

TrenchMV™ Power MOSFET

IXTA130N10T IXTP130N10T

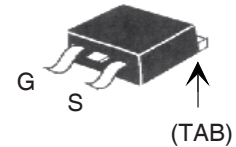
$V_{DSS} = 100V$
 $I_{D25} = 130A$
 $R_{DS(on)} \leq 9.1m\Omega$

N-Channel Enhancement Mode
Avalanche Rated

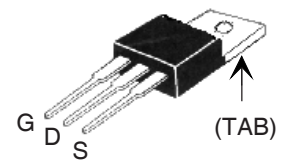


| Symbol | Test Conditions | Maximum Ratings | |
|------------|-----------------------------------------------------------|-----------------|------------|
| V_{DSS} | $T_J = 25^\circ C$ to $175^\circ C$ | 100 | V |
| V_{DGR} | $T_J = 25^\circ C$ to $175^\circ C$, $R_{GS} = 1M\Omega$ | 100 | V |
| V_{GSM} | Transient | ± 30 | V |
| I_{D25} | $T_C = 25^\circ C$ | 130 | A |
| I_{LRMS} | Lead Current Limit, RMS | 75 | A |
| I_{DM} | $T_C = 25^\circ C$, pulse width limited by T_{JM} | 350 | A |
| I_A | $T_C = 25^\circ C$ | 65 | A |
| E_{AS} | $T_C = 25^\circ C$ | 500 | mJ |
| P_D | $T_C = 25^\circ C$ | 360 | W |
| T_J | | -55 ... +175 | $^\circ C$ |
| T_{JM} | | 175 | $^\circ C$ |
| T_{stg} | | -55 ... +175 | $^\circ C$ |
| T_L | 1.6mm (0.062 in.) from case for 10s | 300 | $^\circ C$ |
| T_{SOLD} | Plastic body for 10 seconds | 260 | $^\circ C$ |
| M_d | Mounting torque (TO-220) | 1.13 / 10 | Nm/lb.in. |
| Weight | TO-220 | 3.0 | g |
| | TO-263 | 2.5 | 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 $^\circ C$ Operating Temperature

Advantages

- Easy to mount
- Space savings
- High power density

Applications

- Automotive
 - Motor Drives
 - 42V Power Bus
 - ABS Systems
- DC/DC Converters and Off-line UPS
- Primary Switch for 24V and 48V Systems
- Distributed Power Architectures and VRMs
- Electronic Valve Train Systems
- High Current Switching Applications
- High Voltage Synchronous Rectifier

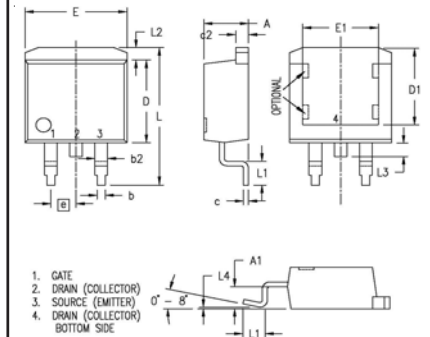
| Symbol | Test Conditions ($T_J = 25^\circ C$ unless otherwise specified) | Characteristic Values | | |
|--------------|---------------------------------------------------------------------|-----------------------|------|----------------|
| | | Min. | Typ. | Max. |
| BV_{DSS} | $V_{GS} = 0V$, $I_D = 250\mu A$ | 100 | | V |
| $V_{GS(th)}$ | $V_{DS} = V_{GS}$, $I_D = 250\mu A$ | 2.5 | | V |
| I_{GSS} | $V_{GS} = \pm 20V$, $V_{DS} = 0V$ | | | ± 200 nA |
| I_{DSS} | $V_{DS} = V_{DSS}$ $V_{GS} = 0V$ $T_J = 150^\circ C$ | | | 5 μA |
| | | | | 250 μA |
| $R_{DS(on)}$ | $V_{GS} = 10V$, $I_D = 25A$, Notes 1, 2 | | | 9.1 m Ω |

| Symbol | Test Conditions | Characteristic Values | | | |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|------|------|--------------------|
| | | Min. | Typ. | Max. | |
| $(T_J = 25^\circ\text{C unless otherwise specified})$ | | | | | |
| g_{fs} | $V_{DS} = 10\text{V}, I_D = 60\text{A}, \text{Note 1}$ | 55 | 93 | | S |
| C_{iss} | $V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$ | | 5080 | | pF |
| C_{oss} | | | 635 | | pF |
| C_{rss} | | | 95 | | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 25\text{A}$ $R_G = 5\Omega \text{ (External)}$ | | 30 | | ns |
| t_r | | | 47 | | ns |
| $t_{d(off)}$ | | | 44 | | ns |
| t_f | | | 28 | | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 25\text{A}$ | | 104 | | nC |
| Q_{gs} | | | 30 | | nC |
| Q_{gd} | | | 29 | | nC |
| R_{thJC} | TO-220 | | | 0.42 | $^\circ\text{C/W}$ |
| R_{thCH} | | | 0.50 | | $^\circ\text{C/W}$ |

Source-Drain Diode

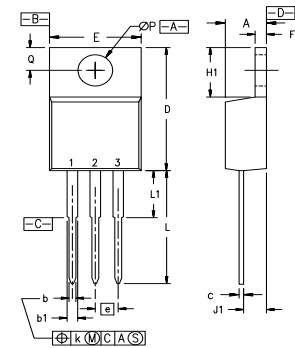
| Symbol | Test Conditions | Characteristic Values | | | |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------|-----------------------|------|------|----|
| | | Min. | Typ. | Max. | |
| $T_J = 25^\circ\text{C unless otherwise specified}$ | | | | | |
| I_S | $V_{GS} = 0\text{V}$ | | | 130 | A |
| I_{SM} | Pulse width limited by T_{JM} | | | 350 | A |
| V_{SD} | $I_F = 25\text{A}, V_{GS} = 0\text{V}, \text{Note 1}$ | | | 1.0 | V |
| t_{rr} | $I_F = 0.5 \cdot I_S, -di/dt = 100\text{A}/\mu\text{s}$ $V_R = 0.5 \cdot V_{DSS}, V_{GS} = 0\text{V}$ | | 67 | | ns |
| I_{RM} | | | 4.7 | | A |
| Q_{rr} | | | 160 | | nC |

- 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.

TO-263 (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-220 (IXTP) Outline


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

| SYM | INCHES | | MILLIMETERS | |
|-----|----------|------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | .170 | .190 | 4.32 | 4.83 |
| b | .025 | .040 | 0.64 | 1.02 |
| b1 | .045 | .065 | 1.15 | 1.65 |
| c | .014 | .022 | 0.35 | 0.56 |
| D | .580 | .630 | 14.73 | 16.00 |
| E | .390 | .420 | 9.91 | 10.66 |
| e | .100 BSC | | 2.54 BSC | |
| F | .045 | .055 | 1.14 | 1.40 |
| H1 | .230 | .270 | 5.85 | 6.85 |
| J1 | .090 | .110 | 2.29 | 2.79 |
| k | 0 | .015 | 0 | 0.38 |
| L | .500 | .550 | 12.70 | 13.97 |
| L1 | .110 | .230 | 2.79 | 5.84 |
| ØP | .139 | .161 | 3.53 | 4.08 |
| Q | .100 | .125 | 2.54 | 3.18 |

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 | 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

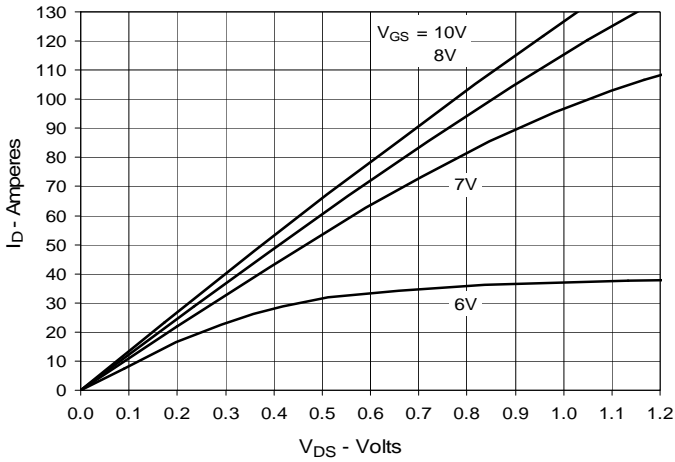


Fig. 2. Extended Output Characteristics @ 25°C

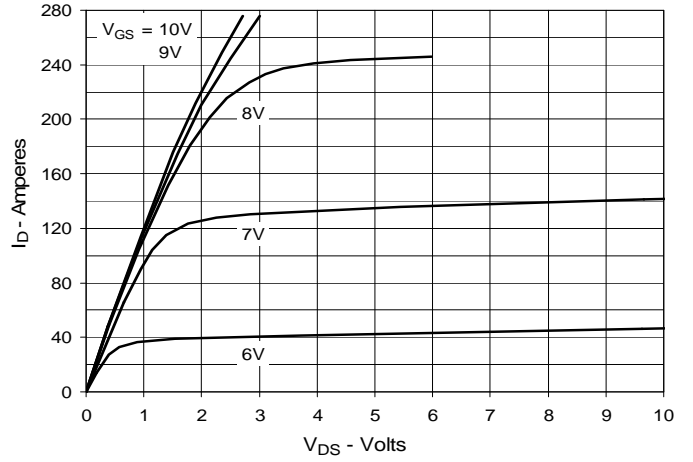


Fig. 3. Output Characteristics @ 150°C

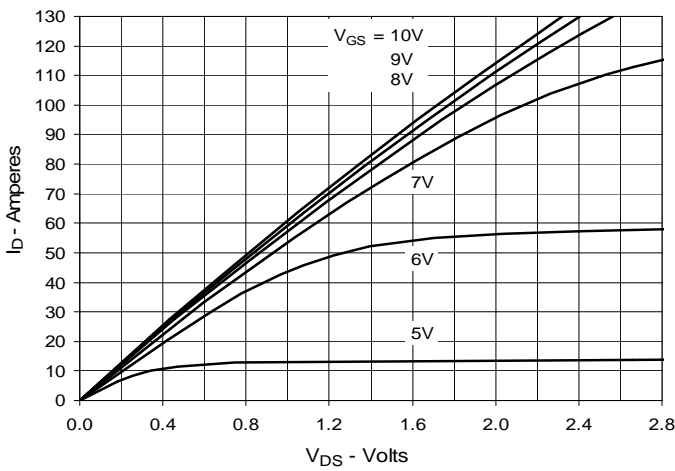


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 65A$ Value vs. Junction Temperature

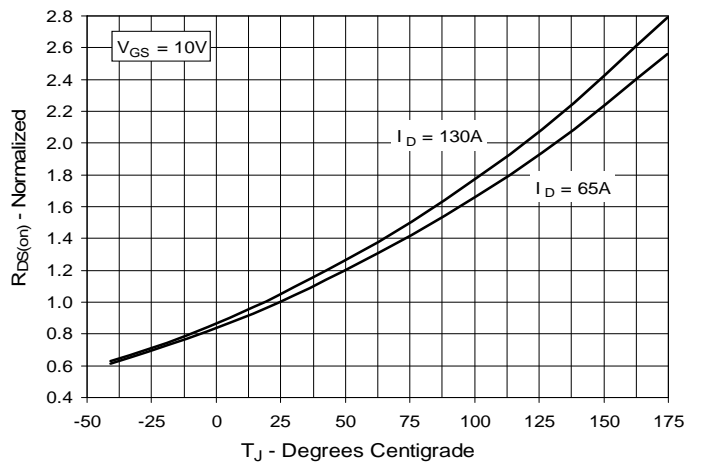


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 65A$ Value vs. Drain Current

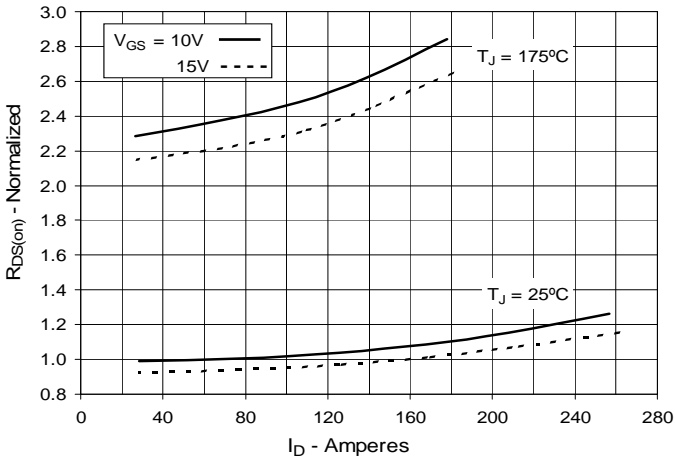


Fig. 6. Drain Current vs. Case Temperature

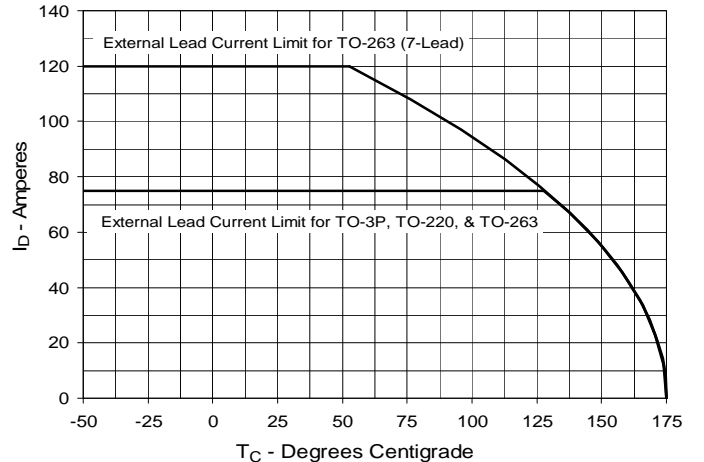


Fig. 7. Input Admittance

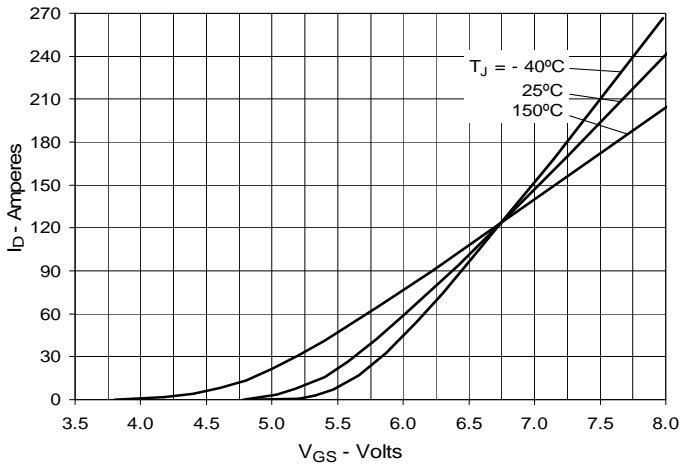


Fig. 8. Transconductance

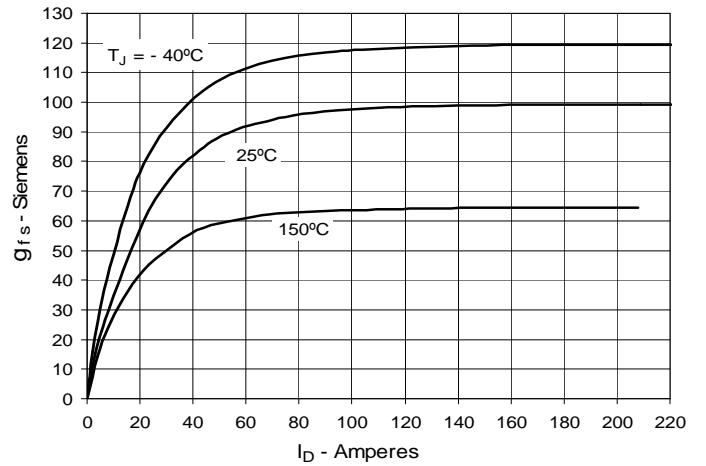


Fig. 9. Forward Voltage Drop of Intrinsic Diode

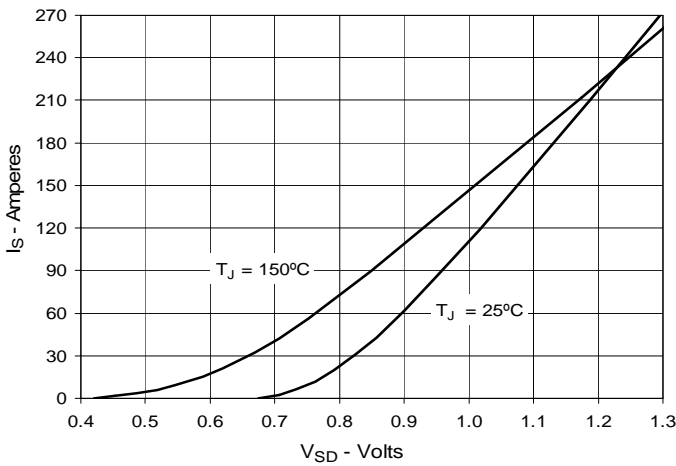


Fig. 10. Gate Charge

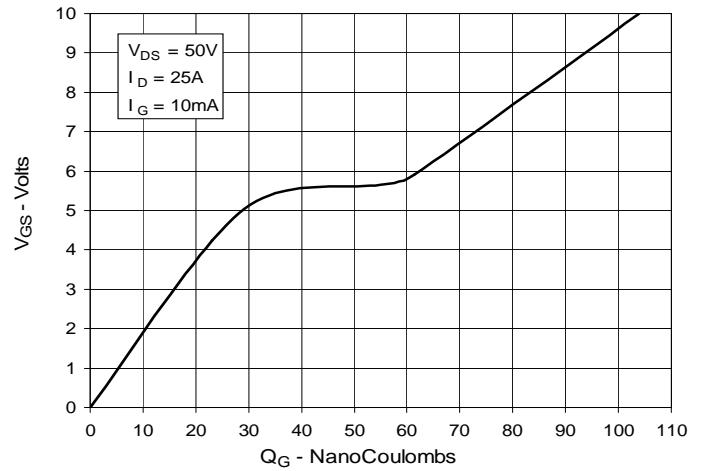


Fig. 11. Capacitance

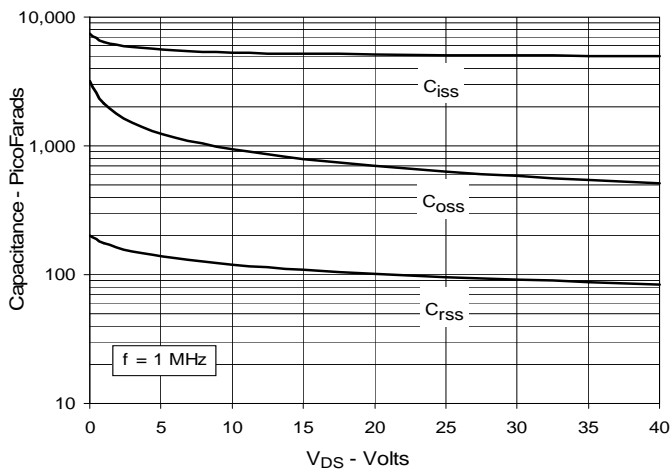


Fig. 12. Maximum Transient Thermal Impedance

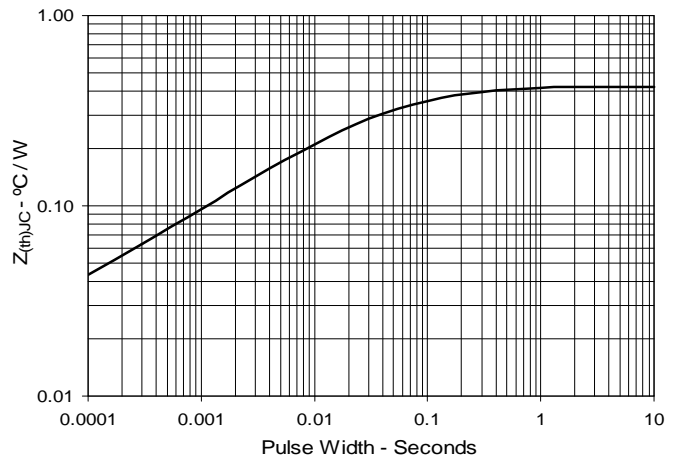


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

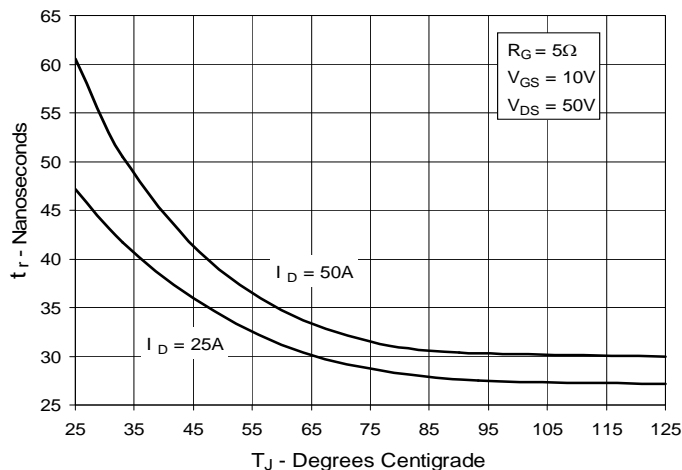


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

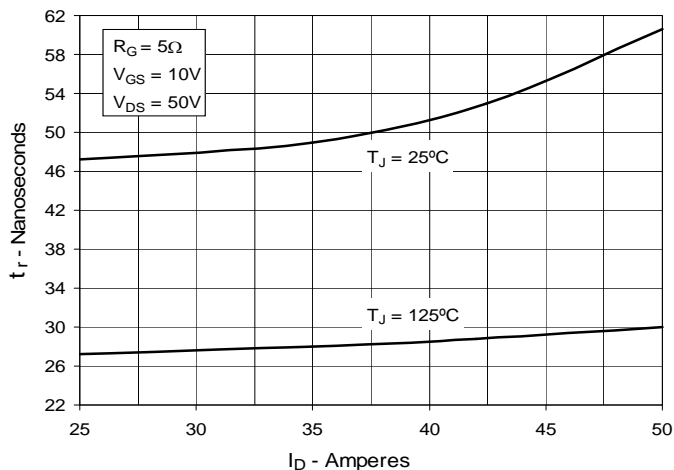


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

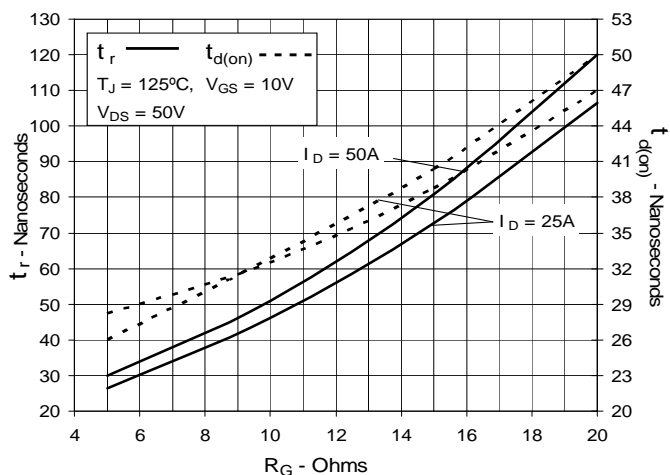


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

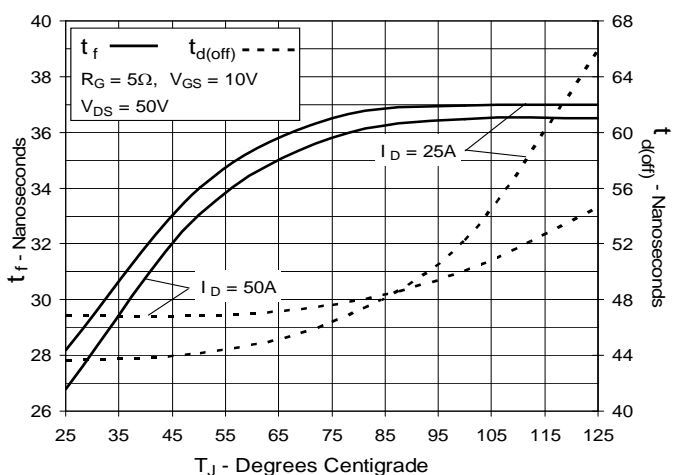


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

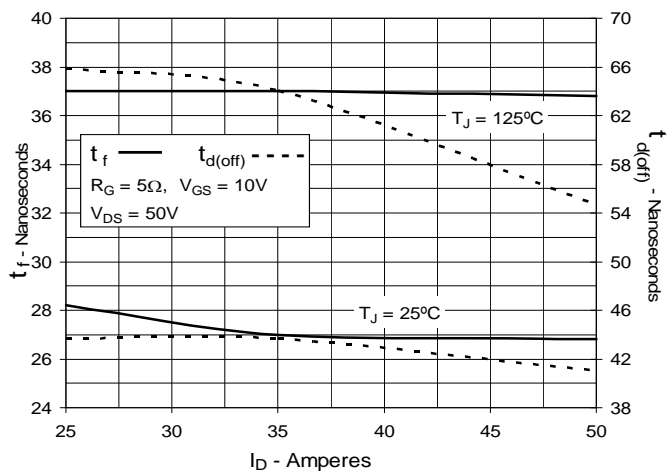


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

