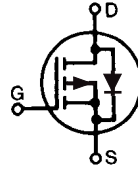


# Standard Power MOSFET

P-Channel Enhancement Mode  
Avalanche Rated

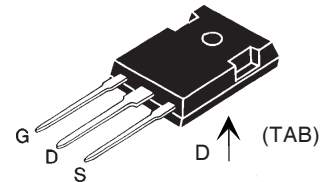
**IXTH 11P50**  
**IXTT 11P50**

$V_{DSS} = -500 \text{ V}$   
 $I_{D25} = -11 \text{ A}$   
 $R_{DS(on)} = 0.75 \Omega$

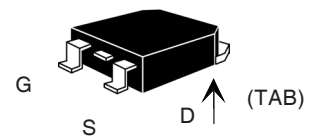


| Symbol    | Test Conditions   | Maximum Ratings |                  |
|-----------|---|-----------------|------------------|
| $V_{DSS}$ | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                                  | -500            | V                |
| $V_{DGR}$ | $T_J = 25^\circ\text{C to } 150^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$      | -500            | V                |
| $V_{GS}$  | Continuous  | $\pm 20$        | V                |
| $V_{GSM}$ | Transient   | $\pm 30$        | V                |
| $I_{D25}$ | $T_C = 25^\circ\text{C}$  | -11             | A                |
| $I_{DM}$  | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_J$                         | -44             | A                |
| $I_{AR}$  | $T_C = 25^\circ\text{C}$  | -11             | A                |
| $E_{AR}$  | $T_C = 25^\circ\text{C}$  | 30              | mJ               |
| $P_D$     | $T_C = 25^\circ\text{C}$  | 300             | W                |
| $T_J$     |   | -55 ... +150    | $^\circ\text{C}$ |
| $T_{JM}$  |   | 150             | $^\circ\text{C}$ |
| $T_{stg}$ |   | -55 ... +150    | $^\circ\text{C}$ |
| $T_L$     | Maximum lead temperature for soldering<br>1.6 mm (0.062 in.) from case for 10 s | 300             | $^\circ\text{C}$ |
| $M_d$     | Mounting torque (TO-247)  | 1.13/10         | Nm/lb.in.        |
| Weight    | TO-247 AD   | 6               | g                |
|           | TO-268  | 4               | g                |

TO-247 AD (IXTH)



TO-268 (IXTT) Case Style



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

| Symbol       | Test Conditions   | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |        |                             |
|--------------|---|---|--------|-----------------------------|
|              |   | min.  | typ.   | max.                        |
| $V_{DSS}$    | $V_{GS} = 0 \text{ V}$ , $I_D = -250 \mu\text{A}$<br>$BV_{DSS}$ Temperature Coefficient                       | -500  | 0.054  | V<br>%/K                    |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = -250 \mu\text{A}$<br>$V_{GS(th)}$ Temperature Coefficient                          | -3.0  | -0.122 | V<br>%/K                    |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}_{DC}$ , $V_{DS} = 0$   |   |        | $\pm 100$ nA                |
| $I_{DSS}$    | $V_{DS} = 0.8 \cdot V_{DSS}$ , $T_J = 25^\circ\text{C}$<br>$V_{GS} = 0 \text{ V}$ , $T_J = 125^\circ\text{C}$ |   |        | -200 $\mu\text{A}$<br>-1 mA |
| $R_{DS(on)}$ | $V_{GS} = -10 \text{ V}$ , $I_D = 0.5 \cdot I_{D25}$<br>$R_{DS(on)}$ Temperature Coefficient                  |   |        | 0.75 $\Omega$<br>0.6 %/K    |

## Features

- International standard packages
- Low  $R_{DS(on)}$  HDMOS™ process
- Rugged polysilicon gate cell structure
- Unclamped Inductive Switching (UIS) rated
- Low package inductance  
- easy to drive and to protect

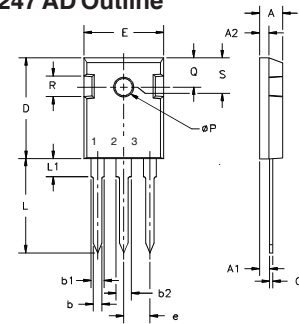
## Advantages

- Easy to mount
- Space savings
- High power density

| Symbol       | Test Conditions  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |      |
|--------------|--|---|------|------|
|              |  | min.  | typ. | max. |
| $g_{fs}$     | $V_{DS} = -10\text{ V}$ ; $I_D = I_{D25}$ , pulse test   | 5   | 9    | S    |
| $C_{iss}$    | $V_{GS} = 0\text{ V}$ , $V_{DS} = -25\text{ V}$ , $f = 1\text{ MHz}$                                     |   | 4700 | pF   |
| $C_{oss}$    |  |   | 430  | pF   |
| $C_{rss}$    |  |   | 135  | pF   |
| $t_{d(on)}$  | $V_{GS} = -10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 0.5 I_{D25}$<br>$R_G = 4.7\ \Omega$ (External) |   | 33   | ns   |
| $t_r$        |  |   | 27   | ns   |
| $t_{d(off)}$ |  |   | 35   | ns   |
| $t_f$        |  |   | 35   | ns   |
| $Q_{G(on)}$  | $V_{GS} = -10\text{ V}$ , $V_{DS} = 0.5 V_{DSS}$ , $I_D = 0.5 I_{D25}$                                   |   | 130  | nC   |
| $Q_{GS}$     |  |   | 46   | nC   |
| $Q_{GD}$     |  |   | 92   | nC   |
| $R_{thJC}$   | (TO-247)   |   | 0.42 | K/W  |
| $R_{thCS}$   |  |   | 0.25 | K/W  |

| Source-Drain Diode |  | Characteristic Values<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified) |      |                |
|--------------------|--|---|------|----------------|
| Symbol             | Test Conditions  | min.  | typ. | max.           |
| $I_S$              | $V_{GS} = 0$   | 10P50<br>11P50  |      | -10 A<br>-11 A |
| $I_{SM}$           | Repetitive; pulse width limited by $T_{JM}$  | 10P50<br>11P50  |      | -40 A<br>-44 A |
| $V_{SD}$           | $I_F = I_S$ , $V_{GS} = 0\text{ V}$ ,<br>Pulse test, $t \leq 300\ \mu\text{s}$ , duty cycle $d \leq 2\%$ |   |      | -3 V           |
| $t_{rr}$           | $I_F = I_S$ , $di/dt = 100\text{ A}/\mu\text{s}$   |   | 500  | ns             |

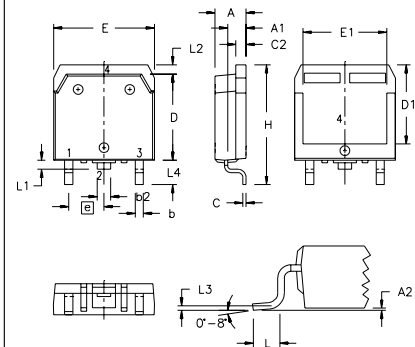
### TO-247 AD Outline



Terminals: 1 - Gate 2 - Drain  
3 - Source Tab - Drain

| Dim.           | Millimeter |       | Inches |       |
|----------------|------------|-------|--------|-------|
|                | Min.       | Max.  | Min.   | Max.  |
| A              | 4.7        | 5.3   | .185   | .209  |
| A <sub>1</sub> | 2.2        | 2.54  | .087   | .102  |
| A <sub>2</sub> | 2.2        | 2.6   | .059   | .098  |
| b              | 1.0        | 1.4   | .040   | .055  |
| b <sub>1</sub> | 1.65       | 2.13  | .065   | .084  |
| b <sub>2</sub> | 2.87       | 3.12  | .113   | .123  |
| C              | .4         | .8    | .016   | .031  |
| D              | 20.80      | 21.46 | .819   | .845  |
| E              | 15.75      | 16.26 | .610   | .640  |
| e              | 5.20       | 5.72  | 0.205  | 0.225 |
| L              | 19.81      | 20.32 | .780   | .800  |
| L <sub>1</sub> |            | 4.50  |        | .177  |
| ØP             | 3.55       | 3.65  | .140   | .144  |
| Q              | 5.89       | 6.40  | 0.232  | 0.252 |
| R              | 4.32       | 5.49  | .170   | .216  |
| S              | 6.15       | BSC   | 242    | BSC   |

### TO-268 Outline



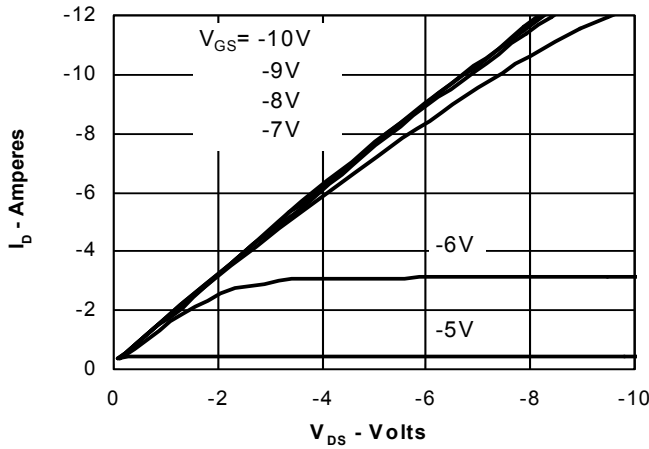
Terminals: 1 - Gate 2 - Drain  
3 - Source Tab - Drain

| SYM            | INCHES |          | MILLIMETERS |          |
|----------------|--------|----------|-------------|----------|
|                | MIN    | MAX      | MIN         | MAX      |
| A              | .193   | .201     | 4.90        | 5.10     |
| A <sub>1</sub> | .106   | .114     | 2.70        | 2.90     |
| A <sub>2</sub> | .001   | .010     | 0.02        | 0.25     |
| b              | .045   | .057     | 1.15        | 1.45     |
| b <sub>2</sub> | .075   | .083     | 1.90        | 2.10     |
| C              | .016   | .026     | 0.40        | 0.65     |
| C <sub>2</sub> | .057   | .063     | 1.45        | 1.60     |
| D              | .543   | .551     | 13.80       | 14.00    |
| D <sub>1</sub> | .488   | .500     | 12.40       | 12.70    |
| E              | .624   | .632     | 15.85       | 16.05    |
| E <sub>1</sub> | .524   | .535     | 13.30       | 13.60    |
| e              |        | .215 BSC |             | 5.45 BSC |
| H              | .736   | .752     | 18.70       | 19.10    |
| L              | .094   | .106     | 2.40        | 2.70     |
| L <sub>1</sub> | .047   | .055     | 1.20        | 1.40     |
| L <sub>2</sub> | .039   | .045     | 1.00        | 1.15     |
| L <sub>3</sub> |        | .010 BSC |             | 0.25 BSC |
| L <sub>4</sub> | .150   | .161     | 3.80        | 4.10     |

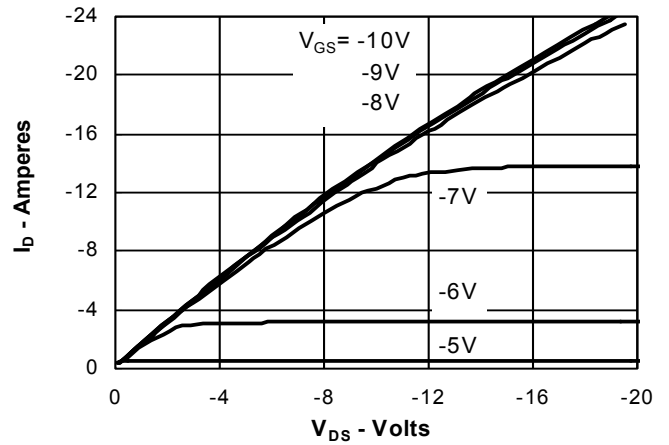
IXYS reserves the right to change limits, test conditions, and dimensions.

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

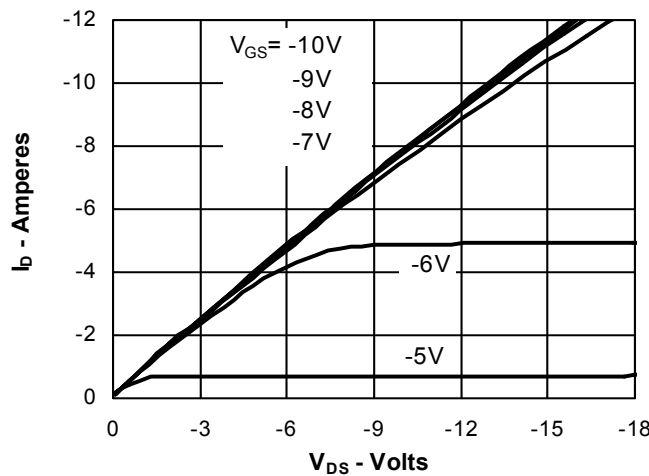
**Fig. 1. Output Characteristics  
@ 25 Deg. C**



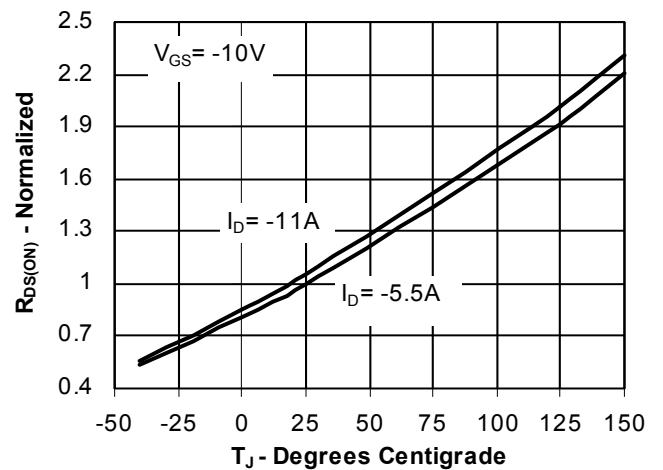
**Fig. 2. Extended Output Characteristics  
@ 25 Deg. C**



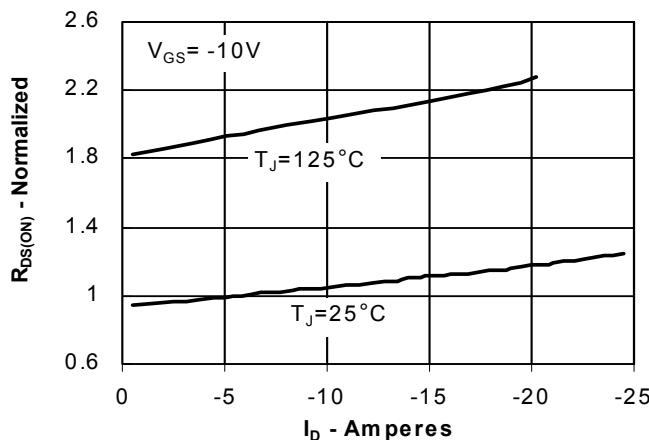
**Fig. 3. Output Characteristics  
@ 125 Deg. C**



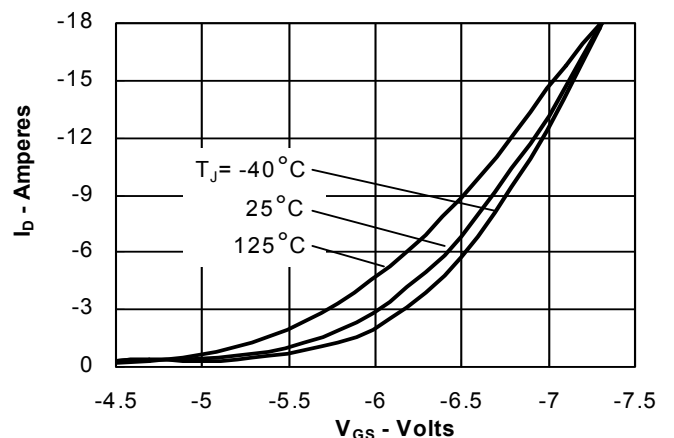
**Fig. 4.  $R_{DS(ON)}$  Normalized to  $I_{D25}$  Value  
vs. Junction Temperature**



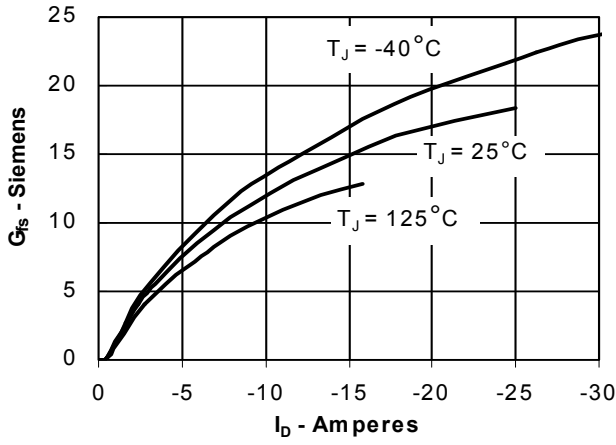
**Fig. 5.  $R_{DS(ON)}$  Normalized to  $I_{D25}$   
Value vs.  $I_D$**



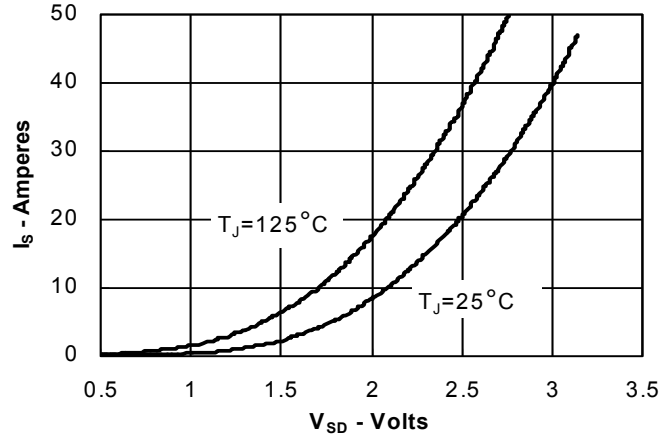
**Fig. 6. Input Admittance**



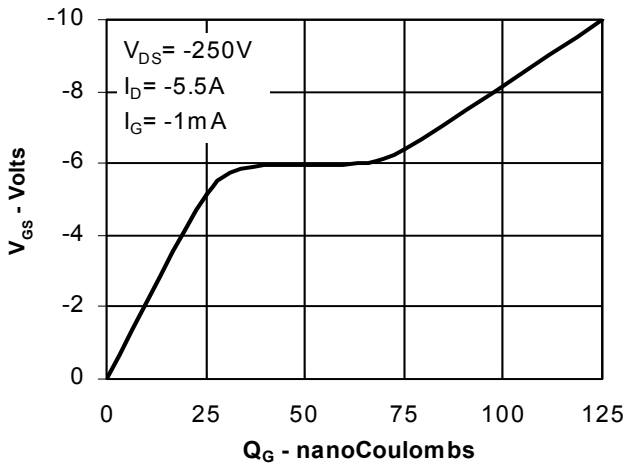
**Fig. 7. Transconductance**



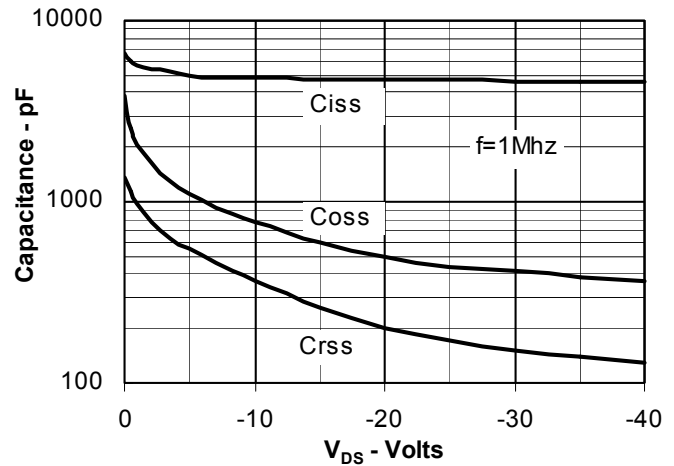
**Fig. 8. Source Current vs. Source-To-Drain Voltage**



**Fig. 9. Gate Charge**



**Fig. 10. Capacitance**



**Fig. 14. Maximum Transient Thermal Resistance**

