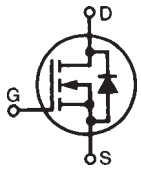
IXYS

Advance Technical Information

# HiPerFET™ Power MOSFET Q-Class

# IXFP4N100QM

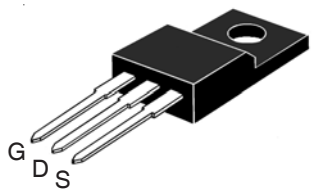
$V_{DSS}$ = 1000V
$I_{D25}$ = 2.2A
$R_{DS(on)}$ ≤ 3.0Ω




N-Channel Enhancement Mode
Avalanche Rated, Low $Q_g$, High dv/dt
Fast Intrinsic Diode

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | 1000 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C, $R_{GS}$ = 1MΩ | 1000 | V |
| $V_{GSS}$ | Continuous | ±20 | V |
| $V_{GSM}$ | Transient | ±30 | V |
| $I_{D25}$ | $T_C$ = 25°C | 2.2 | A |
| $I_{DM}$ | $T_C$ = 25°C, pulse width limited by $T_{JM}$ | 16 | A |
| $I_A$ | $T_C$ = 25°C | 4 | A |
| $E_{AS}$ | $T_C$ = 25°C | 700 | mJ |
| dv/dt | $I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$ | 5 | V/ns |
| $P_D$ | $T_C$ = 25°C | 46 | W |
| $T_J$ | | - 55 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | - 55 ... +150 | °C |
| $T_L$ | 1.6mm (0.062 in.) from case for 10s | 300 | °C |
| $T_{SOLD}$ | Plastic body for 10s | 260 | °C |
| $M_d$ | Mounting Torque | 1.13 / 10 | Nm/lb.in. |
| Weight | | 2.5 | g |

**OVERMOLDED (IXFP...M) OUTLINE**




G = Gate D = Drain
S = Source

## Features

- Plastic Overmolded Tab for Electrical Isolation
- International Standard Package
- Avalanche Rated
- Fast Intrinsic Diode
- Molding Epoxies meet UL 94 V-0 Flammability Classification

## Advantages

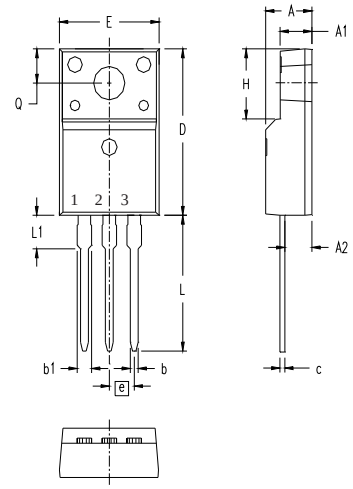
- High Power Density
- Easy to Mount
- Space Savings

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 1mA | 1000 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 1.5mA | 3.0 | | 5.0 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | | | ±100 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$, $V_{GS}$= 0V | | | 25 | μA |
| | $T_J$ = 125°C | | | 1 | mA |
| $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 2A, Note 1 | | | 3.0 | Ω |

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| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 20V, $I_D$ = 2A, Note 1 | 2.5 | 4.3 | | S |
| $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | | 1185 | | pF |
| $C_{oss}$ | | | 130 | | pF |
| $C_{rss}$ | | | 65 | | pF |
| $t_{d(on)}$ | **Resistive Switching Times** | | 17 | | ns |
| $t_r$ | $V_{GS}$ = 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 2A, | | 15 | | ns |
| $t_{d(off)}$ | $R_G$ = 4.7Ω (External) | | 32 | | ns |
| $t_f$ | | | 18 | | ns |
| $Q_{g(on)}$ | $V_{GS}$= 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 2A | | 43.5 | | nC |
| $Q_{gs}$ | | | 6.2 | | nC |
| $Q_{gd}$ | | | 23.0 | | nC |
| $R_{thJC}$ | | | | 2.7 | °C/W |

**OVERMOLDED 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 |

**Source-Drain Diode**

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0V | | | 4 | A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$ | | | 16 | A |
| $V_{SD}$ | $I_F$ = $I_S$, $V_{GS}$ = 0V, Note 1 | | | 1.5 | V |
| $t_{rr}$ | $I_F$ = 4A, -di/dt = 100A/μs, | | | 250 | ns |
| $Q_{RM}$ | $V_R$ = 100V, $V_{GS}$ = 0V | | 480 | | nC |
| $I_{RM}$ | | | 6.16 | | A |

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

**ADVANCE 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.

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 7,157,338B2

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

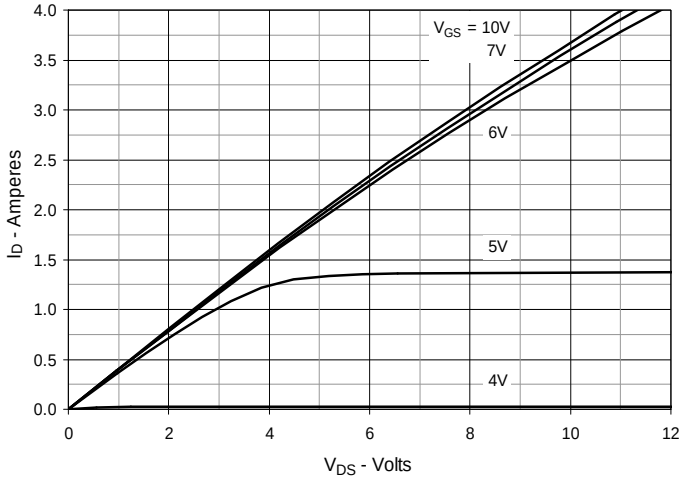



**Fig. 2. Extended Output Characteristics @ 25ºC**

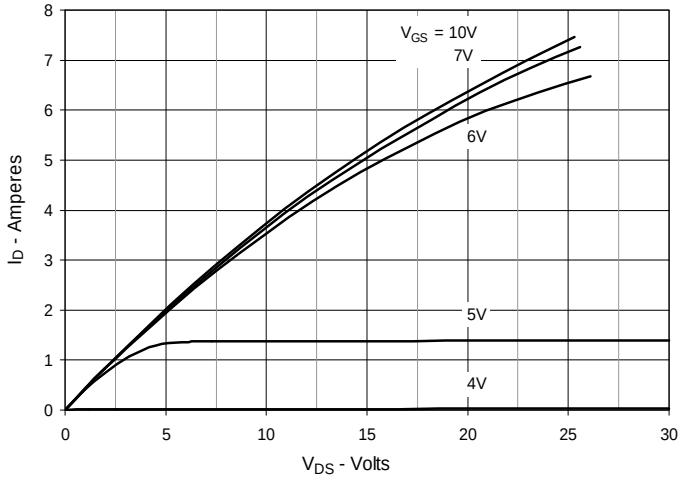



**Fig. 3. Output Characteristics @ 125ºC**

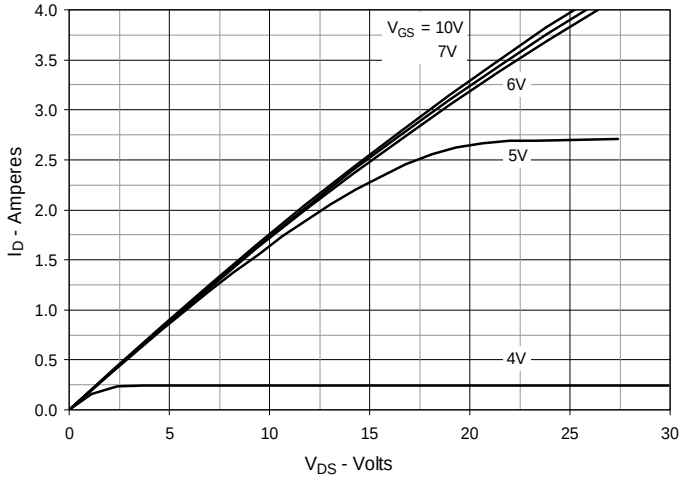



**Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 2A Value vs. Junction Temperature**

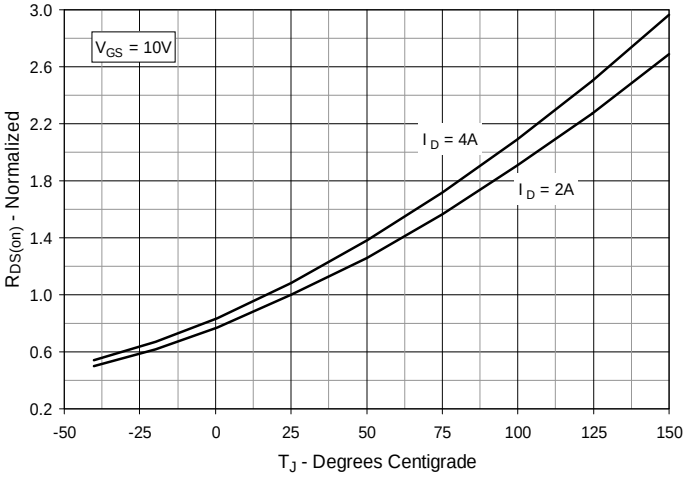



**Fig. 5. $R_{DS(on)}$ Normalized to $I_D$ = 2A Value vs. Drain Current**

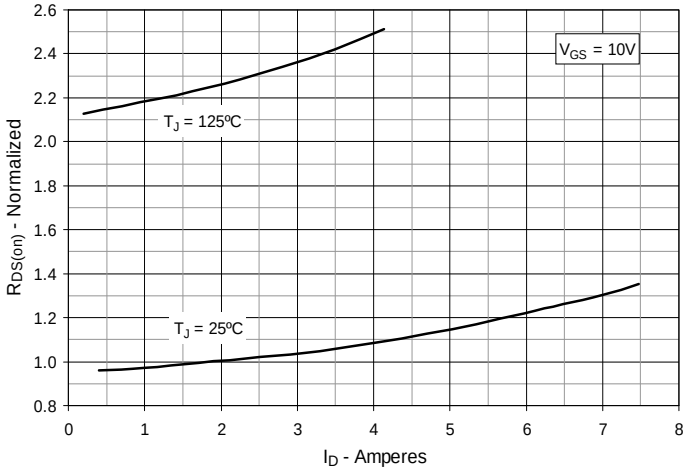
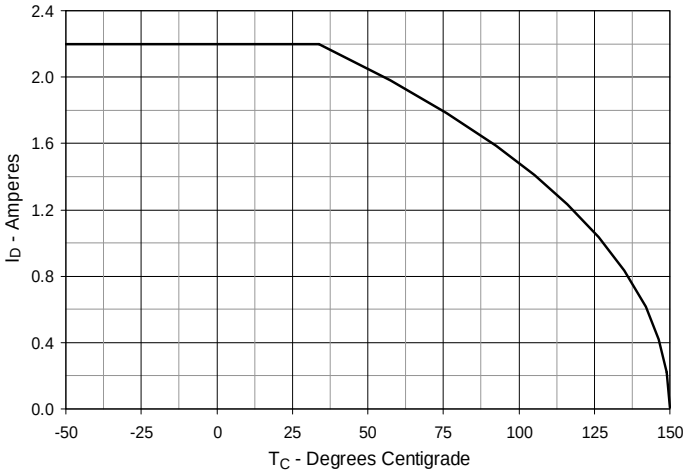



**Fig. 6. Maximum Drain Current vs. Case Temperature**




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**Fig. 7. Input Admittance**

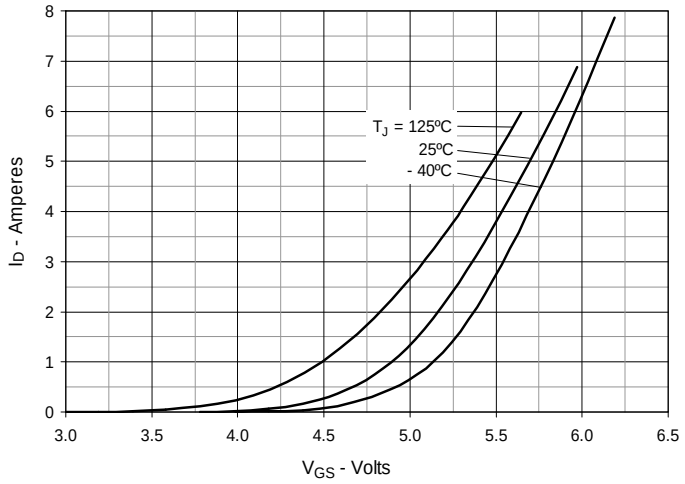



**Fig. 8. Transconductance**

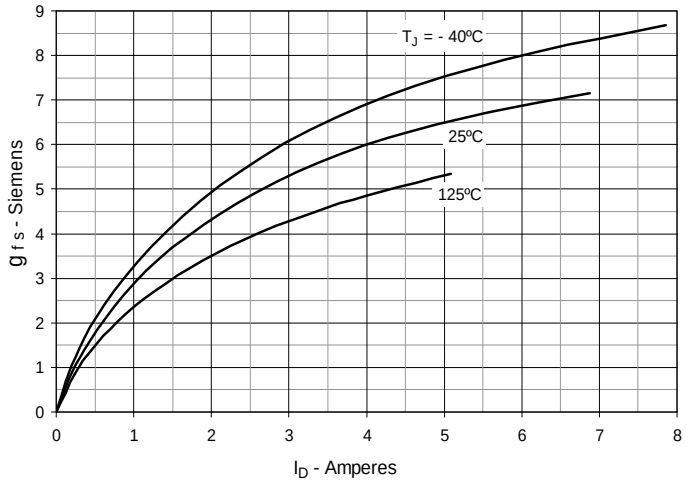



**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

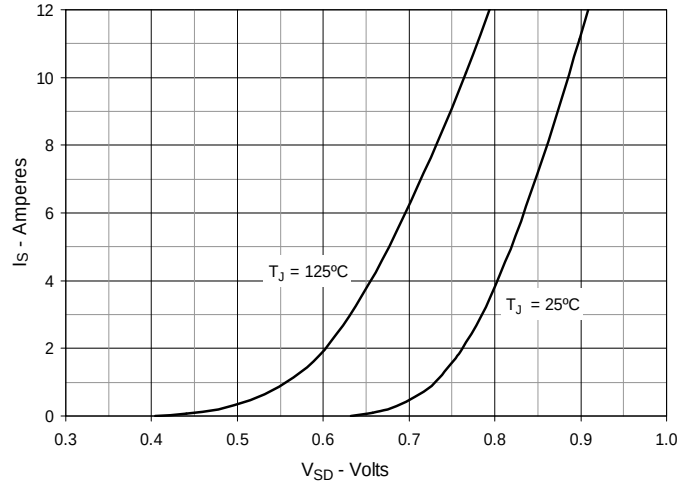



**Fig. 10. Gate Charge**

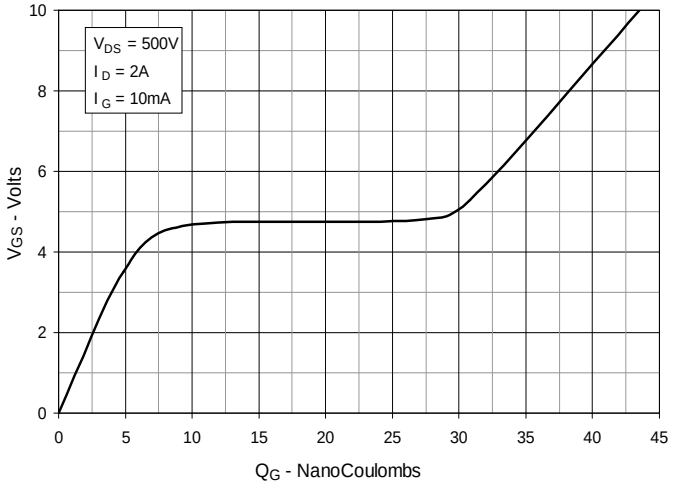



**Fig. 11. Capacitance**

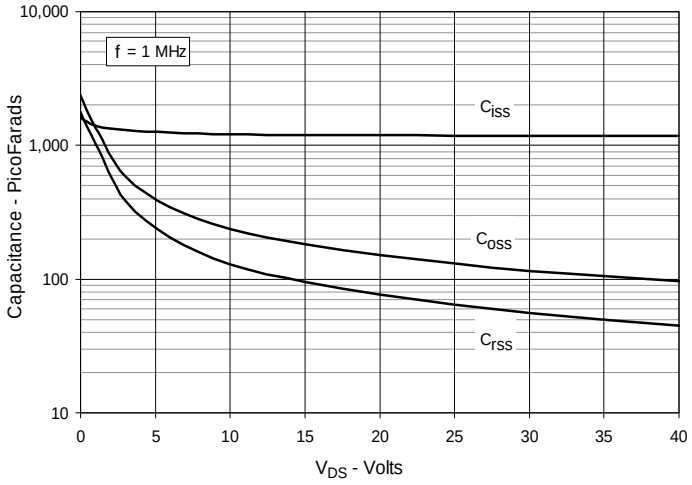
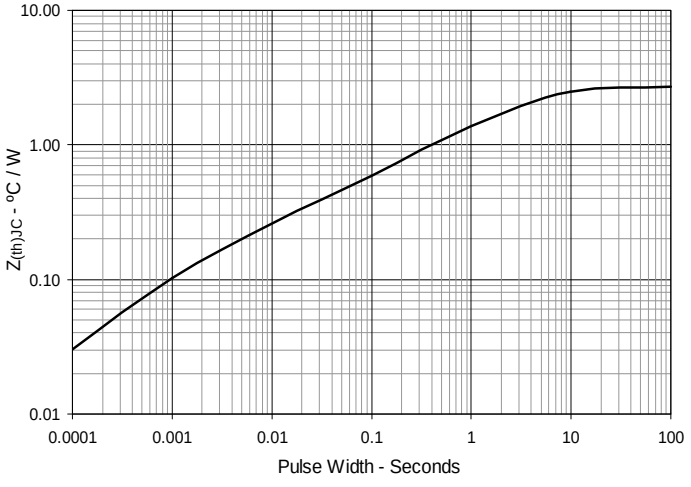



**Fig. 12. Maximum Transient Thermal Impedance**




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