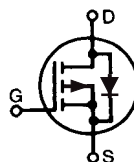


## TrenchP™ Power MOSFETs

**IXTA24P085T**  
**IXTP24P085T**

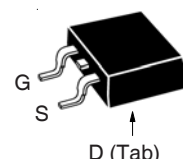
$$\begin{aligned} V_{DSS} &= -85V \\ I_{D25} &= -24A \\ R_{DS(on)} &\leq 65m\Omega \end{aligned}$$

P-Channel Enhancement Mode  
Avalanche Rated

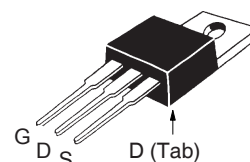


| Symbol     | Test Conditions                                                       | Maximum Ratings |                  |
|------------|-----------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$                       | - 85            | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$ | - 85            | V                |
| $V_{GSS}$  | Continuous                                                            | $\pm 15$        | V                |
| $V_{GSM}$  | Transient                                                             | $\pm 25$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                              | - 24            | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$            | - 80            | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                              | - 24            | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                              | 200             | mJ               |
| $P_D$      | $T_C = 25^\circ\text{C}$                                              | 83              | 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             | $^\circ\text{C}$ |
| $M_d$      | Mounting Torque (TO-220)                                              | 1.13/10         | Nm/lb.in.        |
| Weight     | TO-220                                                                | 3.0             | g                |
|            | TO-263                                                                | 2.5             | g                |

TO-263 AA (IXTA)



TO-220AB (IXTP)



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

### 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>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified) | Characteristic Values |      |                              |
|--------------|-----------------------------------------------------------------------------|-----------------------|------|------------------------------|
|              |                                                                             | Min.                  | Typ. | Max.                         |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = -250\mu A$                                           | - 85                  |      | V                            |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = -250\mu A$                                       | - 2.5                 |      | V                            |
| $I_{GSS}$    | $V_{GS} = \pm 15V$ , $V_{DS} = 0V$                                          |                       |      | $\pm 50$ nA                  |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$ , $V_{GS} = 0V$<br>$T_J = 125^\circ\text{C}$             |                       |      | - 3 $\mu A$<br>- 100 $\mu A$ |
| $R_{DS(on)}$ | $V_{GS} = -10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                        |                       |      | 65 m $\Omega$                |

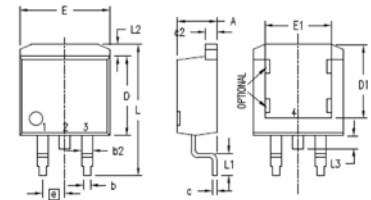
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                                                          | Characteristic Values |      |                        |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|------------------------|
|              |                                                                                                                                                      | Min.                  | Typ. | Max.                   |
| $g_{fs}$     | $V_{DS} = -10\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                                                                                          | 10                    | 16   | S                      |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = -25\text{V}$ , $f = 1\text{MHz}$                                                                                    |                       | 2090 | pF                     |
| $C_{oss}$    |                                                                                                                                                      |                       | 243  | pF                     |
| $C_{rss}$    |                                                                                                                                                      |                       | 117  | 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>$R_G = 10\Omega$ (External) |                       | 18   | ns                     |
| $t_r$        |                                                                                                                                                      |                       | 26   | ns                     |
| $t_{d(off)}$ |                                                                                                                                                      |                       | 53   | ns                     |
| $t_f$        |                                                                                                                                                      |                       | 26   | ns                     |
| $Q_{g(on)}$  | $V_{GS} = -10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$                                                                    |                       | 41   | nC                     |
| $Q_{gs}$     |                                                                                                                                                      |                       | 17   | nC                     |
| $Q_{gd}$     |                                                                                                                                                      |                       | 11   | nC                     |
| $R_{thJC}$   | TO-220                                                                                                                                               |                       |      | 1.5 $^\circ\text{C/W}$ |
| $R_{thCS}$   |                                                                                                                                                      | 0.50                  |      | $^\circ\text{C/W}$     |

### Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                             | Characteristic Values |       |        |
|----------|---------------------------------------------------------------------------------------------------------|-----------------------|-------|--------|
|          |                                                                                                         | Min.                  | Typ.  | Max.   |
| $I_s$    | $V_{GS} = 0\text{V}$                                                                                    |                       |       | - 24 A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                             |                       |       | - 96 A |
| $V_{SD}$ | $I_F = -24\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                                                     |                       |       | -1.5 V |
| $t_{rr}$ | $I_F = -12\text{A}$ , $-di/dt = -100\text{A}/\mu\text{s}$<br>$V_R = -43\text{V}$ , $V_{GS} = 0\text{V}$ |                       | 40    | ns     |
| $Q_{RM}$ |                                                                                                         |                       | 72    | nC     |
| $I_{RM}$ |                                                                                                         |                       | - 3.6 | A      |

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

### TO-263 Outline

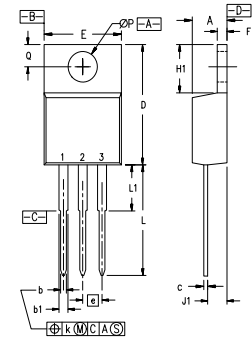


Pins:

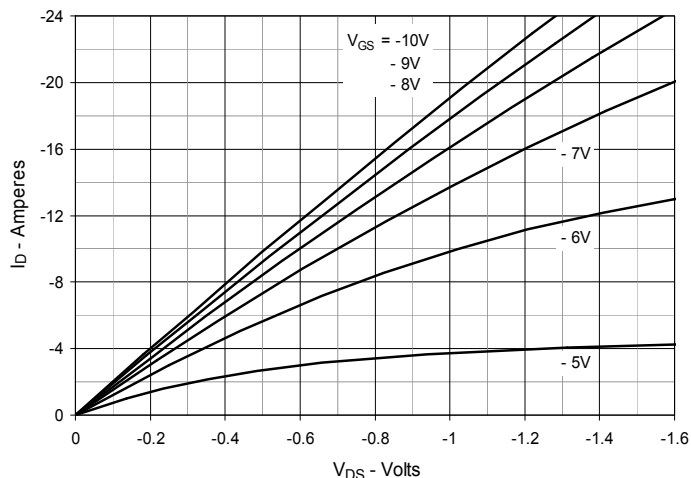
- 1 - Gate
- 2,4 - Drain
- 3 - Source

| SYM | INCHES   |      | MILLIMETERS |       |
|-----|----------|------|-------------|-------|
|     | MIN      | MAX  | MIN         | MAX   |
| A   | .160     | .190 | 4.06        | 4.83  |
| A1  | .080     | .110 | 2.03        | 2.79  |
| b   | .020     | .039 | 0.51        | 0.99  |
| b2  | .045     | .055 | 1.14        | 1.40  |
| c   | .016     | .029 | 0.40        | 0.74  |
| c2  | .045     | .055 | 1.14        | 1.40  |
| D   | .340     | .380 | 8.64        | 9.65  |
| D1  | .315     | .350 | 8.00        | 8.89  |
| E   | .380     | .410 | 9.65        | 10.41 |
| E1  | .245     | .320 | 6.22        | 8.13  |
| e   | .100 BSC |      | 2.54 BSC    |       |
| L   | .575     | .625 | 14.61       | 15.88 |
| L1  | .090     | .110 | 2.29        | 2.79  |
| L2  | .040     | .055 | 1.02        | 1.40  |
| L3  | .050     | .070 | 1.27        | 1.78  |
| L4  | 0        | .005 | 0           | 0.13  |

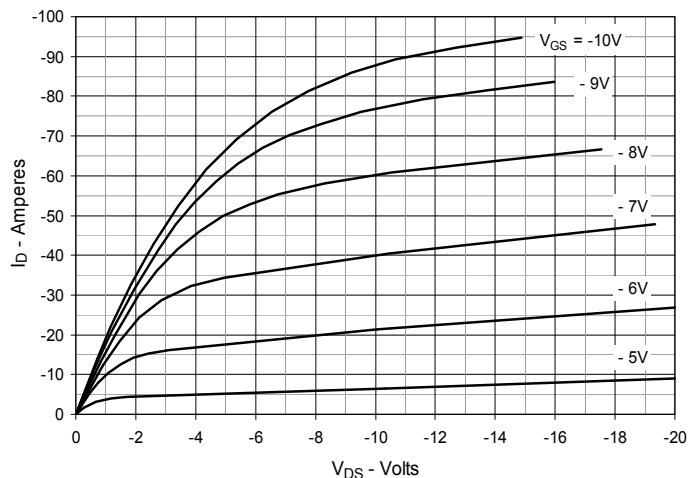
### TO-220 Outline



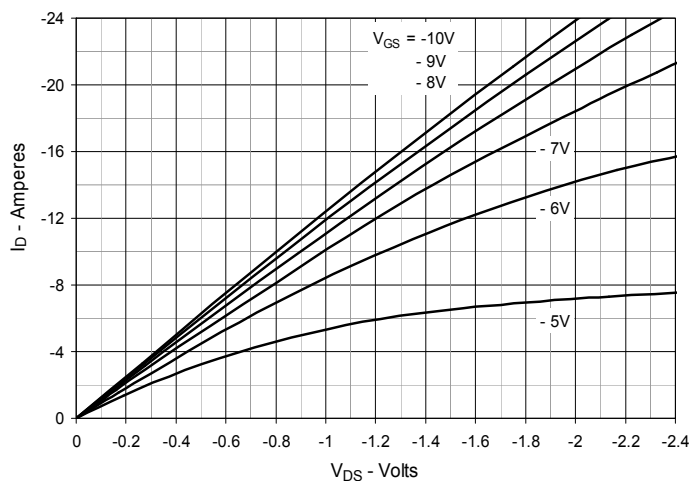
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



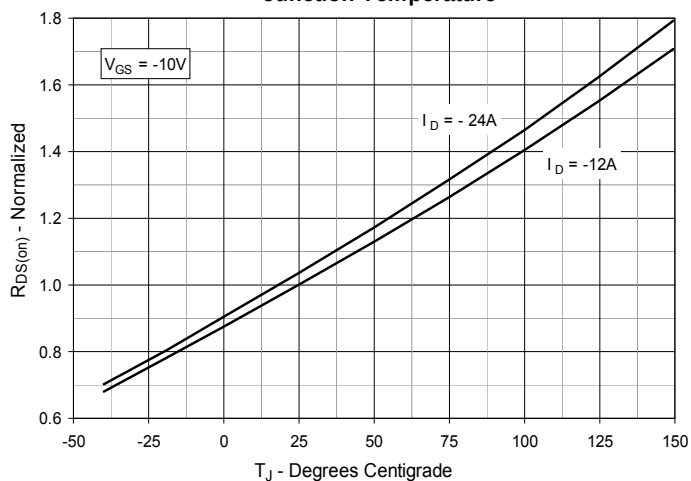
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



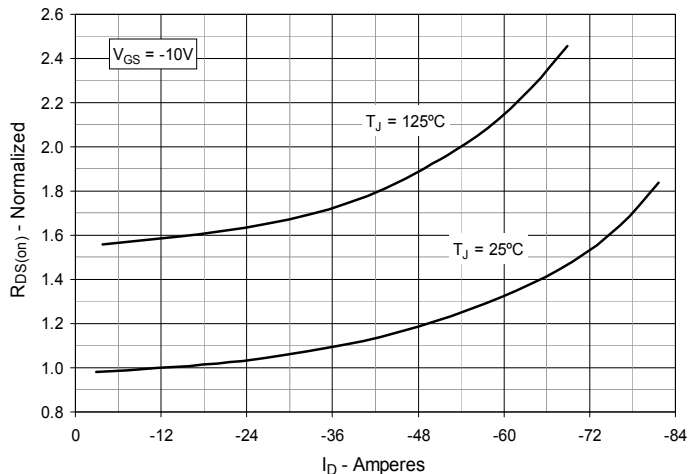
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



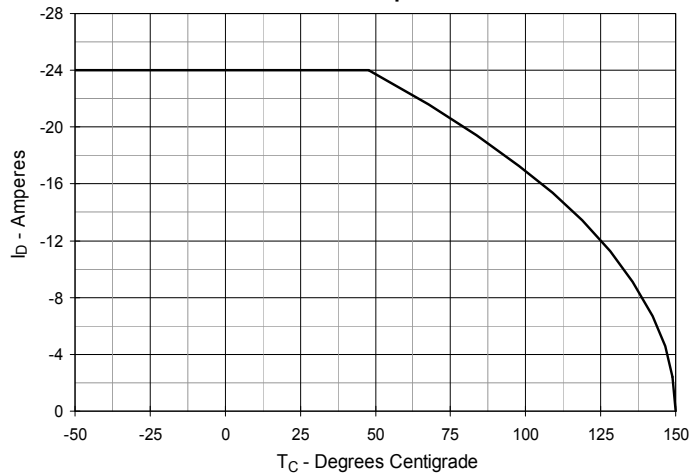
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = -12\text{A}$  Value vs. Junction Temperature**



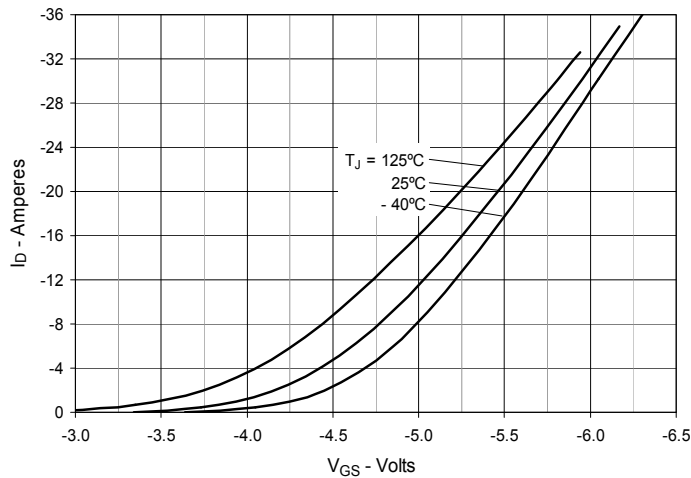
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = -12\text{A}$  Value vs. Drain Current**



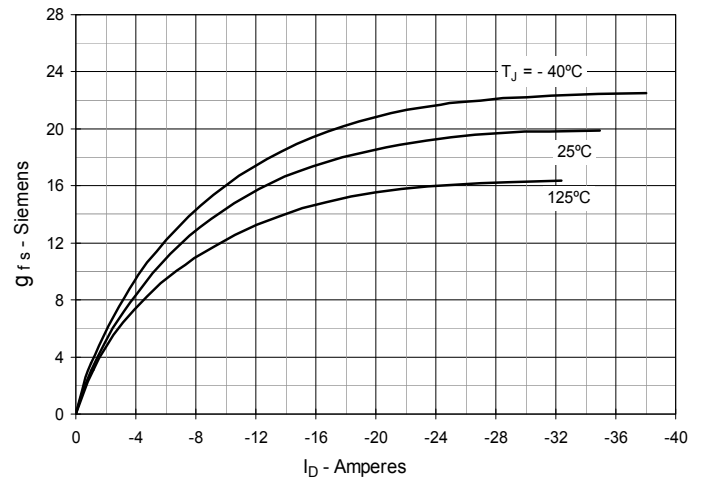
**Fig. 6. Maximum Drain Current vs. Case Temperature**



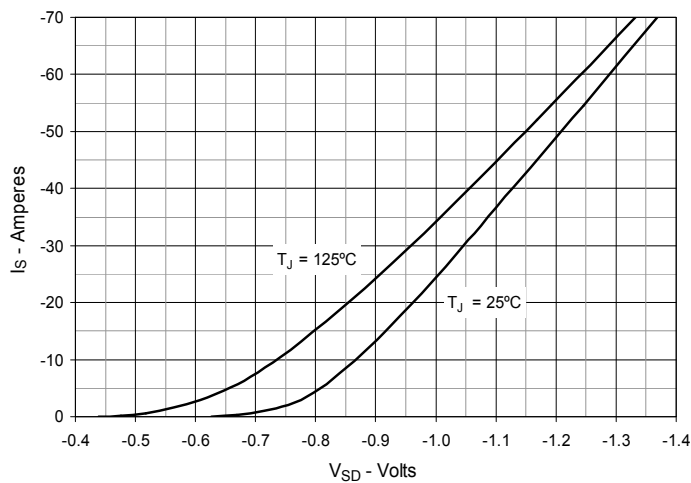
**Fig. 7. Input Admittance**



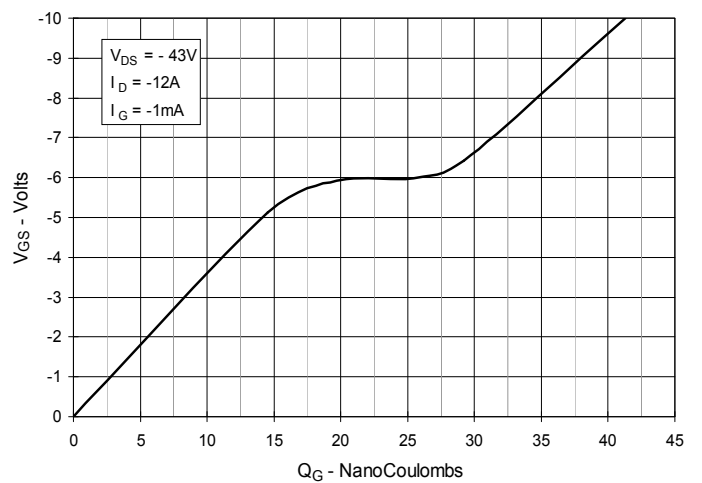
**Fig. 8. Transconductance**



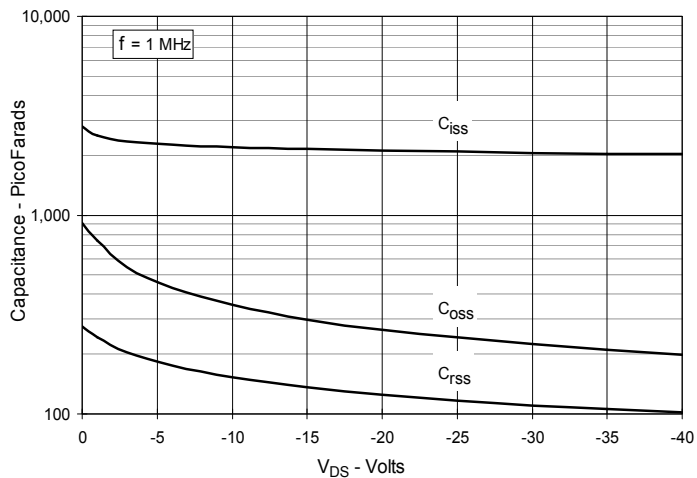
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



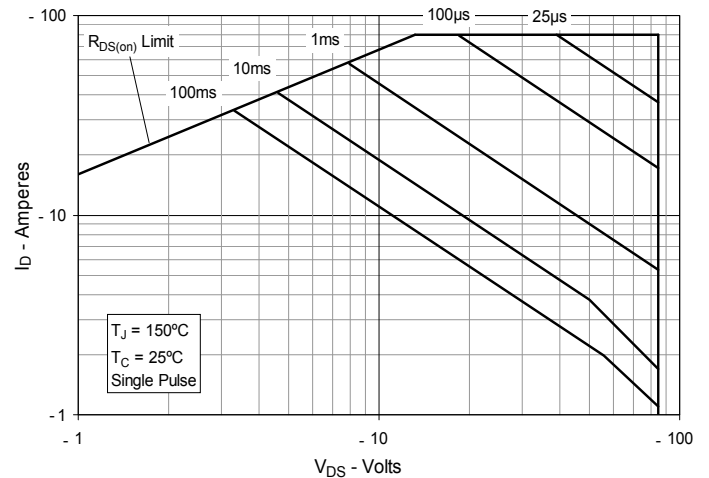
**Fig. 10. Gate Charge**



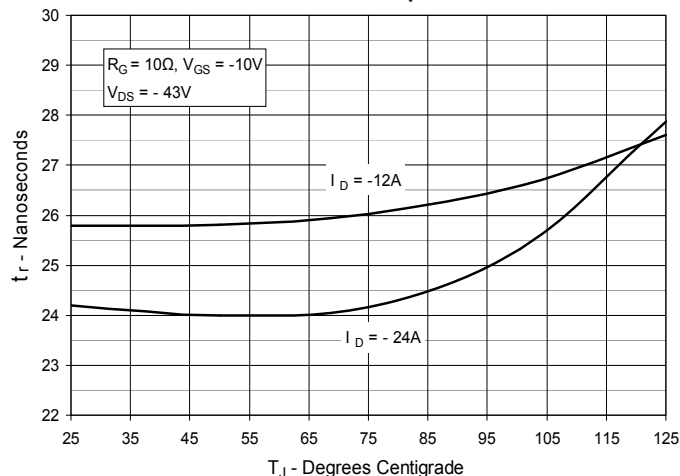
**Fig. 11. Capacitance**



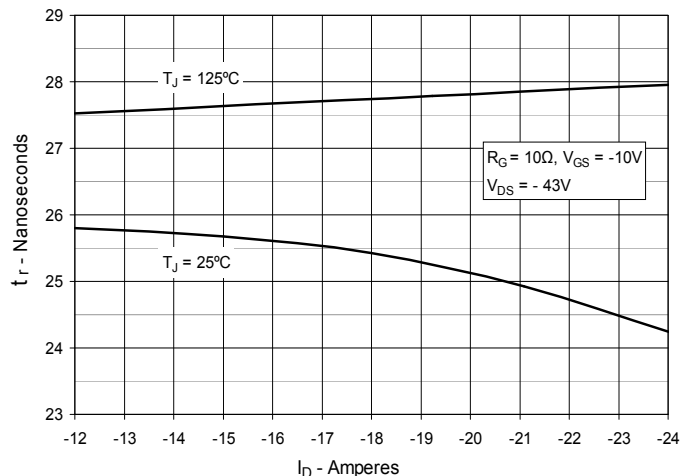
**Fig. 12. Forward-Bias Safe Operating Area**



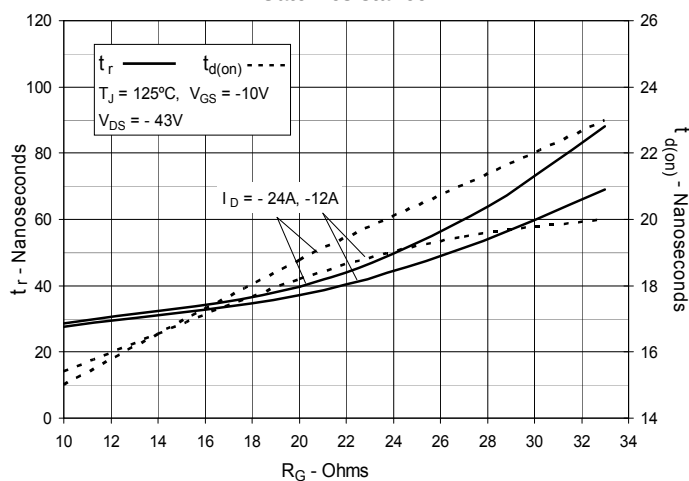
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



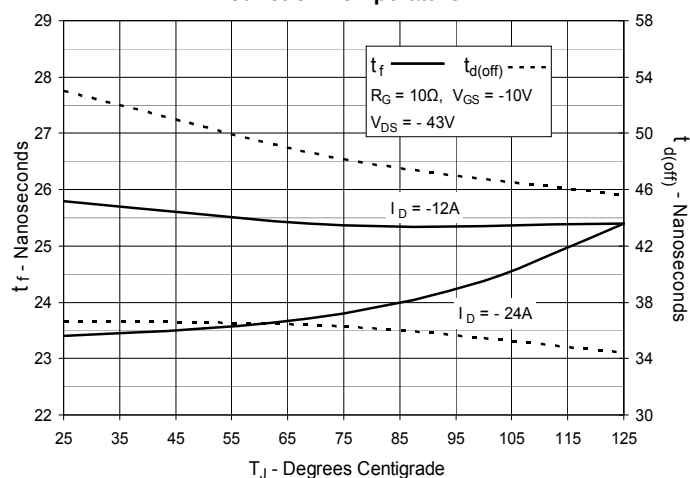
**Fig. 14. Resistive Turn-on Rise Time vs. Drain Current**



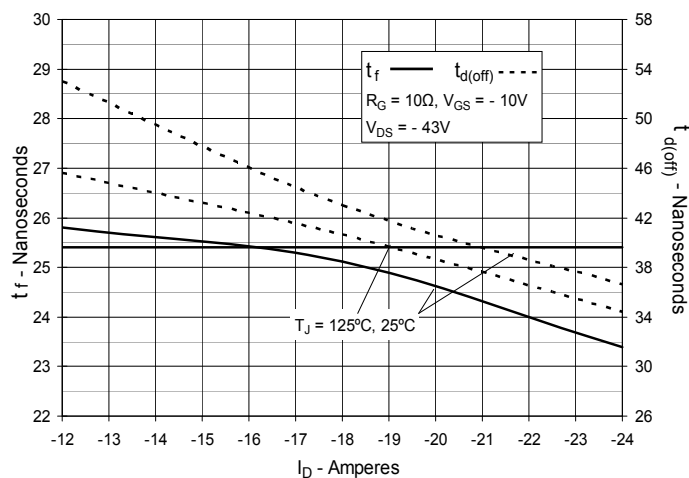
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



**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**

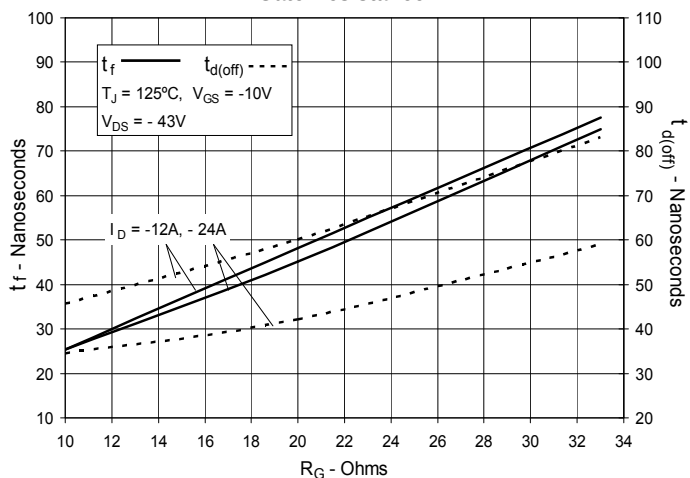
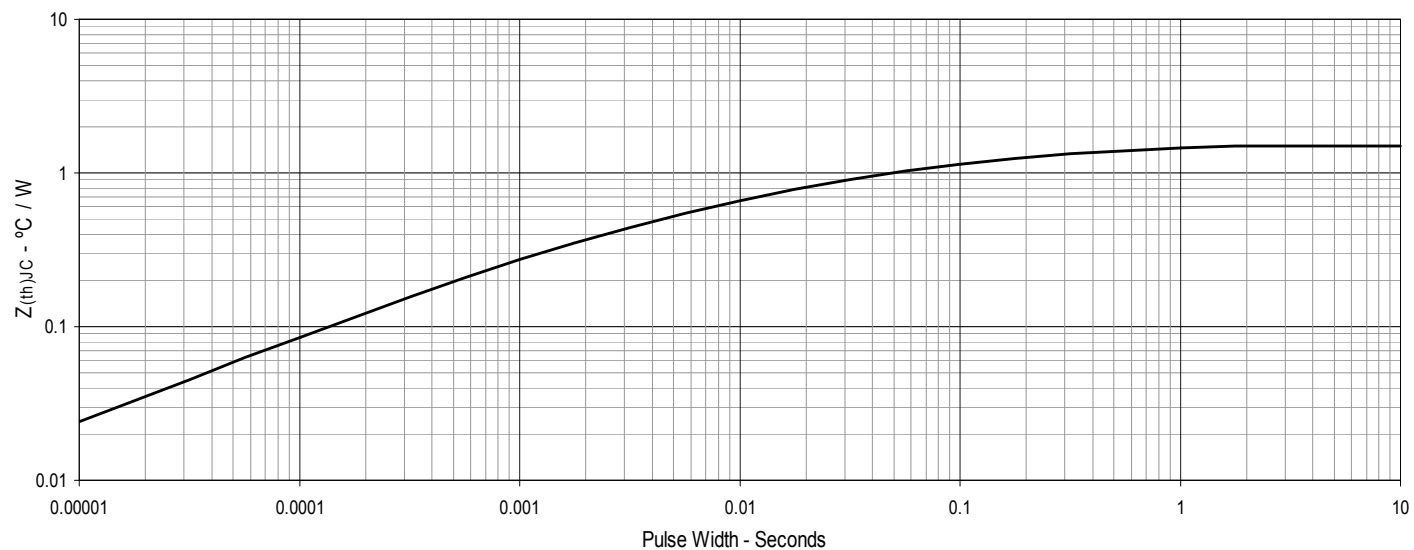


Fig. 19. Maximum Transient Thermal Impedance





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