

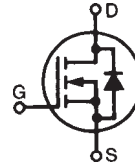
HiPerFET™ Power MOSFETs Q-Class

IXFE 44N50Q
IXFE 48N50Q

| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 500 V | 39 A | 120 mΩ |
| 500 V | 41 A | 110 mΩ |

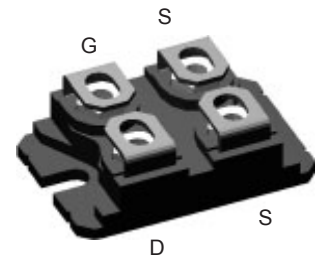
$t_{rr} \leq 250$ ns

N-Channel Enhancement Mode
Avalanche Rated, Low Q_g , High dv/dt



Preliminary data sheet

ISOPLUS 227™ (IXFE)



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 | 500 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$ | 500 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 44N50Q 39 48N50Q 41 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 44N50Q 176 48N50Q 192 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 48 | A |
| E_{AR} E_{AS} | $T_C = 25^\circ\text{C}$ | 60 2.5 | mJ mJ |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 2\ \Omega$ | 15 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 400 | W |
| T_J | | -40 to +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -40 to +150 | $^\circ\text{C}$ |
| V_{ISOL} | 50/60 Hz, RMS $t = 1$ min $I_{ISOL} \leq 1\text{ mA}$ $t = 1$ 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 | | 19 | g |

Features

- Conforms to SOT-227B outline
- 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

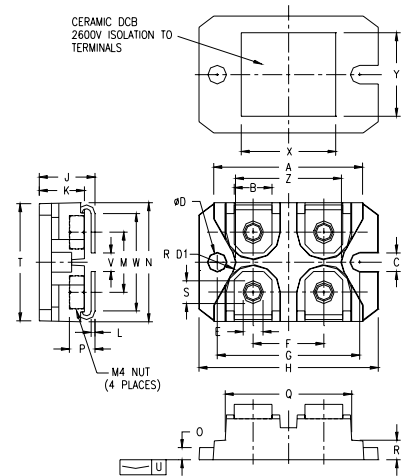
- Low cost
- Easy to mount
- Space savings
- High power density

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|---------------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0\text{ V}$, $I_D = 1\text{ mA}$ | 500 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4\text{ mA}$ | 2.0 | | V |
| I_{GSS} | $V_{GS} = \pm 20\text{ V}_{DC}$, $V_{DS} = 0$ | | | ± 100 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $T_J = 25^\circ\text{C}$ $V_{GS} = 0\text{ V}$, $T_J = 125^\circ\text{C}$ | | | 100 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$, $I_D = I_T$ | 44N50Q 48N50Q | | 120 mΩ 110 mΩ |
| | Notes 1, 2 | | | |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 20\text{ V}; I_D = I_T$, Notes 1, 2 | 30 | 42 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 7000 | pF |
| C_{oss} | | | 960 | pF |
| C_{rss} | | | 230 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ $R_G = 4.7\ \Omega$ (External), | | 33 | ns |
| t_r | | | 22 | ns |
| $t_{d(off)}$ | | | 75 | ns |
| t_f | | | 10 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ | | 190 | nC |
| Q_{gs} | | | 40 | nC |
| Q_{gd} | | | 86 | nC |
| R_{thJC} | | | 0.31 | K/W |
| R_{thCK} | | | 0.07 | K/W |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|----------|--|---|------|---------------|
| | | min. | typ. | max. |
| I_s | $V_{GS} = 0\text{ V}$ | | | 48 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | | | 192 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{ V}$, Note:1 | | | 1.5 V |
| t_{rr} | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | 1.0 | 250 ns |
| Q_{RM} | | | 10 | μC |
| I_{RM} | | | | A |

ISOPLUS-227 B

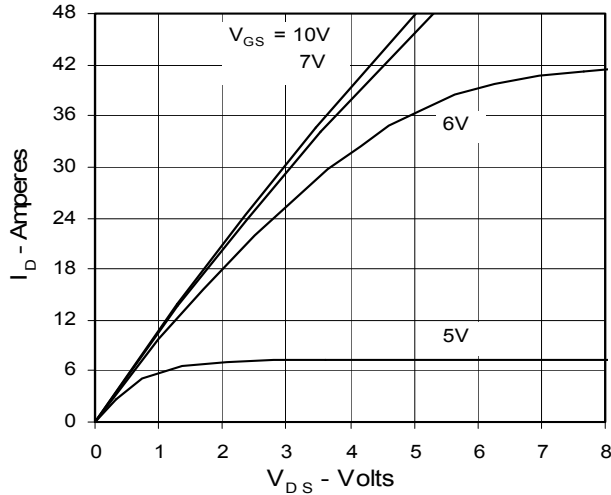


| SYM | INCHES | | MILLIMETERS | |
|-----|--------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.240 | 1.270 | 31.50 | 32.26 |
| B | .310 | .330 | 7.87 | 8.38 |
| C | .155 | .165 | 3.94 | 4.19 |
| D | .155 | .165 | 3.94 | 4.19 |
| D1 | .150 | .157 | 3.81 | 3.98 |
| E | .160 | .168 | 4.06 | 4.27 |
| F | .587 | .595 | 14.91 | 15.11 |
| G | 1.186 | 1.193 | 30.12 | 30.30 |
| H | 1.489 | 1.505 | 37.80 | 38.23 |
| J | .465 | .481 | 11.81 | 12.22 |
| K | .370 | .380 | 9.40 | 9.65 |
| L | .030 | .033 | 0.76 | 0.84 |
| M | .496 | .506 | 12.60 | 12.85 |
| N | .990 | 1.001 | 25.15 | 25.42 |
| O | .100 | .105 | 2.54 | 2.67 |
| P | .195 | .235 | 4.95 | 5.97 |
| Q | 1.045 | 1.059 | 26.54 | 26.90 |
| R | .160 | .170 | 4.06 | 4.32 |
| S | .186 | .191 | 4.72 | 4.85 |
| T | .968 | .987 | 24.59 | 25.07 |
| U | -.001 | .002 | -0.03 | 0.05 |
| V | .130 | .160 | 3.30 | 4.06 |
| W | .780 | .830 | 19.81 | 21.08 |
| X | .770 | .810 | 19.56 | 20.57 |
| Y | .680 | .720 | 17.27 | 18.29 |
| Z | .885 | .892 | 22.48 | 22.66 |

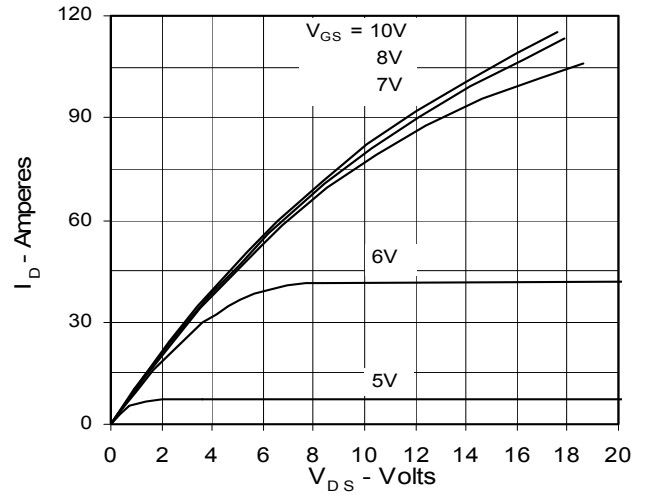
- Note: 1. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$
 2. I_T Test current:
 44N50Q: $I_T = 22\text{ A}$
 48N50Q: $I_T = 24\text{ A}$

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

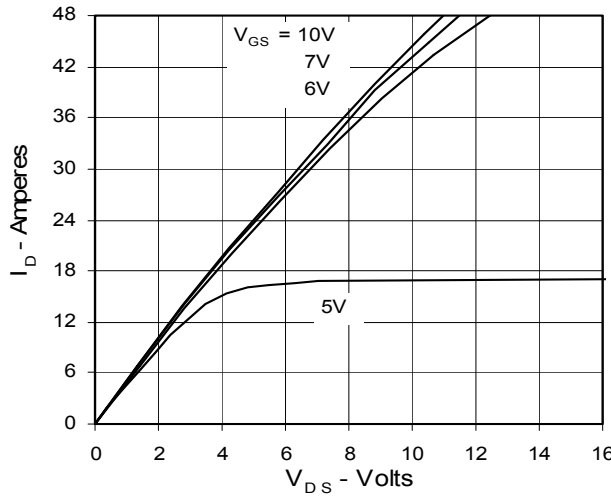
**Fig. 1. Output Characteristics
@ 25 Deg. C**



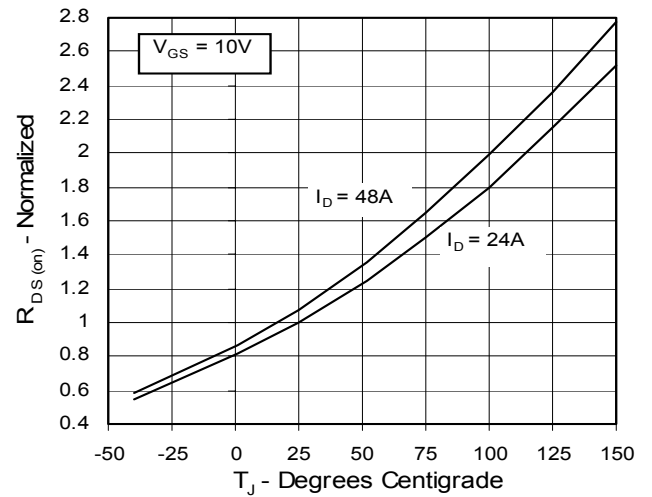
**Fig. 2. Extended Output Characteristics
@ 25 deg. C**



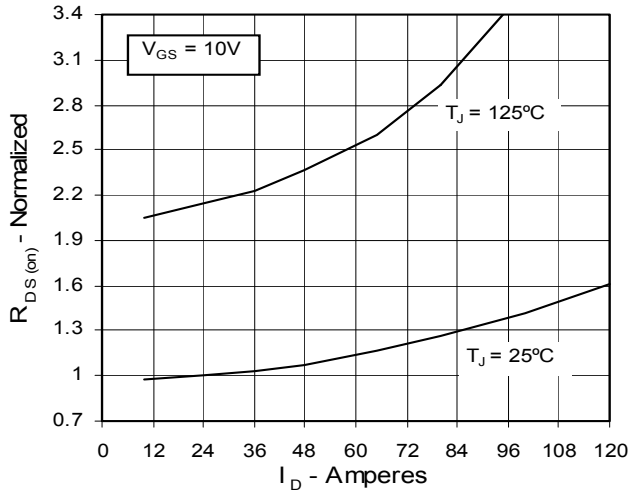
**Fig. 3. Output Characteristics
@ 125 Deg. C**



**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**

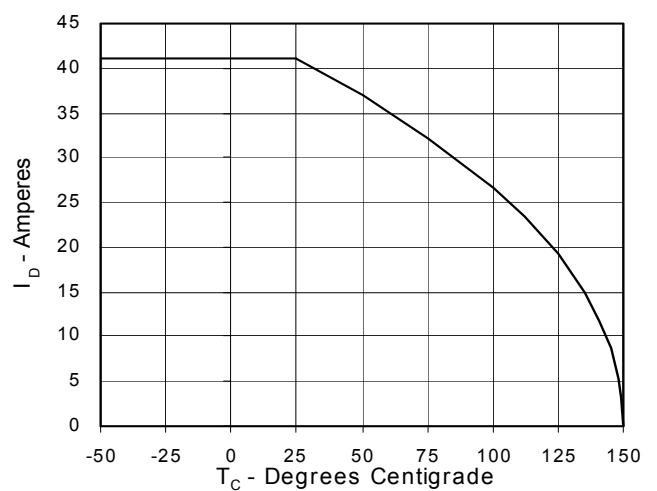


Fig. 7. Input Admittance

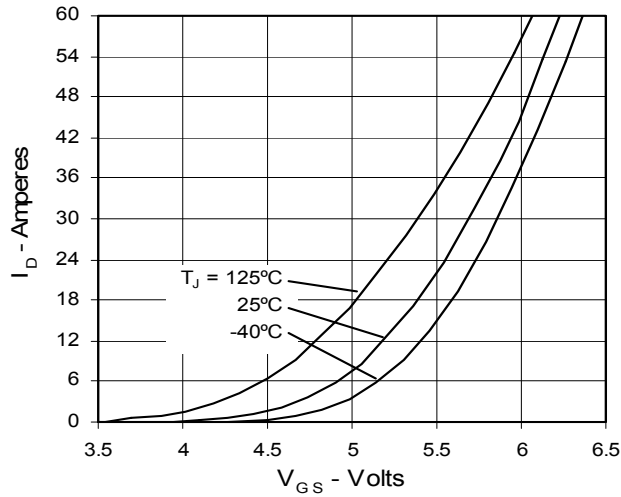


Fig. 8. Transconductance

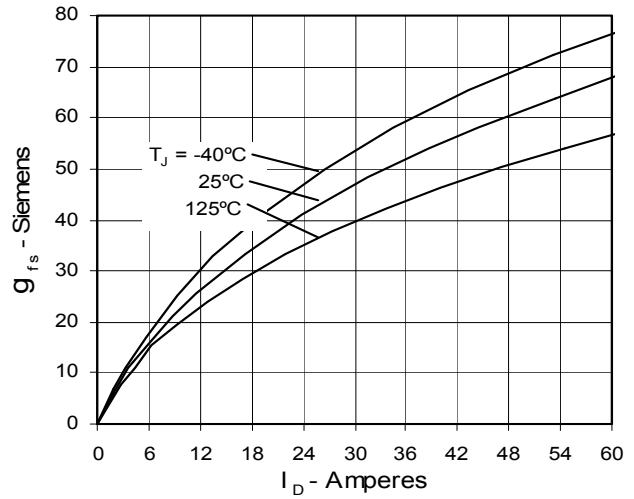


Fig. 9. Source Current vs. Source-To-Drain Voltage

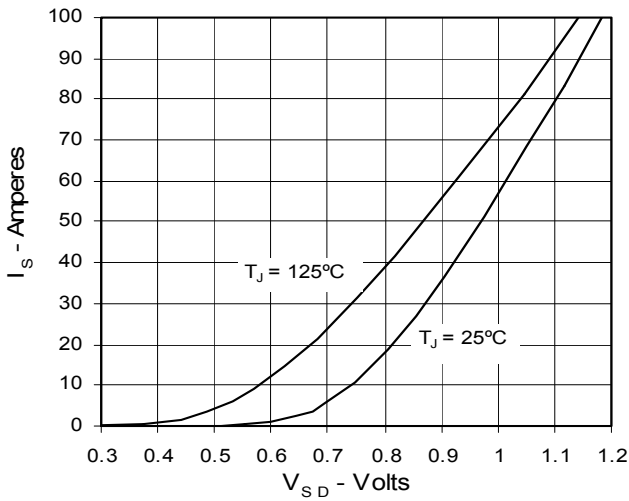


Fig. 10. Gate Charge

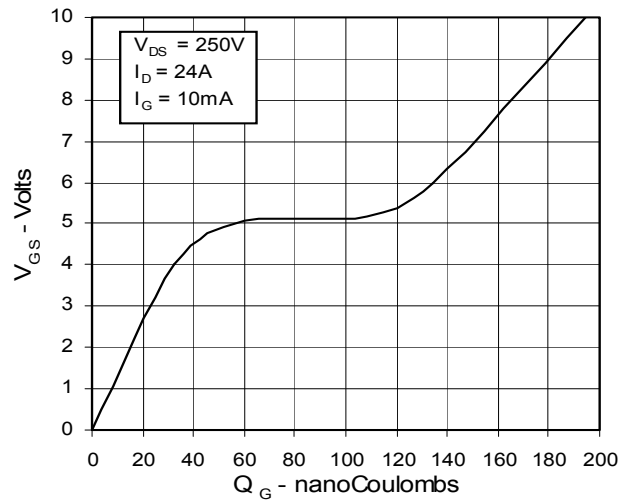


Fig. 11. Capacitance

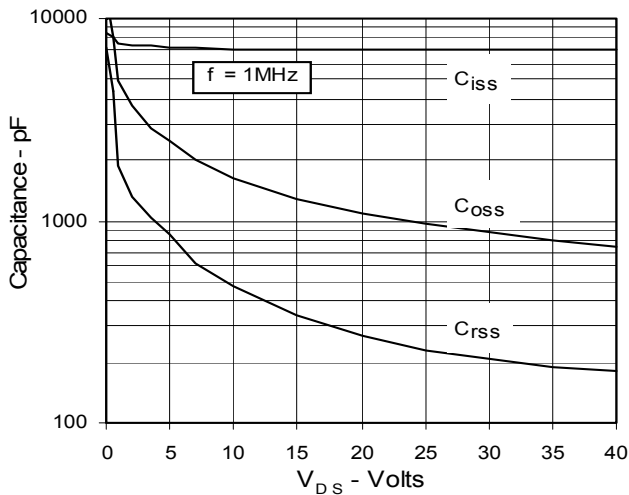
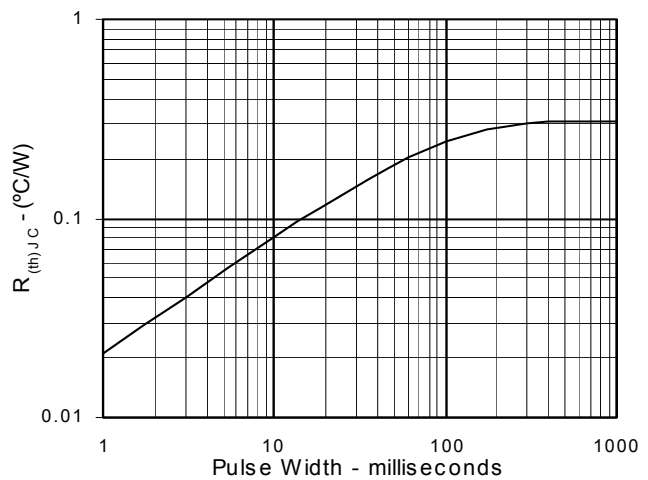


Fig. 12. Maximum Transient Thermal Resistance



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