IXYS

Preliminary Technical Information

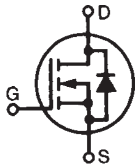
TrenchMV™ Power MOSFET

(Electrically Isolated Back Surface)

IXTC280N055T

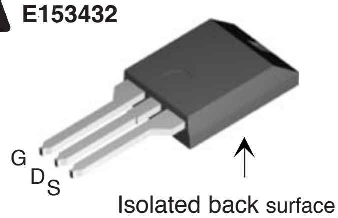
V_{DSS}	=	55	V
I_{D25}	=	145	A
$R_{DS(on)}$	≤	3.6	mΩ

N-Channel Enhancement Mode
Avalanche Rated



Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	55	V
V_{DGR}	T_J = 25°C to 175°C; R_{GS} = 1 MΩ	55	V
V_{GSM}	Transient	± 20	V
I_{D25}	T_C = 25°C	145	A
I_{LRMS}	Package Current Limit, RMS	75	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	600	A
I_{AR}	T_C = 25°C	40	A
E_{AS}	T_C = 25°C	1.5	J
dv/dt	$I_S \le I_{DM}$, di/dt ≤ 100 A/µs, $V_{DD} \le V_{DSS}$ $T_J \le$ 175°C, R_G = 3.3 Ω	3	V/ns
P_D	T_C = 25°C	160	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	1.6 mm (0.062 in.) from case for 10 s	300	°C
T_{SOLD}	Plastic body for 10 seconds	260	°C
V_{ISOL}	50/60 Hz, t = 1 minute, I_{ISOL} < 1 mA, RMS	2500	V
F_C	Mounting force	11..65/2.5..15	N/lb.
Weight		2	g

ISOPLUS220 (IXTC)
E153432



G = Gate D = Drain
S = Source

Features
- Ultra-low On Resistance
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect
- 175 °C Operating Temperature

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

Applications
- Automotive
  - Motor Drives
  - High Side Switch
  - 12V Battery
  - ABS Systems
- DC/DC Converters and Off-line UPS
- Primary- Side Switch
- High Current Switching Applications

Symbol	Test Conditions		Characteristic Values			
(T_J = 25°C unless otherwise specified)			Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA		55			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 µA		2.0		4.0	V
I_{GSS}	V_{GS} = ± 20 V, V_{DS} = 0 V				± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$ V_{GS} = 0 V	 T_J = 150°C			25 250	µA µA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 50 A, Notes 1, 2			2.9	3.6	mΩ

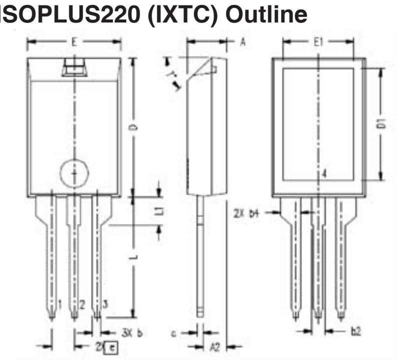
Symbol	Test Conditions	Characteristic Values ($T_J = 25°C$ unless otherwise specified) Min.	Typ.	Max.	
g_{fs}	V_{DS}= 10 V; I_D = 60 A, Note 1	65	108		S
C_{iss}			9800		pF
C_{oss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1450		pF
C_{rss}			320		pF
$t_{d(on)}$			32		ns
t_r	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 50 A		55		ns
$t_{d(off)}$	R_G = 3.3 Ω (External)		49		ns
t_f			37		ns
$Q_{g(on)}$			200		nC
Q_{gs}	V_{GS}= 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 25 A		50		nC
Q_{gd}			50		nC
R_{thJC}				0.96	°C/W
R_{thCS}			0.5		°C/W

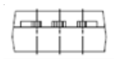
Source-Drain Diode

Symbol	Test Conditions	Characteristic Values ($T_J = 25°C$ unless otherwise specified) Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			280	A
I_{SM}	Pulse width limited by T_{JM}			600	A
V_{SD}	I_F = 50 A, V_{GS} = 0 V, Note 1			1.0	V
t_{rr}	I_F = 25 A, -di/dt = 100 A/μs V_R = 30 V, V_{GS} = 0 V		30		ns

Notes: 1. Pulse test: t ≤ 300 μs, duty cycle d ≤ 2 %;
2. Drain and Source Kelvin contacts must be located less than 5 mm from the plastic body.

ISOPLUS220 (IXTC) Outline





1.Gate 2. Drain
3.Source

Note: Bottom heatsink (Pin 4) is electrically isolated from Pins 1,2, and 3.

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.157	.197	4.00	5.00
A2	.098	.118	2.50	3.00
b	.035	.051	0.90	1.30
b2	.049	.065	1.25	1.65
b4	.093	.100	2.35	2.55
c	.028	.039	0.70	1.00
D	.591	.630	15.00	16.00
D1	.472	.512	12.00	13.00
E	.394	.433	10.00	11.00
E1	.295	.335	7.50	8.50
e	.100 BASIC		2.55 BASIC	
L	.512	.571	13.00	14.50
L1	.118	.138	3.00	3.50
T°			42.5°	47.5°

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

Fig. 1. Output Characteristics @ 25ºC

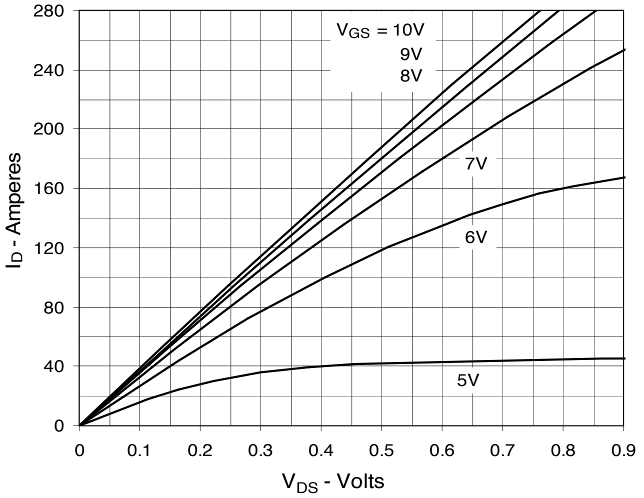


Fig. 2. Extended Output Characteristics @ 25ºC

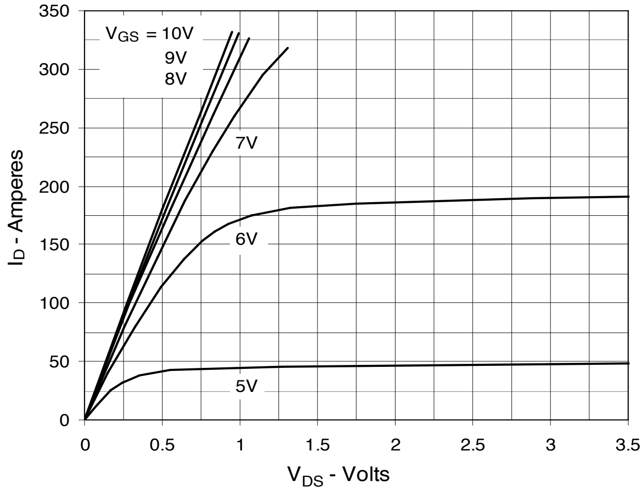


Fig. 3. Output Characteristics @ 150ºC

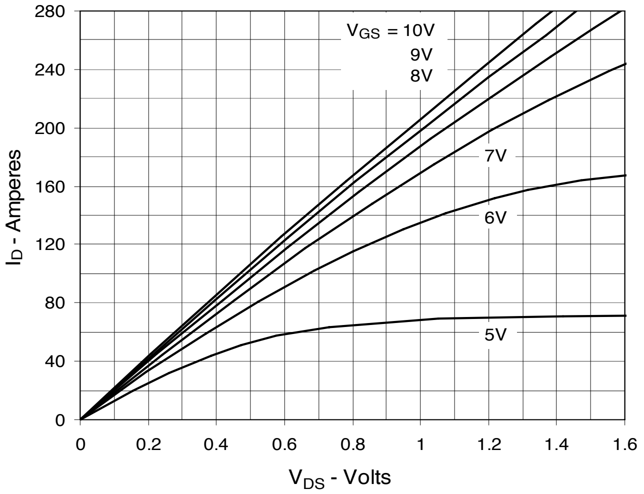


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 140A Value vs. Junction Temperature

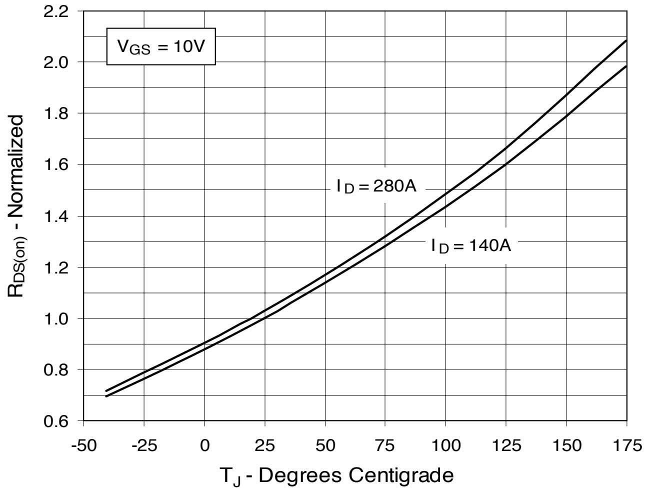


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 140A Value vs. Drain Current

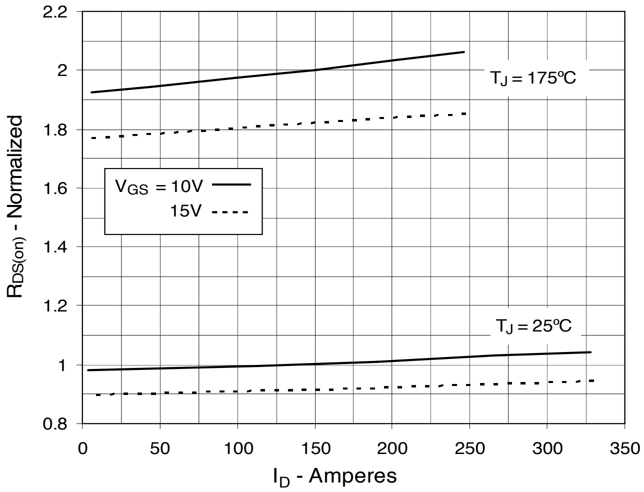


Fig. 6. Drain Current vs. Case Temperature

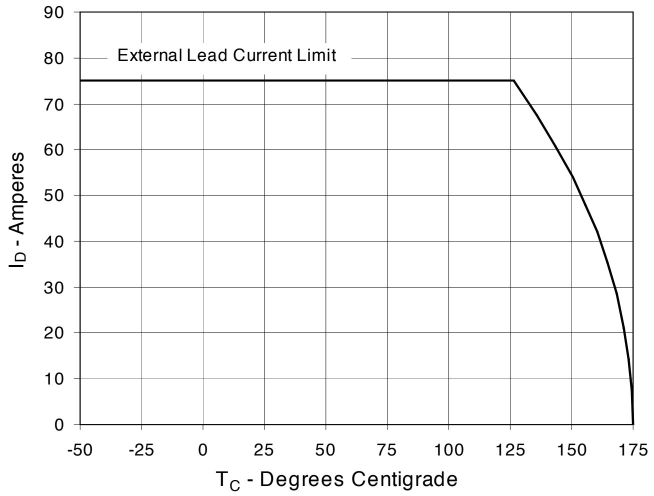


Fig. 7. Input Admittance

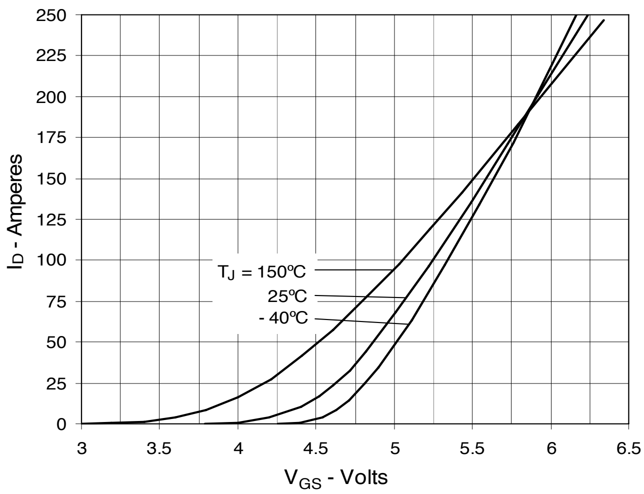


Fig. 8. Transconductance

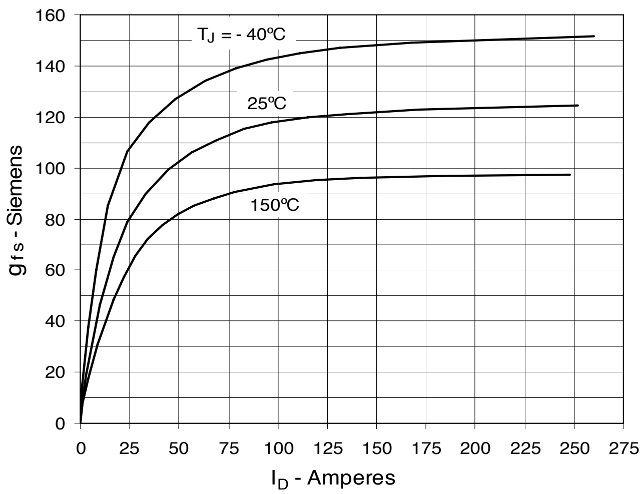


Fig. 9. Forward Voltage Drop of Intrinsic Diode

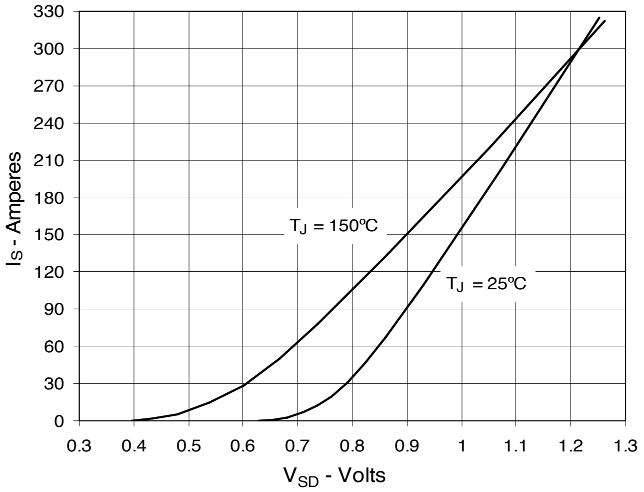


Fig. 10. Gate Charge

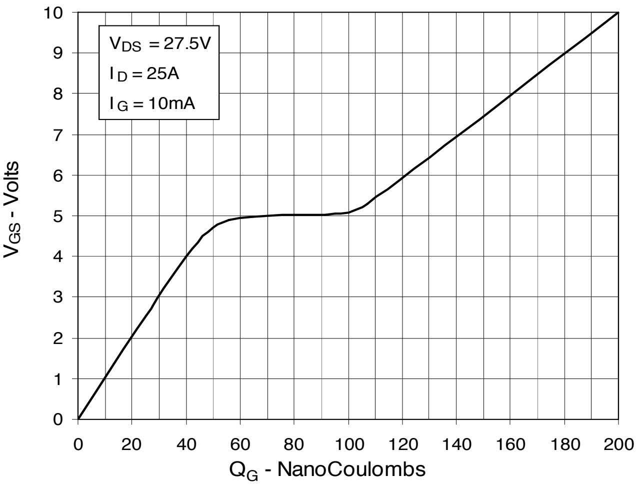


Fig. 11. Capacitance

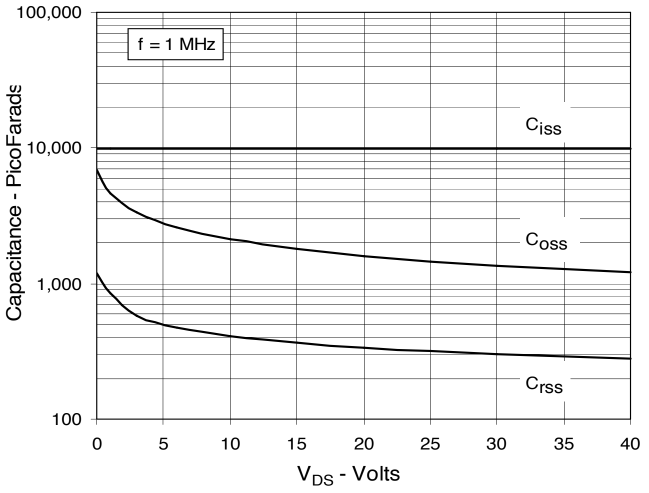


Fig. 12. Maximum Transient Thermal Impedance

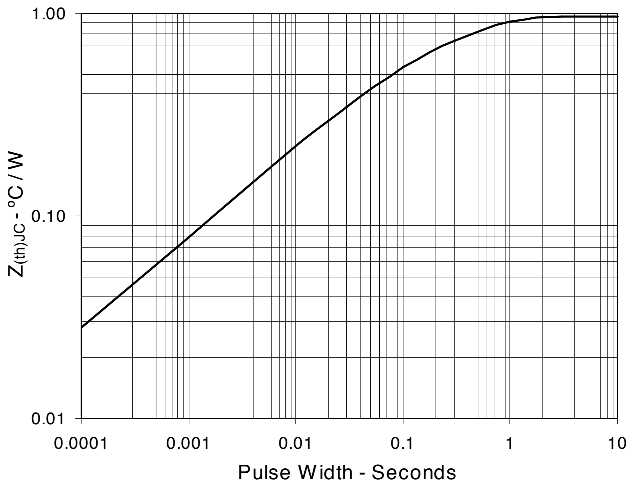


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

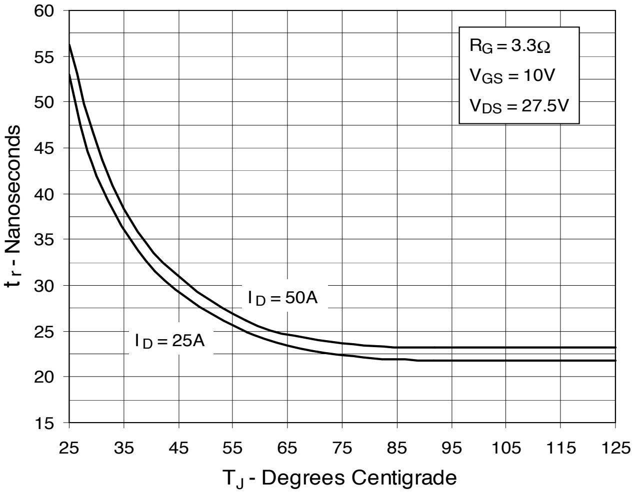


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

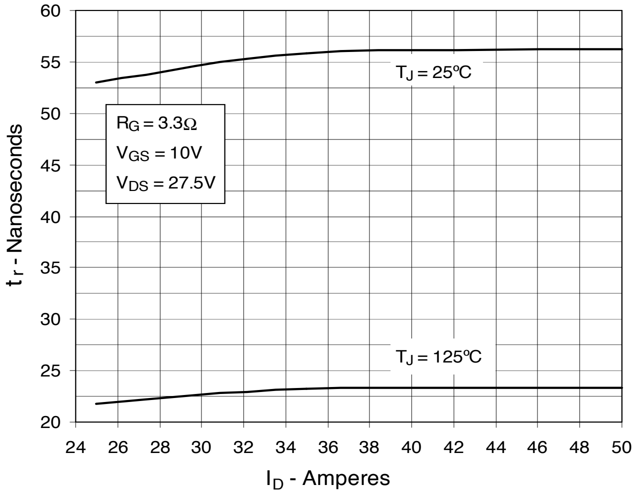


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

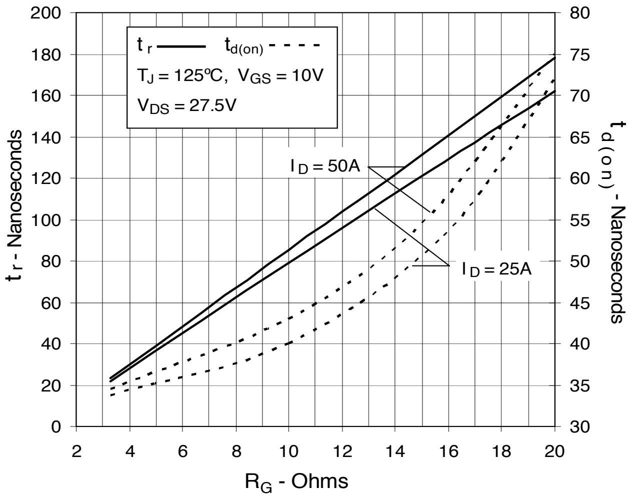


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

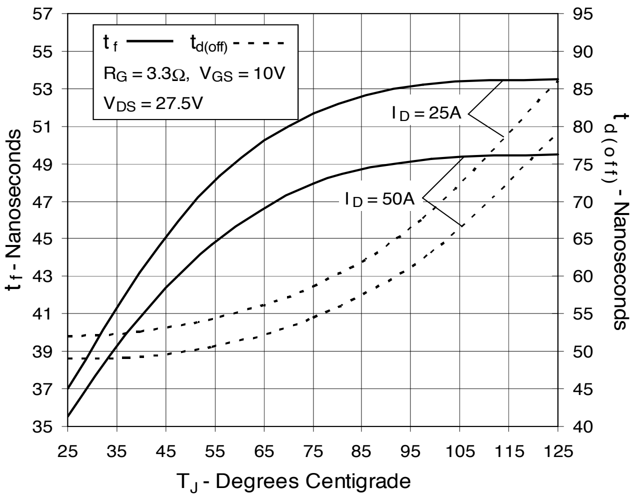


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

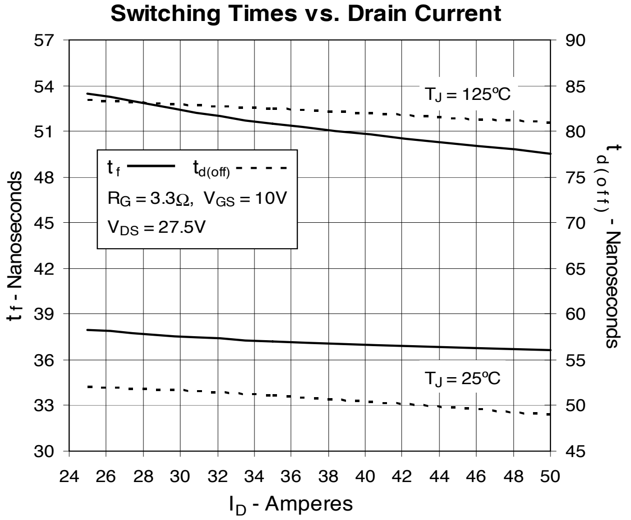


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance