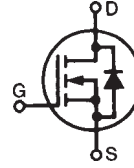


# TrenchMV™ Power MOSFET

**IXTA182N055T**  
**IXTP182N055T**

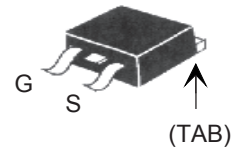
$$\begin{aligned} V_{DSS} &= 55 \text{ V} \\ I_{D25} &= 182 \text{ A} \\ R_{DS(on)} &\leq 5.0 \text{ m}\Omega \end{aligned}$$

N-Channel Enhancement Mode  
Avalanche Rated

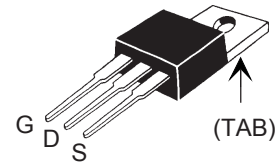


| Symbol     | Test Conditions                                                                                                                       | Maximum Ratings |                  |
|------------|---------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C to } 175^\circ\text{C}$                                                                                        | 55              | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C to } 175^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$                                                            | 55              | V                |
| $V_{GSM}$  | Transient                                                                                                                             | $\pm 20$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                                                                              | 182             | A                |
| $I_{LRMS}$ | Lead Current Limit, RMS                                                                                                               | 75              | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$                                                                            | 490             | A                |
| $I_{AR}$   | $T_C = 25^\circ\text{C}$                                                                                                              | 25              | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                                                                              | 1.0             | J                |
| $dv/dt$    | $I_S \leq I_{DM}$ , $di/dt \leq 100 \text{ A}/\mu\text{s}$ , $V_{DD} \leq V_{DSS}$<br>$T_J \leq 175^\circ\text{C}$ , $R_G = 5 \Omega$ | 3               | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                                                                              | 360             | W                |
| $T_J$      |                                                                                                                                       | -55 ... +175    | $^\circ\text{C}$ |
| $T_{JM}$   |                                                                                                                                       | 175             | $^\circ\text{C}$ |
| $T_{stg}$  |                                                                                                                                       | -55 ... +175    | $^\circ\text{C}$ |
| $T_L$      | 1.6 mm (0.062 in.) from case for 10 s                                                                                                 | 300             | $^\circ\text{C}$ |
| $T_{SOLD}$ | Plastic body for 10 seconds                                                                                                           | 260             | $^\circ\text{C}$ |
| $M_d$      | Mounting torque (TO-220)                                                                                                              | 1.13 / 10       | Nm/lb.in.        |
| Weight     | TO-263                                                                                                                                | 2.5             | g                |
|            | TO-220                                                                                                                                | 3.0             | g                |

TO-263 (IXTA)



TO-220 (IXTP)



G = Gate      D = Drain  
S = Source      TAB = Drain

## Features

- Ultra-low On Resistance
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect
- 175 °C Operating Temperature

## Advantages

- Easy to mount
- Space savings
- High power density

## Applications

- Automotive
  - Motor Drives
  - High Side Switch
  - 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.                 |
| $BV_{DSS}$   | $V_{GS} = 0 \text{ V}$ , $I_D = 250 \mu\text{A}$                          | 55                    |      | V                    |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250 \mu\text{A}$                               | 2.0                   |      | 4.0 V                |
| $I_{GSS}$    | $V_{GS} = \pm 20 \text{ V}$ , $V_{DS} = 0 \text{ V}$                      |                       |      | $\pm 200 \text{ nA}$ |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$                                                        |                       |      | 5 $\mu\text{A}$      |
|              | $V_{GS} = 0 \text{ V}$ $T_J = 150^\circ\text{C}$                          |                       |      | 250 $\mu\text{A}$    |
| $R_{DS(on)}$ | $V_{GS} = 10 \text{ V}$ , $I_D = 25 \text{ A}$ , Notes 1, 2               | 3.8                   | 5.0  | m $\Omega$           |

| Symbol                                              | Test Conditions                                                                                          | Characteristic Values |      |           |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------|------|-----------|
|                                                     |                                                                                                          | Min.                  | Typ. | Max.      |
| (T <sub>J</sub> = 25° C unless otherwise specified) |                                                                                                          |                       |      |           |
| <b>g<sub>fs</sub></b>                               | V <sub>DS</sub> = 10 V; I <sub>D</sub> =60 A, Note 1                                                     | 65                    | 100  | S         |
| <b>C<sub>iss</sub></b>                              | V <sub>GS</sub> = 0 V, V <sub>DS</sub> = 25 V, f = 1 MHz                                                 |                       | 4850 | pF        |
| <b>C<sub>oss</sub></b>                              |                                                                                                          |                       | 954  | pF        |
| <b>C<sub>rss</sub></b>                              |                                                                                                          |                       | 212  | pF        |
| <b>Resistive Switching Times</b>                    |                                                                                                          |                       |      |           |
| <b>t<sub>d(on)</sub></b>                            | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 30 V, I <sub>D</sub> = 25 A<br>R <sub>G</sub> = 5 Ω (External) |                       | 36   | ns        |
| <b>t<sub>r</sub></b>                                |                                                                                                          |                       | 35   | ns        |
| <b>t<sub>d(off)</sub></b>                           |                                                                                                          |                       | 53   | ns        |
| <b>t<sub>f</sub></b>                                |                                                                                                          |                       | 38   | ns        |
| <b>Q<sub>g(on)</sub></b>                            | V <sub>GS</sub> = 10 V, V <sub>DS</sub> = 0.5 V <sub>DSS</sub> , I <sub>D</sub> = 25 A                   |                       | 114  | nC        |
| <b>Q<sub>gs</sub></b>                               |                                                                                                          |                       | 30   | nC        |
| <b>Q<sub>gd</sub></b>                               |                                                                                                          |                       | 32   | nC        |
| <b>R<sub>thJC</sub></b>                             | TO-220                                                                                                   |                       |      | 0.42 °C/W |
| <b>R<sub>thCS</sub></b>                             |                                                                                                          |                       | 0.50 | °C/W      |

## Source-Drain Diode

| Symbol                                             | Test Conditions                                                                          | Characteristic Values |      |       |
|----------------------------------------------------|------------------------------------------------------------------------------------------|-----------------------|------|-------|
|                                                    |                                                                                          | Min.                  | Typ. | Max.  |
| T <sub>J</sub> = 25° C unless otherwise specified) |                                                                                          |                       |      |       |
| I <sub>S</sub>                                     | V <sub>GS</sub> = 0 V                                                                    |                       |      | 182 A |
| I <sub>SM</sub>                                    | Pulse width limited by T <sub>JM</sub>                                                   |                       |      | 490 A |
| V <sub>SD</sub>                                    | I <sub>F</sub> = 25 A, V <sub>GS</sub> = 0 V, Note 1                                     |                       |      | 1.0 V |
| t <sub>rr</sub>                                    | I <sub>F</sub> = 25 A, -di/dt = 100 A/μs<br>V <sub>R</sub> = 25 V, V <sub>GS</sub> = 0 V |                       | 70   | ns    |

- 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 5 mm or less from the package body.

## PRELIMINARY TECHNICAL INFORMATION

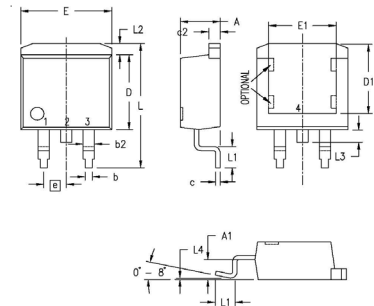
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right 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 |
| 4,850,072 | 5,017,508 | 5,063,307 | 5,381,025 | 6,259,123 B1 | 6,534,343    | 6,710,405B2 | 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    |

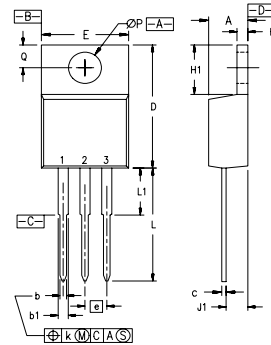
## TO-263AA (IXTA) Outline



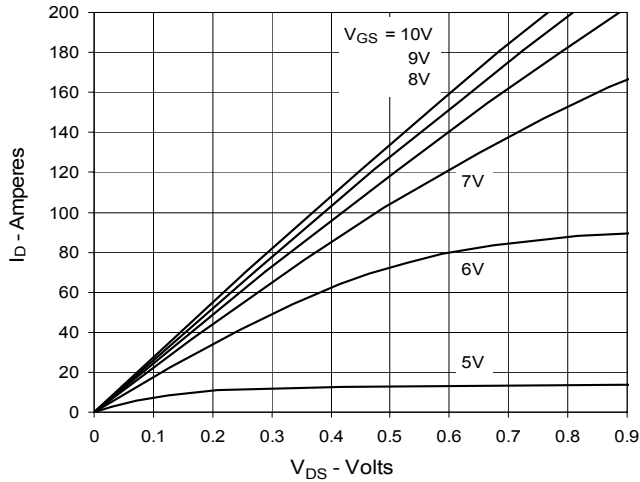
Pins: 1 - Gate 2 - Drain  
3 - Source 4, TAB - Drain

| Dim. | Millimeter |       | Inches |      |
|------|------------|-------|--------|------|
|      | Min.       | Max.  | Min.   | Max. |
| A    | 4.06       | 4.83  | .160   | .190 |
| A1   | 2.03       | 2.79  | .080   | .110 |
| b    | 0.51       | 0.99  | .020   | .039 |
| b2   | 1.14       | 1.40  | .045   | .055 |
| c    | 0.46       | 0.74  | .018   | .029 |
| c2   | 1.14       | 1.40  | .045   | .055 |
| D    | 8.64       | 9.65  | .340   | .380 |
| D1   | 7.11       | 8.13  | .280   | .320 |
| E    | 9.65       | 10.29 | .380   | .405 |
| E1   | 6.86       | 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          | 0.38  | 0      | .015 |
| R    | 0.46       | 0.74  | .018   | .029 |

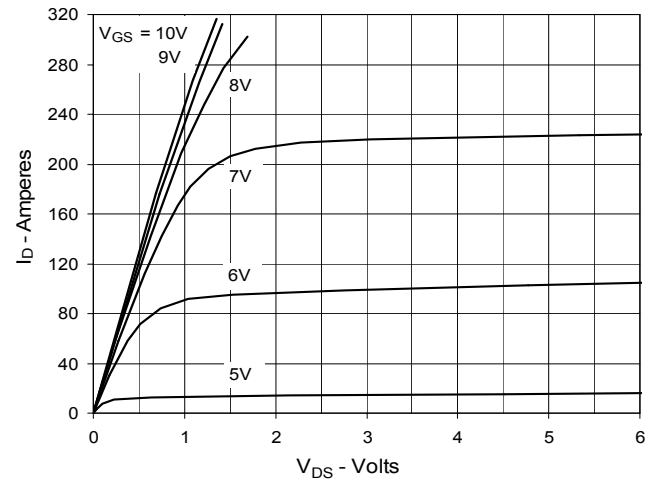
## TO-220AB (IXTP) Outline



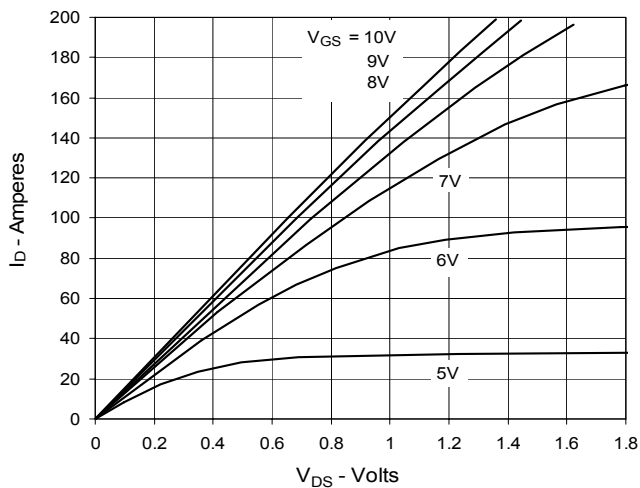
**Fig. 1. Output Characteristics  
@ 25°C**



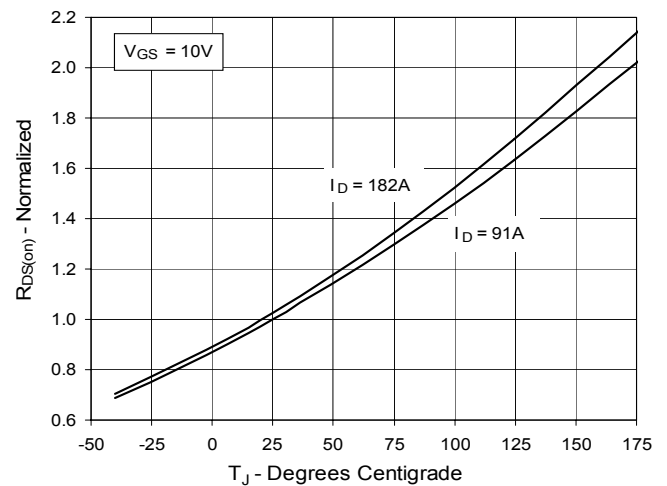
**Fig. 2. Extended Output Characteristics  
@ 25°C**



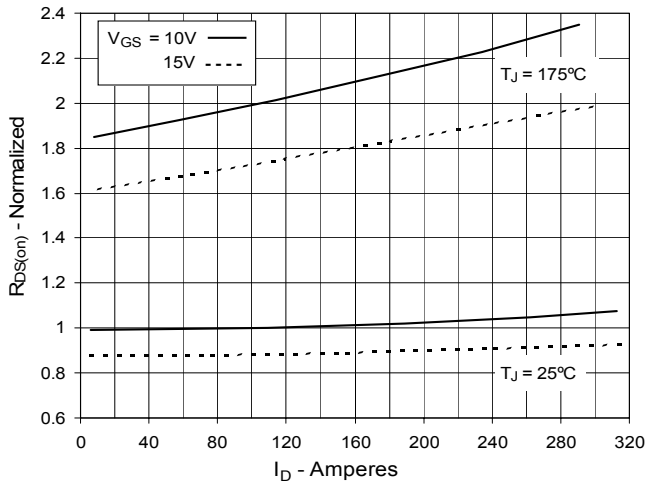
**Fig. 3. Output Characteristics  
@ 150°C**



**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 91A$  Value  
vs. Junction Temperature**



**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 91A$  Value  
vs. Drain Current**



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

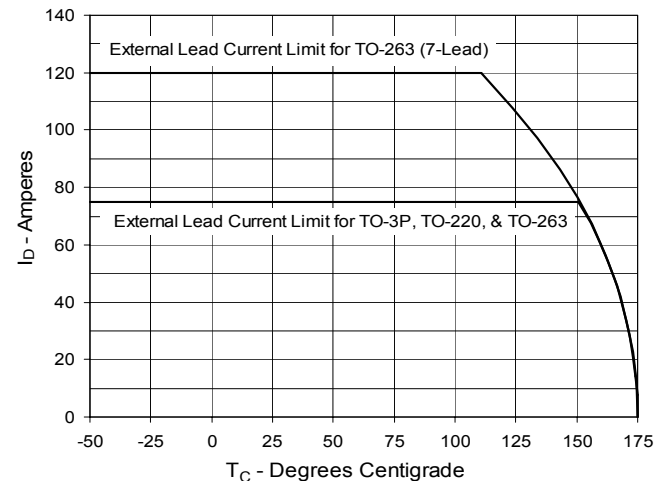


Fig. 7. Input Admittance

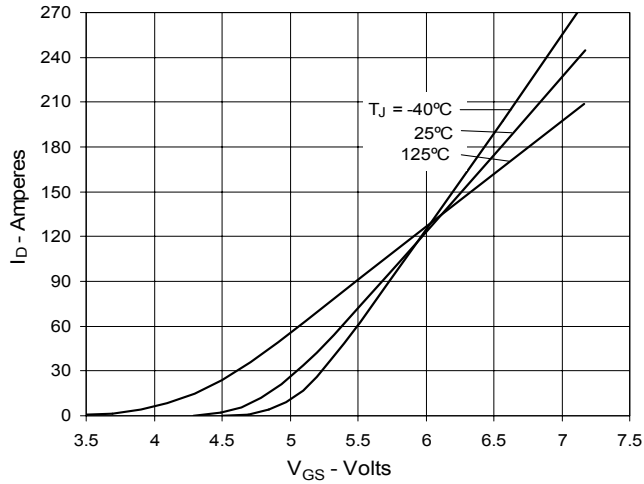


Fig. 8. Transconductance

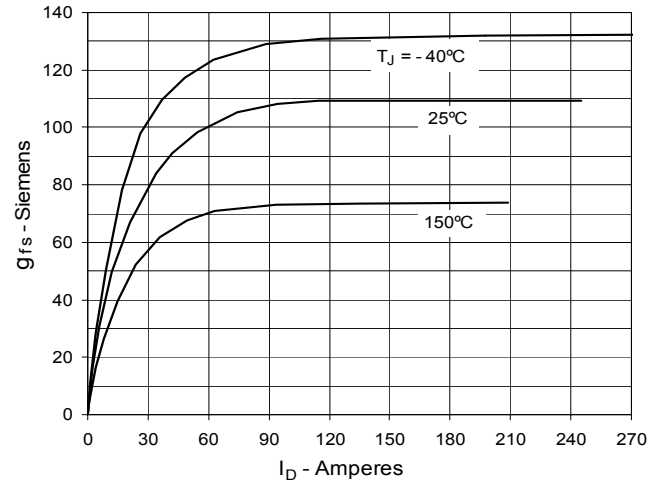


Fig. 9. Forward Voltage Drop of Intrinsic Diode

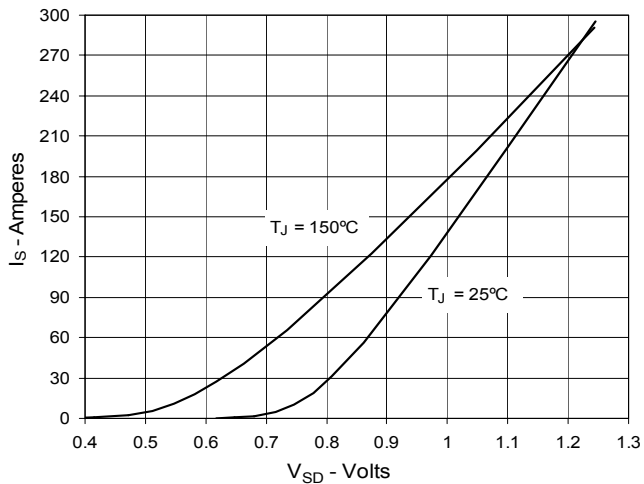


Fig. 10. Gate Charge

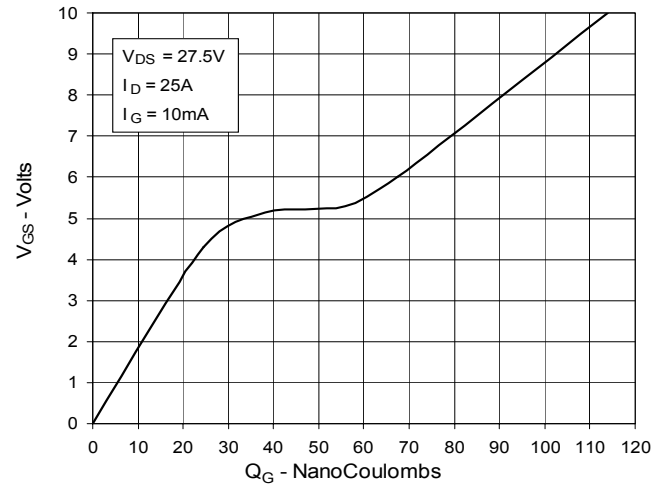


Fig. 11. Capacitance

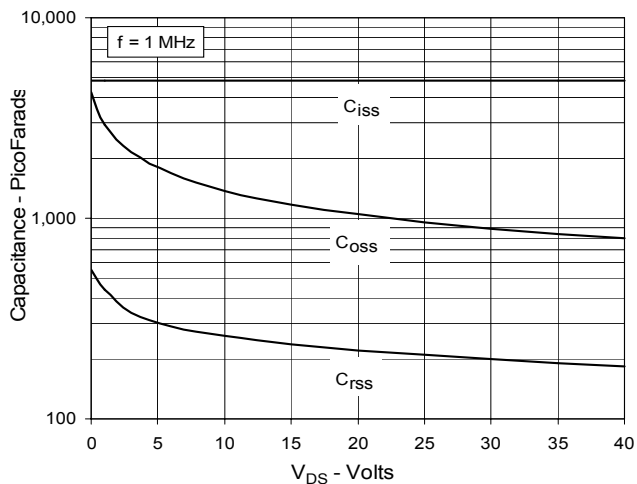
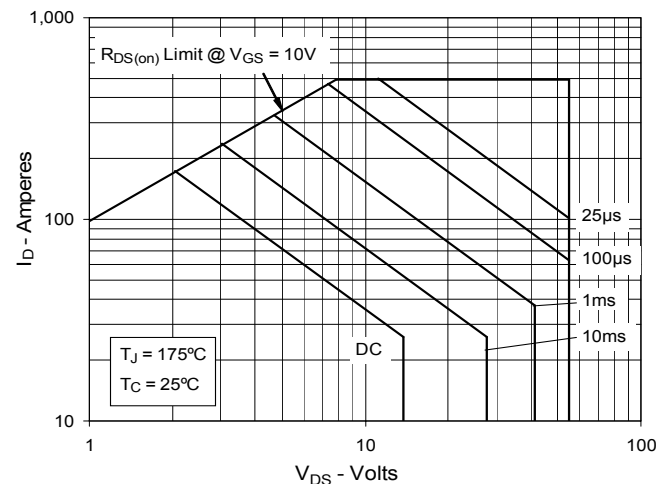
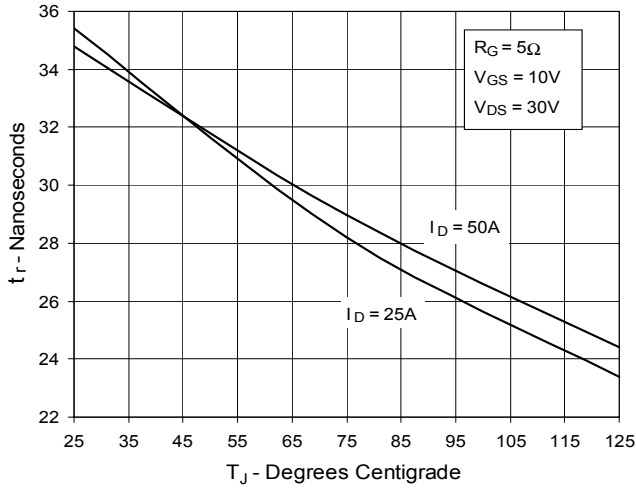


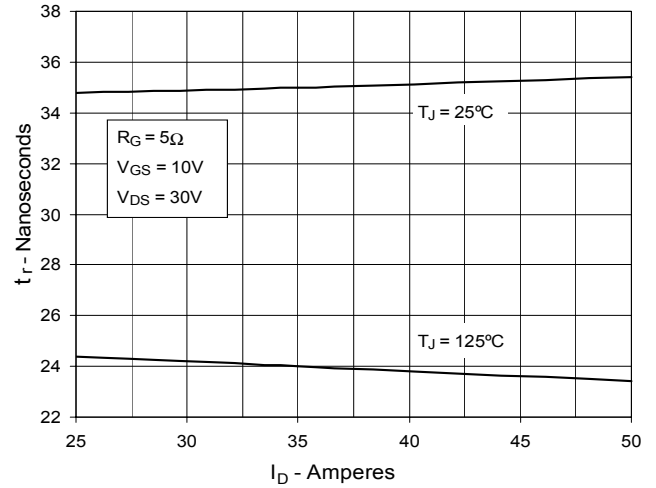
Fig. 12. Forward-Bias Safe Operating Area



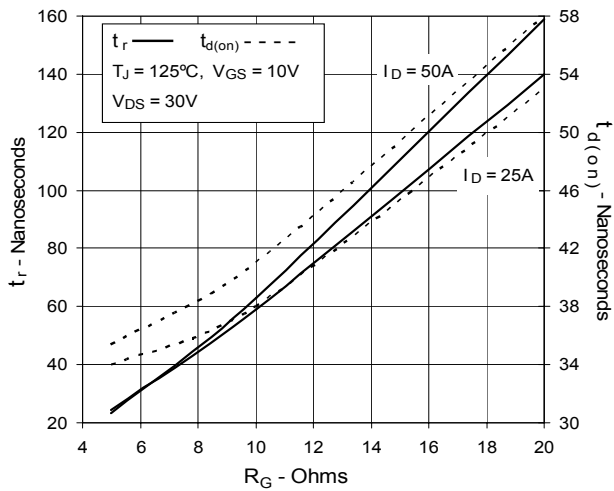
**Fig. 13. Resistive Turn-on  
Rise Time vs. Junction Temperature**



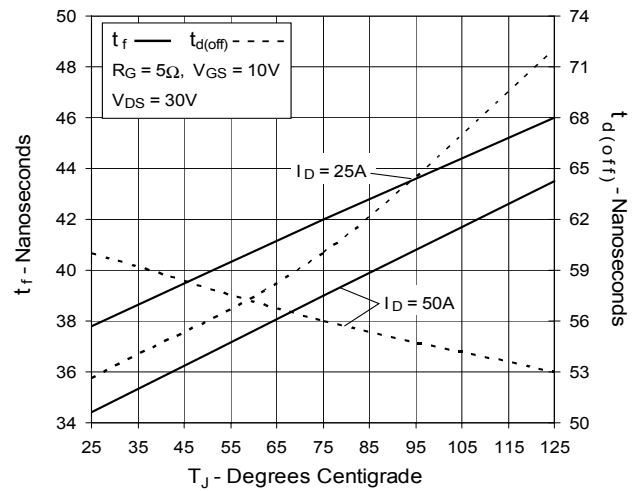
**Fig. 14. Resistive Turn-on  
Rise Time vs. Drain Current**



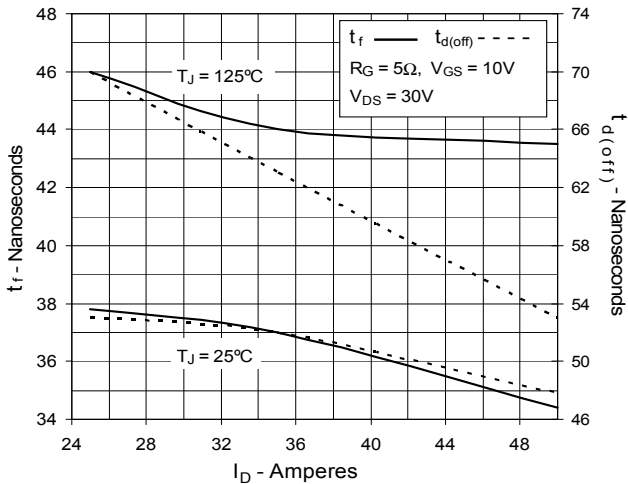
**Fig. 15. Resistive Turn-on  
Switching Times vs. Gate Resistance**



**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**

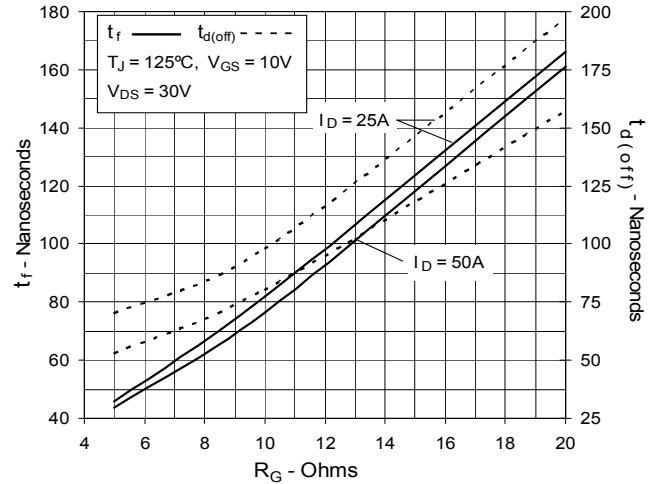
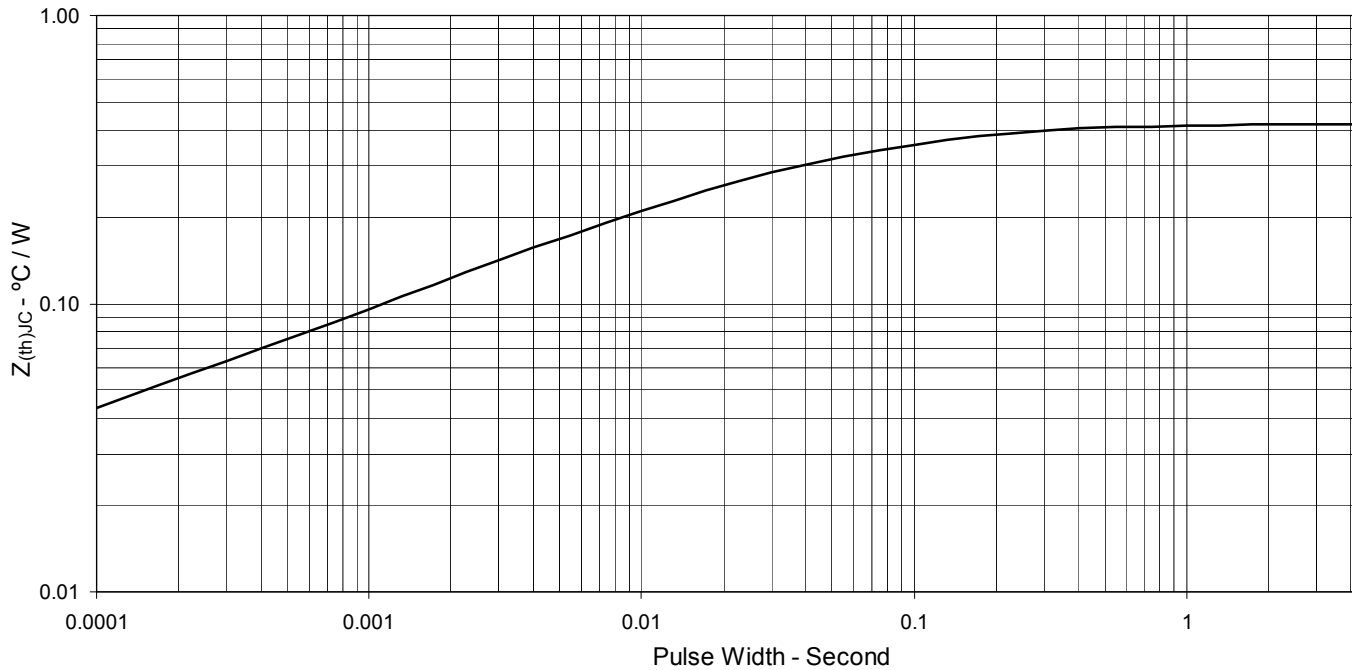


Fig. 19. Maximum Transient Thermal Impedance





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