IXYS

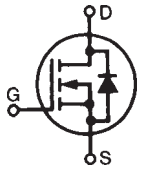
Advance Technical Information

Trench™ Power MOSFET

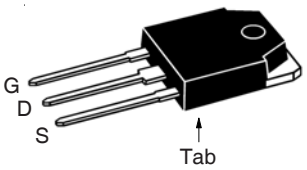
IXTQ60N10T

V_{DSS} = 100V
I_{D25} = 60A
$R_{DS(on)}$ ≤ 18.0mΩ

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



TO-3P



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} = 1MΩ	100	V
V_{GSM}	Transient	± 30	V
I_{D25}	T_C = 25°C	60	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	180	A
I_A	T_C = 25°C	10	A
E_{AS}	T_C = 25°C	500	mJ
P_D	T_C = 25°C	176	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
M_d	Mounting Torque	1.13/10	Nm/lb.in.
Weight		5.5	g

Features

- 175°C Operating Temperature
- Avalanche Rated
- Low $R_{DS(on)}$
- Fast Intrinsic Diode
- Low Package Inductance

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- DC/DC Converters and Off-Line UPS
- Primary Switch for 24V and 48V Systems
- High Current Switching Applications
- Distributed Power Architechtures and VRMs
- Electronic Valve Train Systems
- High Voltage Synchronous Recifier

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	100			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 50μA	2.5		4.5	V
I_{GSS}	V_{GS} = ± 20V, V_{DS} = 0V			± 100	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			1	μA
	T_J = 150°C			100	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A, Note 1		14.8	18.0	mΩ

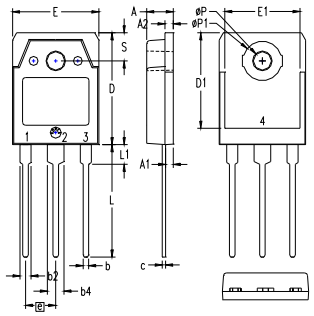
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 0.5 • I_{D25}, Note 1	25	42		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2650		pF
C_{oss}			335		pF
C_{rss}			60		pF
$t_{d(on)}$	**Resistive Switching Times** V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 10A R_G = 15Ω (External)		27		ns
t_r			40		ns
$t_{d(off)}$			43		ns
t_f			37		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 10A		49		nC
Q_{gs}			15		nC
Q_{gd}			11		nC
R_{thJC}				0.85	°C/W
R_{thCH}			0.25		°C/W

Source-Drain Diode

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			60	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			240	A
V_{SD}	I_F = 25A, V_{GS} = 0V, Note 1			1.2	V
t_{rr}	I_F = 0.5 • I_S, V_{GS} = 0V -di/dt = 100A/μs V_R = 0.5 • V_{DSS}		59		ns
I_{RM}			3.8		A
Q_{RM}			112		nC

Note 1. Pulse test, t ≤ 300 μs, duty cycle, d ≤ 2%.

TO-3P (IXTQ) Outline



1 – GATE
2 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)
4 – DRAIN (COLLECTOR)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.799	19.80	20.30
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
øP	.126	.134	3.20	3.40
øP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

Fig. 1. Output Characteristics @ T_J = 25ºC

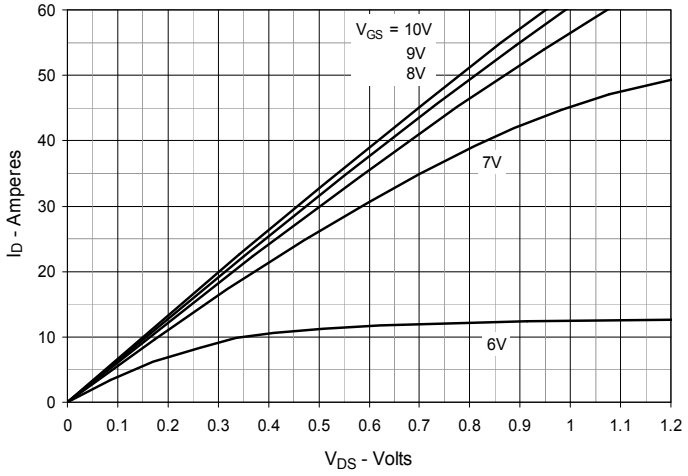


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

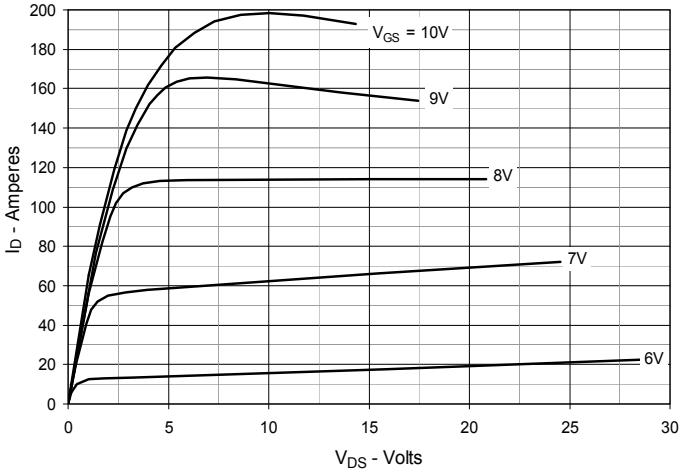


Fig. 3. Output Characteristics @ T_J = 150ºC

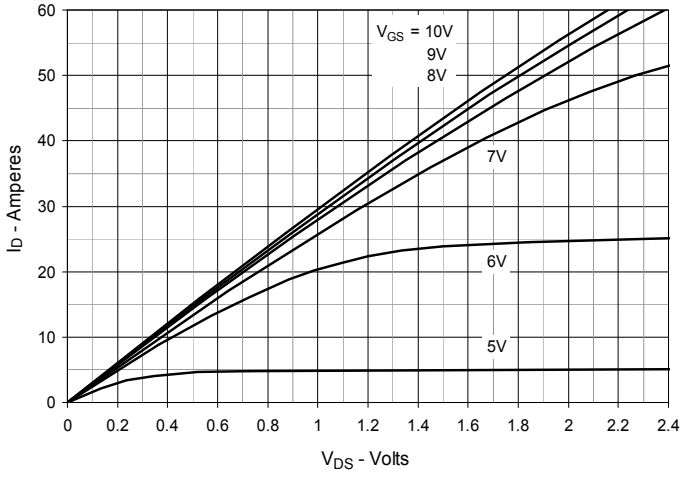


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 30A Value vs. Junction Temperature

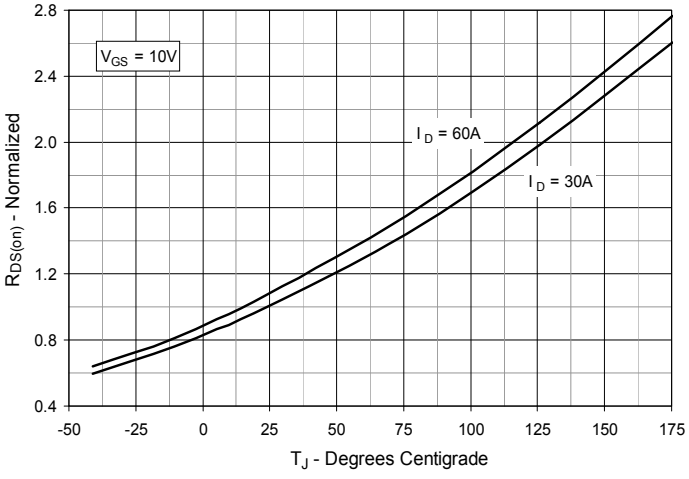


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 30A Value vs. Drain Current

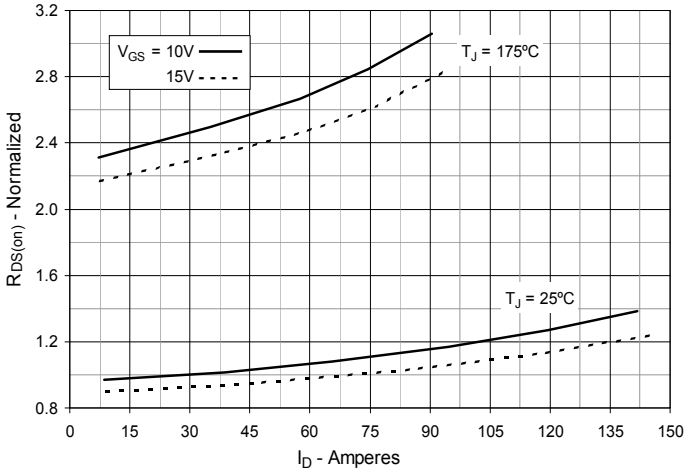


Fig. 6. Drain Current vs. Case Temperature

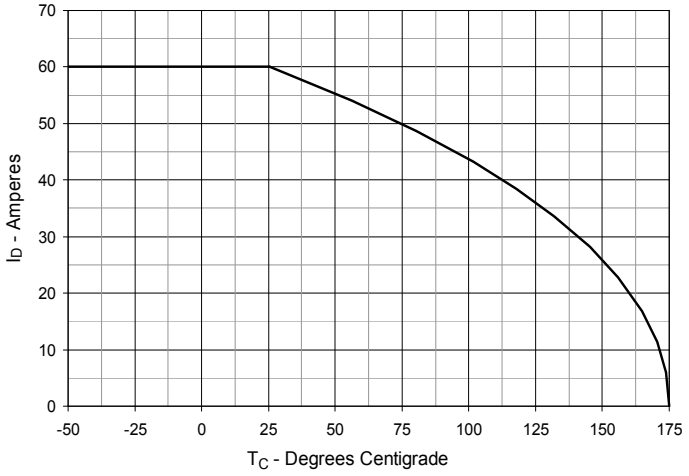


Fig. 7. Input Admittance

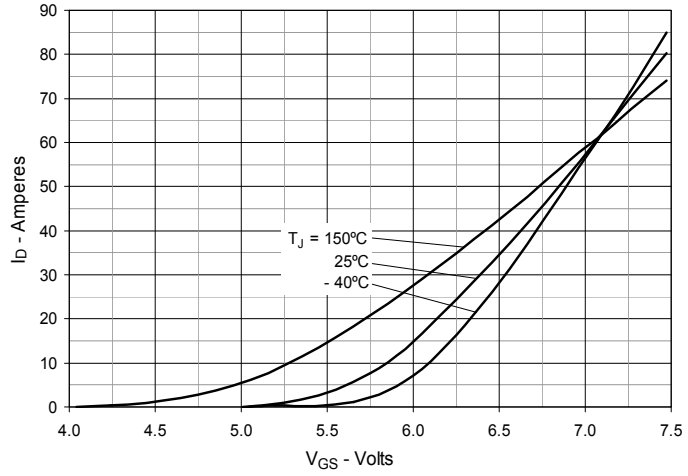


Fig. 8. Transconductance

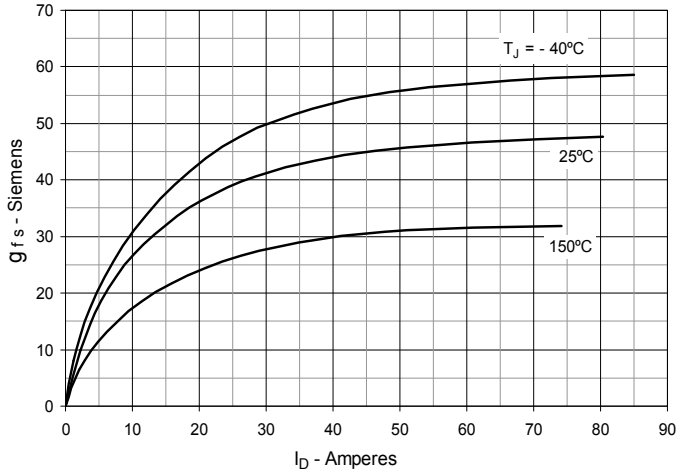


Fig. 9. Forward Voltage Drop of Intrinsic Diode

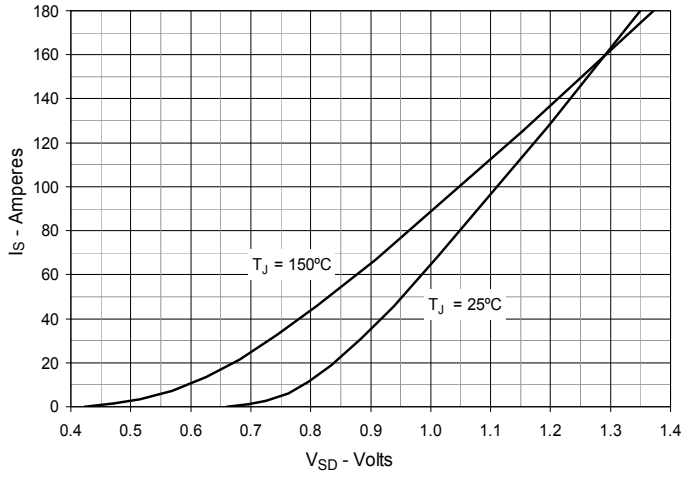


Fig. 10. Gate Charge

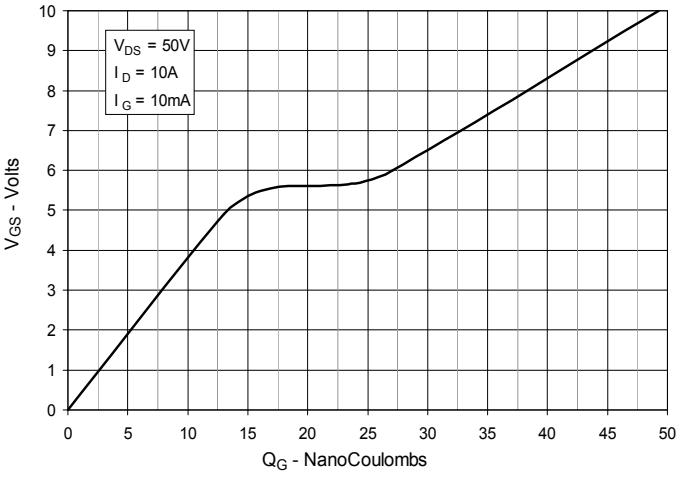


Fig. 11. Capacitance

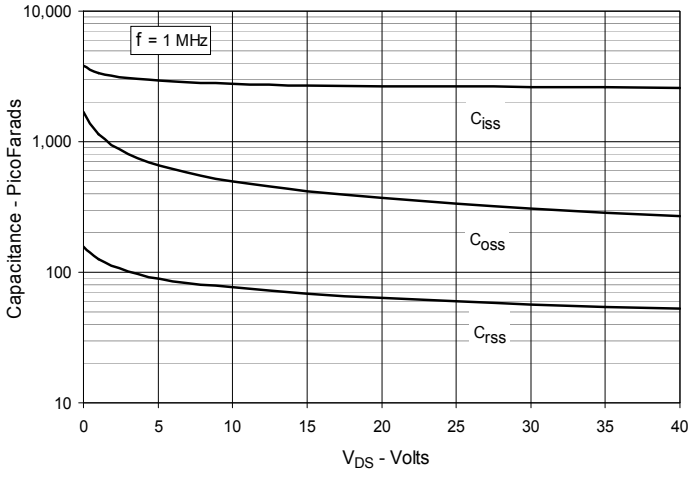


Fig. 12. Maximum Transient Thermal Impedance

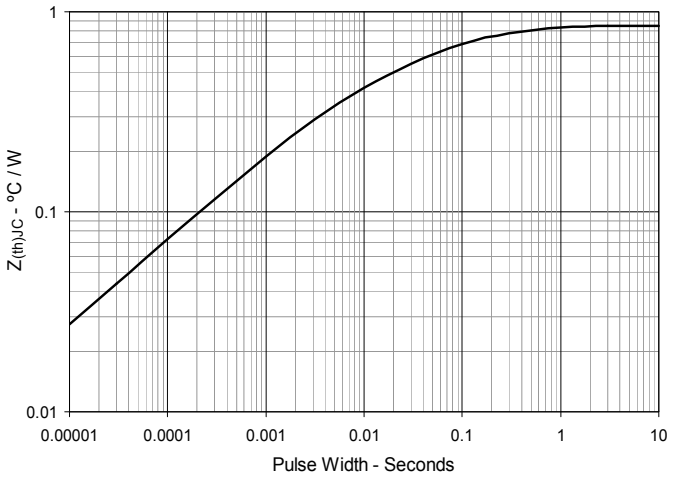


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

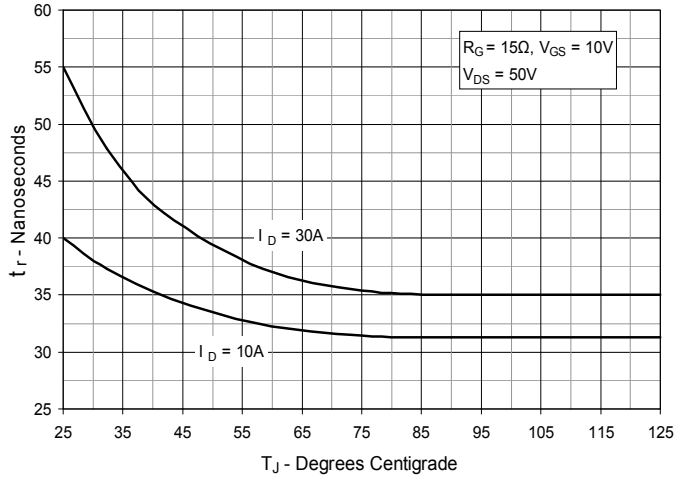


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

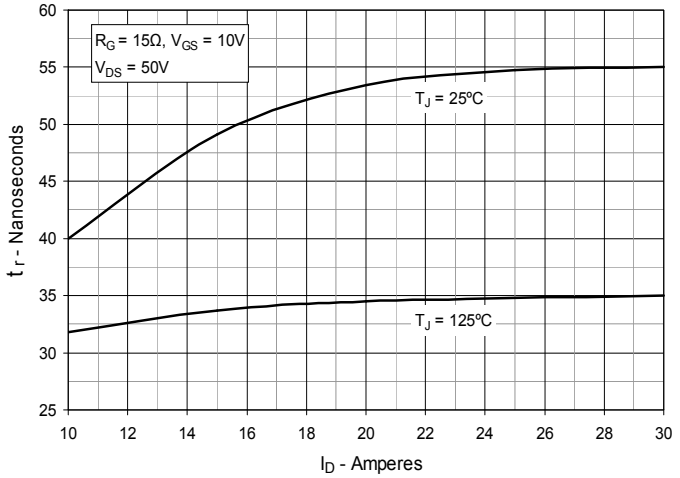


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

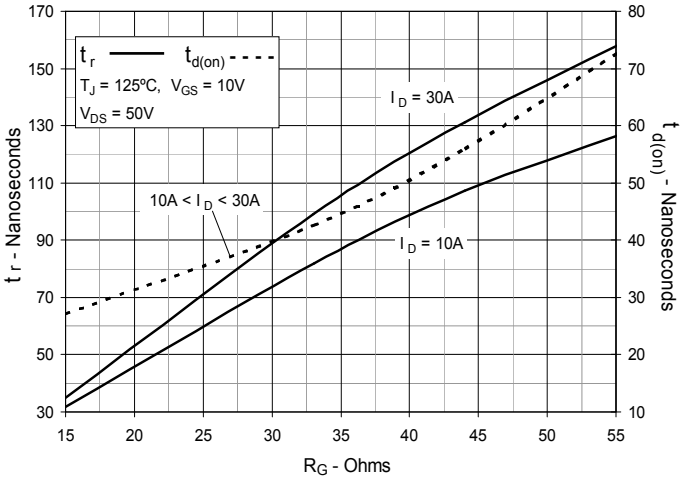


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

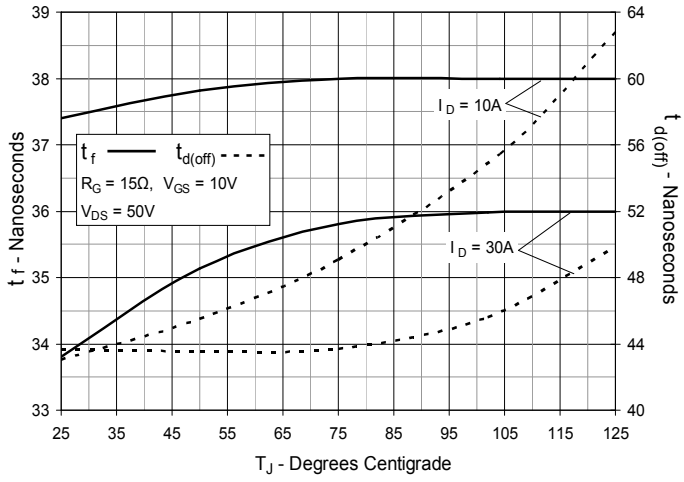


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

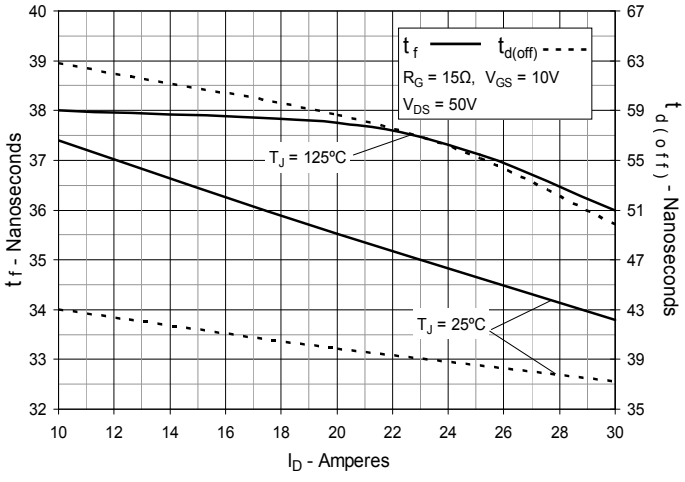


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance