



THE DATASHEET OF IXFX90N30

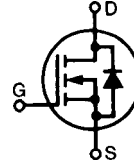


HiPerFET™ Power MOSFETs

IXFX 90N30 IXFK 90N30

$V_{DSS} = 300 \text{ V}$
 $I_{D25} = 90 \text{ A}$
 $R_{DS(on)} = 33 \text{ m}\Omega$

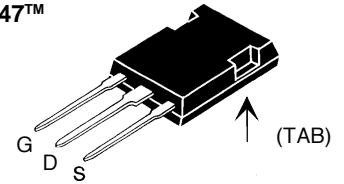
Single MOSFET Die



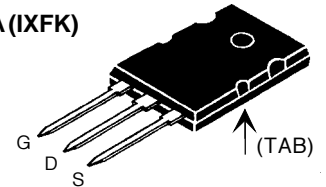
$t_{rr} \leq 250 \text{ ns}$

| Symbol | Test Conditions | Maximum Ratings | |
|------------|---|-----------------|------------------|
| V_{DSS} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$ | 300 | V |
| V_{DGR} | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$ | 300 | V |
| V_{GS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ\text{C}$ (MOSFET chip capability) | 90 | A |
| I_{D104} | $T_C = 104^\circ\text{C}$ (External lead capability) | 75 | A |
| I_{DM} | $T_C = 25^\circ\text{C}$, pulse width limited by T_{JM} | 360 | A |
| I_{AR} | $T_C = 25^\circ\text{C}$ | 90 | 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 | $T_C = 25^\circ\text{C}$ | 560 | 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 | $^\circ\text{C}$ |
| M_d | Mounting torque | TO-264 | 0.4/6 Nm/lb.in. |
| Weight | | PLUS 247 | 6 g |
| | | TO-264 | 10 g |

PLUS 247™



TO-264 AA (IXFK)



G = Gate
S = Source

D = Drain
TAB = Drain

Features

- International standard packages
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- easy to drive and to protect
- Fast intrinsic rectifier

Applications

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

Advantages

- PLUS 247™ package for clip or spring mounting
- Space savings
- High power density

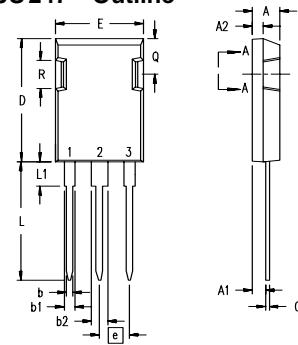
| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|---|---|---|---------------------------|
| | | min. | typ. | max. |
| V_{DSS} | $V_{GS} = 0 \text{ V}$, $I_D = 3 \text{ mA}$ | 300 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8 \text{ mA}$ | 2.0 | | 4.0 V |
| I_{GSS} | $V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0$ | | | $\pm 100 \text{ nA}$ |
| 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 |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$, $I_D = 0.5 I_{D25}$ Note 1 | | | 33 m Ω |

| Symbol | Test Conditions | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------|--|---|-------|------|
| | | min. | typ. | max. |
| g_{fs} | $V_{DS} = 10\text{ V}; I_D = 0.5 I_{D25}$ Note 1 | 40 | 70 | S |
| C_{iss} | $V_{GS} = 0\text{ V}, V_{DS} = 25\text{ V}, f = 1\text{ MHz}$ | | 10000 | pF |
| C_{oss} | | | 1800 | pF |
| C_{rss} | | | 700 | pF |
| $t_{d(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ $R_G = 1\ \Omega$ (External), | | 42 | ns |
| t_r | | | 55 | ns |
| $t_{d(off)}$ | | | 100 | ns |
| t_f | | | 40 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{ V}, V_{DS} = 0.5 V_{DSS}, I_D = 0.5 I_{D25}$ | | 360 | nC |
| Q_{gs} | | | 60 | nC |
| Q_{gd} | | | 180 | nC |
| R_{thJC} | | | 0.22 | K/W |
| R_{thCK} | | 0.15 | | K/W |

| Source-Drain Diode | | Characteristic Values ($T_J = 25^\circ\text{C}$, unless otherwise specified) | | |
|--------------------|--|---|------|---------------|
| Symbol | Test Conditions | min. | typ. | max. |
| I_S | $V_{GS} = 0\text{ V}$ | | | 90 A |
| I_{SM} | Repetitive; pulse width limited by T_{JM} | | | 360 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} | | | 1.4 | μC |
| I_{RM} | | | 10 | A |

Note: 1. Pulse test, $t \leq 300\ \mu\text{s}$, duty cycle $d \leq 2\%$

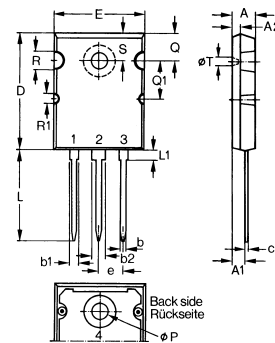
PLUS247™ Outline



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 |

TO-264 AA Outline



| Dim. | Millimeter | | Inches | |
|----------------|------------|-------|----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.82 | 5.13 | .190 | .202 |
| A ₁ | 2.54 | 2.89 | .100 | .114 |
| A ₂ | 2.00 | 2.10 | .079 | .083 |
| b | 1.12 | 1.42 | .044 | .056 |
| b ₁ | 2.39 | 2.69 | .094 | .106 |
| b ₂ | 2.90 | 3.09 | .114 | .122 |
| c | 0.53 | 0.83 | .021 | .033 |
| D | 25.91 | 26.16 | 1.020 | 1.030 |
| E | 19.81 | 19.96 | .780 | .786 |
| e | 5.46 BSC | | .215 BSC | |
| J | 0.00 | 0.25 | .000 | .010 |
| K | 0.00 | 0.25 | .000 | .010 |
| L | 20.32 | 20.83 | .800 | .820 |
| L1 | 2.29 | 2.59 | .090 | .102 |
| P | 3.17 | 3.66 | .125 | .144 |
| Q | 6.07 | 6.27 | .239 | .247 |
| Q1 | 8.38 | 8.69 | .330 | .342 |
| R | 3.81 | 4.32 | .150 | .170 |
| R1 | 1.78 | 2.29 | .070 | .090 |
| S | 6.04 | 6.30 | .238 | .248 |
| T | 1.57 | 1.83 | .062 | .072 |

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

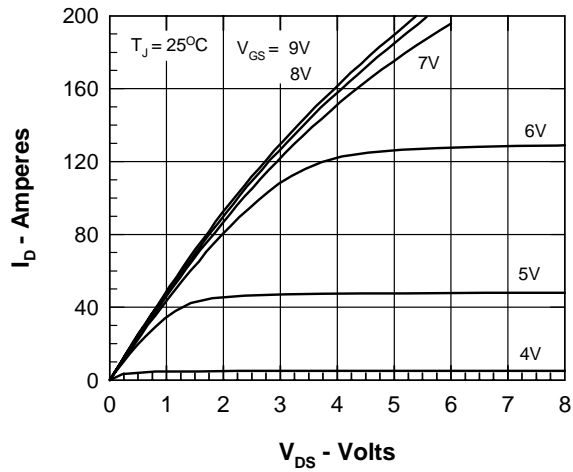


Fig.1 Output Characteristics @ $T_J = 25^\circ\text{C}$

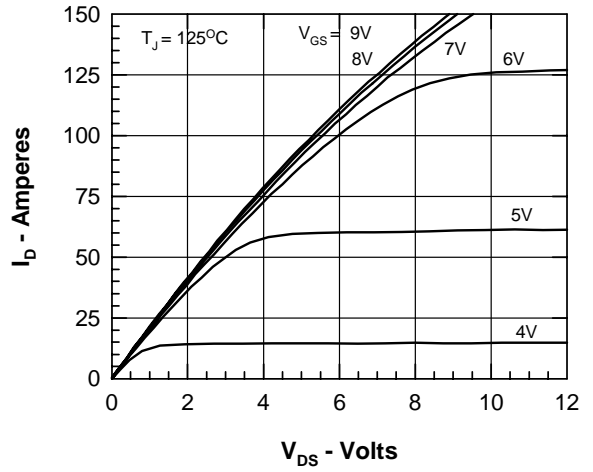


Fig.2 Output Characteristics @ $T_J = 125^\circ\text{C}$

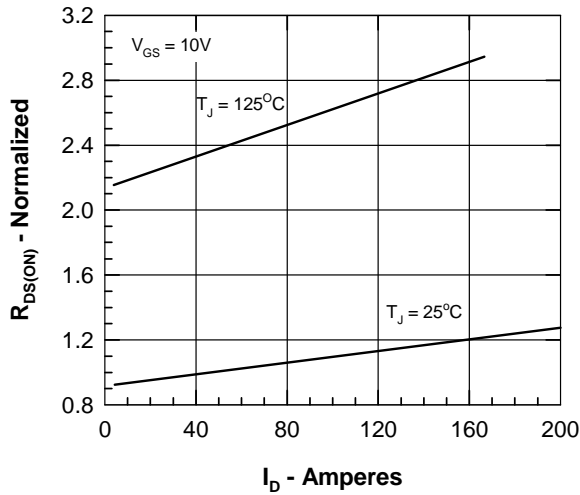


Fig.3 $R_{DS(on)}$ vs. Drain Current

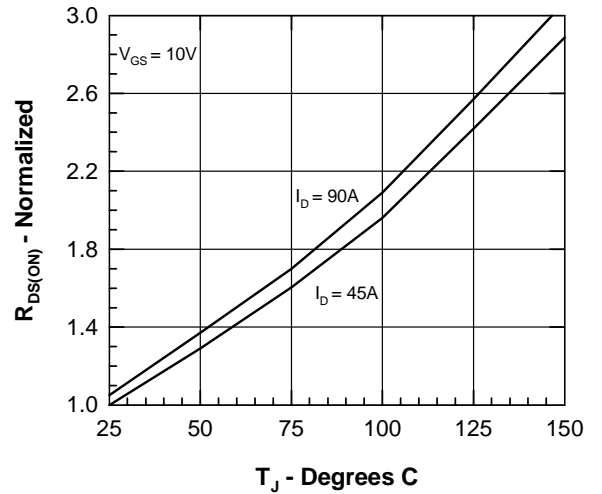


Fig.4 Temperature Dependence of Drain to Source Resistance

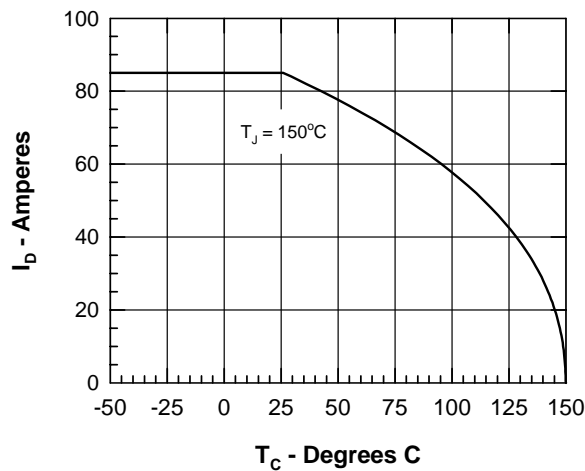


Fig.5 Drain Current vs. Case Temperature

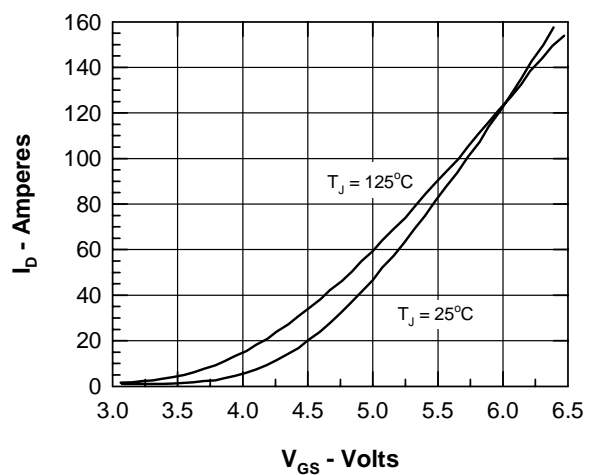


Fig.6 Drain Current vs. Gate Source Voltage

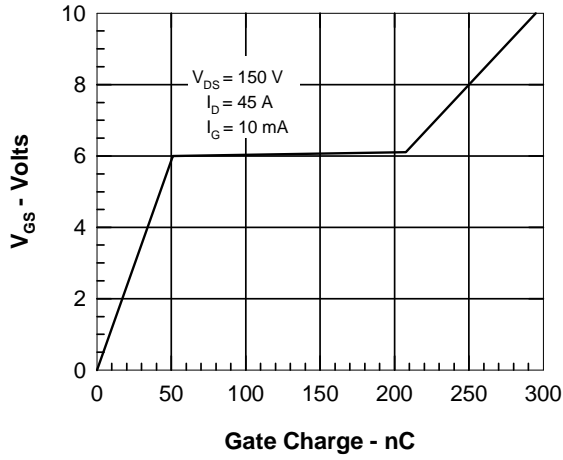


Fig.7 Gate Charge Characteristic Curve

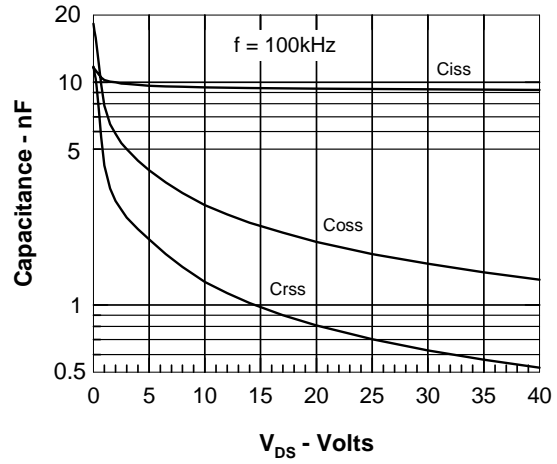


Fig.8 Capacitance Curves

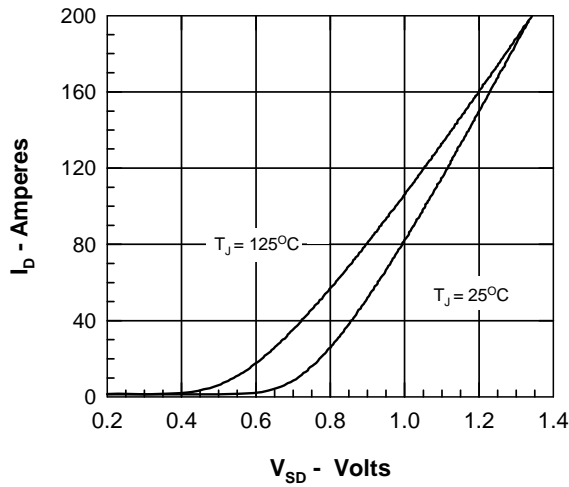


Fig.9 Drain Current vs Drain to Source Voltage

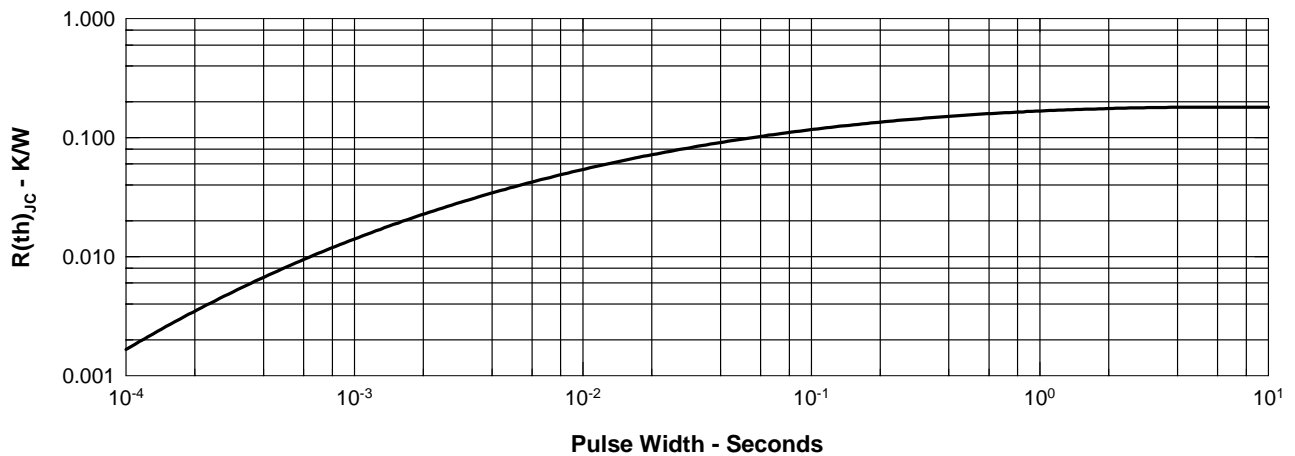


Fig.10 Transient Thermal Impedance



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