

HiPerFET™ Power MOSFET

IXFN38N100Q2

$$V_{DSS} = 1000 \text{ V}$$

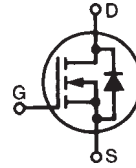
$$I_{D25} = 38 \text{ A}$$

$$R_{DS(on)} = 0.25 \Omega$$

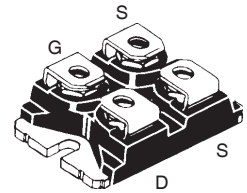
$$t_{rr} \leq 300 \text{ ns}$$

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 D = Drain
S = Source

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°C | 1000 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$ | 1000 | V |
| V_{GS} | Continuous | ± 30 | V |
| V_{GSM} | Transient | ± 40 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 38 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 152 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 38 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 60 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 5.0 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$ | 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, $t = 1$ 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 |

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

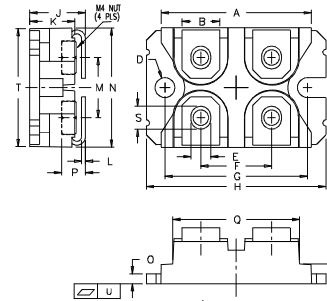
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|----------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 1 \text{ mA}$ | 1000 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8 \text{ mA}$ | 2.5 | | 5.0 V |
| I_{GSS} | $V_{GS} = \pm 30 \text{ V}$, $V_{DS} = 0$ | | | $\pm 200 \text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ | | | 50 mA 3 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = 0.5 \cdot I_{D25}$ Note 1 | | | 0.25 Ω |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|------|------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 20\text{ V}; I_D = 0.5 \cdot I_{D25}$ Note 1 | 24 | 40 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 7200 | pF |
| C_{oss} | | | 950 | pF |
| C_{rss} | | | 170 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ (External) | | 25 | ns |
| t_r | | | 28 | ns |
| $t_{d(off)}$ | | | 57 | ns |
| t_f | | | 15 | ns |
| $Q_{G(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 250 | nC |
| Q_{GS} | | | 60 | nC |
| Q_{GD} | | | 105 | nC |
| R_{thJC} | | | 0.14 | K/W |
| R_{thCK} | | 0.05 | | K/W |

| Source-Drain Diode | | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------------|--|---|------|---------------|
| Symbol | Test Conditions | min. | typ. | max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 38 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | | | 152 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}$, Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 25\text{ A}$ $-di/dt = 100\text{ A}/\mu\text{s}$ $V_R = 100\text{ V}$ | | | 300 ns |
| Q_{RM} | | | 1.4 | μC |
| I_{RM} | | | 9 | 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

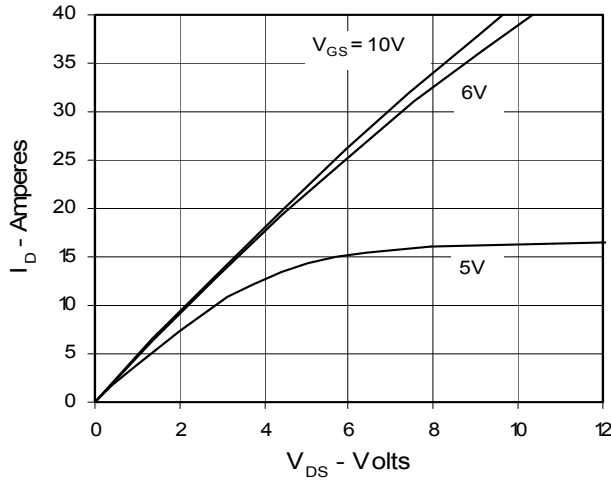
| Dim. | Millimeter | | Inches | |
|------|------------|-------|--------|-------|
| | Min. | Max. | Min. | Max. |
| A | 31.50 | 31.88 | 1.240 | 1.255 |
| B | 7.80 | 8.20 | 0.307 | 0.323 |
| C | 4.09 | 4.29 | 0.161 | 0.169 |
| D | 4.09 | 4.29 | 0.161 | 0.169 |
| E | 4.09 | 4.29 | 0.161 | 0.169 |
| F | 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.

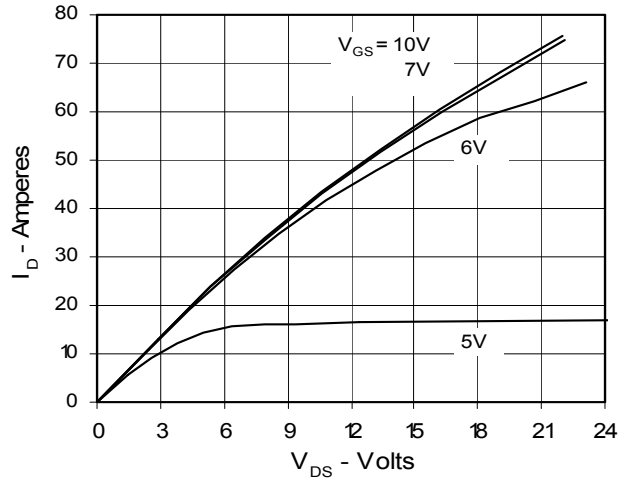
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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

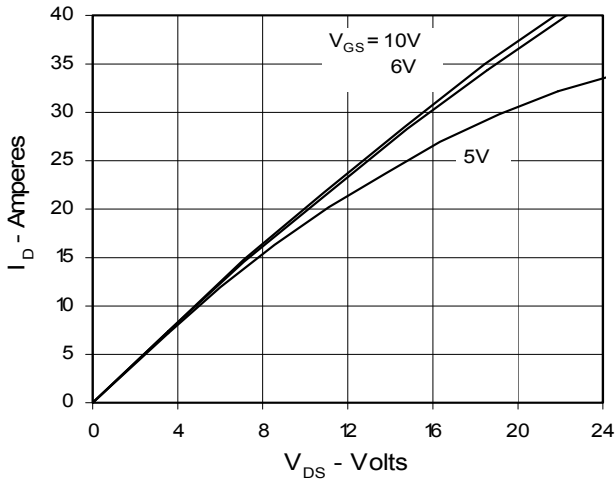
**Fig. 1. Output Characteristics
@ 25 Deg. C**



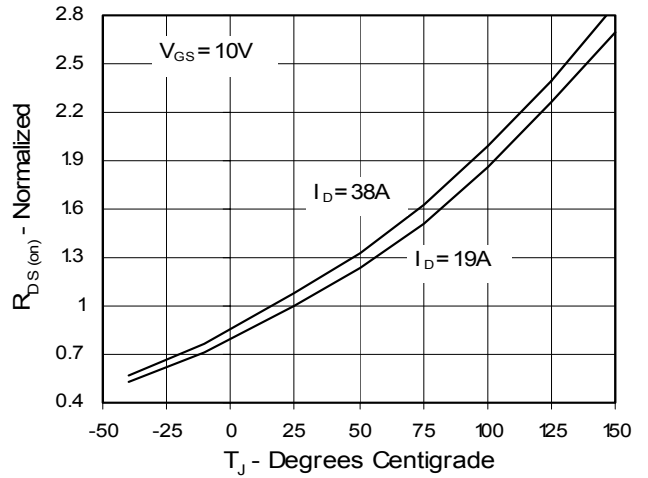
**Fig. 2. Extended Output Characteristics
@ 25 deg. C**



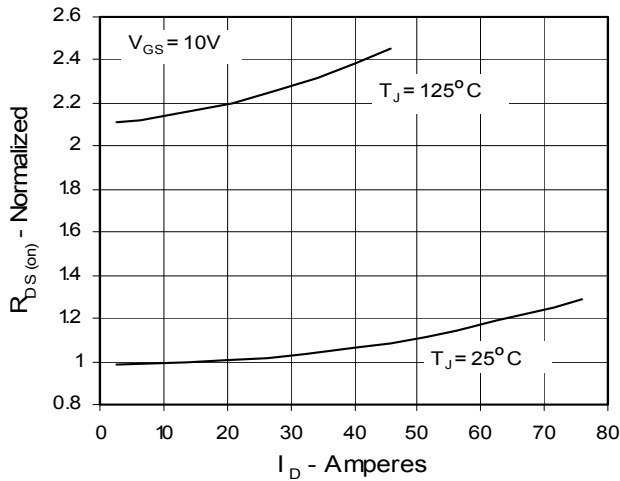
**Fig. 3. Output Characteristics
@ 125 Deg. C**



**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**

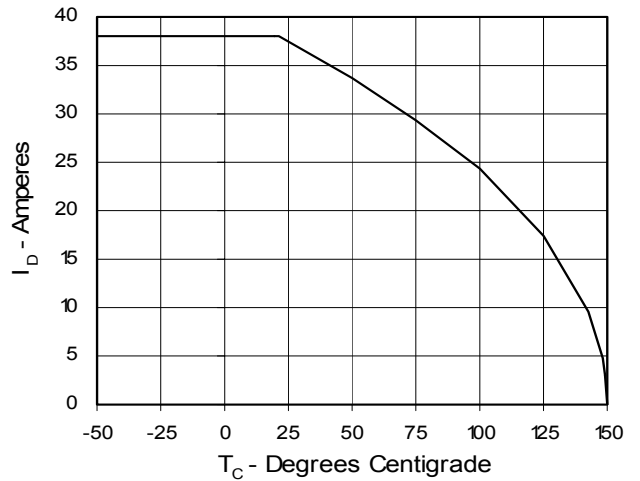


Fig. 7. Input Admittance

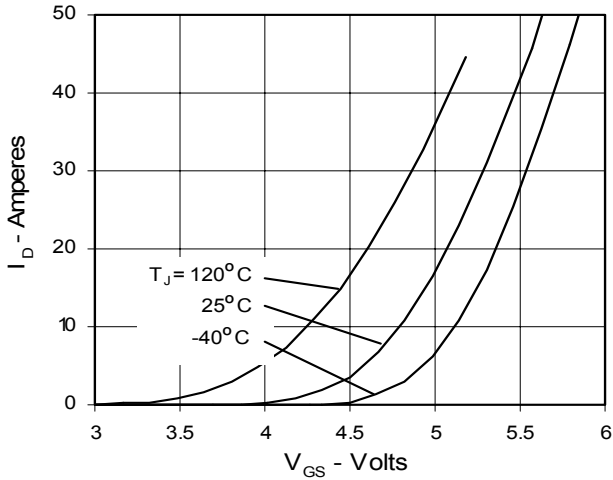


Fig. 8. Transconductance

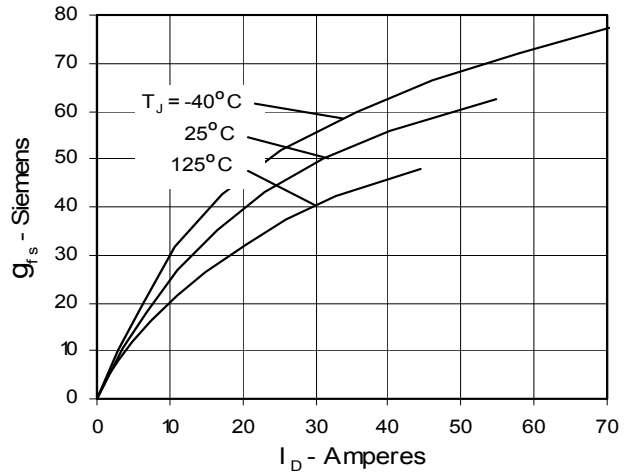


Fig. 9. Source Current vs. Source-To-Drain Voltage

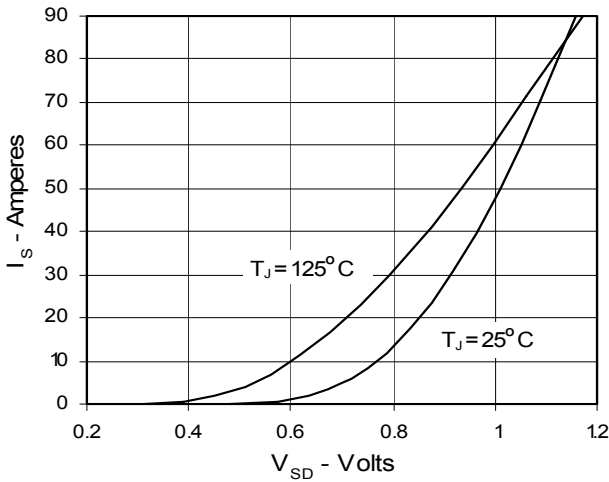


Fig. 10. Gate Charge

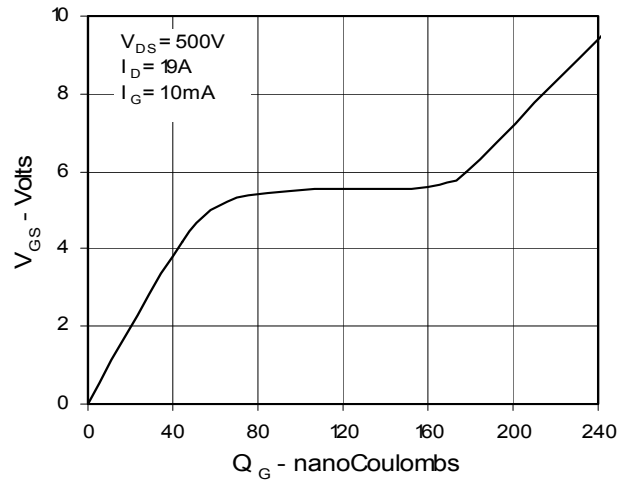


Fig. 11. Capacitance

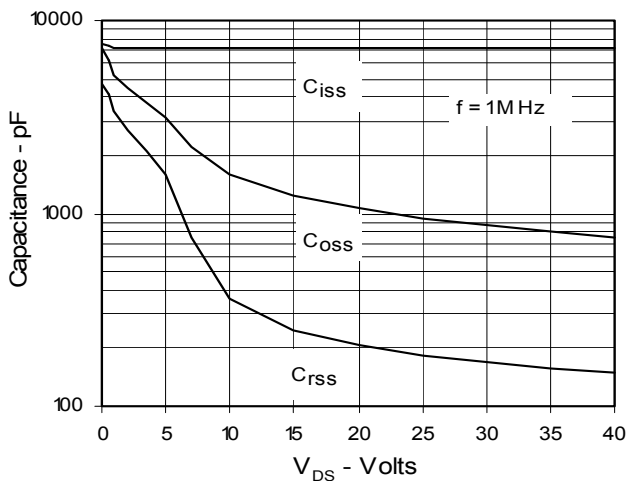
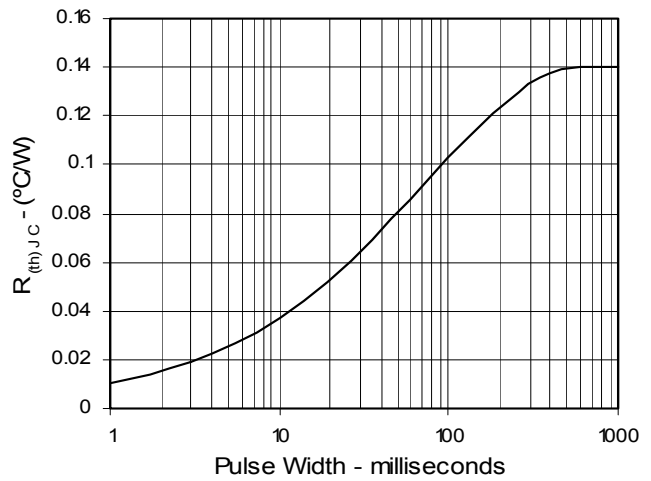


Fig. 12. Maximum Transient Thermal Resistance



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