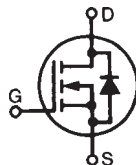


## HiperFET™ Power MOSFET Q2-Class

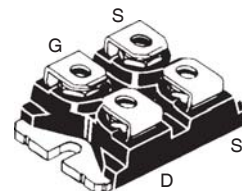
## IXFN80N50Q2

N-Channel Enhancement Mode  
Fast Intrinsic Rectifier



$$\begin{aligned} V_{DSS} &= 500V \\ I_{D25} &= 72A \\ R_{DS(on)} &\leq 65m\Omega \\ t_{rr} &\leq 250ns \end{aligned}$$

miniBLOC  
E153432



G = Gate      D = Drain  
S = Source

Either Source Terminal S can be used as the Source Terminal or the Kelvin Source (Gate Return) Terminal.

| Symbol     | Test Conditions                                                          | Maximum Ratings |                  |
|------------|--------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                          | 500             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$    | 500             | V                |
| $V_{GSS}$  | Continuous                                                               | $\pm 30$        | V                |
| $V_{GSM}$  | Transient                                                                | $\pm 40$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                 | 72              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$               | 320             | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | 80              | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 5               | J                |
| $dv/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ | 20              | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 890             | W                |
| $T_J$      |                                                                          | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                          | 150             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                          | -55 ... +150    | $^\circ\text{C}$ |
| $V_{ISOL}$ | 50/60 Hz, RMS, $t = 1\text{minute}$                                      | 2500            | V~               |
|            | $I_{ISOL} \leq 1\text{mA}$ , $t = 1\text{s}$                             | 3000            | V~               |
| $M_d$      | Mounting Torque for Base Plate                                           | 1.5/13          | Nm/lb.in         |
|            | Terminal Connection Torque                                               | 1.3/11.5        | Nm/lb.in         |
| Weight     |                                                                          | 30              | g                |

### Features

- International Standard Package
- Low Intrinsic Gate Resistance
- miniBLOC with Aluminum Nitride Isolation
- Avalanche Rated
- Low Package Inductance
- Fast Intrinsic Rectifier
- Low  $R_{DS(on)}$  and  $Q_G$

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

### Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- Temperature and Lighting Controls

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified) | Characteristic Values |      |                           |
|--------------|---------------------------------------------------------------------------|-----------------------|------|---------------------------|
|              |                                                                           | Min.                  | Typ. | Max.                      |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 1\text{mA}$                                        | 500                   |      | V                         |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8\text{mA}$                                    | 3.0                   |      | 5.5 V                     |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                        |                       |      | $\pm 200$ nA              |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$           |                       |      | 100 $\mu\text{A}$<br>5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 40A$ , Note 1                                     |                       |      | 65 m $\Omega$             |

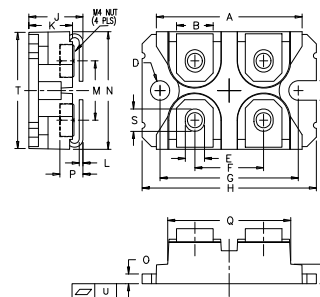
| Symbol       | Test Conditions                                                                                                         | Characteristic Values |      |           |
|--------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-----------|
|              |                                                                                                                         | Min.                  | Typ. | Max.      |
| $g_{fs}$     | $V_{DS} = 10V, I_D = 40A$ , Note 1                                                                                      | 40                    | 55   | S         |
| $C_{iss}$    | $V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$                                                                                   |                       | 12.8 | nF        |
| $C_{oss}$    |                                                                                                                         |                       | 1640 | pF        |
| $C_{rss}$    |                                                                                                                         |                       | 440  | pF        |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 40A$<br>$R_G = 1\Omega$ (External) |                       | 29   | ns        |
| $t_r$        |                                                                                                                         |                       | 25   | ns        |
| $t_{d(off)}$ |                                                                                                                         |                       | 60   | ns        |
| $t_f$        |                                                                                                                         |                       | 11   | ns        |
| $Q_{g(on)}$  | $V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 40A$                                                                   |                       | 250  | nC        |
| $Q_{gs}$     |                                                                                                                         |                       | 60   | nC        |
| $Q_{gd}$     |                                                                                                                         |                       | 120  | nC        |
| $R_{thJC}$   |                                                                                                                         |                       | 0.05 | 0.14 °C/W |
| $R_{thCS}$   |                                                                                                                         |                       |      | °C/W      |

## Source-Drain Diode

| Symbol   | Test Conditions                                               | Characteristic Values |      |         |
|----------|---------------------------------------------------------------|-----------------------|------|---------|
|          |                                                               | Min.                  | Typ. | Max.    |
| $I_S$    | $V_{GS} = 0V$                                                 |                       |      | 80 A    |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                   |                       |      | 320 A   |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0V$ , Note 1                             |                       |      | 1.4 V   |
| $t_{rr}$ | $I_F = 25A, -di/dt = 100A/\mu s$<br>$V_R = 100V, V_{GS} = 0V$ |                       |      | 250 ns  |
| $Q_{RM}$ |                                                               |                       | 1.2  | $\mu C$ |
| $I_{RM}$ |                                                               |                       | 12.0 | A       |

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

## SOT-227B (IXFN) Outline



(M4 screws (4x) supplied)

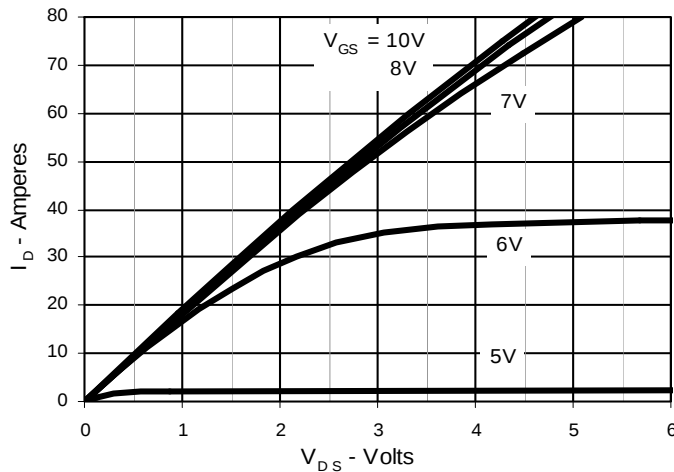
| SYM | INCHES |       | MILLIMETERS |       |
|-----|--------|-------|-------------|-------|
|     | MIN    | MAX   | MIN         | MAX   |
| A   | 1.240  | 1.255 | 31.50       | 31.88 |
| B   | .307   | .323  | 7.80        | 8.20  |
| C   | .161   | .169  | 4.09        | 4.29  |
| D   | .161   | .169  | 4.09        | 4.29  |
| E   | .161   | .169  | 4.09        | 4.29  |
| F   | .587   | .595  | 14.91       | 15.11 |
| G   | 1.186  | 1.193 | 30.12       | 30.30 |
| H   | 1.496  | 1.505 | 38.00       | 38.23 |
| J   | .460   | .481  | 11.68       | 12.22 |
| K   | .351   | .378  | 8.92        | 9.60  |
| L   | .030   | .033  | 0.76        | 0.84  |
| M   | .496   | .506  | 12.60       | 12.85 |
| N   | .990   | 1.001 | 25.15       | 25.42 |
| O   | .078   | .084  | 1.98        | 2.13  |
| P   | .195   | .235  | 4.95        | 5.97  |
| Q   | 1.045  | 1.059 | 26.54       | 26.90 |
| R   | .155   | .174  | 3.94        | 4.42  |
| S   | .186   | .191  | 4.72        | 4.85  |
| T   | .968   | .987  | 24.59       | 25.07 |
| U   | -.002  | .004  | -0.05       | 0.1   |

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

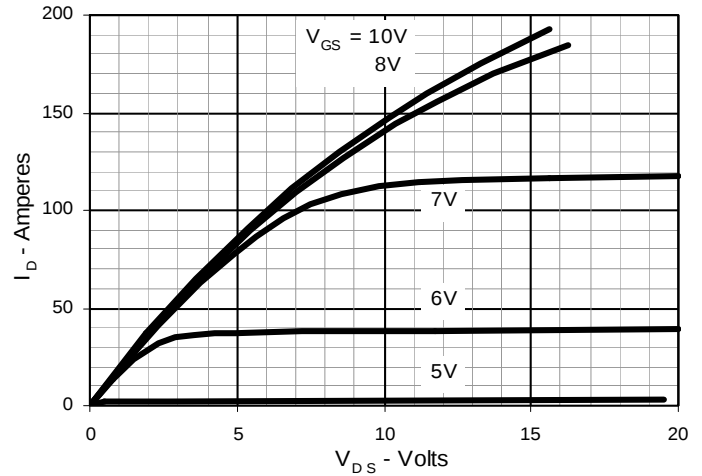
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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 |
| 4,860,072 | 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    |             |

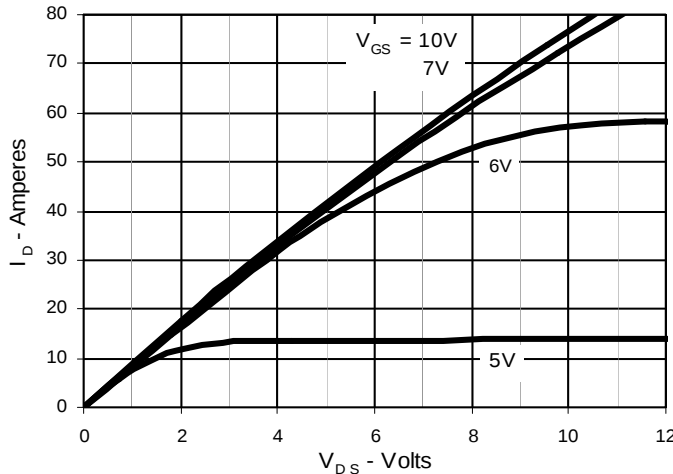
**Fig. 1. Output Characteristics**  
@  $T_J = 25^\circ\text{C}$



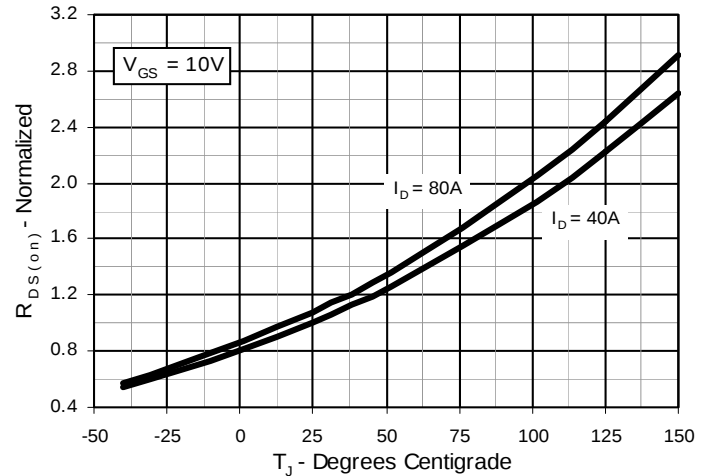
**Fig. 2. Extended Output Characteristics**  
@  $T_J = 25^\circ\text{C}$



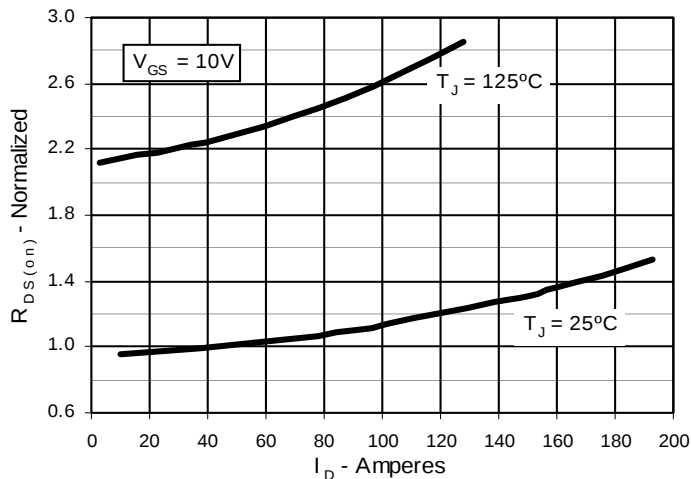
**Fig. 3. Output Characteristics**  
@  $T_J = 125^\circ\text{C}$



**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 40\text{A}$  Value vs. Junction Temperature**



**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 40\text{A}$  Value vs. Drain Current**



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

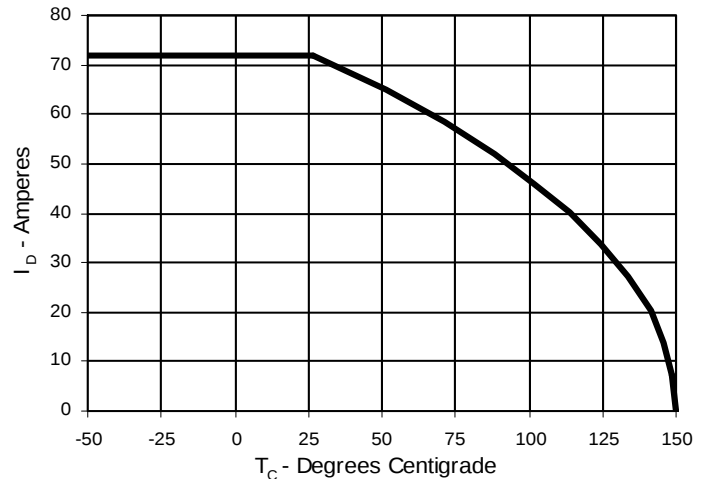


Fig. 7. Input Admittance

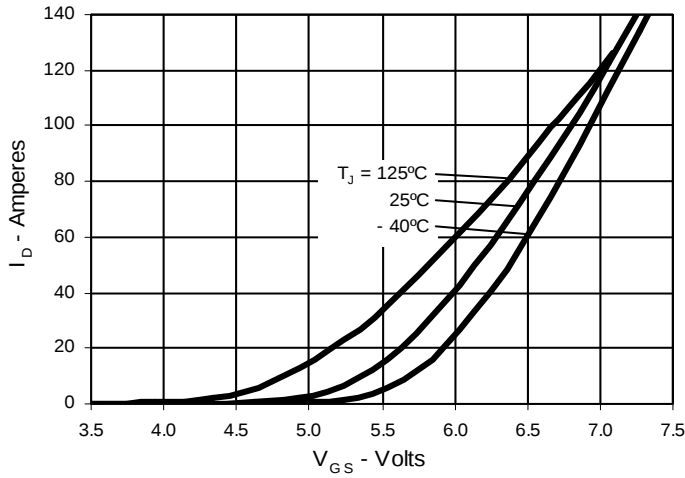


Fig. 8. Transconductance

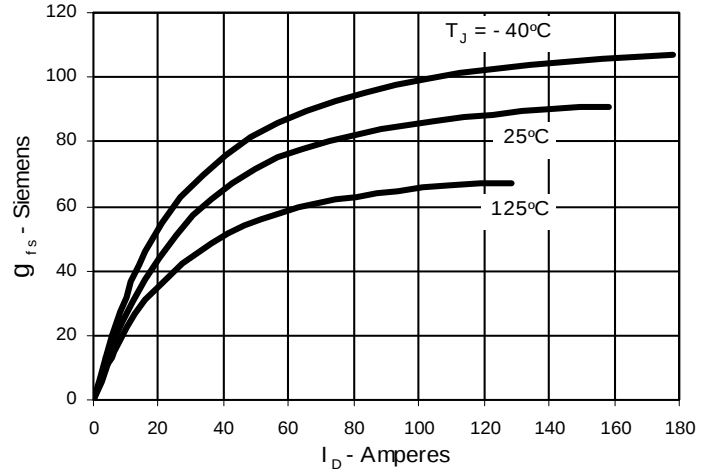


Fig. 9. Source Current vs. Source-To-Drain Voltage

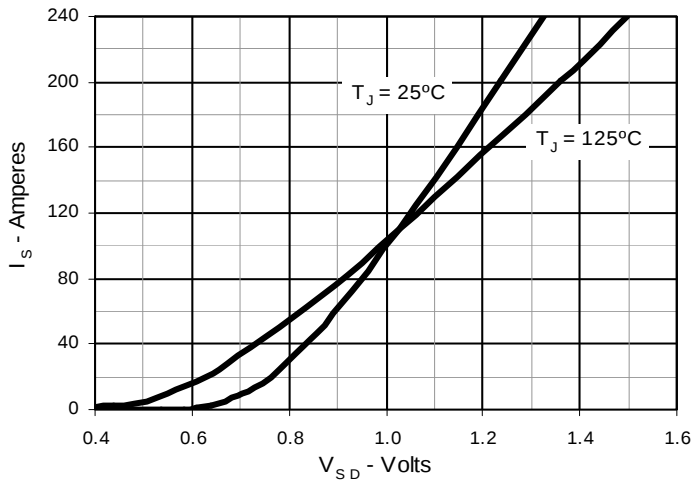


Fig. 10. Gate Charge

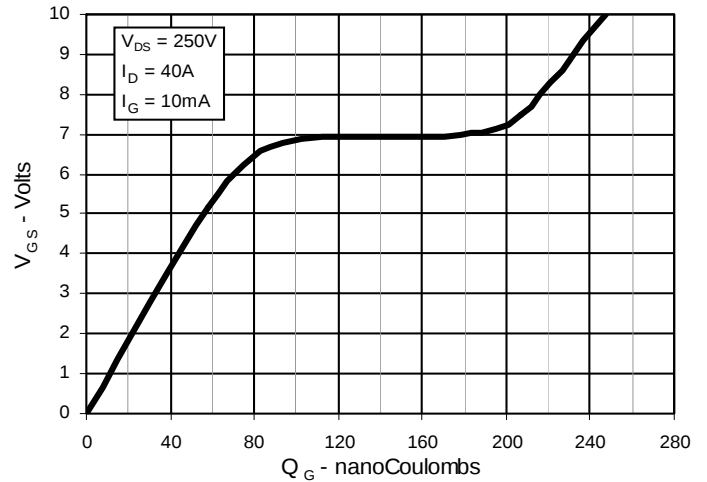


Fig. 11. Capacitance

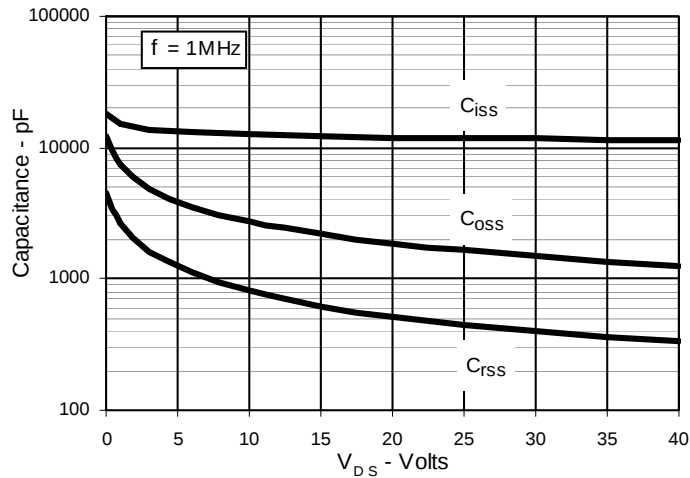
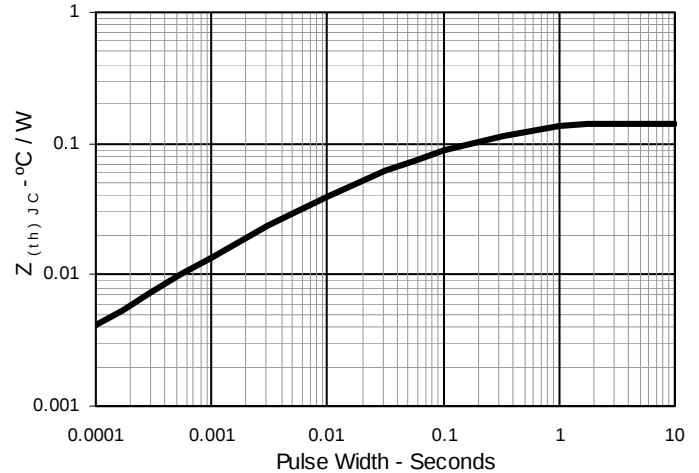


Fig. 12. Maximum Transient Thermal Impedance





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