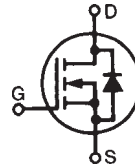


HiPerFET™ Power MOSFET ISOPLUS247™

(Electrically Isolated Back Surface)

IXFR24N100

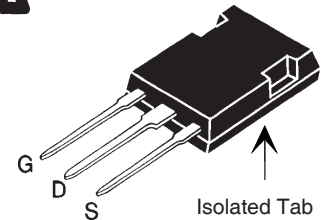


$V_{DSS} = 1000V$
 $I_{D25} = 22A$
 $R_{DS(on)} \leq 390m\Omega$
 $t_{rr} \leq 250ns$

N-Channel Enhancement Mode
Avalanche Rated

| Symbol | Test Conditions | Maximum Ratings | |
|---------------|--|----------------------------------|------------|
| V_{DSS} | $T_J = 25^\circ C$ to $150^\circ C$ | 1000 | V |
| V_{DGR} | $T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$ | 1000 | V |
| V_{GSS} | Continuous | ± 20 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ C$ | 22 | A |
| I_{DM} | $T_C = 25^\circ C$, pulse width limited by T_{JM} | 96 | A |
| I_A | $T_C = 25^\circ C$ | 24 | A |
| E_{AS} | $T_C = 25^\circ C$ | 3 | J |
| dV/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$ | 5 | V/ns |
| P_D | $T_C = 25^\circ C$ | 416 | W |
| T_J | | -55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 ... +150 | $^\circ C$ |
| T_L | 1.6mm (0.062 in.) from case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic body for 10s | 260 | $^\circ C$ |
| V_{ISOL} | 50/60 Hz, RMS $I_{ISOL} \leq 1mA$ | $t = 1min$ 2500 $t = 1s$ 3000 | V~ V~ |
| M_d | Mounting force | 20..120 / 4.5..27 | N/lb. |
| Weight | | 5 | g |

ISOPLUS247
E153432



G = Gate D = Drain
S = Source

Features

- Silicon chip on Direct-Copper-Bond substrate
 - High power dissipation
 - Isolated mounting surface
 - 2500V electrical isolation
- Low drain to tab capacitance (<30pF)
- Low $R_{DS(on)}$ HDMOS™ process
- Rugged polysilicon gate cell structure
- Avalanche rated
- Fast intrinsic Rectifier

Applications

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

Advantages

- Easy assembly
- Space savings
- High power density

| Symbol | Test Conditions ($T_J = 25^\circ C$, unless otherwise specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|---------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 3mA$ | 1000 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 8mA$ | 3.0 | | 5.5 V |
| I_{GSS} | $V_{GS} = \pm 20V$, $V_{DS} = 0V$ | | | ± 200 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0V$ $T_J = 125^\circ C$ | | | 100 μA 2 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 12A$, Note 1 | | | 390 m Ω |

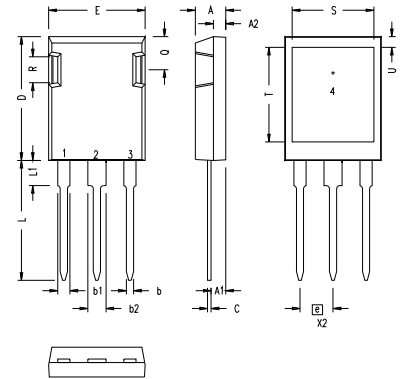
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|--------------|---|-----------------------|------|--------------------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{V}, I_D = 12\text{A}$, Note 1 | 15 | 27 | S |
| C_{iss} | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$ | | 8700 | pF |
| C_{oss} | | | 785 | pF |
| C_{rss} | | | 315 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 12\text{A}$ $R_G = 1\Omega$ (External) | | 35 | ns |
| t_r | | | 35 | ns |
| $t_{d(off)}$ | | | 75 | ns |
| t_f | | | 21 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 12\text{A}$ | | 267 | nC |
| Q_{gs} | | | 52 | nC |
| Q_{gd} | | | 142 | nC |
| R_{thJC} | | | 0.30 | $^\circ\text{C/W}$ |
| R_{thCS} | | 0.15 | | $^\circ\text{C/W}$ |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|----------|---|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_s | $V_{GS} = 0\text{V}$ | | | 24 A |
| I_{SM} | Repetitive, pulse width limited by T_{JM} | | | 96 A |
| V_{SD} | $I_F = 24\text{A}, V_{GS} = 0\text{V}$, Note 1 | | | 1.5 V |
| t_{rr} | $I_F = 24\text{A}, -di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GS} = 0\text{V}$ | | | 250 ns |
| Q_{RM} | | | 1.0 | μC |
| I_{RM} | | | 8.0 | A |

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

ISOPLUS247 (IXFR) Outline



| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .190 | .205 | 4.83 | 5.21 |
| A1 | .090 | .100 | 2.29 | 2.54 |
| A2 | .075 | .085 | 1.91 | 2.16 |
| b | .045 | .055 | 1.14 | 1.40 |
| b1 | .075 | .084 | 1.91 | 2.13 |
| b2 | .115 | .123 | 2.92 | 3.12 |
| C | .024 | .031 | 0.61 | 0.80 |
| D | .819 | .840 | 20.80 | 21.34 |
| E | .620 | .635 | 15.75 | 16.13 |
| e | .215 BSC | | 5.45 BSC | |
| L | .780 | .800 | 19.81 | 20.32 |
| L1 | .150 | .170 | 3.81 | 4.32 |
| Q | .220 | .244 | 5.59 | 6.20 |
| R | .170 | .190 | 4.32 | 4.83 |
| S | .520 | .540 | 13.21 | 13.72 |
| T | .620 | .640 | 15.75 | 16.26 |
| U | .065 | .080 | 1.65 | 2.03 |

- 1 - GATE
- 2 - DRAIN (COLLECTOR)
- 3 - SOURCE (EMITTER)
- 4 - NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

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 | 7,157,338B2 |
| | 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 @ 25°C

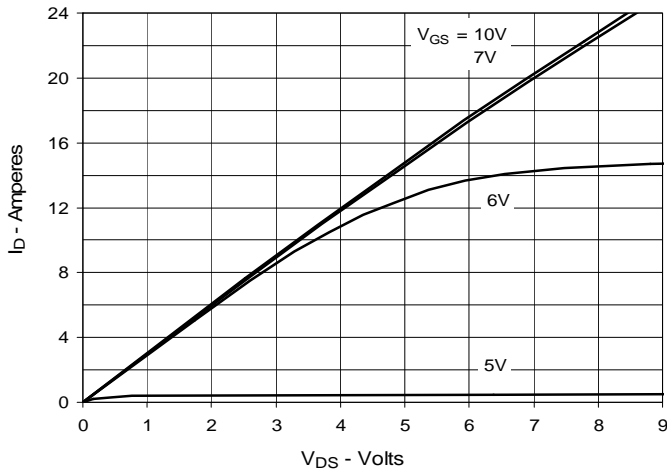


Fig. 2. Extended Output Characteristics @ 25°C

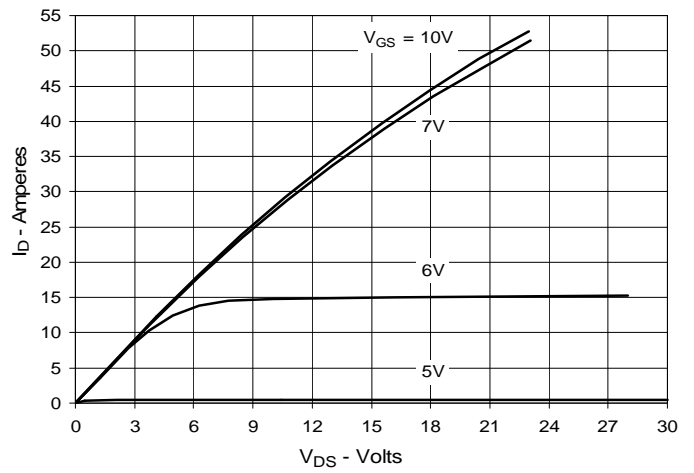


Fig. 3. Output Characteristics @ 125°C

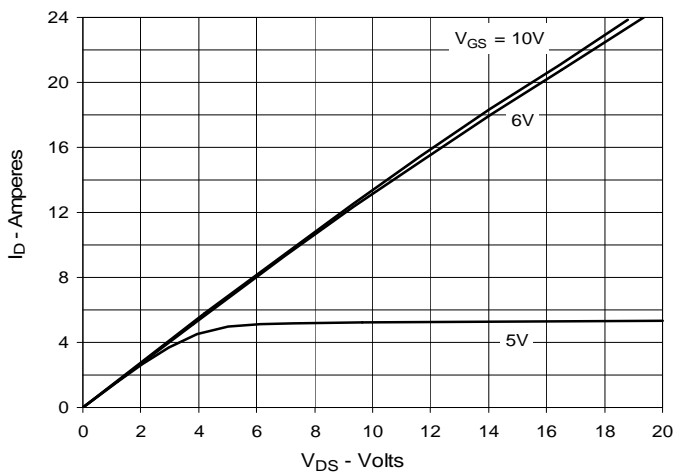


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 12A$ Value vs. Junction Temperature

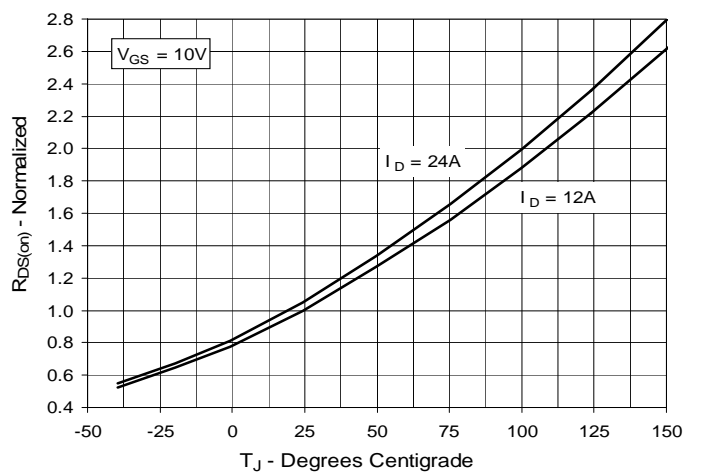


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 12A$ Value vs. Drain Current

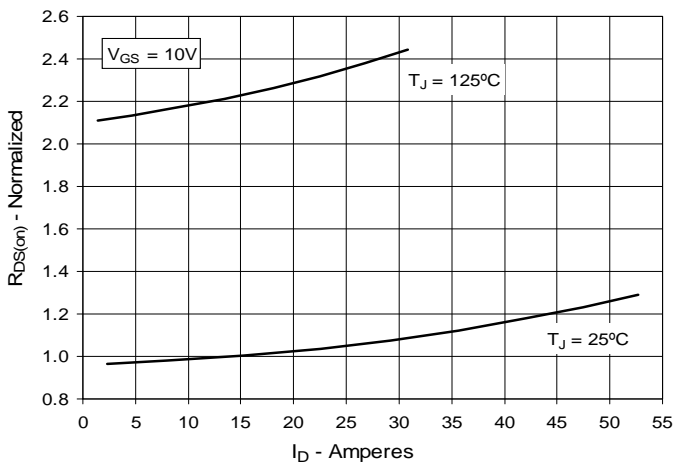


Fig. 6. Maximum Drain Current vs. Case Temperature

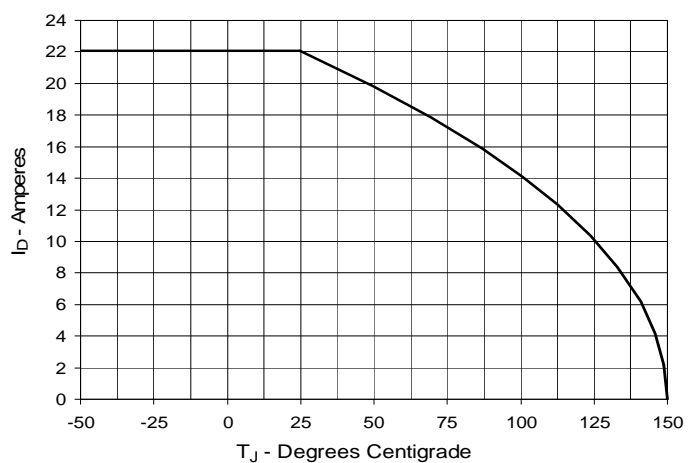


Fig. 7. Input Admittance

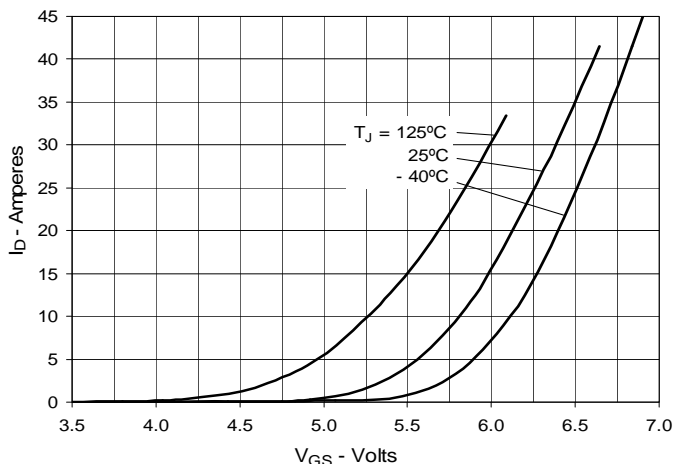


Fig. 8. Transconductance

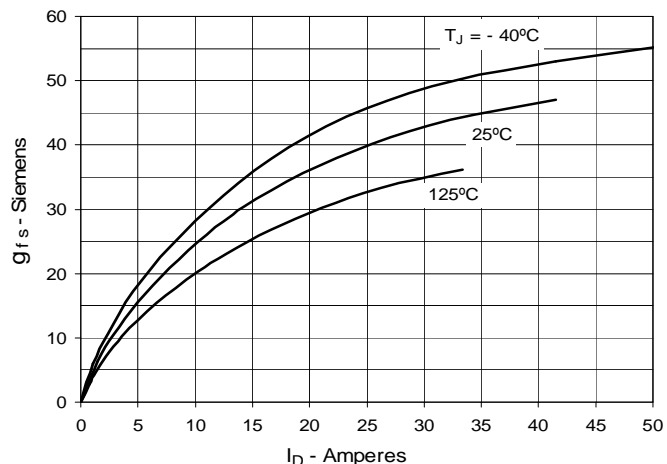


Fig. 9. Forward Voltage Drop of Intrinsic Diode

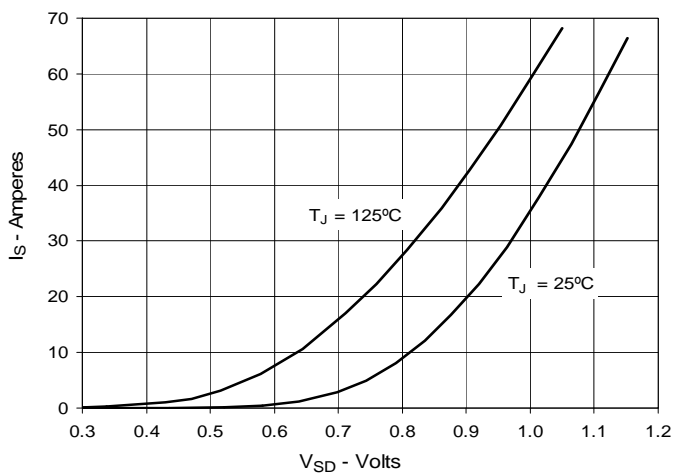


Fig. 10. Gate Charge

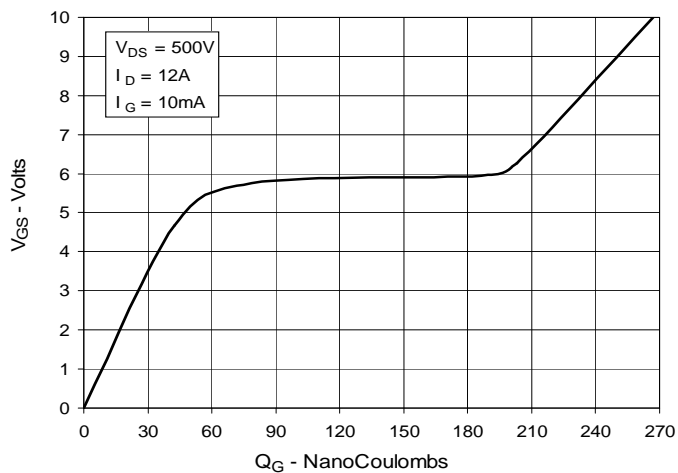


Fig. 11. Capacitance

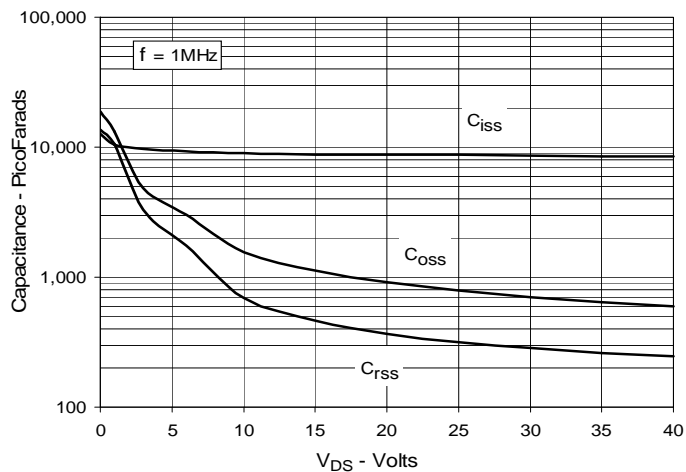
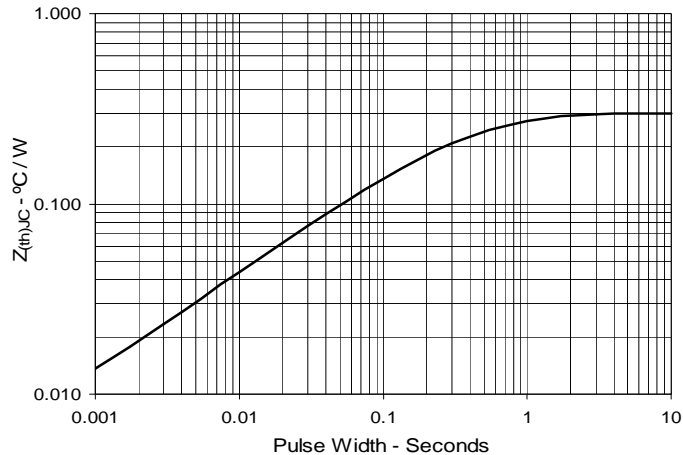


Fig. 12. Maximum Transient Thermal Impedance





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