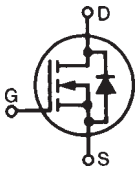
IXYS Preliminary Technical Information

TrenchMV™ Power MOSFET

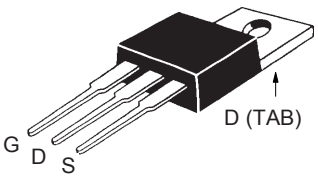
IXTP44N10T
IXTY44N10T

V_{DSS} = 100 V
I_{D25} = 44 A
$R_{DS(on)}$ ≤ 30 mΩ

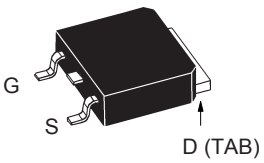
N-Channel Enhancement Mode
Avalanche Rated



TO-220 (IXTP)



TO-252 AA (IXTY)



G = Gate D = Drain
S = Source TAB = Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25° C to 175° C	100	V
V_{DGR}	T_J = 25° C to 175° C; R_{GS} = 1 MΩ	100	V
V_{GSM}	Transient	± 30	V
I_{D25}	T_C = 25° C	44	A
I_L	Package Current Limit, RMS TO-252A	25	A
I_{DM}	T_C = 25° C, pulse width limited by T_{JM}	140	A
I_{AR}	T_C = 25° C	10	A
E_{AS}	T_C = 25° C	250	mJ
dv/dt	$I_S \le I_{DM}$, di/dt ≤100 A/μs, $V_{DD} \le V_{DSS}$ $T_J \le$175° C, R_G = 18 Ω	3	V/ns
P_D	T_C = 25° C	130	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-40 ... +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
M_d	Mounting torque (TO-220)	1.13 / 10	Nm/lb.in.
Weight	TO-220	3	g
	TO-252	0.8	g

Symbol (T_J = 25° C unless otherwise specified)	Test Conditions	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA	85			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 25 μA	2.5		4.5	V
I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			± 100	nA
I_{DSS}	$V_{DS} = V_{DSS}$ V_{GS} = 0 V			1	μA
	T_J = 150° C			100	μA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 22 A, Notes 1, 2		22	30	mΩ

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

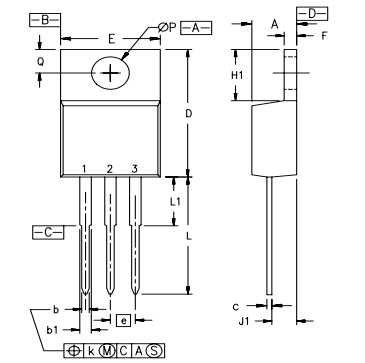
Applications
- Automotive
  - Motor Drives
  - 42V Power Bus
  - ABS Systems
- DC/DC Converters and Off-line UPS
- Primary Switch for 24V and 48V Systems
- Distributed Power Architechtures and VRMs
- Electronic Valve Train Systems
- High Current Switching Applications
- High Voltage Synchronous Recifier

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS}= 10 V; I_D = 0.5 I_{D25}, Note 1	13	21		S
C_{iss}			1262		pF
C_{oss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		190		pF
C_{rss}			43		pF
$t_{d(on)}$	**Resistive Switching Times**		21		ns
t_r	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 10 A		47		ns
$t_{d(off)}$	R_G = 18 Ω (External)		36		ns
t_f			32		ns
$Q_{g(on)}$			33		nC
Q_{gs}	V_{GS}= 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 10 A		10		nC
Q_{gd}			11		nC
R_{thJC}				1.15	°C/W
R_{thCS}	TO-220		0.5		°C/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			44	A
I_{SM}	Repetitive			140	A
V_{SD}	I_F = 25 A, V_{GS} = 0 V, Note 1			1.1	V
t_{rr}	I_F = 25 A, -di/dt = 100 A/µs V_R = 50 V, V_{GS} = 0 V		100		ns

TO-220 (IXTP) Outline

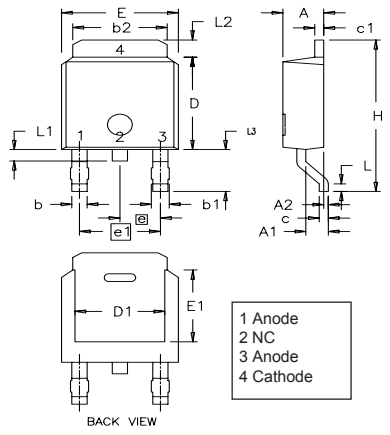


Pins: 1 - Gate 2 - Drain
3 - Source 4, TAB - Drain

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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

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

TO-252 (IXTY) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	2.19	2.38	0.086	0.094
A1	0.89	1.14	0.035	0.045
A2	0	0.13	0	0.005
b	0.64	0.89	0.025	0.035
b1	0.76	1.14	0.030	0.045
b2	5.21	5.46	0.205	0.215
c	0.46	0.58	0.018	0.023
c1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D1	4.32	5.21	0.170	0.205
E	6.35	6.73	0.250	0.265
E1	4.32	5.21	0.170	0.205
e	2.28 BSC		0.090 BSC	
e1	4.57 BSC		0.180 BSC	
H	9.40	10.42	0.370	0.410
L	0.51	1.02	0.020	0.040
L1	0.64	1.02	0.025	0.040
L2	0.89	1.27	0.035	0.050
L3	2.54	2.92	0.100	0.115

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

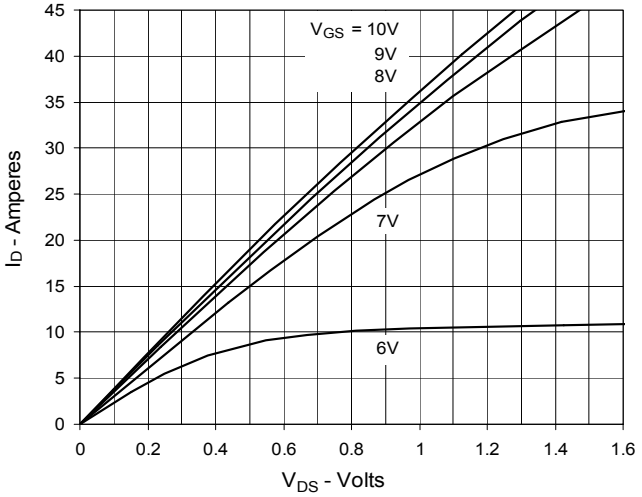


Fig. 2. Extended Output Characteristics @ 25ºC

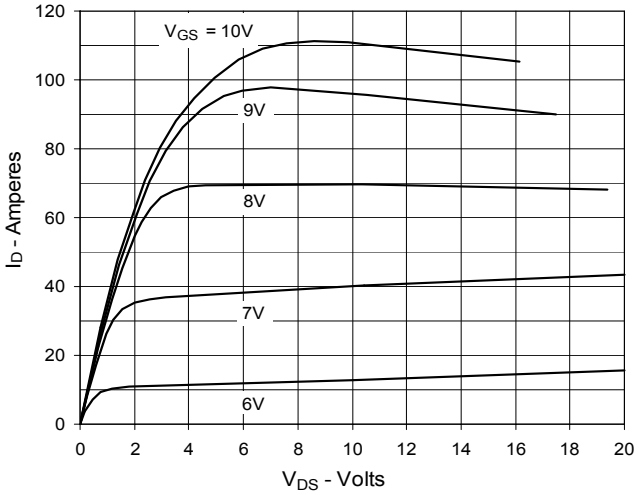


Fig. 3. Output Characteristics @ 150ºC

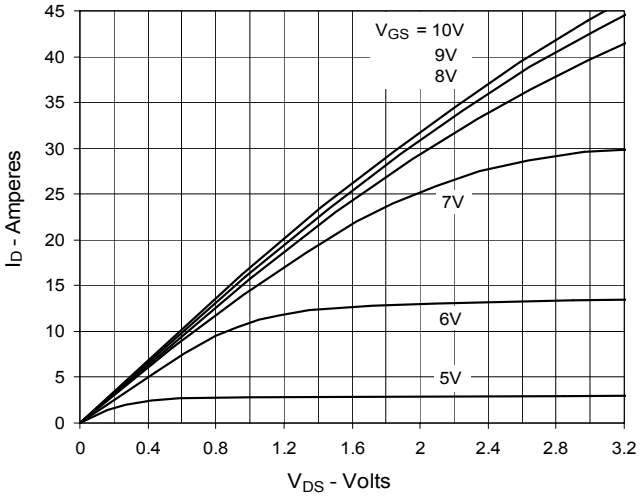


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 22A Value vs. Junction Temperature

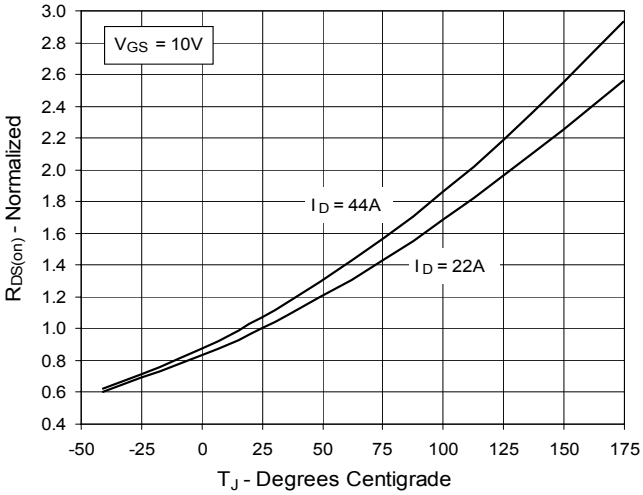


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 22A Value vs. Drain Current

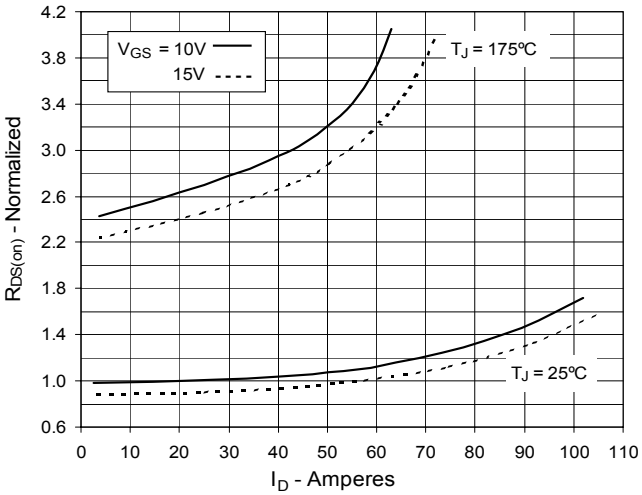


Fig. 6. Drain Current vs. Case Temperature

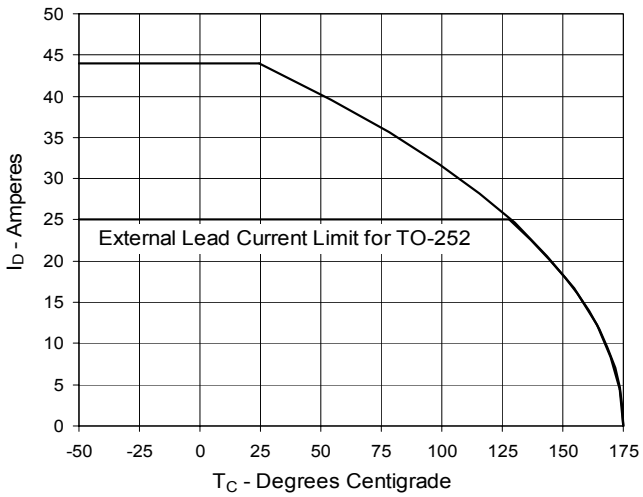


Fig. 7. Input Admittance

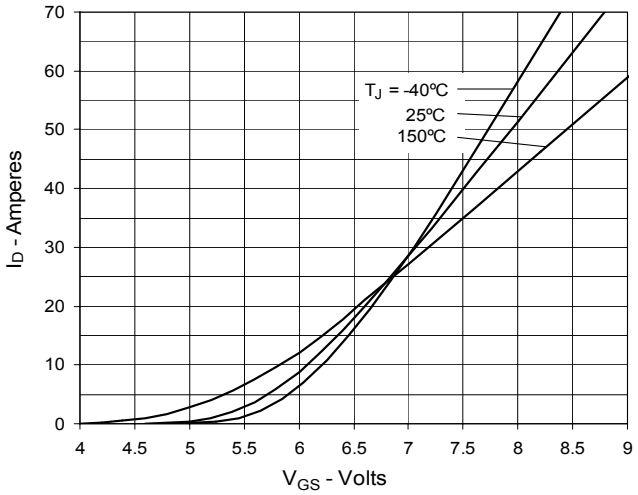


Fig. 8. Transconductance

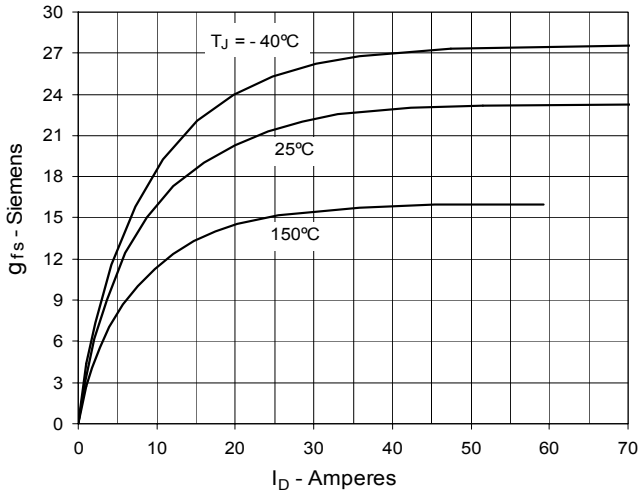


Fig. 9. Forward Voltage Drop of Intrinsic Diode

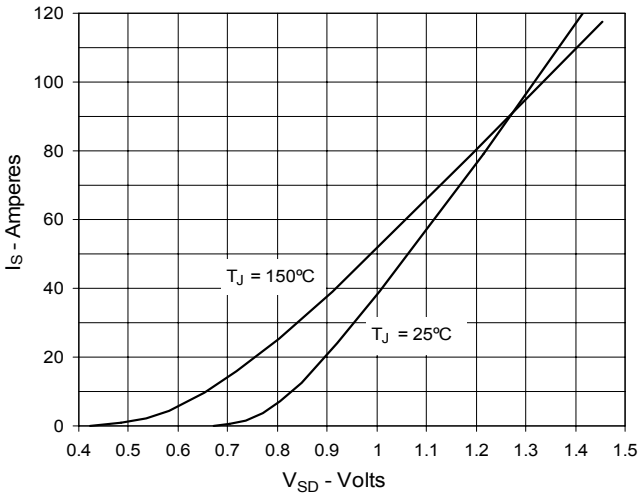


Fig. 10. Gate Charge

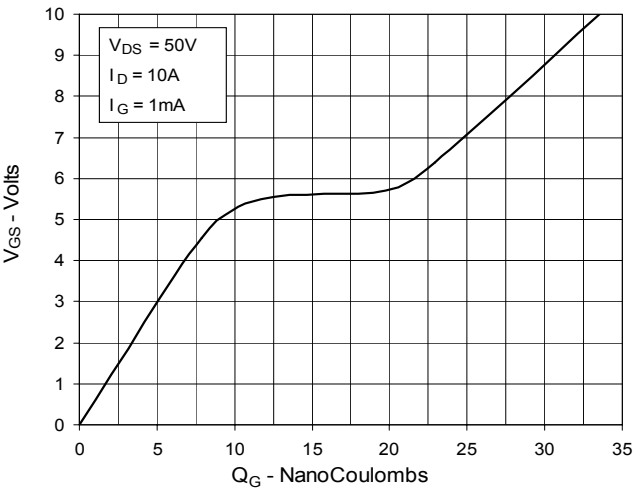


Fig. 11. Capacitance

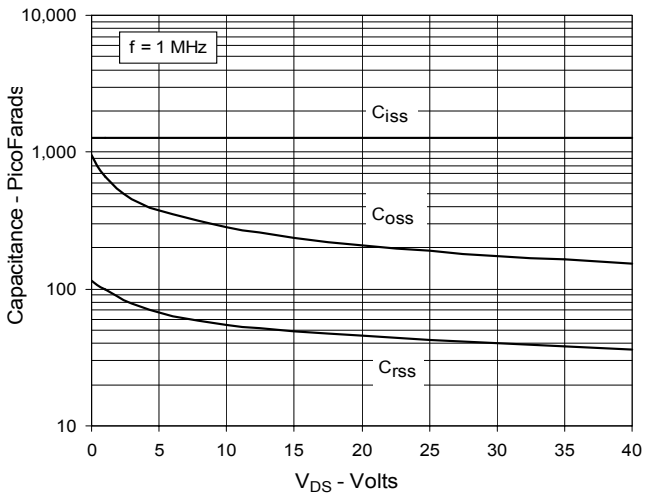


Fig. 12. Maximum Transient Thermal Impedance

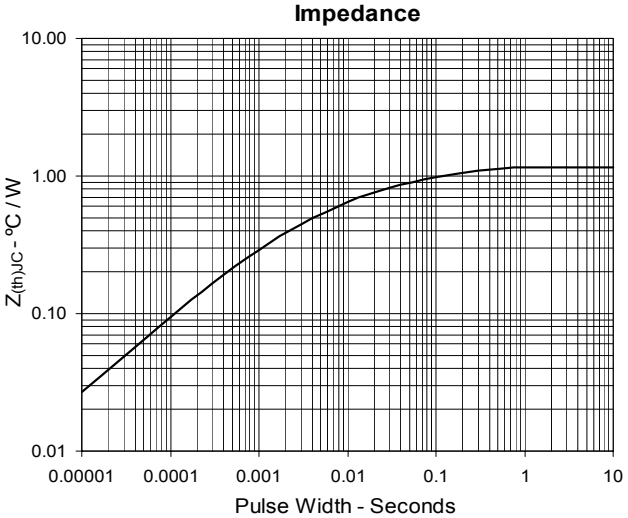


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

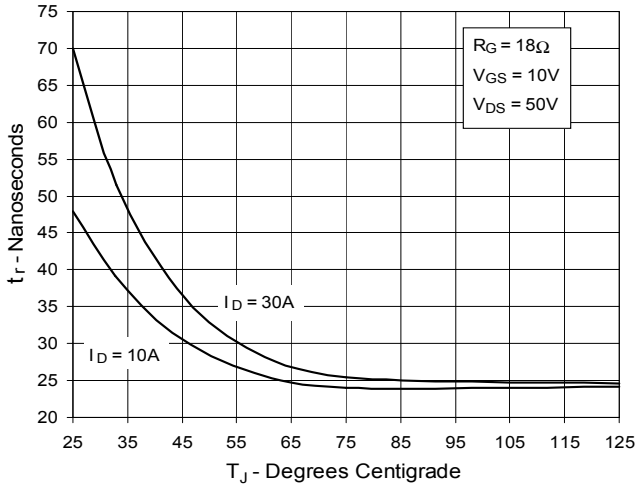


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

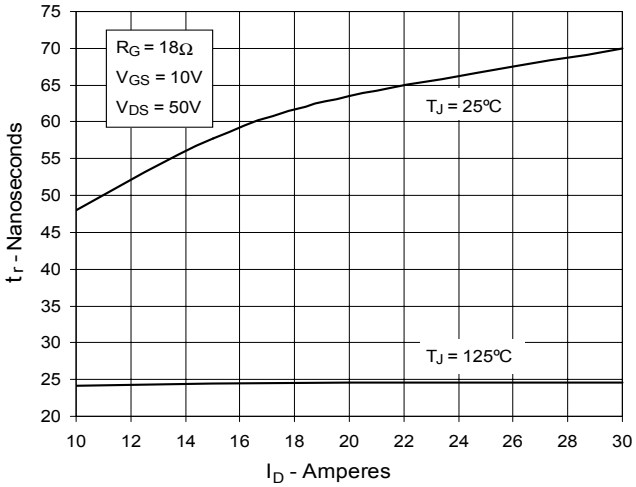


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

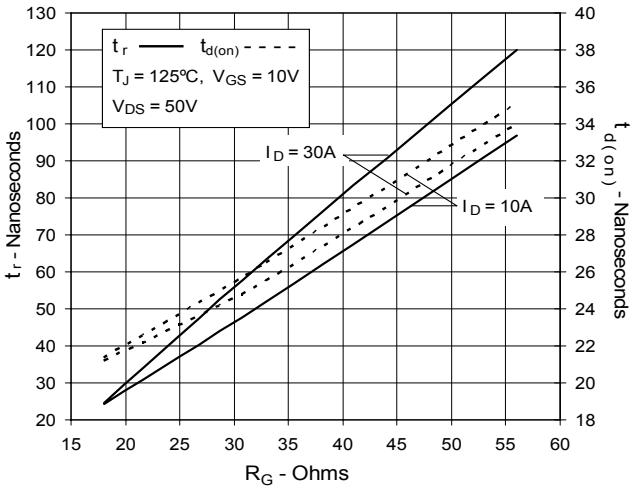


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

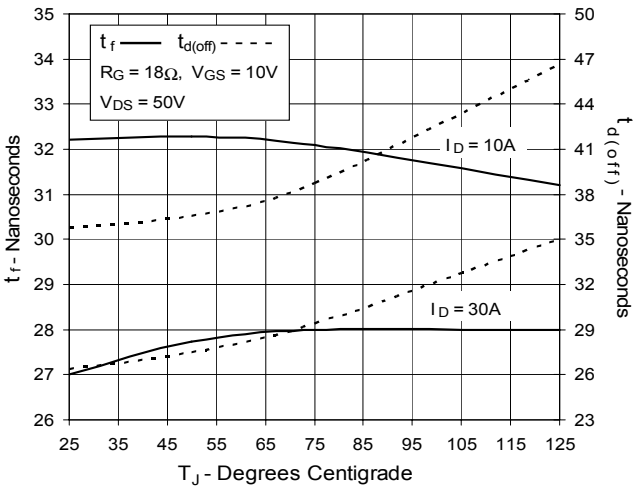


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

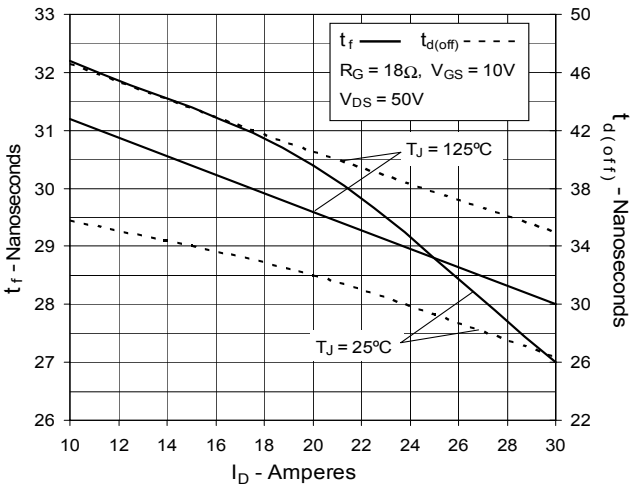


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance