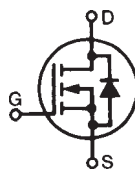


## High Voltage Power MOSFET

**IXTU01N100**  
**IXTY01N100**

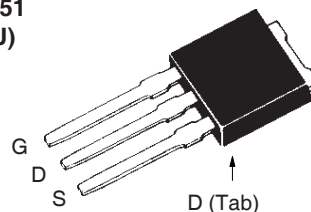
$$\begin{aligned} V_{DSS} &= 1000V \\ I_{D25} &= 100mA \\ R_{DS(on)} &\leq 80\Omega \end{aligned}$$

N-Channel Enhancement Mode

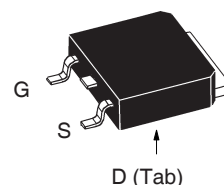


| Symbol        | Test Conditions                                                       | Maximum Ratings |                  |
|---------------|-----------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                       | 1000            | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$ | 1000            | V                |
| $V_{GSS}$     | Continuous                                                            | $\pm 20$        | V                |
| $V_{GSM}$     | Transient                                                             | $\pm 30$        | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$                                              | 100             | mA               |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$            | 400             | mA               |
| $P_D$         | $T_C = 25^\circ\text{C}$                                              | 25              | 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                                | 300             | $^\circ\text{C}$ |
| $T_{SOLD}$    | 1.6 mm (0.062in.) from Case for 10s                                   | 260             | $^\circ\text{C}$ |
| $F_C$         | Mounting force                                                        | 1.13 / 10       | Nm/lb.in.        |
| <b>Weight</b> | TO-251                                                                | 0.40            | g                |
|               | TO-252                                                                | 0.35            | g                |

**TO-251  
(IXTU)**



**TO-252  
(IXTY)**



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

### Features

- International Standard Packages
- Fast Switching Times
- Avalanche Rated
- $R_{DS(on)}$  HDMOS™ Process
- Rugged Polysilicon Gate Cell structure

### Advantages

- High Power Density
- Space Savings

### Applications

- Level Shifting
- Triggers
- Solid State Relays
- Current Regulators

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                           |
|--------------|-----------------------------------------------------------------------------|-----------------------|------|---------------------------|
|              |                                                                             | Min.                  | Typ. | Max.                      |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 25\mu A$                                             | 1000                  |      | V                         |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 25\mu A$                                         | 2.0                   |      | 4.5 V                     |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                                          |                       |      | $\pm 50$ nA               |
| $I_{DSS}$    | $V_{DS} = 0.8 \cdot V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$   |                       |      | 10 $\mu A$<br>200 $\mu A$ |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 50mA$ , Note 1                                      |                       | 60   | 80 $\Omega$               |

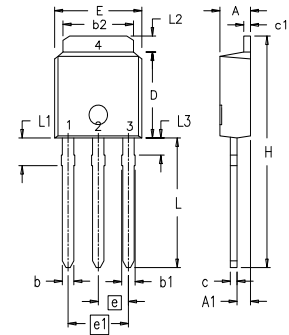
| Symbol                    | Test Conditions                                                                                                                                                | Characteristic Values |      |        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|--------|
|                           | (T <sub>J</sub> = 25°C, Unless Otherwise Specified)                                                                                                            | Min.                  | Typ. | Max.   |
| <b>g<sub>fs</sub></b>     | V <sub>DS</sub> = 10V, I <sub>D</sub> = 50mA, Note 1                                                                                                           |                       | 0.16 | S      |
| <b>C<sub>iss</sub></b>    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz                                                                                                          |                       | 54.0 | pF     |
| <b>C<sub>oss</sub></b>    |                                                                                                                                                                |                       | 6.9  | pF     |
| <b>C<sub>rss</sub></b>    |                                                                                                                                                                |                       | 2.0  | pF     |
| <b>t<sub>d(on)</sub></b>  | <b>Resistive Switching Times</b><br>V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 50mA<br>R <sub>G</sub> = 50Ω (External) |                       | 12   | ns     |
| <b>t<sub>r</sub></b>      |                                                                                                                                                                |                       | 12   | ns     |
| <b>t<sub>d(off)</sub></b> |                                                                                                                                                                |                       | 40   | ns     |
| <b>t<sub>f</sub></b>      |                                                                                                                                                                |                       | 28   | ns     |
| <b>Q<sub>g(on)</sub></b>  | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 0.5 • V <sub>DSS</sub> , I <sub>D</sub> = 50mA                                                                        |                       | 6.9  | nC     |
| <b>Q<sub>gs</sub></b>     |                                                                                                                                                                |                       | 1.8  | nC     |
| <b>Q<sub>gd</sub></b>     |                                                                                                                                                                |                       | 3.0  | nC     |
| <b>R<sub>thJC</sub></b>   |                                                                                                                                                                |                       |      | 5 °C/W |

## Source-Drain Diode

| Symbol                | Test Conditions                                                | Characteristic Values |      |        |
|-----------------------|----------------------------------------------------------------|-----------------------|------|--------|
|                       | (T <sub>J</sub> = 25°C, Unless Otherwise Specified)            | Min.                  | Typ. | Max.   |
| <b>I<sub>S</sub></b>  | V <sub>GS</sub> = 0V                                           |                       |      | 100 mA |
| <b>I<sub>SM</sub></b> | Repetitive, Pulse Width Limited by T <sub>JM</sub>             |                       |      | 300 mA |
| <b>V<sub>SD</sub></b> | I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0V, Note 1 |                       |      | 1.8 V  |
| <b>t<sub>rr</sub></b> | I <sub>F</sub> = 0.75A, -di/dt = 100A/μs, V <sub>R</sub> = 25V |                       |      | 1.5 μs |

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

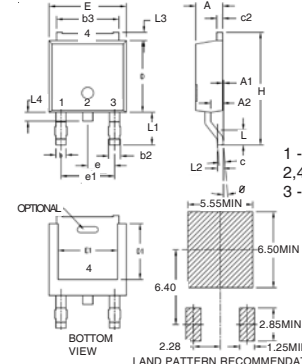
## TO-251 Outline



1. Gate 2.Drain  
3. Source 4.Drain

| Dim. | Millimeter |       | Inches |      |
|------|------------|-------|--------|------|
|      | Min.       | Max.  | Min.   | Max. |
| A    | 2.19       | 2.38  | .086   | .094 |
| A1   | 0.89       | 1.14  | 0.35   | .045 |
| b    | 0.64       | 0.89  | .025   | .035 |
| b1   | 0.76       | 1.14  | .030   | .045 |
| b2   | 5.21       | 5.46  | .205   | .215 |
| c    | 0.46       | 0.58  | .018   | .023 |
| c1   | 0.46       | 0.58  | .018   | .023 |
| D    | 5.97       | 6.22  | .235   | .245 |
| E    | 6.35       | 6.73  | .250   | .265 |
| e    | 2.28       | BSC   | .090   | BSC  |
| e1   | 4.57       | BSC   | .180   | BSC  |
| H    | 17.02      | 17.78 | .670   | .700 |
| L    | 8.89       | 9.65  | .350   | .380 |
| L1   | 1.91       | 2.28  | .075   | .090 |
| L2   | 0.89       | 1.27  | .035   | .050 |

## TO-252 AA Outline



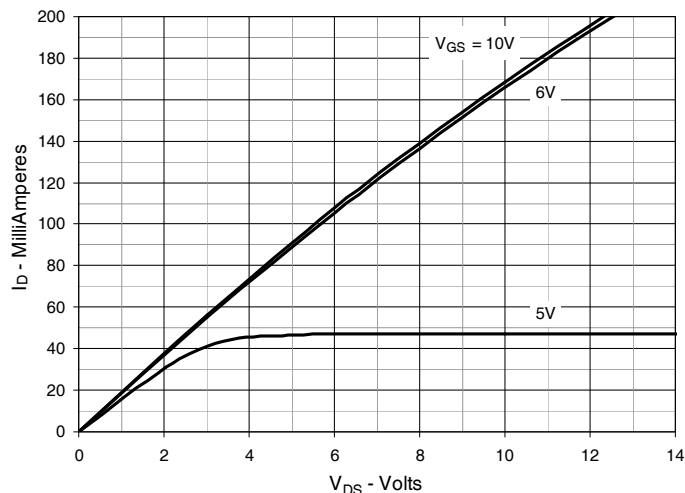
1 - Gate  
2,4 - Drain  
3 - Source

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .086     | .094 | 2.19        | 2.38  |
| A1  | 0        | .005 | 0           | 0.12  |
| A2  | .038     | .046 | 0.97        | 1.17  |
| b   | .025     | .035 | 0.64        | 0.89  |
| b2  | .030     | .045 | 0.76        | 1.14  |
| b3  | .200     | .215 | 5.08        | 5.46  |
| c   | .018     | .024 | 0.46        | 0.61  |
| c2  | .018     | .023 | 0.46        | 0.58  |
| D   | .235     | .245 | 5.97        | 6.22  |
| D1  | .180     | .205 | 4.57        | 5.21  |
| E   | .250     | .265 | 6.35        | 6.73  |
| E1  | .170     | .205 | 4.32        | 5.21  |
| e   | .090 BSC |      | 2.28 BSC    |       |
| e1  | .180 BSC |      | 4.57 BSC    |       |
| H   | .370     | .410 | 9.40        | 10.42 |
| L   | .055     | .070 | 1.40        | 1.78  |
| L1  | .100     | .115 | 2.54        | 2.92  |
| L2  | .020 BSC |      | 0.50 BSC    |       |
| L3  | .025     | .040 | 0.64        | 1.02  |
| L4  | .025     | .040 | 0.64        | 1.02  |
| θ   | 0°       | 10°  | 0°          | 10°   |

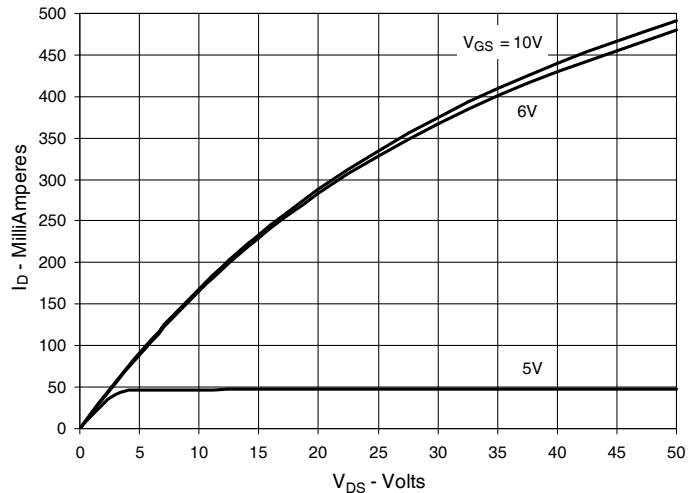
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

|                                                                                  |           |           |           |           |              |              |              |              |              |             |
|----------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|--------------|--------------|--------------|--------------|--------------|-------------|
| 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    | 7,005,734 B2 | 7,157,338B2 |
|                                                                                  | 4,860,072 | 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    |             |

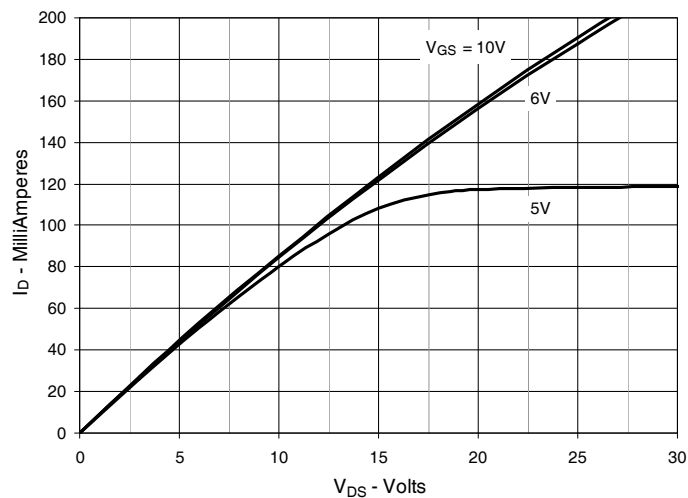
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



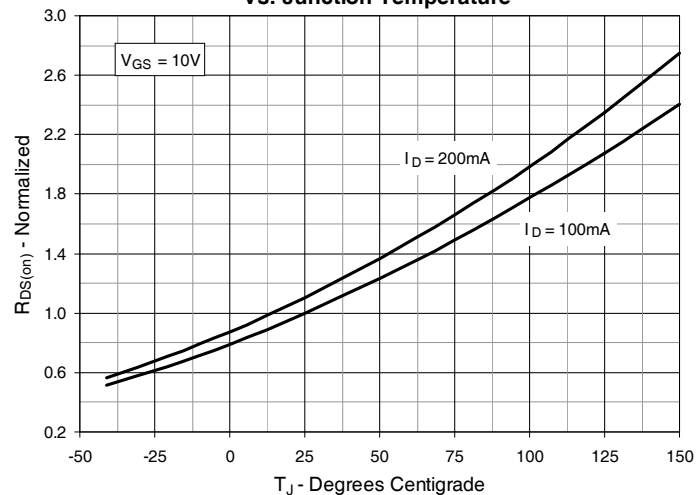
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



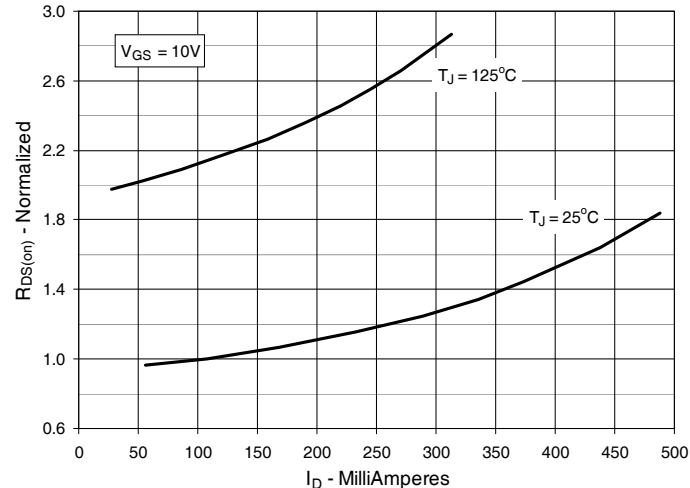
**Fig. 2. Output Characteristics @  $T_J = 125^\circ\text{C}$**



**Fig. 3.  $R_{DS(on)}$  Normalized to  $I_D = 50\text{mA}$  Value vs. Junction Temperature**



**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 50\text{mA}$  Value vs. Drain Current**



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

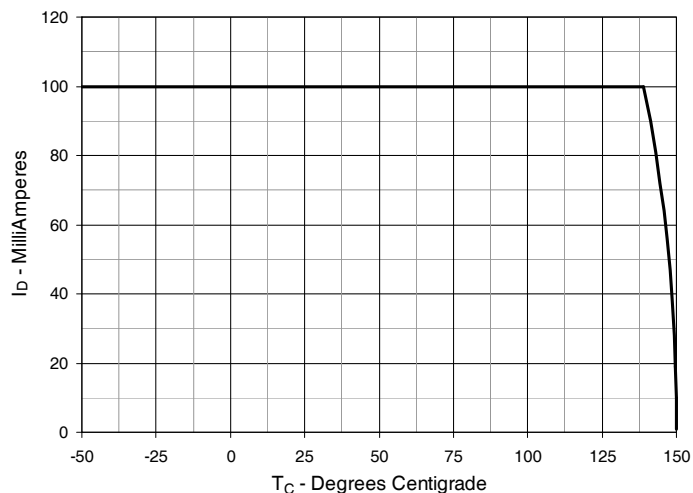


Fig. 7. Input Admittance

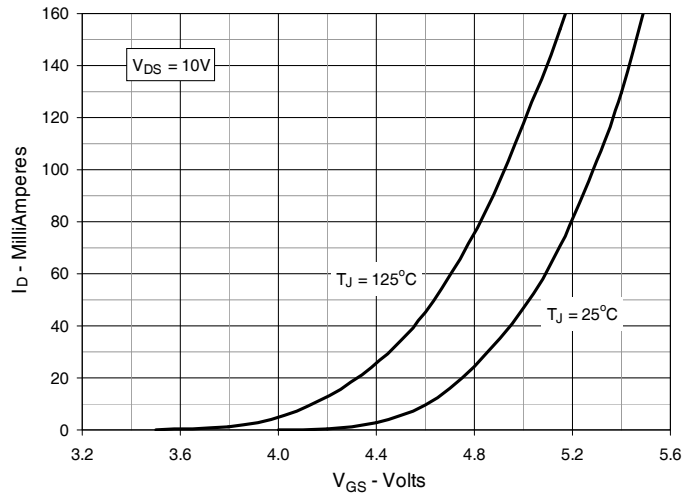


Fig. 8. Transconductance

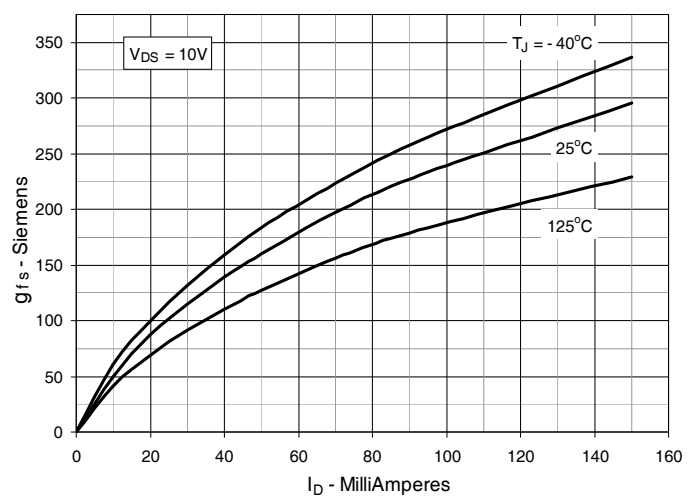


Fig. 9. Forward Voltage Drop of Intrinsic Diode

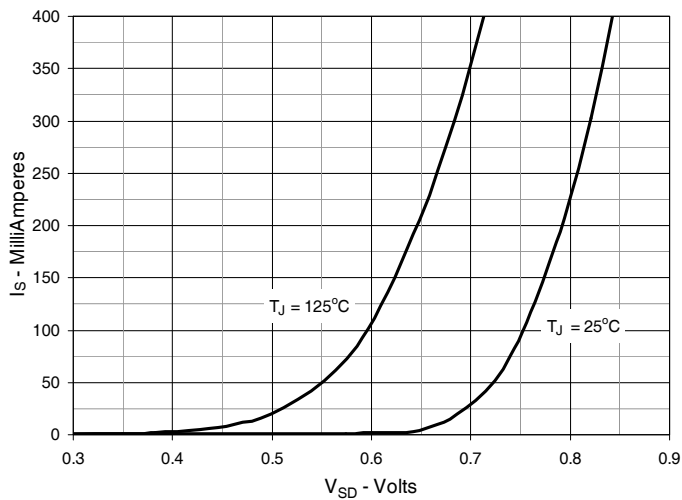


Fig. 10. Gate Charge

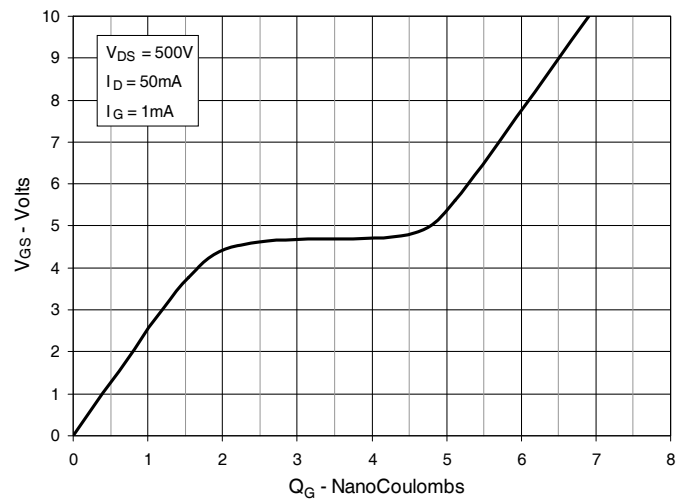


Fig. 11. Capacitance

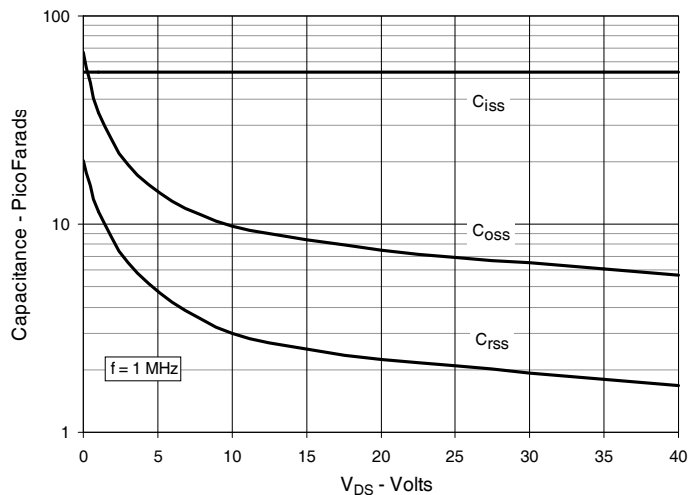


Fig. 12. Maximum Transient Thermal Impedance

