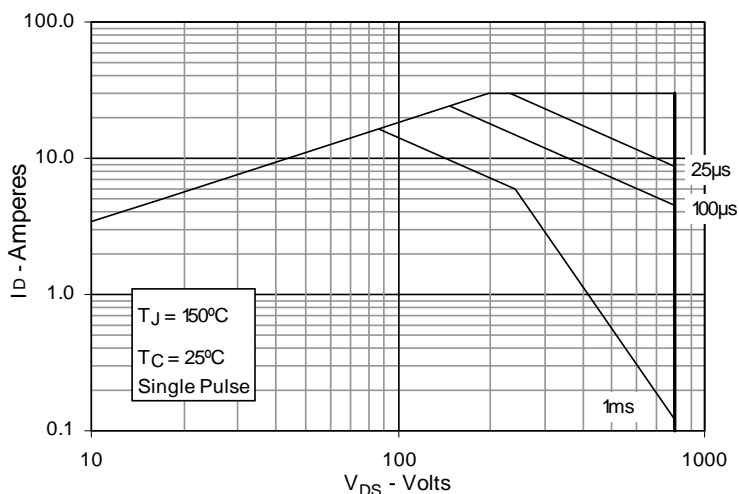
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)  | Characteristic Values |      |                         |
|--------------|--|-----------------------|------|-------------------------|
|              |  | Min.                  | Typ. | Max                     |
| $g_{fs}$     | $V_{DS} = 20\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1   | 7                     | 11   | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$   |                       | 2050 | pF                      |
| $C_{oss}$    |  |                       | 172  | pF                      |
| $C_{rss}$    |  |                       | 16   | pF                      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$<br>$R_G = 5\Omega$ (External) |                       | 21   | ns                      |
| $t_r$        |  |                       | 22   | ns                      |
| $t_{d(off)}$ |  |                       | 62   | ns                      |
| $t_f$        |  |                       | 22   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$   |                       | 40   | nC                      |
| $Q_{gs}$     |  |                       | 12   | nC                      |
| $Q_{gd}$     |  |                       | 14   | nC                      |
| $R_{thJC}$   |  |                       |      | 0.42 $^\circ\text{C/W}$ |
| $R_{thCS}$   | (TO-220)   |                       | 0.50 | $^\circ\text{C/W}$      |
| $R_{thCS}$   | (TO-247 & TO-3P)   |                       | 0.25 | $^\circ\text{C/W}$      |

### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                            | Characteristic Values |      |               |
|----------|--|-----------------------|------|---------------|
|          |  | Min.                  | Typ. | Max           |
| $I_S$    | $V_{GS} = 0\text{V}$   |                       |      | 10 A          |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$  |                       |      | 30 A          |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1  |                       |      | 1.5 V         |
| $t_{rr}$ | $I_F = 10\text{A}$ , $V_{GS} = 0\text{V}$<br>$-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ |                       | 200  | 250 ns        |
| $I_{RM}$ |  |                       | 3.0  | A             |
| $Q_{RM}$ |  |                       | 0.6  | $\mu\text{C}$ |

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

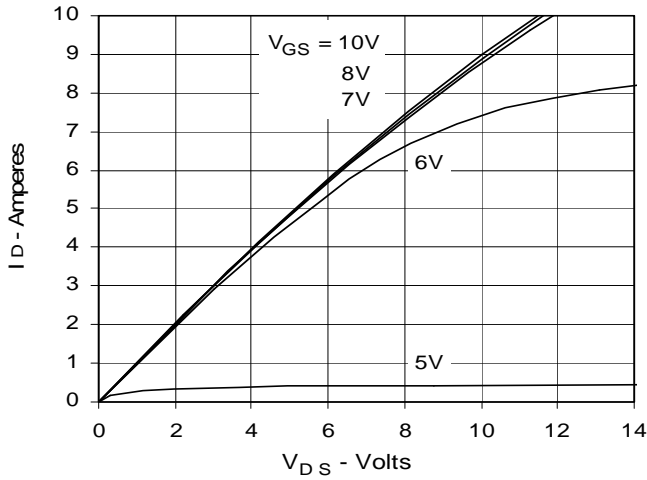
Fig. 1. Forward-Bias Safe Operating Area



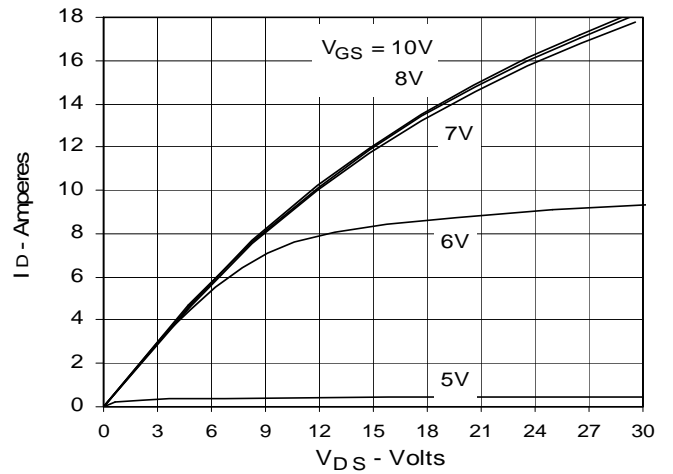
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

|  |           |           |           |           |              |              |              |              |              |             |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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 |
|  | 4,850,072 | 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    |             |

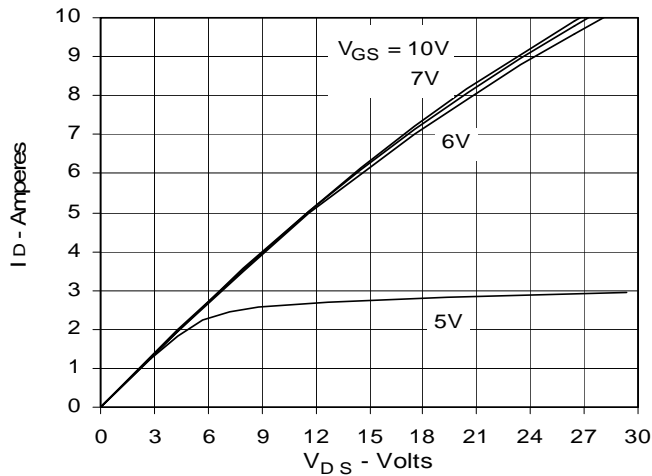
**Fig. 2. Output Characteristics**  
@ 25°C



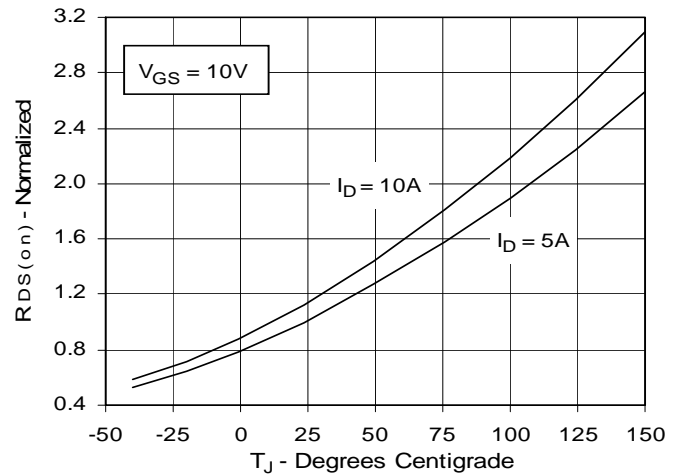
**Fig. 3. Extended Output Characteristics**  
@ 25°C



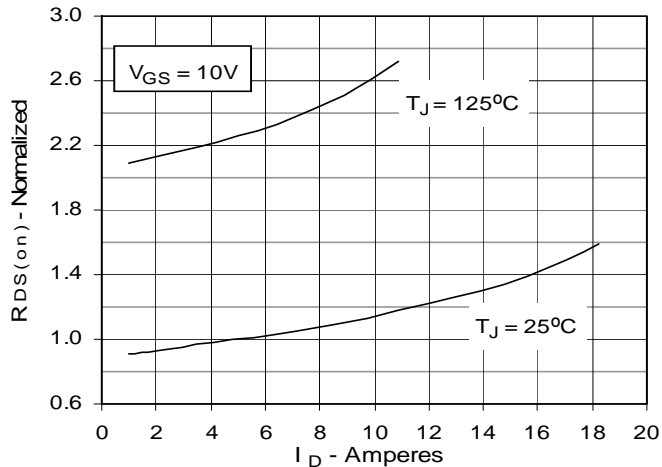
**Fig. 4. Output Characteristics**  
@ 125°C



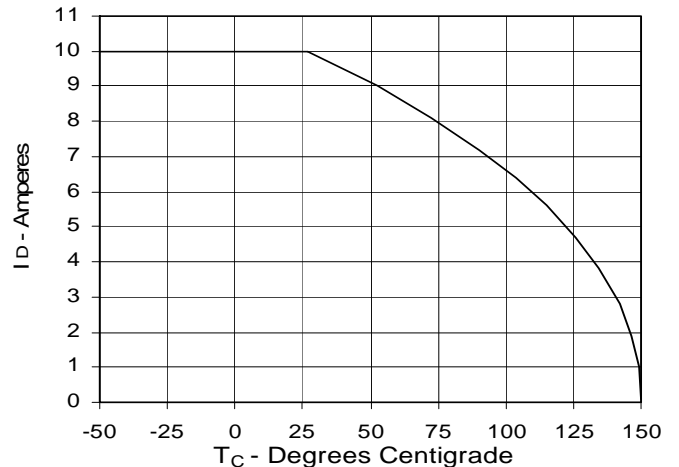
**Fig. 5.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs. Junction Temperature**



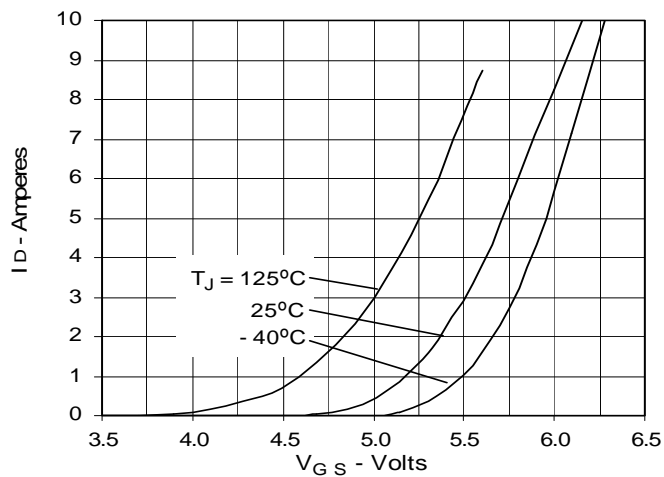
**Fig. 6.  $R_{DS(on)}$  Normalized to 0.5  $I_{D25}$  Value vs.  $I_D$**



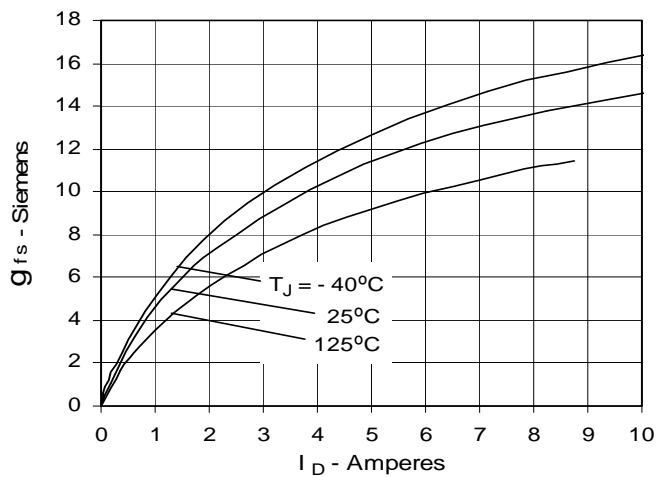
**Fig. 7. Drain Current vs. Case Temperature**



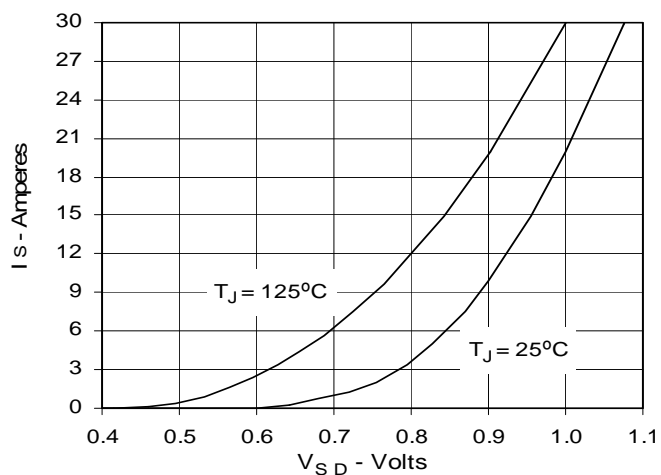
**Fig. 8. Input Admittance**



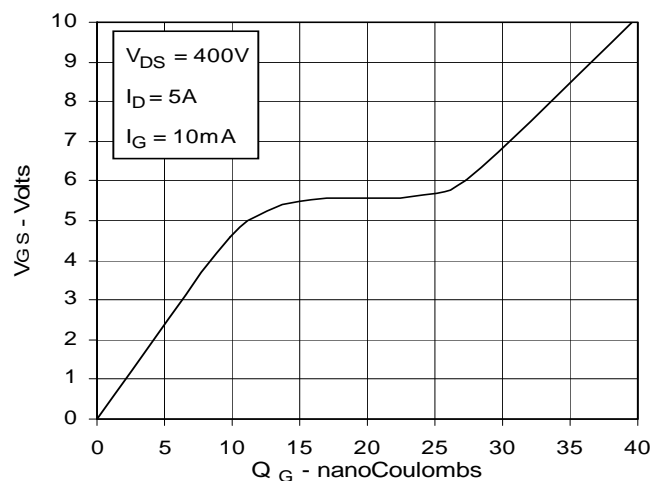
**Fig. 9. Transconductance**



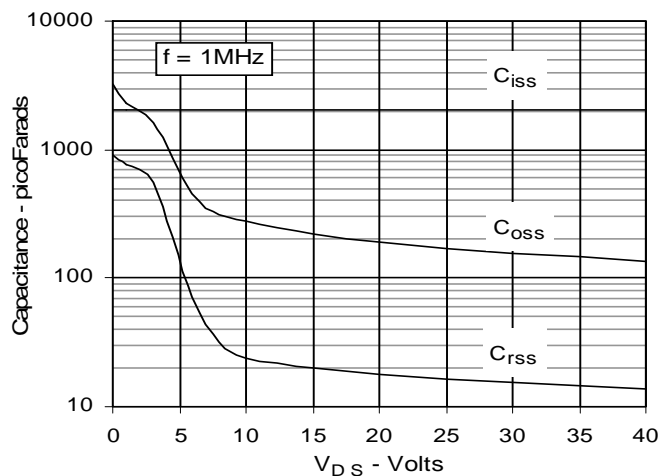
**Fig. 10. Source Current vs. Source-To-Drain Voltage**



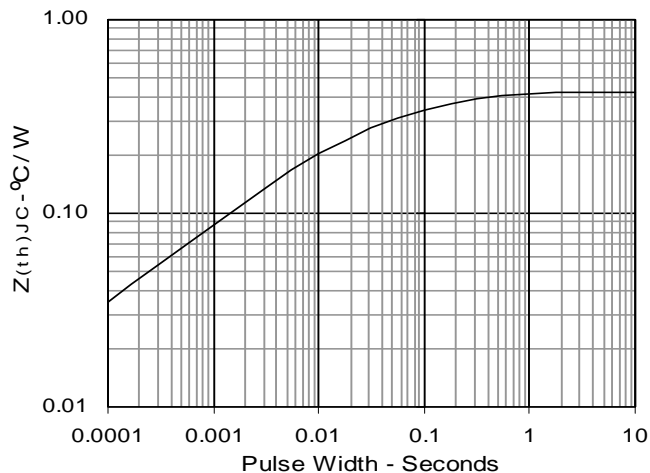
**Fig. 11. Gate Charge**



**Fig. 12. Capacitance**



**Fig. 13. Maximum Transient Thermal Impedance**





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