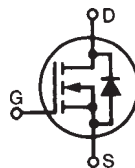


## TrenchT2™ HiperFET™ Power MOSFET

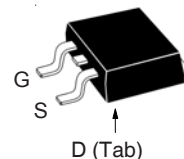
## IXFA230N075T2 IXFP230N075T2

$$\begin{aligned} V_{DSS} &= 75V \\ I_{D25} &= 230A \\ R_{DS(on)} &\leq 4.2m\Omega \end{aligned}$$

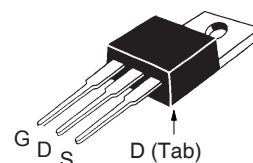
N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Rectifier



TO-263 AA (IXFA)



TO-220AB (IXFP)



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

| Symbol     | Test Conditions                                                   | Maximum Ratings |                  |
|------------|-------------------------------------------------------------------|-----------------|------------------|
| $V_{DSS}$  | $T_J = 25^\circ\text{C to } 175^\circ\text{C}$                    | 75              | V                |
| $V_{DGR}$  | $T_J = 25^\circ\text{C to } 175^\circ\text{C}, R_{GS} = 1M\Omega$ | 75              | V                |
| $V_{GSM}$  | Transient                                                         | $\pm 20$        | V                |
| $I_{D25}$  | $T_C = 25^\circ\text{C}$ (Chip Capability)                        | 230             | A                |
| $I_{LRMS}$ | Lead Current Limit, RMS                                           | 120             | A                |
| $I_{DM}$   | $T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$        | 700             | A                |
| $I_A$      | $T_C = 25^\circ\text{C}$                                          | 115             | A                |
| $E_{AS}$   | $T_C = 25^\circ\text{C}$                                          | 850             | mJ               |
| $P_D$      | $T_C = 25^\circ\text{C}$                                          | 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             | $^\circ\text{C}$ |
| $M_d$      | Mounting Torque (TO-220)                                          | 1.13 / 10       | Nm/lb.in.        |
| Weight     | TO-263                                                            | 2.5             | g                |
|            | TO-220                                                            | 3.0             | g                |

### Features

- International Standard Packages
- 175°C Operating Temperature
- High Current Handling Capability
- Avalanche Rated
- Fast Intrinsic Rectifier
- Low  $R_{DS(on)}$

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- Automotive
  - Motor Drives
  - 12V Power Bus
  - 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.           |
| $BV_{DSS}$   | $V_{GS} = 0V, I_D = 250\mu A$                                             | 75                    |      | V              |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 1mA$                                              | 2.0                   |      | 4.0 V          |
| $I_{GSS}$    | $V_{GS} = \pm 20V, V_{DS} = 0V$                                           |                       |      | $\pm 200$ nA   |
| $I_{DSS}$    | $V_{DS} = V_{DSS}, V_{GS} = 0V$<br>$T_J = 150^\circ\text{C}$              |                       |      | 25 $\mu A$     |
|              |                                                                           |                       |      | 250 $\mu A$    |
| $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 50A$ , Note 1                                        |                       |      | 4.2 m $\Omega$ |

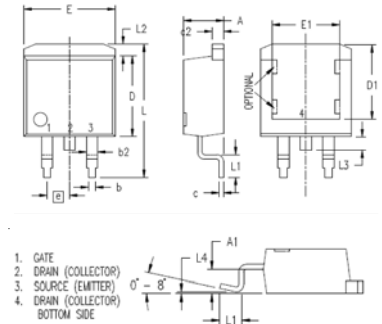
| Symbol       | Test Conditions<br>( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)                                                                        | Characteristic Values |      |                         |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|-------------------------|
|              |                                                                                                                                                    | Min.                  | Typ. | Max.                    |
| $g_{fs}$     | $V_{DS} = 10\text{V}$ , $I_D = 60\text{A}$ , Note 1                                                                                                | 50                    | 85   | S                       |
| $C_{iss}$    | $V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$                                                                                   |                       | 10.5 | nF                      |
| $C_{oss}$    |                                                                                                                                                    |                       | 1165 | pF                      |
| $C_{rss}$    |                                                                                                                                                    |                       | 125  | 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>$R_G = 2\Omega$ (External) |                       | 23   | ns                      |
| $t_r$        |                                                                                                                                                    |                       | 18   | ns                      |
| $t_{d(off)}$ |                                                                                                                                                    |                       | 33   | ns                      |
| $t_f$        |                                                                                                                                                    |                       | 15   | ns                      |
| $Q_{g(on)}$  | $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$                                                                   |                       | 178  | nC                      |
| $Q_{gs}$     |                                                                                                                                                    |                       | 53   | nC                      |
| $Q_{gd}$     |                                                                                                                                                    |                       | 41   | nC                      |
| $R_{thJC}$   | TO-220                                                                                                                                             |                       |      | 0.31 $^\circ\text{C/W}$ |
| $R_{thCH}$   |                                                                                                                                                    |                       | 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.  |
| $I_S$    | $V_{GS} = 0\text{V}$                                                                                   |                       |      | 230 A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$                                                            |                       |      | 900 A |
| $V_{SD}$ | $I_F = 100\text{A}$ , $V_{GS} = 0\text{V}$ , Note 1                                                    |                       |      | 1.3 V |
| $t_{rr}$ | $I_F = 115\text{A}$ , $V_{GS} = 0\text{V}$<br>$-di/dt = 100\text{A}/\mu\text{s}$<br>$V_R = 37\text{V}$ |                       | 59   | ns    |
| $I_{RM}$ |                                                                                                        |                       | 3.6  | A     |
| $Q_{RM}$ |                                                                                                        |                       | 106  | nC    |

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

## TO-263 (IXFA) Outline



| 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 (IXFP) Outline

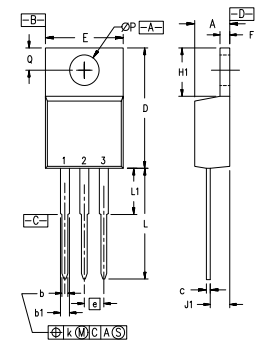


Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$

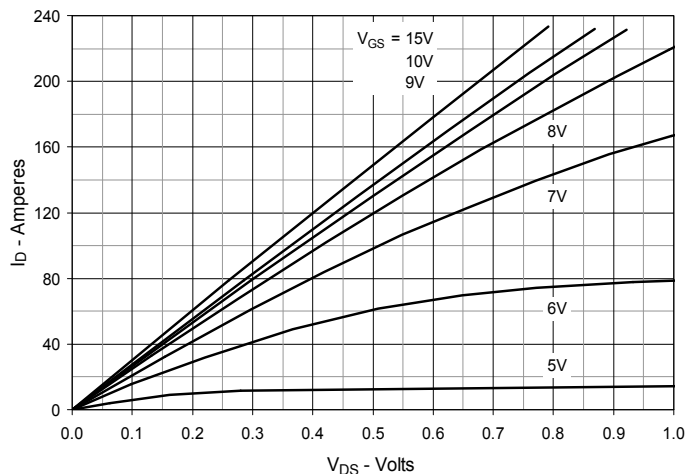


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

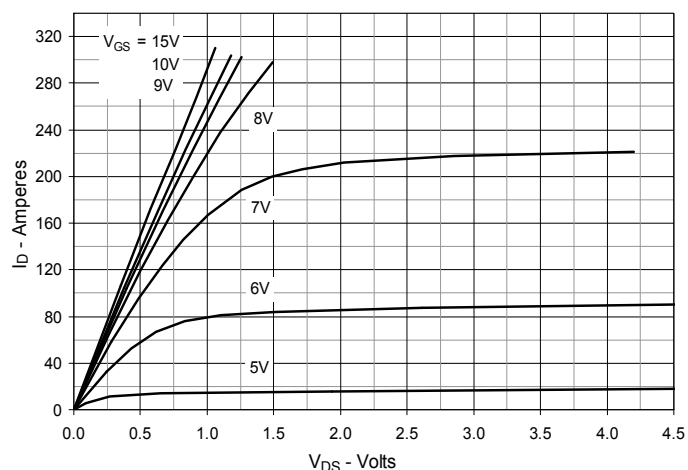


Fig. 3. Output Characteristics @  $T_J = 150^\circ\text{C}$

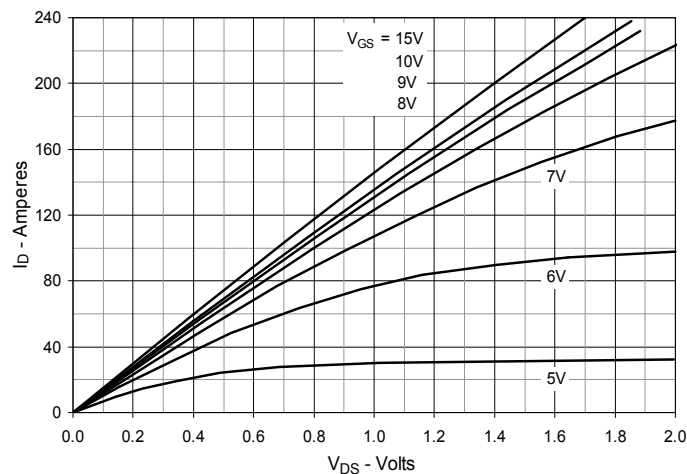


Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 115\text{A}$  Value vs. Junction Temperature

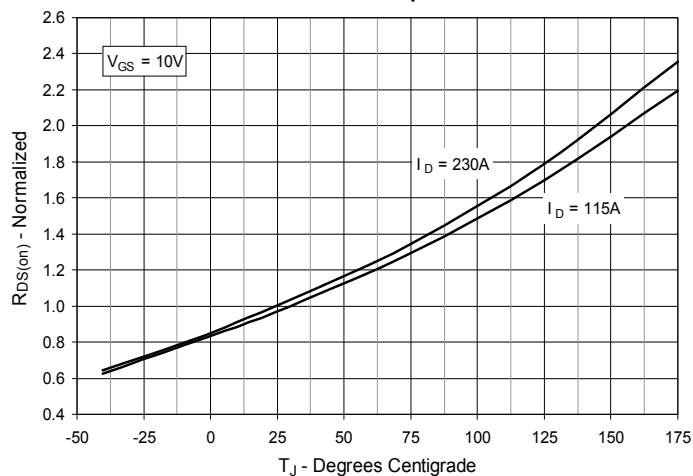


Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 115\text{A}$  Value vs. Drain Current

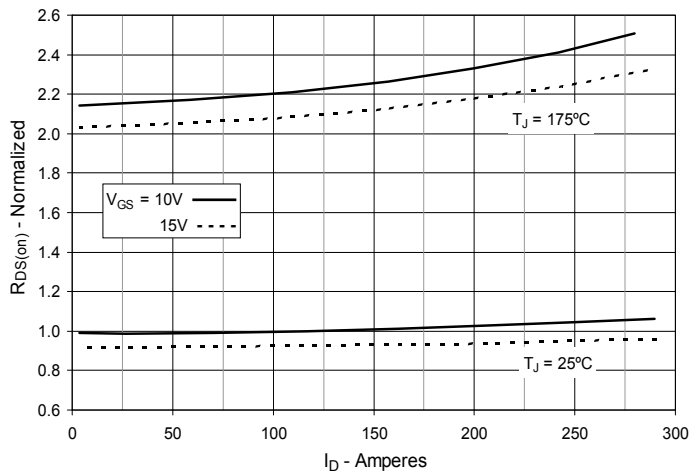


Fig. 6. Drain Current vs. Case Temperature

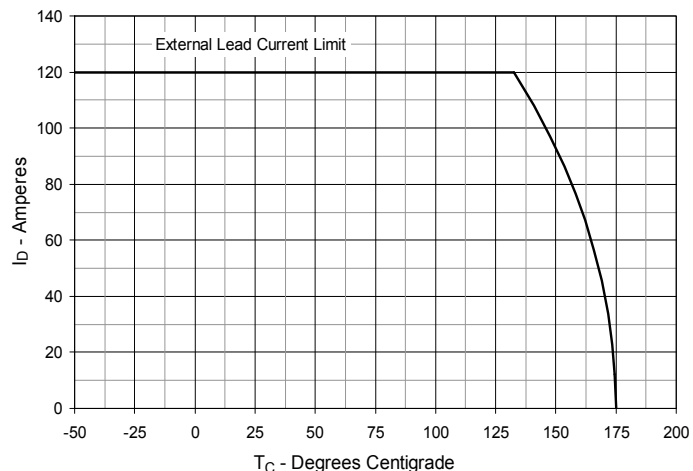


Fig. 7. Input Admittance

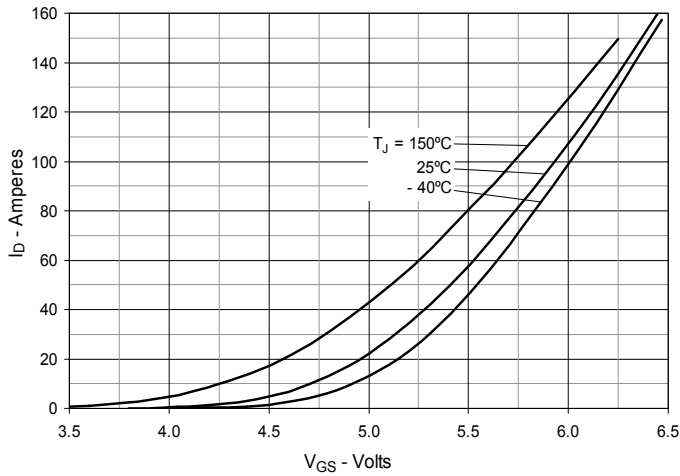


Fig. 8. Transconductance

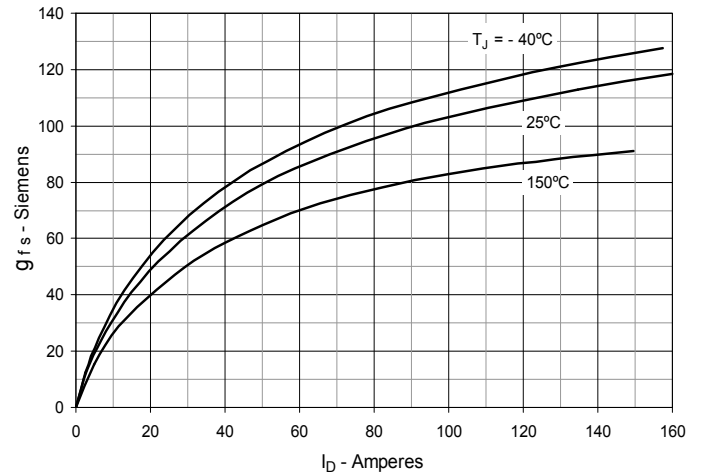


Fig. 9. Forward Voltage Drop of Intrinsic Diode

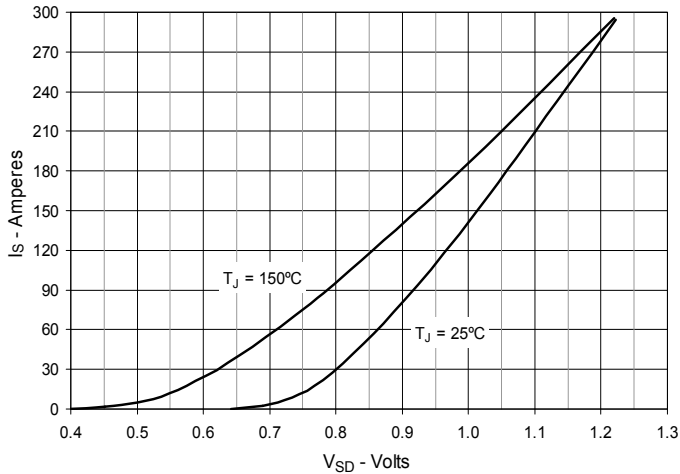


Fig. 10. Gate Charge

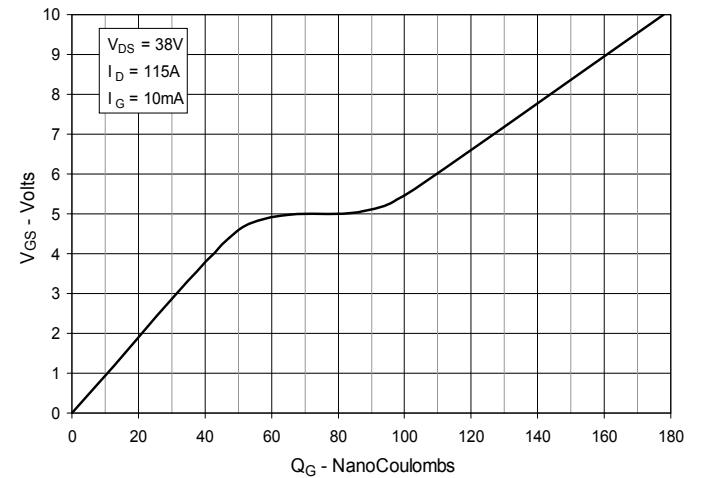


Fig. 11. Capacitance

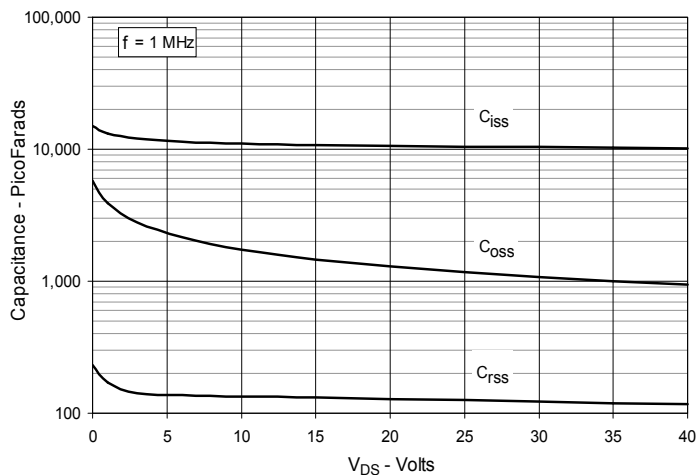


Fig. 12. Forward-Bias Safe Operating Area

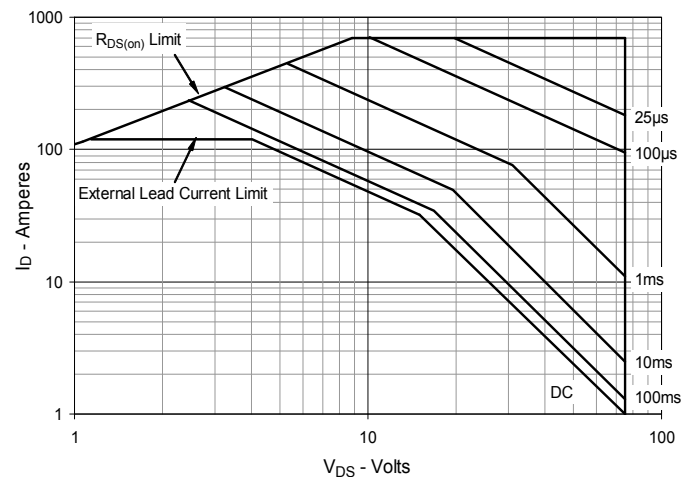


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

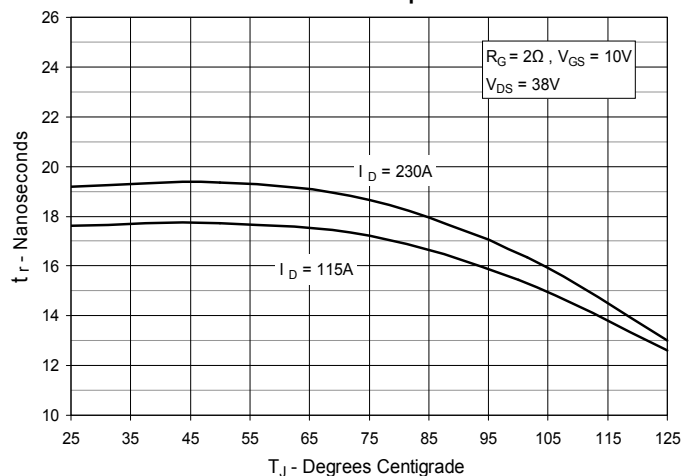


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

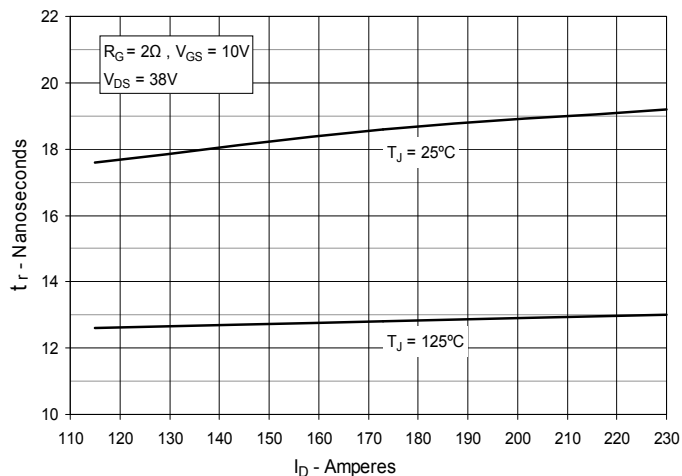


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

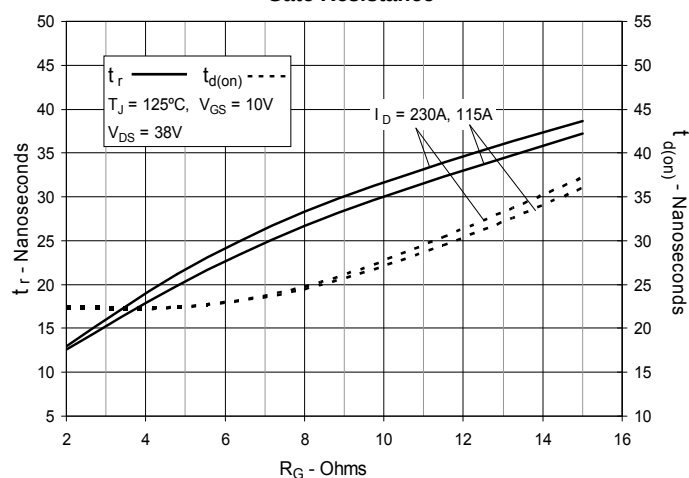


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

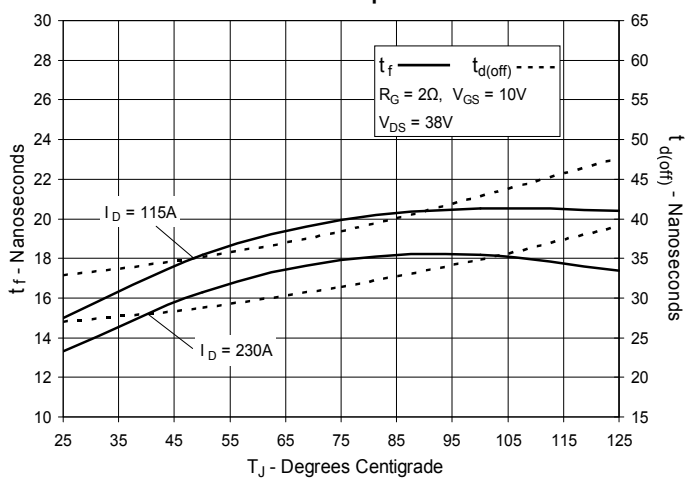


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

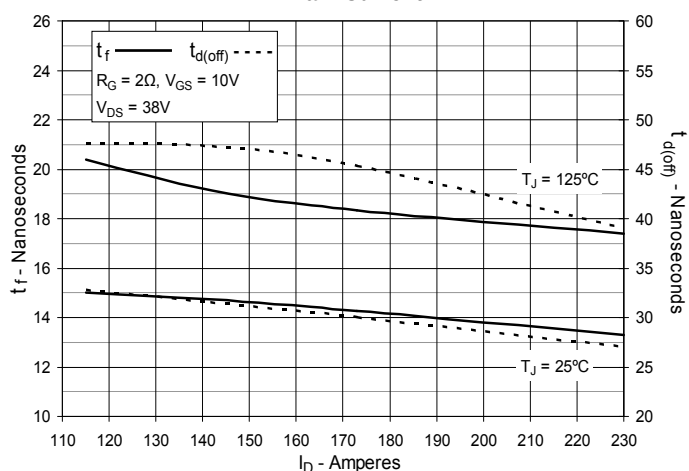


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

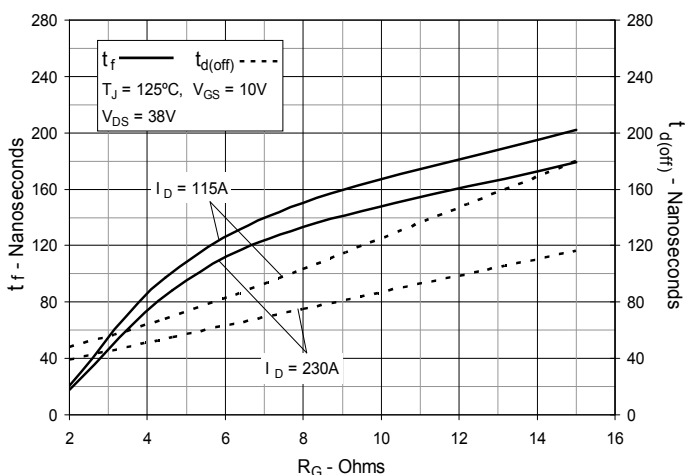
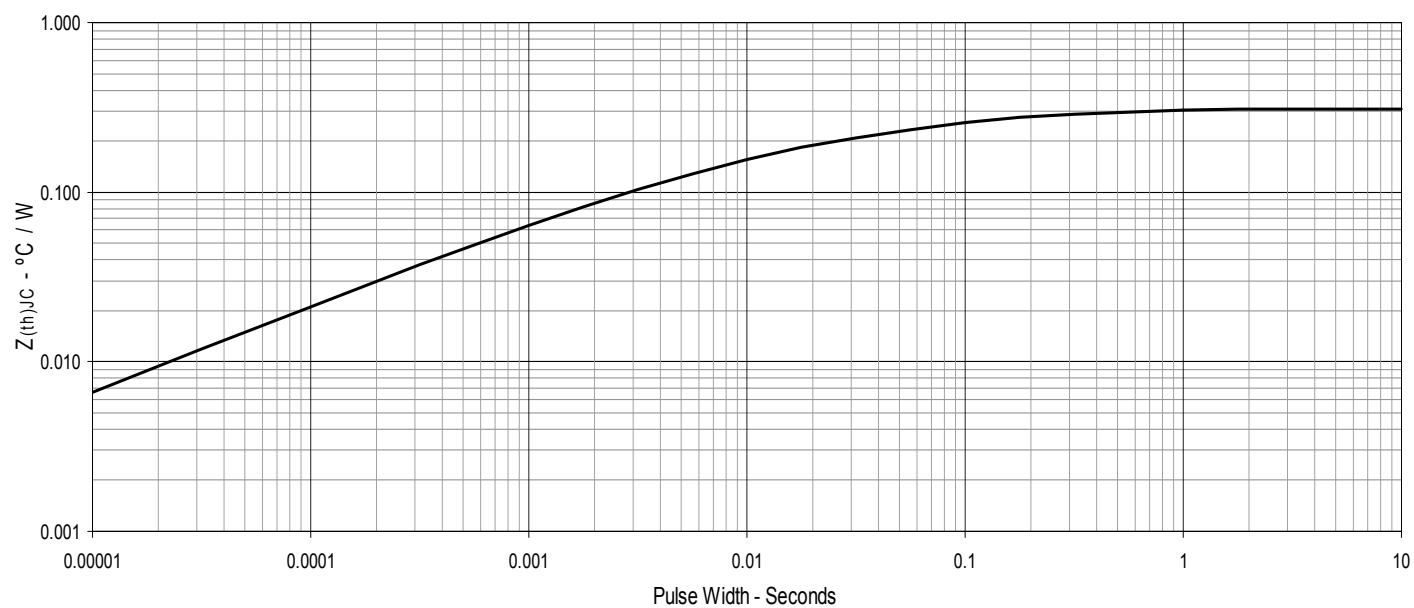


Fig. 19. Maximum Transient Thermal Impedance





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