

HiPerFET™ Power MOSFETs

Single MOSFET Die

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

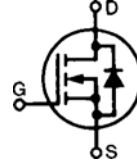
IXFN 120N20

$$V_{DSS} = 200 \text{ V}$$

$$I_{D25} = 120 \text{ A}$$

$$R_{DS(on)} = 17 \text{ m}\Omega$$

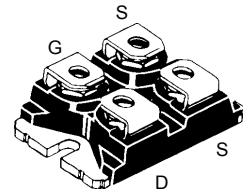
$$t_{rr} \leq 250 \text{ ns}$$



| Symbol | Test Conditions | Maximum Ratings | |
|------------|---|------------------|------------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 200 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1 \text{ M}\Omega$ | 200 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 120 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 480 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 120 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 64 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 3 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2 \Omega$ | 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 | - | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz, RMS $t = 1 \text{ min}$ $I_{ISOL} \leq 1 \text{ mA}$ $t = 1 \text{ s}$ | 2500 3000 | V~ V~ |
| M_d | Mounting torque Terminal connection torque | 1.5/13 1.5/13 | Nm/lb.in. Nm/lb.in. |
| Weight | | 30 | g |

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

Features

- Encapsulating epoxy meets UL 94 V-0, flammability classification
- International standard package
- miniBLOC, with Aluminium nitride isolation
- Low $R_{DS(on)}$ HDMOST™ 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
- Low voltage relays

Advantages

- Easy to mount
- Space savings
- High power density

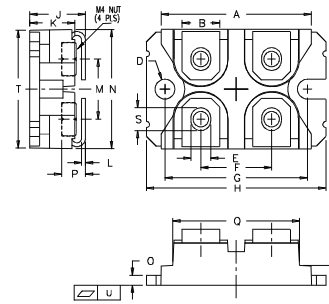
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|---|---------------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 3 \text{ mA}$ | 200 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8 \text{ mA}$ | 2 | | 4 V |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$ | | | $\pm 200 \text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0 \text{ V}$ | | $T_J = 25^\circ\text{C}$ $T_J = 125^\circ\text{C}$ | 100 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = 0.5 \cdot I_{D25}$ Note 1 | | | 17 m Ω |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 0.5 \cdot I_{D25}$ Note 1 | 40 | 77 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 9100 | pF |
| C_{oss} | | | 2200 | pF |
| C_{rss} | | | 1000 | 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), | | 42 | ns |
| t_r | | | 55 | ns |
| $t_{d(off)}$ | | | 110 | ns |
| t_f | | | 40 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 360 | nC |
| Q_{gs} | | | 50 | nC |
| Q_{gd} | | | 160 | nC |
| R_{thJC} | | | 0.22 | 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 | $V_{GS} = 0\text{ V}$ | | | 120 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | | | 480 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}$, Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 50\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | | 250 ns |
| Q_{RM} | | | 1.1 | μC |
| I_{RM} | | | 13 | A |

Note: 1. Pulse test, $t \leq 300\ \mu\text{s}$, 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 |

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

Fig. 1. Output Characteristics
@ 25 Deg. C

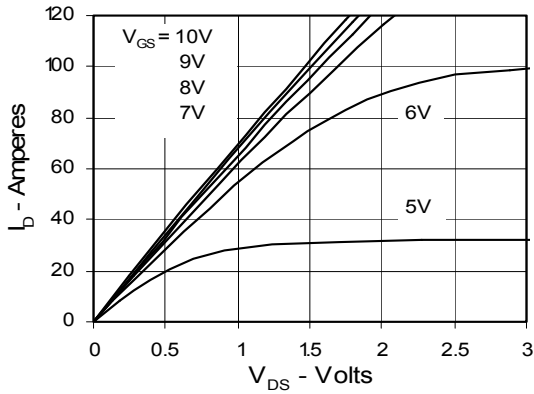


Fig. 2. Extended Output Characteristics
@ 25 deg. C

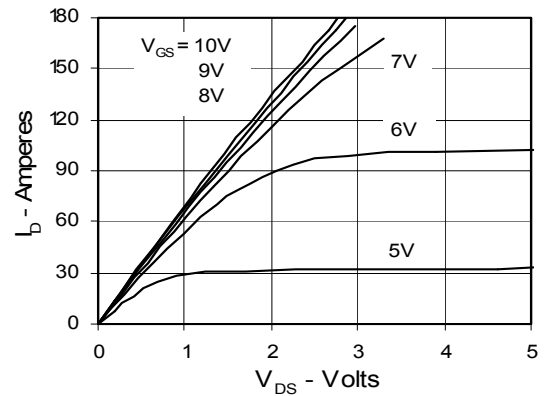


Fig. 3. Output Characteristics
@ 125 Deg. C

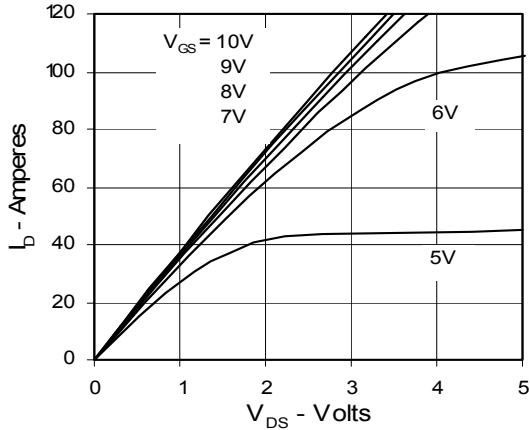


Fig. 4. $R_{DS(on)}$ Normalized to I_{D25} Value vs. Junction Temperature

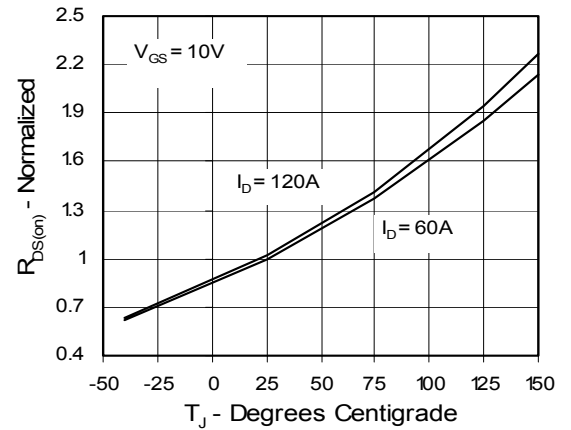


Fig. 5. $R_{DS(on)}$ Normalized to I_{D25} Value vs. I_D

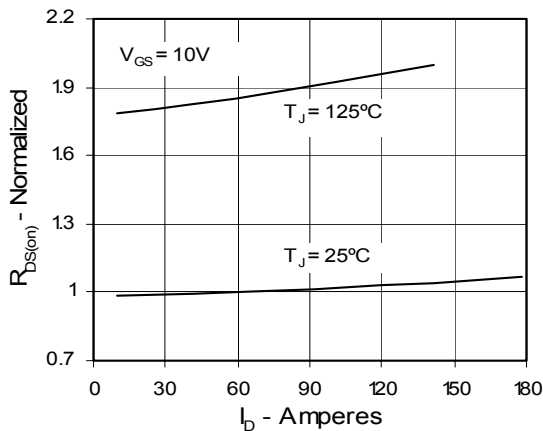


Fig. 6. Drain Current vs. Case Temperature

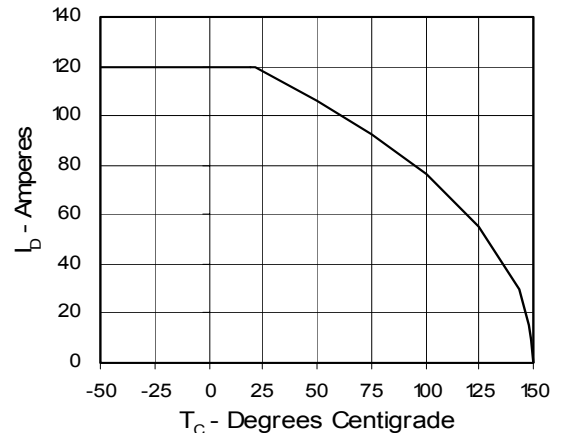


Fig. 7. Input Admittance



Fig. 8. Transconductance

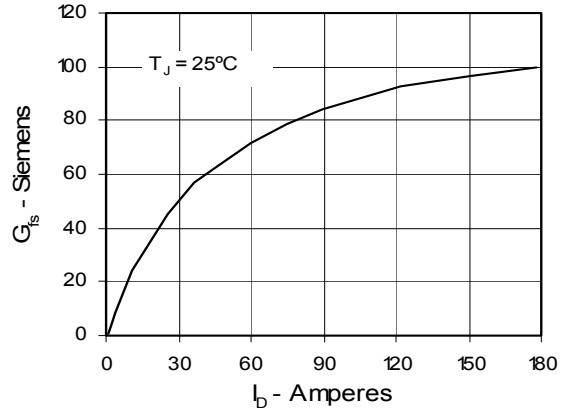


Fig. 9. Source Current vs. Source-To-Drain Voltage

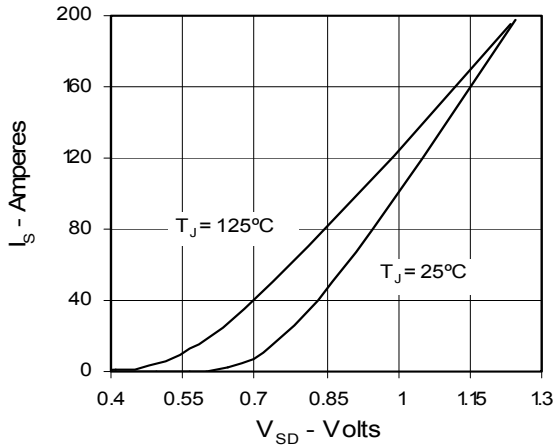


Fig. 10. Gate Charge

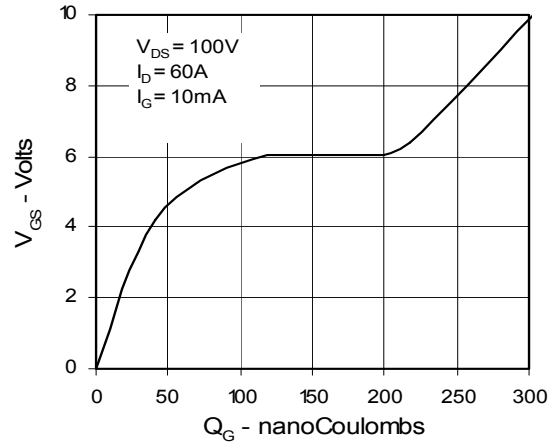


Fig. 11. Capacitance

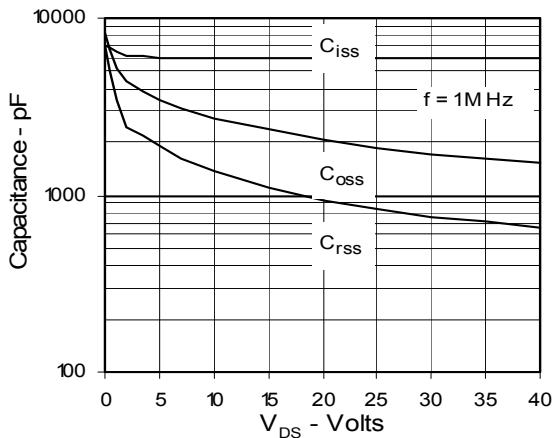
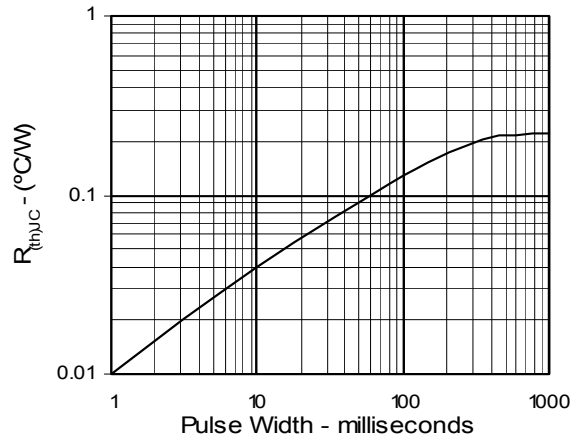


Fig. 12. Maximum Transient Thermal Resistance



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



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