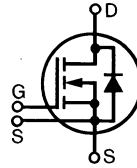


HiPerFET™ Power MOSFET

Single MOSFET Die

Preliminary data sheet

IXFN 24N100
IXFN 23N100



| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|---------------|
| 1000 V | 24 A | 0.39 Ω |
| 1000 V | 23 A | 0.43 Ω |

$t_{rr} \leq 250$ ns

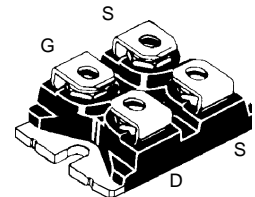
Symbol Test Conditions

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 | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 24N100: 24 23N100: 23 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$; Note 1 | 24N100: 96 23N100: 92 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 24 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 60 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 3 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100$ A/ μs , $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$ | 5 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 600 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| T_L | 1.6 mm (0.063 in) from case for 10 s | 300 | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz, RMS $t = 1$ min $I_{ISOL} \leq 1$ mA $t = 1$ s | 2500 3000 | V~ V~ |
| M_d | Mounting torque Terminal connection torque | 1.5/13 Nm/lb.in. 1.5/13 Nm/lb.in. | |
| Weight | | 30 | g |

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

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
- Unclamped Inductive Switching (UIS) 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

($T_J = 25^\circ\text{C}$, unless otherwise specified)

Characteristic Values

| | | Min. | Typ. | Max. |
|--------------|--|---|------|--------------------------------|
| V_{DSS} | $V_{GS} = 0$ V, $I_D = 3$ mA | 1000 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8$ mA | 3.0 | | 5.0 V |
| I_{GSS} | $V_{GS} = \pm 20$ V, $V_{DS} = 0$ V | | | ± 100 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0$ V | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | | 100 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = 0.5 \cdot I_{D25}$ Note 2 | 23N100 24N100 | | 0.43 Ω 0.39 Ω |

| Symbol | Test Conditions | Characteristic Values | | |
|--------------|--|-----------------------|------|------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$, Note 2 | 15 | 22 | S |
| C_{iss} | | | 7000 | pF |
| C_{oss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 750 | pF |
| C_{rss} | | | 260 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\ \Omega$ (External), | | 35 | ns |
| t_r | | | 35 | ns |
| $t_{d(off)}$ | | | 75 | ns |
| t_f | | | 21 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 250 | nC |
| Q_{gs} | | | 55 | nC |
| Q_{gd} | | | 135 | nC |
| R_{thJC} | | | 0.21 | K/W |
| R_{thCK} | | 0.05 | | K/W |

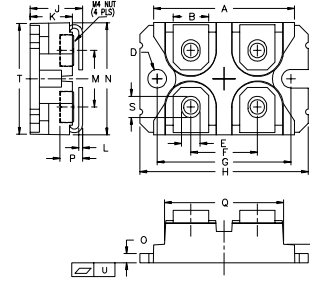
Source-Drain Diode

($T_J = 25^\circ\text{C}$, unless otherwise specified)

| Symbol | Test Conditions | Characteristic Values | | |
|----------|---|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0$ | 24N100 23N100 | | 24 23 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | 24N100 23N100 | | 96 92 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}$, Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 1.5 V |
| t_{rr} | $I_F = I_S, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | 1.0 | 250 ns |
| Q_{RM} | | | 8 | μC |
| I_{RM} | | | | |

- Notes: 1. Pulse width limited by T_{JM} .
2. Pulse test, $t \leq 300\text{ ms}$, duty cycle $d \leq 2\%$.

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 |

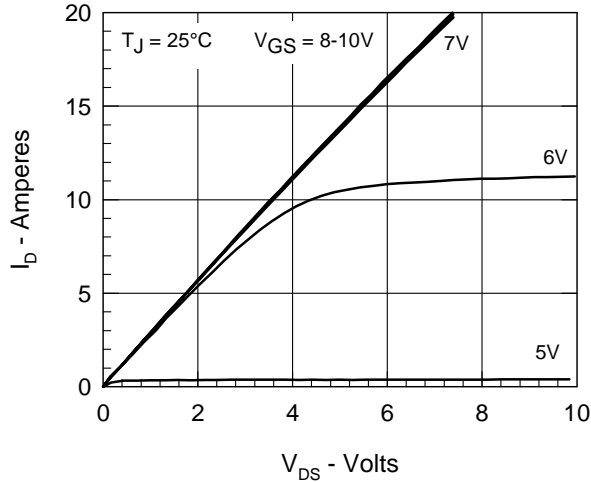


Figure 1. Output Characteristics at 25°C

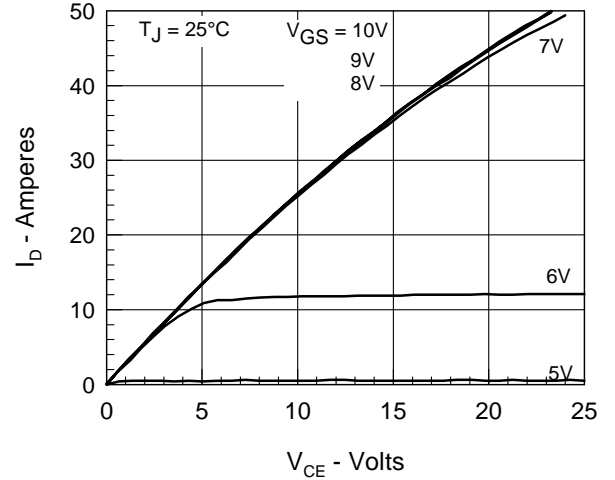


Figure 2. Extended Output Characteristics at 125°C

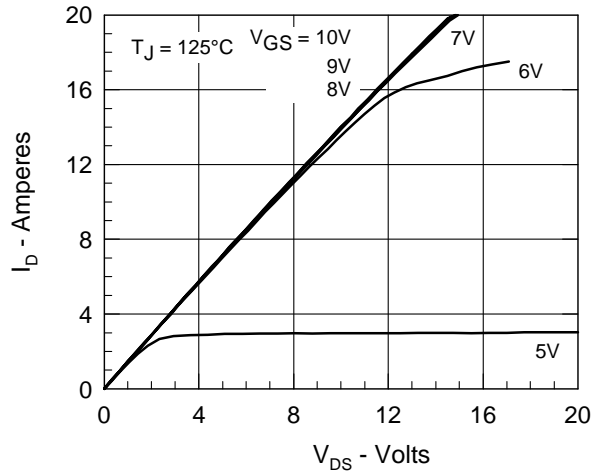


Figure 3. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. I_D

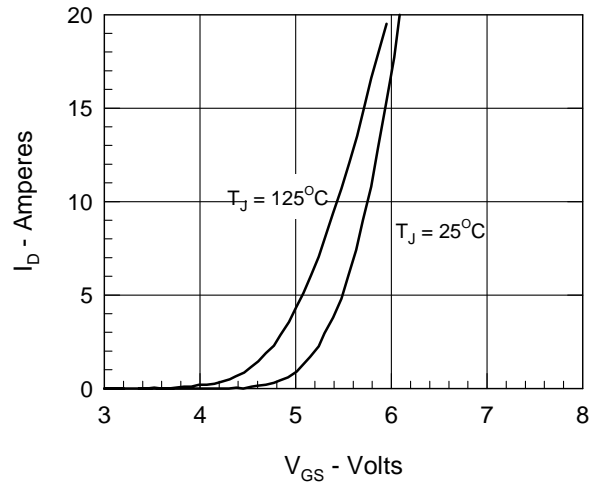


Figure 4. Admittance Curves

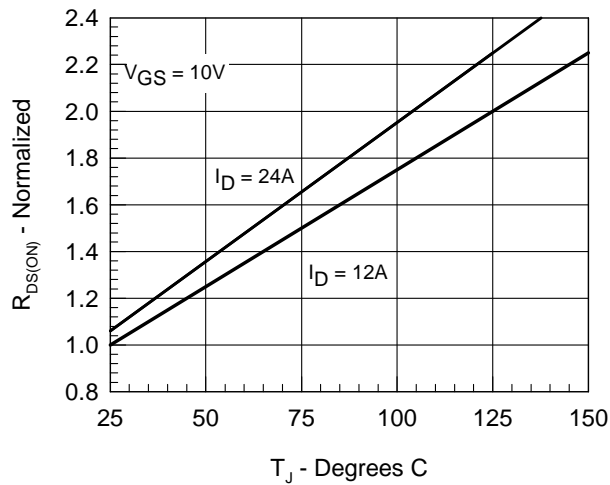


Figure 5. $R_{DS(on)}$ normalized to 0.5 I_{D25} value vs. T_J

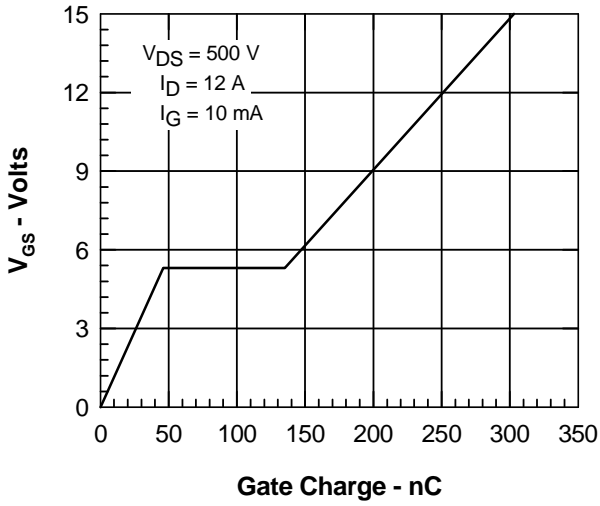


Figure 6. Gate Charge

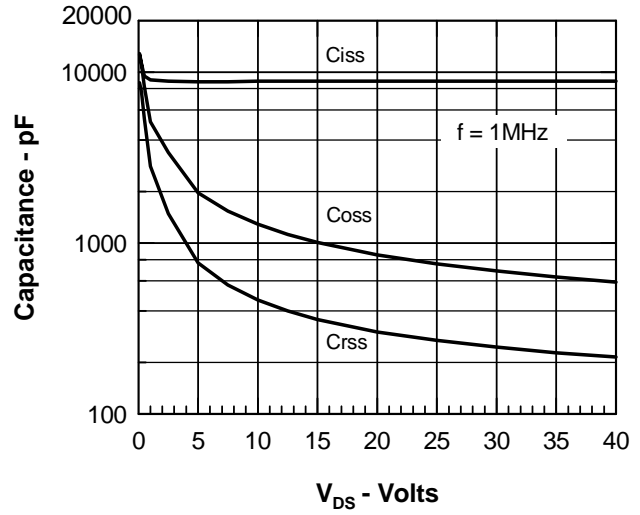


Figure 7. Capacitance Curves

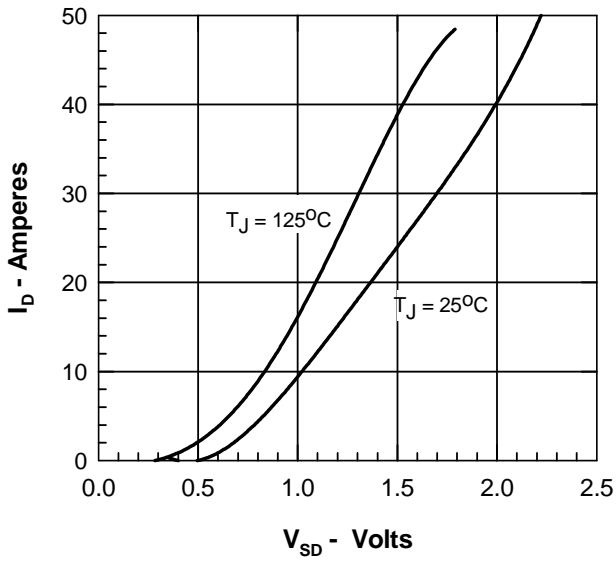


Figure 8. Forward Voltage Drop of the Intrinsic Diode

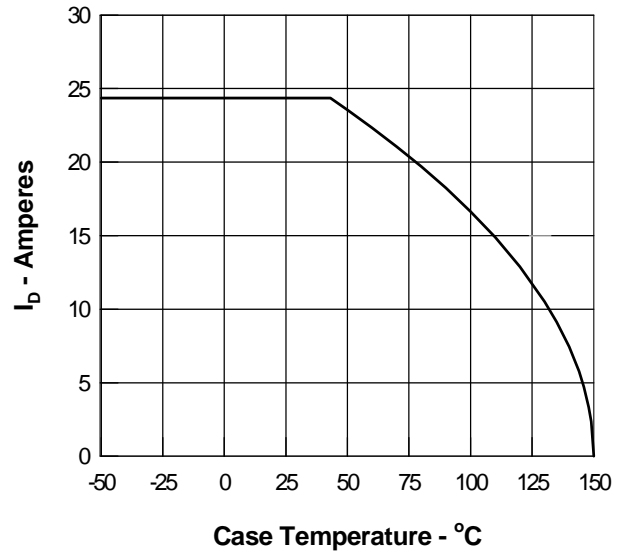


Figure 9. Drain Current vs. Case Temperature

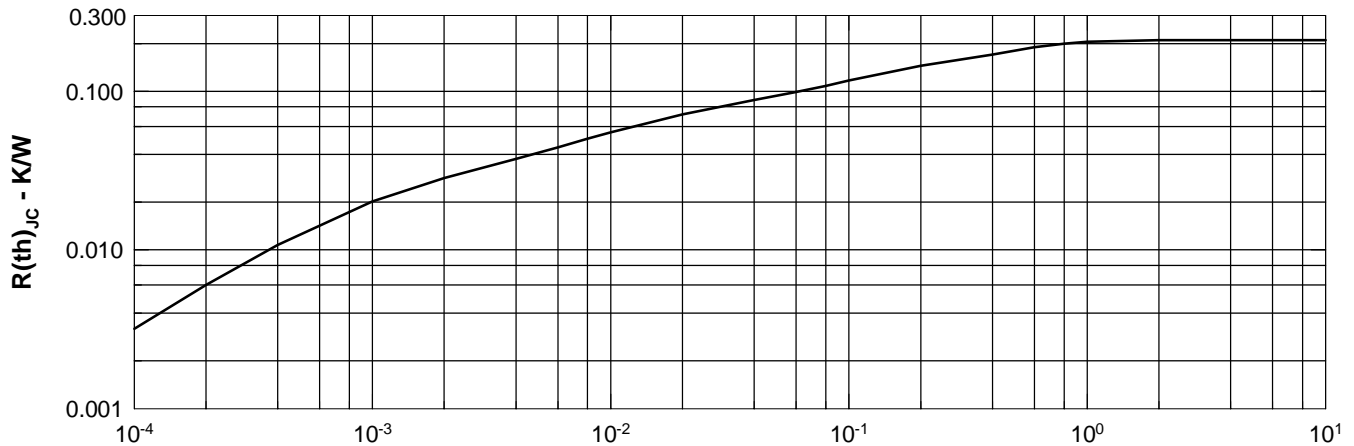


Figure 10. Transient Thermal Resistance

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
4,850,072 4,931,844 5,034,796 5,063,307 5,237,481 5,381,025