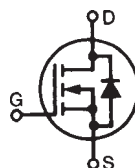


## High Voltage Power MOSFET

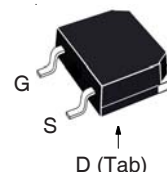
## IXTT12N150HV

N-Channel Enhancement Mode  
Fast Intrinsic Diode



$$\begin{aligned} V_{DSS} &= 1500V \\ I_{D25} &= 12A \\ R_{DS(on)} &\leq 2.2\Omega \end{aligned}$$

TO-268HV



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

| Symbol     | Test Conditions                                                    | Maximum Ratings |                  |
|------------|--------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}$                     | 1500            | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C to } 150^\circ\text{C}, R_{GS} = 1M\Omega$  | 1500            | V                |
| $V_{GSS}$  | Continuous                                                         | $\pm 30$        | V                |
| $V_{GSM}$  | Transient                                                          | $\pm 40$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                           | 12              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$         | 40              | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                           | 6               | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                           | 750             | mJ               |
| $dv/dt$    | $I_S \leq I_{DM}, V_{DD} \leq V_{DSS}, T_J \leq 150^\circ\text{C}$ | 5               | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                           | 890             | 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             | $^\circ\text{C}$ |
| $T_{SOLD}$ | Plastic Body for 10s                                               | 260             | $^\circ\text{C}$ |
| Weight     |                                                                    | 4               | g                |

### Features

- High Blocking Voltage
- High Voltage Package
- Fast Intrinsic Diode
- Low Package Inductance

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- High Voltage Power Supplies
- Capacitor Discharge
- Pulse Circuits

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                           |
|--------------|-----------------------------------------------------------------------------|-----------------------|------|---------------------------|
|              |                                                                             | Min.                  | Typ. | Max.                      |
| $BV_{DSS}$   | $V_{GS} = 0V, I_D = 1mA$                                                    | 1500                  |      | V                         |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$                                           | 2.5                   |      | 4.5 V                     |
| $I_{GSS}$    | $V_{GS} = \pm 30V, V_{DS} = 0V$                                             |                       |      | $\pm 100$ nA              |
| $I_{DSS}$    | $V_{DS} = V_{DSS}, V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$                |                       |      | 25 $\mu A$<br>500 $\mu A$ |
| $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 0.5 \cdot I_{D25}$ , Note 1                            |                       |      | 2.2 $\Omega$              |

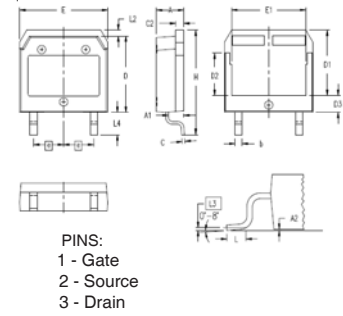
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                                                        | Characteristic Values |      |                         |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------------------------|
|              |                                                                                                                                                    | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $V_{DS} = 20\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                                                                                         | 8                     | 13   | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                                   |                       | 3720 | pF                      |
| $C_{oss}$    |                                                                                                                                                    |                       | 240  | pF                      |
| $C_{rss}$    |                                                                                                                                                    |                       | 80   | pF                      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$<br>$R_G = 2\Omega$ (External) |                       | 26   | ns                      |
| $t_r$        |                                                                                                                                                    |                       | 16   | ns                      |
| $t_{d(off)}$ |                                                                                                                                                    |                       | 53   | ns                      |
| $t_f$        |                                                                                                                                                    |                       | 14   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$                                                                   |                       | 106  | nC                      |
| $Q_{gs}$     |                                                                                                                                                    |                       | 17   | nC                      |
| $Q_{gd}$     |                                                                                                                                                    |                       | 50   | nC                      |
| $R_{thJC}$   |                                                                                                                                                    |                       |      | 0.14 $^\circ\text{C/W}$ |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                          | Characteristic Values |      |               |
|----------|------------------------------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                                                      | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                 |                       |      | 12 A          |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                          |                       |      | 48 A          |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1                                                          |                       |      | 1.4 V         |
| $t_{rr}$ | $I_F = 6\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$ |                       | 1.2  | $\mu\text{s}$ |
| $I_{RM}$ |                                                                                                      |                       | 24.5 | A             |
| $Q_{RM}$ |                                                                                                      |                       | 14.8 | $\mu\text{C}$ |

Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

## TO-268HV Outline

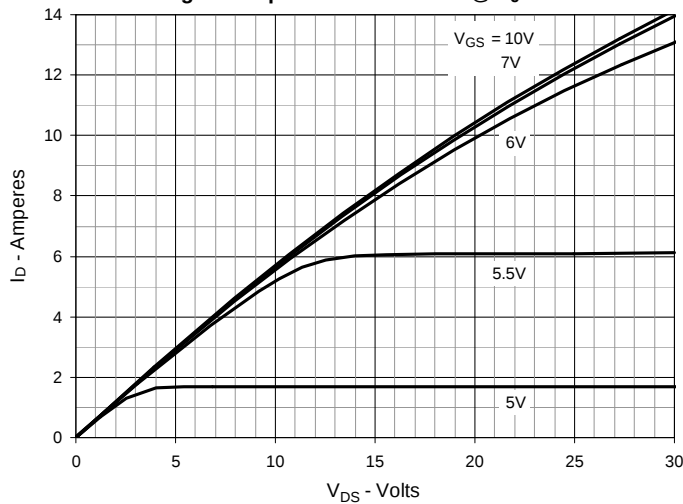


| Dim. | Millimeter |       | Inches    |       |
|------|------------|-------|-----------|-------|
|      | min        | max   | min       | max   |
| A    | 4.90       | 5.10  | 0.193     | 0.201 |
| A1   | 2.70       | 2.90  | 0.106     | 0.114 |
| A2   | 0.02       | 0.25  | 0.001     | 0.100 |
| b    | 1.15       | 1.45  | 0.045     | 0.057 |
| C    | 0.40       | 0.65  | 0.016     | 0.026 |
| C2   | 1.45       | 1.60  | 0.057     | 0.063 |
| D    | 13.80      | 14.00 | 0.543     | 0.551 |
| D1   | 11.80      | 12.10 | 0.465     | 0.476 |
| D2   | 7.50       | 7.80  | 0.295     | 0.307 |
| D3   | 2.90       | 3.20  | 0.114     | 0.126 |
| E    | 15.85      | 16.05 | 0.624     | 0.632 |
| E1   | 13.30      | 13.60 | 0.524     | 0.535 |
| e    | 5.45 BSC   |       | 0.215 BSC |       |
| H    | 18.70      | 19.10 | 0.736     | 0.752 |
| L    | 1.70       | 2.00  | 0.067     | 0.079 |
| L2   | 1.00       | 1.15  | 0.039     | 0.045 |
| L3   | 0.25 BSC   |       | 0.010 BSC |       |
| L4   | 3.80       | 4.10  | 0.150     | 0.161 |

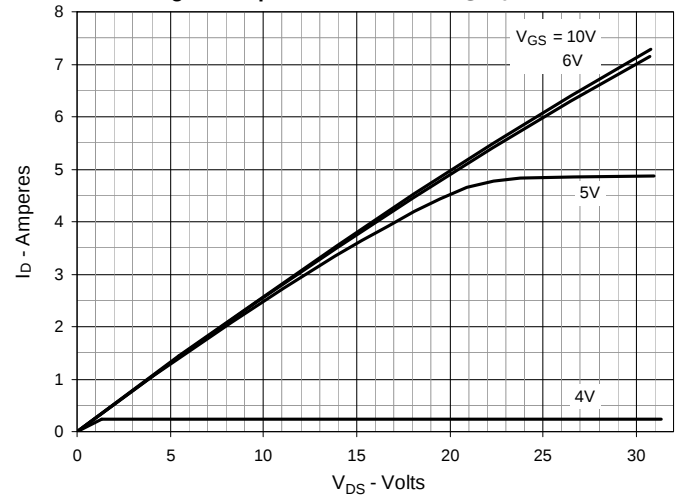
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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

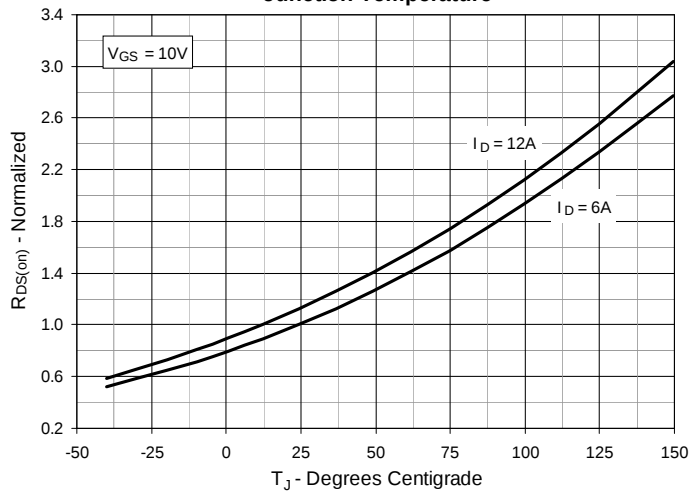
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



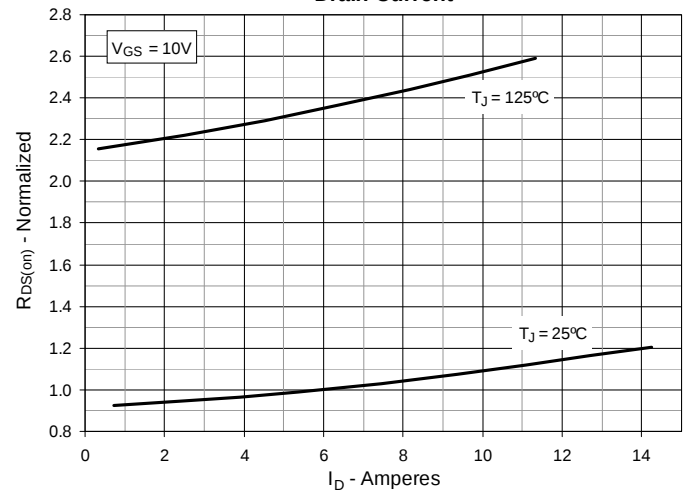
**Fig. 2. Output Characteristics @  $T_J = 125^\circ\text{C}$**



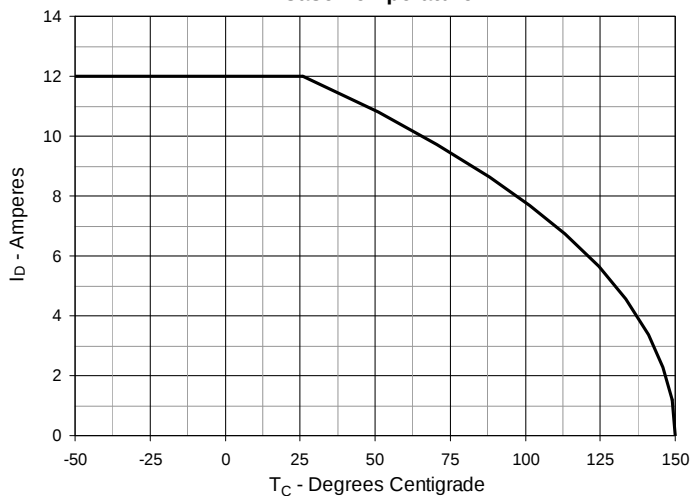
**Fig. 3.  $R_{DS(on)}$  Normalized to  $I_D = 6\text{A}$  Value vs. Junction Temperature**



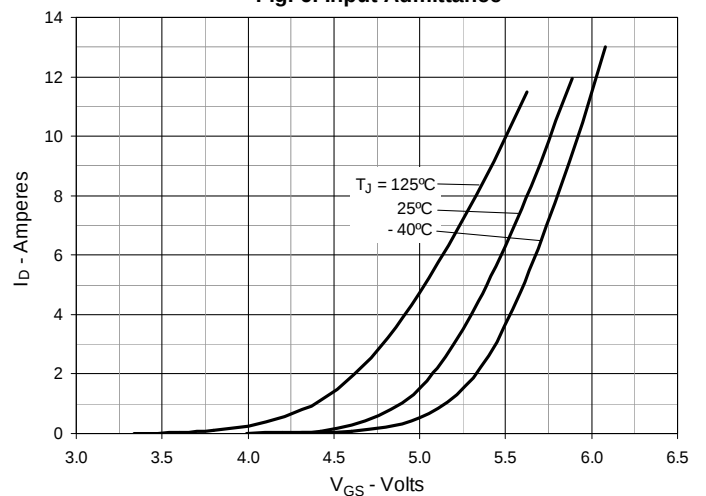
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 6\text{A}$  Value vs. Drain Current**



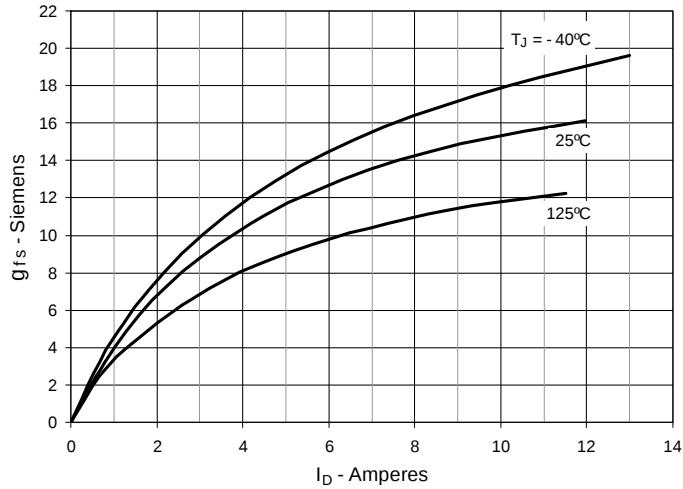
**Fig. 5. Maximum Drain Current vs. Case Temperature**



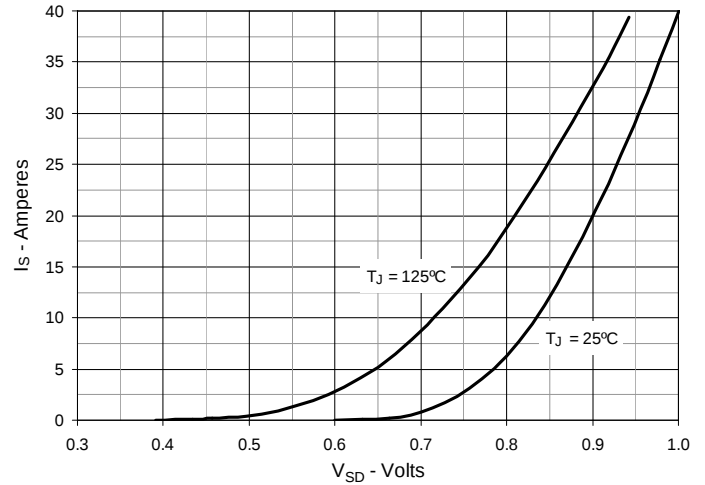
**Fig. 6. Input Admittance**



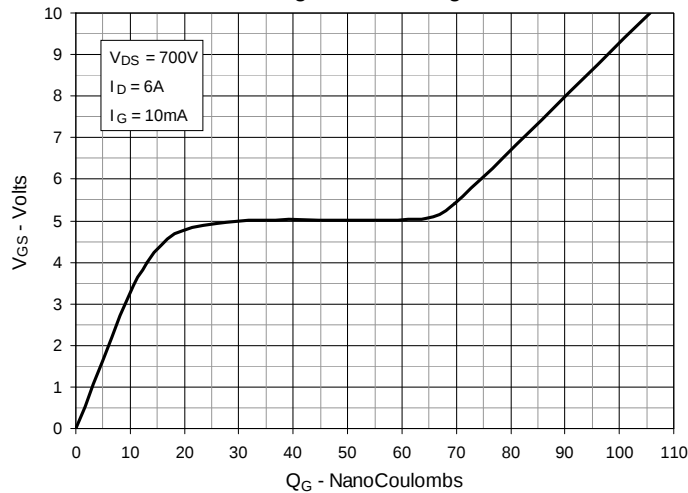
**Fig. 7. Transconductance**



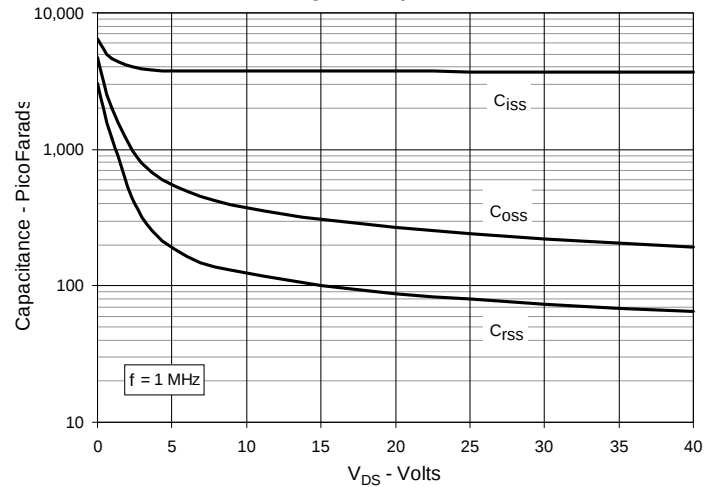
**Fig. 8. Forward Voltage Drop of Intrinsic Diode**



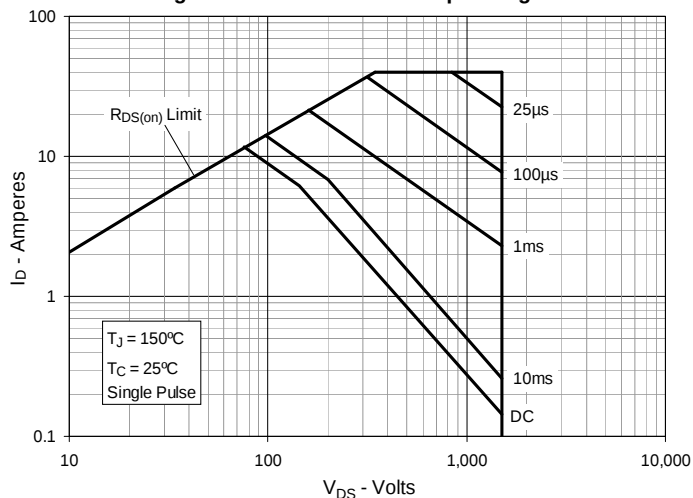
**Fig. 9. Gate Charge**



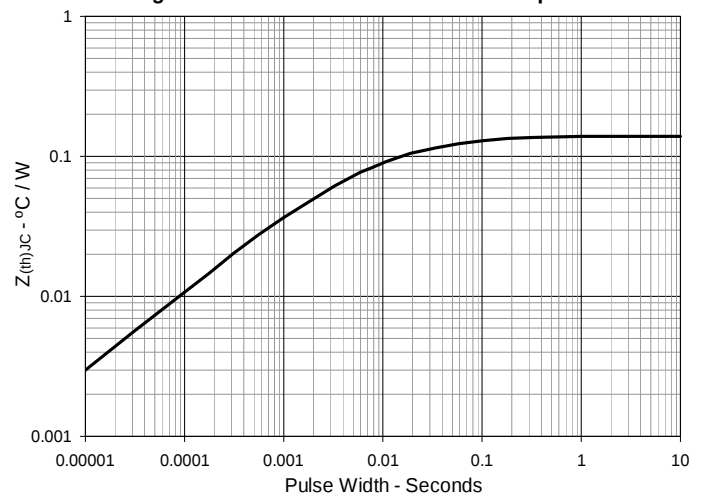
**Fig. 10. Capacitance**



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



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





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