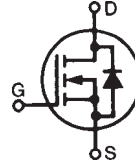


TrenchT2™ Power MOSFET

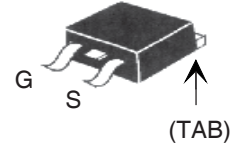
IXTA70N075T2
IXTP70N075T2

V_{DSS} = 75V
I_{D25} = 70A
R_{DS(on)} ≤ 12mΩ

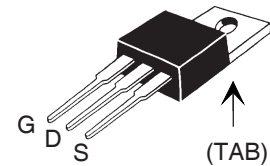
N-Channel Enhancement Mode
Avalanche Rated



TO-263 (IXTA)



TO-220 (IXTP)



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 | 70 | A |
| I _{DM} | T _C = 25°C, pulse width limited by T _{JM} | 180 | A |
| I _{AR} | T _C = 25°C | 40 | A |
| E _{AS} | T _C = 25°C | 300 | mJ |
| P _D | T _C = 25°C | 150 | 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 Plastic body for 10 seconds | 300 260 | °C °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
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
- 175°C Operating Temperature
- High current handling capability
- ROHS Compliant
- High performance Trench Technology for extremely low R_{DS(on)}

Advantages

- Easy to mount
- Space savings
- High power density
- Synchronous

Applications

- Automotive Engine Control
- Synchronous Buck Converter (for notebook systempower & General purpose point & load.)
- DC/DC Converters
- High Current Switching Applications
- Power Train Management
- Distributed Power Architecture

| 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 = 250μA | 2.0 | | 4.0 V |
| I _{GSS} | V _{GS} = ± 20V, V _{DS} = 0V | | | ±200 nA |
| I _{DSS} | V _{DS} = V _{DSS} | | | 2 μA |
| | V _{GS} = 0V T _J = 150°C | | | 200 μA |
| R _{DS(on)} | V _{GS} = 10V, I _D = 25A, Notes 1, 2 | 10 | | 12 mΩ |

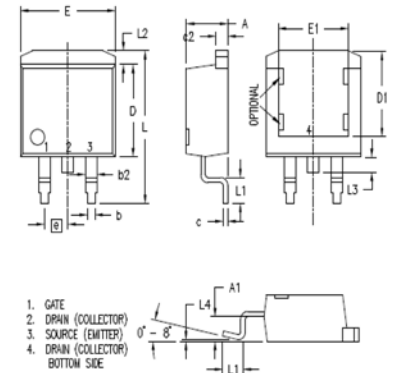
| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|--------------|--|-----------------------|------|-----------|
| | | Min. | Typ. | Max. |
| g_{fs} | $V_{DS} = 10\text{V}$, $I_D = 0.5 \cdot I_{D25}$, Note 1 | 22 | 36 | S |
| C_{iss} | $V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | | 2725 | pF |
| C_{oss} | | | 334 | pF |
| C_{rss} | | | 60 | pF |
| $t_{d(on)}$ | Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 38\text{V}$, $I_D = 25\text{A}$ $R_G = 5\Omega$ (External) | | 15 | ns |
| t_r | | | 28 | ns |
| $t_{d(off)}$ | | | 31 | ns |
| t_f | | | 22 | ns |
| $Q_{g(on)}$ | $V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 25\text{A}$ | | 46 | nC |
| Q_{gs} | | | 14 | nC |
| Q_{gd} | | | 7.5 | nC |
| R_{thJC} | | | | 1.00 °C/W |
| R_{thCH} | TO-220 | 0.50 | | °C/W |

Source-Drain Diode

| Symbol | Test Conditions ($T_J = 25^\circ\text{C}$, unless otherwise specified) | Characteristic Values | | |
|----------|---|-----------------------|------|-------|
| | | Min. | Typ. | Max. |
| I_S | $V_{GS} = 0\text{V}$ | | | 70 A |
| I_{SM} | Repetitive, Pulse width limited by T_{JM} | | | 280 A |
| V_{SD} | $I_F = 25\text{A}$, $V_{GS} = 0\text{V}$, Note 1 | 0.86 | 1.0 | V |
| t_{rr} | $I_F = 50\text{A}$, $V_{GS} = 0\text{V}$ $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 38\text{V}$ | | 48 | ns |
| I_{RM} | | | 3.7 | A |
| Q_{RM} | | | 89 | 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 5mm or less from the package body.

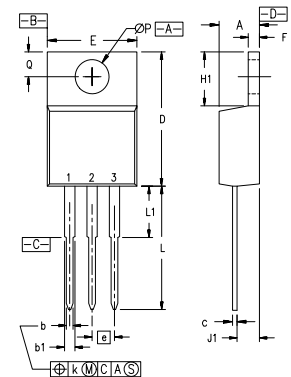
TO-263 (IXTA) Outline



- GATE
 - DRAIN (COLLECTOR)
 - SOURCE (EMITTER)
 - DRAIN (COLLECTOR)
- BOTTOM SIDE

| 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 (IXTP) Outline



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

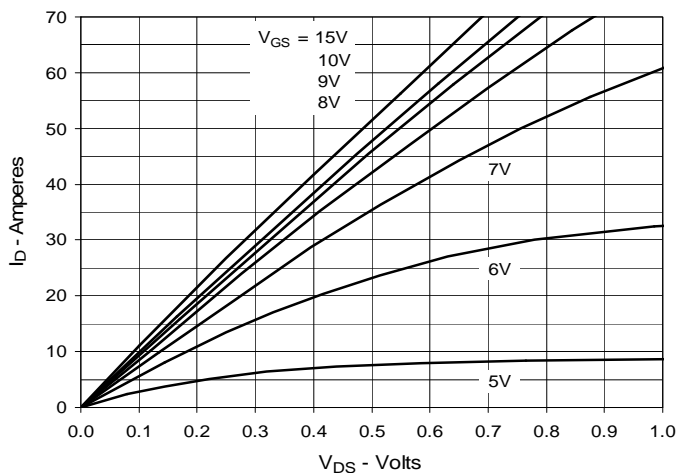


Fig. 2. Extended Output Characteristics @ 25°C

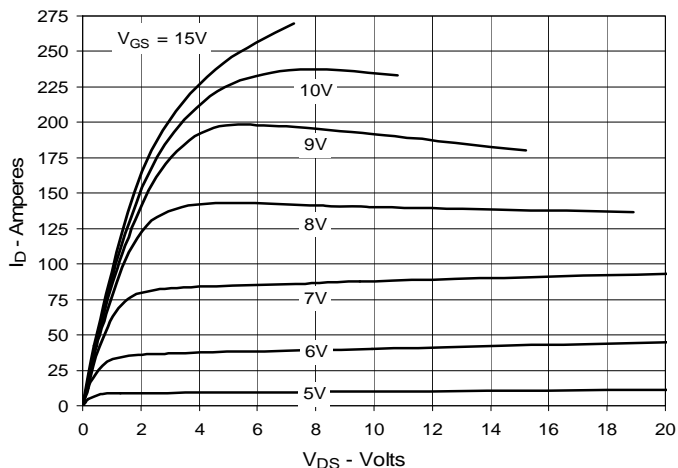


Fig. 3. Output Characteristics @ 150°C

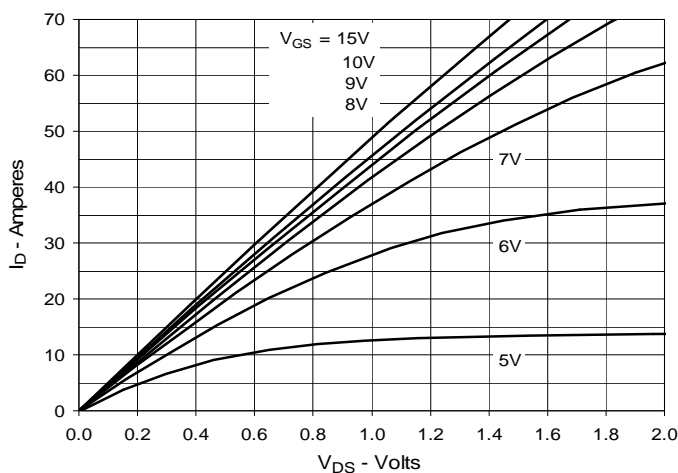


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 35A$ Value vs. Junction Temperature

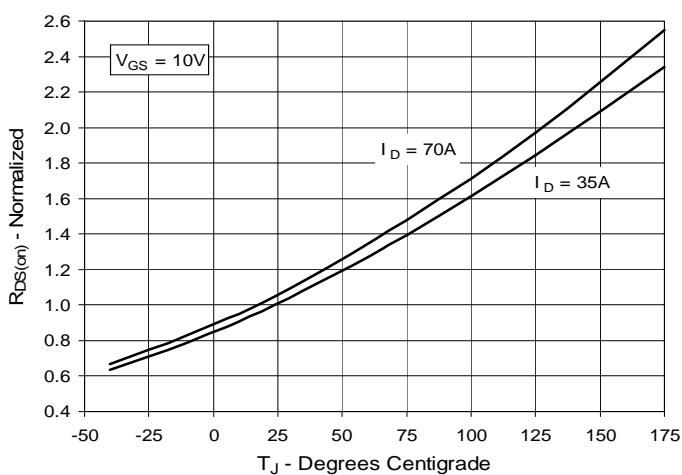


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 35A$ Value vs. Drain Current

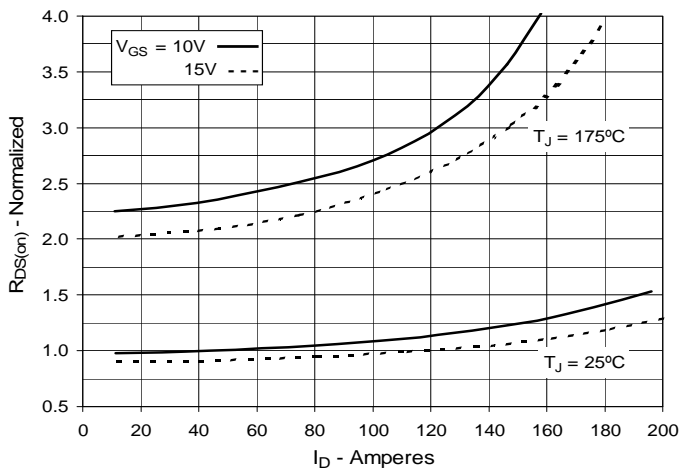


Fig. 6. Drain Current vs. Case Temperature

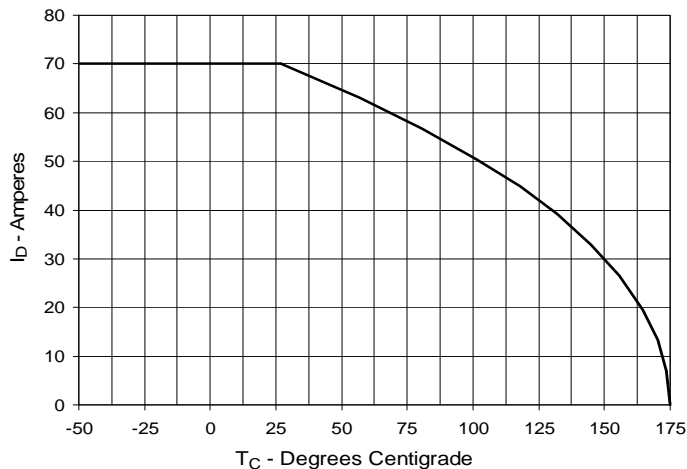


Fig. 7. Input Admittance

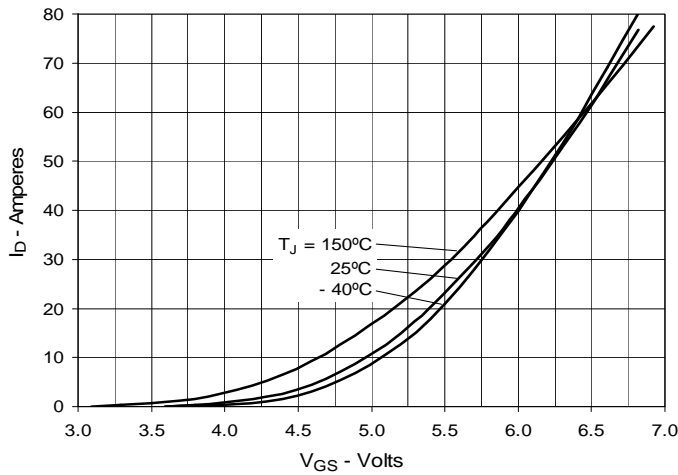


Fig. 8. Transconductance

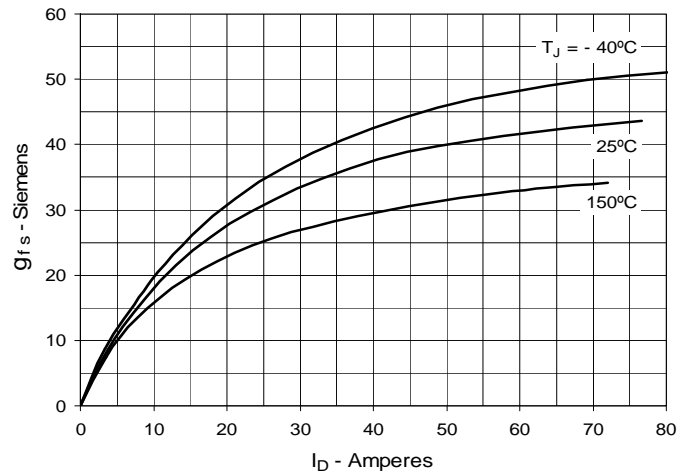


Fig. 9. Forward Voltage Drop of Intrinsic Diode

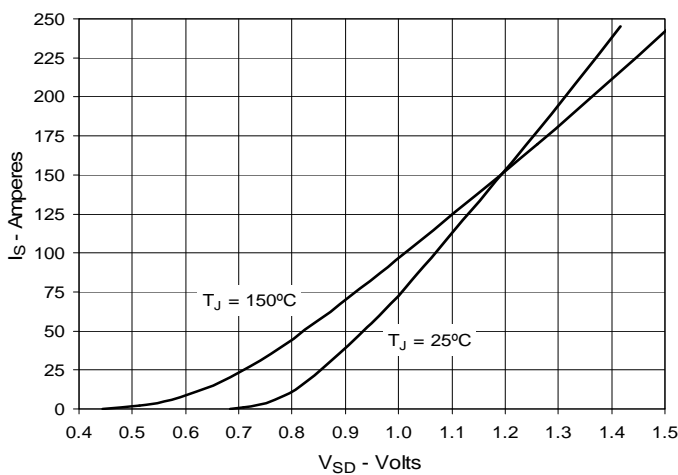


Fig. 10. Gate Charge

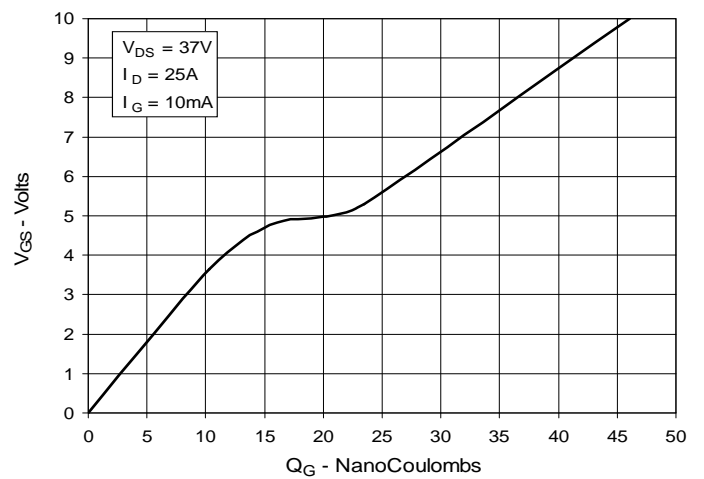


Fig. 11. Capacitance

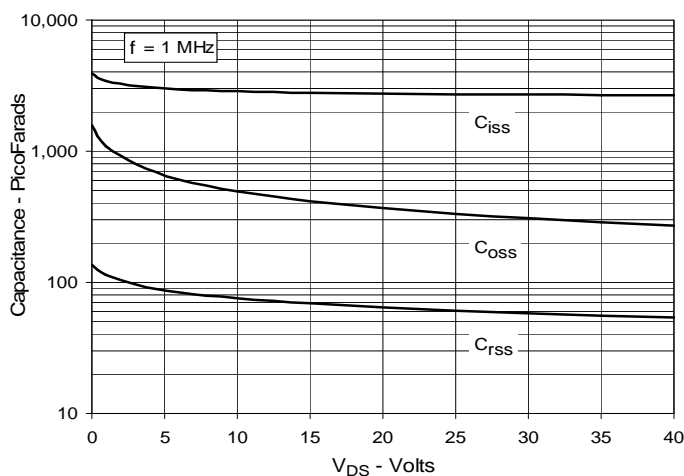
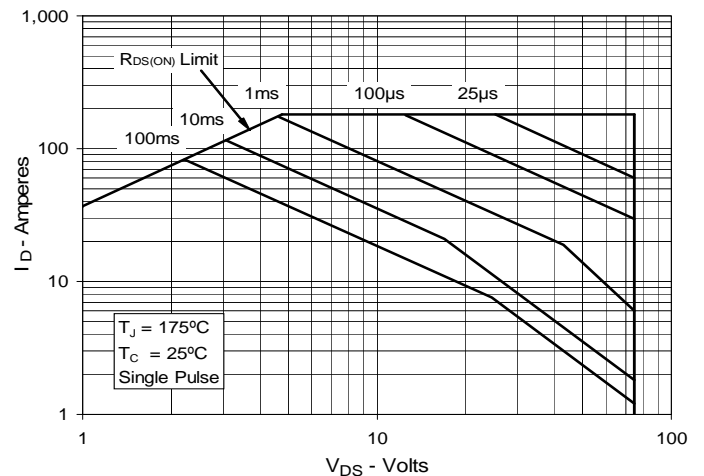
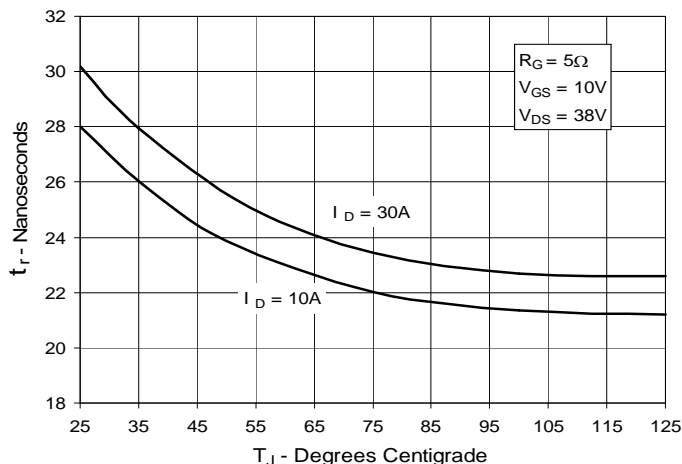


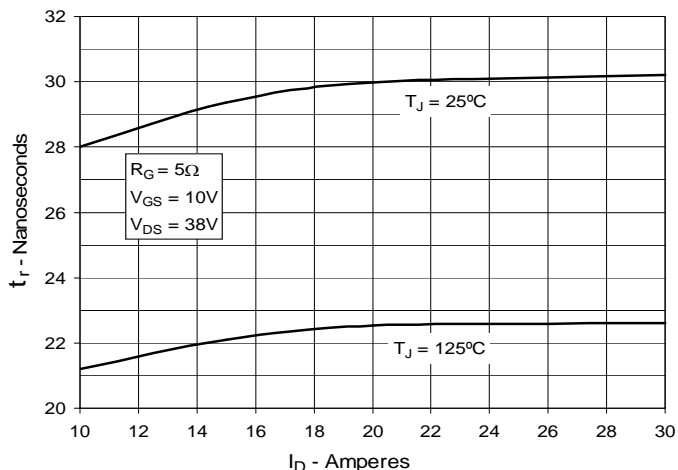
Fig. 12. Forward-Bias Safe Operating Area



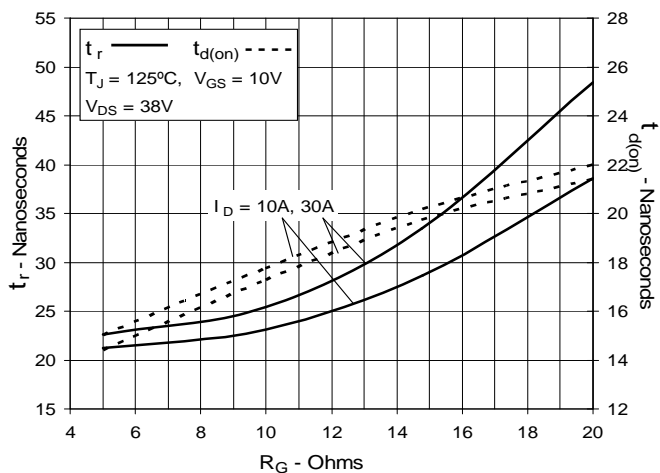
**Fig. 13. Resistive Turn-on
Rise Time vs. Junction Temperature**



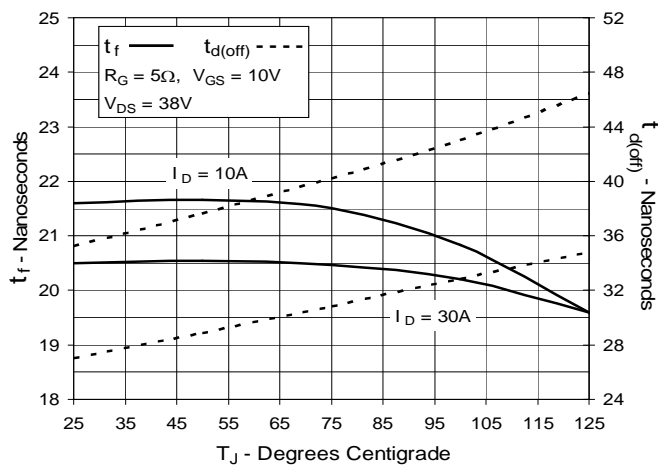
**Fig. 14. Resistive Turn-on
Rise Time vs. Drain Current**



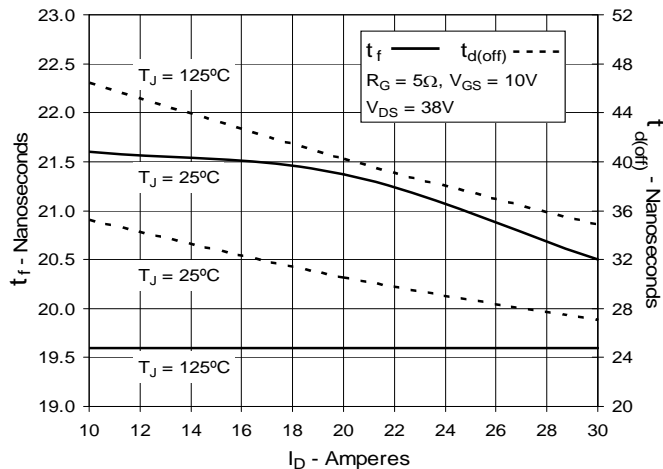
**Fig. 15. Resistive Turn-on
Switching Times vs. Gate Resistance**



**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**

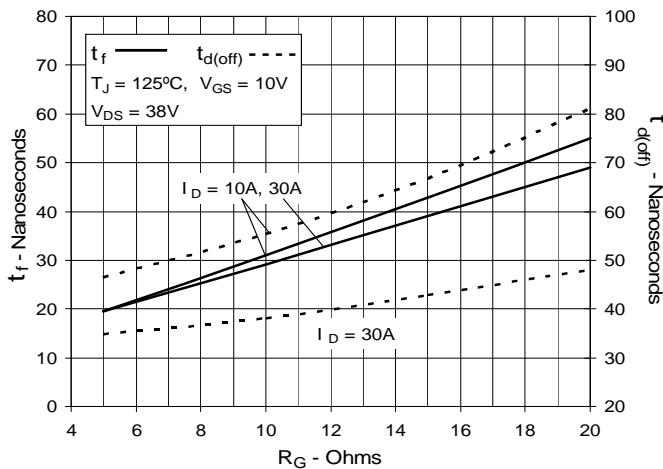


Fig. 19. Maximum Transient Thermal Impedance

