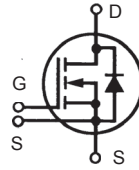


# HiPerFET™ Power MOSFETs

**IXFN 32N120**

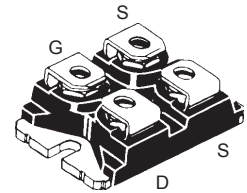
$$\begin{aligned} V_{DSS} &= 1200V \\ I_{D25} &= 32A \\ R_{DS(on)} &= 0.35\Omega \end{aligned}$$

N-Channel Enhancement Mode  
Avalanche Rated, High dv/dt, Low  $t_{rr}$



| Symbol     | Test Conditions                                                                                                                       | Maximum Ratings  |                        |
|------------|---------------------------------------------------------------------------------------------------------------------------------------|------------------|------------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                                                                                       | 1200             | V                      |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ ; $R_{GS} = 1\text{ M}\Omega$                                                         | 1200             | V                      |
| $V_{GS}$   | Continuous                                                                                                                            | $\pm 30$         | V                      |
| $V_{GSM}$  | Transient                                                                                                                             | $\pm 40$         | V                      |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$ , Chip capability                                                                                            | 32               | A                      |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                            | 128              | A                      |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                              | 32               | A                      |
| $E_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                              | 64               | mJ                     |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                                                                              | 4                | J                      |
| dv/dt      | $I_S \leq I_{DM}$ , $di/dt \leq 100\text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$ ,<br>$T_J \leq 150^\circ\text{C}$ , $R_G = 2\Omega$ | 15               | V/ns                   |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                                                                              | 780              | 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 $t = 1\text{ min}$<br>$I_{ISOL} \leq 1\text{ mA}$ $t = 1\text{ s}$                                                      | 2500<br>3000     | V~<br>V~               |
| $M_d$      | Mounting torque<br>Terminal connection torque                                                                                         | 1.5/13<br>1.5/13 | Nm/lb.in.<br>Nm/lb.in. |
| Weight     |                                                                                                                                       | 30               | g                      |

miniBLOC, SOT-227 B (IXFN)  
E153432



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

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

## Features

- International standard package
- miniBLOC, with Aluminium nitride isolation
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- Fast intrinsic Rectifier

## Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls

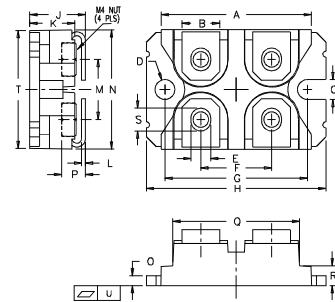
## Advantages

- 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.                     |
| $V_{DSS}$    | $V_{GS} = 0\text{ V}$ , $I_D = 3\text{ mA}$                                                                                    | 1200                                                                              |      | V                        |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 8\text{ mA}$                                                                                        | 2.5                                                                               |      | 5.0 V                    |
| $I_{GSS}$    | $V_{GS(th)} = \pm 30\text{ V}_{DC}$ , $V_{DS} = 0$                                                                             |                                                                                   |      | $\pm 200\text{ nA}$      |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0\text{ V}$                                                                                     |                                                                                   |      | 50 $\mu\text{A}$<br>3 mA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$ , $I_D = 0.5 \cdot I_{D25}$<br>Pulse test, $t \leq 300\text{ }\mu\text{s}$ ,<br>duty cycle $d \leq 2\%$ |                                                                                   |      | 0.35 $\Omega$            |

| Symbol       | Test Conditions                                                                                              | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |       |          |
|--------------|--------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|----------|
|              |                                                                                                              | min.                                                                              | typ.  | max.     |
| $g_{fs}$     | $V_{DS} = 20\text{ V}; I_D = 0.5 \cdot I_{D25}$ , pulse test                                                 | 28                                                                                | 52    | S        |
| $C_{iss}$    | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$                                                |                                                                                   | 15900 | pF       |
| $C_{oss}$    |                                                                                                              |                                                                                   | 1000  | pF       |
| $C_{rss}$    |                                                                                                              |                                                                                   | 260   | 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), |                                                                                   | 36    | ns       |
| $t_r$        |                                                                                                              |                                                                                   | 42    | ns       |
| $t_{d(off)}$ |                                                                                                              |                                                                                   | 98    | ns       |
| $t_f$        |                                                                                                              |                                                                                   | 22    | ns       |
| $Q_{g(on)}$  | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$                                  |                                                                                   | 400   | nC       |
| $Q_{gs}$     |                                                                                                              |                                                                                   | 70    | nC       |
| $Q_{gd}$     |                                                                                                              |                                                                                   | 188   | nC       |
| $R_{thJC}$   |                                                                                                              |                                                                                   | 0.05  | 0.16 K/W |
| $R_{thCK}$   |                                                                                                              |                                                                                   |       | K/W      |

## miniBLOC, SOT-227 B



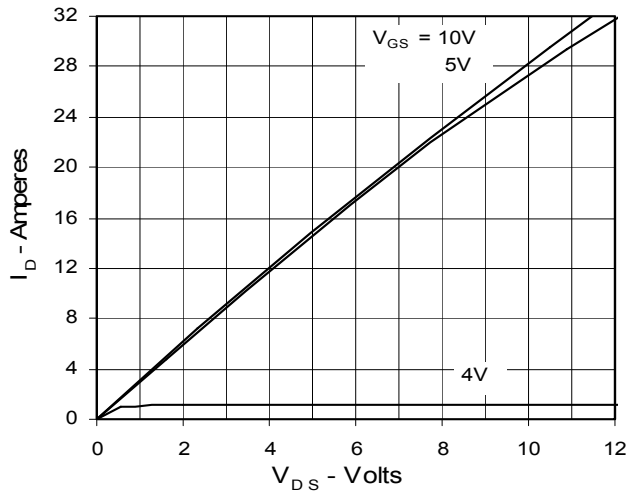
M4 screws (4x) supplied

| 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 |

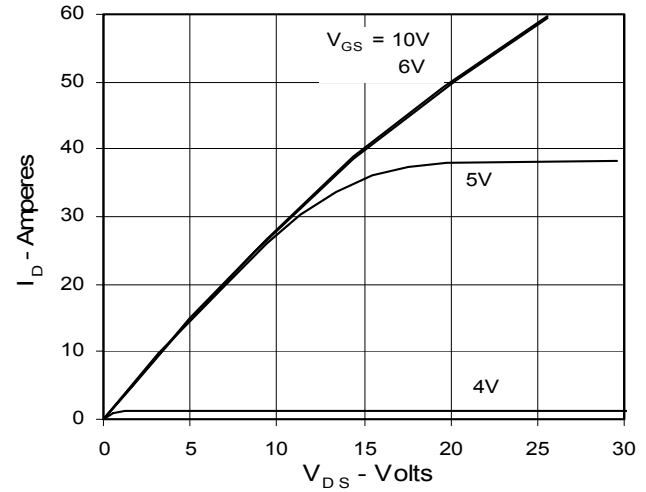
| Symbol   | Test Conditions                                                                                      | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |               |
|----------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|------|---------------|
|          |                                                                                                      | min.                                                                              | typ. | max.          |
| $I_S$    | $V_{GS} = 0\text{ V}$                                                                                |                                                                                   |      | 32 A          |
| $I_{SM}$ | Repetitive;<br>pulse width limited by $T_{JM}$                                                       |                                                                                   |      | 128 A         |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0\text{ V},$<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |                                                                                   |      | 1.3 V         |
| $t_{rr}$ | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$                           |                                                                                   | 180  | ns            |
| $Q_{RM}$ |                                                                                                      |                                                                                   | 1.4  | $\mu\text{C}$ |
| $I_{RM}$ |                                                                                                      |                                                                                   | 8    | A             |

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

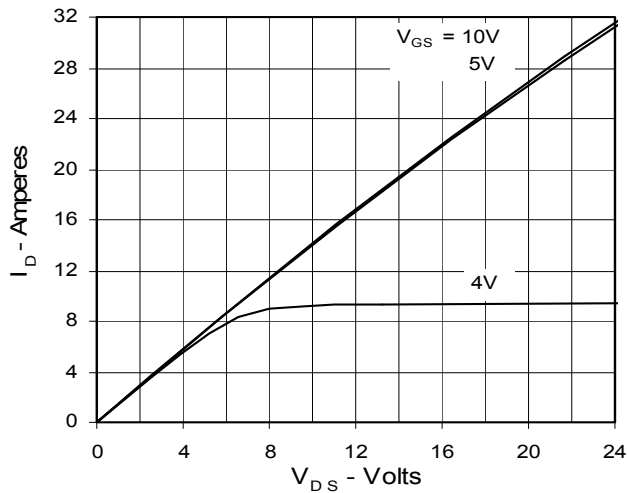
**Fig. 1. Output Characteristics  
@ 25 Deg. C**



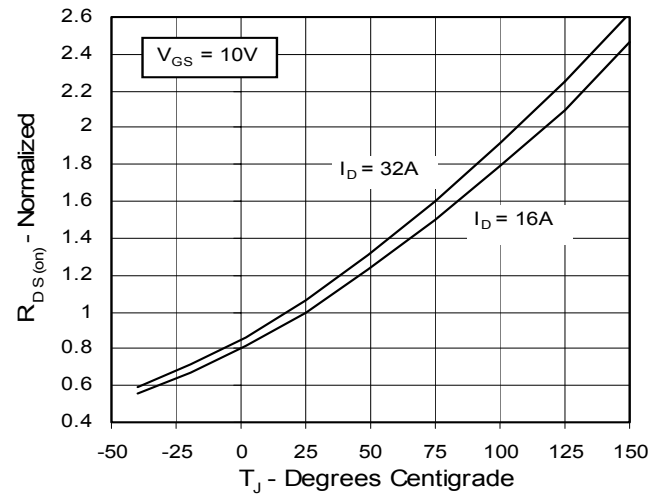
**Fig. 2. Extended Output Characteristics  
@ 25 deg. C**



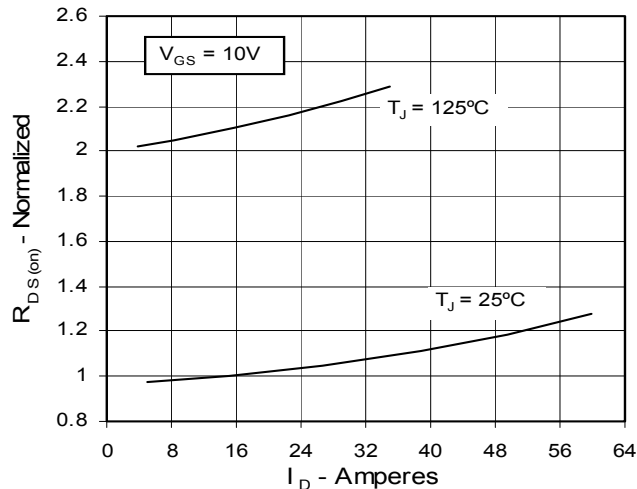
**Fig. 3. Output Characteristics  
@ 125 Deg. C**



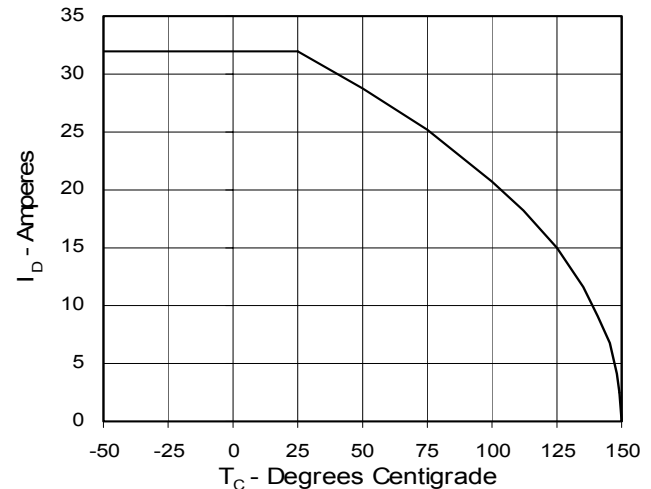
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_{D25}$  Value vs.  
Junction Temperature**

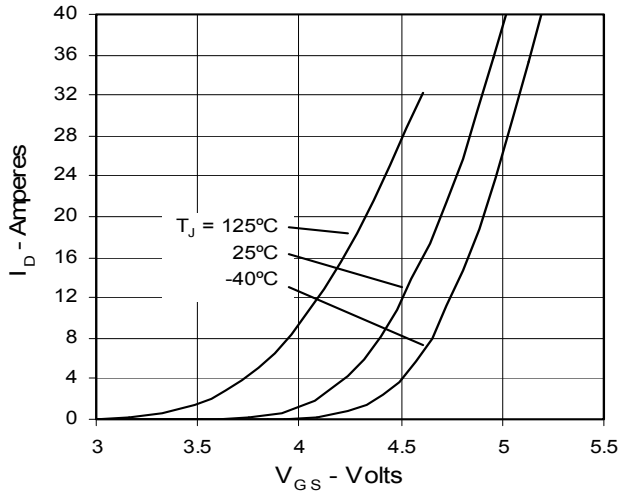
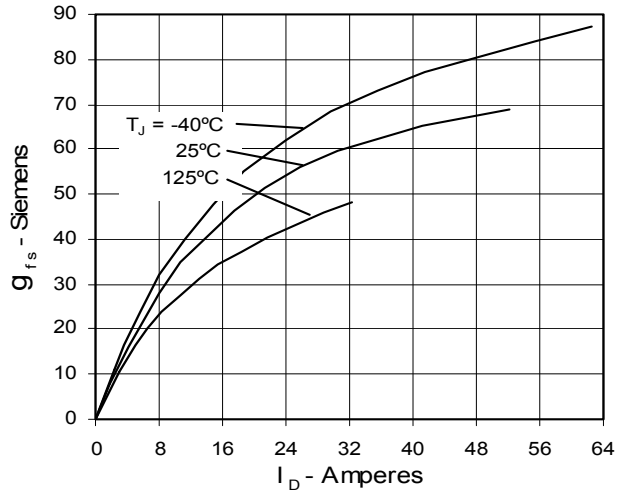
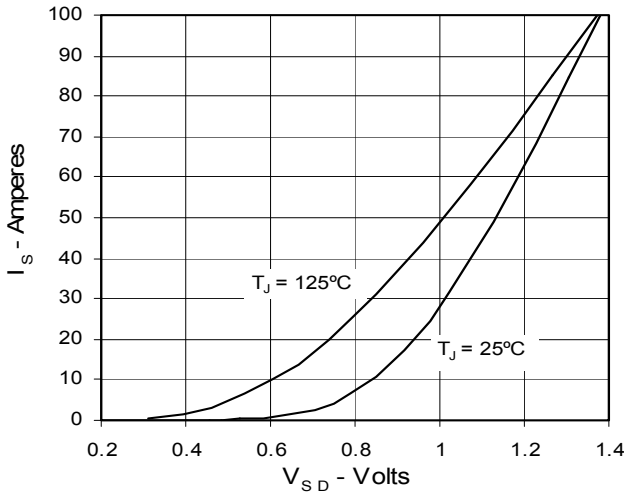
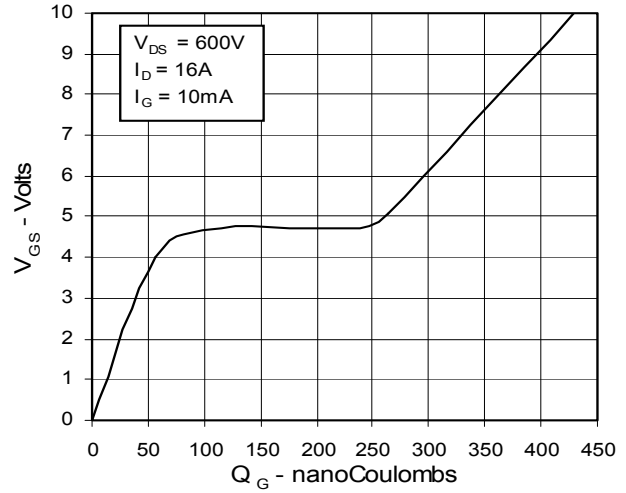
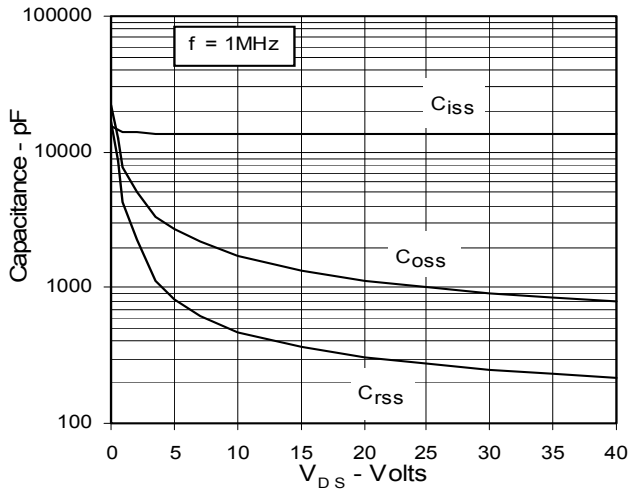
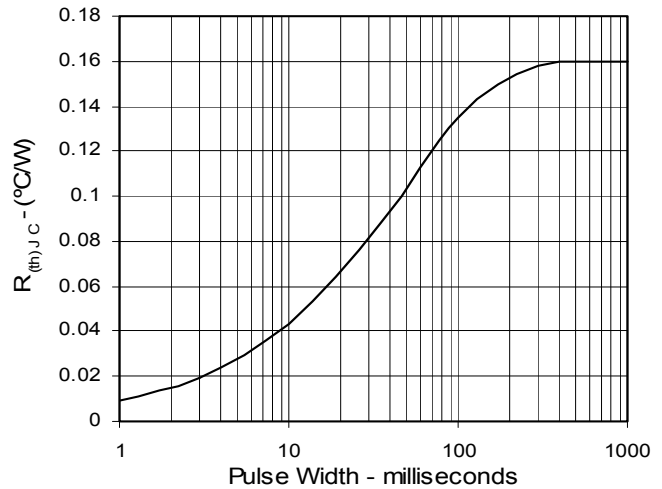


**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_{D25}$   
Value vs.  $I_D$**



**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**


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   |



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