

### TrenchT2™ HiperFET Power MOSFET

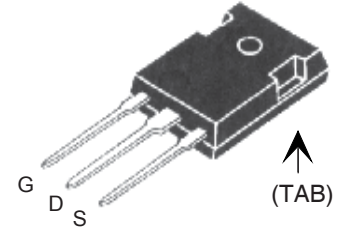
### IXFH110N15T2

$$\begin{aligned} V_{DSS} &= 150V \\ I_{D25} &= 110A \\ R_{DS(on)} &\leq 13m\Omega \end{aligned}$$

N-Channel Enhancement Mode  
Avalanche Rated



TO-247



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

| Symbol     | Test Conditions                                                          | Maximum Ratings |                  |
|------------|--------------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$                          | 150             | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$ , $R_{GS} = 1M\Omega$    | 150             | V                |
| $V_{GSS}$  | Continuous                                                               | $\pm 20$        | V                |
| $V_{GSM}$  | Transient                                                                | $\pm 30$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$                                                 | 110             | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , pulse width limited by $T_{JM}$               | 300             | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                                 | 55              | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                                 | 800             | mJ               |
| $dV/dt$    | $I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 175^\circ\text{C}$ | 15              | V/ns             |
| $P_D$      | $T_C = 25^\circ\text{C}$                                                 | 480             | 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     |                                                                          | 6               | g                |

#### Features

- International standard package
- $175^\circ\text{C}$  Operating Temperature
- High current handling capability
- Fast intrinsic Rectifier
- Dynamic  $dV/dt$  rated
- Low  $R_{DS(on)}$

#### Advantages

- Easy to mount
- Space savings
- High power density

#### Applications

- DC-DC converters
- Battery chargers
- Switched-mode and resonant-mode power supplies
- DC choppers
- AC motor drives
- Uninterruptible power supplies
- High speed power switching applications

| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ unless otherwise specified) | Characteristic Values |      |                   |
|--------------|---------------------------------------------------------------------------|-----------------------|------|-------------------|
|              |                                                                           | Min.                  | Typ. | Max.              |
| $BV_{DSS}$   | $V_{GS} = 0V$ , $I_D = 250\mu\text{A}$                                    | 150                   |      | V                 |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$ , $I_D = 250\mu\text{A}$                                | 2.5                   |      | 4.5 V             |
| $I_{GSS}$    | $V_{GS} = \pm 20V$ , $V_{DS} = 0V$                                        |                       |      | $\pm 200$ nA      |
| $I_{DSS}$    | $V_{DS} = V_{DSS}$                                                        |                       |      | 25 $\mu\text{A}$  |
|              | $V_{GS} = 0V$ $T_J = 150^\circ\text{C}$                                   |                       |      | 500 $\mu\text{A}$ |
| $R_{DS(on)}$ | $V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Notes 1, 2                   |                       |      | 13 m $\Omega$     |

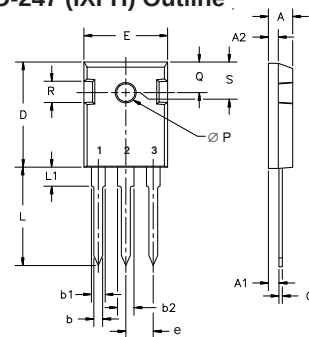
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                                                                          | Characteristic Values |      |                    |
|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|--------------------|
|              |                                                                                                                                                      | Min.                  | Typ. | Max.               |
| $g_{fs}$     | $V_{DS} = 10\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1                                                                                           | 75                    | 115  | S                  |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                                     |                       | 8600 | pF                 |
| $C_{oss}$    |                                                                                                                                                      |                       | 685  | pF                 |
| $C_{rss}$    |                                                                                                                                                      |                       | 77   | 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>$R_G = 3.3\Omega$ (External) |                       | 33   | ns                 |
| $t_r$        |                                                                                                                                                      |                       | 16   | ns                 |
| $t_{d(off)}$ |                                                                                                                                                      |                       | 33   | ns                 |
| $t_f$        |                                                                                                                                                      |                       | 18   | ns                 |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$                                                                     |                       | 150  | nC                 |
| $Q_{gs}$     |                                                                                                                                                      |                       | 42   | nC                 |
| $Q_{gd}$     |                                                                                                                                                      |                       | 46   | nC                 |
| $R_{thJC}$   |                                                                                                                                                      |                       | 0.31 | $^\circ\text{C/W}$ |
| $R_{thCH}$   |                                                                                                                                                      | 0.21                  |      | $^\circ\text{C/W}$ |

## Source-Drain Diode

| Symbol   | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , unless otherwise specified)                           | Characteristic Values |      |       |
|----------|-------------------------------------------------------------------------------------------------------|-----------------------|------|-------|
|          |                                                                                                       | Min.                  | Typ. | Max.  |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                  |                       |      | 110 A |
| $I_{SM}$ | Repetitive, Pulse width limited by $T_{JM}$                                                           |                       |      | 440 A |
| $V_{SD}$ | $I_F = 100\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                                                   |                       |      | 1.3 V |
| $t_{rr}$ | $I_F = 55\text{A}$ , $V_{GS} = 0\text{V}$<br>$-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 75\text{V}$ |                       | 85   | ns    |
| $I_{RM}$ |                                                                                                       |                       | 6.8  | A     |
| $Q_{RM}$ |                                                                                                       |                       | 290  | nC    |

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

## TO-247 (IXFH) Outline



Terminals: 1 - Gate 2 - Drain

| Dim.           | Millimeter |       | Inches |       |
|----------------|------------|-------|--------|-------|
|                | Min.       | Max.  | Min.   | Max.  |
| A              | 4.7        | 5.3   | .185   | .209  |
| A <sub>1</sub> | 2.2        | 2.54  | .087   | .102  |
| A <sub>2</sub> | 2.2        | 2.6   | .059   | .098  |
| b              | 1.0        | 1.4   | .040   | .055  |
| b <sub>1</sub> | 1.65       | 2.13  | .065   | .084  |
| b <sub>2</sub> | 2.87       | 3.12  | .113   | .123  |
| C              | .4         | .8    | .016   | .031  |
| D              | 20.80      | 21.46 | .819   | .845  |
| E              | 15.75      | 16.26 | .610   | .640  |
| e              | 5.20       | 5.72  | 0.205  | 0.225 |
| L              | 19.81      | 20.32 | .780   | .800  |
| L1             |            | 4.50  |        | .177  |
| ØP             | 3.55       | 3.65  | .140   | .144  |
| Q              | 5.89       | 6.40  | 0.232  | 0.252 |
| R              | 4.32       | 5.49  | .170   | .216  |

## PRELIMINARY TECHNICAL INFORMATION

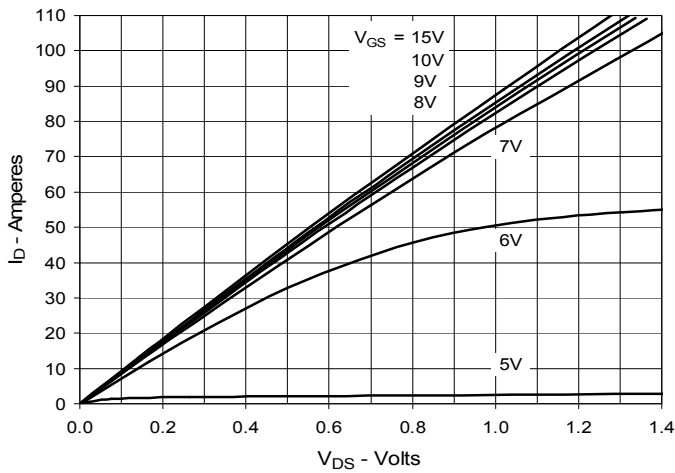
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right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

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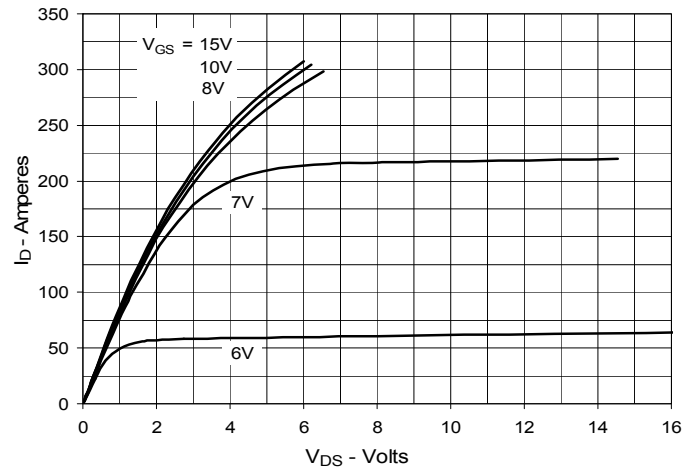
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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

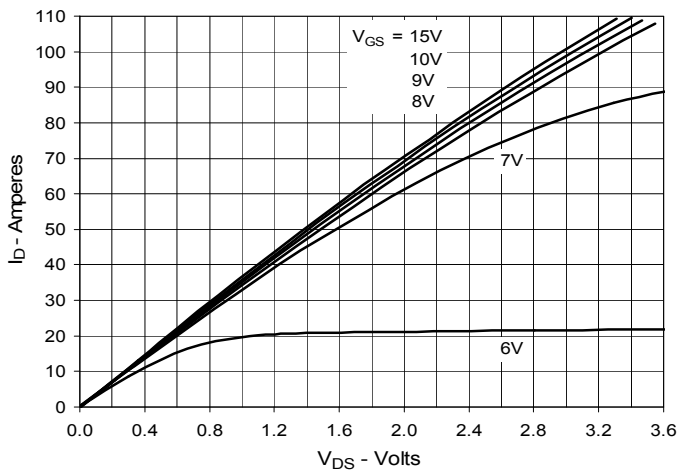
**Fig. 1. Output Characteristics  
@ 25°C**



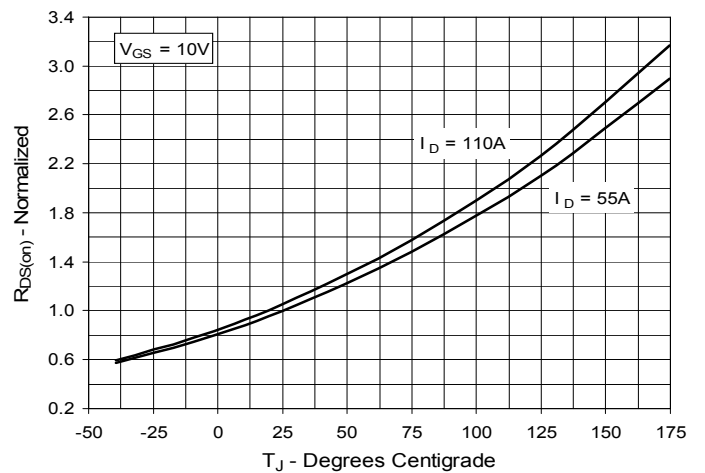
**Fig. 2. Extended Output Characteristics  
@ 25°C**



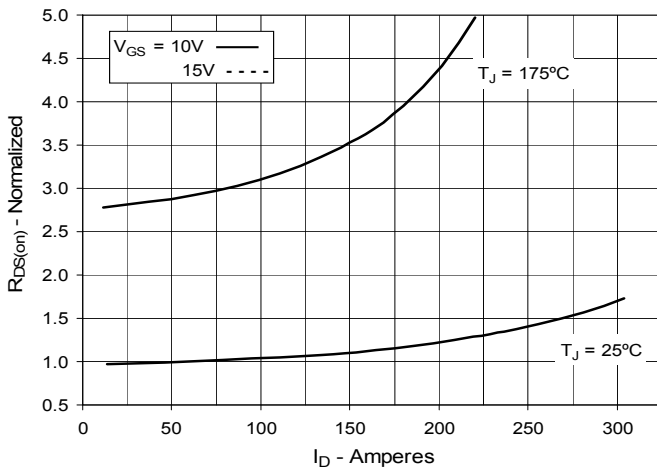
**Fig. 3. Output Characteristics  
@ 150°C**



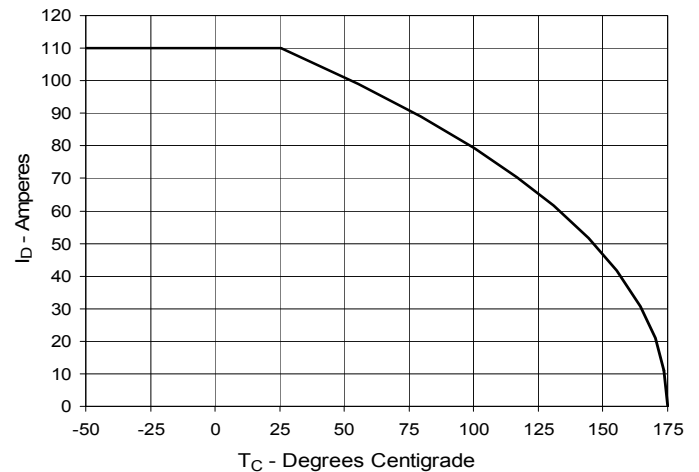
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 55A$  Value  
vs. Junction Temperature**



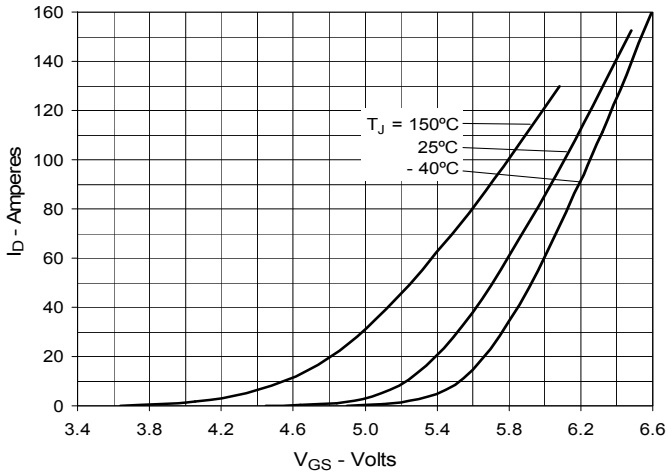
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 55A$  Value  
vs. Drain Current**



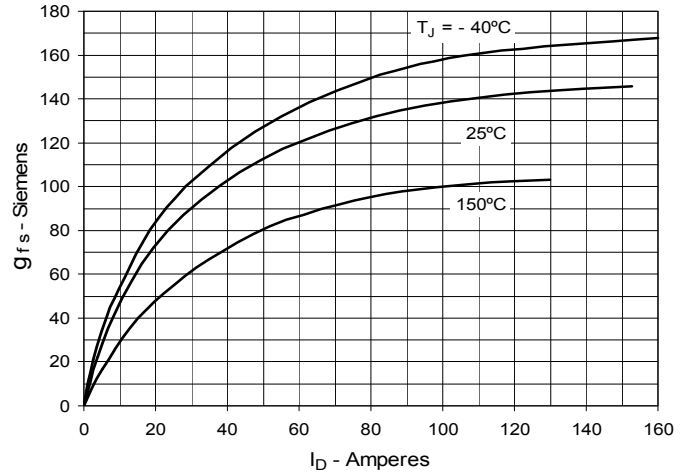
**Fig. 6. Drain Current vs. Case Temperature**



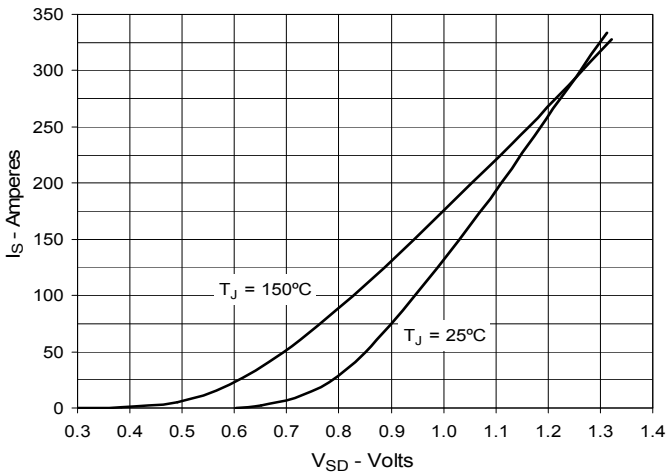
**Fig. 7. Input Admittance**



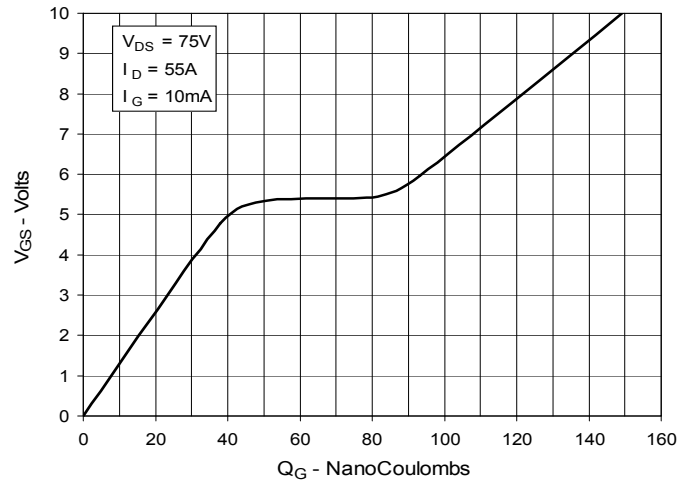
**Fig. 8. Transconductance**



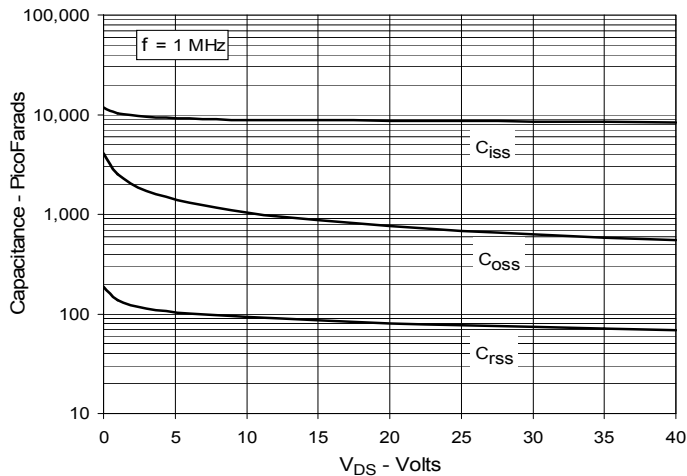
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



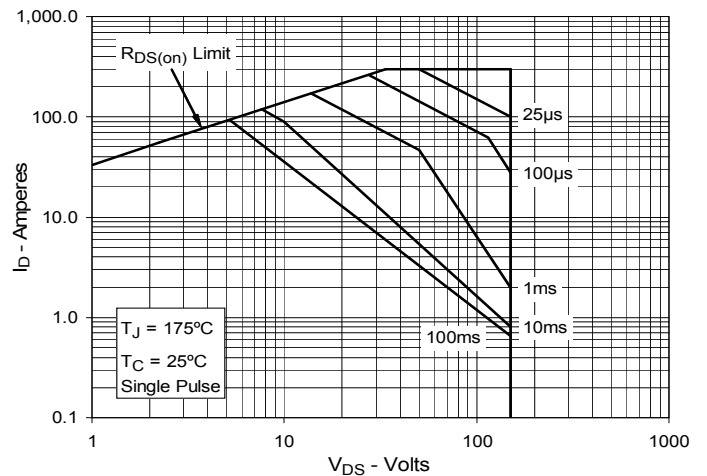
**Fig. 10. Gate Charge**



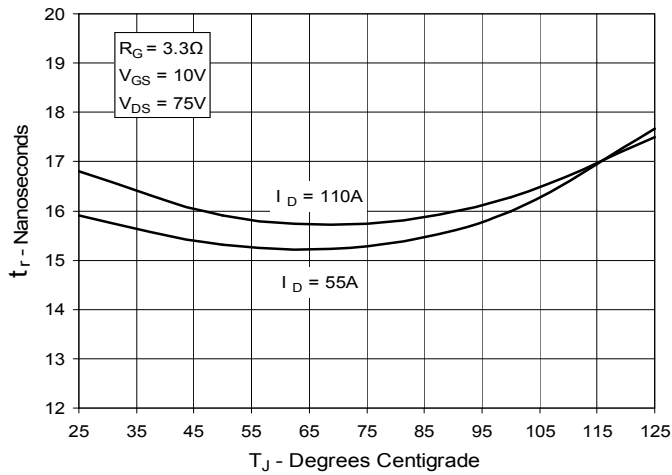
**Fig. 11. Capacitance**



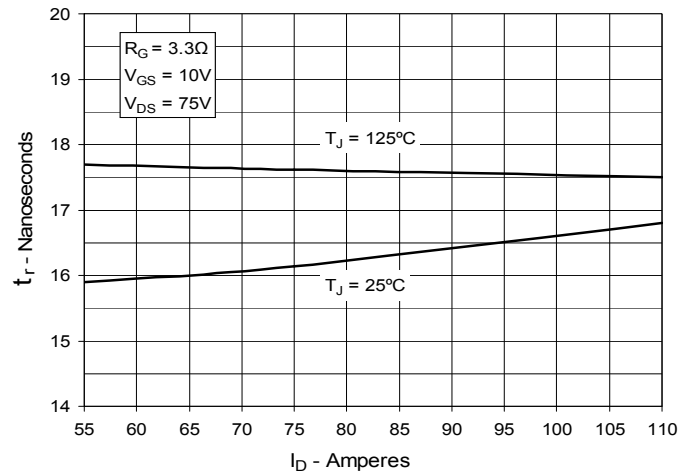
**Fig. 12. Forward-Bias Safe Operating Area**



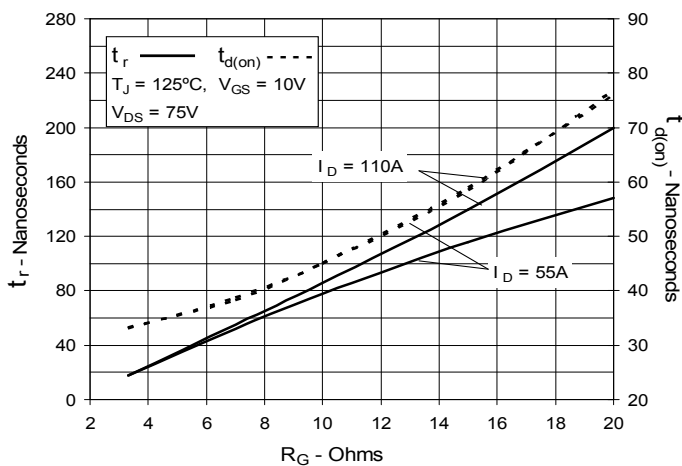
**Fig. 13. Resistive Turn-on  
Rise Time vs. Junction Temperature**



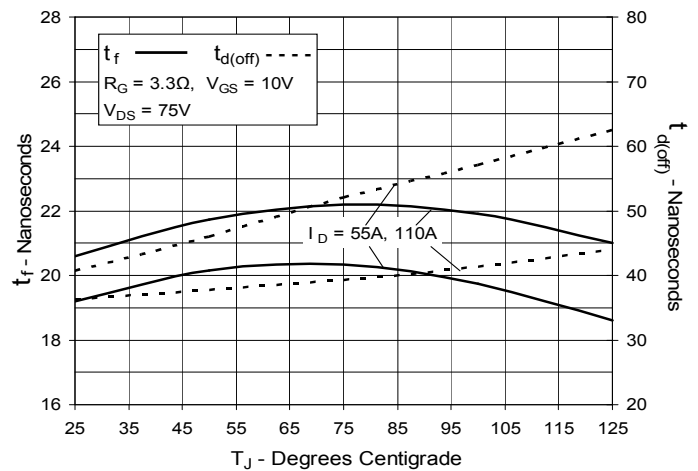
**Fig. 14. Resistive Turn-on  
Rise Time vs. Drain Current**



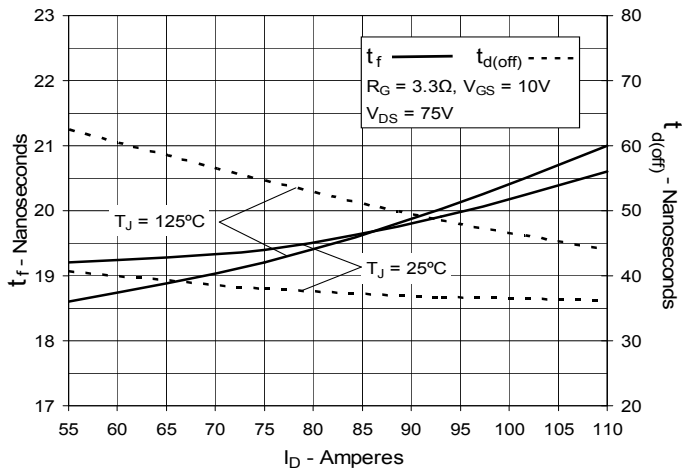
**Fig. 15. Resistive Turn-on  
Switching Times vs. Gate Resistance**



**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**

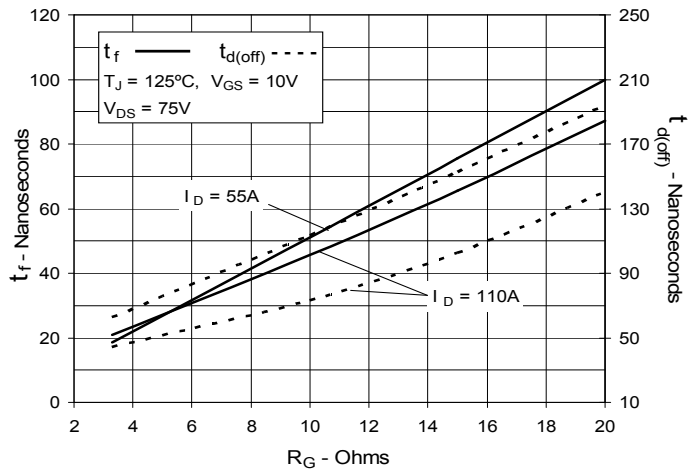
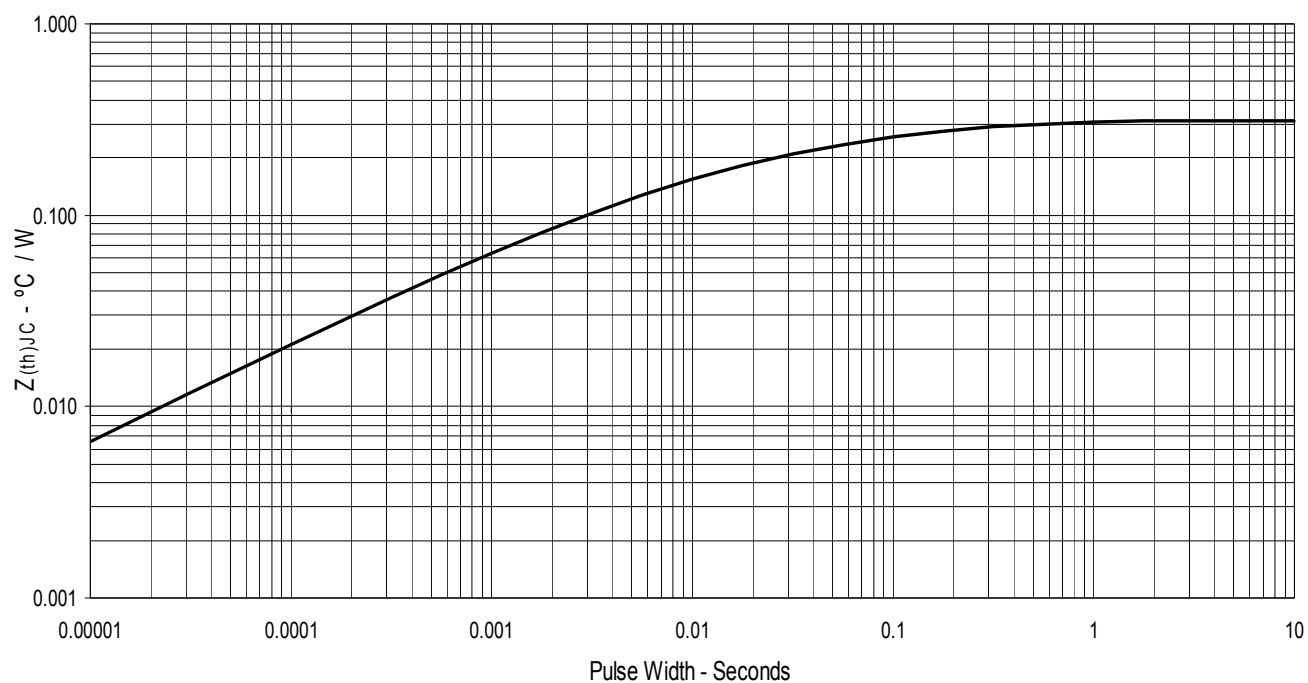


Fig. 19. Maximum Transient Thermal Impedance





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