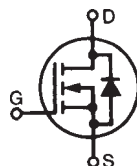


# Polar™ Power MOSFET

## HiPerFET™

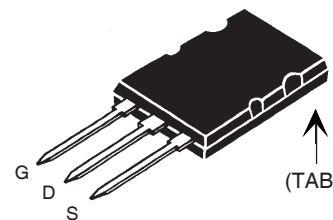
# IXFB40N110P

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



$V_{DSS} = 1100V$   
 $I_{D25} = 40A$   
 $R_{DS(on)} \leq 260m\Omega$   
 $t_{rr} \leq 300ns$

PLUS264™ (IXFB)



G = Gate      D = Drain  
S = Source      TAB = Drain

| Symbol        | Test Conditions  | Maximum Ratings |            |
|---------------|--|-----------------|------------|
| $V_{DSS}$     | $T_J = 25^\circ C$ to $150^\circ C$                                | 1100            | V          |
| $V_{DGR}$     | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 1100            | V          |
| $V_{GSS}$     | Continuous   | $\pm 30$        | V          |
| $V_{GSM}$     | Transient  | $\pm 40$        | V          |
| $I_{D25}$     | $T_C = 25^\circ C$   | 40              | A          |
| $I_{DM}$      | $T_C = 25^\circ C$ , pulse width limited by $T_{JM}$               | 100             | A          |
| $I_{AR}$      | $T_C = 25^\circ C$   | 20              | A          |
| $E_{AS}$      | $T_C = 25^\circ C$   | 2               | J          |
| $dV/dt$       | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 15              | V/ns       |
| $P_D$         | $T_C = 25^\circ C$   | 1250            | 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             | $^\circ C$ |
| $F_C$         | Mounting force   | 30..120/6.7..27 | N/lb.      |
| <b>Weight</b> |  | 10              | g          |

### Features

- Fast recovery diode
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect

### Advantages

- Plus 264™ package for clip or spring mounting
- Space savings
- High power density

### Applications:

- High Voltage Switched-mode and resonant-mode power supplies
- High Voltage Pulse Power Applications
- High Voltage Discharge circuits in Lasers Pulsers, Spark Igniters, RF Generators
- High Voltage DC-DC converters
- High Voltage DC-AC inverters

| Symbol       | Test Conditions                                     | Characteristic Values |      |                    |
|--------------|---|-----------------------|------|--------------------|
|              |   | Min.                  | Typ. | Max.               |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 3mA$                         | 1100                  |      | V                  |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 1mA$                     | 3.5                   |      | 6.5 V              |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                  |                       |      | $\pm 200$ nA       |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$<br>$V_{GS} = 0V$                 |                       |      | 50 $\mu A$<br>3 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1 |                       |      | 260 m $\Omega$     |

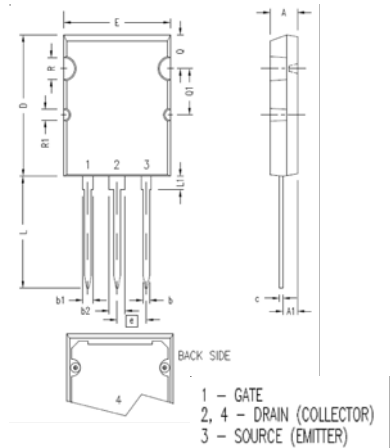
| Symbol       | Test Conditions   | Characteristic Values |      |               |
|--------------|---|-----------------------|------|---------------|
|              |   | Min.                  | Typ. | Max.          |
| $g_{fs}$     | $V_{DS} = 20V, I_D = 0.5 \cdot I_{D25}$ , Note 1  | 20                    | 32   | S             |
| $C_{iss}$    | $V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$   |                       | 19   | nF            |
| $C_{oss}$    |   |                       | 1070 | pF            |
| $C_{rss}$    |   |                       | 46   | pF            |
| $R_{GI}$     | Gate Input Resistance   |                       | 1.65 | $\Omega$      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$<br>$R_G = 1\Omega$ (External) |                       | 53   | ns            |
| $t_r$        |   |                       | 55   | ns            |
| $t_{d(off)}$ |   |                       | 110  | ns            |
| $t_f$        |   |                       | 54   | ns            |
| $Q_{g(on)}$  | $V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$   |                       | 310  | nC            |
| $Q_{gs}$     |   |                       | 95   | nC            |
| $Q_{gd}$     |   |                       | 142  | nC            |
| $R_{thJC}$   |   |                       | 0.10 | $^{\circ}C/W$ |
| $R_{thCS}$   |   | 0.13                  |      | $^{\circ}C/W$ |

**Source-Drain Diode**

**Characteristic Values**  
( $T_J = 25^{\circ}C$ , unless otherwise specified)

| Symbol   | Test Conditions   | Characteristic Values |      |         |
|----------|---|-----------------------|------|---------|
|          |   | Min.                  | Typ. | Max.    |
| $I_S$    | $V_{GS} = 0V$   |                       |      | 40 A    |
| $I_{SM}$ | Repetitive, pulse width limited by $T_{JM}$                   |                       |      | 160 A   |
| $V_{SD}$ | $I_F = I_S, V_{GS} = 0V$ , Note 1                             |                       |      | 1.5 V   |
| $t_{rr}$ | $I_F = 20A, -di/dt = 100A/\mu s$<br>$V_R = 100V, V_{GS} = 0V$ |                       |      | 300 ns  |
| $Q_{RM}$ |   |                       | 2.2  | $\mu C$ |
| $I_{RM}$ |   |                       | 16   | A       |

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

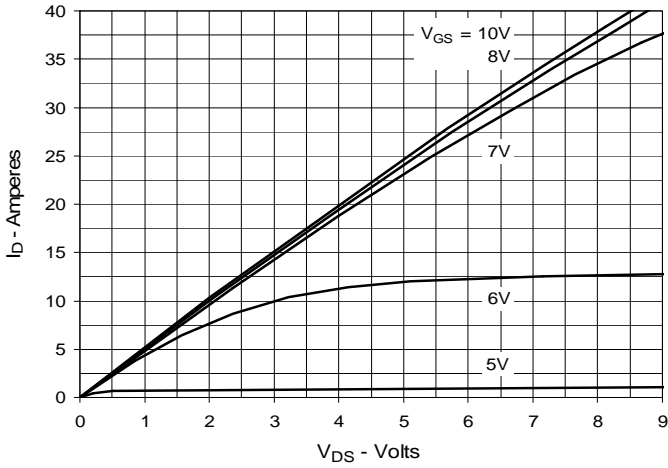
**PLUS264™ (IXFB) Outline**


| SYM              | INCHES   |       | MILLIMETERS |       |
|------------------|----------|-------|-------------|-------|
|                  | MIN      | MAX   | MIN         | 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  |
| $\varnothing R$  | .155     | .187  | 3.94        | 4.75  |
| $\varnothing R1$ | .085     | .093  | 2.16        | 2.36  |

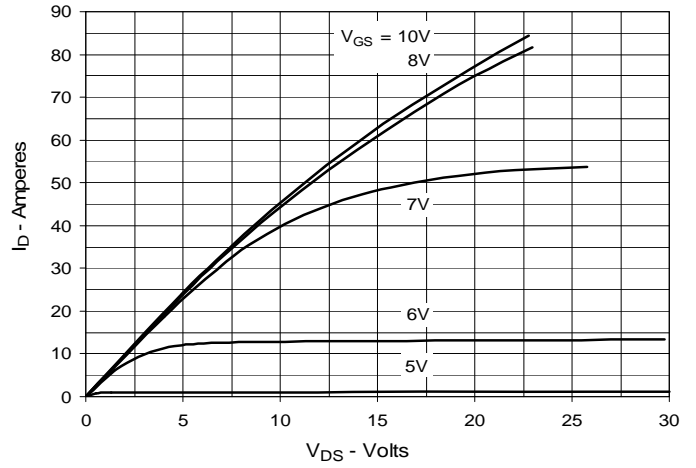
IXYS reserves the right to change limits, test conditions, and dimensions.

|  |           |           |           |           |              |              |              |              |              |             |
|--|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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    |             |

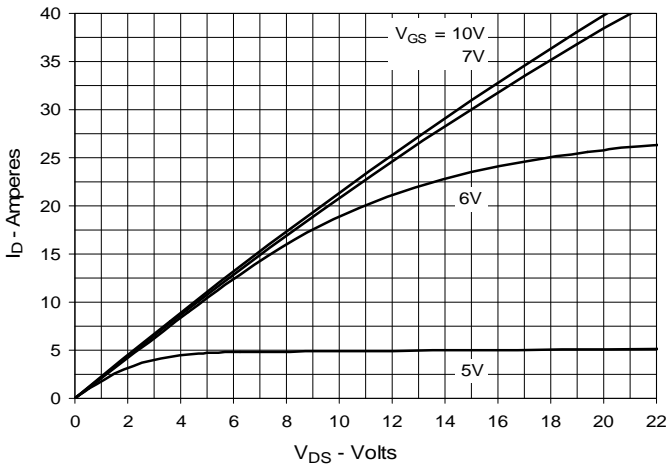
**Fig. 1. Output Characteristics @ 25°C**



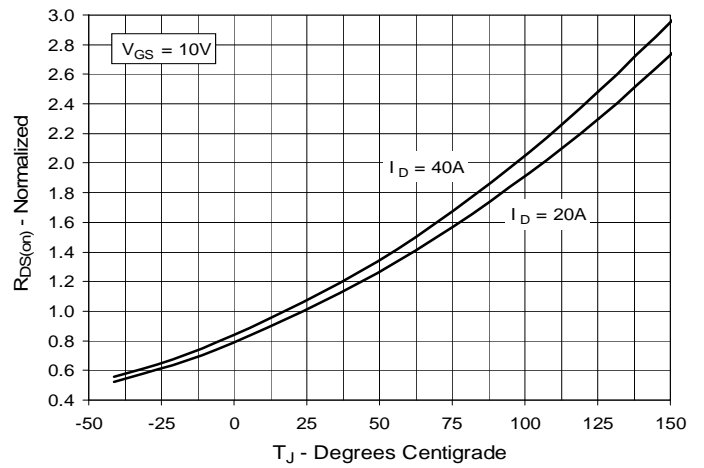
**Fig. 2. Extended Output Characteristics @ 25°C**



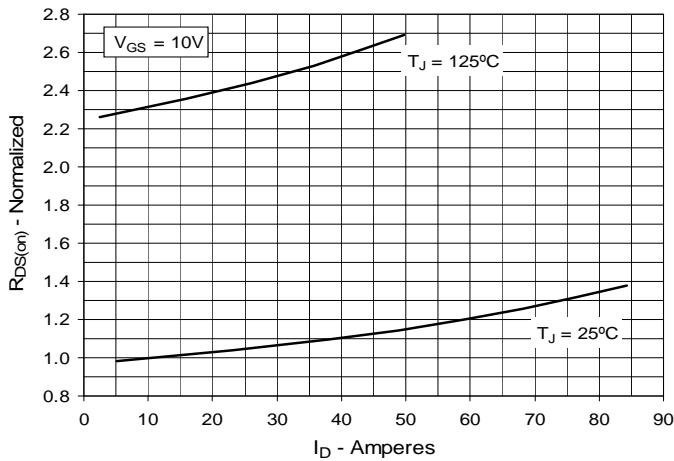
**Fig. 3. Output Characteristics @ 125°C**



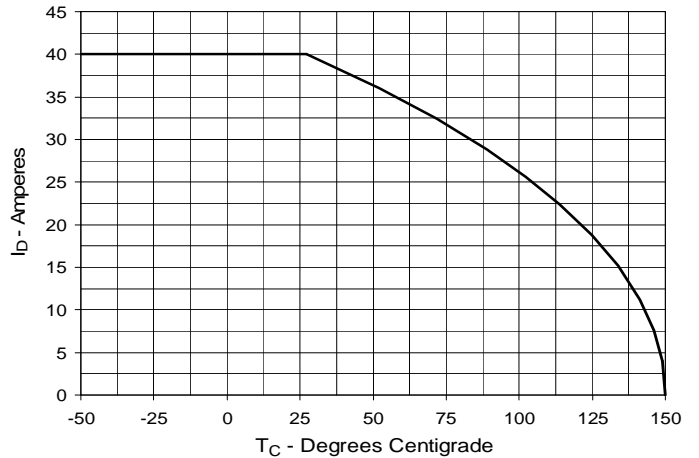
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 20A$  Value vs. Junction Temperature**

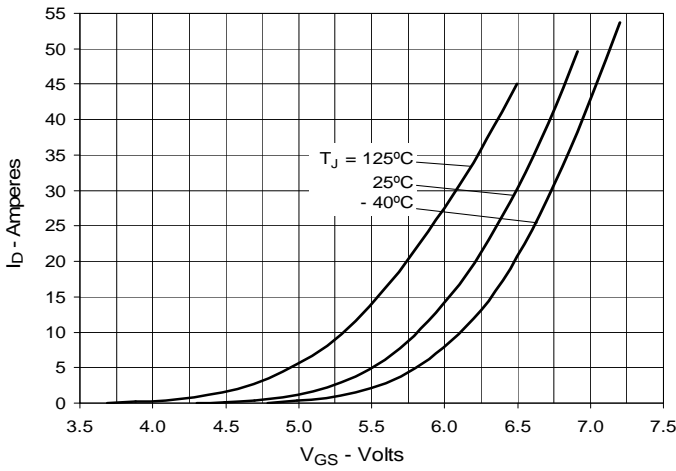
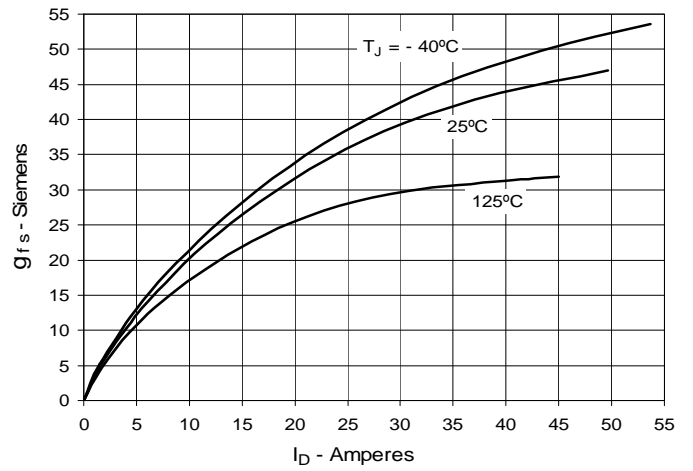
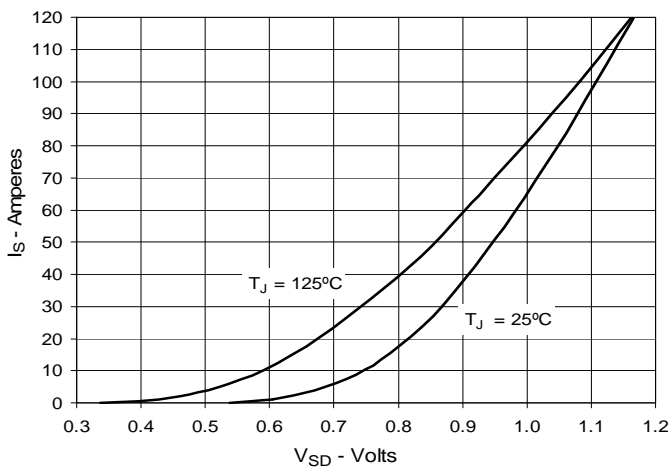
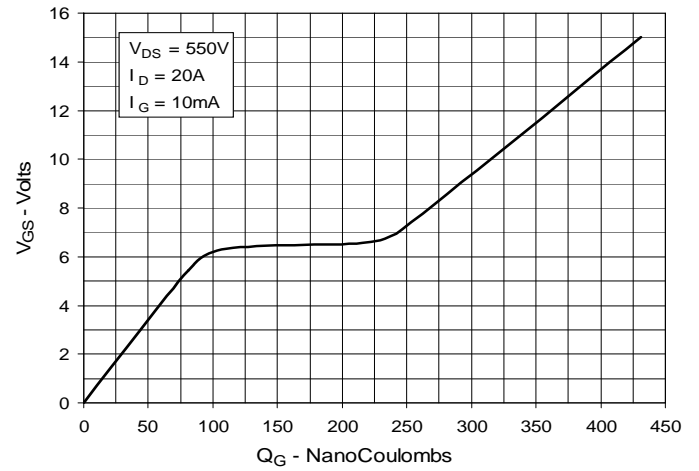
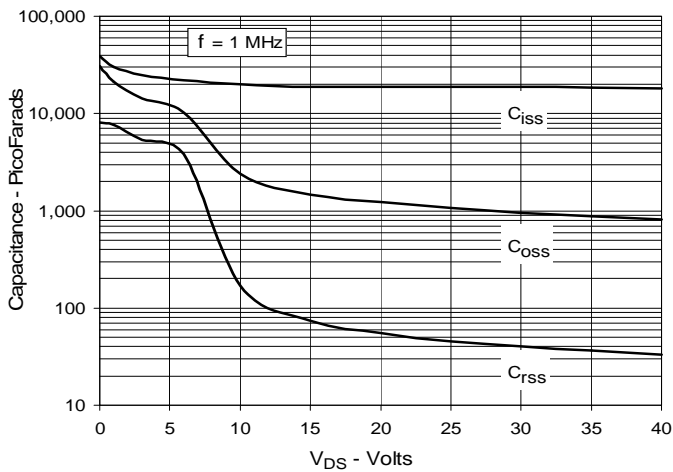
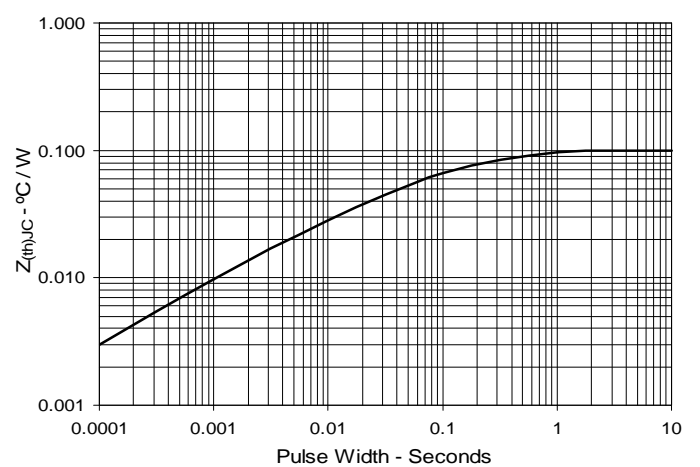


**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 20A$  Value vs. Drain Current**



**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**




---

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at [www.littelfuse.com/disclaimer-electronics](http://www.littelfuse.com/disclaimer-electronics).