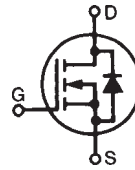


PolarHV™ HiPerFET Power MOSFET

IXFK 48N60P
IXFX 48N60P

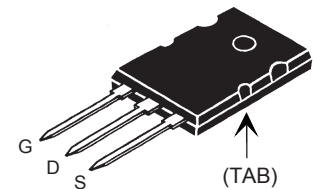
$V_{DSS} = 600\text{ V}$
 $I_{D2} = 48\text{ A}$
 $R_{DS(on)} \leq 135\text{ m}\Omega$
 $t_{rr} \leq 200\text{ ns}$

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode

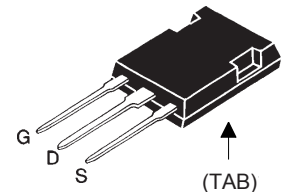


| Symbol | Test Conditions | Maximum Ratings | |
|------------|---|-------------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C}$ to 150°C | 600 | V |
| V_{DGR} | $T_J = 25^\circ\text{C}$ to 150°C ; $R_{GS} = 1\text{ M}\Omega$ | 600 | V |
| V_{GSS} | Continuous | ± 30 | V |
| V_{GSM} | Transient | ± 40 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ | 48 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 110 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 48 | A |
| E_{AR} | $T_C = 25^\circ\text{C}$ | 70 | mJ |
| E_{AS} | $T_C = 25^\circ\text{C}$ | 2.0 | J |
| dv/dt | $I_S \leq I_{DM}$, $di/dt \leq 100\text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ\text{C}$, $R_G = 4\ \Omega$ | 20 | V/ns |
| P_D | $T_C = 25^\circ\text{C}$ | 830 | W |
| T_J | | -55 ... +150 | $^\circ\text{C}$ |
| T_{JM} | | 150 | $^\circ\text{C}$ |
| T_{stg} | | -55 ... +150 | $^\circ\text{C}$ |
| M_d | Mounting torque (TO-264) | 1.13/10 Nm/lb.in. | |
| Weight | TO-264 | 10 | g |
| | PLUS247 | 6 | g |
| T_L | 1.6 mm (0.062 in.) from case for 10 s | 300 | $^\circ\text{C}$ |
| T_{SOLD} | Plastic body for 10 s | 260 | $^\circ\text{C}$ |

TO-264 (IXFK)



PLUS247 (IXFX)



G = Gate D = Drain
S = Source Tab = Drain

Features

- † International standard packages
- † Fast recovery diode
- † Unclamped Inductive Switching (UIS) rated
- † Low package inductance
- easy to drive and to protect

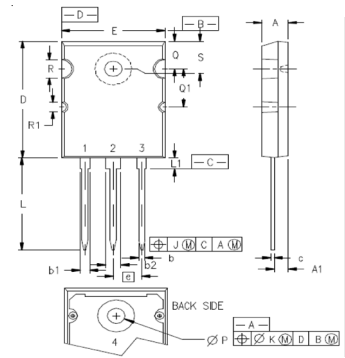
Advantages

- † 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. |
| BV_{DSS} | $V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$ | 600 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8\text{ mA}$ | 3.0 | | 5.0 V |
| I_{GSS} | $V_{GS} = \pm 30\text{ V}_{DC}$, $V_{DS} = 0$ | | | $\pm 200\text{ nA}$ |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0\text{ V}$, $T_J = 125^\circ\text{C}$ | | | 25 μA 1000 μA |
| $R_{DS(on)}$ | $V_{GS} = 10\text{ V}$, $I_D = 0.5\ I_{D25}$ Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$ | | | 135 $\text{m}\Omega$ |

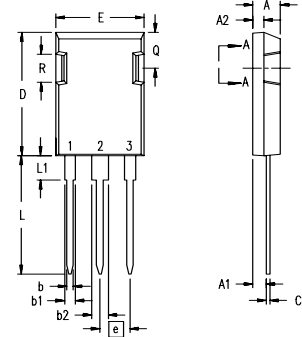
| Symbol | Test Conditions | Characteristic Values | | |
|--------------|--|-----------------------|------|-----------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 20\text{ V}; I_D = 0.5 I_{D25}$, pulse test | 35 | 53 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 8860 | pF |
| C_{oss} | | | 850 | pF |
| C_{rss} | | | 60 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 I_{D25}$ $R_G = 2\ \Omega$ (External) | | 30 | ns |
| t_r | | | 25 | ns |
| $t_{d(off)}$ | | | 85 | ns |
| t_f | | | 22 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ | | 150 | nC |
| Q_{gs} | | | 50 | nC |
| Q_{gd} | | | 50 | nC |
| R_{thJC} | TO-264 and PLUS247 | | | 0.15 °C/W |
| R_{thCs} | | | 0.15 | °C/W |

| Symbol | Test Conditions | Characteristic Values | | |
|----------|---|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 48 A |
| I_{SM} | Repetitive | | | 110 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} | $I_F = 25\text{ A}, -di/dt = 100\text{ A}/\mu\text{s}$ $V_R = 100\text{ V}$ | | | 200 ns |
| Q_{RM} | | | 0.8 | μC |
| I_{RM} | | | 6.0 | A |

TO-264 (IXFK) Outline


- 1 - GATE
2, 4 - DRAIN (COLLECTOR)
3 - SOURCE (EMITTER)

| SYM | INCHES | | MILLIMETERS | |
|-----|----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .185 | .209 | 4.70 | 5.31 |
| A1 | .102 | .118 | 2.59 | 3.00 |
| b | .037 | .055 | 0.94 | 1.40 |
| b1 | .087 | .102 | 2.21 | 2.59 |
| b2 | .110 | .126 | 2.79 | 3.20 |
| c | .017 | .029 | 0.43 | 0.74 |
| D | 1.007 | 1.047 | 25.58 | 26.59 |
| E | .760 | .799 | 19.30 | 20.29 |
| e | .215 BSC | | 5.46 BSC | |
| J | .000 | .010 | 0.00 | 0.25 |
| K | .000 | .010 | 0.00 | 0.25 |
| L | .779 | .842 | 19.79 | 21.39 |
| L1 | .087 | .102 | 2.21 | 2.59 |
| ØP | .122 | .138 | 3.10 | 3.51 |
| Q | .240 | .256 | 6.10 | 6.50 |
| Q1 | .330 | .346 | 8.38 | 8.79 |
| ØR | .155 | .187 | 3.94 | 4.75 |
| ØR1 | .085 | .093 | 2.16 | 2.36 |
| S | .243 | .253 | 6.17 | 6.43 |

PLUS 247™ (IXFX) Outline


- Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)
4 - Drain (Collector)

| 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 | 0.244 |
| R | 4.32 | 4.83 | .170 | .190 |

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

IXYS MOSFETs and IGBTs are covered by 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585
one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405B2 6,759,692
4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2

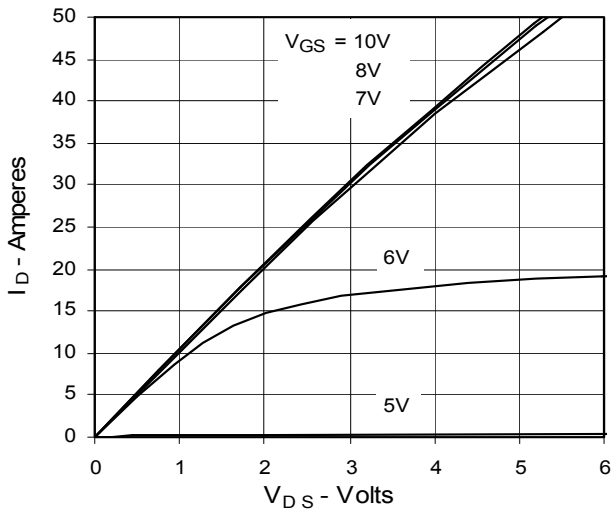
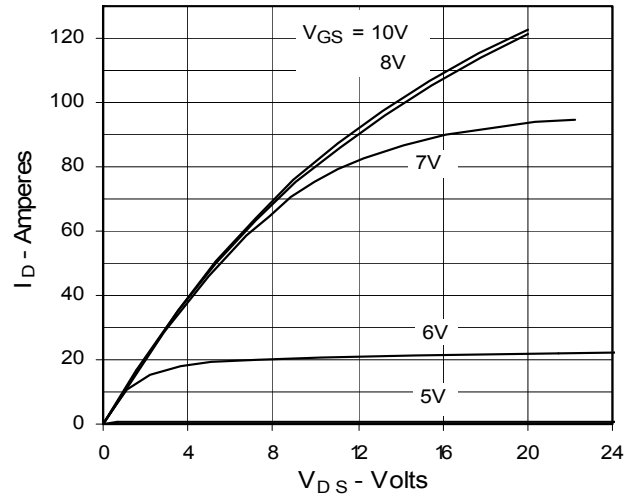
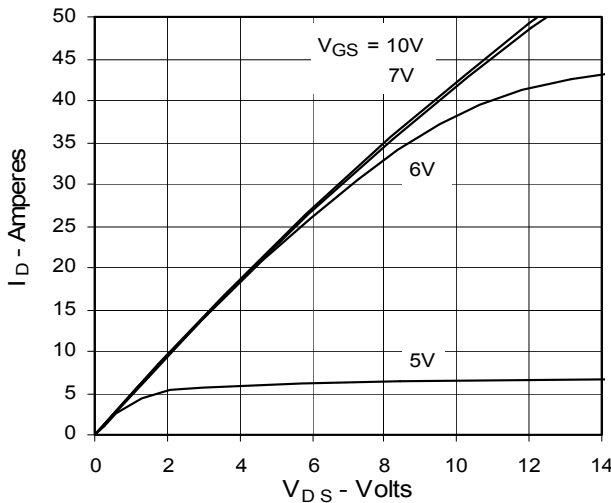
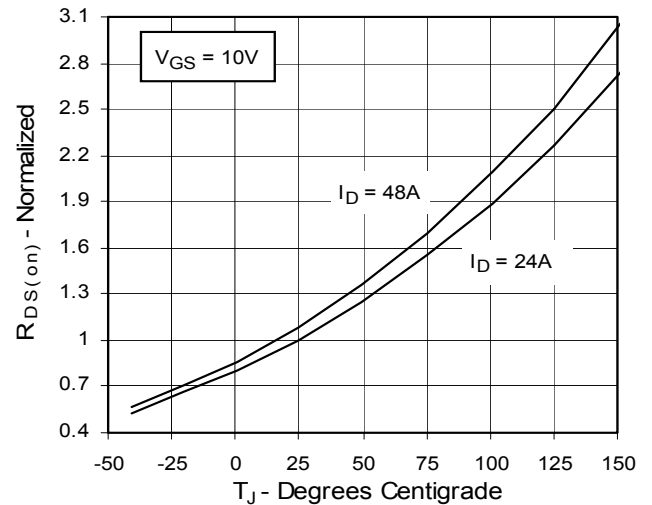
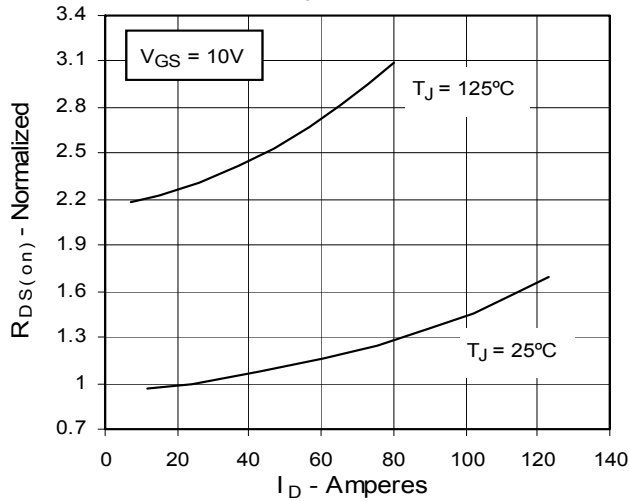
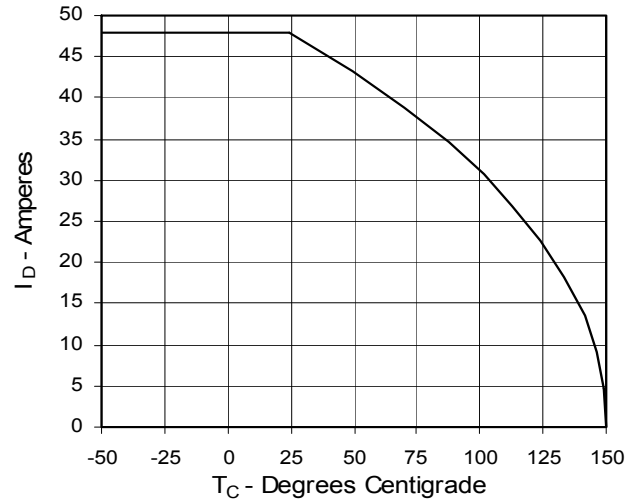
**Fig. 1. Output Characteristics
@ 25°C**

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

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

**Fig. 4. $R_{DS(on)}$ Normalized to 0.5 I_{D25}
Value vs. Junction Temperature**

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

**Fig. 6. Drain Current vs. Case
Temperature**


Fig. 7. Input Admittance

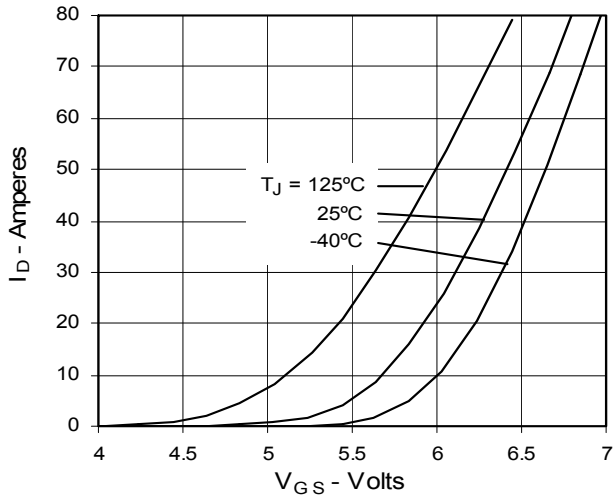


Fig. 8. Transconductance

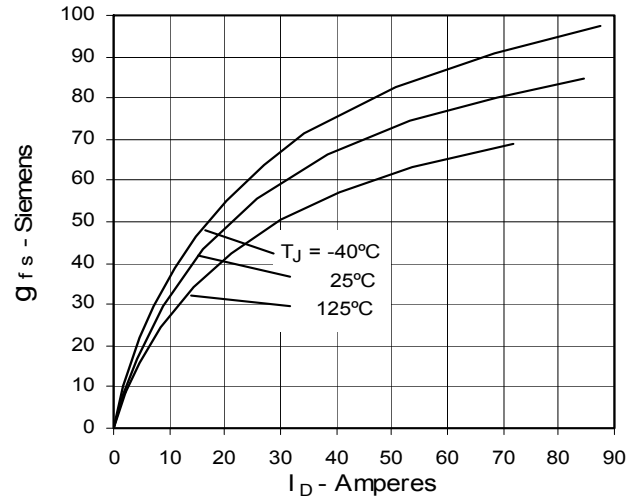


Fig. 9. Source Current vs. Source-To-Drain Voltage

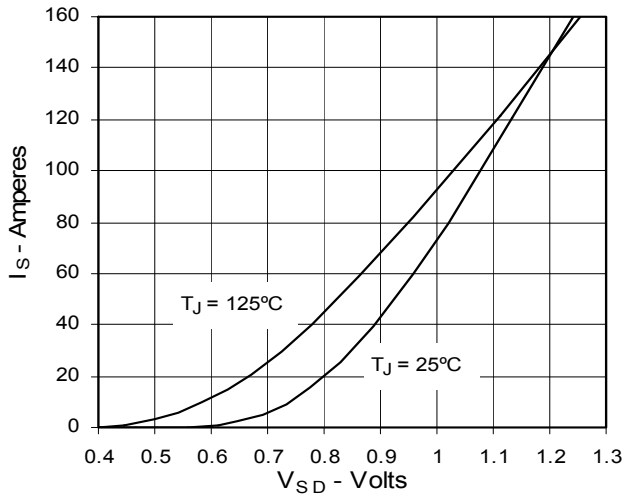


Fig. 10. Gate Charge

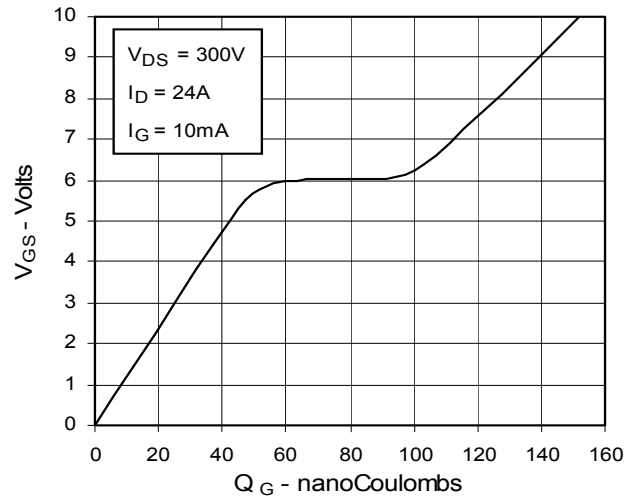


Fig. 11. Capacitance

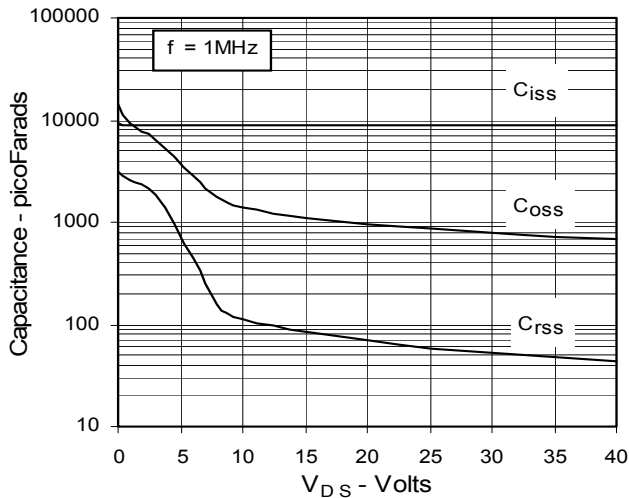


Fig. 13. Maximum Transient Thermal Resistance

