

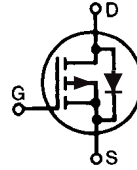
**TrenchP™  
Power MOSFET**
**IXTR210P10T**

$$V_{DSS} = -100V$$

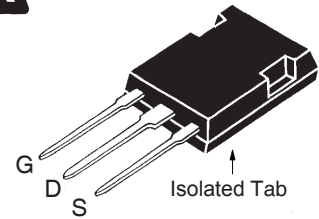
$$I_{D25} = -195A$$

$$R_{DS(on)} \leq 8m\Omega$$

P-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Rectifier



ISOPLUS247  
E153432



G = Gate    D = Drain  
S = Source

| Symbol        | Test Conditions  | Maximum Ratings |                  |
|---------------|--|-----------------|------------------|
| $V_{DSS}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                          | -100            | V                |
| $V_{DGR}$     | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$    | -100            | V                |
| $V_{GSS}$     | Continuous   | $\pm 15$        | V                |
| $V_{GSM}$     | Transient  | $\pm 25$        | V                |
| $I_{D25}$     | $T_C = 25^\circ\text{C}$ (Chip Capability)                               | -195            | A                |
| $I_{LRMS}$    | Lead Current Limit, RMS  | -160            | A                |
| $I_{DM}$      | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$               | - 800           | A                |
| $I_A$         | $T_C = 25^\circ\text{C}$   | -100            | A                |
| $E_{AS}$      | $T_C = 25^\circ\text{C}$   | 3               | J                |
| $dv/dt$       | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$ | 10              | V/ns             |
| $P_D$         | $T_C = 25^\circ\text{C}$   | 595             | W                |
| $T_J$         |  | - 55 ... +150   | $^\circ\text{C}$ |
| $T_{JM}$      |  | 150             | $^\circ\text{C}$ |
| $T_{stg}$     |  | - 55 ... +150   | $^\circ\text{C}$ |
| $T_L$         | 1.6mm (0.062 in.) from Case for 10s                                      | 300             | $^\circ\text{C}$ |
| $T_{SOLD}$    | Plastic Body for 10s   | 260             | $^\circ\text{C}$ |
| $V_{ISOL}$    | 50/60 Hz, 1 Minute   | 2500            | V~               |
| $F_C$         | Mounting Force   | 20..120/4.5..27 | N/lb.            |
| <b>Weight</b> |  | 5               | g                |

**Features**

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- Avalanche Rated
- Extended FBSOA
- Fast Intrinsic Rectifier
- Low  $R_{DS(ON)}$  and  $Q_G$

**Advantages**

- Easy to Mount
- Space Savings
- High Power Density

**Applications**

- High-Side Switching
- Push Pull Amplifiers
- DC Choppers
- Automatic Test Equipment
- Current Regulators
- Battery Charger Applications

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                               |
|--------------|---|-----------------------|------|-------------------------------|
|              |   | Min.                  | Typ. | Max.                          |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = -250\mu A$   | -100                  |      | V                             |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = -250\mu A$                                       | - 2.5                 |      | V                             |
| $I_{GSS}$    | $V_{GS} = \pm 15V$ , $V_{DS} = 0V$  |                       |      | $\pm 100$ nA                  |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$             |                       |      | - 25 $\mu A$<br>- 300 $\mu A$ |
| $R_{DS(on)}$ | $V_{GS} = -10V$ , $I_D = -105A$ , Note 1                                    |                       |      | 8 m $\Omega$                  |

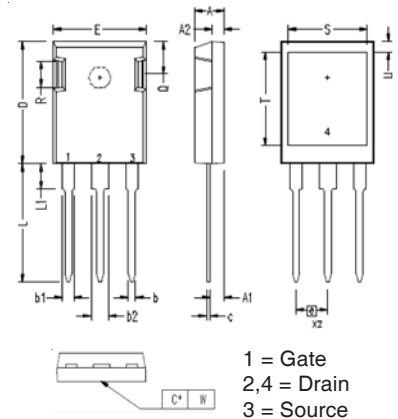
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)  | Characteristic Values |      |                         |
|--------------|--|-----------------------|------|-------------------------|
|              |  | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $V_{DS} = -10\text{V}$ , $I_D = -60\text{A}$ , Note 1  | 90                    | 150  | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = -25\text{V}$ , $f = 1\text{MHz}$  |                       | 69.5 | nF                      |
| $C_{oss}$    |  |                       | 4070 | pF                      |
| $C_{rss}$    |  |                       | 1100 | pF                      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = -105\text{A}$<br>$R_G = 1\Omega$ (External) |                       | 90   | ns                      |
| $t_r$        |  |                       | 98   | ns                      |
| $t_{d(off)}$ |  |                       | 165  | ns                      |
| $t_f$        |  |                       | 55   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = -105\text{A}$   |                       | 740  | nC                      |
| $Q_{gs}$     |  |                       | 200  | nC                      |
| $Q_{gd}$     |  |                       | 155  | nC                      |
| $R_{thJC}$   |  |                       |      | 0.21 $^\circ\text{C/W}$ |
| $R_{thCS}$   |  | 0.15                  |      | $^\circ\text{C/W}$      |

### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                               | Characteristic Values |       |        |
|----------|---|-----------------------|-------|--------|
|          |   | Min.                  | Typ.  | Max.   |
| $I_S$    | $V_{GS} = 0\text{V}$  |                       |       | -210 A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$   |                       |       | -840 A |
| $V_{SD}$ | $I_F = -100\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1  |                       |       | -1.4 V |
| $t_{rr}$ | $I_F = -105\text{A}$ , $-di/dt = -100\text{A}/\mu\text{s}$<br>$V_R = -100\text{V}$ , $V_{GS} = 0\text{V}$ |                       |       | 200 ns |
| $Q_{RM}$ |   |                       | 930   | nC     |
| $I_{RM}$ |   |                       | -12.4 | A      |

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

### ISOPLUS247 (IXTR) 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  |
| b1  | .075     | .085 | 1.91        | 2.15  |
| b2  | .115     | .126 | 2.92        | 3.20  |
| C   | .024     | .033 | 0.61        | 0.83  |
| D   | .819     | .840 | 20.80       | 21.34 |
| E   | .620     | .635 | 15.75       | 16.13 |
| e   | .215 BSC |      | 5.45 BSC    |       |
| L   | .780     | .811 | 19.81       | 20.60 |
| L1  | .150     | .172 | 3.81        | 4.38  |
| Q   | .220     | .244 | 5.59        | 6.20  |
| R   | .170     | .191 | 4.32        | 4.85  |
| S   | .520     | .540 | 13.21       | 13.72 |
| T   | .620     | .640 | 15.75       | 16.26 |
| U   | .065     | .080 | 1.65        | 2.03  |
| W   | 0        | .004 | 0           | 0.10  |

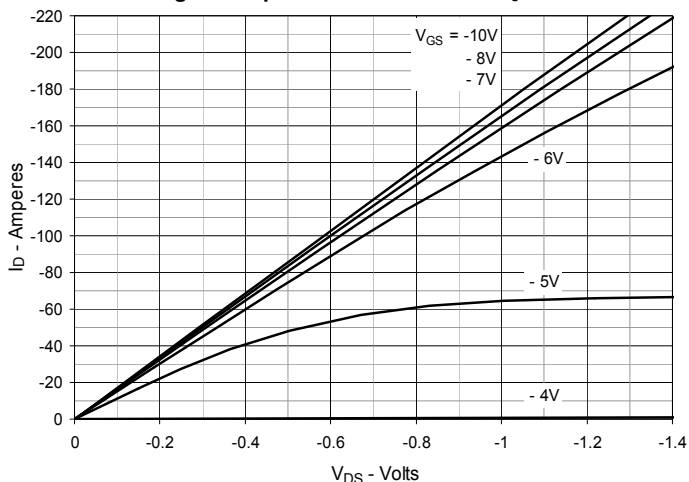
### PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

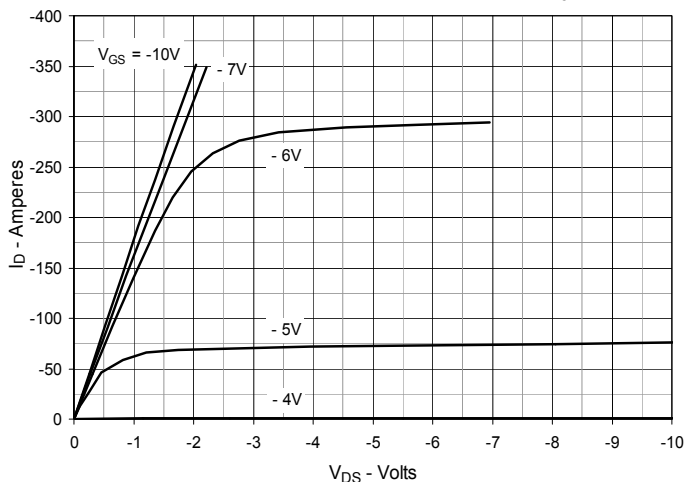
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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

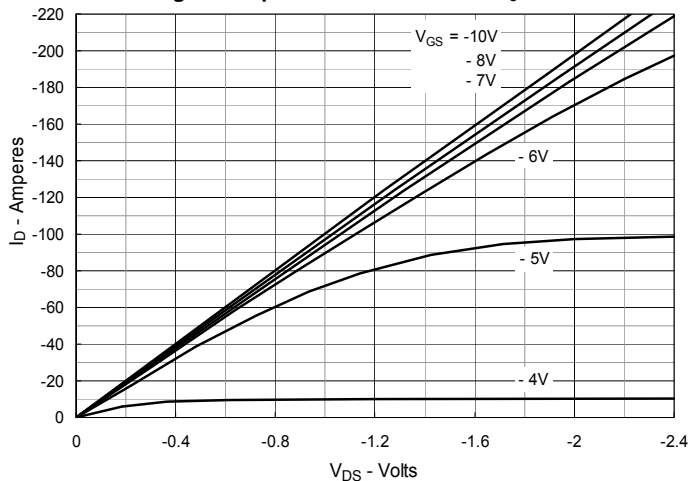
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



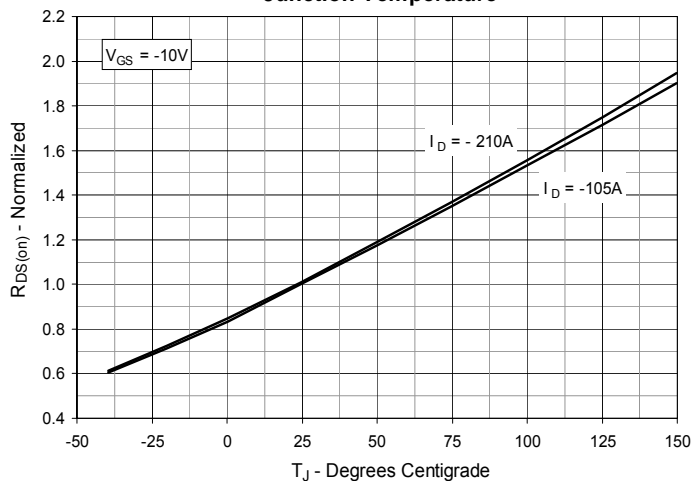
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



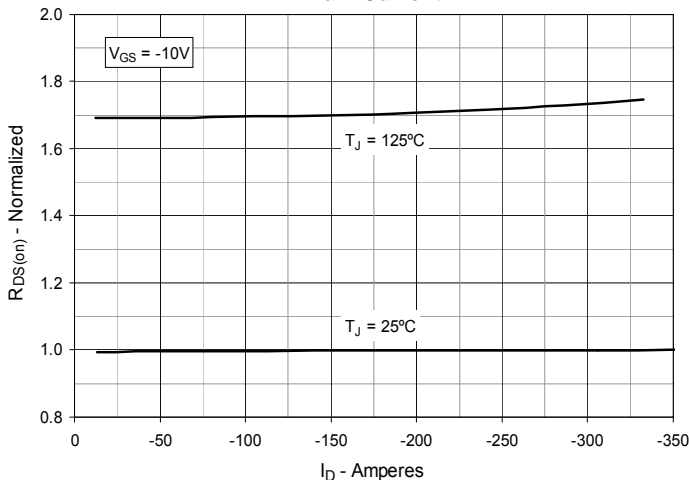
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



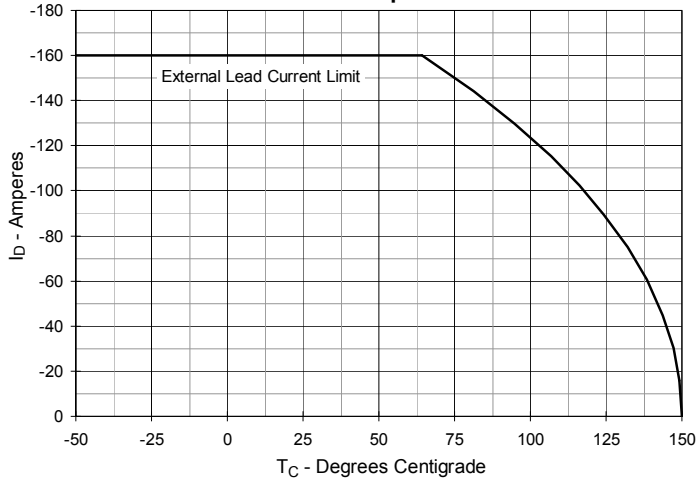
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = -105\text{A}$  Value vs. Junction Temperature**



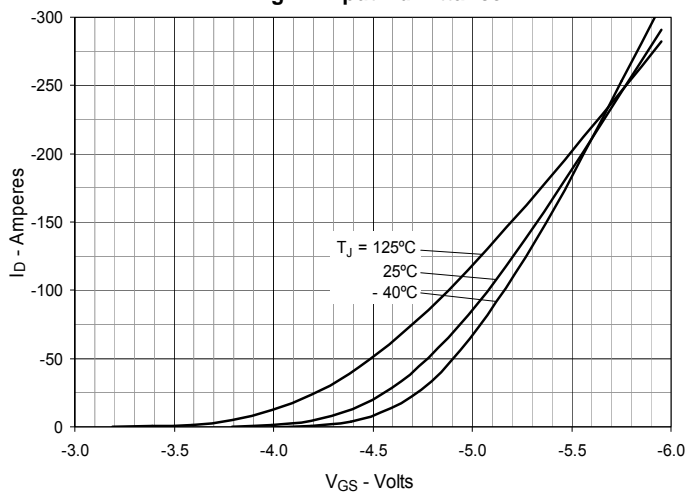
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = -105\text{A}$  Value vs. Drain Current**



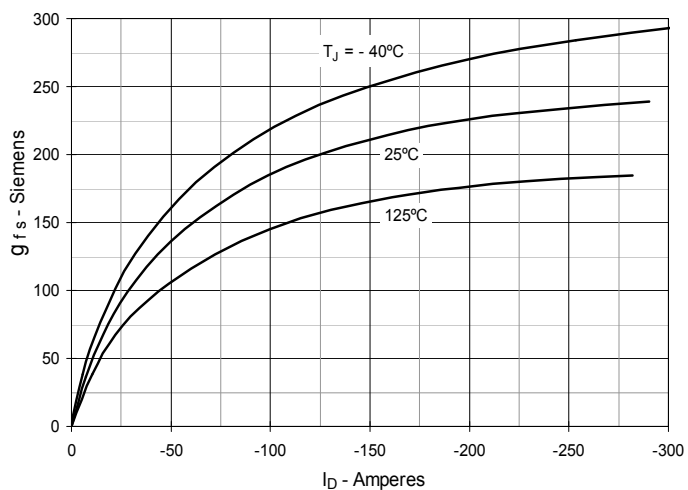
**Fig. 6. Maximum Drain Current vs. Case Temperature**



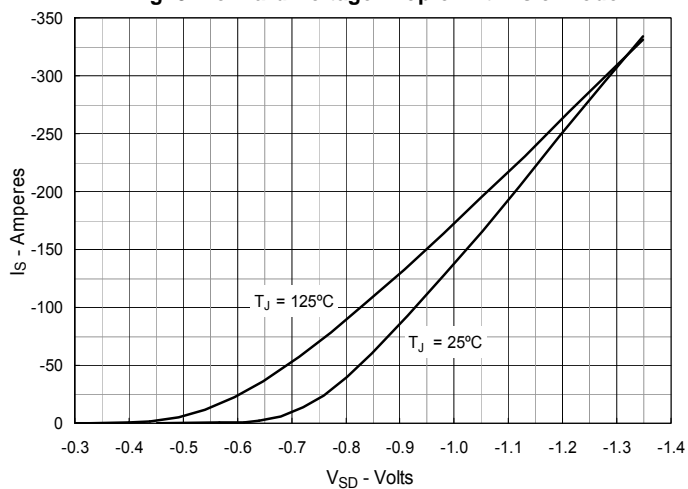
**Fig. 7. Input Admittance**



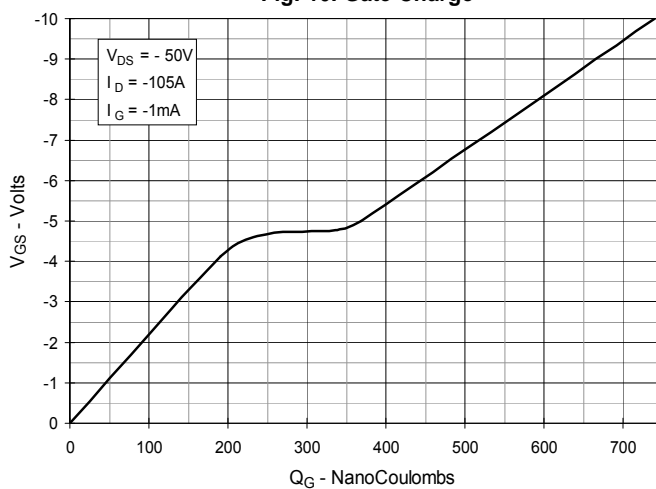
**Fig. 8. Transconductance**



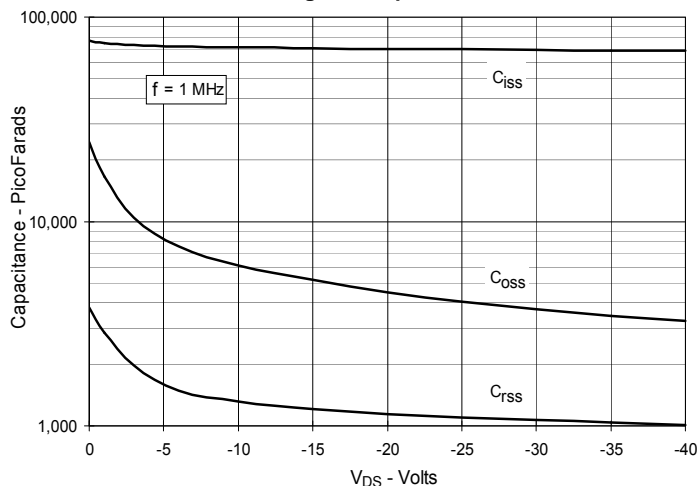
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



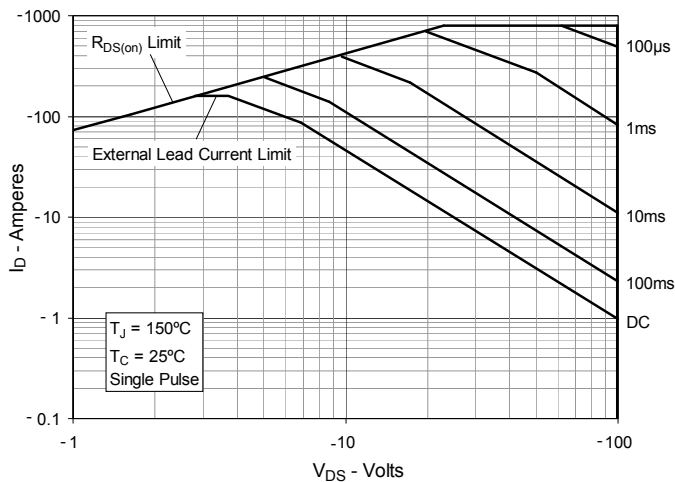
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**



**Fig. 12. Forward-Bias Safe Operating Area**



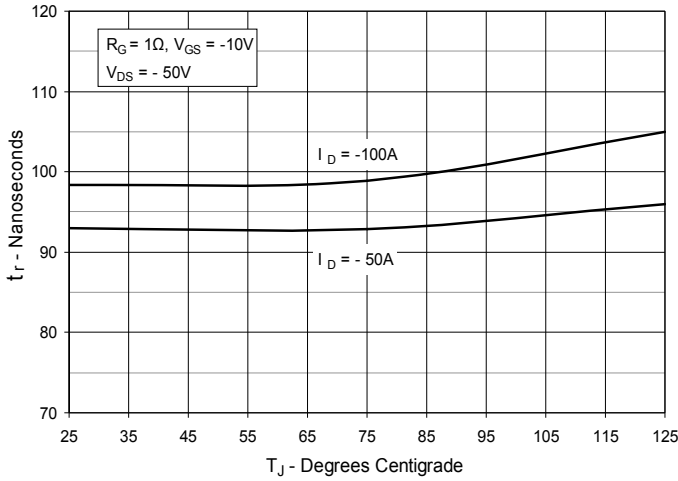
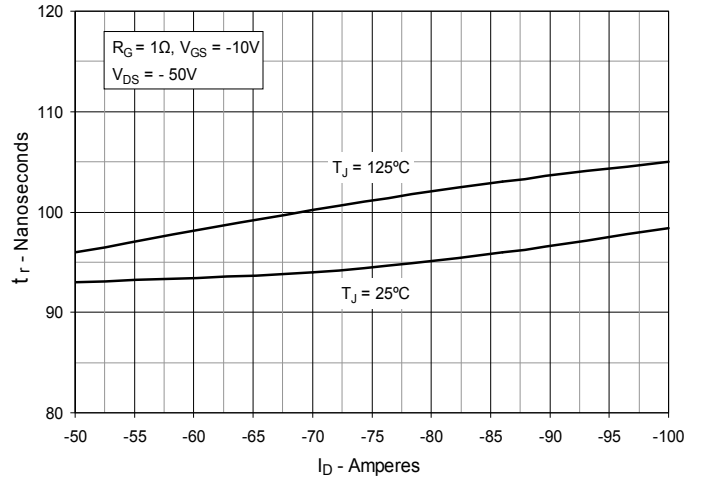
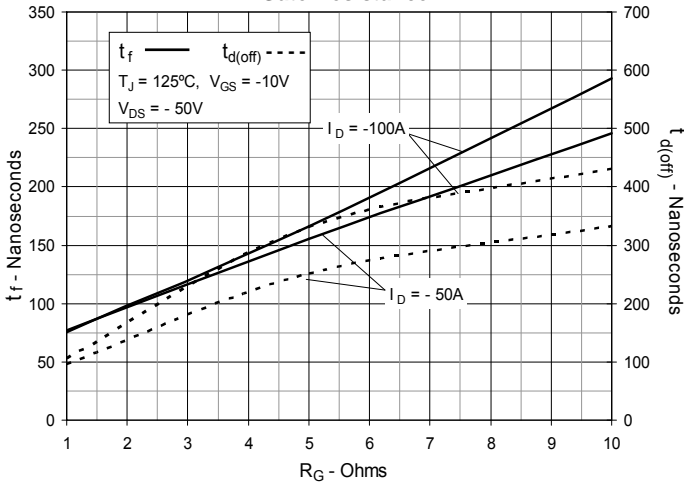
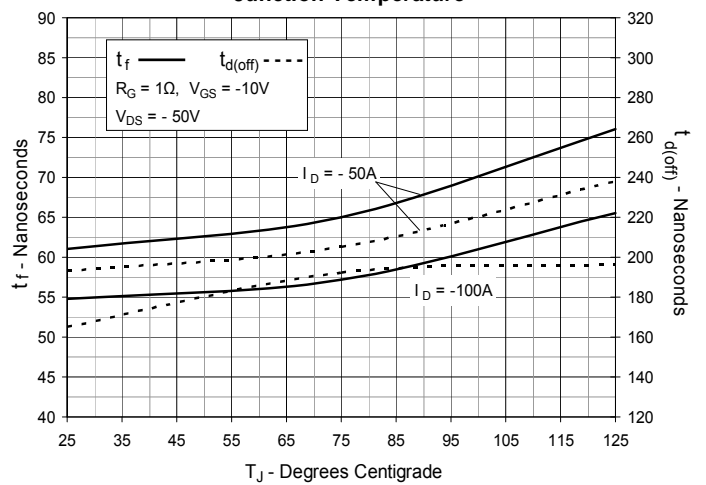
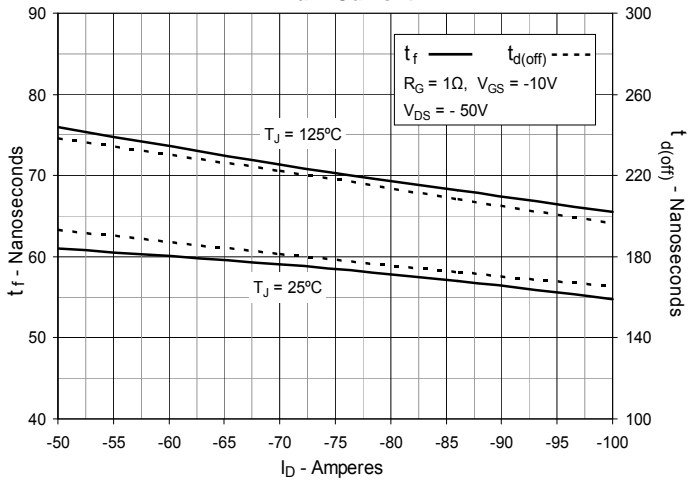
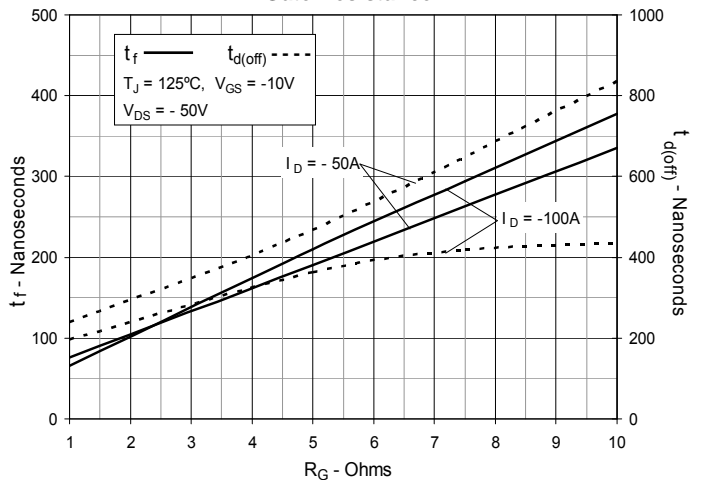
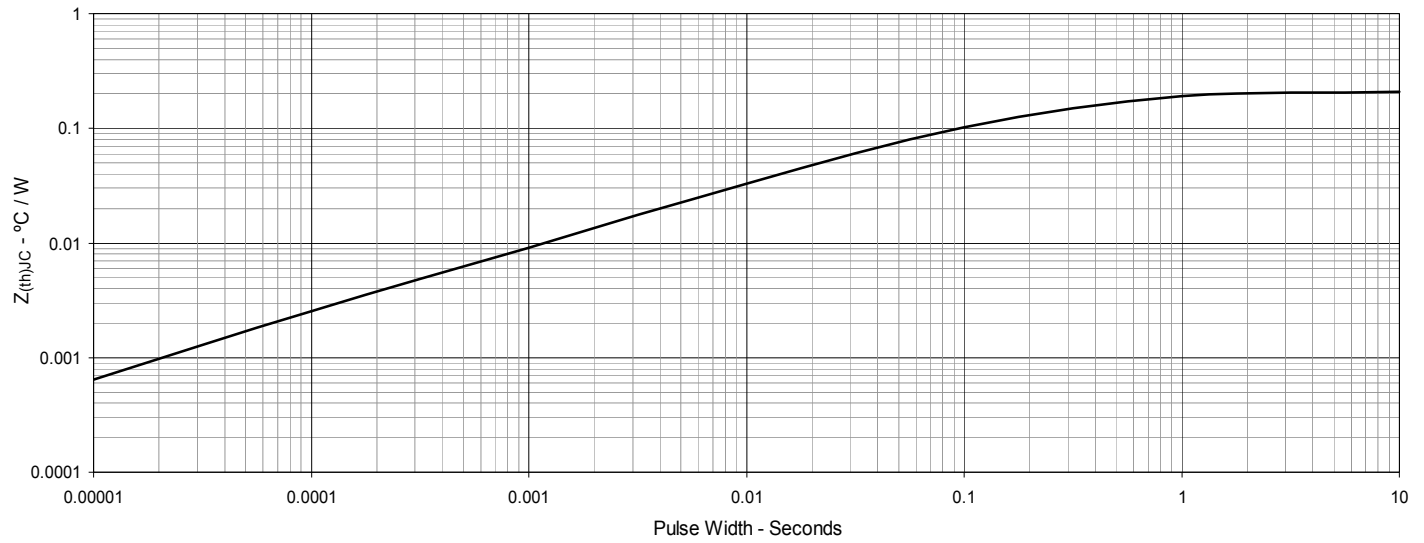
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**

**Fig. 14. Resistive Turn-on Rise Time vs. Drain Current**

**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**

**Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature**

**Fig. 17. Resistive Turn-off Switching Times vs. Drain Current**

**Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance**


Fig. 19. Maximum Transient Thermal Impedance





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