

# TrenchT2™

## Power MOSFET

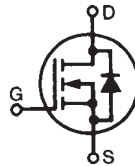
IXTA200N055T2-7

$$V_{DSS} = 55V$$

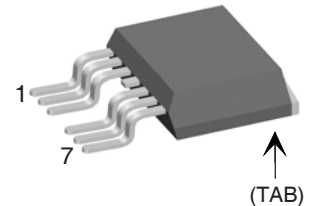
$$I_{D25} = 200A$$

$$R_{DS(on)} \leq 4.2m\Omega$$

N-Channel Enhancement Mode  
Avalanche Rated



TO-263 (7-lead)



Pins: 1 - Gate  
2, 3 - Source  
5, 6, 7 - Source  
TAB (8) - Drain

| Symbol     | Test Conditions                                                       | Maximum Ratings |                  |
|------------|-----------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$                       | 55              | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$ , $R_{GS} = 1M\Omega$ | 55              | V                |
| $V_{GSM}$  | Transient                                                             | $\pm 20$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                              | 200             | A                |
| $I_{LRMS}$ | Lead Current Limit, RMS                                               | 160             | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$            | 500             | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                              | 100             | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                              | 600             | mJ               |
| $P_D$      | $T_C = 25^\circ\text{C}$                                              | 360             | W                |
| $T_J$      |                                                                       | -55 ... +175    | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                       | 175             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                       | -55 ... +175    | $^\circ\text{C}$ |
| $T_L$      | 1.6mm (0.062in.) from case for 10s                                    | 300             | $^\circ\text{C}$ |
| $T_{sold}$ | Plastic body for 10 seconds                                           | 260             | $^\circ\text{C}$ |
| Weight     |                                                                       | 3               | g                |

### Features

- International standard package
- $175^\circ\text{C}$  Operating Temperature
- High current handling capability
- Avalanche rated
- Low  $R_{DS(on)}$

### Advantages

- Easy to mount
- Space savings
- High power density

### Applications

- Automotive
  - Motor Drives
  - 12V Battery
  - ABS Systems
- DC/DC Converters and Off-line UPS
- Primary- Side Switch
- High Current Switching Applications

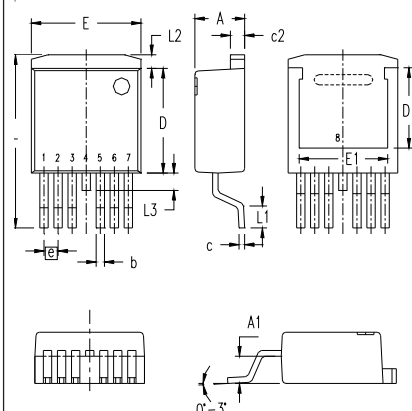
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ unless otherwise specified) | Characteristic Values |      |              |
|--------------|---------------------------------------------------------------------------|-----------------------|------|--------------|
|              |                                                                           | Min.                  | Typ. | Max.         |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu A$                                          | 55                    |      | V            |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\mu A$                                      | 2.0                   |      | 4.0 V        |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                                        |                       |      | $\pm 200$ nA |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$                                                        |                       |      | 5 $\mu A$    |
|              | $V_{GS} = 0V$ $T_J = 150^\circ\text{C}$                                   |                       |      | 50 $\mu A$   |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 50A$ , Notes 1, 2                                 | 3.3                   | 4.2  | 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                                                                                    | 50                    | 80   | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                       |                       | 6970 | pF                      |
| $C_{oss}$    |                                                                                                                                        |                       | 1026 | pF                      |
| $C_{rss}$    |                                                                                                                                        |                       | 228  | pF                      |
| $t_{d(on)}$  | <b>Resistive Switching Times</b><br>$V_{GS} = 10\text{V}$ , $V_{DS} = 30\text{V}$ , $I_D = 50\text{A}$<br>$R_G = 3.3\Omega$ (External) |                       | 26   | ns                      |
| $t_r$        |                                                                                                                                        |                       | 22   | ns                      |
| $t_{d(off)}$ |                                                                                                                                        |                       | 49   | ns                      |
| $t_f$        |                                                                                                                                        |                       | 27   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$                                                       |                       | 109  | nC                      |
| $Q_{gs}$     |                                                                                                                                        |                       | 35   | nC                      |
| $Q_{gd}$     |                                                                                                                                        |                       | 24   | nC                      |
| $R_{thJC}$   |                                                                                                                                        |                       |      | 0.42 $^\circ\text{C/W}$ |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                            | Characteristic Values |      |       |
|----------|--------------------------------------------------------------------------------------------------------|-----------------------|------|-------|
|          |                                                                                                        | Min.                  | Typ. | Max.  |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                   |                       |      | 200 A |
| $I_{SM}$ | Repetitive, Pulse width limited by $T_{JM}$                                                            |                       |      | 600 A |
| $V_{SD}$ | $I_F = 50\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                                                     |                       |      | 1.0 V |
| $t_{rr}$ | $I_F = 100\text{A}$ , $V_{GS} = 0\text{V}$<br>$-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 27\text{V}$ |                       | 49   | ns    |
| $I_{RM}$ |                                                                                                        |                       | 2.6  | A     |
| $Q_{RM}$ |                                                                                                        |                       | 64   | nC    |

## TO-263 (7-lead) (IXTA..7) Outline



Pins: 1 - Gate  
2, 3 - Source  
4 - Drain  
5, 6, 7 - Source  
Tab (8) - Drain

| SYM | INCHES |      | MILLIMETER |       |
|-----|--------|------|------------|-------|
|     | MIN    | MAX  | MIN        | MAX   |
| A   | .170   | .185 | 4.30       | 4.70  |
| A1  | .085   | .104 | 2.15       | 2.65  |
| b   | .026   | .035 | 0.65       | 0.90  |
| c   | .016   | .024 | 0.40       | 0.60  |
| c2  | .049   | .055 | 1.25       | 1.40  |
| D   | .355   | .370 | 9.00       | 9.40  |
| D1  | .272   | .280 | 6.90       | 7.10  |
| E   | .386   | .402 | 9.80       | 10.20 |
| E1  | .311   | .319 | 7.90       | 8.10  |
| e   | .050   | BSC  | 1.27       | BSC   |
| L   | .591   | .614 | 15.00      | 15.60 |
| L1  | .091   | .110 | 2.30       | 2.80  |
| L2  | .039   | .059 | 1.00       | 1.50  |
| L3  | .000   | .059 | 0.00       | 1.50  |

- Notes: 1. Pulse test,  $t \leq 300\mu\text{s}$ ; duty cycle,  $d \leq 2\%$ .  
2. On through-hole packages,  $R_{DS(on)}$  Kelvin test contact location must be 5mm or less from the package body.

## PRELIMINARY TECHNICAL INFORMATION

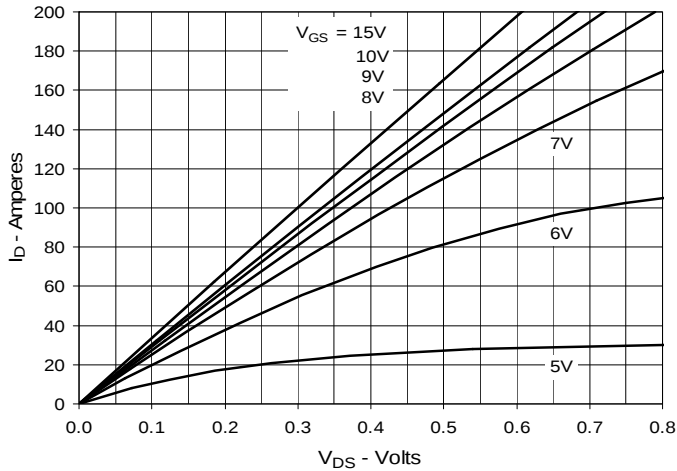
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right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

IXYS reserves the right to change limits, test conditions, and dimensions.

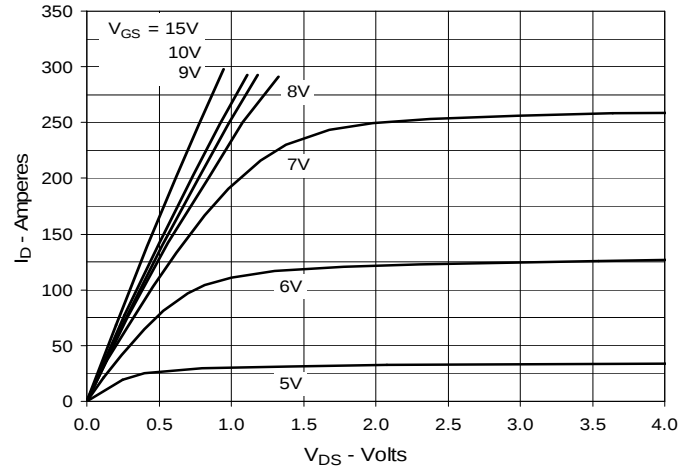
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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

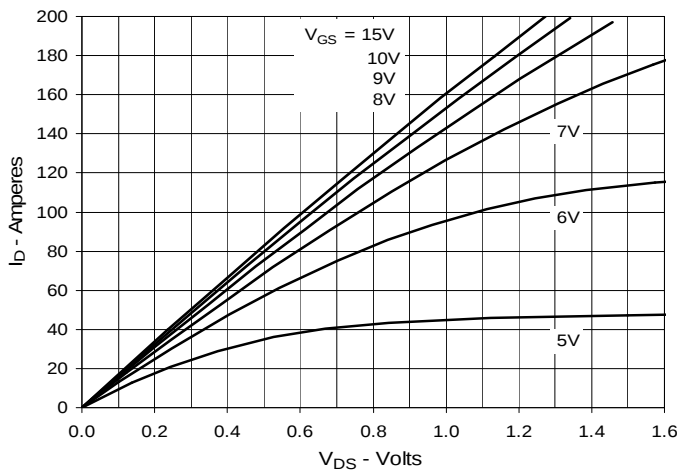
**Fig. 1. Output Characteristics  
@ 25°C**



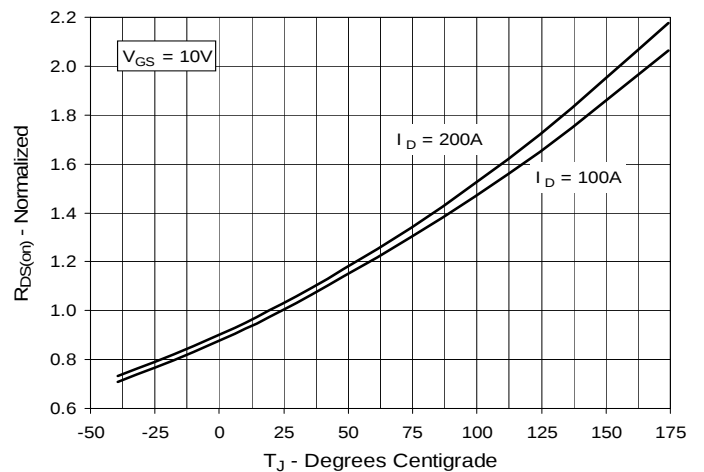
**Fig. 2. Extended Output Characteristics  
@ 25°C**



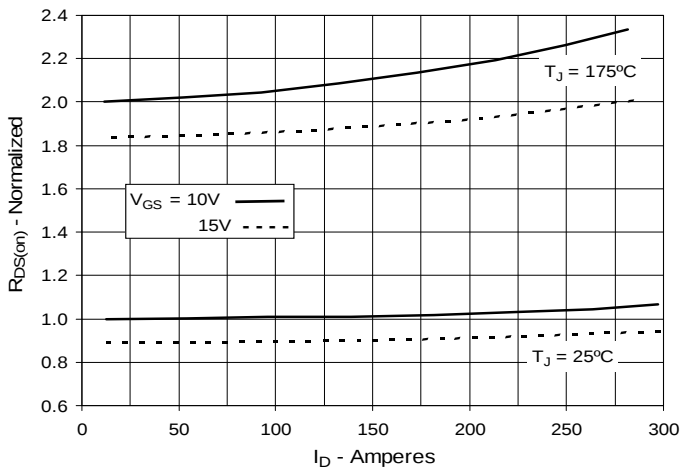
**Fig. 3. Output Characteristics  
@ 150°C**



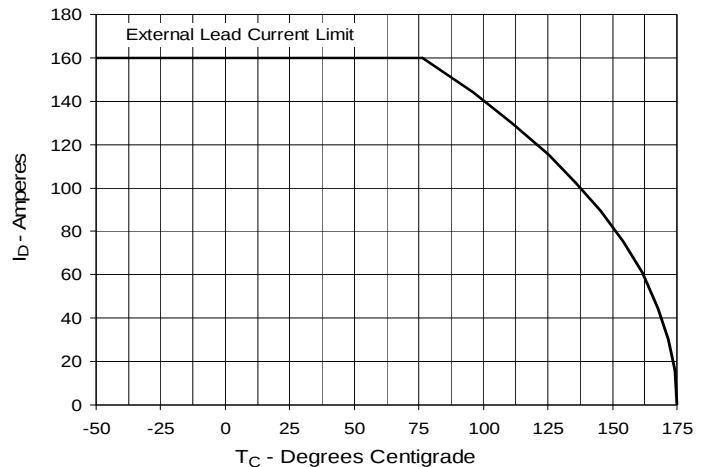
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 100A$  Value  
vs. Junction Temperature**



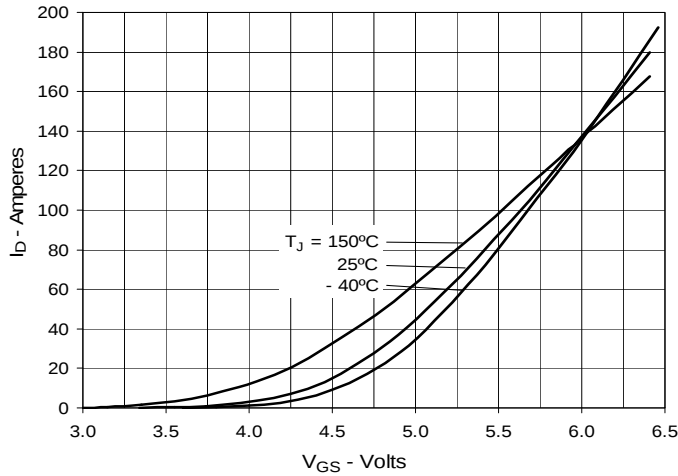
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 100A$  Value  
vs. Drain Current**



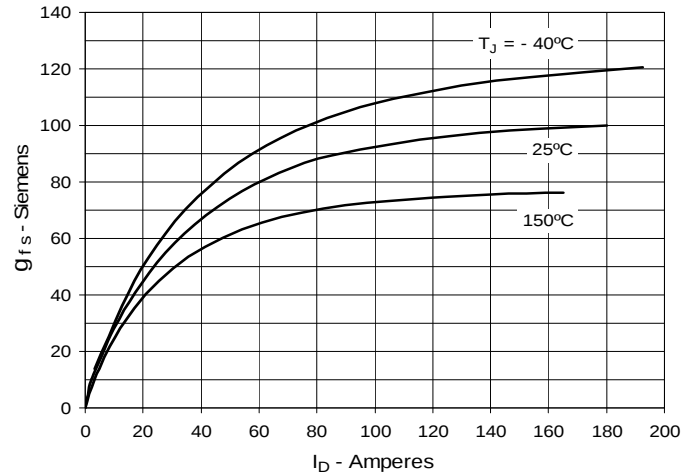
**Fig. 6. Drain Current vs. Case Temperature**



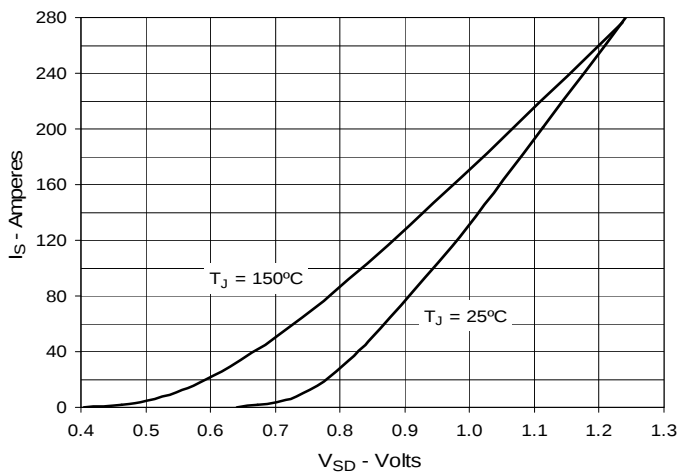
**Fig. 7. Input Admittance**



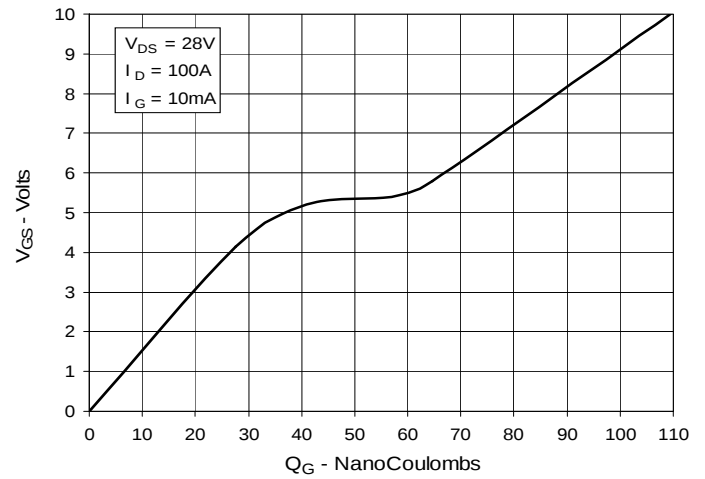
**Fig. 8. Transconductance**



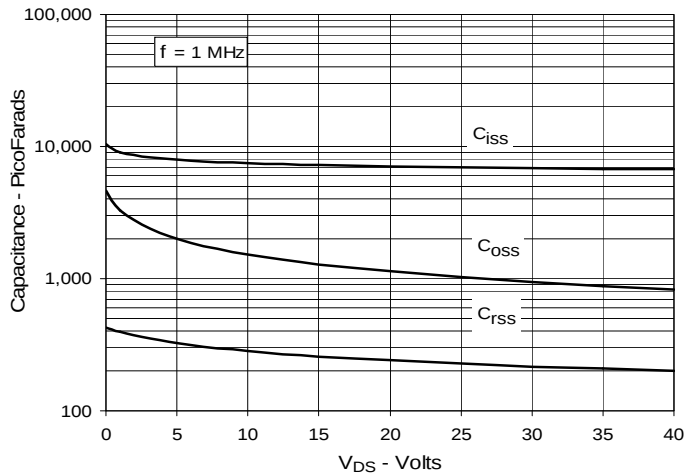
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



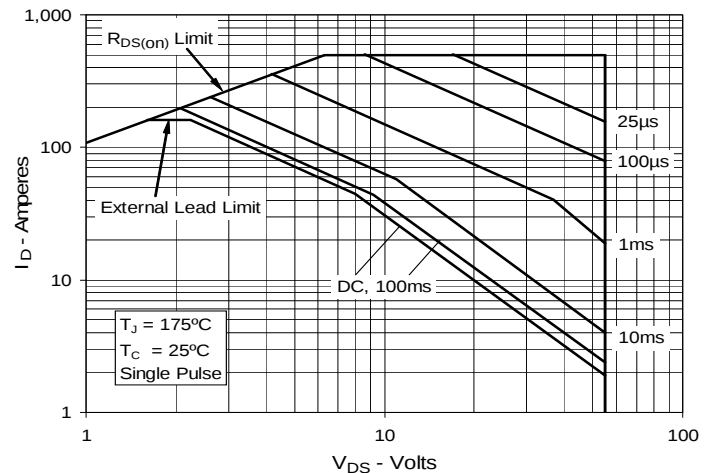
**Fig. 10. Gate Charge**



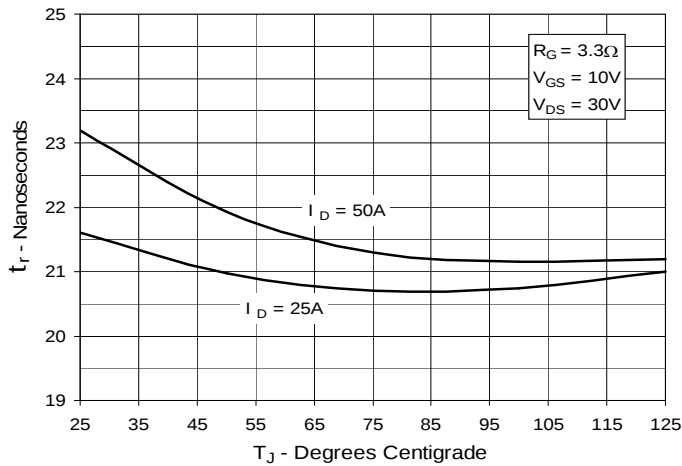
**Fig. 11. Capacitance**



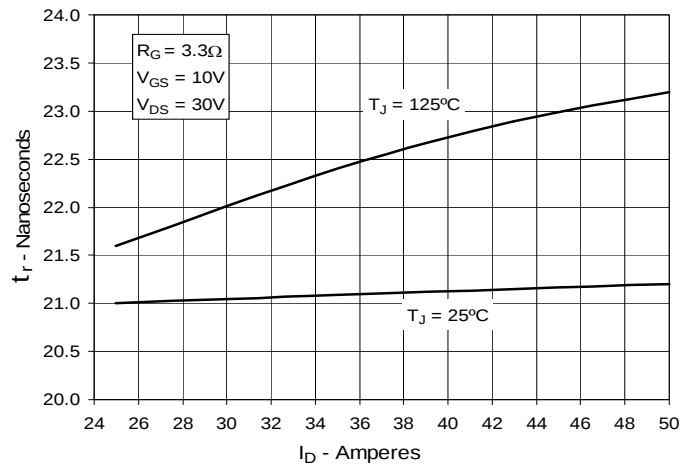
**Fig. 12. Forward-Bias Safe Operating Area**



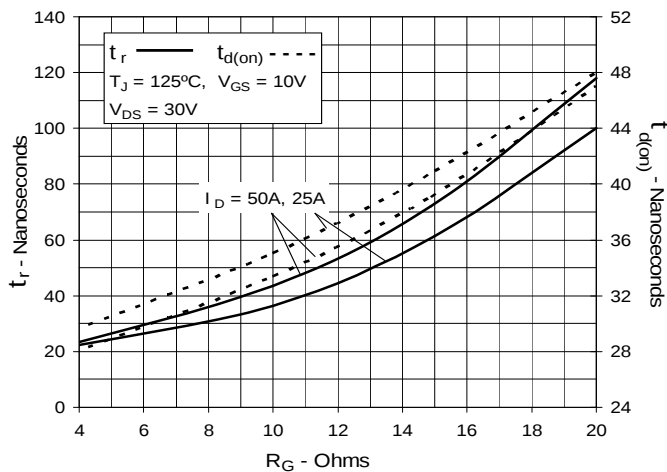
**Fig. 13. Resistive Turn-on  
Rise Time vs. Junction Temperature**



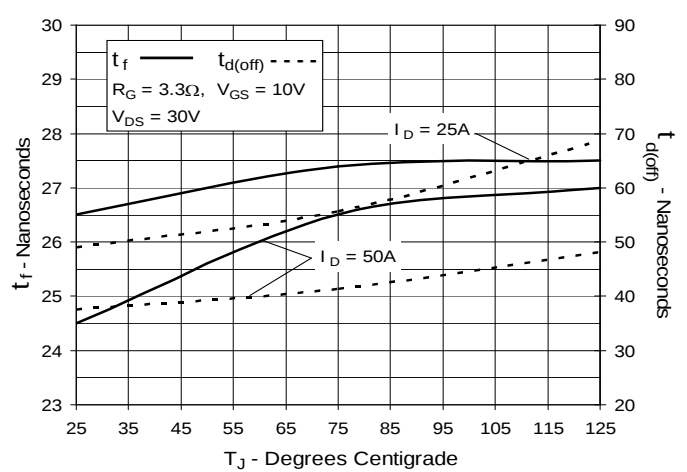
**Fig. 14. Resistive Turn-on  
Rise Time vs. Drain Current**



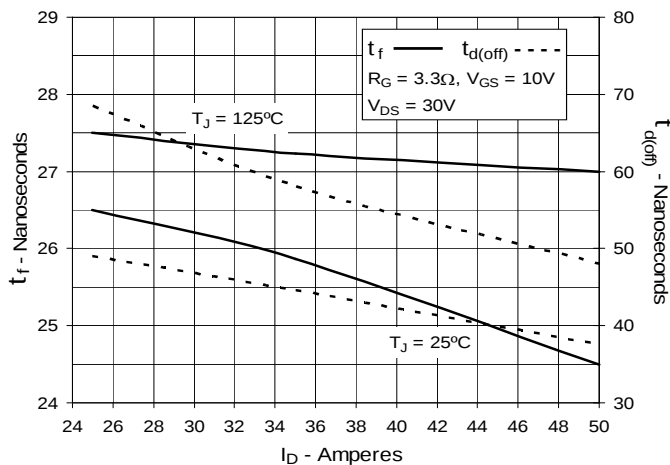
**Fig. 15. Resistive Turn-on  
Switching Times vs. Gate Resistance**



**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**

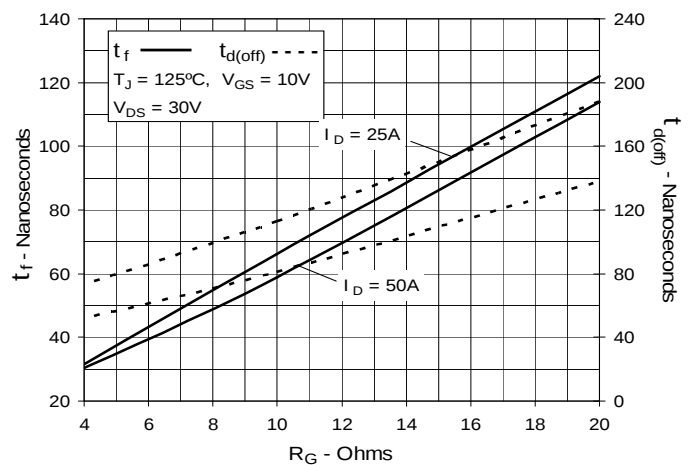
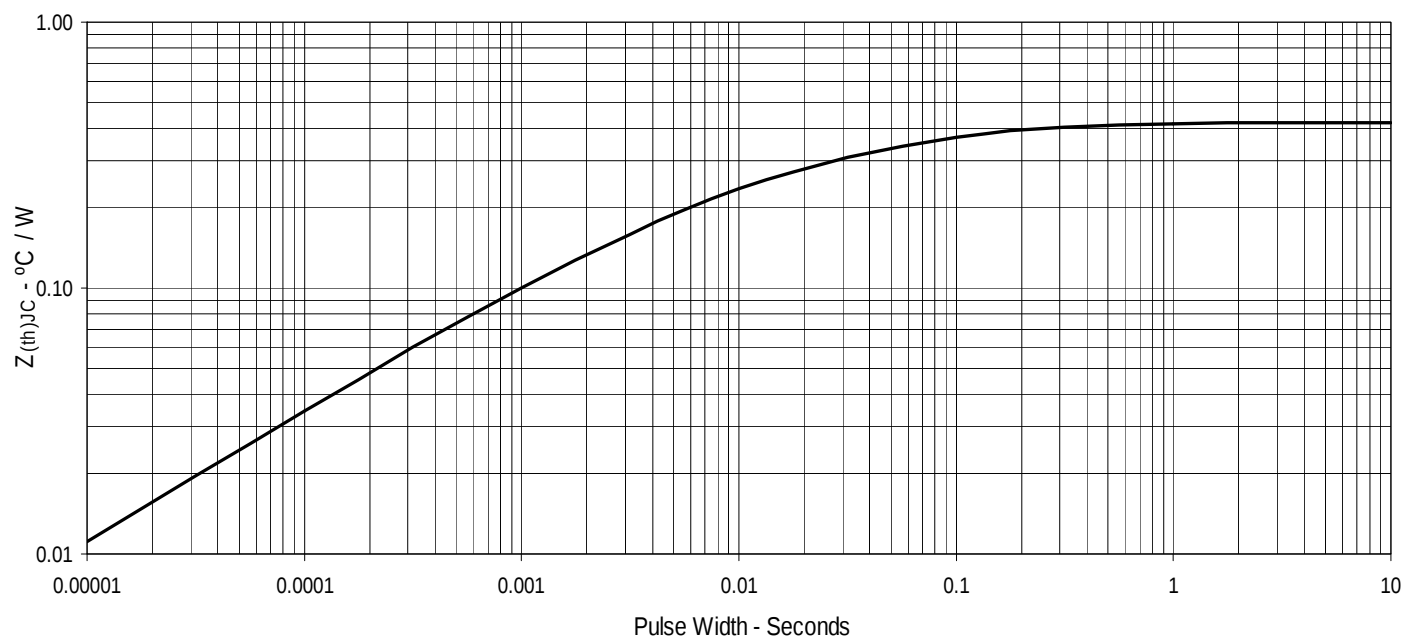


Fig. 19. Maximum Transient Thermal Impedance





---

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).