

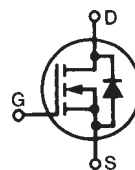
# HiPerFET™ Power MOSFET

IXFN 72N55Q2

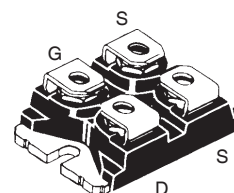
$$\begin{aligned} V_{DSS} &= 550 \text{ V} \\ I_{D25} &= 72 \text{ A} \\ R_{DS(on)} &= 72 \text{ m}\Omega \\ t_{rr} &\leq 250 \text{ ns} \end{aligned}$$

N-Channel Enhancement Mode  
Avalanche Rated, Low  $Q_g$ , Low Intrinsic  $R_g$   
High  $dV/dt$ , Low  $t_{rr}$

Preliminary Data Sheet



miniBLOC, SOT-227 B (IXFN)  
E153432



G = Gate  
S = Source  
D = Drain

Either Source terminal at miniBLOC can be used  
as Main or Kelvin Source

| Symbol     | Test Conditions                                                                                                                       | Maximum Ratings |                  |
|------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                       | 550             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1 \text{ M}\Omega$                                                        | 550             | V                |
| $V_{GS}$   | 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 $T_{JM}$                                                                            | 288             | A                |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                              | 72              | A                |
| $E_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                              | 60              | mJ               |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                                                                              | 5.0             | J                |
| $dv/dt$    | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$<br>$T_J \leq 150^\circ\text{C}$ , $R_g = 2 \Omega$ | 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                |
| $M_d$      | Mounting torque                                                                                                                       | 1.5/13          | Nm/lb.in.        |
|            | Terminal connection torque                                                                                                            | 1.5/13          | Nm/lb.in.        |
| Weight     |                                                                                                                                       | 30              | g                |

| Symbol       | Test Conditions                                               | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                           |
|--------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------------------|
|              |                                                               | min.                                                                              | typ. | max.                      |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = 1 \text{ mA}$                 | 550                                                                               |      | V                         |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8 \text{ mA}$                      | 2.5                                                                               |      | 5.0 V                     |
| $I_{GSS}$    | $V_{GS} = \pm 30 \text{ V}$ , $V_{DS} = 0$                    |                                                                                   |      | $\pm 200 \text{ nA}$      |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0 \text{ V}$                  |                                                                                   |      | 100 $\mu\text{A}$<br>5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$<br>Note 1 |                                                                                   |      | 72 m $\Omega$             |

## Features

- Double metal process for low gate resistance
- miniBLOC, with Aluminium nitride isolation
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

## Applications

- DC-DC converters
- Switched-mode and resonant-mode power supplies
- DC choppers
- Pulse generators

## Advantages

- Easy to mount
- Space savings
- High power density

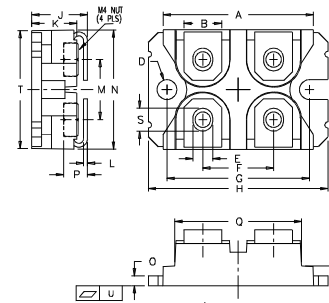
| Symbol       | Test Conditions                                                                                             | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |       |      |
|--------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|------|
|              |                                                                                                             | min.                                                                              | typ.  | max. |
| $g_{fs}$     | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ Note 1                                                      | 40                                                                                | 57    | S    |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                               |                                                                                   | 10500 | pF   |
| $C_{oss}$    |                                                                                                             |                                                                                   | 1500  | pF   |
| $C_{rss}$    |                                                                                                             |                                                                                   | 230   | pF   |
| $t_{d(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$<br>$R_G = 1\ \Omega$ (External) |                                                                                   | 30    | ns   |
| $t_r$        |                                                                                                             |                                                                                   | 23    | ns   |
| $t_{d(off)}$ |                                                                                                             |                                                                                   | 58    | ns   |
| $t_f$        |                                                                                                             |                                                                                   | 10    | ns   |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$                                 |                                                                                   | 258   | nC   |
| $Q_{gs}$     |                                                                                                             |                                                                                   | 65    | nC   |
| $Q_{gd}$     |                                                                                                             |                                                                                   | 123   | nC   |
| $R_{thJC}$   |                                                                                                             |                                                                                   | 0.14  | K/W  |
| $R_{thCK}$   |                                                                                                             |                                                                                   | 0.05  | K/W  |

## Source-Drain Diode

| Symbol   | Test Conditions                                                                    | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------|
|          |                                                                                    | min.                                                                              | typ. | max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                              |                                                                                   |      | 72 A          |
| $I_{SM}$ | Repetitive;<br>pulse width limited by $T_{JM}$                                     |                                                                                   |      | 288 A         |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{ V}$ , Note 1                                          |                                                                                   |      | 1.5 V         |
| $t_{rr}$ | $I_F = 25\text{ A}$<br>$-di/dt = 100\text{ A}/\mu\text{s}$<br>$V_R = 100\text{ V}$ |                                                                                   |      | 250 ns        |
| $Q_{RM}$ |                                                                                    |                                                                                   | 1.2  | $\mu\text{C}$ |
| $I_{RM}$ |                                                                                    |                                                                                   | 8    | A             |

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

## miniBLOC, SOT-227 B Outline



M4 screws (4x) supplied

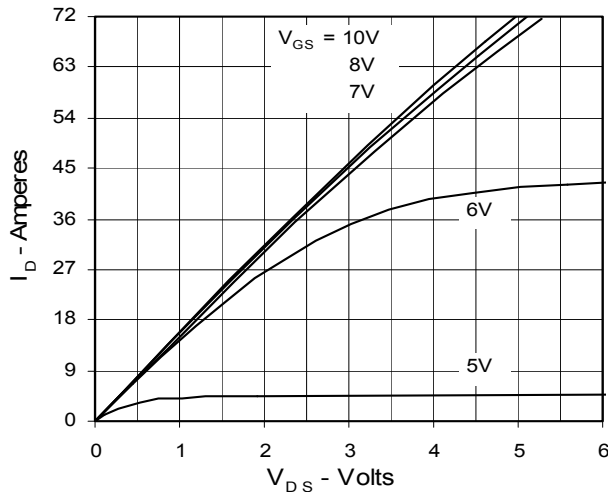
| Dim. | Millimeter |       | Inches |       |
|------|------------|-------|--------|-------|
|      | Min.       | Max.  | Min.   | Max.  |
| A    | 31.50      | 31.88 | 1.240  | 1.255 |
| B    | 7.80       | 8.20  | 0.307  | 0.323 |
| C    | 4.09       | 4.29  | 0.161  | 0.169 |
| D    | 4.09       | 4.29  | 0.161  | 0.169 |
| E    | 4.09       | 4.29  | 0.161  | 0.169 |
| F    | 14.91      | 15.11 | 0.587  | 0.595 |
| G    | 30.12      | 30.30 | 1.186  | 1.193 |
| H    | 38.00      | 38.23 | 1.496  | 1.505 |
| J    | 11.68      | 12.22 | 0.460  | 0.481 |
| K    | 8.92       | 9.60  | 0.351  | 0.378 |
| L    | 0.76       | 0.84  | 0.030  | 0.033 |
| M    | 12.60      | 12.85 | 0.496  | 0.506 |
| N    | 25.15      | 25.42 | 0.990  | 1.001 |
| O    | 1.98       | 2.13  | 0.078  | 0.084 |
| P    | 4.95       | 5.97  | 0.195  | 0.235 |
| Q    | 26.54      | 26.90 | 1.045  | 1.059 |
| R    | 3.94       | 4.42  | 0.155  | 0.174 |
| S    | 4.72       | 4.85  | 0.186  | 0.191 |
| T    | 24.59      | 25.07 | 0.968  | 0.987 |
| U    | -0.05      | 0.1   | -0.002 | 0.004 |

IXYS reserves the right to change limits, test conditions, and dimensions.

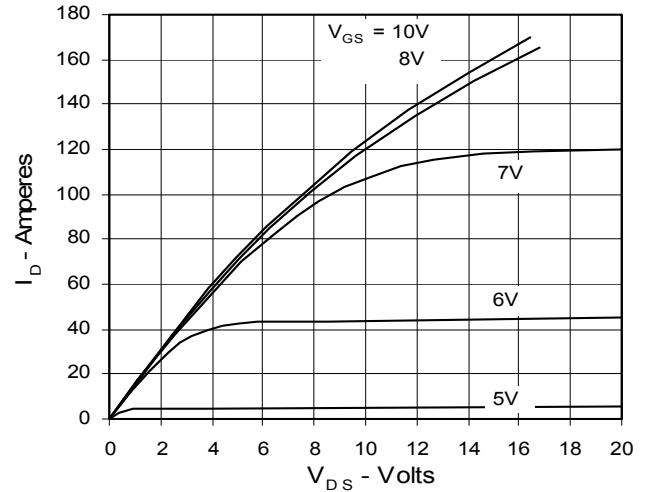
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

4,835,592 4,881,106 5,017,508 5,049,961 5,187,117 5,486,715 6,306,728B1 6,259,123B1 6,306,728B1  
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025 6,404,065B1 6,162,665 6,534,343

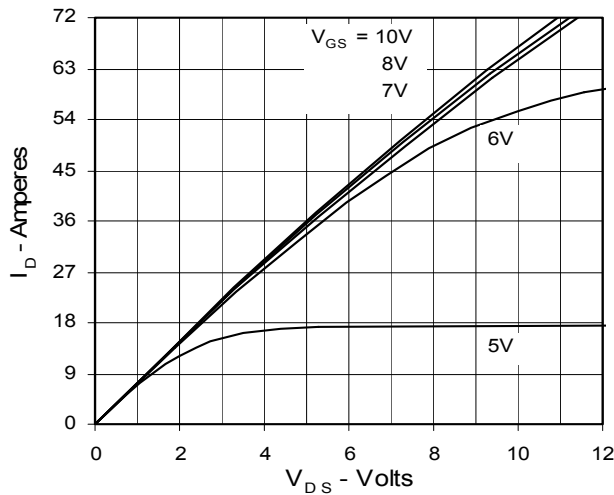
**Fig. 1. Output Characteristics  
@ 25 Deg. C**



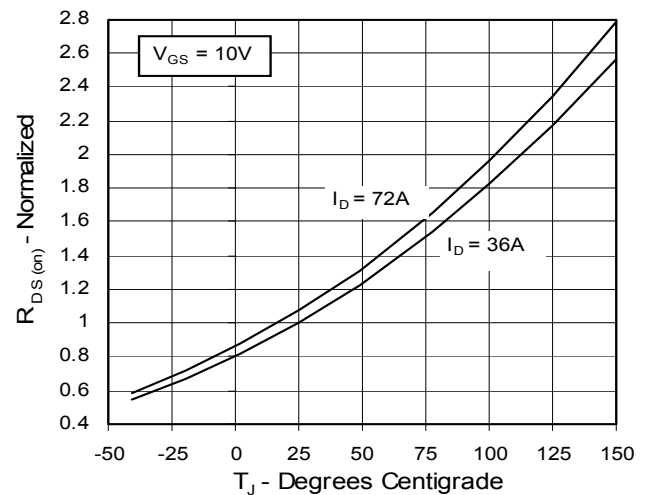
**Fig. 2. Extended Output Characteristics  
@ 25 deg. C**



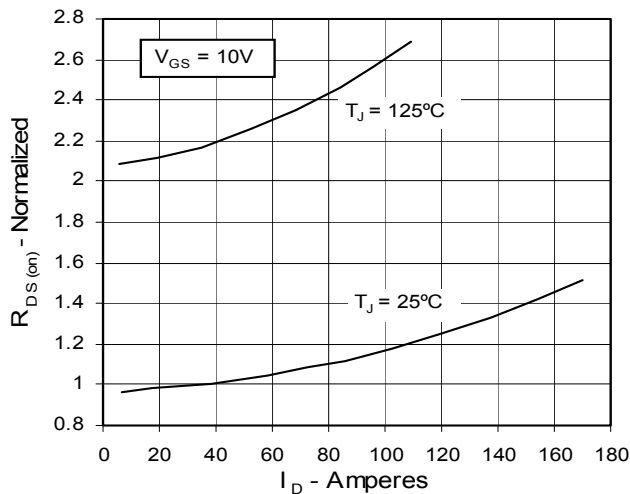
**Fig. 3. Output Characteristics  
@ 125 Deg. C**



**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_{D25}$  Value vs.  
Junction Temperature**



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



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

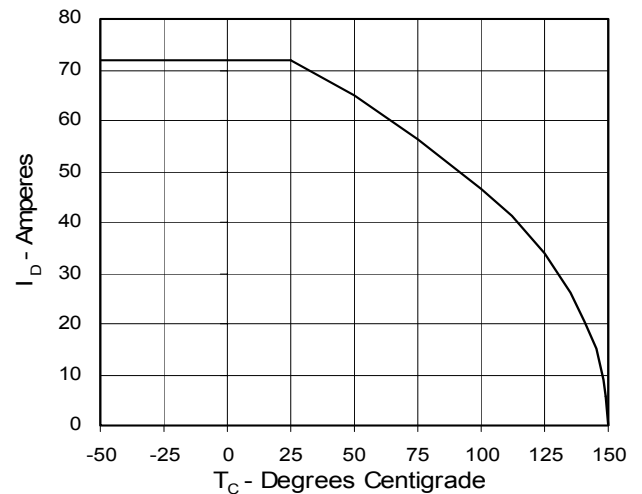


Fig. 7. Input Admittance

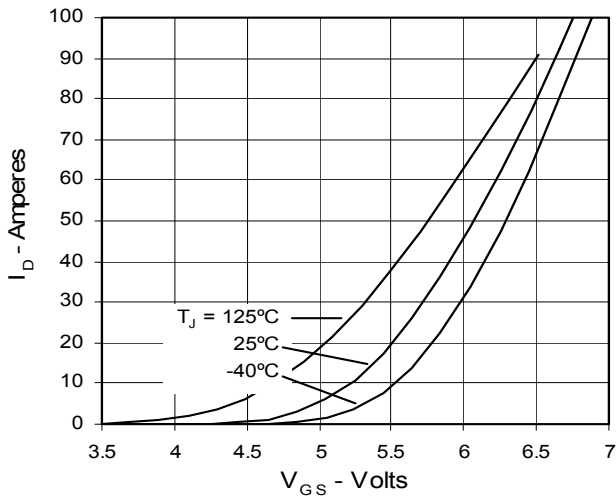


Fig. 8. Transconductance

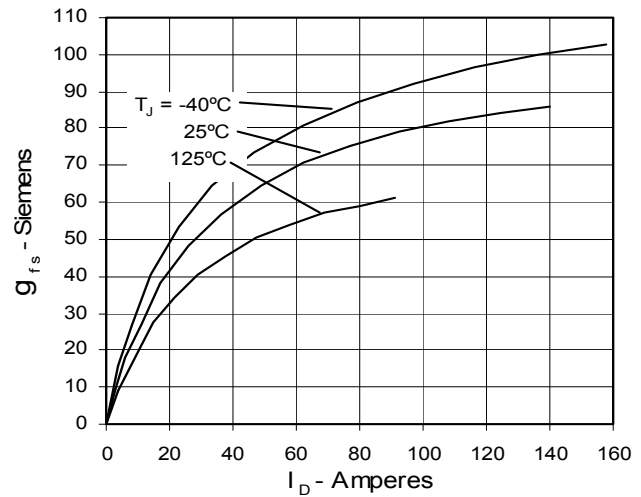


Fig. 9. Source Current vs. Source-To-Drain Voltage

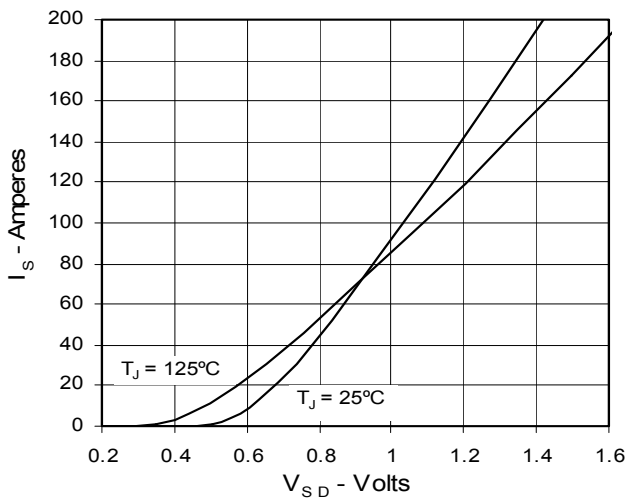


Fig. 10. Gate Charge

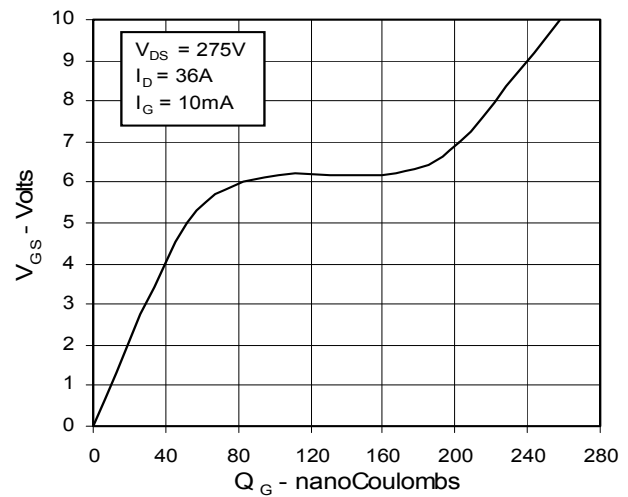


Fig. 11. Capacitance

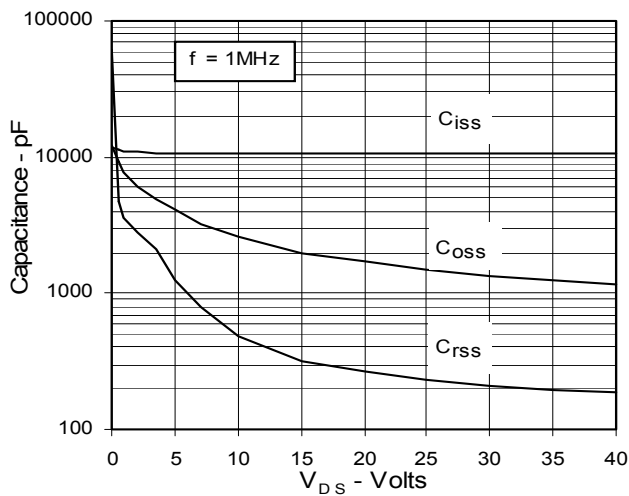
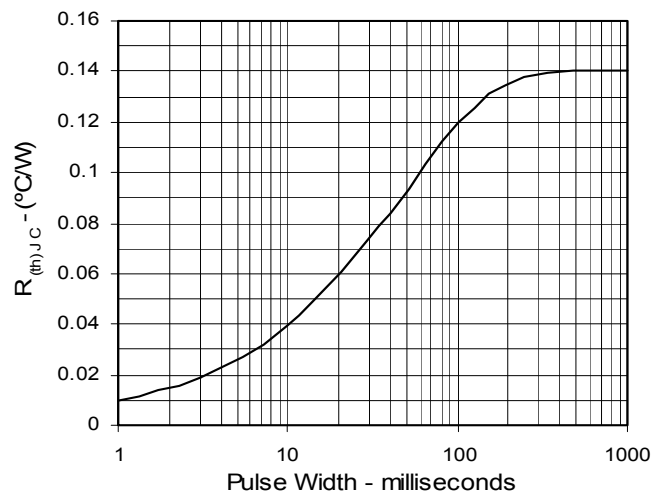


Fig. 12. Maximum Transient Thermal Resistance



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