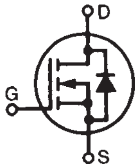
IXYS

# Trench™ HiPerFET™ Power MOSFETs

# IXFV110N25T
# IXFV110N25TS

$V_{DSS}$ = 250V
$I_{D25}$ = 110A
$R_{DS(on)}$ ≤ 24mΩ

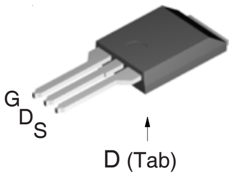
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Rectifier



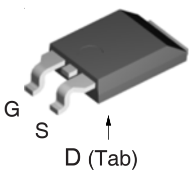
| Symbol | Test Conditions | Maximum Ratings | |
|---|---|---|---|
| $V_{DSS}$ | $T_J$ = 25°C to 150°C | 250 | V |
| $V_{DGR}$ | $T_J$ = 25°C to 150°C, $R_{GS}$ = 1MΩ | 250 | V |
| $V_{GSS}$ | Continuous | ±20 | V |
| $V_{GSM}$ | Transient | ±30 | V |
| $I_{D25}$ | $T_C$ = 25°C | 110 | A |
| $I_{L(RMS)}$ | External Lead Current Limit | 75 | A |
| $I_{DM}$ | $T_C$ = 25°C, Pulse Width Limited by $T_{JM}$ | 300 | A |
| $I_A$ | $T_C$ = 25°C | 25 | A |
| $E_{AS}$ | $T_C$ = 25°C | 1 | J |
| $P_D$ | $T_C$ = 25°C | 694 | W |
| dv/dt | $I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$ | 10 | V/ns |
| $T_J$ | | -55 to +150 | °C |
| $T_{JM}$ | | +150 | °C |
| $T_{stg}$ | | -55 to +150 | °C |
| $T_L$ | 1.6mm (0.063in) from Case for 10s | 300 | °C |
| $T_{SOLD}$ | Plastic Body for 10s | 260 | °C |
| $F_C$ | Mounting force | 11..65/2.5..14.6 | N/lb. |
| Weight | | 4 | g |

| Symbol | Test Conditions<br>($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values<br>Min. | <br>Typ. | <br>Max. | |
|---|---|---|---|---|---|
| $BV_{DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 250 | | | V |
| $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 3mA | 3.0 | | 5.0 | V |
| $I_{GSS}$ | $V_{GS}$ = ±20V, $V_{DS}$ = 0V | | | ±200 | nA |
| $I_{DSS}$ | $V_{DS}$ = $V_{DSS}$, $V_{GS}$ = 0V | | | 10 | μA |
| | $T_J$ = 125°C | | | 1 | mA |
| $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 0.5 • $I_{D25}$, Notes 1, 2 | | | 24 | mΩ |

**PLUS220 (IXFV)**



**PLUS220SMD(IXFV_S)**



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

## Features

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

## Advantages

- Easy to Mount
- Space Savings
- High Power Density

## Applications

- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC Motor Drives
- Uninterruptible Power Supplies

| Symbol | Test Conditions<br>($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values<br>Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $g_{fs}$ | $V_{DS}$ = 10V, $I_D = 0.5 \bullet I_{D25}$, Note 1 | 65 | 110 | | S |
| $C_{iss}$ | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | | 9400 | | pF |
| $C_{oss}$ | | | 850 | | pF |
| $C_{rss}$ | | | 55 | | pF |
| $t_{d(on)}$ | **Resistive Switching Times**<br>$V_{GS} = 15V$, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = 0.5 \bullet I_{D25}$<br>$R_G$ = 2Ω (External) | | 19 | | ns |
| $t_r$ | | | 27 | | ns |
| $t_{d(off)}$ | | | 60 | | ns |
| $t_f$ | | | 27 | | ns |
| $Q_{g(on)}$ | $V_{GS}$ = 10V, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D$ = 25A | | 157 | | nC |
| $Q_{gs}$ | | | 40 | | nC |
| $Q_{gd}$ | | | 50 | | nC |
| $R_{thJC}$ | | | | 0.18 | °C/W |
| $R_{thCS}$ | | | 0.21 | | °C/W |

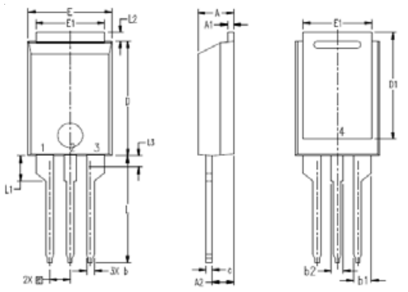
### Source-Drain Diode

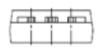
| Symbol | Test Conditions<br>($T_J$ = 25°C, Unless Otherwise Specified) | Characteristic Values<br>Min. | Typ. | Max. | |
|---|---|---|---|---|---|
| $I_S$ | $V_{GS}$ = 0V | | | 110 | A |
| $I_{SM}$ | Repetitive, Pulse Width Limited by $T_{JM}$ | | | 350 | A |
| $V_{SD}$ | $I_F$ = 55A, $V_{GS}$ = 0V, Note 1 | | | 1.2 | V |
| $t_{rr}$ | $I_F$ = 55A, -di/dt = 250A/µs,<br>$V_R$ = 100V, $V_{GS}$ = 0V | | | 170 | ns |
| $I_{RM}$ | | | 17 | | A |
| $Q_{RM}$ | | | 0.95 | | µC |

Notes:

1. Pulse test, t ≤ 300µs, duty cycle, d ≤ 2%.
2. On through-hole package, $R_{DS(ON)}$ kelvin test contact location must be 5mm or less from the package body.

### PLUS220 Outline

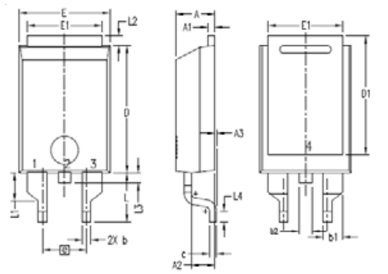


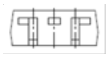


Terminals: 1 - Gate
2,4 - Drain
3 - Source

| SYM | INCHES MIN | INCHES MAX | MILLIMETER MIN | MILLIMETER MAX |
|---|---|---|---|---|
| A | .169 | .185 | 4.30 | 4.70 |
| A1 | .028 | .035 | 0.70 | 0.90 |
| A2 | .098 | .118 | 2.50 | 3.00 |
| b | .035 | .047 | 0.90 | 1.20 |
| b1 | .080 | .095 | 2.03 | 2.41 |
| b2 | .054 | .064 | 1.37 | 1.63 |
| c | .028 | .035 | 0.70 | 0.90 |
| D | .551 | .591 | 14.00 | 15.00 |
| D1 | .512 | .539 | 13.00 | 13.70 |
| E | .394 | .433 | 10.00 | 11.00 |
| E1 | .331 | .346 | 8.40 | 8.80 |
| e | .100 BSC | | 2.54 BSC | |
| L | .512 | .551 | 13.00 | 14.00 |
| L1 | .118 | .138 | 3.00 | 3.50 |
| L2 | .035 | .051 | 0.90 | 1.30 |
| L3 | .047 | .059 | 1.20 | 1.50 |

### PLUS220SMD Outline





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

| SYM | INCHES MIN | INCHES MAX | MILLIMETER MIN | MILLIMETER MAX |
|---|---|---|---|---|
| A | .169 | .185 | 4.30 | 4.70 |
| A1 | .028 | .035 | 0.70 | 0.90 |
| A2 | .098 | .118 | 2.50 | 3.00 |
| A3 | .000 | .010 | 0.00 | 0.25 |
| b | .035 | .047 | 0.90 | 1.20 |
| b1 | .080 | .095 | 2.03 | 2.41 |
| b2 | .054 | .064 | 1.37 | 1.63 |
| c | .028 | .035 | 0.70 | 0.90 |
| D | .551 | .591 | 14.00 | 15.00 |
| D1 | .512 | .539 | 13.00 | 13.70 |
| E | .394 | .433 | 10.00 | 11.00 |
| E1 | .331 | .346 | 8.40 | 8.80 |
| e | .200BSC | | 5.08 BSC | |
| L | .209 | .228 | 5.30 | 5.80 |
| L1 | .118 | .138 | 3.00 | 3.50 |
| L2 | .035 | .051 | 0.90 | 1.30 |
| L3 | .047 | .059 | 1.20 | 1.50 |
| L4 | .039 | .059 | 1.00 | 1.50 |

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

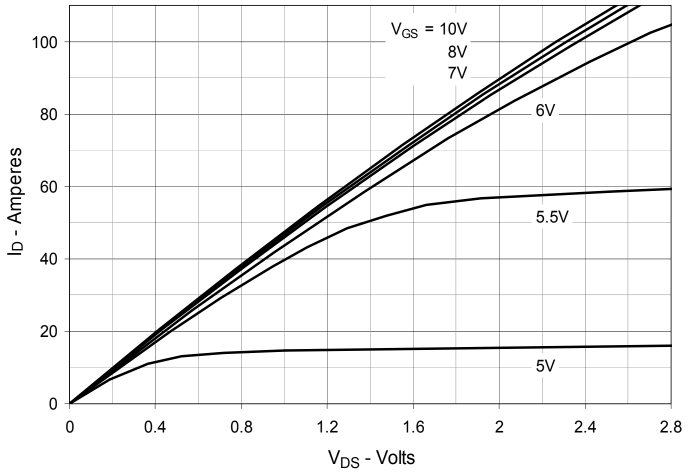


Fig. 2. Extended Output Characteristics @ $T_J$ = 25ºC

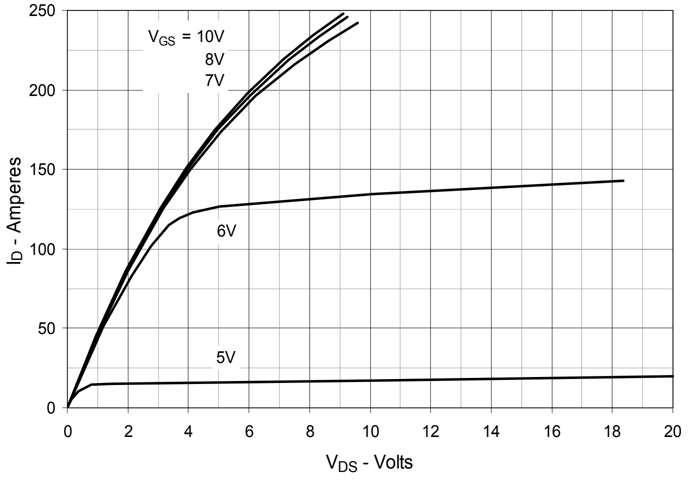


Fig. 3. Output Characteristics @ $T_J$ = 125ºC

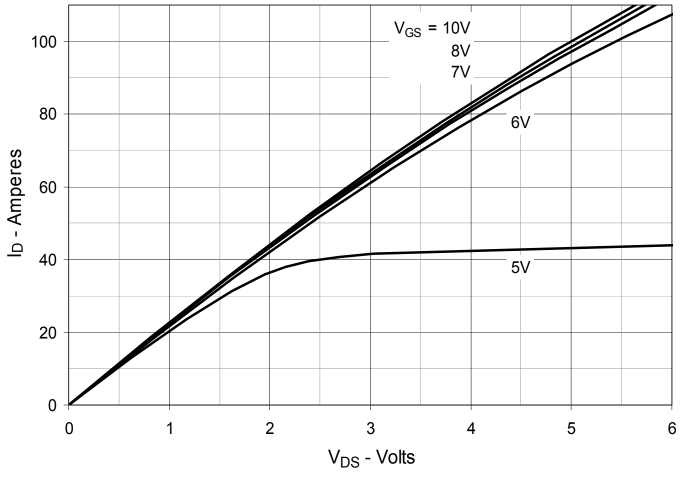


Fig. 4. $R_{DS(on)}$ Normalized to $I_D$ = 55A Value vs. Junction Temperature

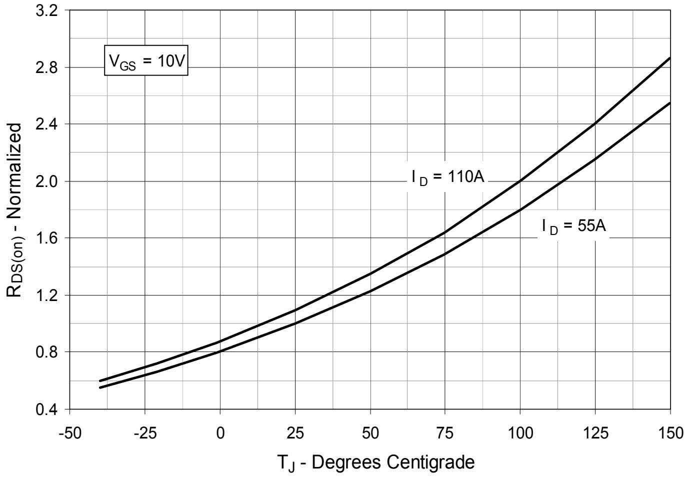


Fig. 5. $R_{DS(on)}$ Normalized to $I_D$ = 55A Value vs. Drain Current

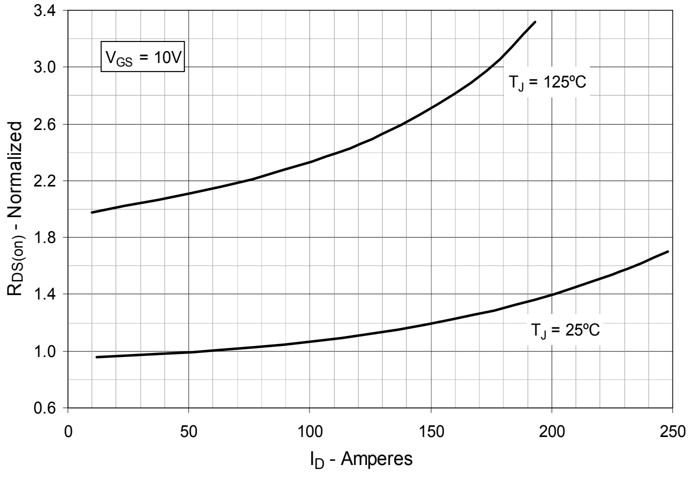


Fig. 6. Maximum Drain Current vs. Case Temperature

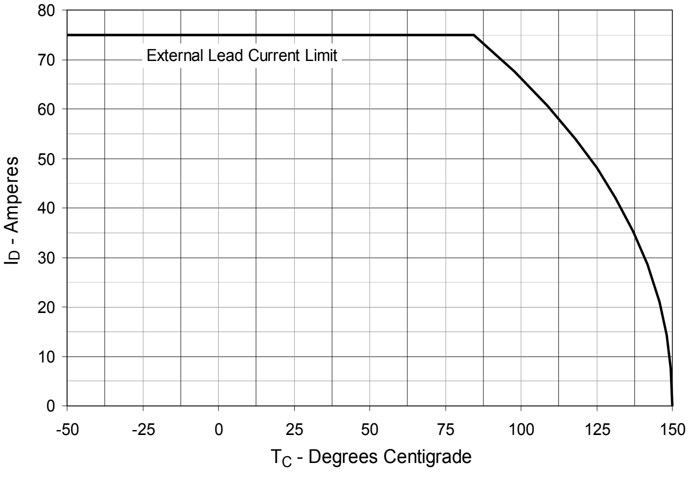


**Fig. 7. Input Admittance**

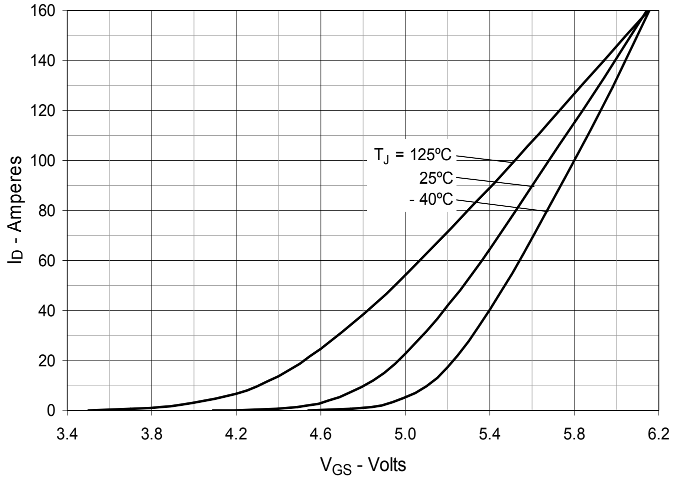


**Fig. 8. Transconductance**

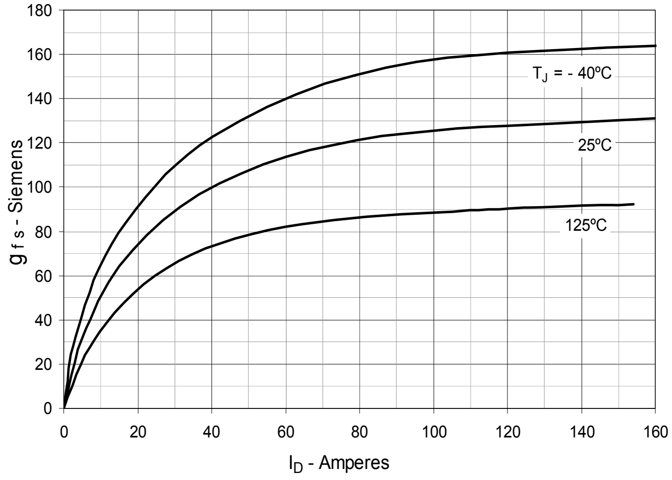


**Fig. 9. Forward Voltage Drop of Intrinsic Diode**

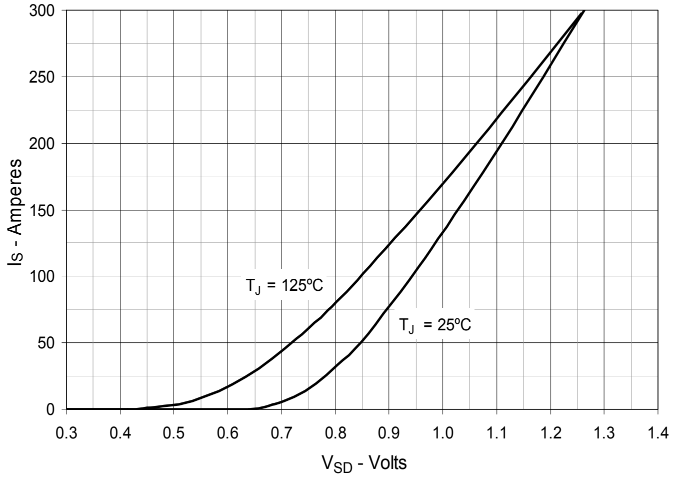


**Fig. 10. Gate Charge**

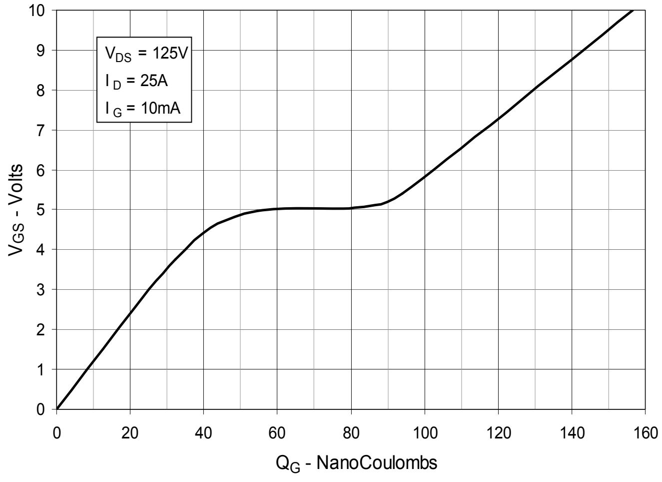


**Fig. 11. Capacitance**

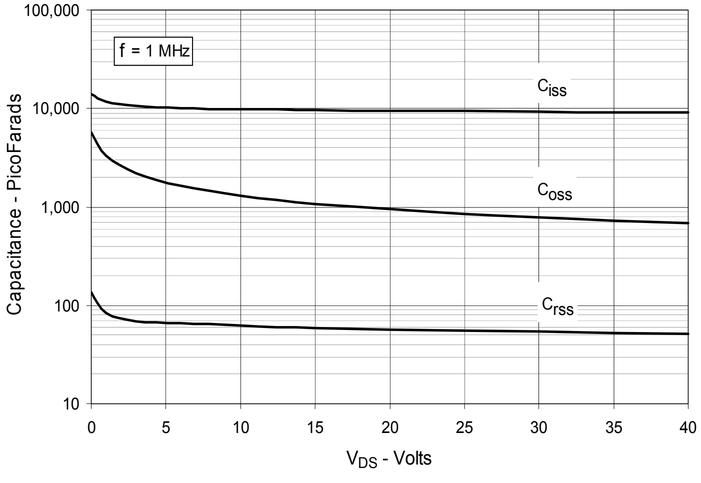
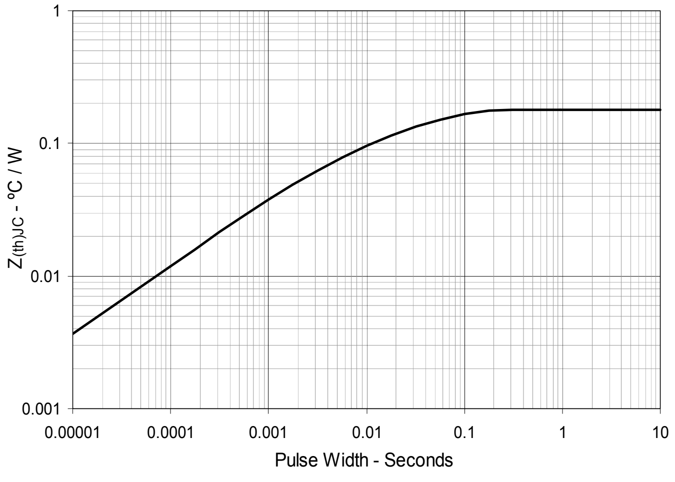
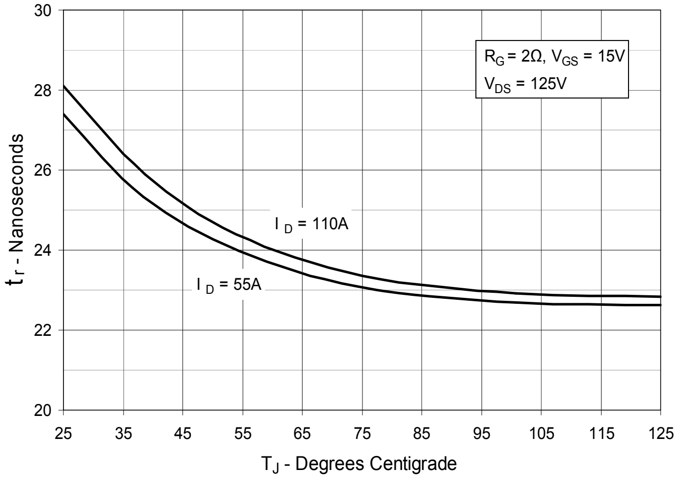


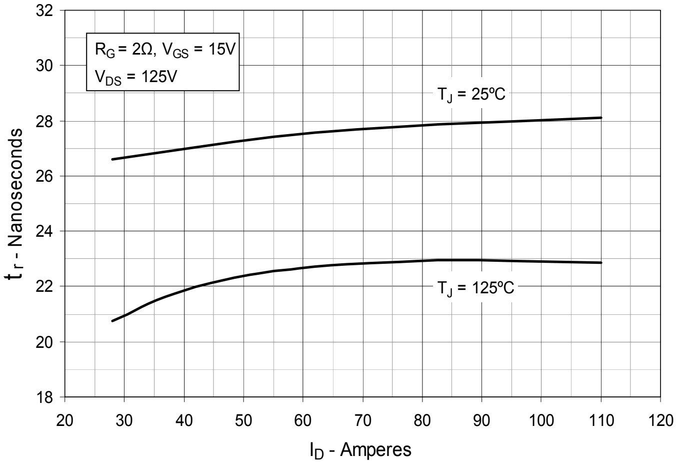
**Fig. 12. Maximum Transient Thermal Impedance**



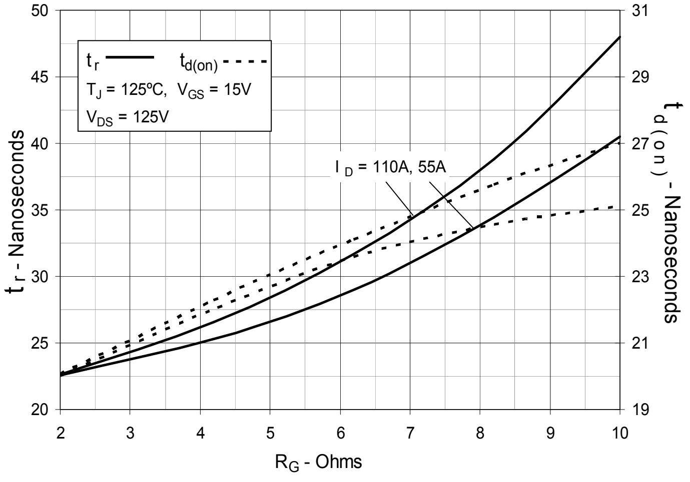
### Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature



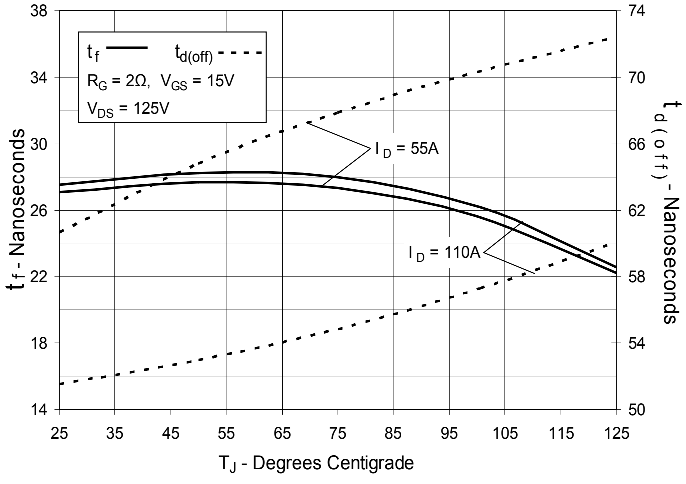
### Fig. 14. Resistive Turn-on Rise Time vs. Drain Current



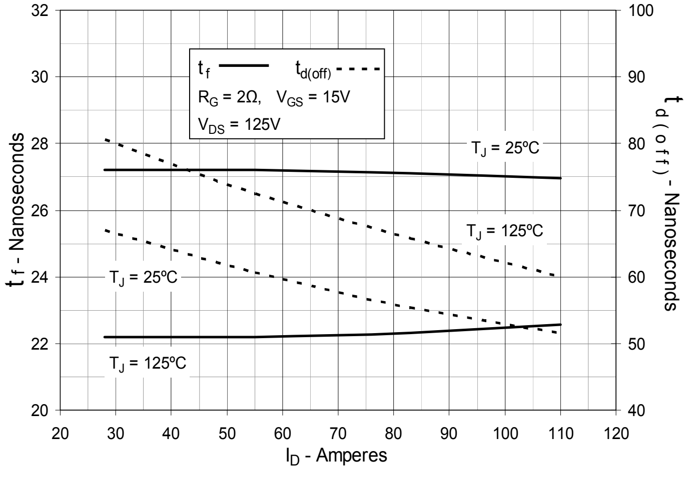
### Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance



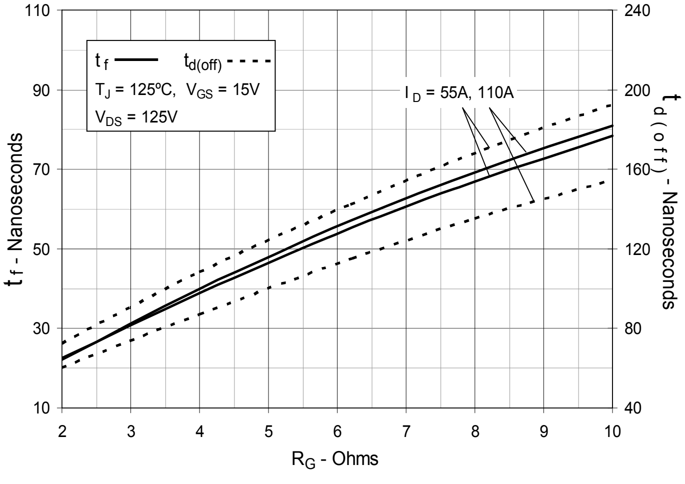
### Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature



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



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



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