IXYS

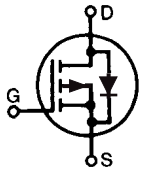
Preliminary Technical Information

TrenchP™ Power MOSFET

IXTR120P20T

V_{DSS} = - 200V
I_{D25} = - 90A
$R_{DS(on)}$ ≤ 32mΩ
t_{rr} ≤ 300ns

P-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Rectifier



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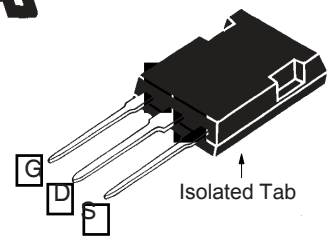


G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	- 200	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	- 200	V
V_{GSS}	Continuous	±15	V
V_{GSM}	Transient	±25	V
I_{D25}	T_C = 25°C	- 90	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	- 400	A
I_A	T_C = 25°C	-100	A
E_{AS}	T_C = 25°C	3	J
dv/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le 150°C$	10	V/ns
P_D	T_C = 25°C	595	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
V_{ISOL}	50/60 Hz, 1 Minute	2500	V~
F_C	Mounting Force	20..120/4.5..27	N/lb.
Weight		5	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = - 250μA	- 200			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = - 250μA	- 2.5		- 4.5	V
I_{GSS}	V_{GS} = ±15V, V_{DS} = 0V			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			- 25	μA
	T_J = 125°C			- 300	μA
$R_{DS(on)}$	V_{GS} = -10V, I_D = - 60A, Note 1			32	mΩ

Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- Avalanche Rated
- Extended FBSOA
- Fast Intrinsic Rectifier
- Low $R_{DS(ON)}$ and Q_G

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- High-Side Switching
- Push Pull Amplifiers
- DC Choppers
- Automatic Test Equipment
- Current Regulators
- Battery Charger Applications

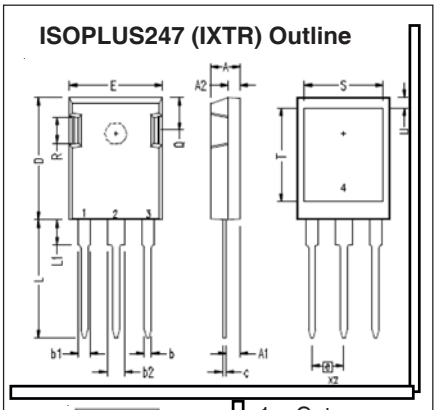
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = -10V, I_D = - 60A, Note 1	85	145		S
C_{iss}	V_{GS} = 0V, V_{DS} = - 25V, f = 1MHz		73		nF
C_{oss}			2550		pF
C_{rss}			480		pF
$t_{d(on)}$	**Resistive Switching Times**		90		ns
t_r	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = - 60A		85		ns
$t_{d(off)}$	R_G = 1Ω (External)		200		ns
t_f			50		ns
$Q_{g(on)}$	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = - 60A		740		nC
Q_{gs}			220		nC
Q_{gd}			120		nC
R_{thJC}				0.21	°C/W
R_{thCS}			0.15		°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			-120	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			- 480	A
V_{SD}	I_F = -100A, V_{GS} = 0V, Note 1			-1.4	V
t_{rr}	I_F = - 60A, -di/dt = -100A/μs			300	ns
Q_{RM}	V_R = -100V, V_{GS} = 0V		3.3		μC
I_{RM}			25.6		A

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

ISOPLUS247 (IXTR) Outline



1 = Gate
2,4 = Drain
3 = Source

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.085	1.91	2.15
b2	.115	.126	2.92	3.20
C	.024	.033	0.61	0.83
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.811	19.81	20.60
L1	.150	.172	3.81	4.38
Q	.220	.244	5.59	6.20
R	.170	.191	4.32	4.85
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03
W	0	.004	0	0.10

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 @ T_J = 25ºC

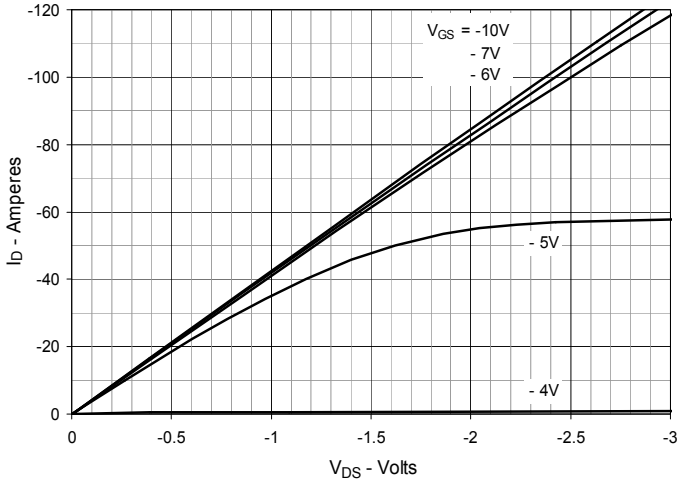


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

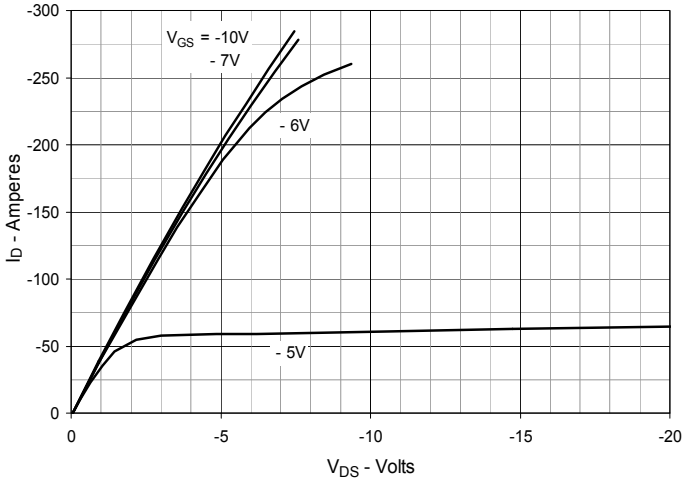


Fig. 3. Output Characteristics @ T_J = 125ºC

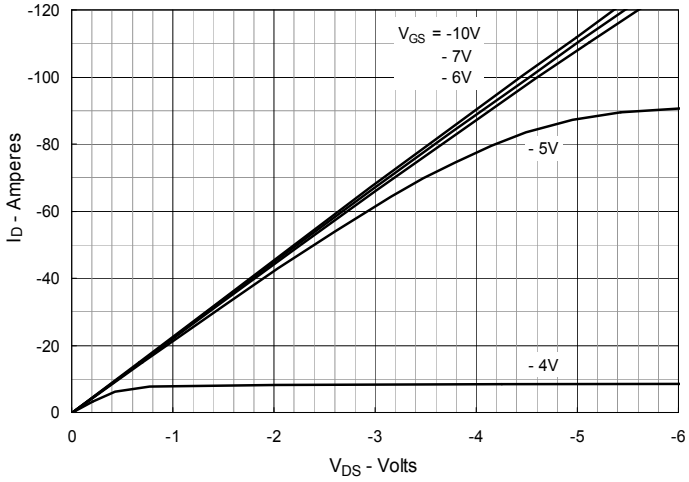


Fig. 4. $R_{DS(on)}$ Normalized to I_D = - 60A Value vs. Junction Temperature

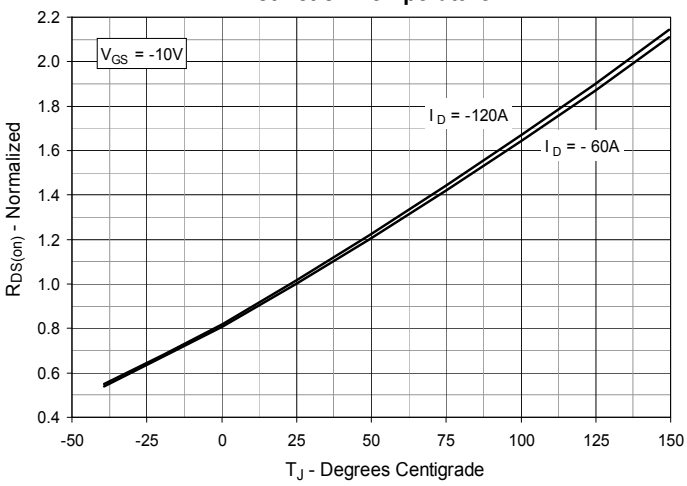


Fig. 5. $R_{DS(on)}$ Normalized to I_D = - 60A Value vs. Drain Current

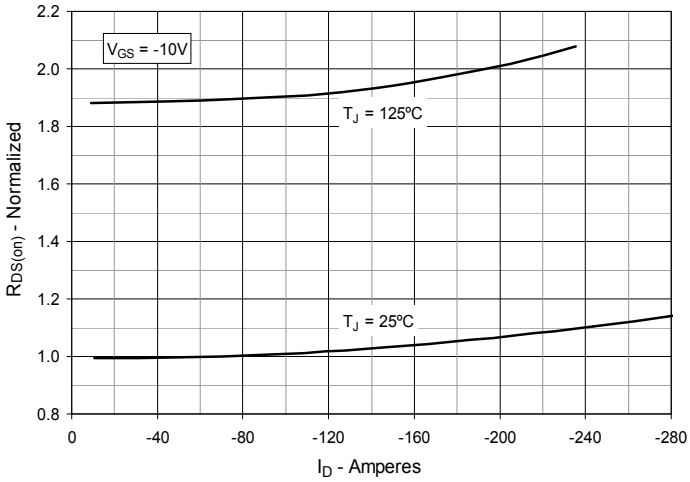


Fig. 6. Maximum Drain Current vs. Case Temperature

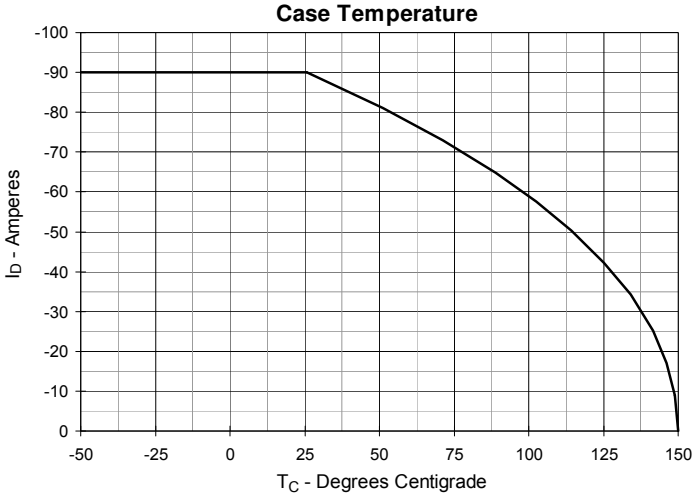


Fig. 7. Input Admittance

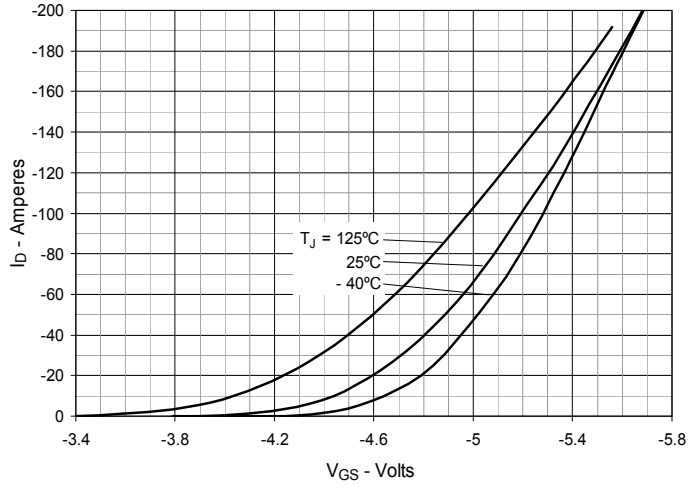


Fig. 8. Transconductance

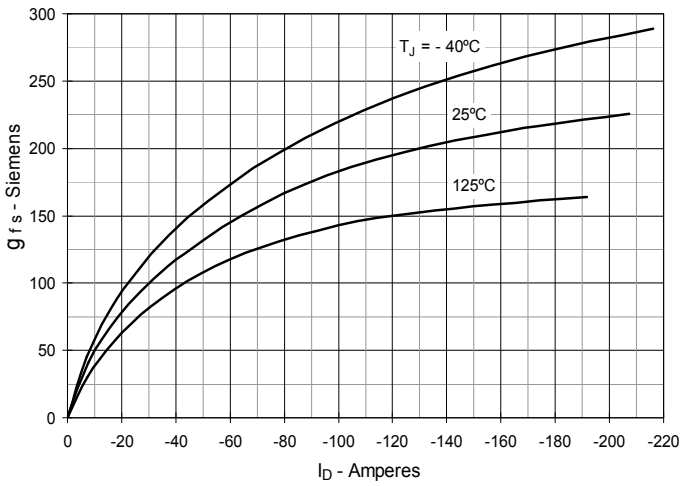


Fig. 9. Forward Voltage Drop of Intrinsic Diode

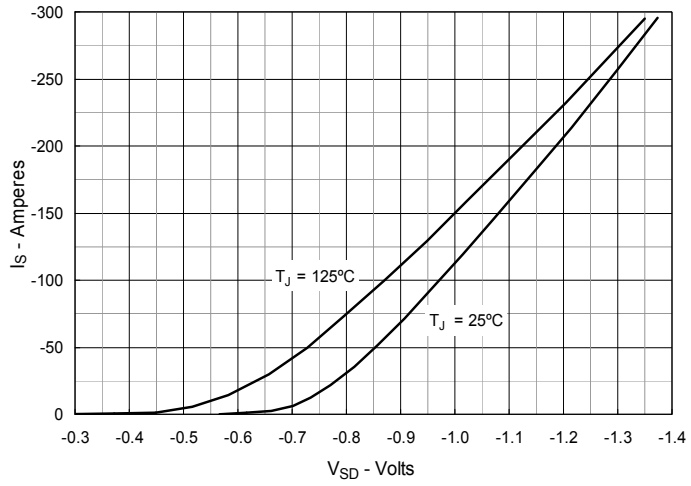


Fig. 10. Gate Charge

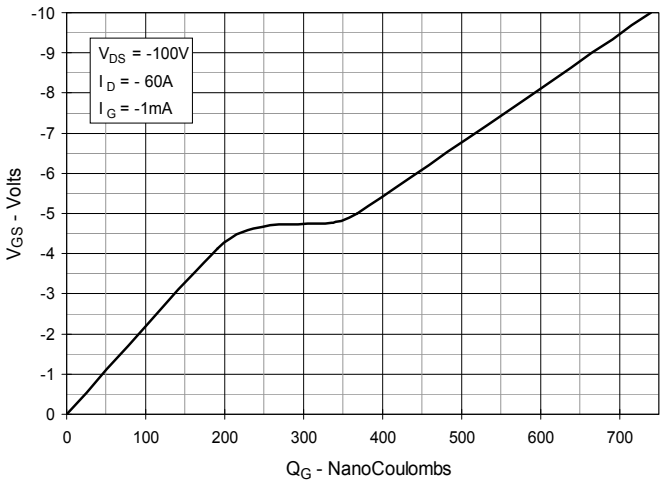


Fig. 11. Capacitance

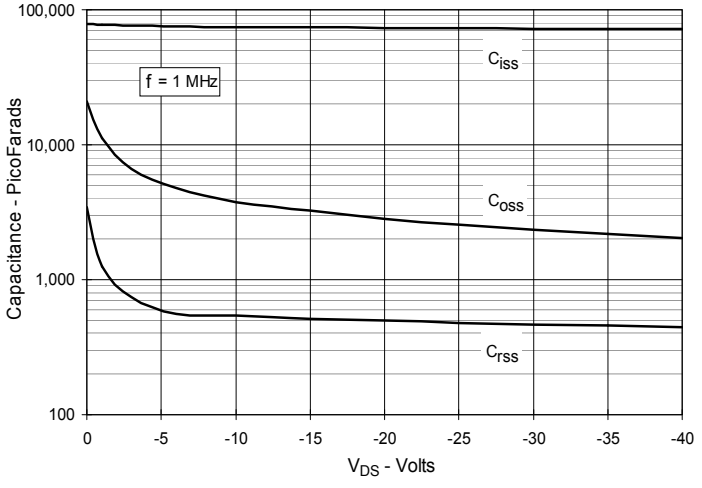


Fig. 12. Forward-Bias Safe Operating Area

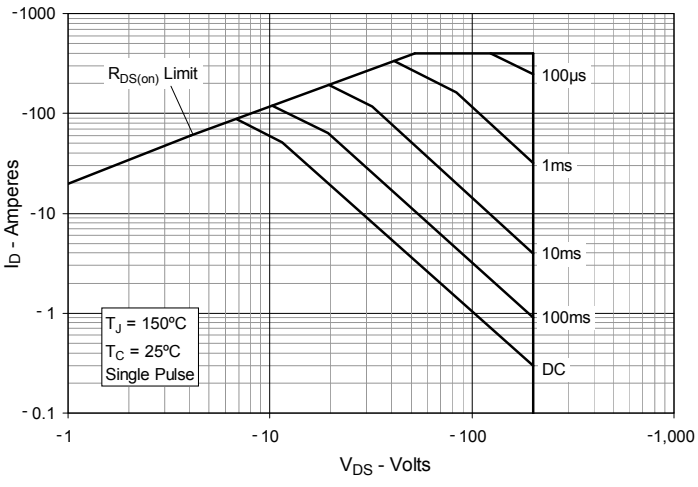


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

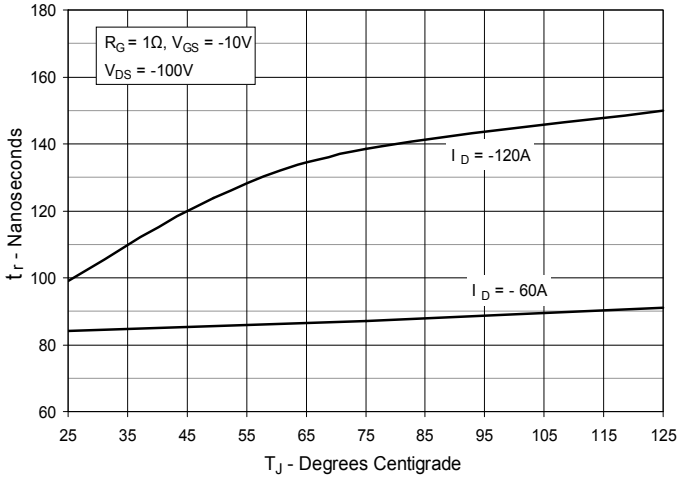


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

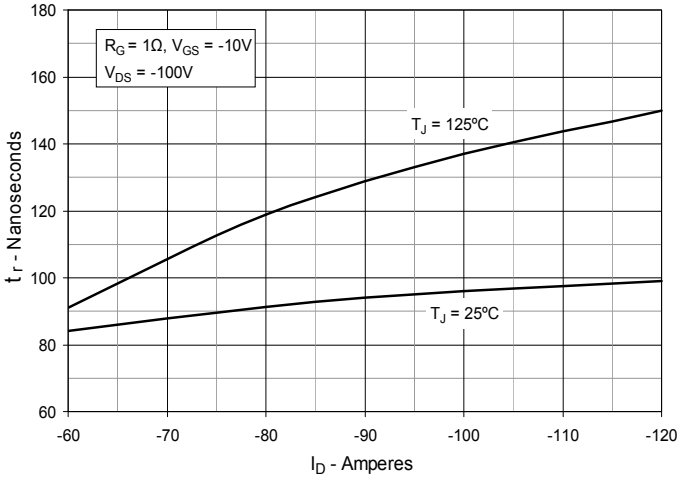


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

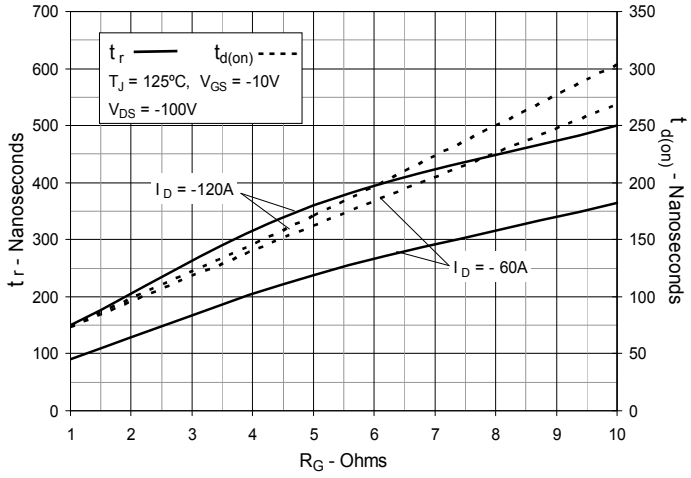


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

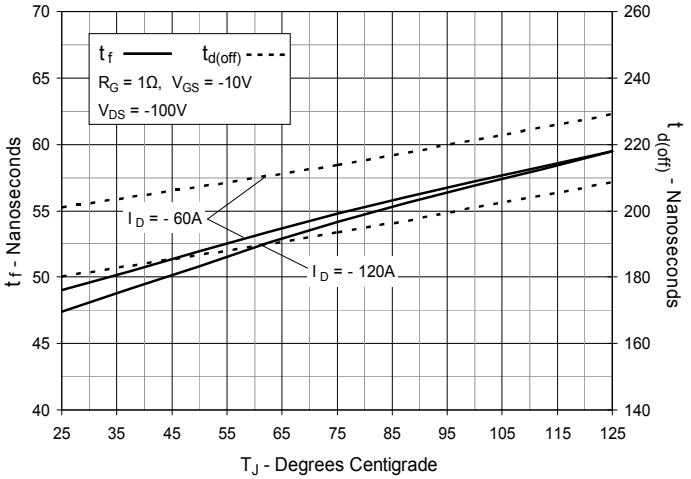


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

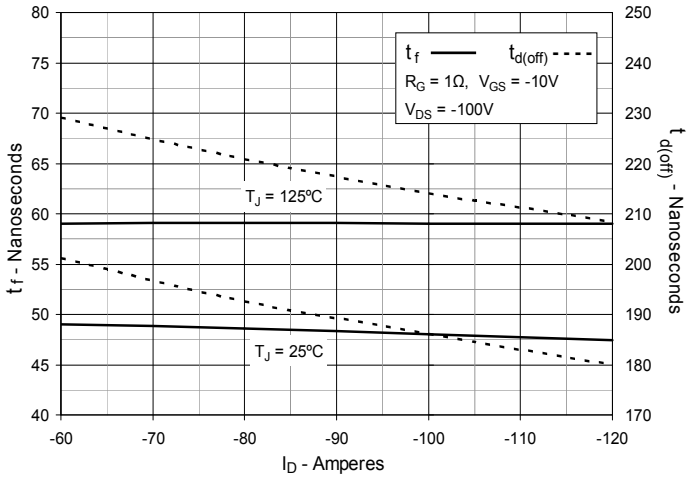


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

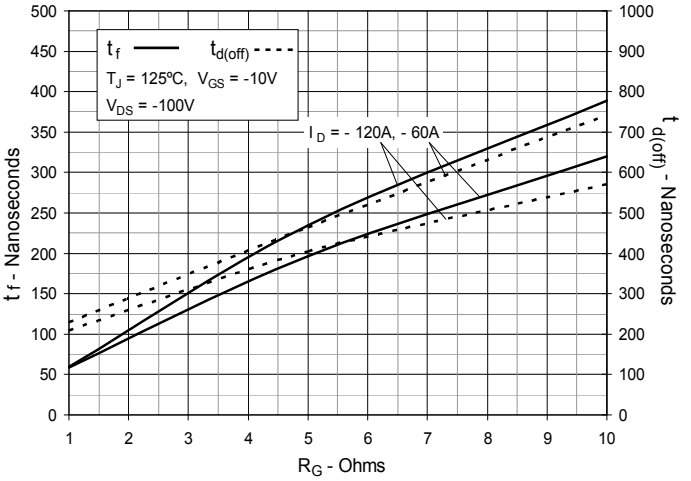


Fig. 19. Maximum Transient Thermal Impedance