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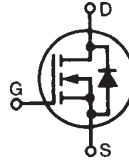
[IXYS Corporation](#)

[IXFK40N90P](#)

For any questions, you can email us directly:

sales@integrated-circuit.com

**Polar™ HiPerFET™
Power MOSFETs**
**IXFK40N90P
IXFX40N90P**

 N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Rectifier


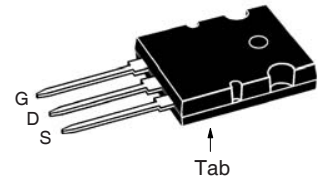
$$V_{DSS} = 900V$$

$$I_{D25} = 40A$$

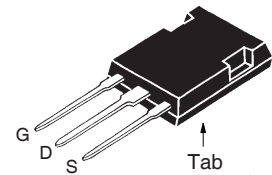
$$R_{DS(on)} \leq 230m\Omega$$

$$t_{rr} \leq 300ns$$

TO-264 (IXFK)



PLUS247 (IXFX)


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

| Symbol | Test Conditions | Maximum Ratings | |
|------------|--|------------------|------------|
| V_{DSS} | $T_J = 25^\circ C$ to $150^\circ C$ | 900 | V |
| V_{DGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$ | 900 | V |
| V_{GSS} | Continuous | ± 30 | V |
| V_{GSM} | Transient | ± 40 | V |
| I_{D25} | $T_C = 25^\circ C$ | 40 | A |
| I_{DM} | $T_C = 25^\circ C$, Pulse Width Limited by T_{JM} | 80 | A |
| I_A | $T_C = 25^\circ C$ | 20 | A |
| E_{AS} | $T_C = 25^\circ C$ | 2.5 | J |
| dv/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$ | 15 | V/ns |
| P_D | $T_C = 25^\circ C$ | 960 | W |
| T_J | | -55 to +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 to +150 | $^\circ C$ |
| T_L | 1.6mm (0.062 in.) from Case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic Body for 10s | 260 | $^\circ C$ |
| M_d | Mounting Torque (TO-264) | 1.13/10 | Nm/lb.in. |
| F_c | Mounting Force (PLUS247) | 20..120 /4.5..27 | N/lb. |
| Weight | TO-264 | 10 | g |
| | PLUS247 | 6 | g |

Features

- Low $R_{DS(on)}$ and Q_G
- Avalanche Rated
- Low Package Inductance
- Fast Intrinsic Rectifier

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- Laser Drivers
- AC and DC Motor Drives
- Robotics and Servo Controls

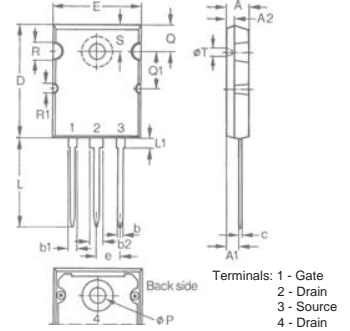
| Symbol | Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|----------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 3mA$ | 900 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 1mA$ | 3.5 | | 6.5 V |
| I_{GSS} | $V_{GS} = \pm 30V$, $V_{DS} = 0V$ | | | ± 200 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$, $V_{GS} = 0V$ $T_J = 125^\circ C$ | | | 50 μA 3.5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | | | 230 m Ω |

IXYS

IXFK40N90P IXFX40N90P

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|--------------|--|-----------------------|------|-------------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 20\text{V}, I_D = 0.5 \cdot I_{D25}$, Note 1 | 18 | 30 | S |
| C_{iss} | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$ | | 14 | nF |
| C_{oss} | | | 896 | pF |
| C_{rss} | | | 58 | pF |
| R_{Gi} | Gate Input Resistance | | 1.5 | Ω |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\Omega$ (External) | | 53 | ns |
| t_r | | | 50 | ns |
| $t_{d(off)}$ | | | 77 | ns |
| t_f | | | 46 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ | | 230 | nC |
| Q_{gs} | | | 70 | nC |
| Q_{gd} | | | 100 | nC |
| R_{thJC} | | | | 0.13 $^\circ\text{C/W}$ |
| R_{thCS} | | 0.15 | | $^\circ\text{C/W}$ |

TO-264 Outline

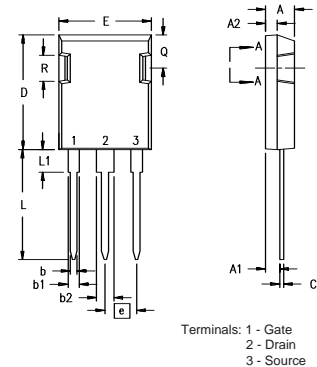


| Dim. | Millimeter | | Inches | |
|------|------------|-------|----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.82 | 5.13 | .190 | .202 |
| A1 | 2.54 | 2.89 | .100 | .114 |
| A2 | 2.00 | 2.10 | .079 | .083 |
| b | 1.12 | 1.42 | .044 | .056 |
| b1 | 2.39 | 2.69 | .094 | .106 |
| b2 | 2.90 | 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 |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified) | Characteristic Values | | |
|----------|--|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{V}$ | | | 40 A |
| I_{SM} | Repetitive, Pulse Width Limited by T_{JM} | | | 160 A |
| V_{SD} | $I_F = I_S, V_{GS} = 0\text{V}$, Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 20\text{A}, -di/dt = 100\text{A}/\mu\text{s},$ $V_R = 100\text{V}, V_{GS} = 0\text{V}$ | | | 300 ns |
| I_{RM} | | | 14.0 | A |
| Q_{RM} | | | 1.7 | μC |

PLUS247™ Outline



| Dim. | Millimeter | | Inches | |
|------|------------|-------|----------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.83 | 5.21 | .190 | .205 |
| A1 | 2.29 | 2.54 | .090 | .100 |
| A2 | 1.91 | 2.16 | .075 | .085 |
| b | 1.14 | 1.40 | .045 | .055 |
| b1 | 1.91 | 2.13 | .075 | .084 |
| b2 | 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 |

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

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 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338 B2
4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2
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 7,071,537

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

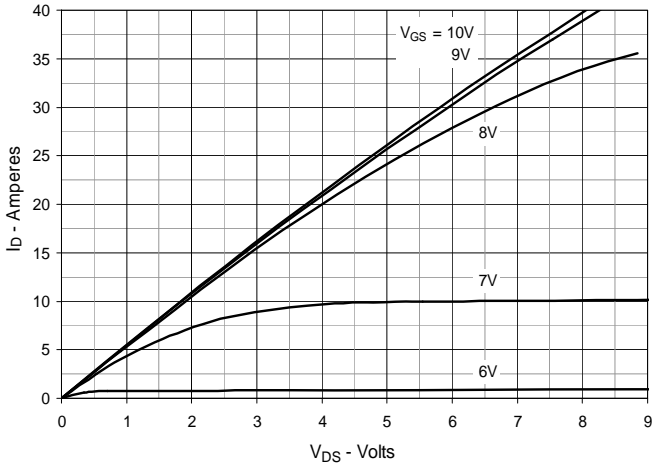


Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

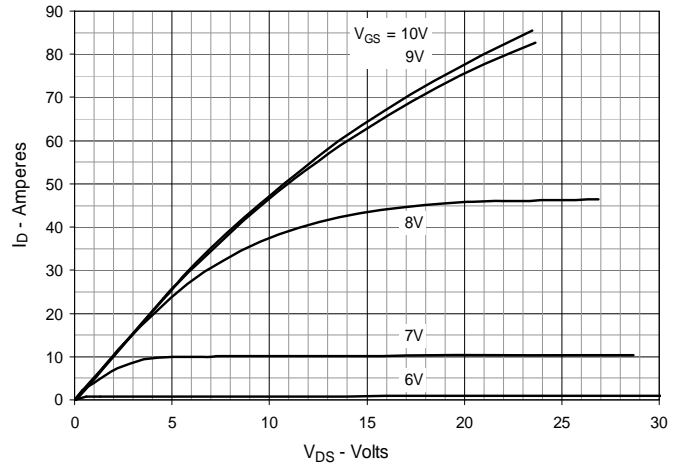


Fig. 3. Output Characteristics @ $T_J = 125^\circ\text{C}$

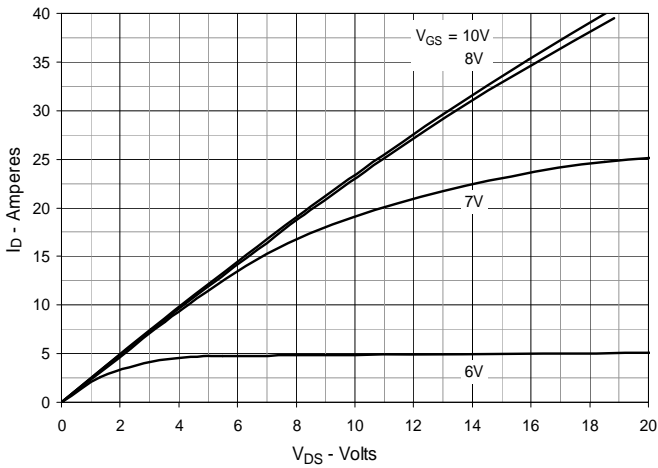


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 20\text{A}$ Value vs. Junction Temperature

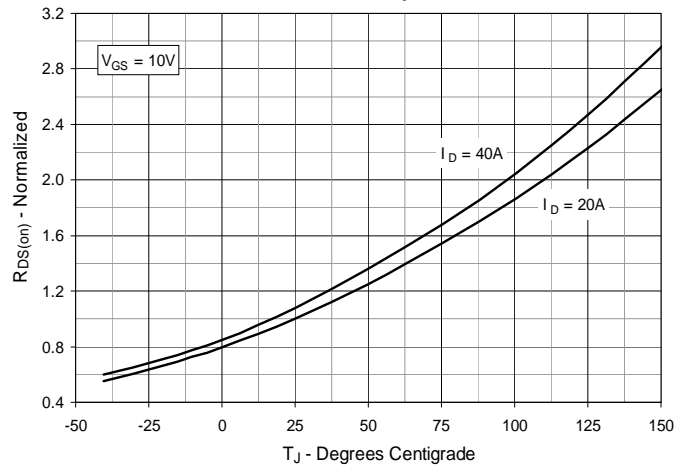


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 20\text{A}$ Value vs. Drain Current

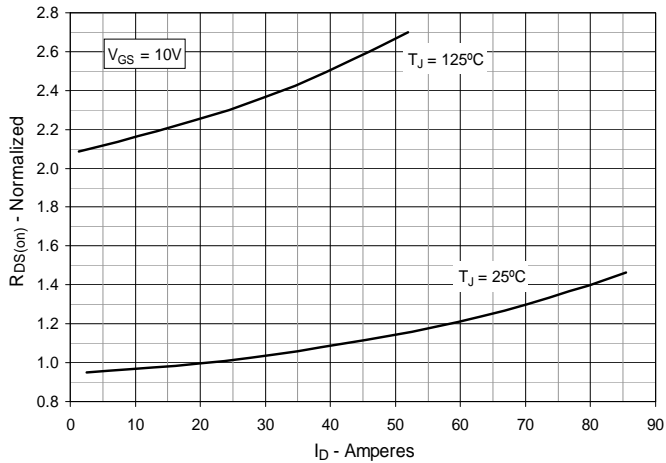


Fig. 6. Maximum Drain Current vs. Case Temperature

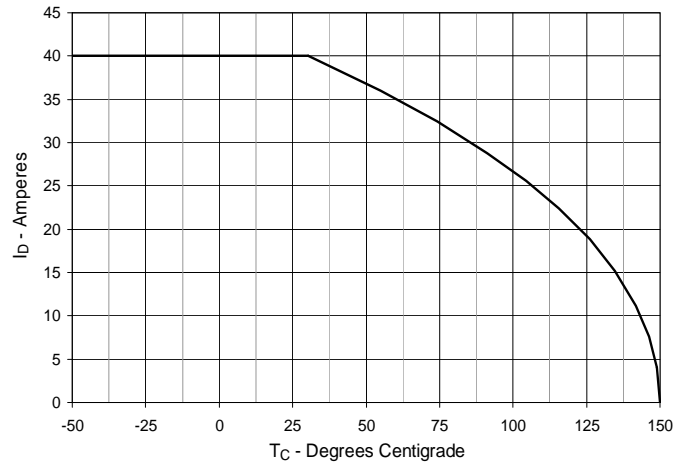


Fig. 7. Input Admittance

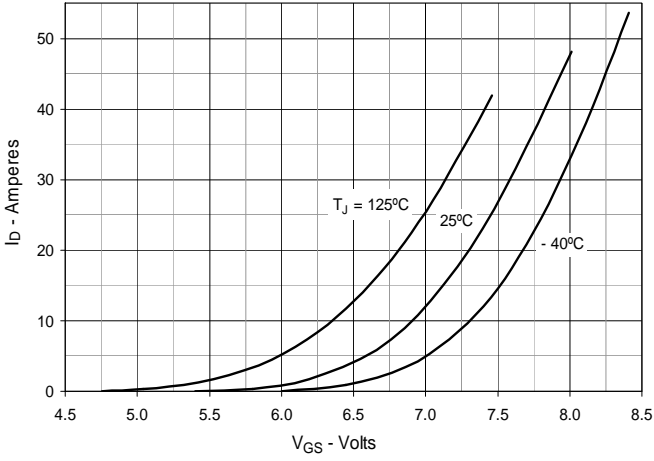


Fig. 8. Transconductance

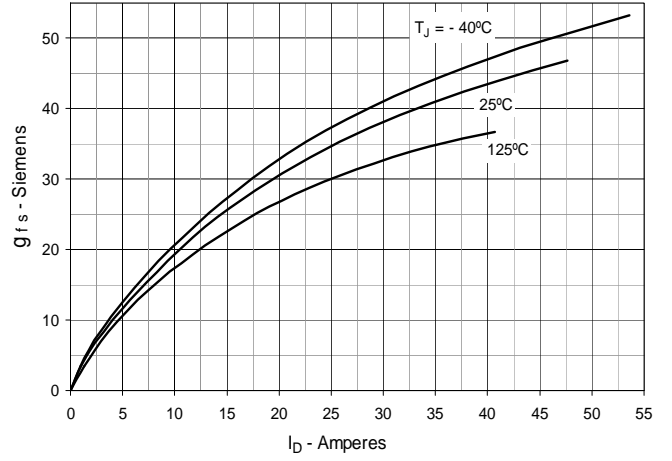


Fig. 9. Forward Voltage Drop of Intrinsic Diode

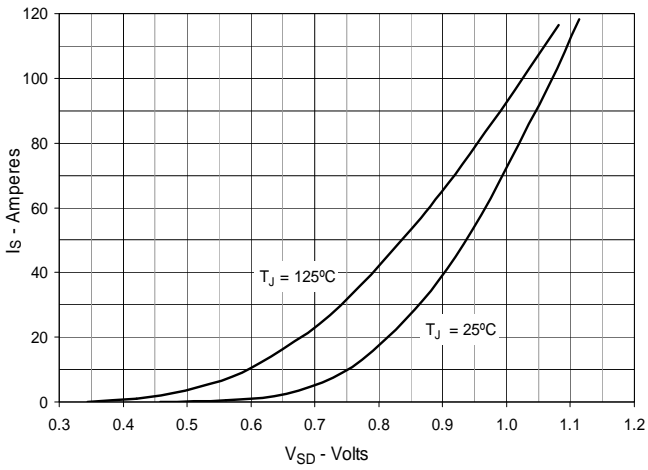


Fig. 10. Gate Charge

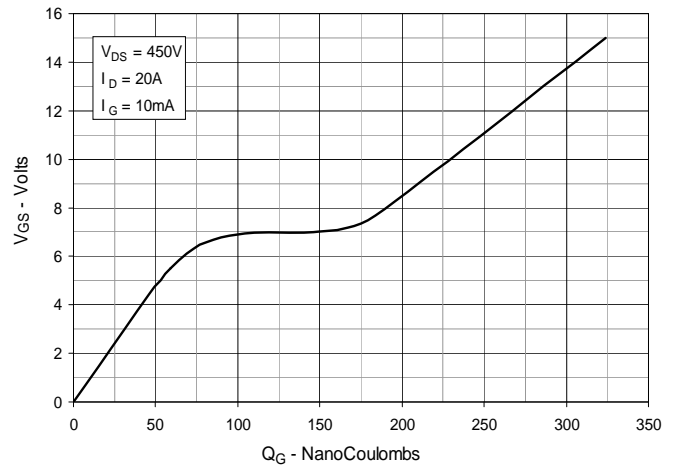


Fig. 11. Capacitance

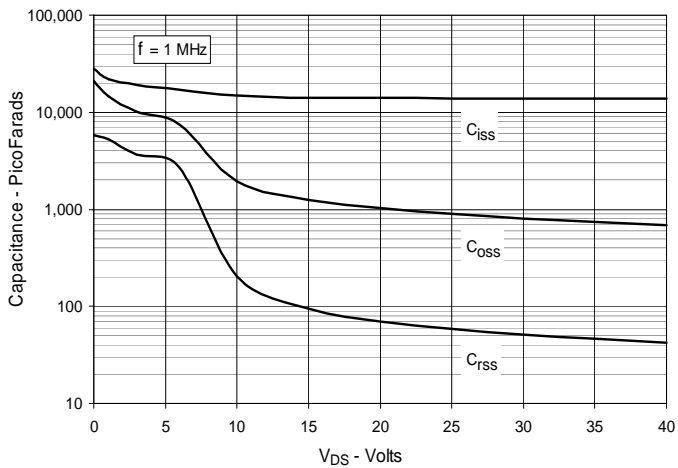


Fig. 12. Maximum Transient Thermal Impedance

