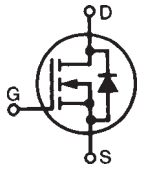
# IXYS

## Polar™ HiPerFET™ Power MOSFET

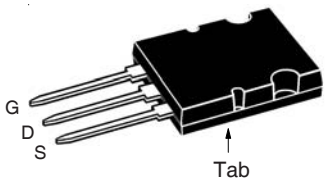
## IXFB300N10P

$V_{DSS}$ = 100V
$I_{D25}$ = 300A
$R_{DS(on)}$ ≤ 5.5mΩ
$t_{rr}$ ≤ 200ns

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode




**PLUS264™**




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

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 175°C | 100 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 175°C, $R_{GS}$ = 1MΩ | 100 | V |
| $V_{GSS}$ | Continuous | ±20 | V |
| $V_{GSM}$ | Transient | ±30 | V |
| $I_{D25}$ | $T_C$ = 25°C | 300 | A |
| $I_{LRMS}$ | Leads Current Limit, RMS | 160 | A |
| $I_{DM}$ | $T_C$ = 25°C, Pulse Width Limited by $T_{JM}$ | 900 | A |
| $I_A$ | $T_C$ = 25°C | 100 | A |
| $E_{AS}$ | $T_C$ = 25°C | 3 | J |
| dv/dt | $I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 175°C$ | 20 | V/ns |
| $P_D$ | $T_C$ = 25°C | 1500 | W |
| $T_J$ | | -55 ... +175 | °C |
| $T_{JM}$ | | 175 | °C |
| $T_{stg}$ | | -55 ... +175 | °C |
| $T_L$ | Maximum Lead Temperature for Soldering | 300 | °C |
| $T_{SOLD}$ | 1.6 mm (0.062in.) from Case for 10s | 260 | °C |
| $F_C$ | Mounting Force | 30..120/6.7..27 | N/lb |
| Weight | | 10 | g |

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 3mA | 100 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 8mA | 2.5 | | 5.0 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | | | ±200 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$, $V_{GS}$ = 0V | | | 25 | μA |
| | $T_J$ = 150°C | | | 1.5 | mA |
| $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 50A, Note 1 | | | 5.5 | mΩ |

### Features

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

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

### Applications

- DC-DC Coverters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC and DC Motor Drives
- Uninterrupted Power Supplies
- High Speed Power Switching Applications

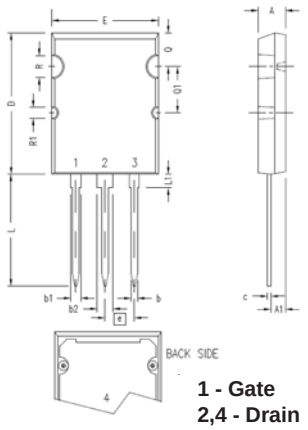
| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 10V, $I_D$ = 60A, Note 1 | 55 | 92 | | S |
| $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | | 23 | | nF |
| $C_{oss}$ | | | 6100 | | pF |
| $C_{rss}$ | | | 417 | | pF |
| $t_{d(on)}$ | **Resistive Switching Times** | | 36 | | ns |
| $t_r$ | $V_{GS}$ = 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 100A | | 35 | | ns |
| $t_{d(off)}$ | $R_G$ = 1Ω (External) | | 56 | | ns |
| $t_f$ | | | 25 | | ns |
| $Q_{g(on)}$ | $V_{GS}$ = 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 0.5 • $I_{D25}$ | | 279 | | nC |
| $Q_{gs}$ | | | 84 | | nC |
| $Q_{gd}$ | | | 107 | | nC |
| $R_{thJC}$ | | | | 0.10 | °C/W |
| $R_{thCS}$ | | | 0.13 | | °C/W |

**Source-Drain Diode**

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0V | | | 300 | A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$ | | | 1000 | A |
| $V_{SD}$ | $I_F$ = 100A, $V_{GS}$ = 0V, Note 1 | | | 1.3 | V |
| $t_{rr}$ | $I_F$ = 150A, -di/dt = 100A/μs | | | 200 | ns |
| $Q_{RM}$ | $V_R$ = 50V | | 0.71 | | μC |
| $I_{RM}$ | | | 10 | | A |

Note 1: Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

**PLUS264™ (IXFB) Outline**




**1 - Gate**
**2,4 - Drain**
**3 - Source**

| SYM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS 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 | |
| L | .779 | .842 | 19.79 | 21.39 |
| L1 | .087 | .102 | 2.21 | 2.59 |
| 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 |

**Fig. 1. Extended Output Characteristics @ $T_J$ = 25ºC**

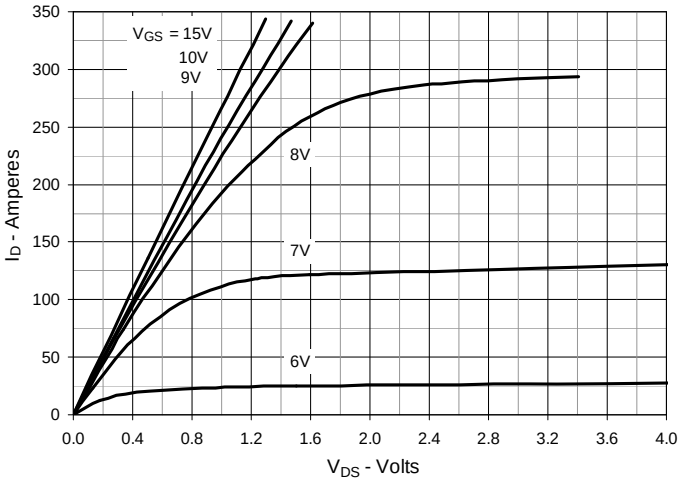



**Fig. 2. Output Characteristics @ $T_J$ = 150ºC**

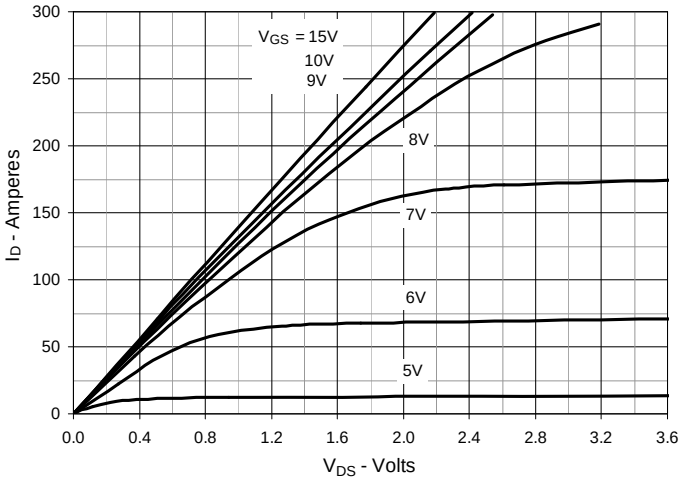



**Fig. 3. $R_{DS(on)}$ Normalized to $I_D$ = 150A Value vs. Junction Temperature**

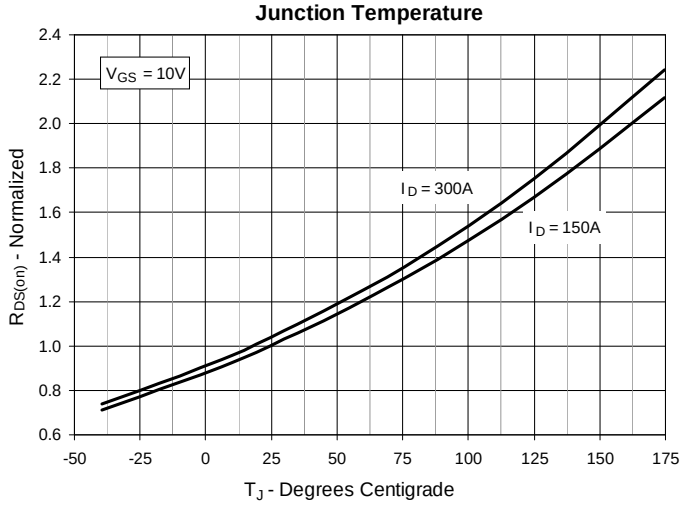



**Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 150A Value vs. Drain Current**

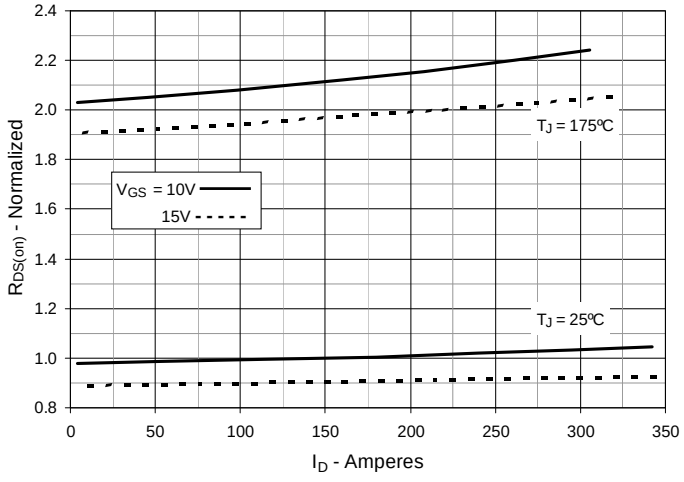



**Fig. 5. Maximum Drain Current vs. Case Temperature**

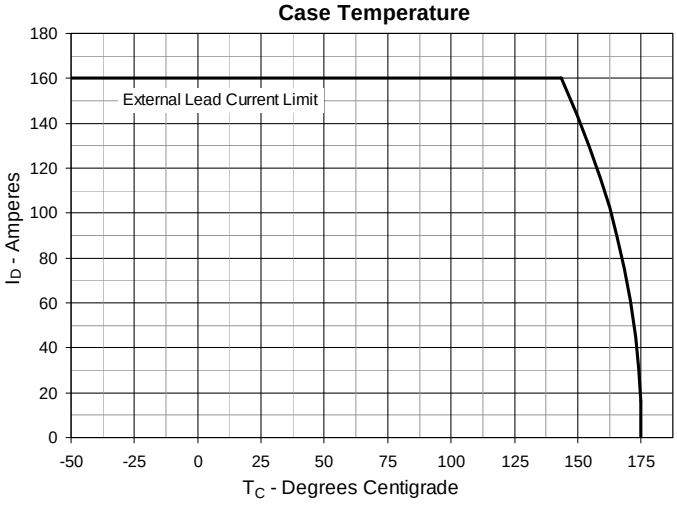



**Fig. 6. Input Admittance**

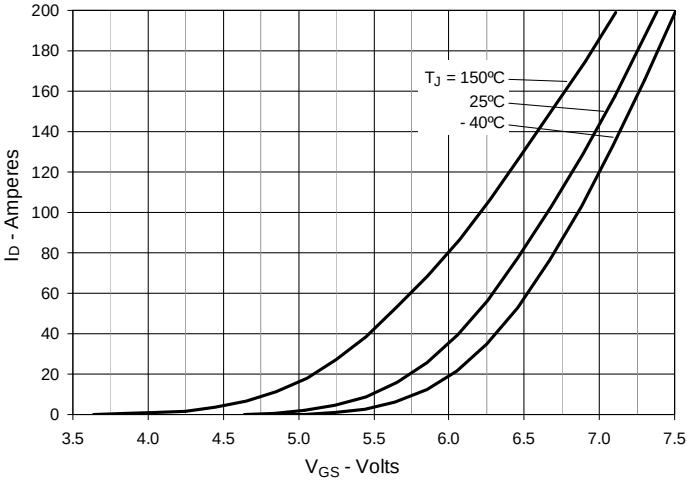


**Fig. . Transconductance**

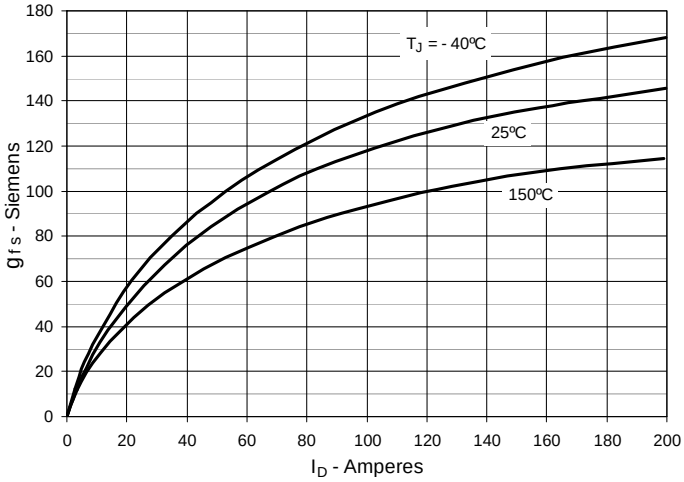



**Fig. 8. Forward Voltage Drop of Intrinsic Diode**

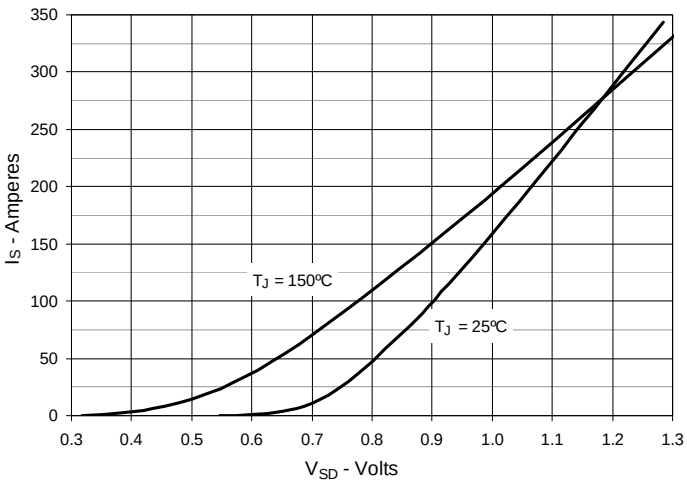



**Fig. 9. Gate Charge**

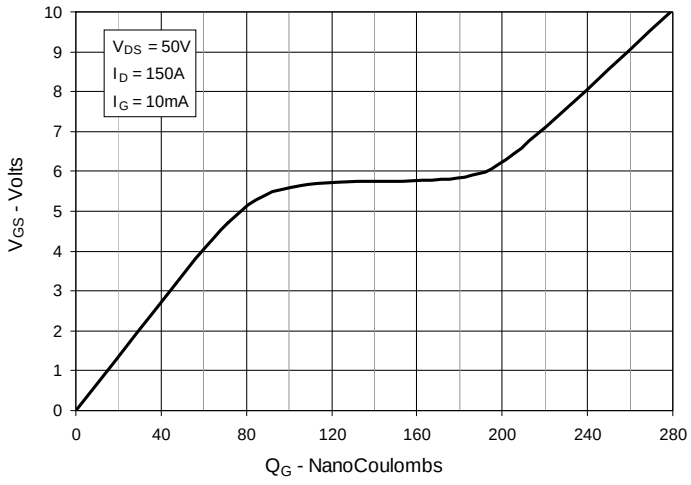



**Fig. 10. Capacitance**

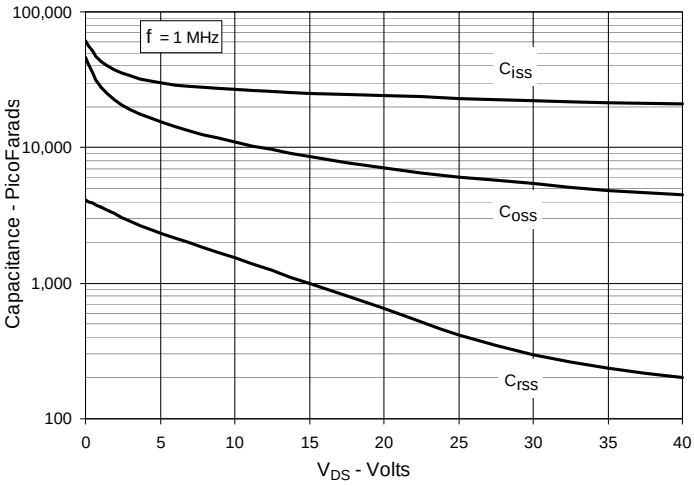



**Fig. 11. Forward-Bias Safe Operating Area**

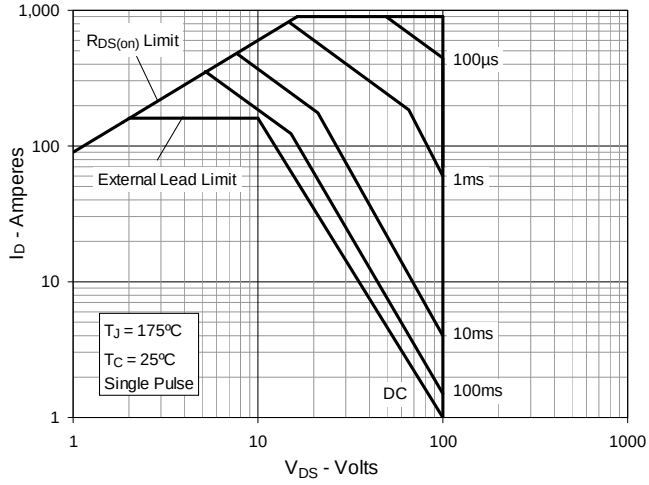



**Fig. 12. Maximum Transient Thermal Impedance**