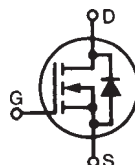


## X2-Class HiPerFET™ Power MOSFET

**IXFK100N65X2**  
**IXFX100N65X2**

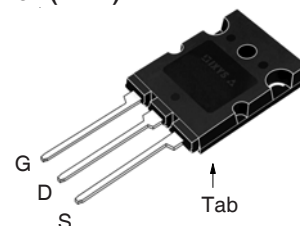
**$V_{DSS} = 650V$**   
 **$I_{D25} = 100A$**   
 **$R_{DS(on)} \leq 30m\Omega$**

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode

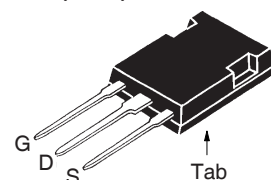


| Symbol        | Test Conditions                                                    | Maximum Ratings   |            |
|---------------|--------------------------------------------------------------------|-------------------|------------|
| $V_{DSS}$     | $T_J = 25^\circ C$ to $150^\circ C$                                | 650               | V          |
| $V_{DGR}$     | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$          | 650               | V          |
| $V_{GSS}$     | Continuous                                                         | $\pm 30$          | V          |
| $V_{GSM}$     | Transient                                                          | $\pm 40$          | V          |
| $I_{D25}$     | $T_C = 25^\circ C$                                                 | 100               | A          |
| $I_{DM}$      | $T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$               | 200               | A          |
| $I_A$         | $T_C = 25^\circ C$                                                 | 15                | A          |
| $E_{AS}$      | $T_C = 25^\circ C$                                                 | 3.5               | J          |
| $P_D$         | $T_C = 25^\circ C$                                                 | 1040              | W          |
| $dv/dt$       | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ C$ | 50                | V/ns       |
| $T_J$         |                                                                    | -55 ... +150      | $^\circ C$ |
| $T_{JM}$      |                                                                    | 150               | $^\circ C$ |
| $T_{stg}$     |                                                                    | -55 ... +150      | $^\circ C$ |
| $T_L$         | Maximum Lead Temperature for Soldering                             | 300               | $^\circ C$ |
| $T_{SOLD}$    | 1.6 mm (0.062in.) from Case for 10s                                | 260               | $^\circ C$ |
| $M_d$         | Mounting Torque (TO-264)                                           | 1.13/10           | Nm/lb.in   |
| $F_C$         | Mounting Force (PLUS247)                                           | 20..120 / 4.5..27 | N/lb       |
| <b>Weight</b> | TO-264                                                             | 10                | g          |
|               | PLUS247                                                            | 6                 | g          |

TO-264 (IXFK)



PLUS247 (IXFX)



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

### Features

- International Standard Packages
- Low  $Q_G$
- Avalanche Rated
- Low Package Inductance

### Advantages

- High Power Density
- Easy to Mount
- Space Savings

### Applications

- Switch-Mode and Resonant-Mode Power Supplies
- DC-DC Converters
- PFC Circuits
- AC and DC Motor Drives
- Robotics and Servo Controls

| Symbol       | Test Conditions<br>( $T_J = 25^\circ C$ Unless Otherwise Specified) | Characteristic Values |      |                    |
|--------------|---------------------------------------------------------------------|-----------------------|------|--------------------|
|              |                                                                     | Min.                  | Typ. | Max.               |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 1mA$                                         | 650                   |      | V                  |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 4mA$                                     | 3.5                   |      | 5.0 V              |
| $I_{GSS}$    | $V_{GS} = \pm 30V$ , $V_{DS} = 0V$                                  |                       |      | $\pm 100$ nA       |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ C$           |                       |      | 50 $\mu A$<br>5 mA |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                 |                       |      | 30 m $\Omega$      |

| Symbol                              | Test Conditions<br>(T <sub>J</sub> = 25°C, Unless Otherwise Specified)                                                                                                          | Characteristic Values                                            |      |           |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|------|-----------|
|                                     |                                                                                                                                                                                 | Min.                                                             | Typ. | Max       |
| <b>g<sub>fs</sub></b>               | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.5 • I <sub>D25</sub> , Note 1                                                                                                         | 40                                                               | 68   | S         |
| <b>R<sub>Gi</sub></b>               | Gate Input Resistance                                                                                                                                                           |                                                                  | 0.7  | Ω         |
| <b>C<sub>iss</sub></b>              | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 25V, f = 1MHz                                                                                                                           |                                                                  | 10.8 | nF        |
| <b>C<sub>oss</sub></b>              |                                                                                                                                                                                 |                                                                  | 6000 | pF        |
| <b>C<sub>rss</sub></b>              |                                                                                                                                                                                 |                                                                  | 2.6  | pF        |
| <b>Effective Output Capacitance</b> |                                                                                                                                                                                 |                                                                  |      |           |
| <b>C<sub>o(er)</sub></b>            | Energy related                                                                                                                                                                  | V <sub>GS</sub> = 0V<br>V <sub>DS</sub> = 0.8 • V <sub>DSS</sub> | 365  | pF        |
| <b>C<sub>o(tr)</sub></b>            | Time related                                                                                                                                                                    |                                                                  | 1500 | 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> = 0.5 • I <sub>D25</sub><br>R <sub>G</sub> = 2Ω (External) |                                                                  | 37   | ns        |
| <b>t<sub>r</sub></b>                |                                                                                                                                                                                 |                                                                  | 26   | ns        |
| <b>t<sub>d(off)</sub></b>           |                                                                                                                                                                                 |                                                                  | 90   | ns        |
| <b>t<sub>f</sub></b>                |                                                                                                                                                                                 |                                                                  | 13   | 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> = 0.5 • I <sub>D25</sub>                                                                       |                                                                  | 183  | nC        |
| <b>Q<sub>gs</sub></b>               |                                                                                                                                                                                 |                                                                  | 60   | nC        |
| <b>Q<sub>gd</sub></b>               |                                                                                                                                                                                 |                                                                  | 62   | nC        |
| <b>R<sub>thJC</sub></b>             |                                                                                                                                                                                 |                                                                  |      | 0.12 °C/W |
| <b>R<sub>thCS</sub></b>             |                                                                                                                                                                                 |                                                                  | 0.15 | °C/W      |

### Source-Drain Diode

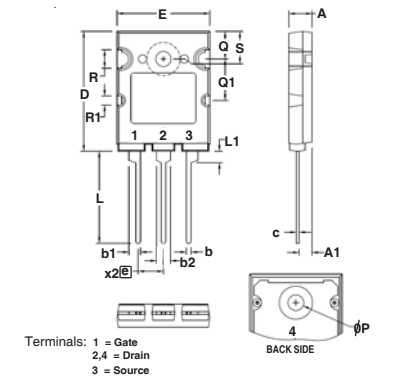
| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                           | Characteristic Values |      |               |
|----------|-------------------------------------------------------------------------------------------------------|-----------------------|------|---------------|
|          |                                                                                                       | Min.                  | Typ. | Max.          |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                  |                       |      | 100 A         |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                           |                       |      | 400 A         |
| $V_{SD}$ | $I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1                                                           |                       |      | 1.4 V         |
| $t_{rr}$ | $I_F = 50\text{A}$ , $-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 100\text{V}$ , $V_{GS} = 0\text{V}$ |                       | 200  | ns            |
| $Q_{RM}$ |                                                                                                       |                       | 1.7  | $\mu\text{C}$ |
| $I_{RM}$ |                                                                                                       |                       | 17.2 | A             |

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

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

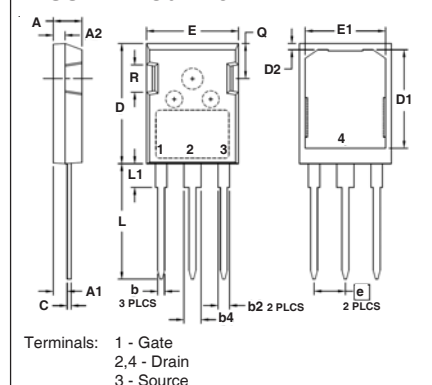
|                                                                                  |           |           |           |           |              |              |              |              |              |             |
|----------------------------------------------------------------------------------|-----------|-----------|-----------|-----------|----------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

### TO-264 Outline



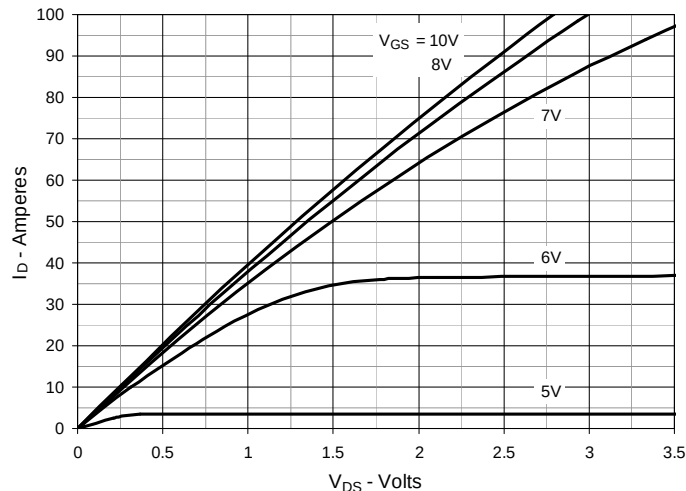
| SYM       | INCHES   |       | MILLIMETERS |       |
|-----------|----------|-------|-------------|-------|
|           | MIN      | MAX   | MIN         | MAX   |
| A         | .185     | .209  | 4.70        | 5.30  |
| A1        | .102     | .118  | 2.60        | 3.00  |
| b         | .035     | .049  | 0.90        | 1.25  |
| b1        | .091     | .106  | 2.30        | 2.70  |
| b2        | .110     | .126  | 2.80        | 3.20  |
| c         | .020     | .033  | 0.50        | 0.85  |
| D         | 1.012    | 1.035 | 25.70       | 26.30 |
| E         | .776     | .799  | 19.70       | 20.30 |
| e         | .215 BSC |       | 5.46 BSC    |       |
| L         | .768     | .807  | 19.50       | 20.50 |
| L1        | .091     | .106  | 2.30        | 2.70  |
| $\phi P$  | .122     | .138  | 3.10        | 3.50  |
| Q         | .228     | .244  | 5.80        | 6.20  |
| Q1        | .346     | .362  | 8.80        | 9.20  |
| $\phi R$  | .150     | .165  | 3.80        | 4.20  |
| $\phi R1$ | .071     | .087  | 1.80        | 2.20  |
| S         | .228     | .244  | 5.80        | 6.20  |

### PLUS247™ Outline

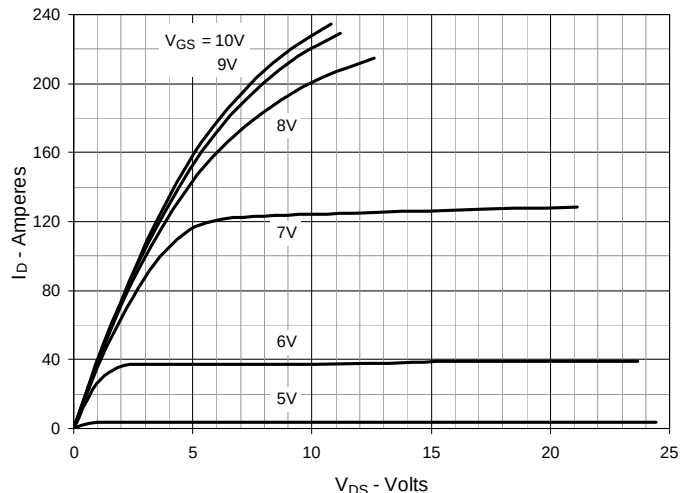


| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .190     | .205 | 4.83        | 5.21  |
| A1  | .090     | .100 | 2.29        | 2.54  |
| A2  | .075     | .085 | 1.91        | 2.16  |
| b   | .045     | .055 | 1.14        | 1.40  |
| b2  | .075     | .087 | 1.91        | 2.20  |
| b4  | .115     | .126 | 2.92        | 3.20  |
| C   | .024     | .031 | 0.61        | 0.80  |
| D   | .819     | .840 | 20.80       | 21.34 |
| D1  | .650     | .690 | 16.51       | 17.53 |
| D2  | .035     | .050 | 0.89        | 1.27  |
| E   | .620     | .635 | 15.75       | 16.13 |
| E1  | .520     | .560 | 13.08       | 14.22 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| L   | .780     | .810 | 19.81       | 20.57 |
| L1  | .150     | .170 | 3.81        | 4.32  |
| Q   | .220     | .244 | 5.59        | 6.20  |
| R   | .170     | .190 | 4.32        | 4.83  |

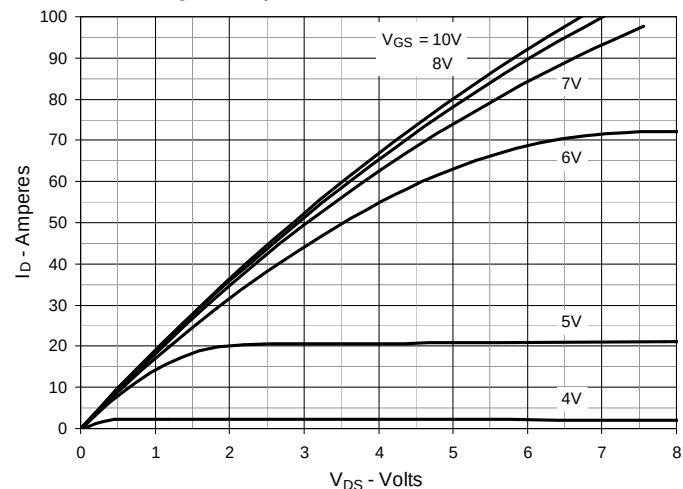
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



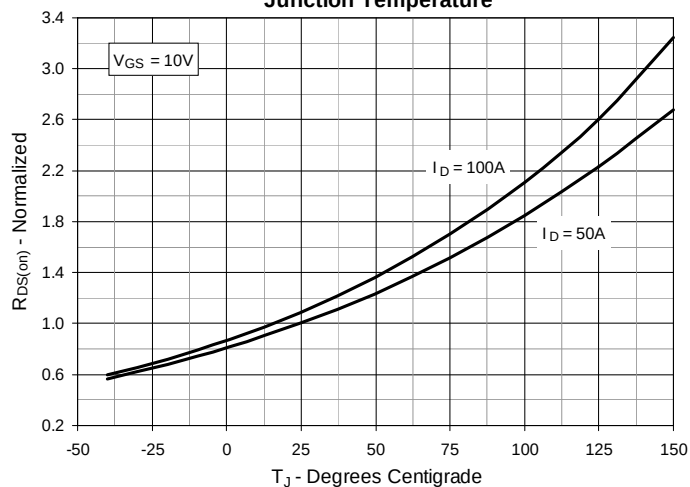
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



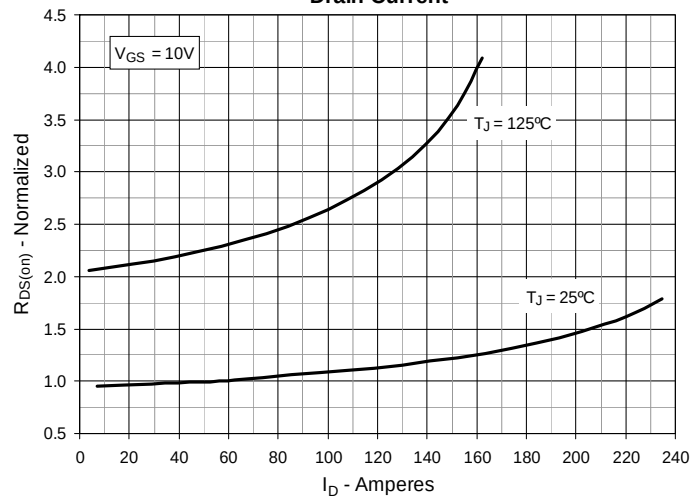
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



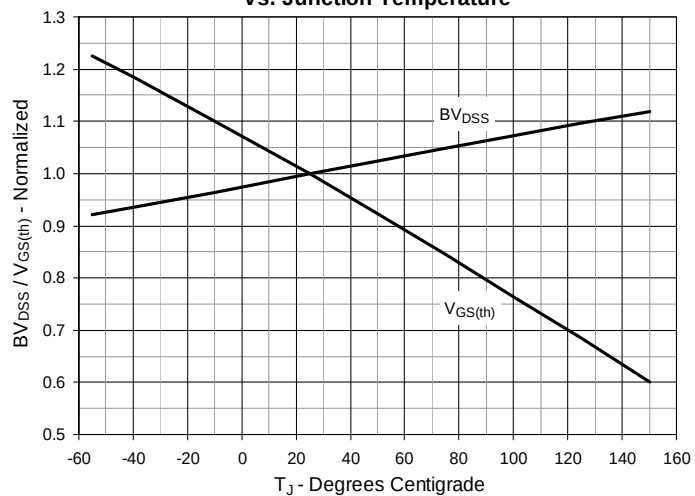
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 50\text{A}$  Value vs. Junction Temperature**



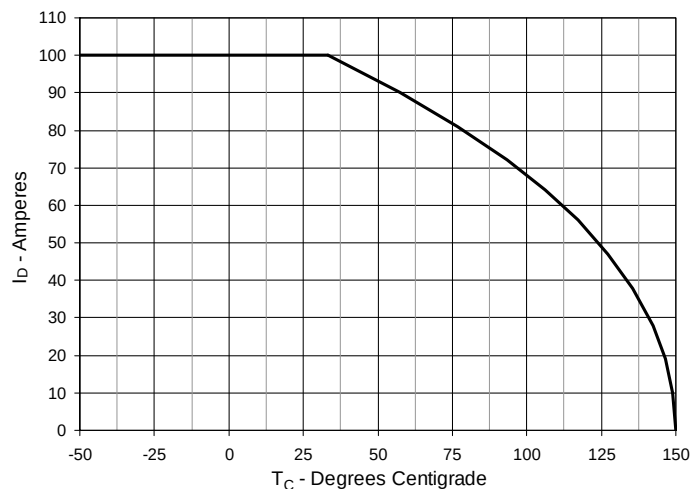
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 50\text{A}$  Value vs. Drain Current**



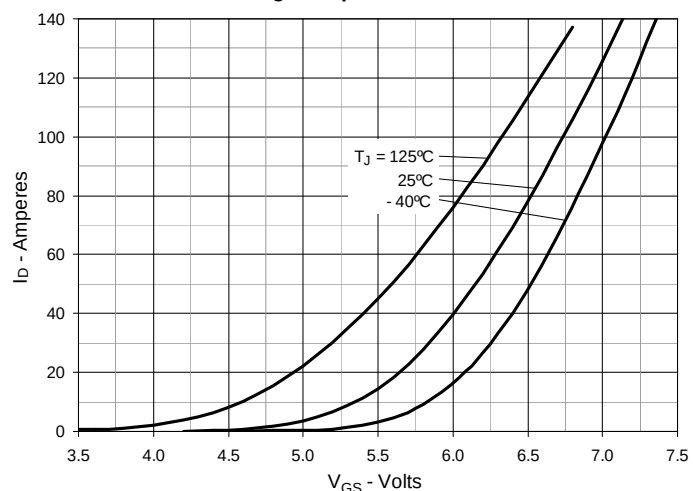
**Fig. 6. Normalized Breakdown & Threshold Voltages vs. Junction Temperature**



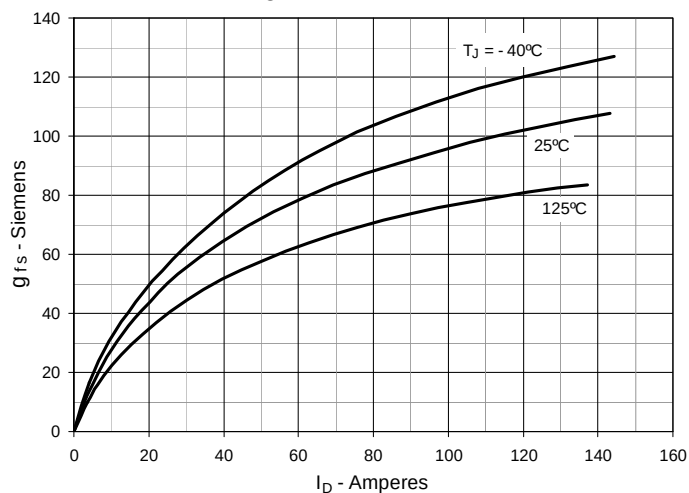
**Fig. 7. Maximum Drain Current vs. Case Temperature**



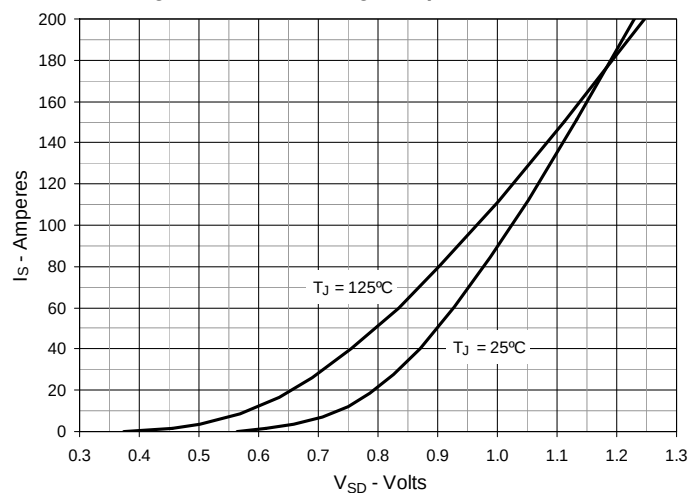
**Fig. 8. Input Admittance**



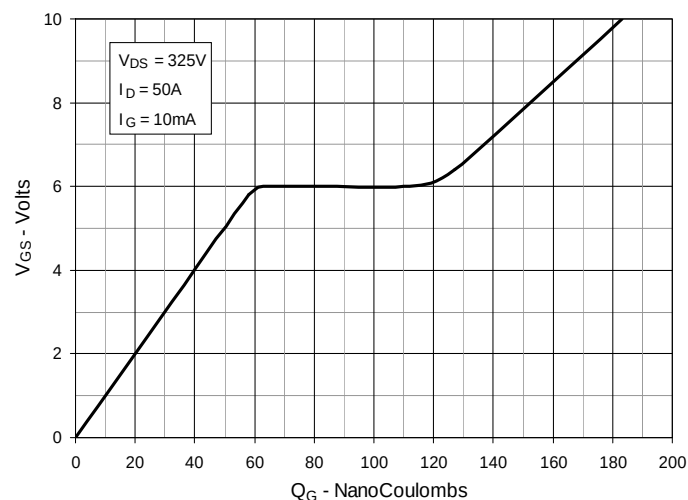
**Fig. 9. Transconductance**



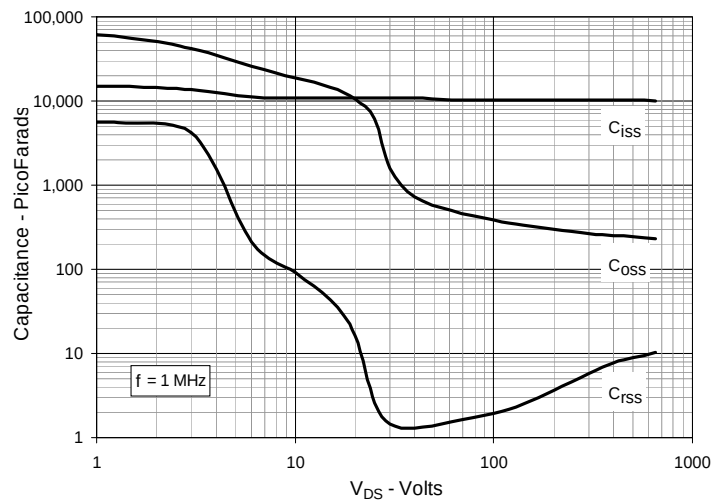
**Fig. 10. Forward Voltage Drop of Intrinsic Diode**



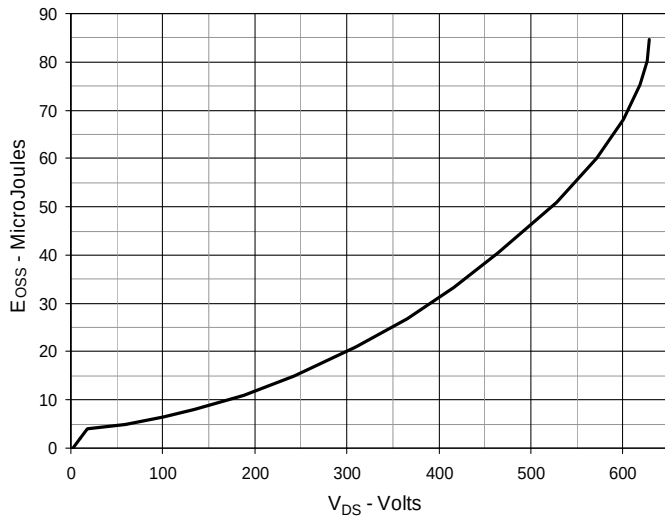
**Fig. 11. Gate Charge**



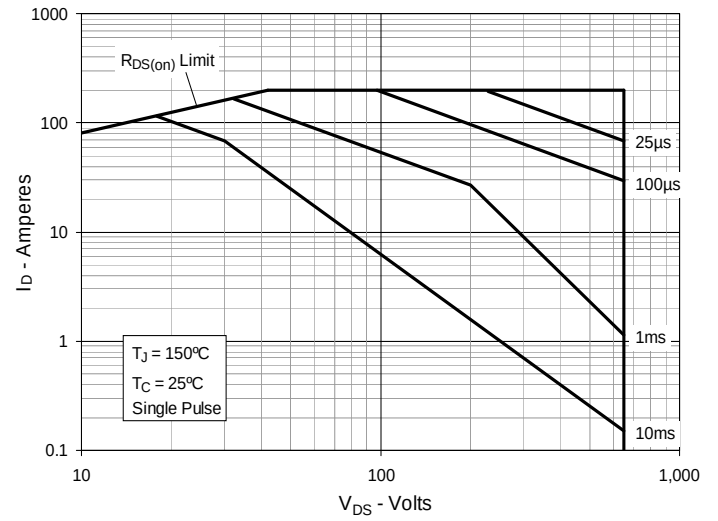
**Fig. 12. Capacitance**



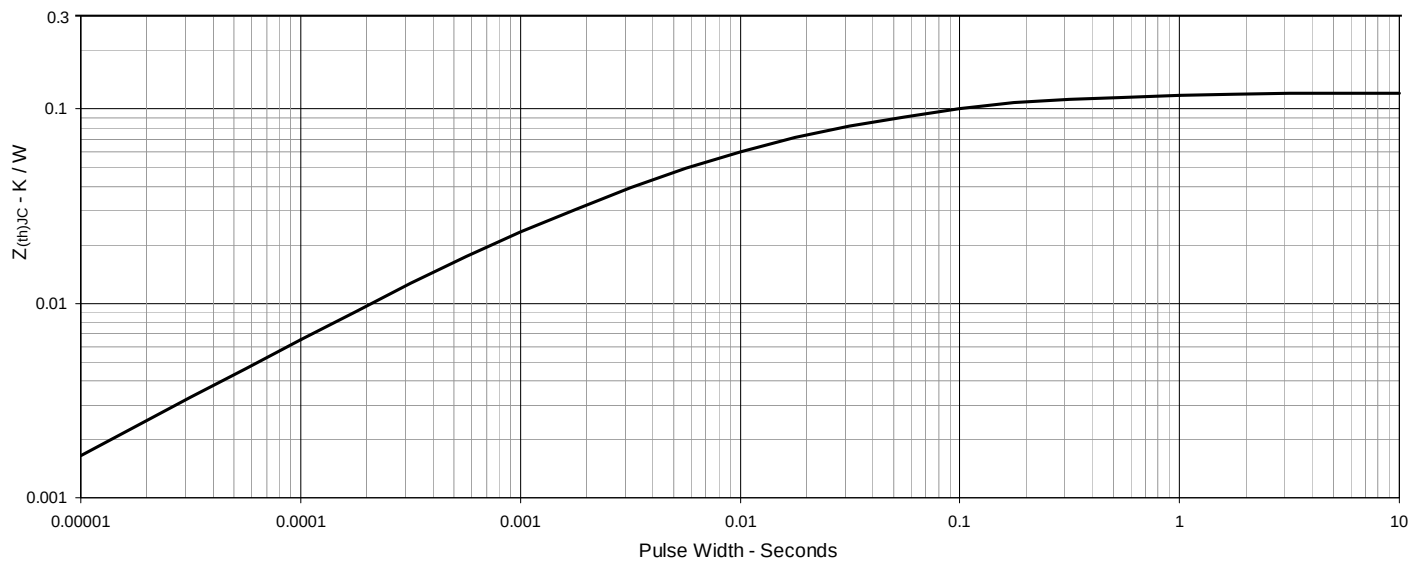
**Fig. 13. Output Capacitance Stored Energy**



**Fig. 14. Forward-Bias Safe Operating Area**



**Fig. 15. 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).