

Polar™ Power MOSFET

HiPerFET™

IXFR20N100P

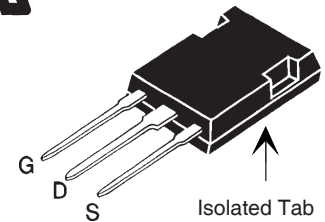
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



$V_{DSS} = 1000V$
 $I_{D25} = 11A$
 $R_{DS(on)} \leq 640m\Omega$
 $t_{rr} \leq 300ns$

| 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 | ± 30 | V |
| V_{GSM} | Transient | ± 40 | V |
| I_{D25} | $T_C = 25^\circ C$ | 11 | A |
| I_{DM} | $T_C = 25^\circ C$, pulse width limited by T_{JM} | 50 | A |
| I_{AR} | $T_C = 25^\circ C$ | 10 | A |
| E_{AS} | $T_C = 25^\circ C$ | 500 | mJ |
| dV/dt | $I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$ | 15 | V/ns |
| P_D | $T_C = 25^\circ C$ | 230 | W |
| T_J | | -55 ... +150 | $^\circ C$ |
| T_{JM} | | 150 | $^\circ C$ |
| T_{stg} | | -55 ... +150 | $^\circ C$ |
| T_L | Maximum lead temperature for soldering | 300 | $^\circ C$ |
| T_{SOLD} | Plastic body for 10s | 260 | $^\circ C$ |
| V_{ISOL} | 50/60 Hz, RMS, 1 minute | 2500 | V~ |
| F_C | Mounting force | 20..120/4.5..27 | N/lb. |
| Weight | | 5 | g |

ISOPLUS247 (IXFR)



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)
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Fast intrinsic Rectifier

Applications

- Switched-mode and resonant-mode power supplies
- DC-DC converters
- Laser Drivers
- AC and DC motor controls
- Robotics and servo controls

Advantages

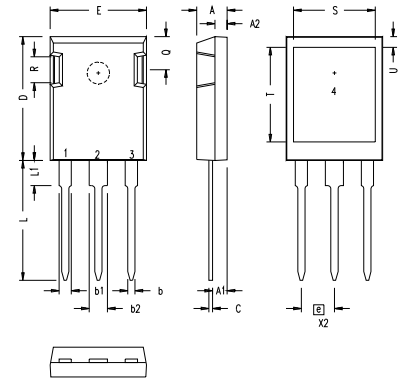
- Easy assembly
- Space savings
- High power density

| Symbol | Test Conditions | Characteristic Values | | |
|--------------|---|-----------------------|------|----------------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 1mA$ | 1000 | | 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} | $V_{DS} = V_{DSS}$ $V_{GS} = 0V$ $T_J = 125^\circ C$ | | | 25 μA 1.5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 10A$, Note 1 | 470 | 640 | m Ω |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$ unless otherwise specified) | Characteristic Values | | |
|---|---|-----------------------|------|--|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 20\text{V}, I_D = 10\text{A}$, Note 1 | 8 | 14 | S |
| C_{iss} C_{oss} C_{rss} | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$ | | 7300 | pF |
| | | | 456 | pF |
| | | | 55 | pF |
| R_{Gi} | Gate input resistance | | 1.20 | Ω |
| $t_{d(on)}$ t_r $t_{d(off)}$ t_f | Resistive Switching Times $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 10\text{A}$ $R_G = 2\Omega$ (External) | | 40 | ns |
| | | | 37 | ns |
| | | | 56 | ns |
| | | | 45 | ns |
| $Q_{g(on)}$ Q_{gs} Q_{gd} | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 10\text{A}$ | | 126 | nC |
| | | | 50 | nC |
| | | | 55 | nC |
| R_{thJC} R_{thCS} | (TO-247) | | 0.15 | 0.54°C/W $^\circ\text{C/W}$ |

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$ unless otherwise specified) | Characteristic Values | | |
|----------------------------------|---|-----------------------|------|---------------|
| | | Min. | Typ. | Max. |
| I_s | $V_{GS} = 0\text{V}$ | | | 20 A |
| I_{SM} | Repetitive, pulse width limited by T_{JM} | | | 80 A |
| V_{SD} | $I_F = I_s, V_{GS} = 0\text{V}$, Note 1 | | | 1.5 V |
| t_{rr} Q_{RM} I_{RM} | $I_F = 10\text{A}, -di/dt = 100\text{A}/\mu\text{s}$ $V_R = 100\text{V}, V_{GS} = 0\text{V}$ | | | 300 ns |
| | | | 0.9 | μC |
| | | | 9.0 | A |

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.

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 | 7,157,338B2 |
| | 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 | |

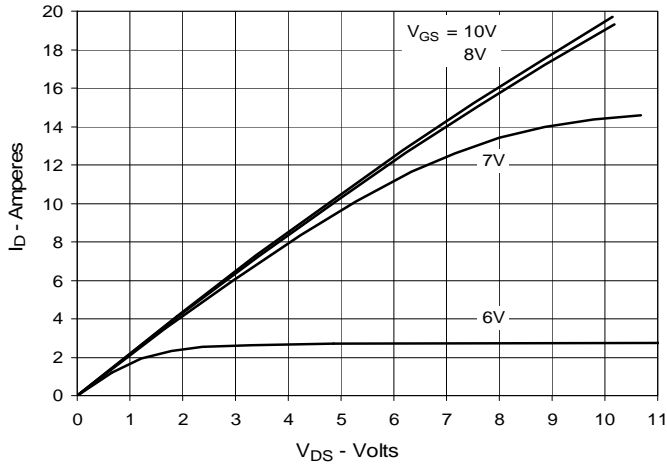
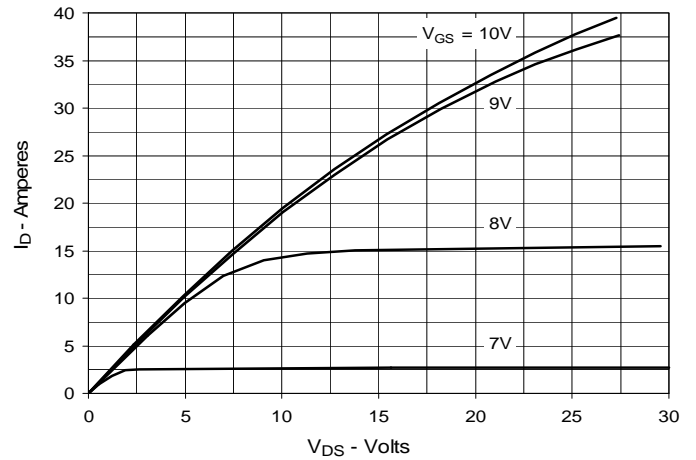
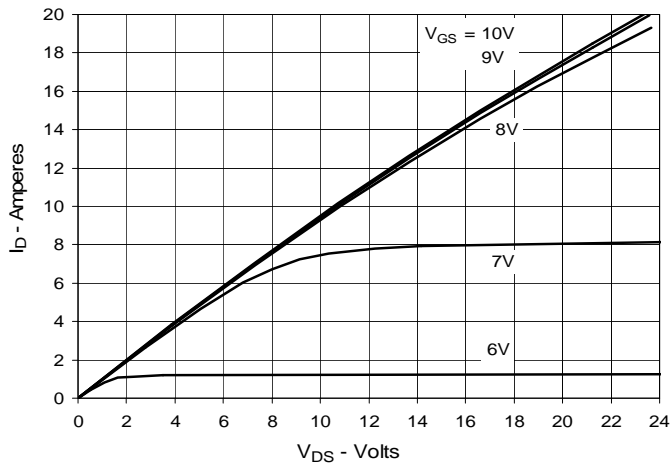
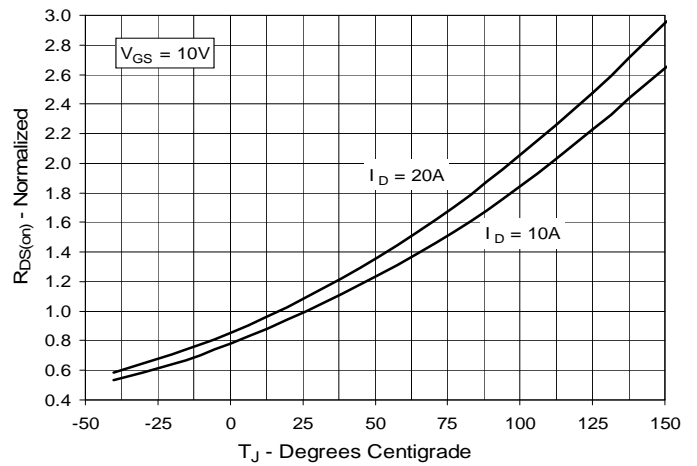
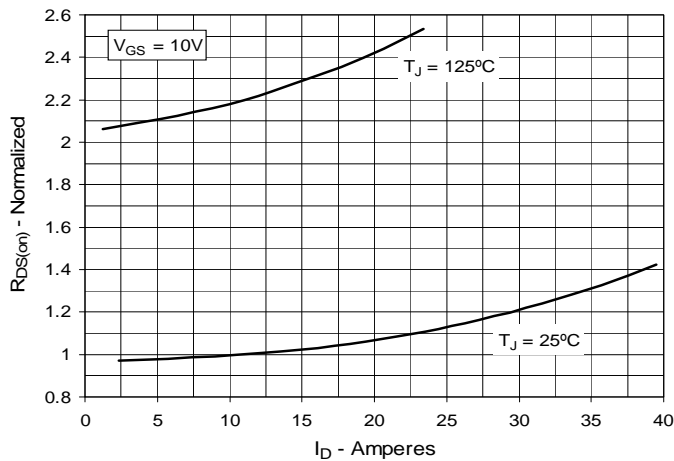
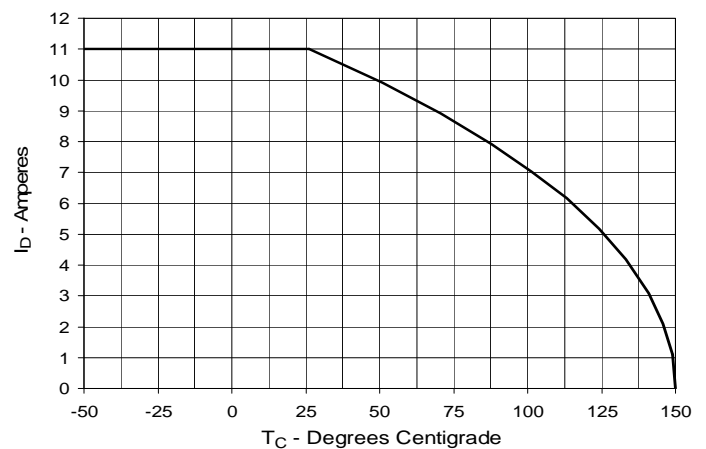
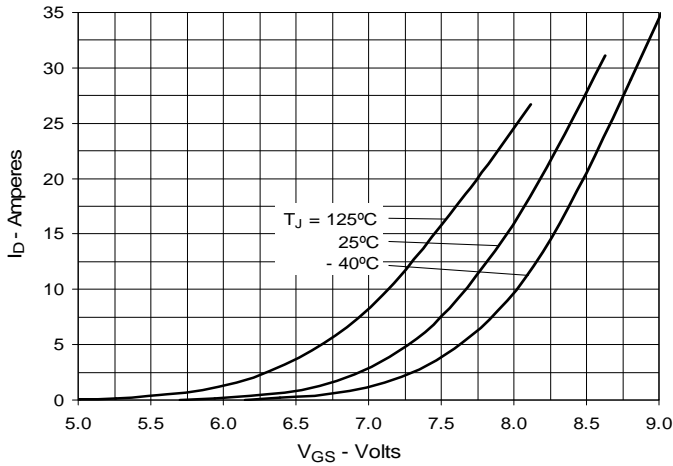
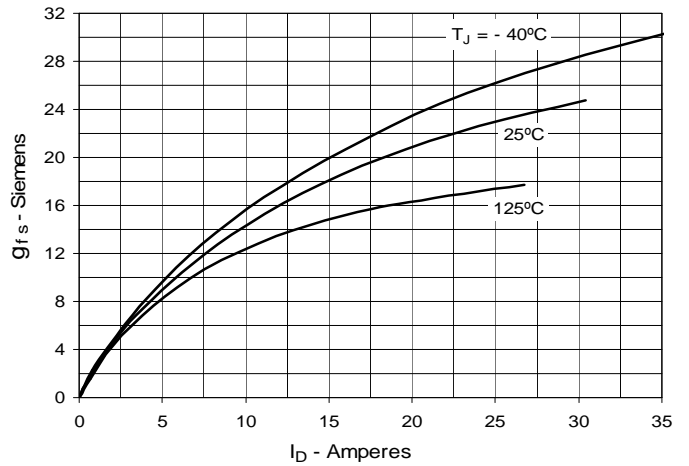
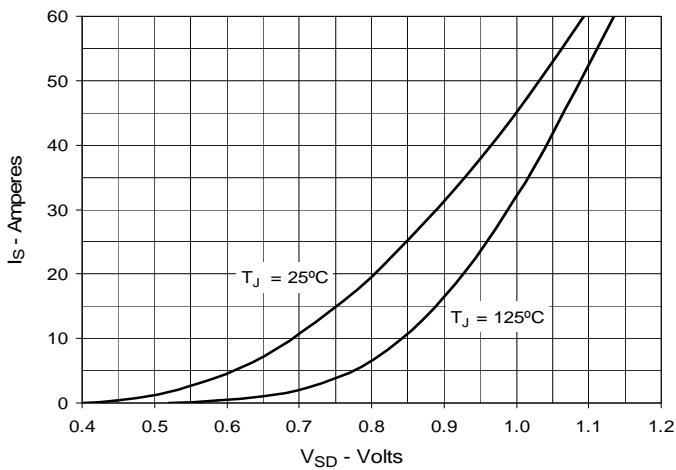
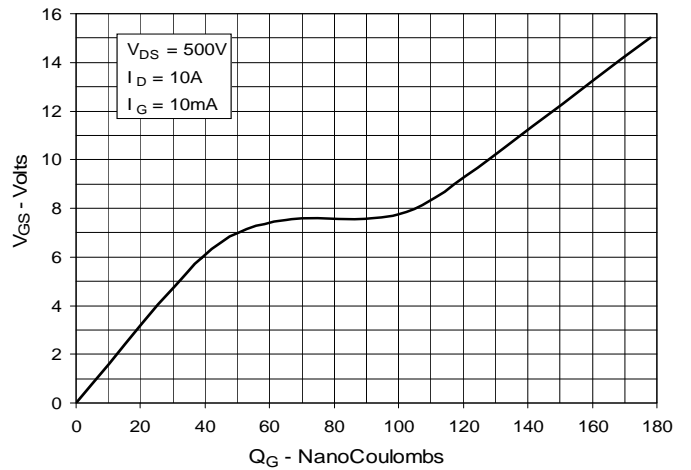
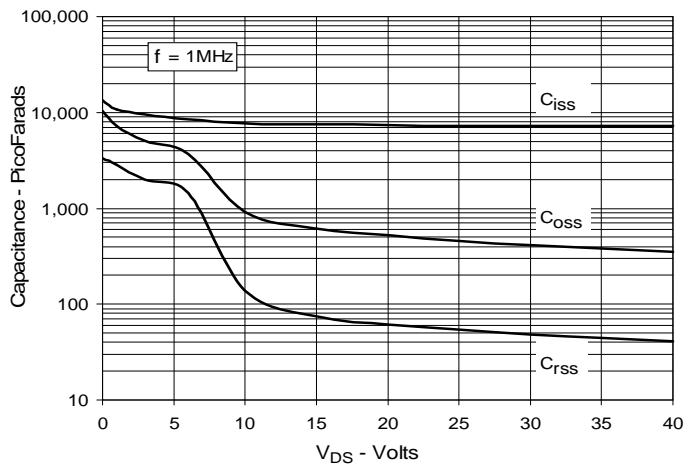
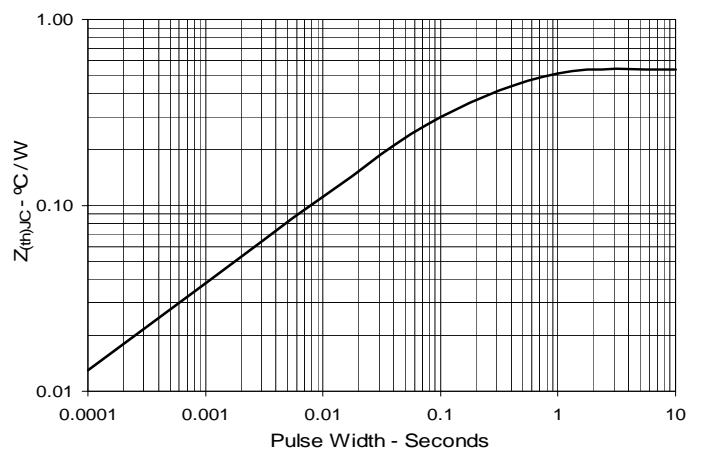
**Fig. 1. Output Characteristics
@ 25°C**

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

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

**Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 10\text{A}$ Value
vs. Junction Temperature**

**Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 10\text{A}$ 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


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