IXYS

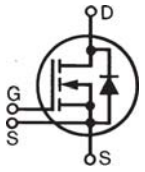
Preliminary Technical Information

# HiPerFET™ Power MOSFETs Single Die MOSFET

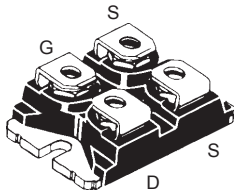
# IXFN280N085

$V_{DSS}$ = 85V
$I_{D25}$ = 280A
$R_{DS(on)}$ ≤ 4.4mΩ

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




**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°C to 150°C | 85 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C, $R_{GS}$ = 1MΩ | 85 | V |
| $V_{GSS}$ | Continuous | ±20 | V |
| $V_{GSM}$ | Transient | ±30 | V |
| $I_{D25}$ | $T_C$ = 25°C, Chip capability | 280 | A |
| $I_{L(RMS)}$ | Terminal current limit | 100 | A |
| $I_{DM}$ | $T_C$ = 25°C, pulse width limited by $T_{JM}$ | 1120 | A |
| $I_{AR}$ | $T_C$ = 25°C | 200 | A |
| $E_{AS}$ | $T_C$ = 25°C | 4 | J |
| dV/dt | $I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$ | 5 | V/ns |
| $P_d$ | $T_C$ = 25°C | 700 | W |
| $T_J$ | | -55 ... +150 | °C |
| $T_{JM}$ | | 150 | °C |
| $T_{stg}$ | | -55 ... +150 | °C |
| $V_{ISOL}$ | 50/60 Hz, RMS t = 1min | 2500 | V~ |
| | $I_{ISOL} \le$ 1mA t = 1s | 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 ($T_J$ = 25°C, unless otherwise specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 3mA | 85 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 8mA | 2.0 | | 4.0 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | | | ±200 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$ | | | 100 | μA |
| | $V_{GS}$ = 0V $T_J$ = 125°C | | | 2 | mA |
| $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 100A, Note 1 | | | 4.4 | mΩ |

### Features

- International standard packages
- 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

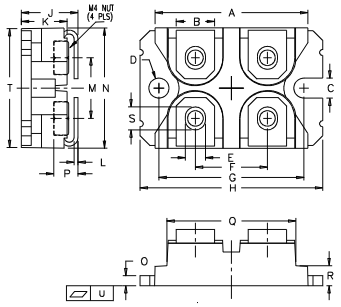
- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- Temperature and lighting controls

### Advantages

- Easy to mount
- Space savings
- High power density

| Symbol | Test Conditions ($T_J$ = 25°C, unless otherwise specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 10V, $I_D$ = 60A, Note 1 | 50 | 85 | | S |
| $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | | 18.4 | | nF |
| $C_{oss}$ | | | 6.7 | | nF |
| $C_{rss}$ | | | 2.9 | | nF |
| $t_{d(on)}$ | **Resistive Switching Times** | | 41 | | ns |
| $t_r$ | $V_{GS}$ = 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 100A | | 67 | | ns |
| $t_{d(off)}$ | $R_G$ = 2Ω (External) | | 90 | | ns |
| $t_f$ | | | 57 | | ns |
| $Q_{g(on)}$ | $V_{GS}$ = 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 100A | | 440 | | nC |
| $Q_{gs}$ | | | 65 | | nC |
| $Q_{gd}$ | | | 230 | | nC |
| $R_{thJC}$ | | | | 0.18 | °C/W |
| $R_{thCS}$ | | | 0.05 | | °C/W |

**miniBLOC, SOT-227 B**




M4 screws (4x) supplied

| Dim. | Millimeter Min. | Max. | Inches 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 |

**Source-Drain Diode**

| Symbol | Test Conditions ($T_J$ = 25°C, unless otherwise specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0V | | | 280 | A |
| $I_{SM}$ | Repetitive, pulse width limited by $T_{JM}$ | | | 1120 | A |
| $V_{SD}$ | $I_F$ = 100A, $V_{GS}$ = 0V, Note 1 | | | 1.2 | V |
| $t_{rr}$ | $I_F$ = 50A, -di/dt = 100A/μs, $V_R$ = 50V | | | 200 | ns |
| $Q_{RM}$ | | | 0.76 | | μC |
| $I_{RM}$ | | | 8.00 | | A |

Note 1: Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.

**PRELIMINARY TECHNICAL INFORMATION**

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

**Fig. 1. Extended Output Characteristics @ 25ºC**

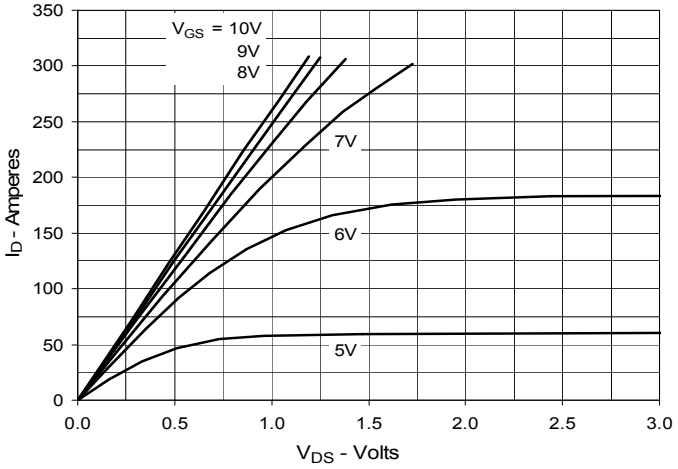



**Fig. 2. Output Characteristics @ 125ºC**

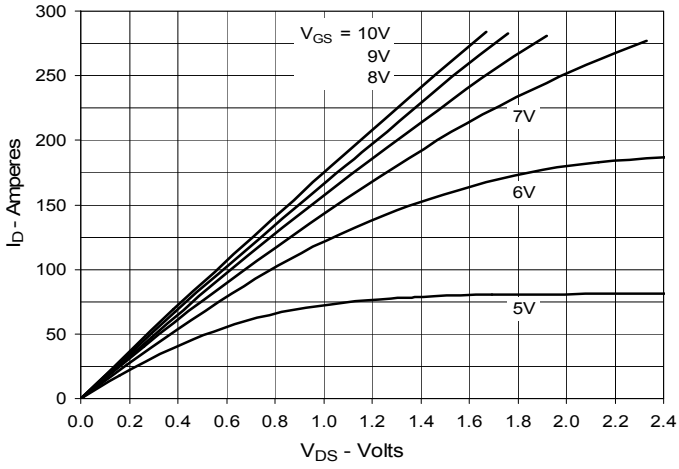



**Fig. 3. $R_{DS(on)}$ Normalized to $I_D$ = 140A Value vs. Junction Temperature**

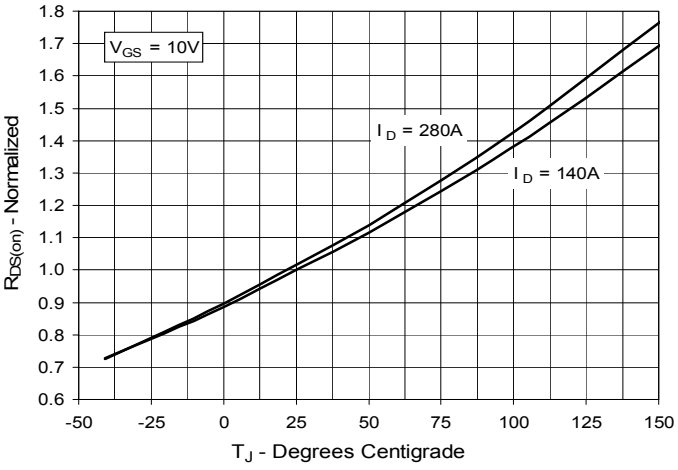



**Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 140A Value vs.Drain Current**

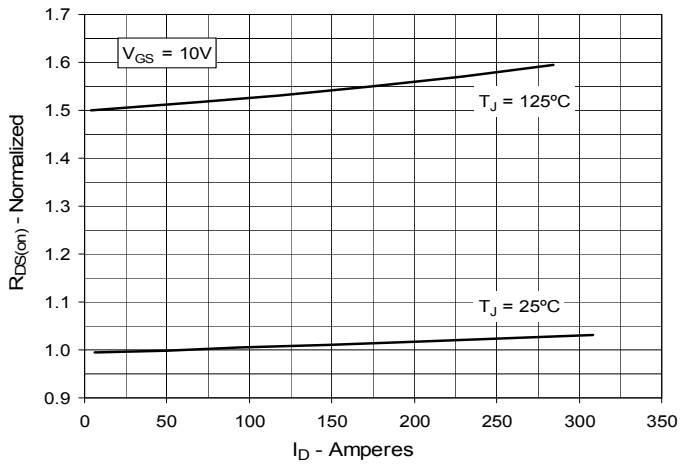



**Fig. 5. Maximum Drain Current vs. Case Temperature**

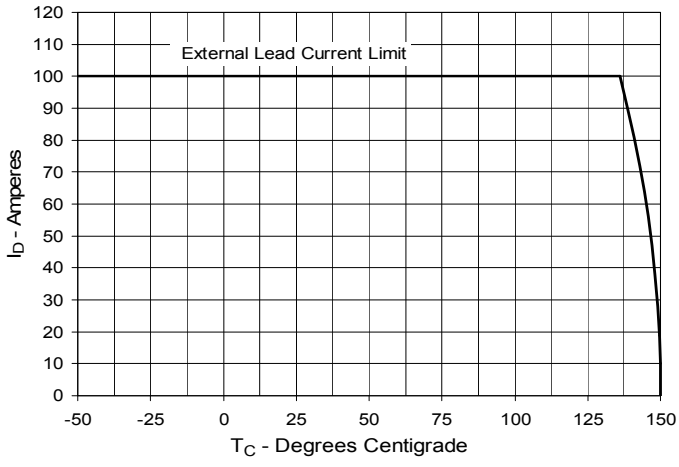



**Fig. 6. Forward Voltage Drop of Intrinsic Diode**

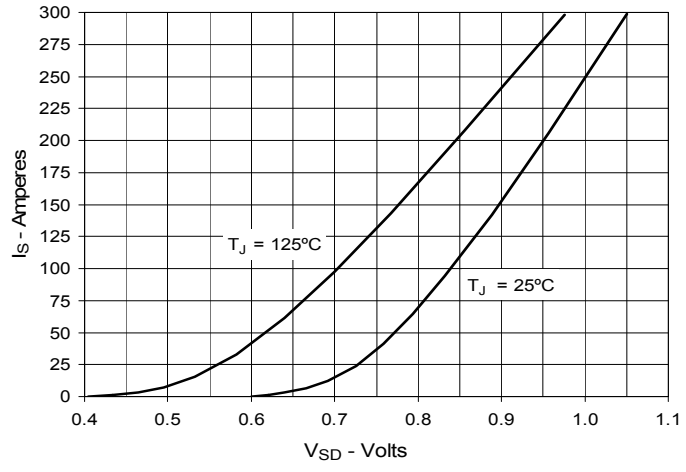


**Fig. 7. Input Admittance**

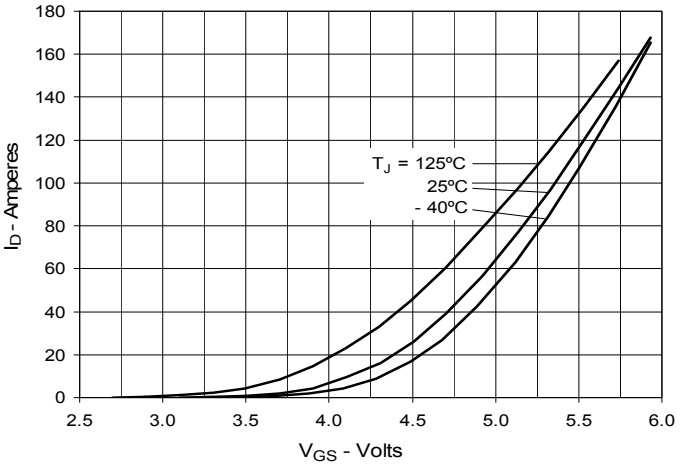



**Fig. 8. Transconductance**

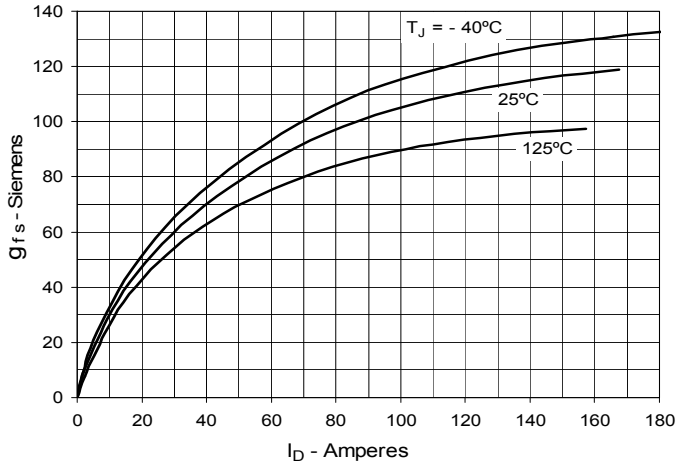



**Fig. 9. Capacitance**

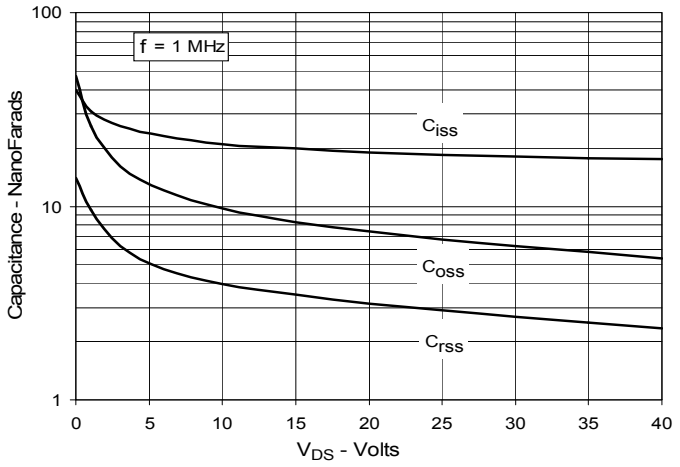



**Fig. 10. Gate Charge**

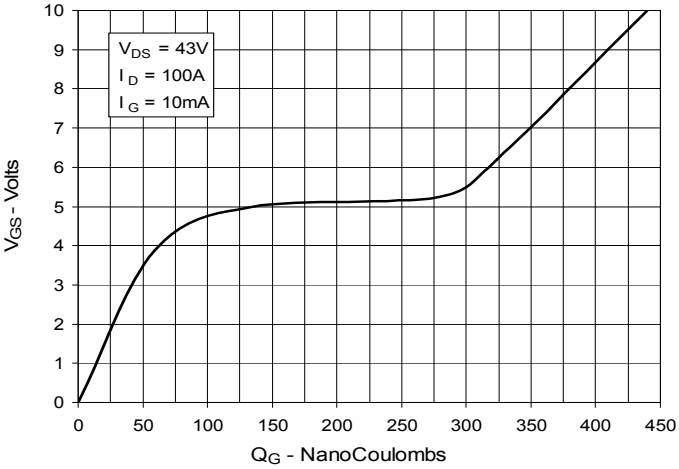



**Fig. 11. Forward-Bias Safe Operating Area**

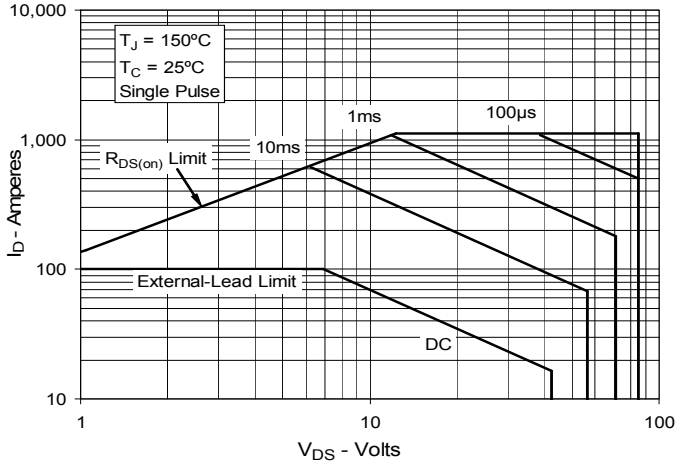



**Fig. 12. Maximum Transient Thermal Impedance**