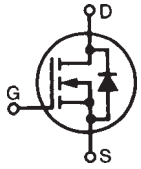
# IXYS

## TrenchT2™ HiperFET™ Power MOSFET

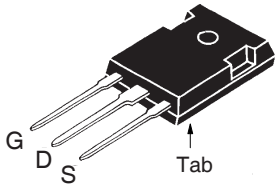
## IXFH230N075T2

$V_{DSS}$ = 75V
$I_{D25}$ = 230A
$R_{DS(on)}$ ≤ 4.2mΩ

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Rectifier




**TO-247**




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

| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 175°C | 75 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 175°C, $R_{GS}$ = 1MΩ | 75 | V |
| $V_{GSM}$ | Transient | ± 20 | V |
| $I_{D25}$ | $T_C$ = 25°C (Chip Capability) | 230 | A |
| $I_{LRMS}$ | Lead Current Limit, RMS | 160 | A |
| $I_{DM}$ | $T_C$ = 25°C, Pulse Width Limited by $T_{JM}$ | 700 | A |
| $I_A$ | $T_C$ = 25°C | 115 | A |
| $E_{AS}$ | $T_C$ = 25°C | 850 | mJ |
| $P_D$ | $T_C$ = 25°C | 480 | W |
| $T_J$ | | -55 ... +175 | °C |
| $T_{JM}$ | | 175 | °C |
| $T_{stg}$ | | -55 ... +175 | °C |
| $T_L$ | 1.6mm (0.062in.) from Case for 10s | 300 | °C |
| $T_{sold}$ | Plastic Body for 10 seconds | 260 | °C |
| **Weight** | | 6 | g |

| Symbol | Test Conditions ($T_J$ = 25°C Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 75 | | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D$ = 1mA | 2.0 | | 4.0 | V |
| $I_{GSS}$ | $V_{GS}$ = ± 20V, $V_{DS}$ = 0V | | | ±200 | nA |
| $I_{DSS}$ | $V_{DS} = V_{DSS}$, $V_{GS}$ = 0V | | | 25 | μA |
| | $T_J$ = 150°C | | | 250 | μA |
| $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 50A, Note 1 | | | 4.2 | mΩ |

### Features

- International Standard Package
- 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

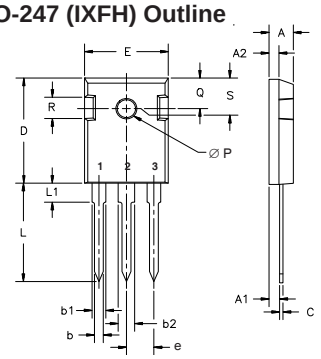
| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 10V, $I_D$ = 60A, Note 1 | 50 | 85 | | S |
| $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | | 10.5 | | nF |
| $C_{oss}$ | | | 1165 | | pF |
| $C_{rss}$ | | | 125 | | pF |
| $t_{d(on)}$ | **Resistive Switching Times** | | 23 | | ns |
| $t_r$ | $V_{GS}$ = 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 0.5 • $I_{D25}$ | | 18 | | ns |
| $t_{d(off)}$ | $R_G$ = 2Ω (External) | | 33 | | ns |
| $t_f$ | | | 15 | | ns |
| $Q_{g(on)}$ | $V_{GS}$ = 10V, $V_{DS}$ = 0.5 • $V_{DSS}$, $I_D$ = 0.5 • $I_{D25}$ | | 178 | | nC |
| $Q_{gs}$ | | | 53 | | nC |
| $Q_{gd}$ | | | 41 | | nC |
| $R_{thJC}$ | | | | 0.31 | °C/W |
| $R_{thCH}$ | | | 0.21 | | °C/W |

**Source-Drain Diode**

| Symbol | Test Conditions ($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0V | | | 230 | A |
| $I_{SM}$ | Repetitive, Pulse width limited by $T_{JM}$ | | | 900 | A |
| $V_{SD}$ | $I_F$ = 100A, $V_{GS}$ = 0V, Note 1 | | | 1.3 | V |
| $t_{rr}$ | $I_F$ = 115A, $V_{GS}$ = 0V | | 59 | | ns |
| $I_{RM}$ | -di/dt = 100A/μs | | 3.6 | | A |
| $Q_{RM}$ | $V_R$ = 37V | | 106 | | nC |

Note 1: Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

**TO-247 (IXFH) Outline**




Terminals: 1 - Gate 2 - Drain
3 - Source

| Dim. | Millimeter Min. | Max. | Inches Min. | Max. |
|---|---|---|---|---|
| A | 4.7 | 5.3 | .185 | .209 |
| $A_1$ | 2.2 | 2.54 | .087 | .102 |
| $A_2$ | 2.2 | 2.6 | .059 | .098 |
| b | 1.0 | 1.4 | .040 | .055 |
| $b_1$ | 1.65 | 2.13 | .065 | .084 |
| $b_2$ | 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 |
| ∅P | 3.55 | 3.65 | .140 | .144 |
| Q | 5.89 | 6.40 | 0.232 | 0.252 |
| R | 4.32 | 5.49 | .170 | .216 |

**Fig. 1. Output Characteristics @ $T_J$ = 25ºC**

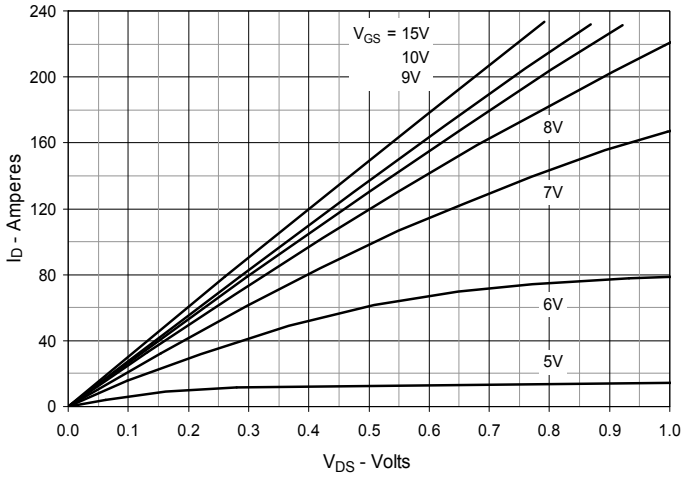



**Fig. 2. Extended Output Characteristics @ $T_J$ = 25ºC**

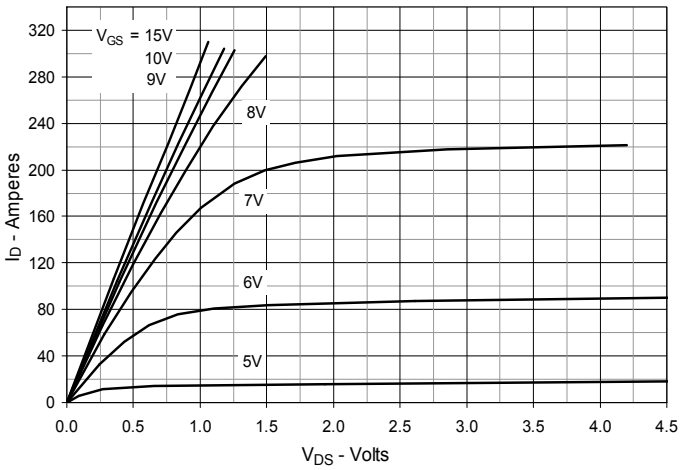



**Fig. 3. Output Characteristics @ $T_J$ = 150ºC**

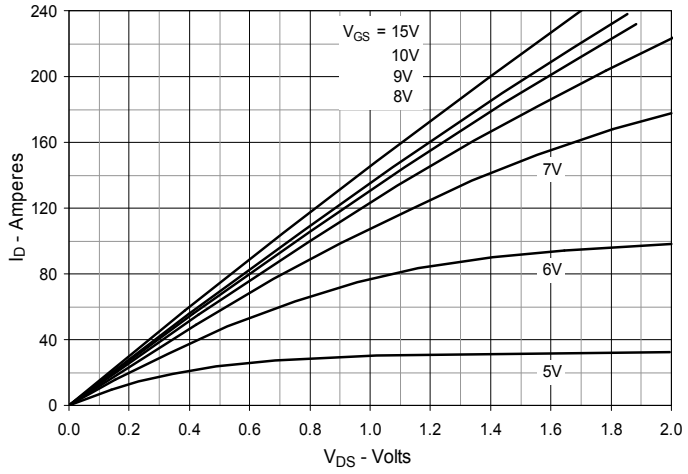



**Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 115A Value vs. Junction Temperature**

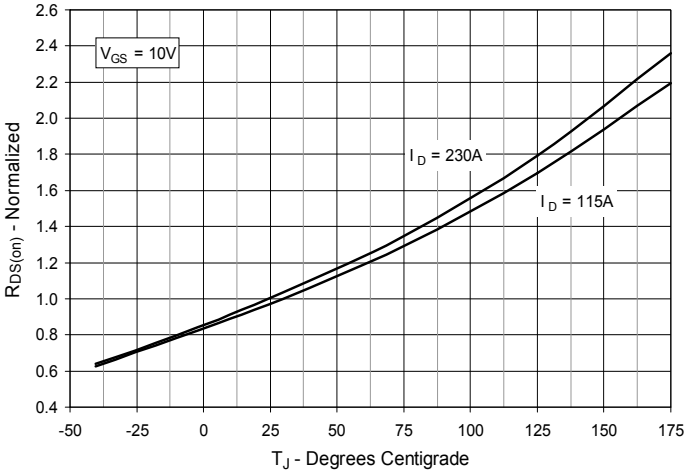



**Fig. 5. $R_{DS(on)}$ Normalized to $I_D$ = 115A Value vs. Drain Current**

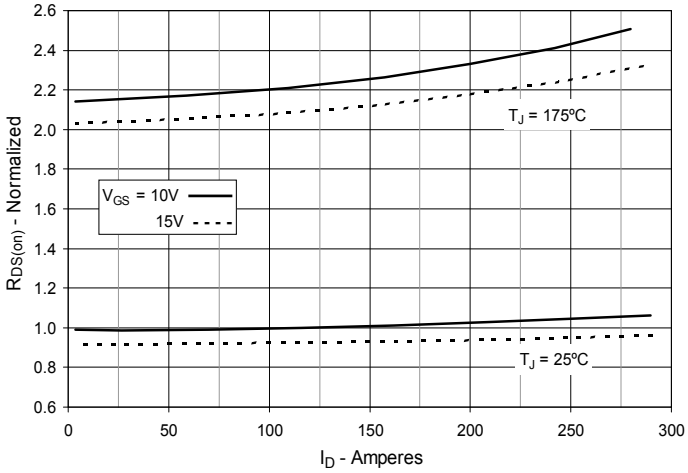



**Fig. 6. Drain Current vs. Case Temperature**

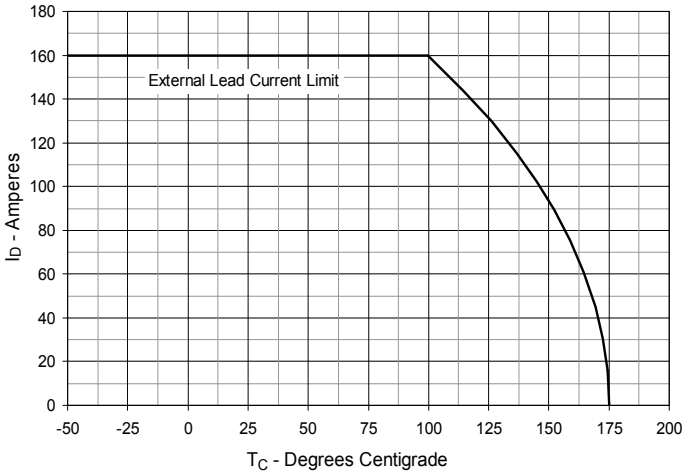


**Fig. 7. Input Admittance**

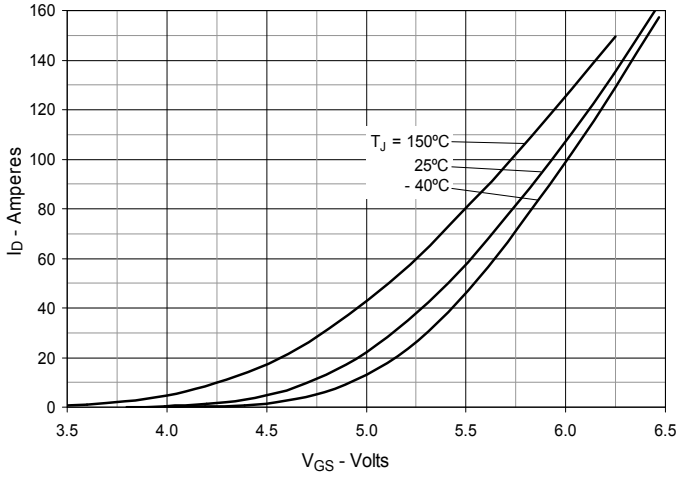



**Fig. 8. Transconductance**

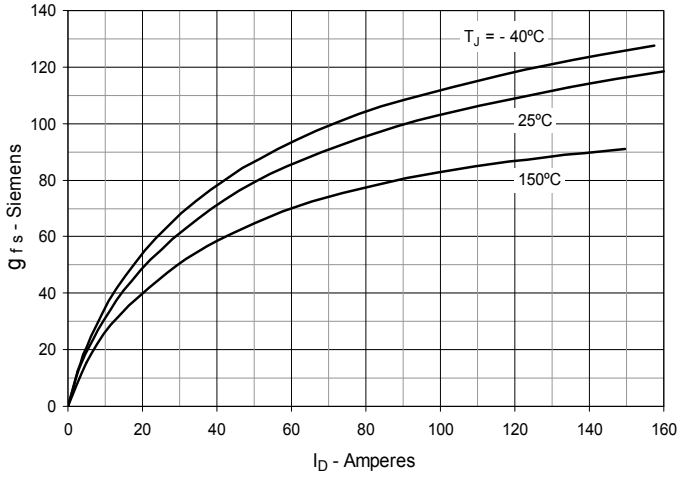



**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

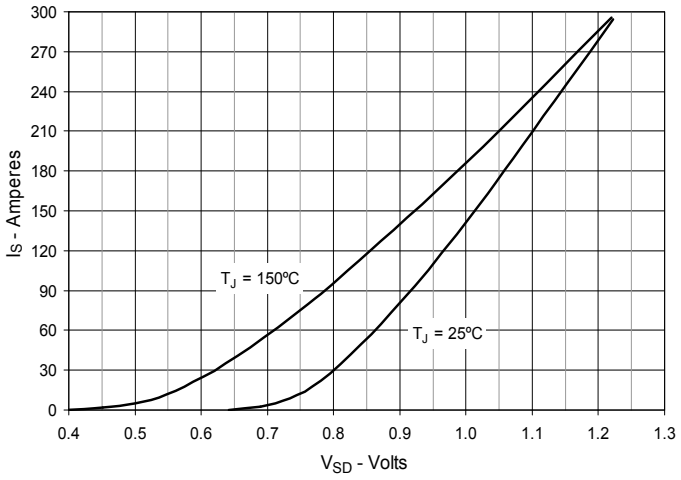



**Fig. 10. Gate Charge**

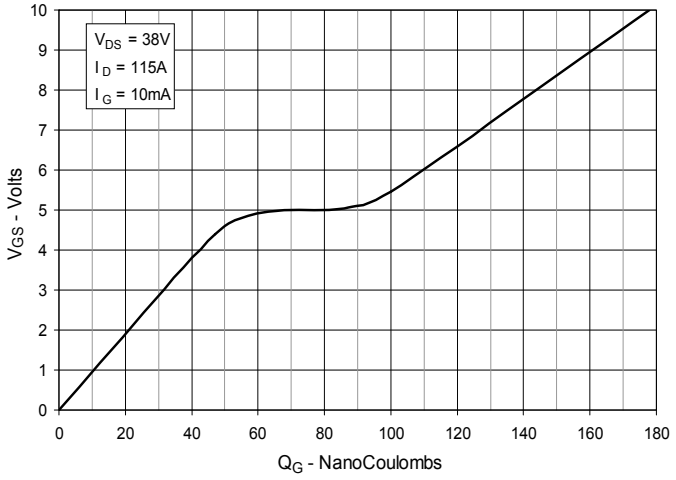



**Fig. 11. Capacitance**

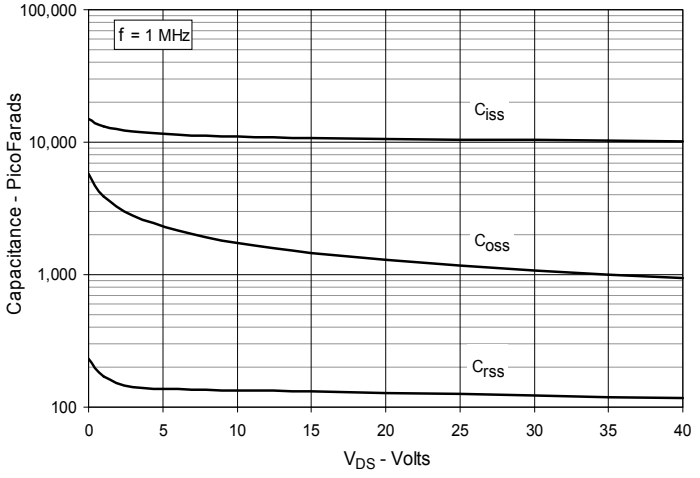



**Fig. 12. Forward-Bias Safe Operating Area**

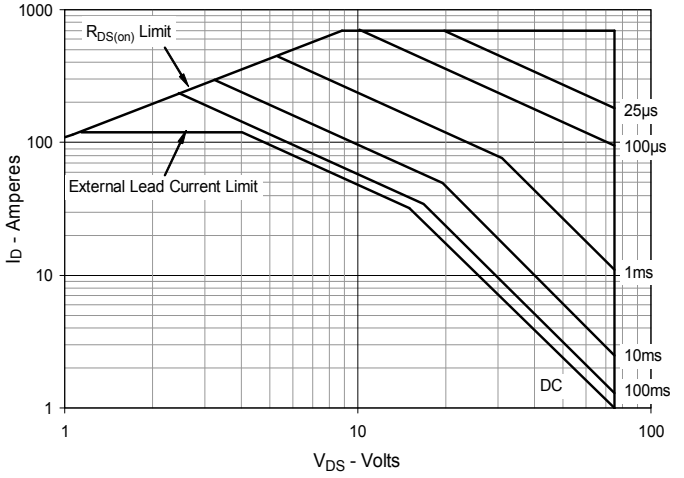


**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**

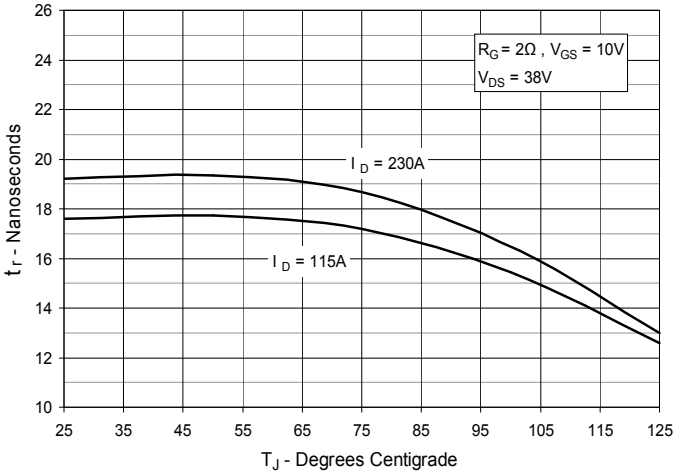



**Fig. 14. Resistive Turn-on Rise Time vs. Drain Current**

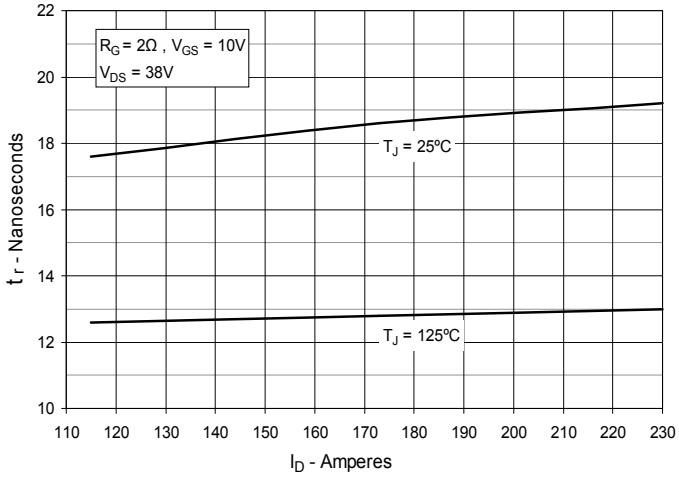



**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**

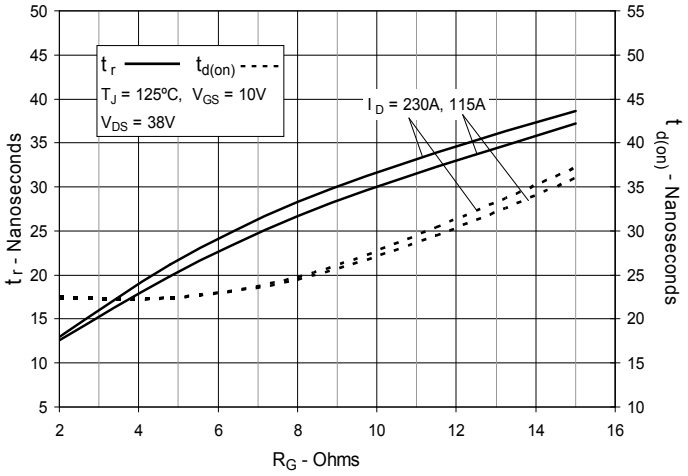



**Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature**

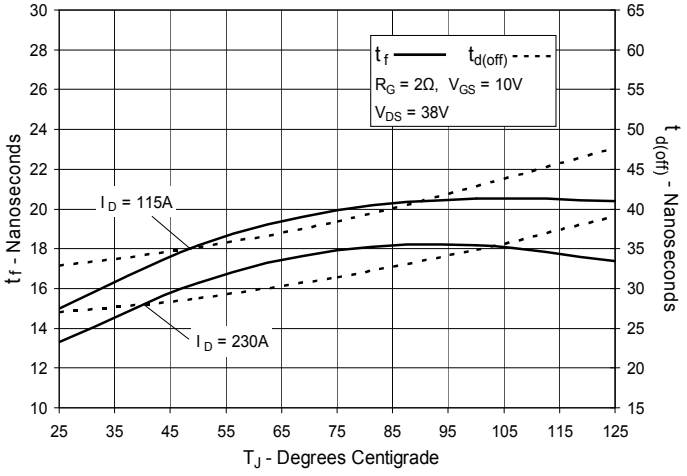



**Fig. 17. Resistive Turn-off Switching Times vs. Drain Current**

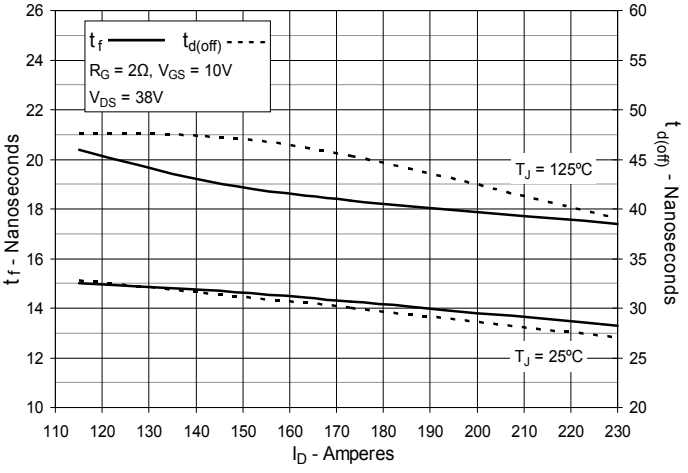



**Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance**

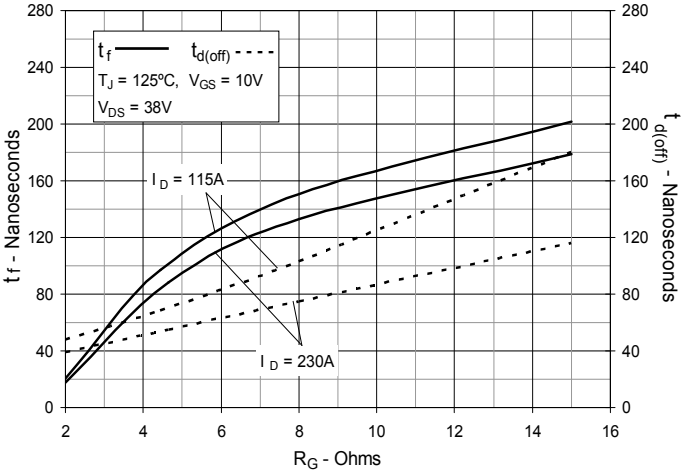


**Fig. 19. Maximum Transient Thermal Impedance**