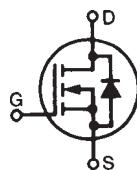


# HiPerFET™ Power MOSFET

## IXFN24N100

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

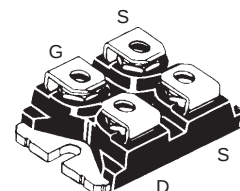


$$\begin{aligned} V_{DSS} &= 1000V \\ I_{D25} &= 24A \\ R_{DS(on)} &\leq 390m\Omega \\ t_{rr} &\leq 250ns \end{aligned}$$

| 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 $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$    | 1000              | V                |
| $V_{GSS}$  | Continuous                                                               | $\pm 20$          | V                |
| $V_{GSM}$  | Transient                                                                | $\pm 30$          | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                 | 24                | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$               | 96                | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | 24                | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 3                 | J                |
| $dV/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ | 5                 | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 568               | W                |
| $T_J$      |                                                                          | -55 ... +150      | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                          | 150               | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                          | -55 ... +150      | $^\circ\text{C}$ |
| $T_L$      | 1.6mm (0.062 in.) from case for 10s                                      | 300               | $^\circ\text{C}$ |
| $V_{ISOL}$ | 50/60 Hz, RMS                                                            | $t = 1\text{min}$ | 2500 V~          |
|            | $I_{ISOL} \leq 1\text{mA}$                                               | $t = 1\text{s}$   | 3000 V~          |
| $M_d$      | Mounting torque                                                          | 1.5/13            | Nm/lb.in.        |
|            | Terminal connection torque                                               | 1.3/11.5          | Nm/lb.in.        |
| Weight     |                                                                          | 30                | g                |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) | Characteristic Values |      |                   |
|--------------|-----------------------------------------------------------------------------|-----------------------|------|-------------------|
|              |                                                                             | Min.                  | Typ. | Max.              |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 3\text{mA}$                                          | 1000                  |      | V                 |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8\text{mA}$                                      | 3.0                   |      | 5.5 V             |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                                          |                       |      | $\pm 200$ nA      |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$                                                          |                       |      | 100 $\mu\text{A}$ |
|              | $V_{GS} = 0V$ , $T_J = 125^\circ\text{C}$                                   |                       |      | 2 mA              |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 12A$ , Note 1                                       |                       |      | 390 m $\Omega$    |

miniBLOC, SOT-227 B  
E153432



G = Gate  
S = Source  
D = Drain

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

### Features

- International standard package
- Encapsulating epoxy meets UL 94 V-0, flammability classification
- miniBLOC with Aluminium nitride isolation
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Avalanche rated
- Low package inductance
- Fast intrinsic Rectifier

### Applications

- DC-DC converters
- Synchronous rectification
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls
- Low voltage relays

### Advantages

- Easy to mount
- Space savings
- High power density

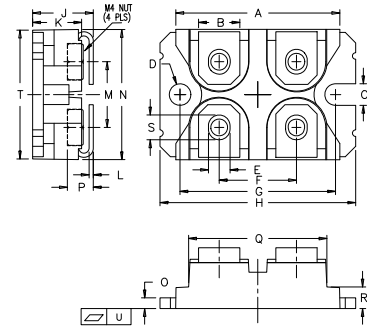
| Symbol       | Test Conditions                                                                                                         | Characteristic Values |      |      |
|--------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------|------|------|
|              |                                                                                                                         | Min.                  | Typ. | Max. |
| $g_{fs}$     | $V_{DS} = 10V, I_D = 12A$ , Note 1                                                                                      | 15                    | 27   | S    |
| $C_{iss}$    | $V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$                                                                                   |                       | 8700 | pF   |
| $C_{oss}$    |                                                                                                                         |                       | 785  | pF   |
| $C_{rss}$    |                                                                                                                         |                       | 315  | pF   |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 12A$<br>$R_G = 1\Omega$ (External) |                       | 35   | ns   |
| $t_r$        |                                                                                                                         |                       | 35   | ns   |
| $t_{d(off)}$ |                                                                                                                         |                       | 75   | ns   |
| $t_f$        |                                                                                                                         |                       | 21   | ns   |
| $Q_{g(on)}$  | $V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 12A$                                                                   |                       | 267  | nC   |
| $Q_{gs}$     |                                                                                                                         |                       | 52   | nC   |
| $Q_{gd}$     |                                                                                                                         |                       | 142  | nC   |
| $R_{thJC}$   |                                                                                                                         |                       | 0.22 | °C/W |
| $R_{thCS}$   |                                                                                                                         | 0.05                  |      | °C/W |

## Source-Drain Diode

Characteristic Values  
( $T_J = 25^\circ C$ , unless otherwise specified)

| Symbol   | Test Conditions                                  | Min. | Typ. | Max.        |
|----------|--------------------------------------------------|------|------|-------------|
| $I_S$    | $V_{GS} = 0V$                                    |      |      | 24 A        |
| $I_{SM}$ | Repetitive, pulse width limited by $T_{JM}$      |      |      | 96 A        |
| $V_{SD}$ | $I_F = 24A, V_{GS} = 0V$ , Note 1                |      |      | 1.5 V       |
| $t_{rr}$ | $I_F = 24A, -di/dt = 100A/\mu s$<br>$V_R = 100V$ |      |      | 250 ns      |
| $Q_{RM}$ |                                                  |      |      | 1.0 $\mu C$ |
| $I_{RM}$ |                                                  |      |      | 8.0 A       |

## SOT-227B Outline



| 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   |

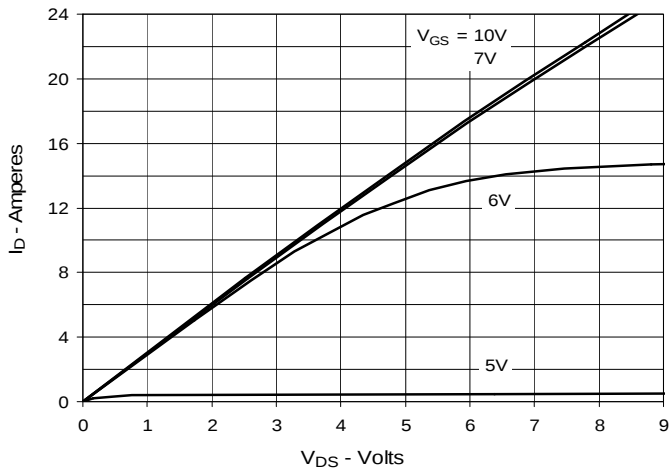
Note 1: Pulse test,  $t \leq 300\mu s$ ; duty cycle,  $d \leq 2\%$ .

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

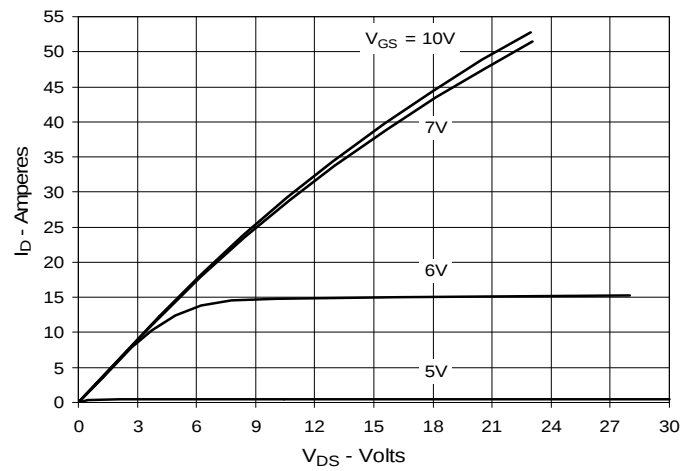
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

|           |           |           |           |              |              |              |              |              |             |
|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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    |             |

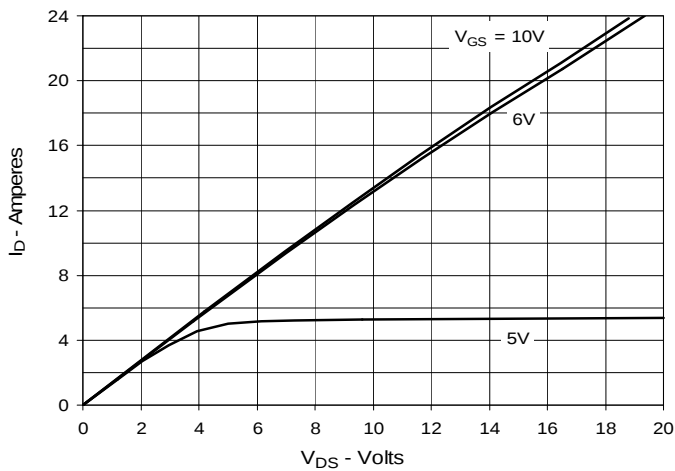
**Fig. 1. Output Characteristics  
@ 25°C**



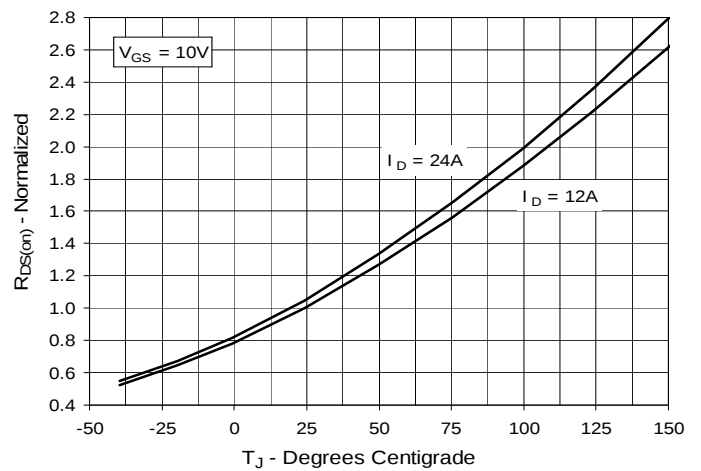
**Fig. 2. Extended Output Characteristics  
@ 25°C**



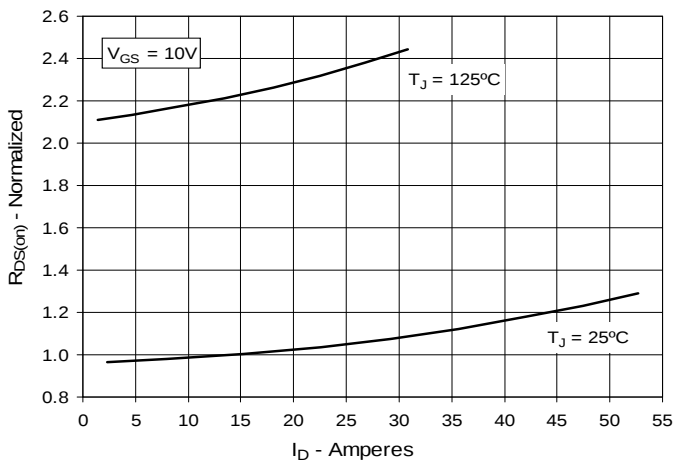
**Fig. 3. Output Characteristics  
@ 125°C**



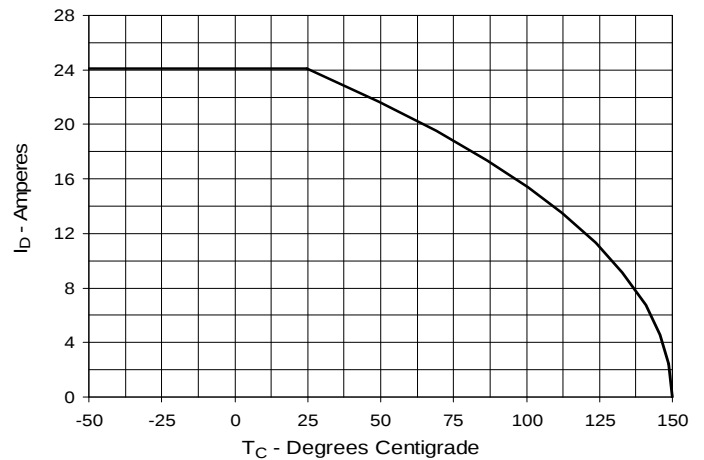
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 12A$  Value  
vs. Junction Temperature**



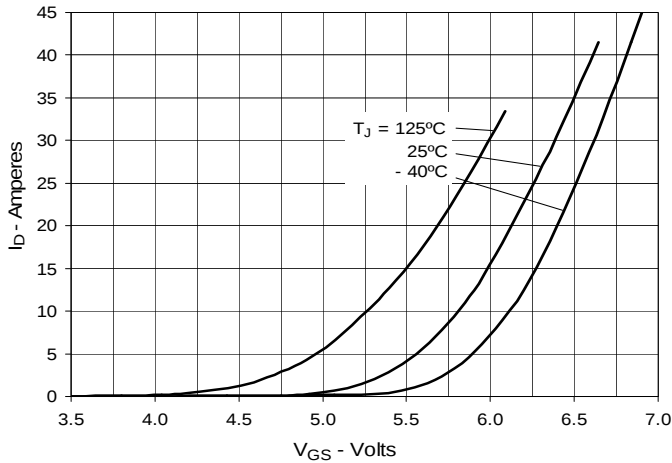
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 12A$  Value  
vs. Drain Current**



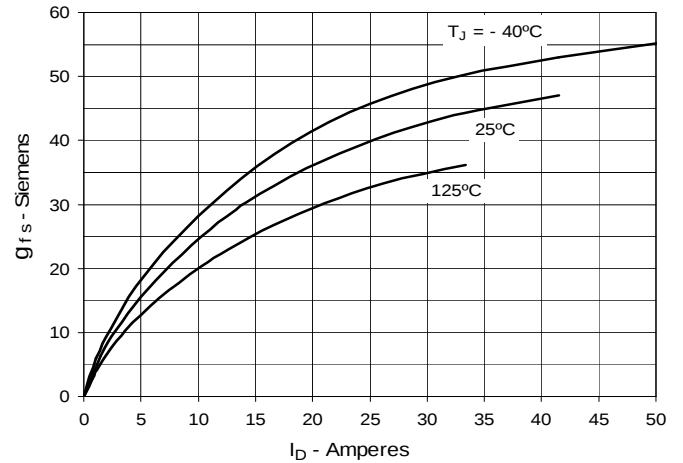
**Fig. 6. Maximum Drain Current vs.  
Case Temperature**



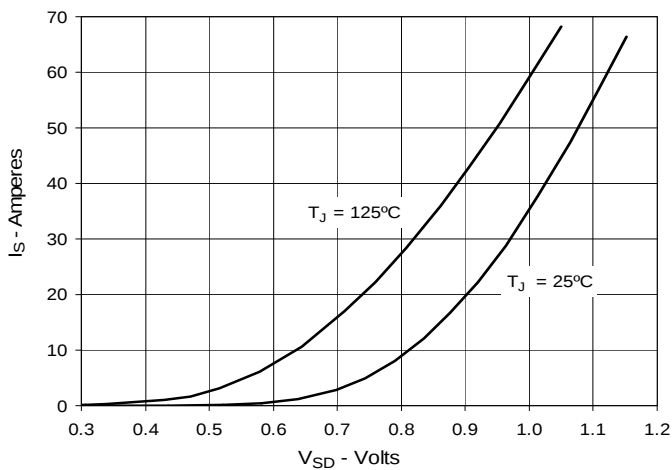
**Fig. 7. Input Admittance**



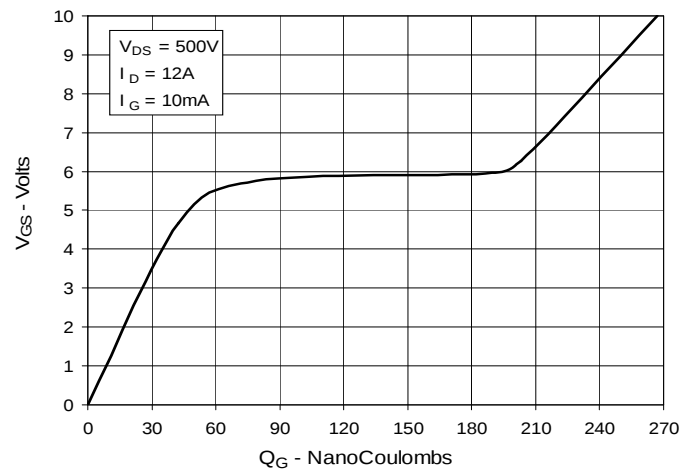
**Fig. 8. Transconductance**



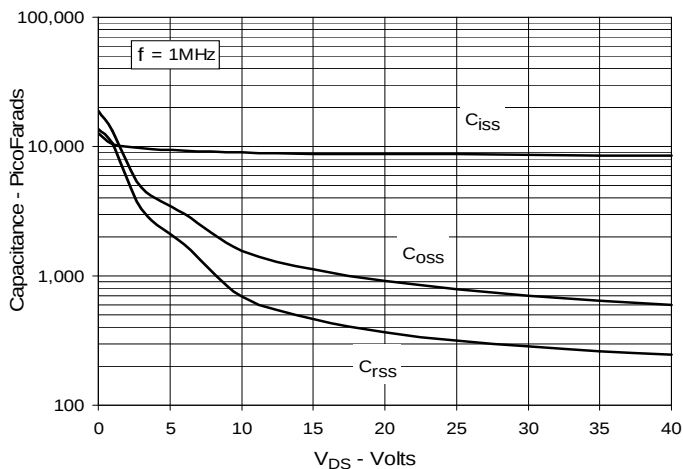
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



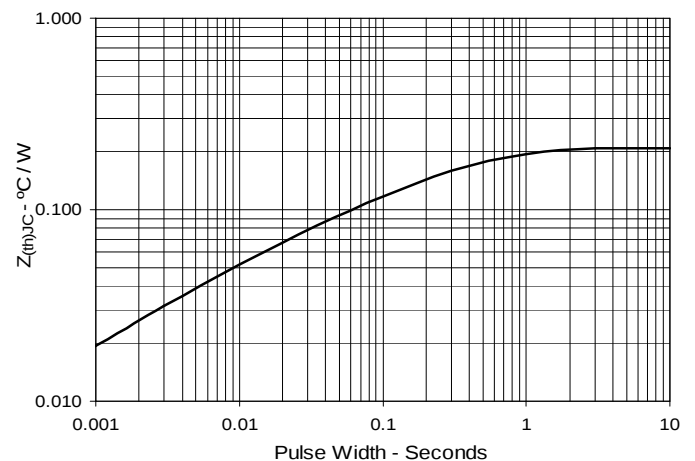
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



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



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