

HiPerFET™

Power MOSFETs ISOPLUS247™, Q-Class

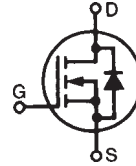
IXFR 44N50Q

IXFR 48N50Q

| V_{DSS} | I_{D25} | $R_{DS(on)}$ |
|-----------|-----------|--------------|
| 500 V | 34 A | 120 mΩ |
| 500 V | 40 A | 110 mΩ |

(Electrically Isolated Backside)

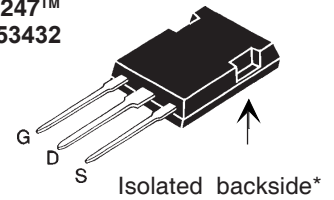
N-Channel Enhancement Mode
Avalanche Rated, Low Q_g , High dv/dt



$t_{rr} \leq 250$ ns

| 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 ; $R_{GS} = 1$ MΩ | 500 | V |
| V_{GS} | Continuous | ±20 | V |
| V_{GSM} | Transient | ±30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 44N50Q 34 48N50Q 40 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, Note 1 | 44N50Q 176 48N50Q 192 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 44N50Q 44 48N50Q 48 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 60 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 2.5 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100$ A/μs, $V_{DD} \leq V_{DSS}$ $T_J \leq 150^\circ\text{C}$, $R_G = 2$ Ω | 15 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 310 | W |
| T_J | | -55 ... +150 | °C |
| T_{JM} | | 150 | °C |
| T_{stg} | | -55 ... +150 | °C |
| T_L | 1.6 mm (0.063 in.) from case for 10 s | 300 | °C |
| V_{ISOL} | 50/60 Hz, RMS $t = 1$ min | 2500 | V~ |
| Weight | | 5 | g |

ISOPLUS247™
E153432



G = Gate D = Drain
S = Source

* Patent pending

Features

- Silicon chip on Direct-Copper-Bond substrate
 - High power dissipation
 - Isolated mounting surface
 - 2500V electrical isolation
- Low drain to tab capacitance (<30pF)
- IXYS advanced low Q_g process
- Rugged polysilicon gate cell structure
- Rated for Unclamped Inductive Load Switching (UIS)
- Fast intrinsic diode

Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor control

Advantages

- Easy assembly
- Space savings
- High power density

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|------|------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0$ V, $I_D = 250$ μA | 500 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 4$ mA | 2.0 | | 4.0 V |
| I_{GSS} | $V_{GS} = \pm 20$ V, $V_{DS} = 0$ | | | ±100 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0$ V | | | 100 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10$ V, $I_D = I_T$ Notes 2, 3 | 44N50Q 48N50Q | | 120 mΩ 110 mΩ |

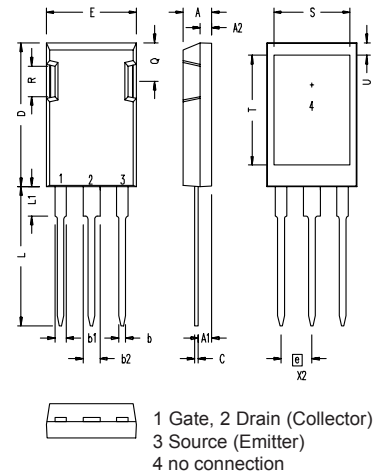
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|--------------|---|---|-----------------------|------|------|
| | | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = I_T$ | Notes 2, 3 | 30 | 42 | S |
| 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 |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ $R_G = 1\ \Omega$ (External), Notes 2, 3 | | | 33 | ns |
| t_r | | | | 22 | ns |
| $t_{d(off)}$ | | | | 75 | ns |
| t_f | | | | 10 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_T$ Notes 2, 3 | | | 190 | nC |
| Q_{gs} | | | | 40 | nC |
| Q_{gd} | | | | 86 | nC |
| R_{thJC} | | | | 0.40 | K/W |
| R_{thCK} | | | | 0.15 | K/W |

Source-Drain Diode

| 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; Note 1 | | | 192 A |
| V_{SD} | $I_F = I_T, V_{GS} = 0\text{ V}$, Notes 2, 3 | | | 1.5 V |
| t_{rr} | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}, V_R = 100\text{ V}$ | | | 250 ns |
| Q_{RM} | | | | 1.0 μC |
| I_{RM} | | | | 10 A |

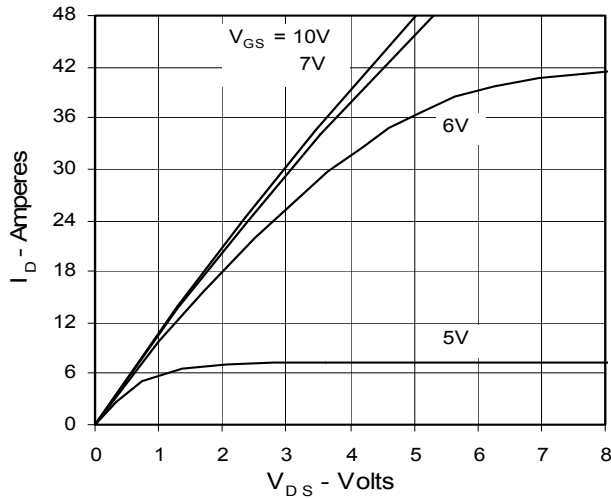
- Note: 1. Pulse width limited by T_{JM}
 2. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$
 3. IXFR44N50Q: $I_T = 22\text{ A}$
 IXFR48N50Q: $I_T = 24\text{ A}$

ISOPLUS 247 OUTLINE

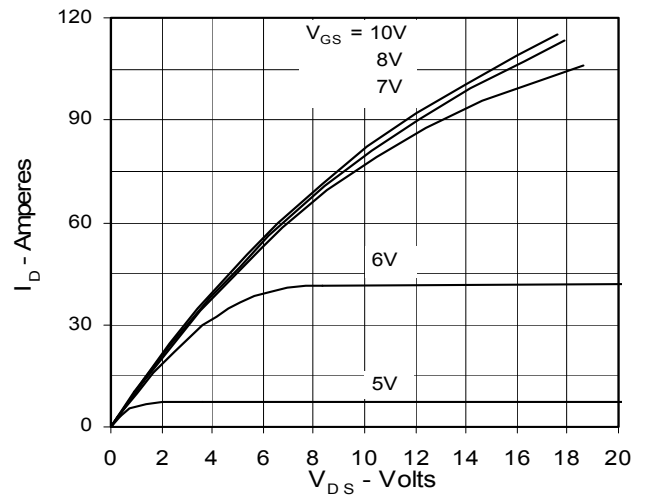


| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|----------|------|
| | Min. | Max. | Min. | Max. |
| A | 4.83 | 5.21 | .190 | .205 |
| A ₁ | 2.29 | 2.54 | .090 | .100 |
| A ₂ | 1.91 | 2.16 | .075 | .085 |
| b | 1.14 | 1.40 | .045 | .055 |
| b ₁ | 1.91 | 2.13 | .075 | .084 |
| b ₂ | 2.92 | 3.12 | .115 | .123 |
| C | 0.61 | 0.80 | .024 | .031 |
| D | 20.80 | 21.34 | .819 | .840 |
| E | 15.75 | 16.13 | .620 | .635 |
| e | 5.45 BSC | | .215 BSC | |
| L | 19.81 | 20.32 | .780 | .800 |
| L1 | 3.81 | 4.32 | .150 | .170 |
| Q | 5.59 | 6.20 | .220 | .244 |
| R | 4.32 | 4.83 | .170 | .190 |

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



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



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

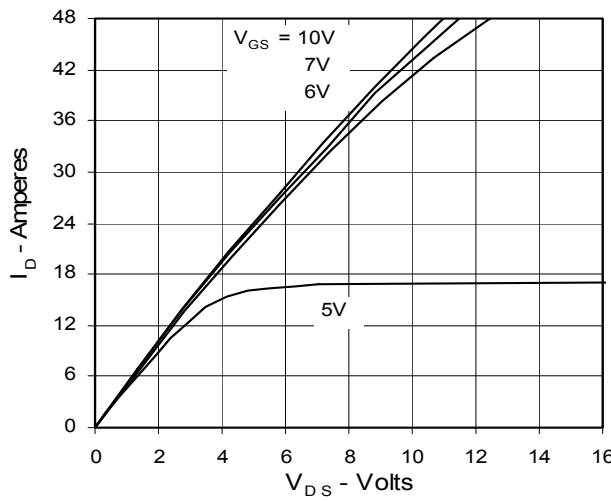


Fig. 4. $R_{DS(on)}$ Normalized to I_{D25} Value vs. Junction Temperature

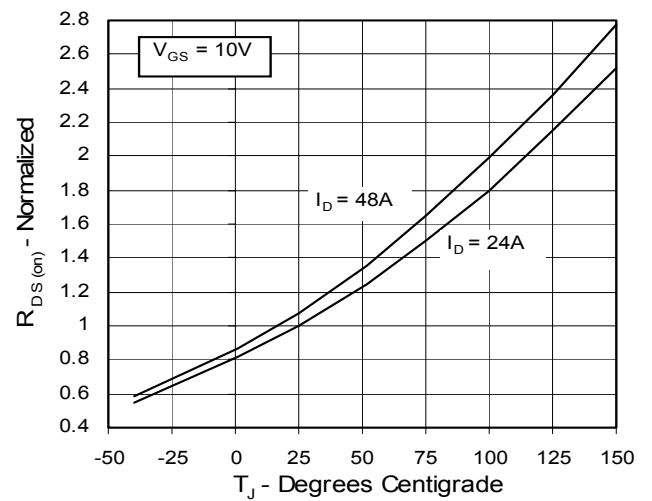


Fig. 5. $R_{DS(on)}$ Normalized to I_{D25} Value vs. I_D

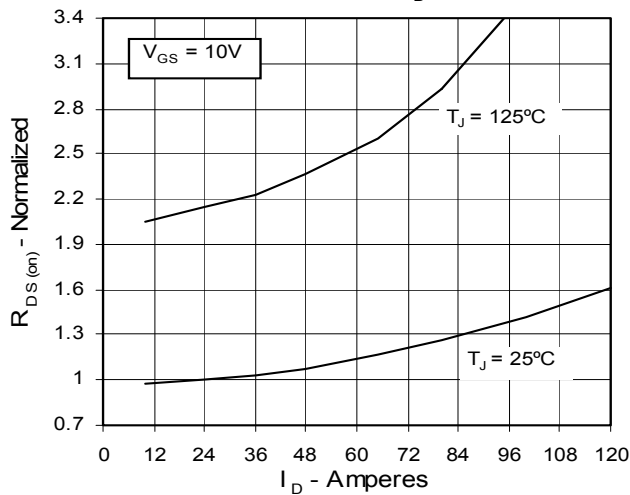


Fig. 6. Drain Current vs. Case Temperature

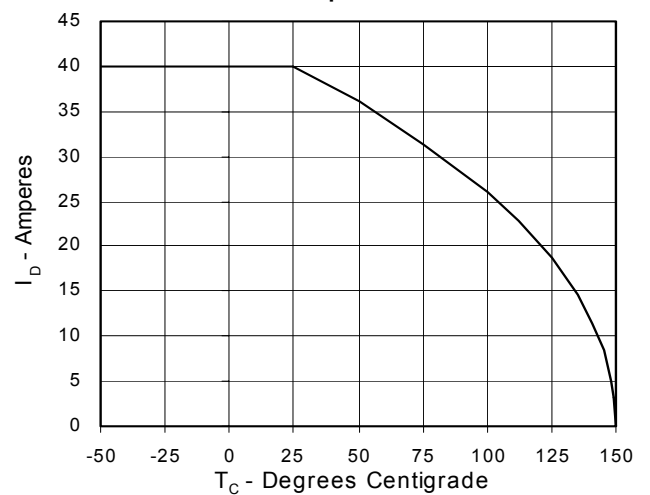


Fig. 7. Input Admittance

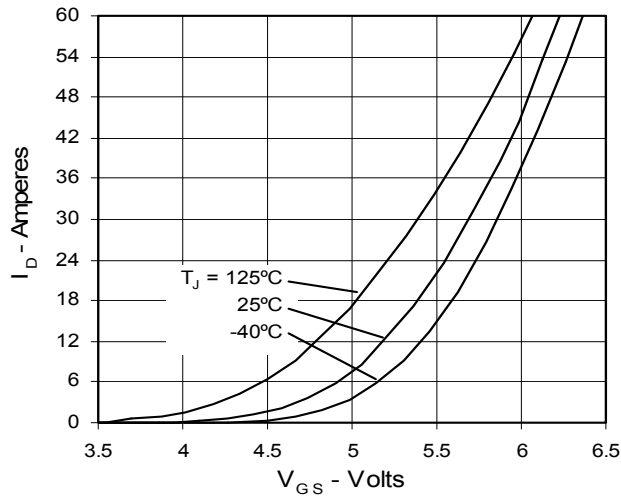


Fig. 8. Transconductance

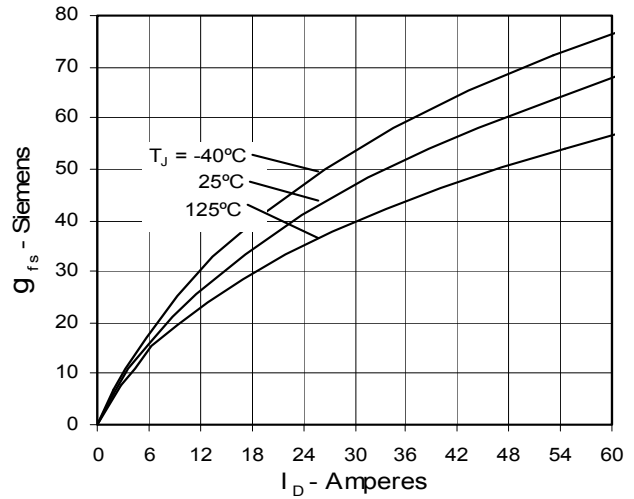


Fig. 9. Source Current vs. Source-To-Drain Voltage

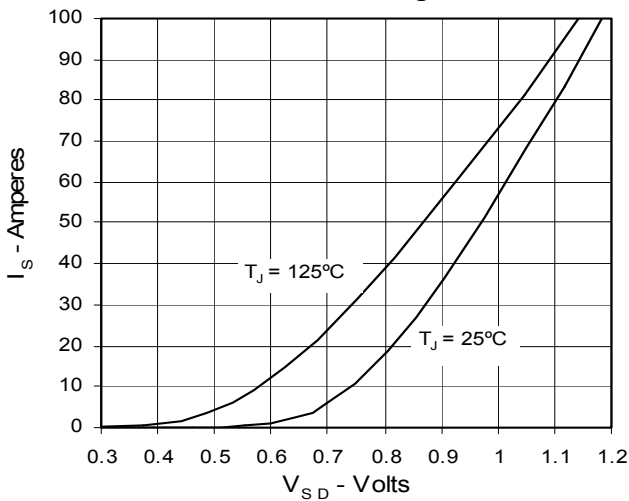


Fig. 10. Gate Charge

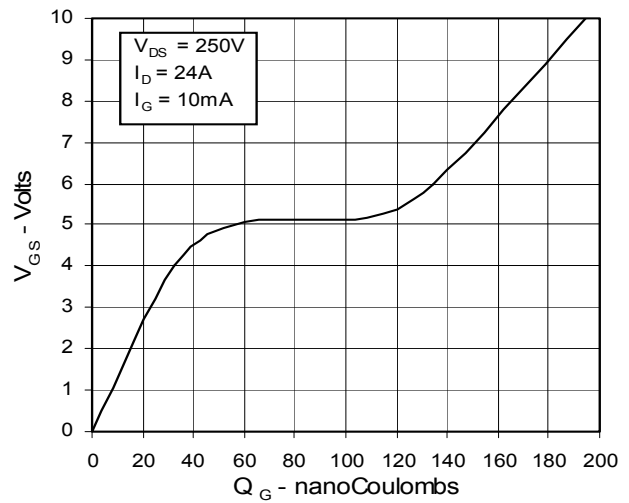


Fig. 11. Capacitance

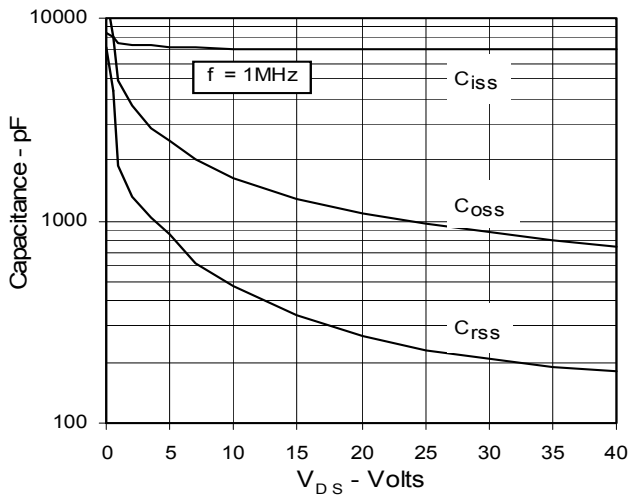
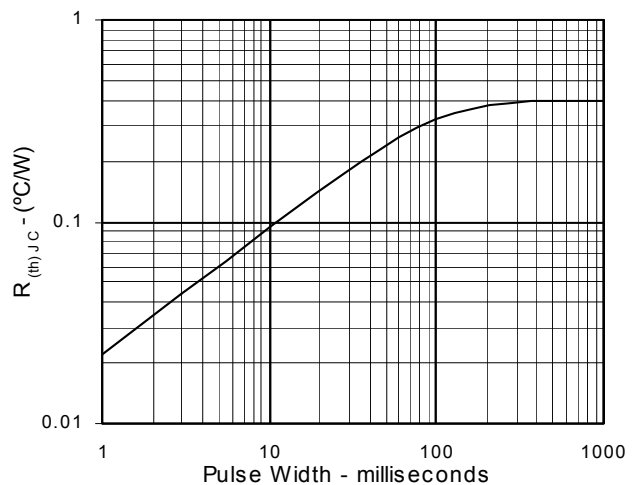


Fig. 12. Maximum Transient Thermal Resistance



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 |

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[IXFR48N50Q](#) [IXFR44N50Q](#)