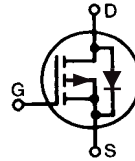


**TrenchP™**  
**Power MOSFET**
**IXTY15P15T**  
**IXTA15P15T**  
**IXTP15P15T**

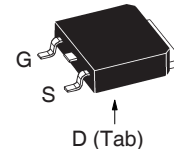
$$V_{DSS} = -150V$$

$$I_{D25} = -15A$$

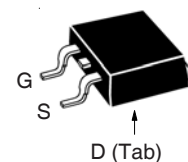
$$R_{DS(on)} \leq 240m\Omega$$

 P-Channel Enhancement Mode  
 Avalanche Rated


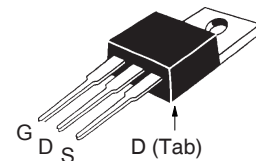
TO-252 (IXTY)



TO-263 AA (IXTA)



TO-220AB (IXTP)


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

| Symbol     | Test Conditions   | Maximum Ratings |            |
|------------|---|-----------------|------------|
| $V_{DSS}$  | $T_J = 25^\circ C$ to $150^\circ C$                       | -150            | V          |
| $V_{DGR}$  | $T_J = 25^\circ C$ to $150^\circ C$ , $R_{GS} = 1M\Omega$ | -150            | V          |
| $V_{GSS}$  | Continuous  | $\pm 15$        | V          |
| $V_{GSM}$  | Transient   | $\pm 25$        | V          |
| $I_{D25}$  | $T_C = 25^\circ C$  | -15             | A          |
| $I_{DM}$   | $T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$      | -45             | A          |
| $I_A$      | $T_C = 25^\circ C$  | -15             | A          |
| $E_{AS}$   | $T_C = 25^\circ C$  | 300             | mJ         |
| $P_D$      | $T_C = 25^\circ C$  | 150             | W          |
| $T_J$      |   | -55 ... +150    | $^\circ C$ |
| $T_{JM}$   |   | 150             | $^\circ C$ |
| $T_{stg}$  |   | -55 ... +150    | $^\circ C$ |
| $T_L$      | 1.6mm (0.062 in.) from Case for 10s                       | 300             | $^\circ C$ |
| $T_{SOLD}$ | Plastic Body for 10s                                      | 260             | $^\circ C$ |
| $M_d$      | Mounting Torque (TO-220)                                  | 1.13 / 10       | Nm/lb.in.  |
| Weight     | TO-252  | 0.35            | g          |
|            | TO-263  | 2.50            | g          |
|            | TO-220  | 3.00            | g          |

| Symbol       | Test Conditions<br>( $T_J = 25^\circ C$ , Unless Otherwise Specified) | Characteristic Values |      |                             |
|--------------|---|-----------------------|------|-----------------------------|
|              |   | Min.                  | Typ. | Max.                        |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = -250\mu A$                                     | -150                  |      | V                           |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = -250\mu A$                                 | -2.0                  |      | -4.5 V                      |
| $I_{GSS}$    | $V_{GS} = \pm 15V$ , $V_{DS} = 0V$                                    |                       |      | $\pm 50$ nA                 |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ C$             |                       |      | -10 $\mu A$<br>-250 $\mu A$ |
| $R_{DS(on)}$ | $V_{GS} = -10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                  |                       |      | 240 m $\Omega$              |

**Features**

- International Standard Packages
- Avalanche Rated
- Extended FBSOA
- Fast Intrinsic Diode
- 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

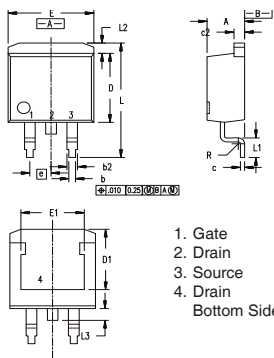
| Symbol                    | Test Conditions<br>(T <sub>J</sub> = 25°C, Unless Otherwise Specified)   | Characteristic Values |      |           |
|---------------------------|--|-----------------------|------|-----------|
|                           |  | Min.                  | Typ. | Max.      |
| <b>g<sub>fs</sub></b>     | V <sub>DS</sub> = -10V, I <sub>D</sub> = 0.5 • I <sub>D25</sub> , Note 1   | 9                     | 15   | S         |
| <b>C<sub>iss</sub></b>    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = -25V, f = 1MHz   |                       | 3650 | pF        |
| <b>C<sub>oss</sub></b>    |  |                       | 210  | pF        |
| <b>C<sub>rss</sub></b>    |  |                       | 55   | 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> = 3Ω (External) |                       | 21   | ns        |
| <b>t<sub>r</sub></b>      |  |                       | 14   | ns        |
| <b>t<sub>d(off)</sub></b> |  |                       | 36   | ns        |
| <b>t<sub>f</sub></b>      |  |                       | 11   | 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>   |                       | 48   | nC        |
| <b>Q<sub>gs</sub></b>     |  |                       | 17   | nC        |
| <b>Q<sub>gd</sub></b>     |  |                       | 12   | nC        |
| <b>R<sub>thJC</sub></b>   | TO-220   |                       |      | 0.83 °C/W |
| <b>R<sub>thCS</sub></b>   |  |                       | 0.50 | °C/W      |

**Source-Drain Diode**

| Symbol                | Test Conditions<br>(T <sub>J</sub> = 25°C, Unless Otherwise Specified)                                      | Characteristic Values |      |        |
|-----------------------|---|-----------------------|------|--------|
|                       |   | Min.                  | Typ. | Max.   |
| <b>I<sub>S</sub></b>  | V <sub>GS</sub> = 0V  |                       |      | -15 A  |
| <b>I<sub>SM</sub></b> | Repetitive, Pulse Width Limited by T <sub>JM</sub>  |                       |      | -60 A  |
| <b>V<sub>SD</sub></b> | I <sub>F</sub> = I <sub>S</sub> , V <sub>GS</sub> = 0V, Note 1  |                       |      | -1.3 V |
| <b>t<sub>TR</sub></b> | I <sub>F</sub> = 0.5 • I <sub>D25</sub> , -di/dt = -100A/μs<br>V <sub>R</sub> = -100V, V <sub>GS</sub> = 0V |                       | 116  | ns     |
| <b>Q<sub>RM</sub></b> |   |                       | 638  | nC     |
| <b>I<sub>RM</sub></b> |   |                       | -11  | A      |

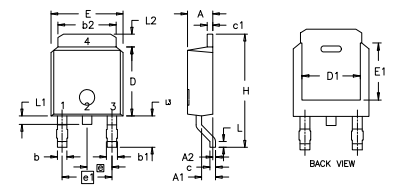
Note 1: Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

**TO-263 Outline**



| Dim. | Millimeter |       | Inches |      |
|------|------------|-------|--------|------|
|      | Min.       | Max.  | Min.   | Max. |
| A    | 4.06       | 4.83  | .160   | .190 |
| b    | 0.51       | 0.99  | .020   | .039 |
| b2   | 1.14       | 1.40  | .045   | .055 |
| c    | 0.40       | 0.74  | .016   | .029 |
| c2   | 1.14       | 1.40  | .045   | .055 |
| D    | 8.64       | 9.65  | .340   | .380 |
| D1   | 8.00       | 8.89  | .280   | .320 |
| E    | 9.65       | 10.41 | .380   | .405 |
| E1   | 6.22       | 8.13  | .270   | .320 |
| e    | 2.54       | BSC   | .100   | BSC  |
| L    | 14.61      | 15.88 | .575   | .625 |
| L1   | 2.29       | 2.79  | .090   | .110 |
| L2   | 1.02       | 1.40  | .040   | .055 |
| L3   | 1.27       | 1.78  | .050   | .070 |
| L4   | 0          | 0.13  | 0      | .005 |

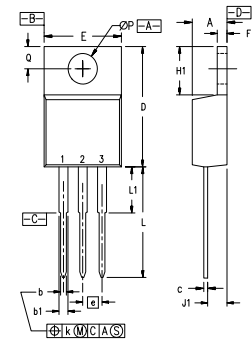
**TO-252 Outline**



Pins: 1 - Gate 2,4 - Drain  
3 - Source

| Dim. | Millimeter |       | Inches    |       |
|------|------------|-------|-----------|-------|
|      | Min.       | Max.  | Min.      | Max.  |
| A    | 2.19       | 2.38  | 0.086     | 0.094 |
| A1   | 0.89       | 1.14  | 0.035     | 0.045 |
| A2   | 0          | 0.13  | 0         | 0.005 |
| b    | 0.64       | 0.89  | 0.025     | 0.035 |
| b1   | 0.76       | 1.14  | 0.030     | 0.045 |
| b2   | 5.21       | 5.46  | 0.205     | 0.215 |
| c    | 0.46       | 0.58  | 0.018     | 0.023 |
| c1   | 0.46       | 0.58  | 0.018     | 0.023 |
| D    | 5.97       | 6.22  | 0.235     | 0.245 |
| D1   | 4.32       | 5.21  | 0.170     | 0.205 |
| E    | 6.35       | 6.73  | 0.250     | 0.265 |
| E1   | 4.32       | 5.21  | 0.170     | 0.205 |
| e    | 2.28 BSC   |       | 0.090 BSC |       |
| e1   | 4.57 BSC   |       | 0.180 BSC |       |
| H    | 9.40       | 10.42 | 0.370     | 0.410 |
| L    | 0.51       | 1.02  | 0.020     | 0.040 |
| L1   | 0.64       | 1.02  | 0.025     | 0.040 |
| L2   | 0.89       | 1.27  | 0.035     | 0.050 |
| L3   | 2.54       | 2.92  | 0.100     | 0.115 |

**TO-220 Outline**



Pins: 1 - Gate 2 - Drain  
3 - Source

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .170     | .190 | 4.32        | 4.83  |
| b   | .025     | .040 | 0.64        | 1.02  |
| b1  | .045     | .065 | 1.15        | 1.65  |
| c   | .014     | .022 | 0.35        | 0.56  |
| D   | .580     | .630 | 14.73       | 16.00 |
| E   | .390     | .420 | 9.91        | 10.66 |
| e   | .100 BSC |      | 2.54 BSC    |       |
| F   | .045     | .055 | 1.14        | 1.40  |
| H1  | .230     | .270 | 5.85        | 6.85  |
| J1  | .090     | .110 | 2.29        | 2.79  |
| k   | 0        | .015 | 0           | 0.38  |
| L   | .500     | .550 | 12.70       | 13.97 |
| L1  | .110     | .230 | 2.79        | 5.84  |
| ØP  | .139     | .161 | 3.53        | 4.08  |
| Q   | .100     | .125 | 2.54        | 3.18  |

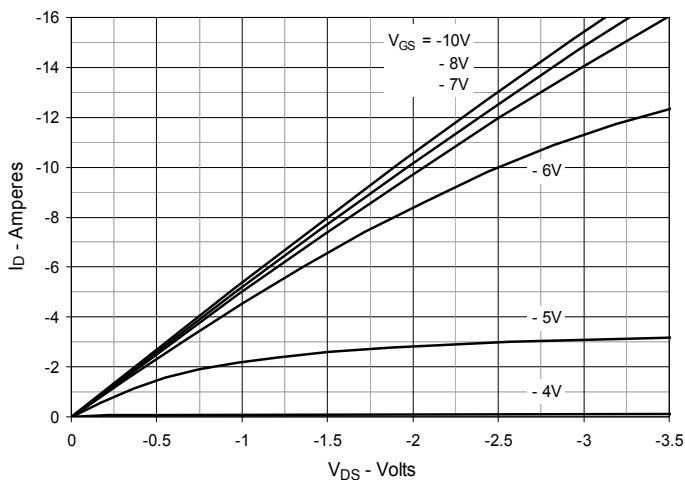
**ADVANCE TECHNICAL INFORMATION**

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

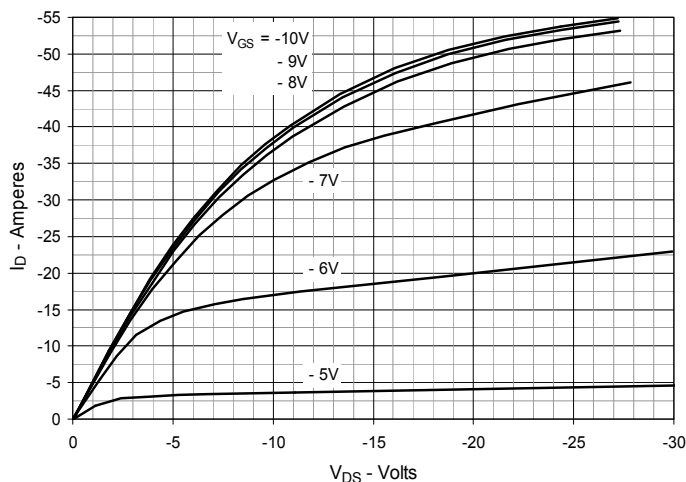
IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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

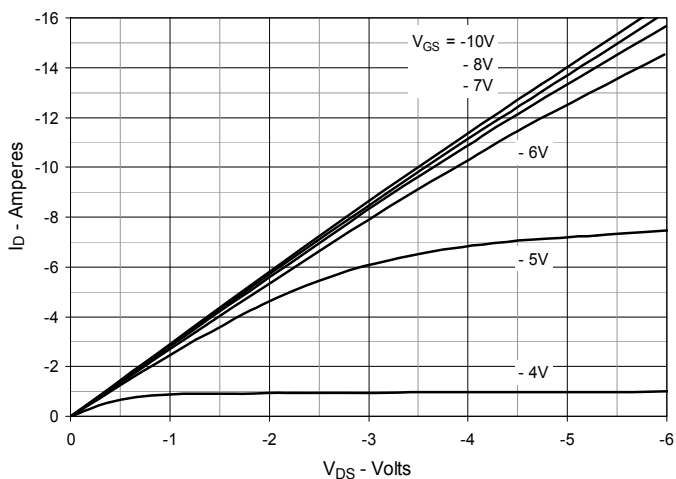
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



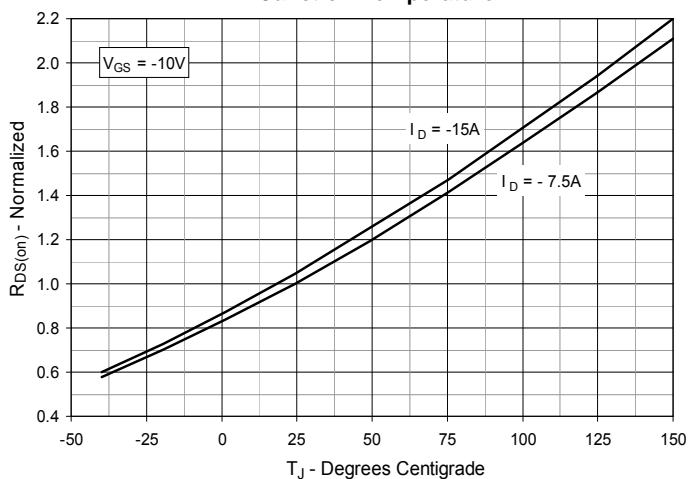
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



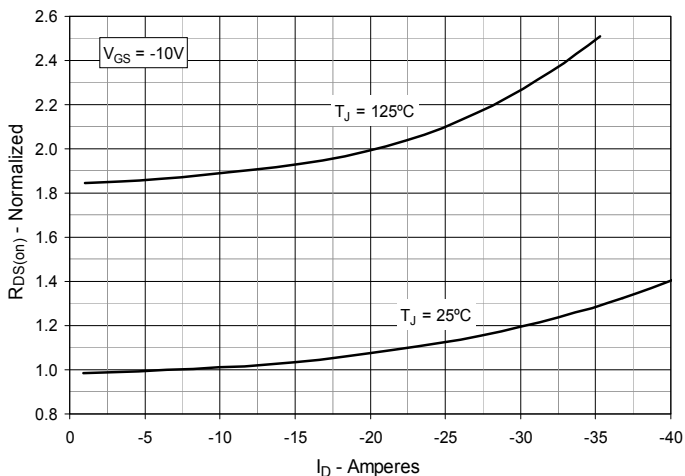
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = -7.5\text{A}$  vs. Junction Temperature**



**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = -7.5\text{A}$  vs. Drain Current**



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

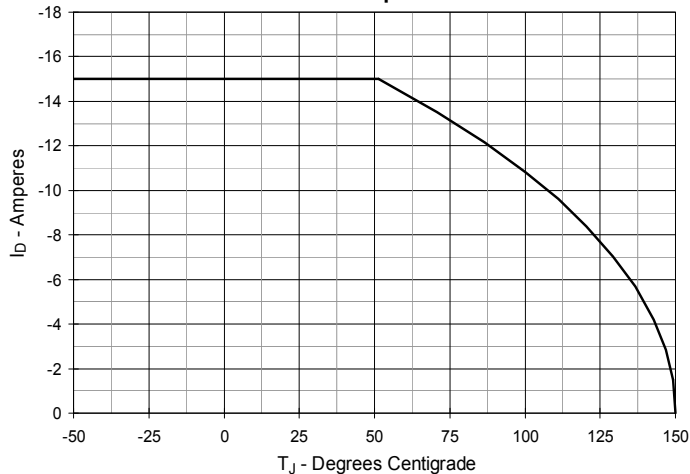


Fig. 7. Input Admittance

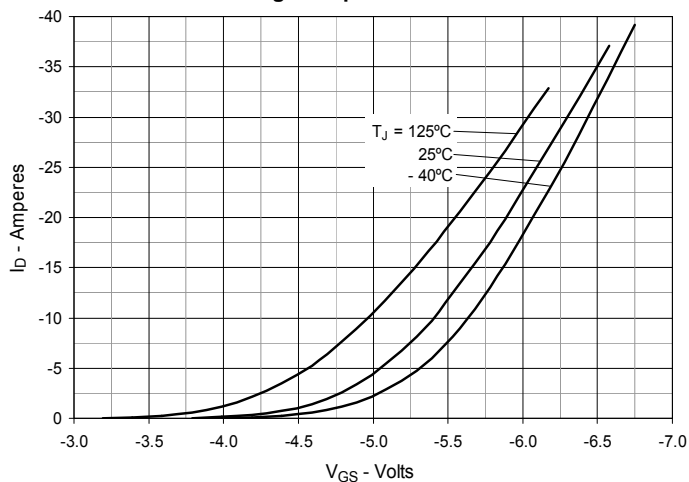


Fig. 8. Transconductance

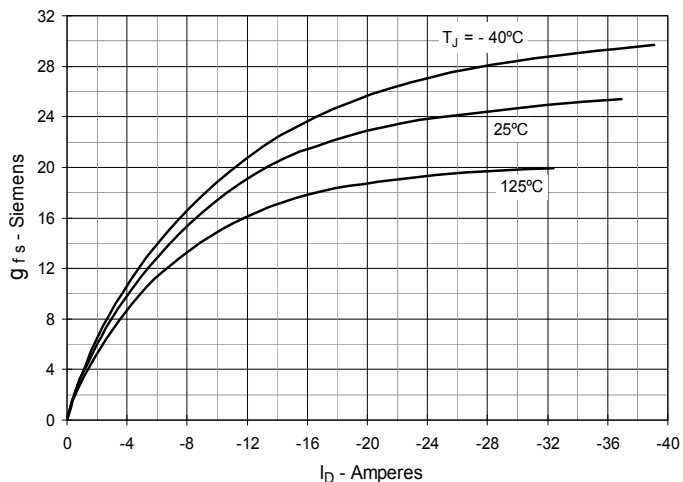


Fig. 9. Forward Voltage Drop of Intrinsic Diode

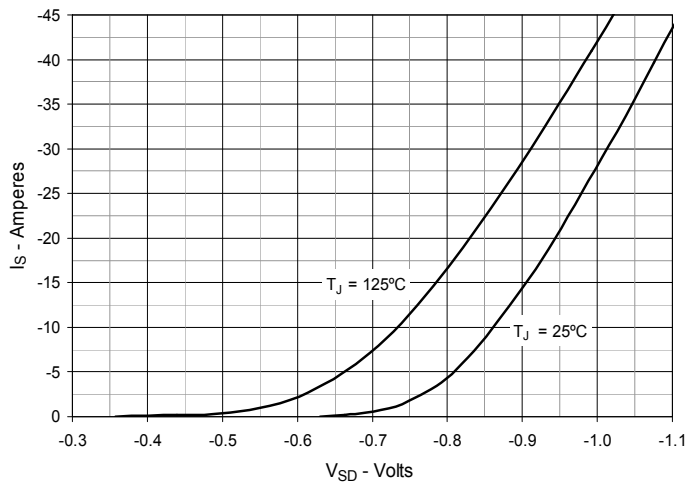


Fig. 10. Gate Charge

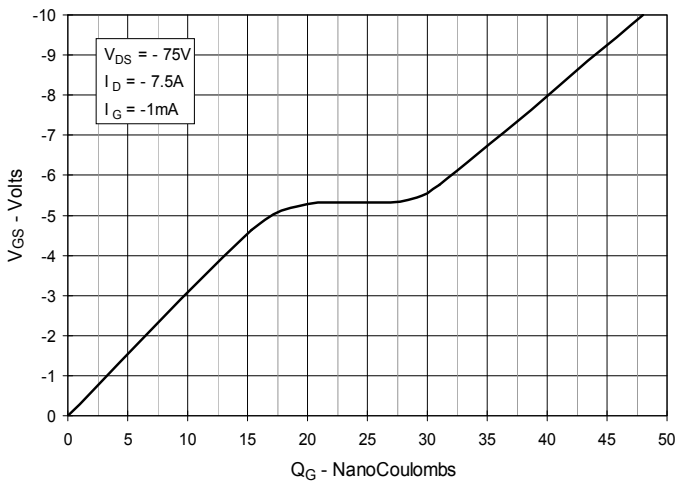


Fig. 11. Capacitance

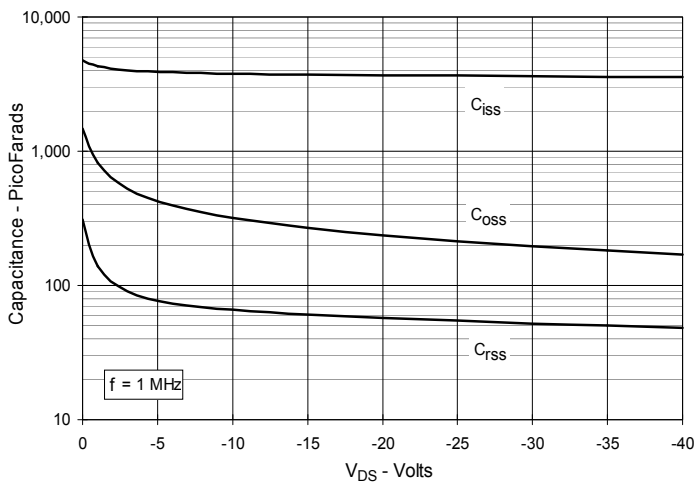
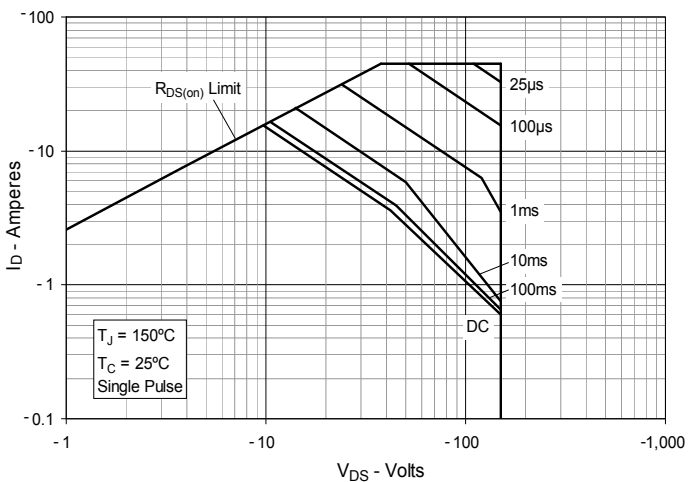
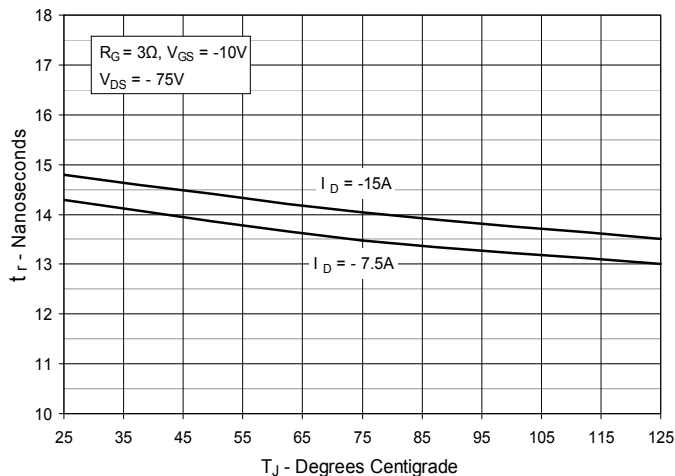


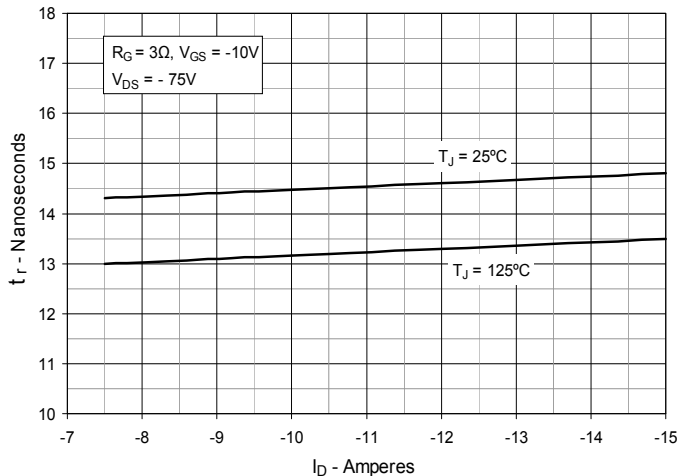
Fig. 12. Forward-Bias Safe Operating Area



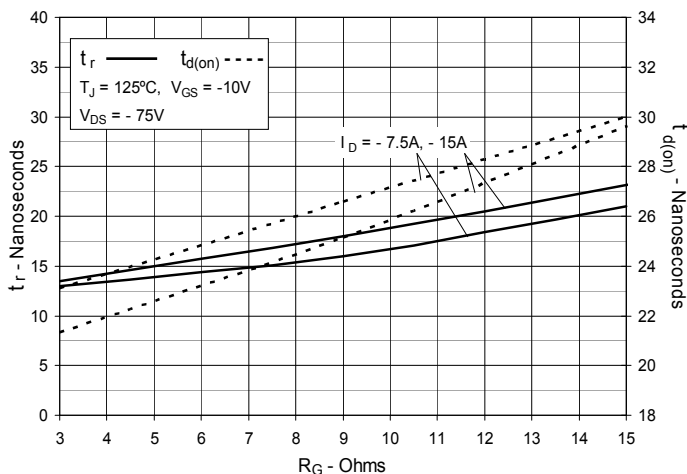
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



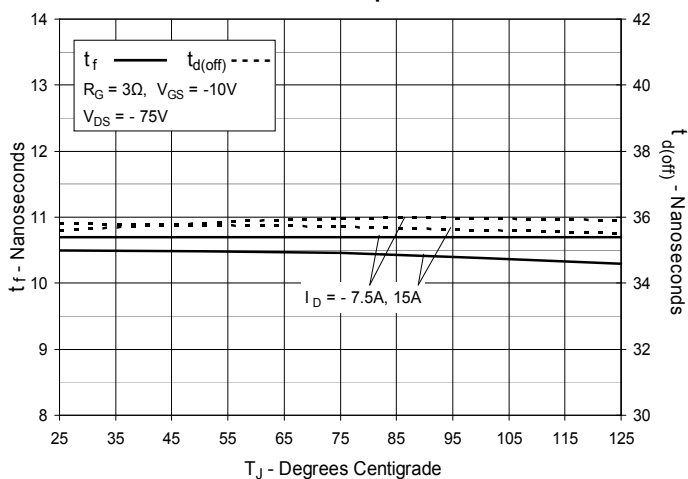
**Fig. 14. Resistive Turn-on Rise Time vs. Drain Current**



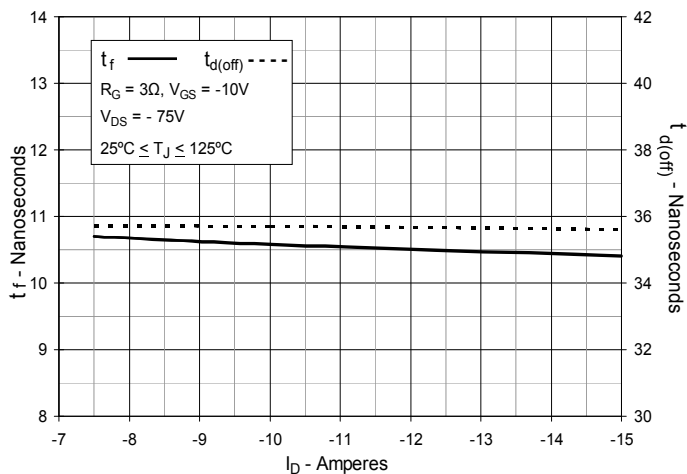
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



**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**

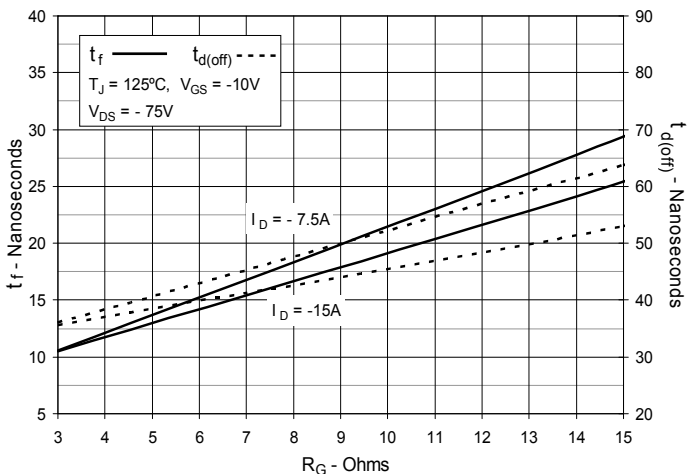


Fig. 19. Maximum Transient Thermal Impedance

