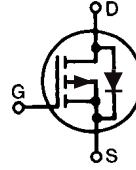


## TrenchP™ Power MOSFETs

## IXTK120P20T IXTX120P20T

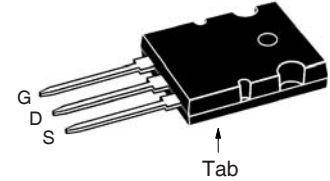
P-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Rectifier



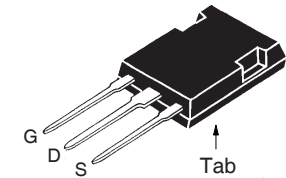
$$\begin{aligned} V_{DSS} &= -200V \\ I_{D25} &= -120A \\ R_{DS(on)} &\leq 30m\Omega \\ t_{rr} &\leq 300ns \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$	- 200	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $150^\circ\text{C}$ , $R_{GS} = 1M\Omega$	- 200	V
$V_{GSS}$	Continuous	$\pm 15$	V
$V_{GSM}$	Transient	$\pm 25$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	-120	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$	- 400	A
$I_A$	$T_C = 25^\circ\text{C}$	-100	A
$E_{AS}$	$T_C = 25^\circ\text{C}$	3	J
$dv/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 150^\circ\text{C}$	10	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	1040	W
$T_J$		-55 ... +150	$^\circ\text{C}$
$T_{JM}$		150	$^\circ\text{C}$
$T_{stg}$		-55 ... +150	$^\circ\text{C}$
$T_L$	Maximum Lead Temperature for Soldering	300	$^\circ\text{C}$
$T_{SOLD}$	1.6 mm (0.062in.) from Case for 10s	260	$^\circ\text{C}$
$M_d$	Mounting Torque (TO-264)	1.13/10	Nm/lb.in.
$F_C$	Mounting Force (PLUS247)	20..120 /4.5..27	N/lb.
<b>Weight</b>	TO-264	10	g
	PLUS247	6	g

TO-264 (IXTK)



PLUS247 (IXTX)



G = Gate      D = Drain  
S = Source      Tab = Drain

### Features

- International Standard Packages
- 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 ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = -250\mu\text{A}$	- 200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = -250\mu\text{A}$	- 2.5		V
$I_{GSS}$	$V_{GS} = \pm 15V$ , $V_{DS} = 0V$			$\pm 200$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0V$ $T_J = 125^\circ\text{C}$			- 25 $\mu\text{A}$ - 300 $\mu\text{A}$
$R_{DS(on)}$	$V_{GS} = -10V$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1			30 m $\Omega$

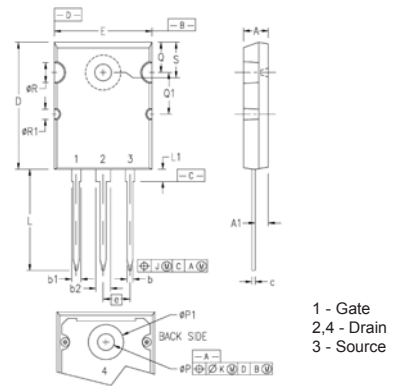
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = -10\text{V}, I_D = -60\text{A}$ , Note 1	85	145	S
$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = -25\text{V}, f = 1\text{MHz}$		73	nF
$C_{oss}$			2550	pF
$C_{rss}$			480	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = -10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$ $R_G = 1\Omega$ (External)		90	ns
$t_r$			85	ns
$t_{d(off)}$			200	ns
$t_f$			50	ns
$Q_{g(on)}$		$V_{GS} = -10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		740
$Q_{gs}$			220	nC
$Q_{gd}$			120	nC
$R_{thJC}$			0.12	$^\circ\text{C/W}$
$R_{thCS}$		0.15		$^\circ\text{C/W}$

### Source-Drain Diode

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			-120 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			-480 A
$V_{SD}$	$I_F = -100\text{A}, V_{GS} = 0\text{V}$ , Note 1			-1.4 V
$t_{rr}$	$I_F = -60\text{A}, -di/dt = -100\text{A}/\mu\text{s}$ $V_R = -100\text{V}, V_{GS} = 0\text{V}$		3.3	ns
$Q_{RM}$			25.6	$\mu\text{C}$
$I_{RM}$				A

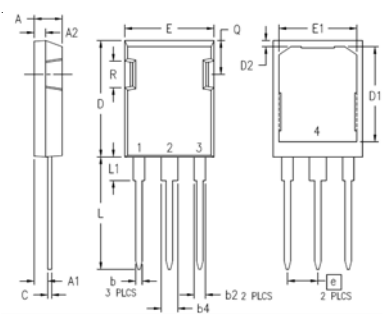
Note 1. Pulse test,  $t \leq 300\mu\text{s}$ , duty cycle,  $d \leq 2\%$ .

### TO-264 AA Outline



SYMBOL	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
phi P	.122	.138	3.10	3.51
phi P1	.270	.290	6.86	7.37
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
phi R	.155	.187	3.94	4.75
phi R1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

### PLUS247™ Outline



Terminals: 1 - Gate  
2,4 - Drain  
3 - Source

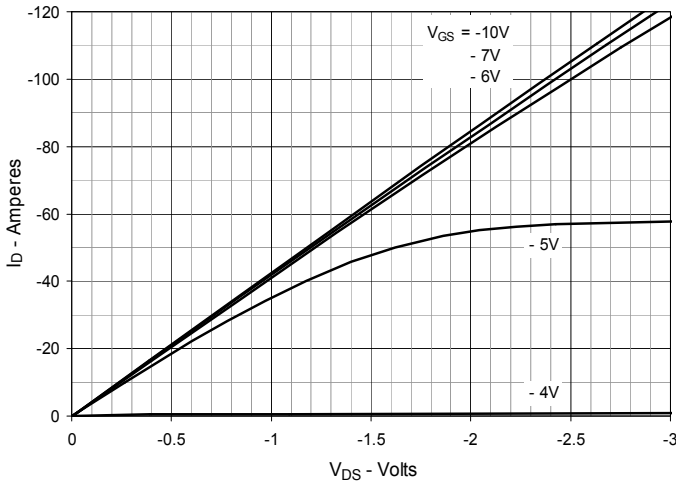
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b2	.075	.087	1.91	2.20
b4	.115	.126	2.92	3.20
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
D1	.650	.690	16.51	17.53
D2	.035	.050	0.89	1.27
E	.620	.635	15.75	16.13
E1	.520	.560	13.08	14.22
e	.215 BSC		5.45 BSC	
L	.780	.810	19.81	20.57
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

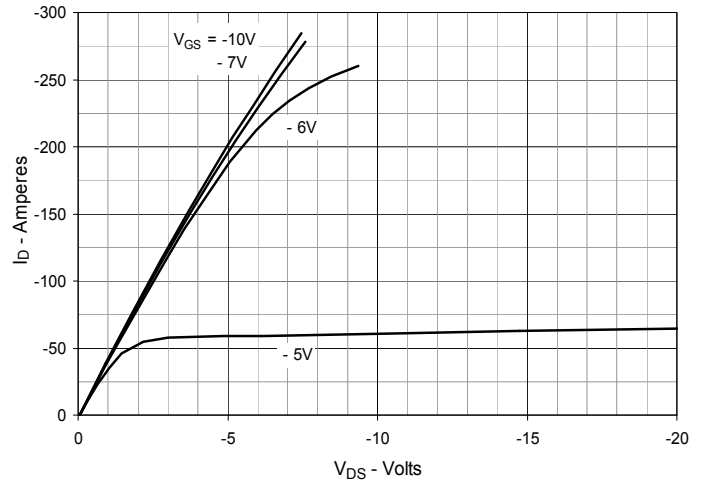
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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
4,860,072	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	

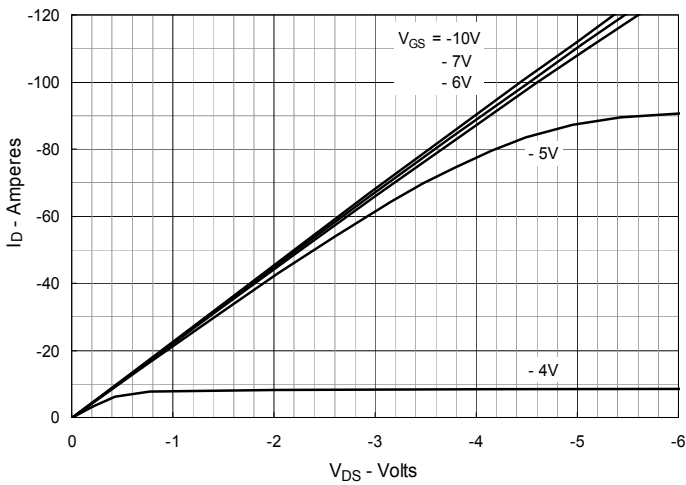
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



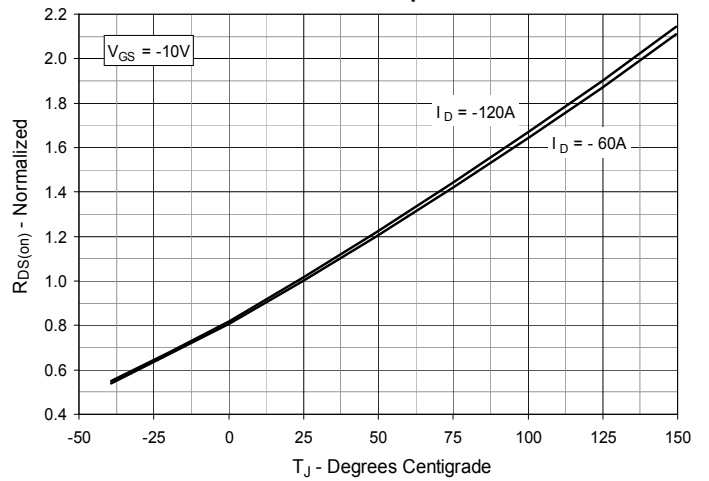
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



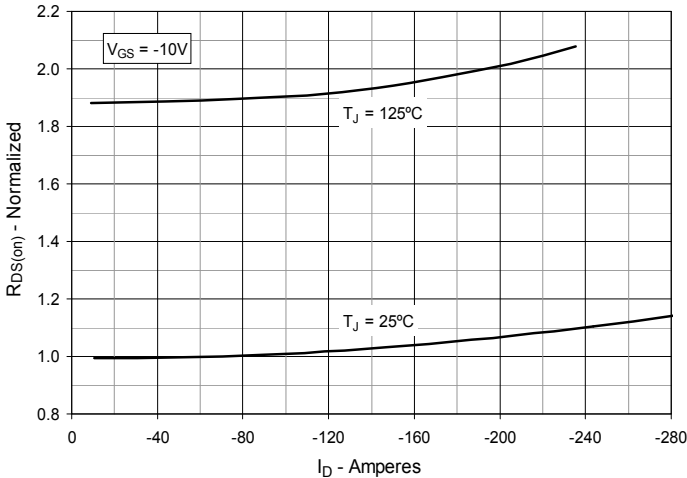
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



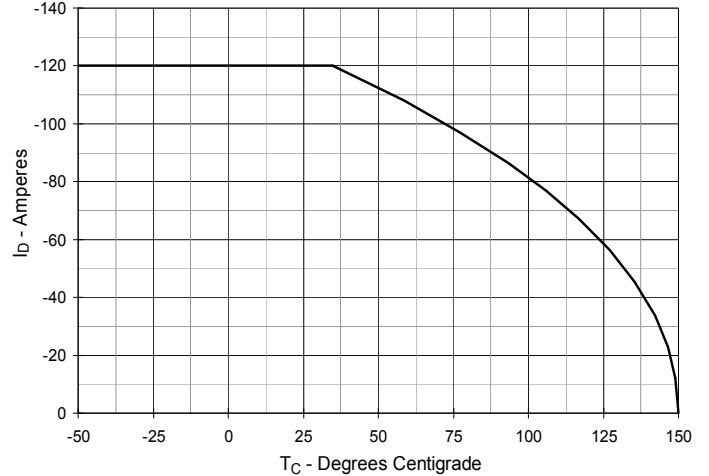
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = -60\text{A}$  Value vs. Junction Temperature**



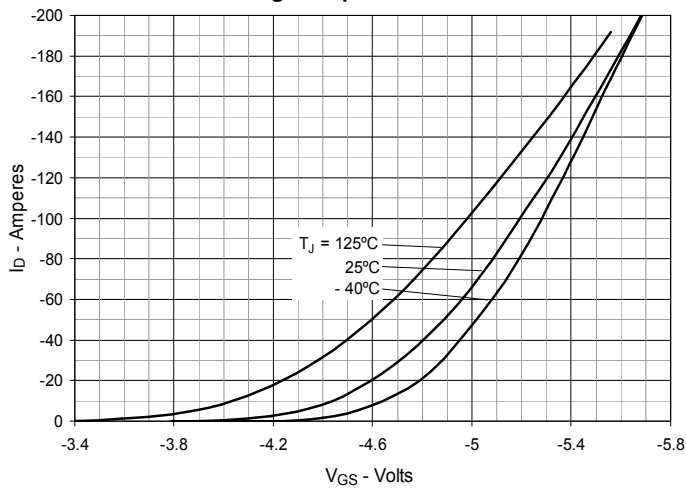
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = -60\text{A}$  Value vs. Drain Current**



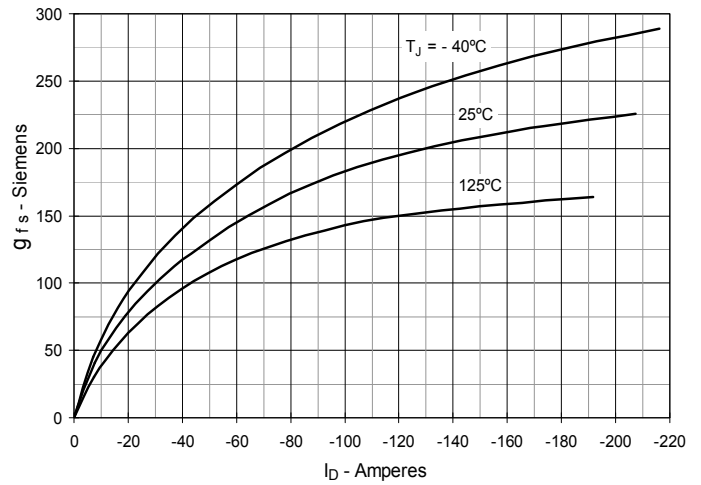
**Fig. 6. Maximum Drain Current vs. Case Temperature**



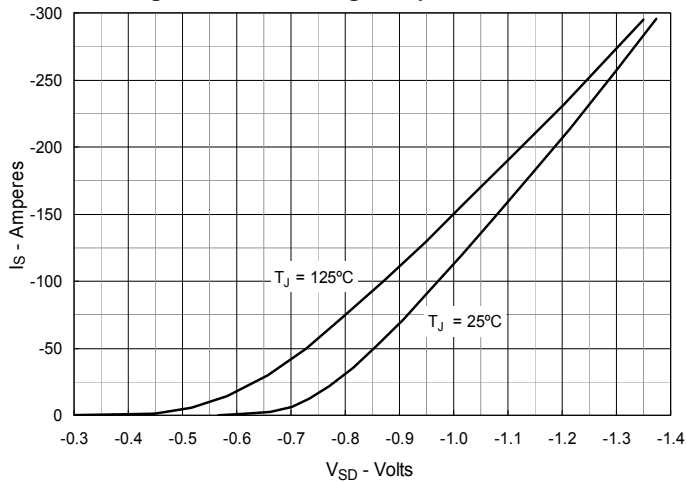
**Fig. 7. Input Admittance**



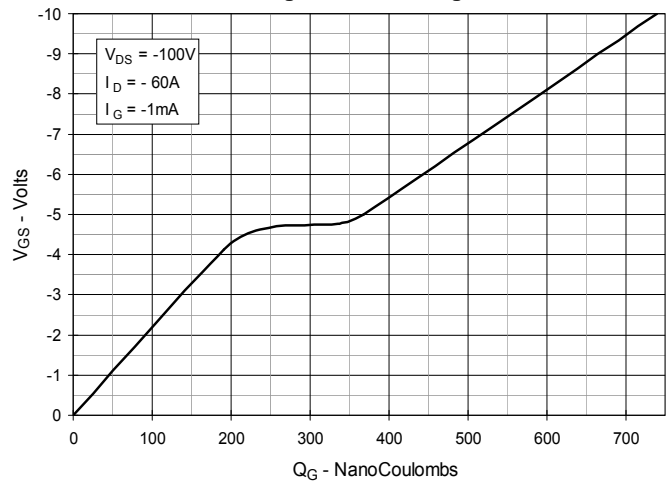
**Fig. 8. Transconductance**



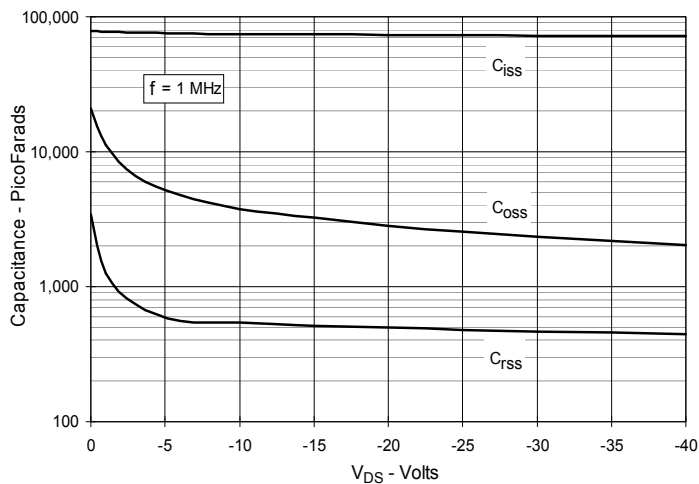
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



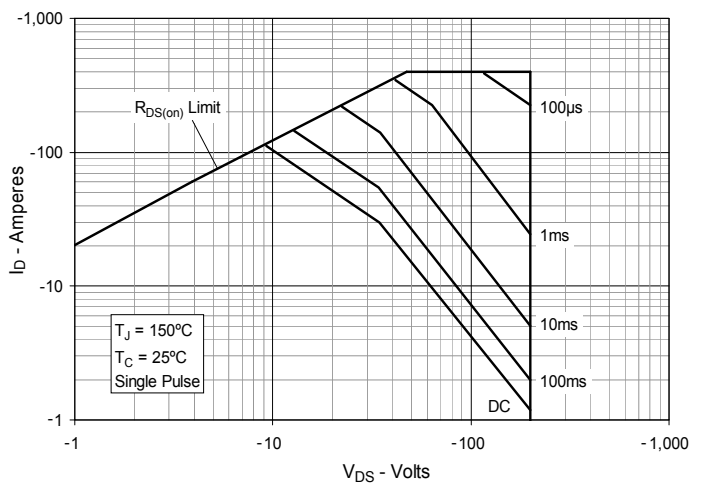
**Fig. 10. Gate Charge**



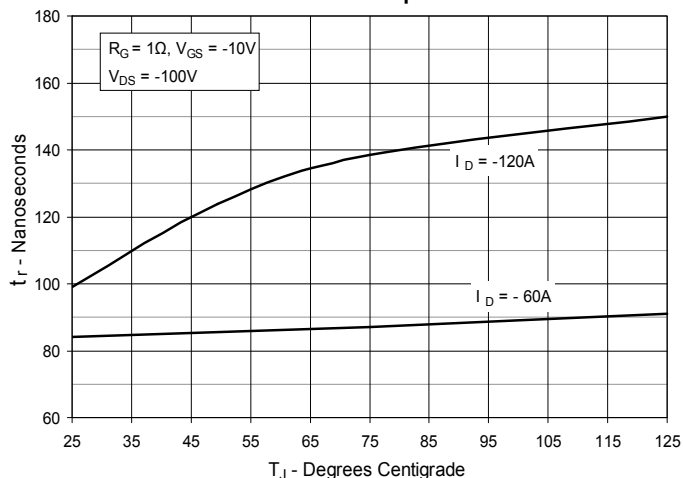
**Fig. 11. Capacitance**



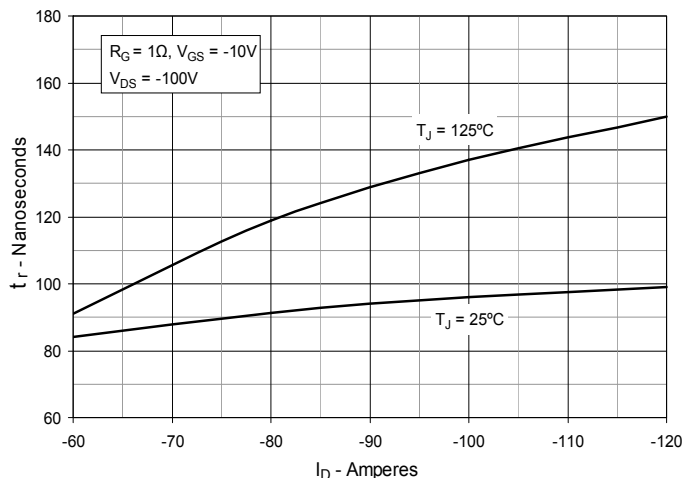
**Fig. 12. Forward-Bias Safe Operating Area**



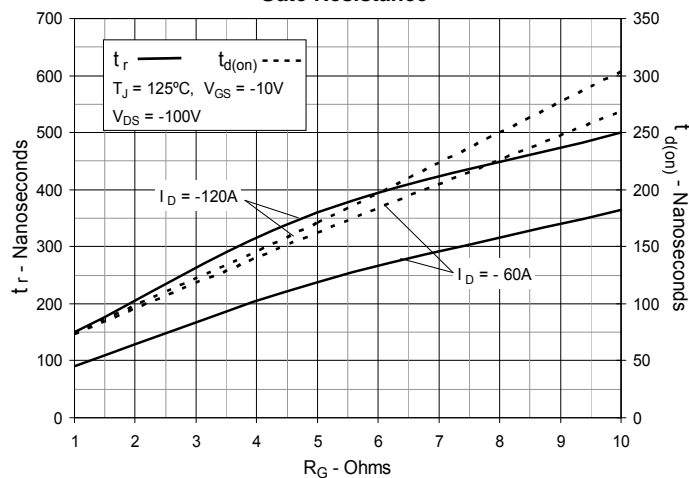
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



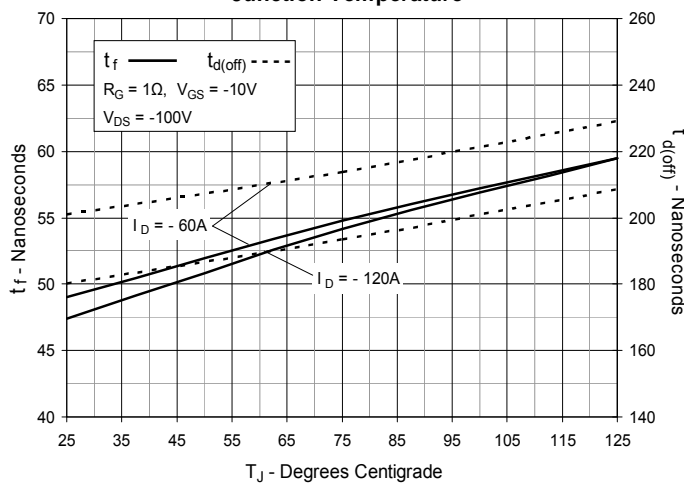
**Fig. 14. Resistive Turn-on Rise Time vs. Drain Current**



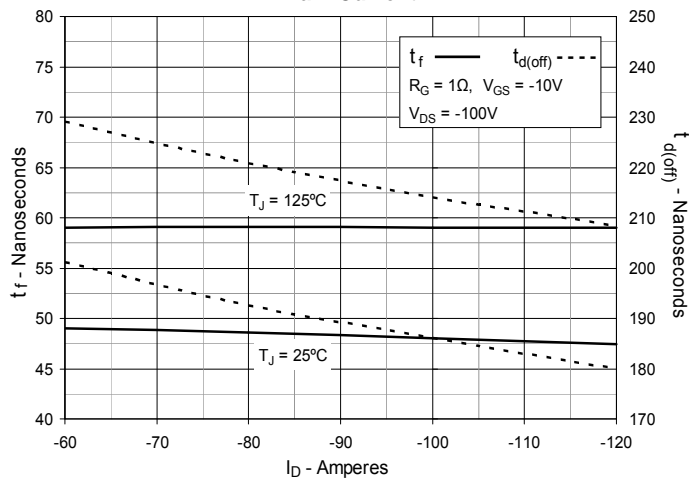
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



**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**

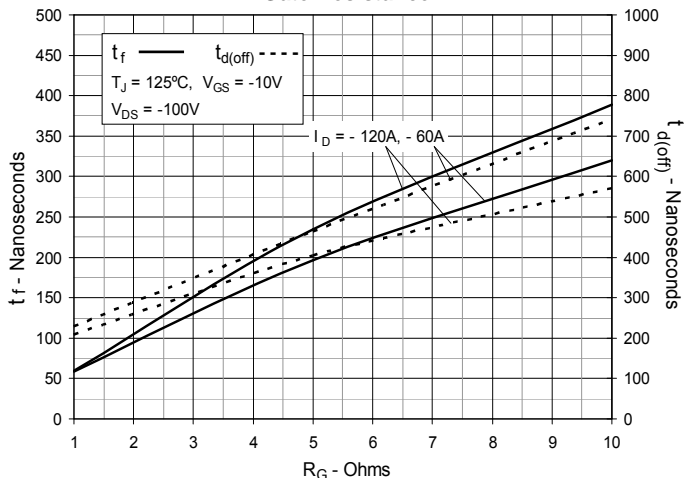
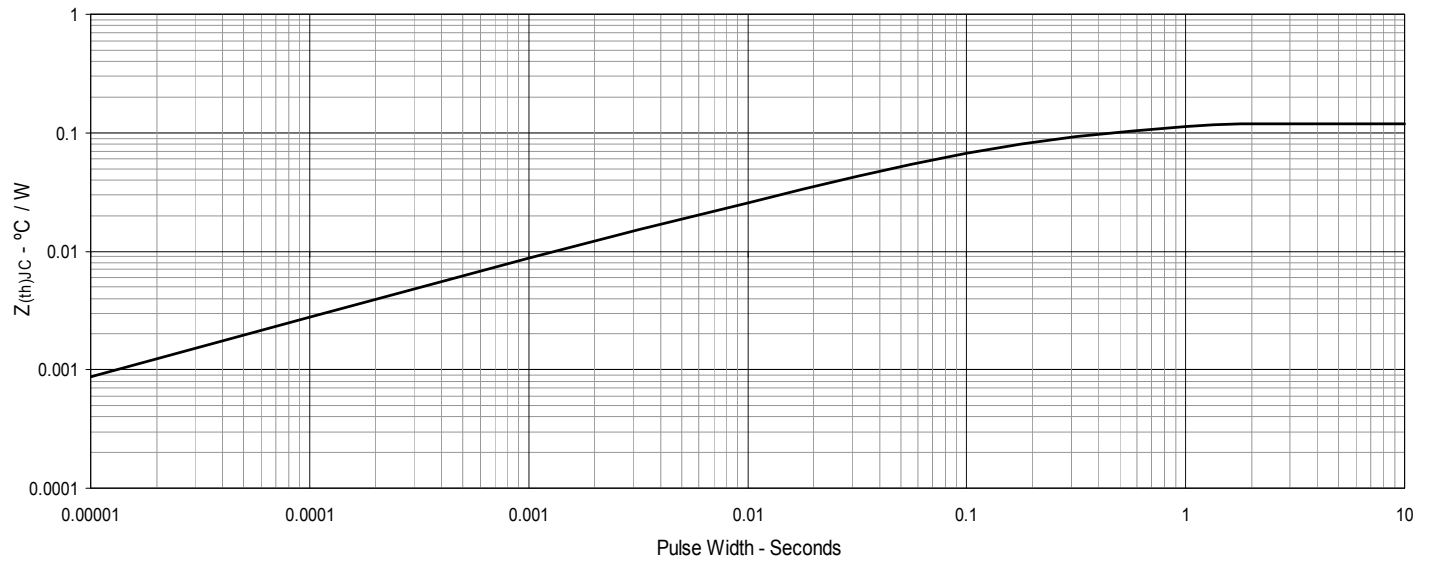


Fig. 19. Maximum Transient Thermal Impedance



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