

# GigaMOS™ Power MOSFET

## IXFR230N20T

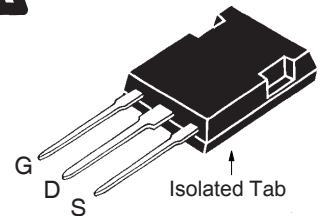
(Electrically Isolated Tab)

N-Channel Enhancement Mode  
Avalanche Rated  
Fast Intrinsic Diode



$$\begin{aligned} V_{DSS} &= 200V \\ I_{D25} &= 156A \\ R_{DS(on)} &\leq 8.0m\Omega \\ t_{rr} &\leq 200ns \end{aligned}$$

ISOPLUS247  
E153432



G = Gate    D = Drain  
S = Source

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$	200	V
$V_{DGR}$	$T_J = 25^\circ\text{C}$ to $175^\circ\text{C}$ , $R_{GS} = 1M\Omega$	200	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ\text{C}$	156	A
$I_{DM}$	$T_C = 25^\circ\text{C}$ , Pulse Width Limited by $T_{JM}$	630	A
$I_A$	$T_C = 25^\circ\text{C}$	100	A
$E_{AS}$	$T_C = 25^\circ\text{C}$	5	J
$dv/dt$	$I_S \leq I_{DM}$ , $V_{DD} \leq V_{DSS}$ , $T_J \leq 175^\circ\text{C}$	20	V/ns
$P_D$	$T_C = 25^\circ\text{C}$	600	W
$T_J$		-55 ... +175	$^\circ\text{C}$
$T_{JM}$		175	$^\circ\text{C}$
$T_{stg}$		-55 ... +175	$^\circ\text{C}$
$T_L$	1.6mm (0.062 in.) from Case for 10s	300	$^\circ\text{C}$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ\text{C}$
$V_{ISOL}$	50/60 Hz, 1 Minute	2500	V~
$F_C$	Mounting Force	20..120/4.5..27	N/lb.
<b>Weight</b>		5	g

### Features

- Silicon Chip on Direct-Copper Bond (DCB) Substrate
- Isolated Mounting Surface
- 2500V~ Electrical Isolation
- Fast Intrinsic Diode
- Avalanche Rated
- Low Package Inductance

### Advantages

- Easy to Mount
- Space Savings
- High Power Density

### Applications

- Synchronous Rectification
- DC-DC Converters
- Battery Chargers
- Switch-Mode and Resonant-Mode Power Supplies
- DC Choppers
- AC Motor Drives
- Uninterruptible Power Supplies
- High Speed Power Switching Applications

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 3mA$	200		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 8mA$	3.0		5.0 V
$I_{GSS}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 200$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0V$ $T_J = 150^\circ\text{C}$			50 $\mu\text{A}$ 3 mA
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 60A$ , Note 1			8.0 m $\Omega$

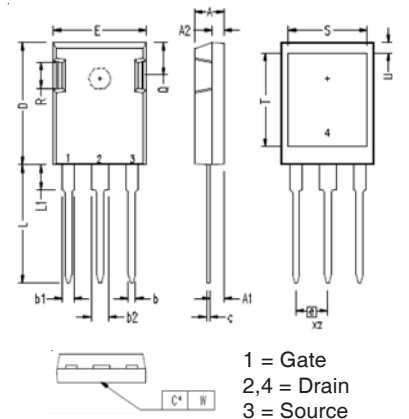
Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 10V, I_D = 60A$ , Note 1	90	150	S
$C_{iss}$	$V_{GS} = 0V, V_{DS} = 25V, f = 1MHz$		24	nF
$C_{oss}$			2440	pF
$C_{rss}$			60	pF
$R_{Gi}$	Gate Input Resistance		1.15	$\Omega$
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = I_D = 0.5 \cdot I_{D25}$ $R_G = 1\Omega$ (External)		58	ns
$t_r$			38	ns
$t_{d(off)}$			62	ns
$t_f$			17	ns
$Q_{g(on)}$	$V_{GS} = 10V, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 0.5 \cdot I_{D25}$		358	nC
$Q_{gs}$			138	nC
$Q_{gd}$			60	nC
$R_{thJC}$				0.25 °C/W
$R_{thCS}$		0.15		°C/W

### Source-Drain Diode

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$I_s$	$V_{GS} = 0V$			230 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			920 A
$V_{SD}$	$I_F = 60A, V_{GS} = 0V$ , Note 1			1.3 V
$t_{rr}$	$I_F = 115A, V_{GS} = 0V$ $-di/dt = 100A/\mu s$ $V_R = 75V$			200 ns
$Q_{RM}$			0.74	$\mu C$
$I_{RM}$			10.6	A

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

### ISOPLUS247 (IXFR) Outline



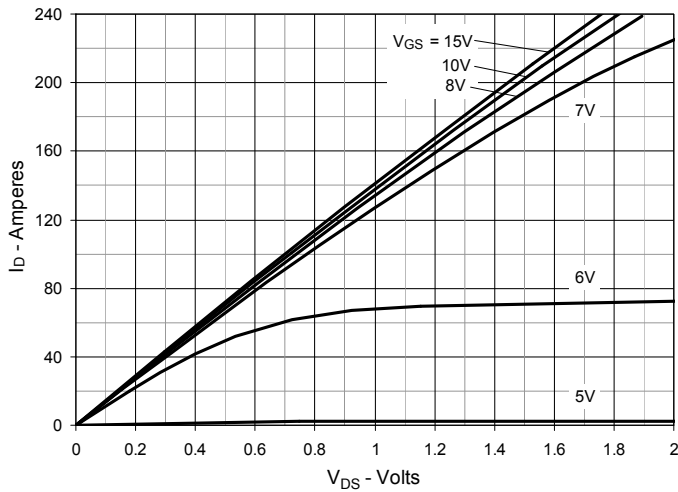
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b1	.075	.085	1.91	2.15
b2	.115	.126	2.92	3.20
C	.024	.033	0.61	0.83
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.811	19.81	20.60
L1	.150	.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

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

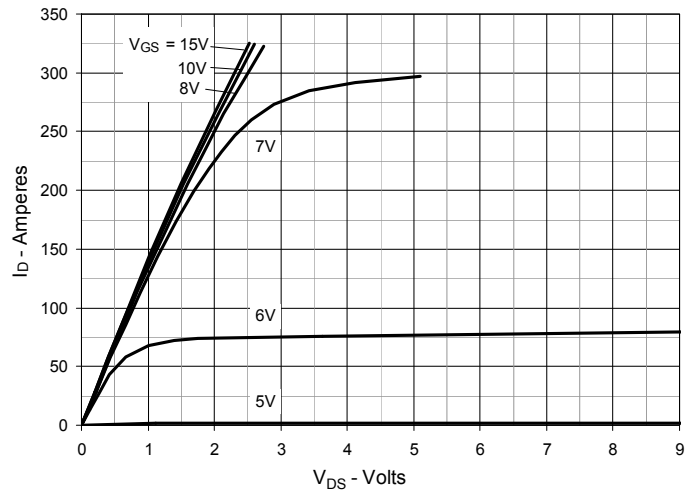
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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	

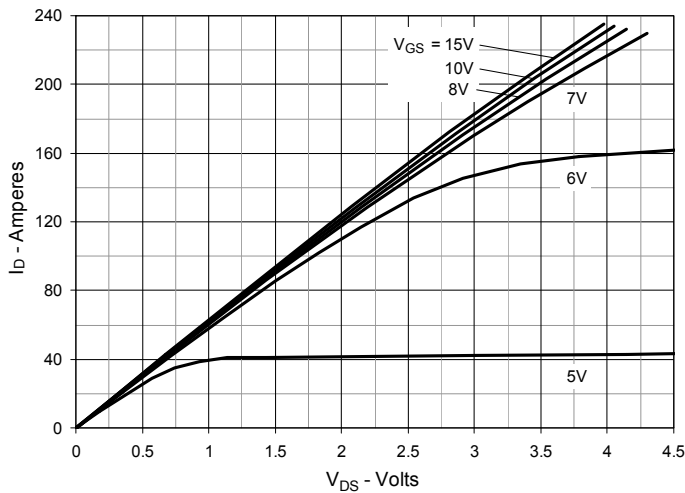
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



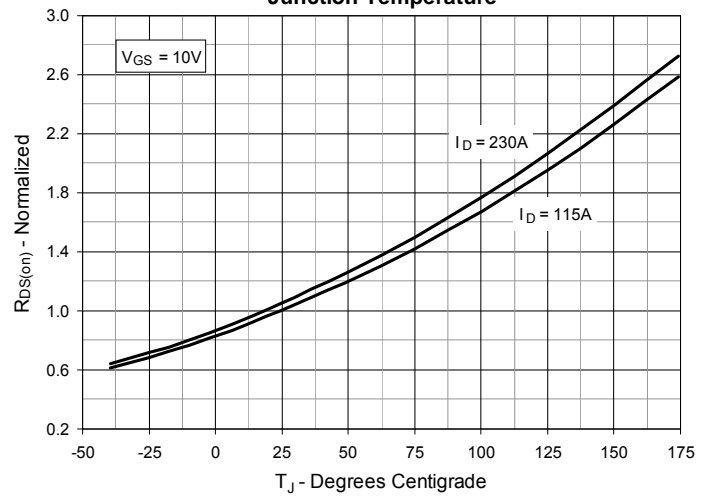
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



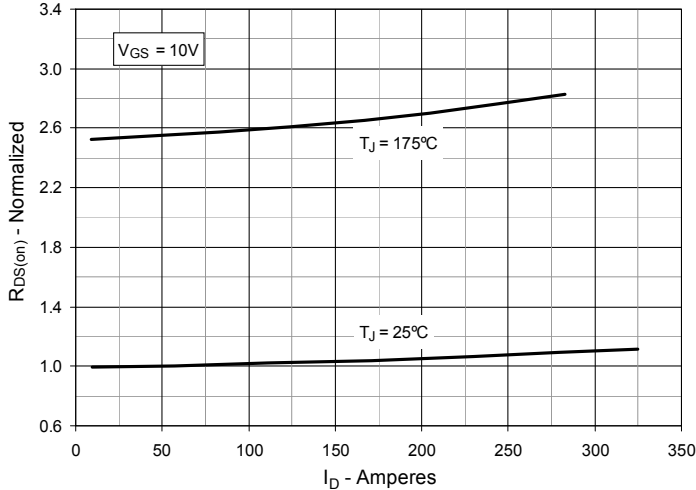
**Fig. 3. Output Characteristics @  $T_J = 150^\circ\text{C}$**



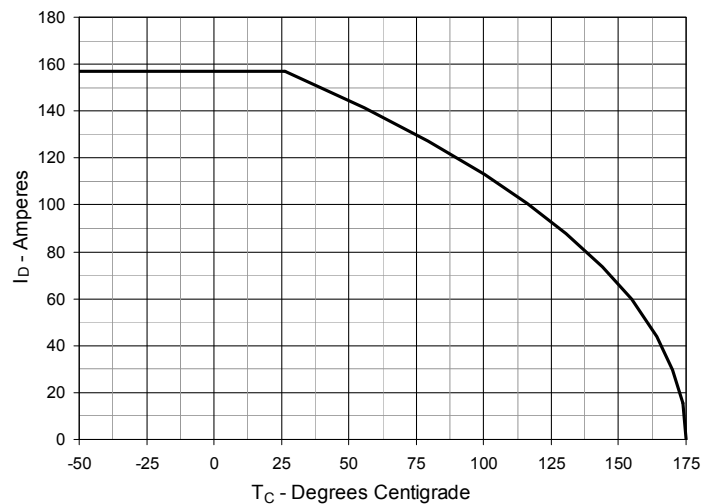
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 115\text{A}$  Value vs. Junction Temperature**



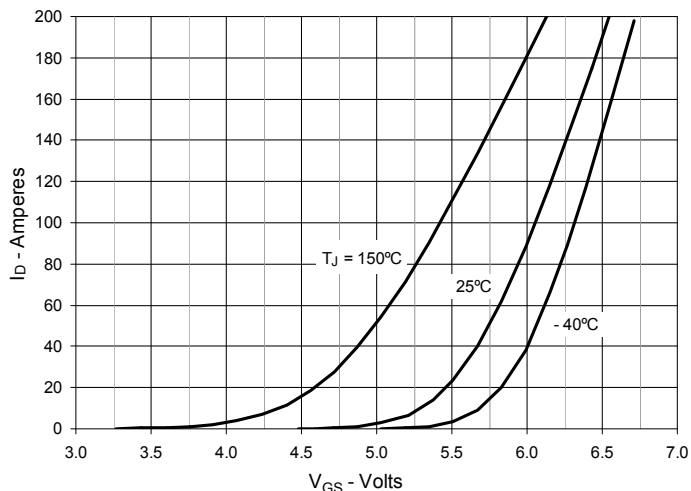
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 115\text{A}$  Value vs. Drain Current**



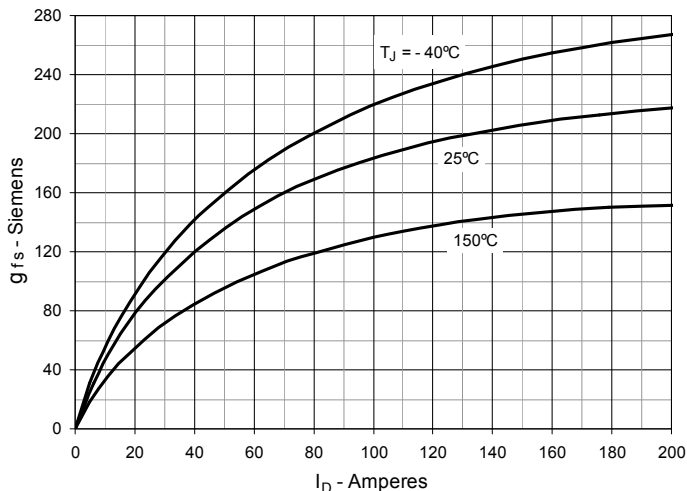
**Fig. 6. Drain Current vs. Case Temperature**



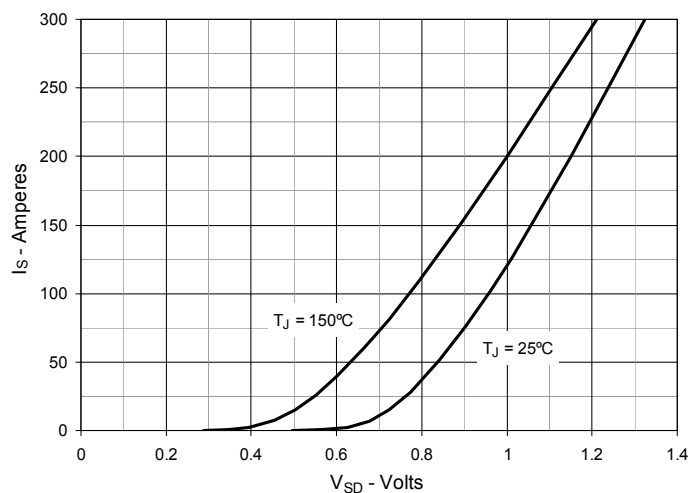
**Fig. 7. Input Admittance**



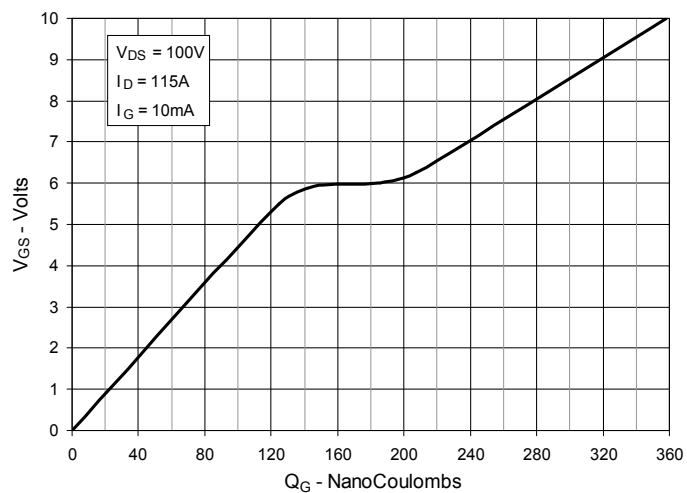
**Fig. 8. Transconductance**



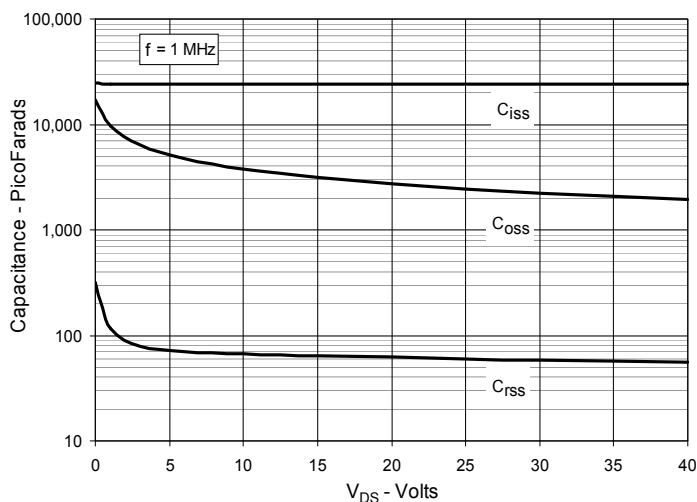
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



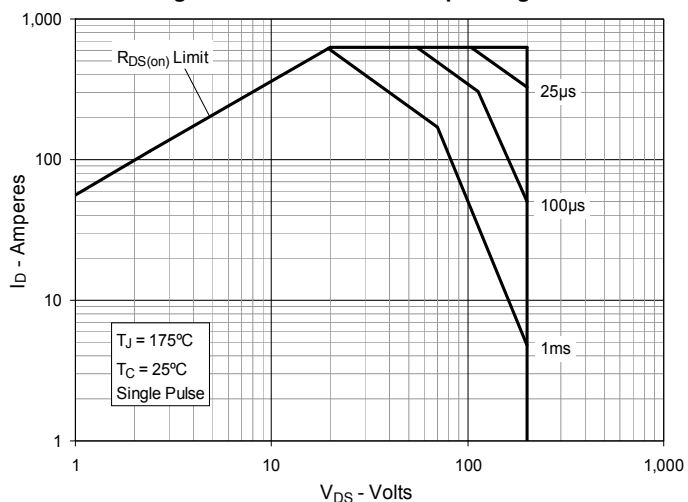
**Fig. 10. Gate Charge**



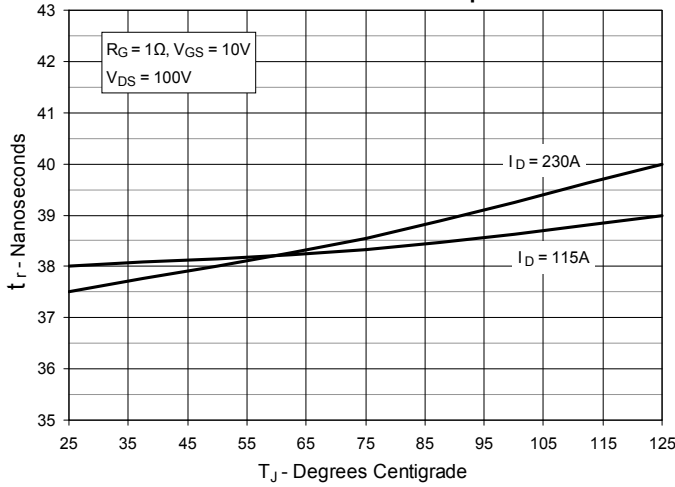
**Fig. 11. Capacitance**



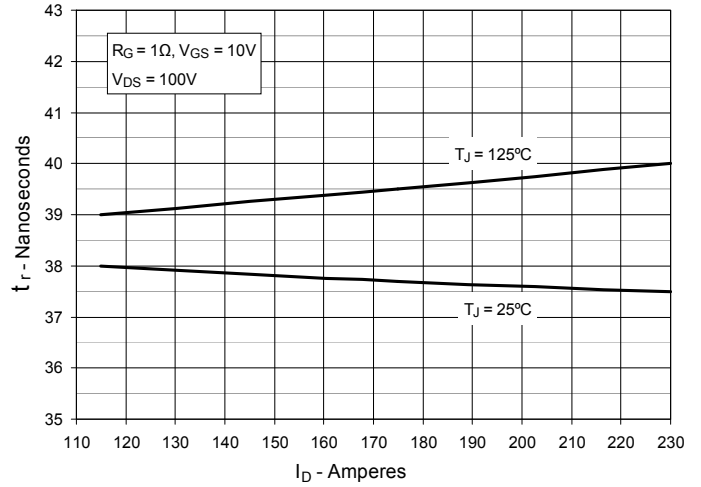
**Fig. 12. Forward-Bias Safe Operating Area**



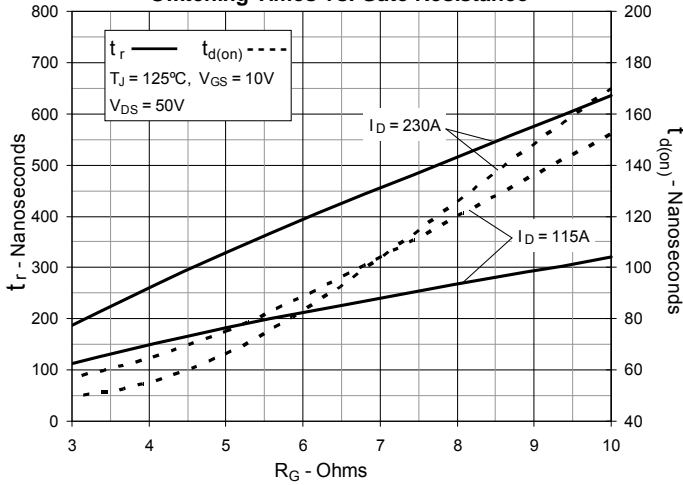
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



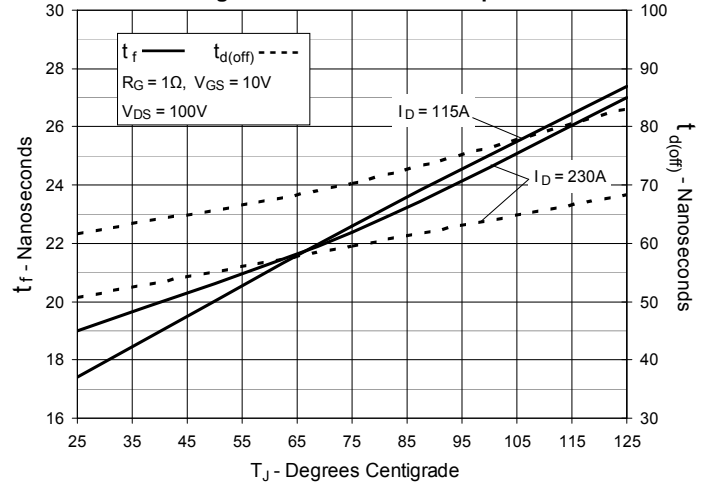
**Fig. 14. Resistive Turn-on Rise Time vs. Drain Current**



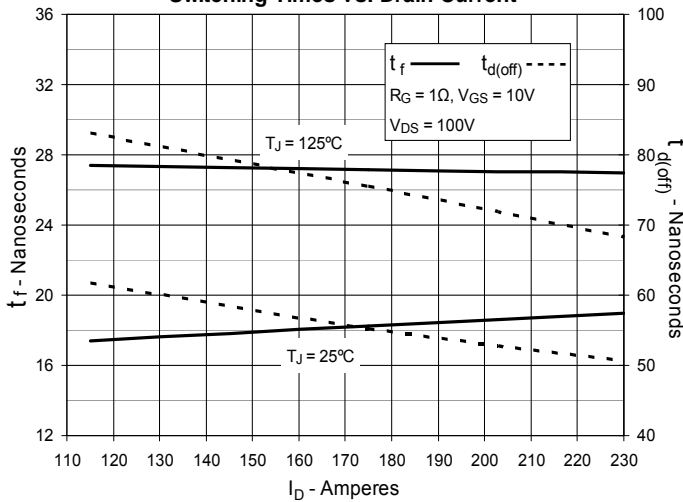
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



**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**

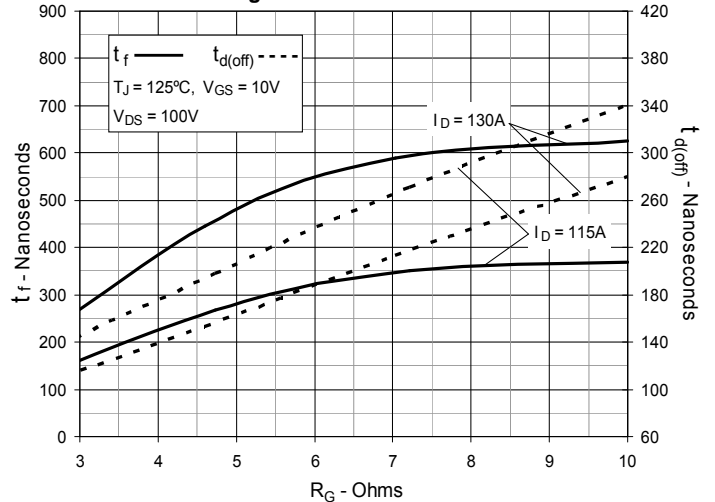
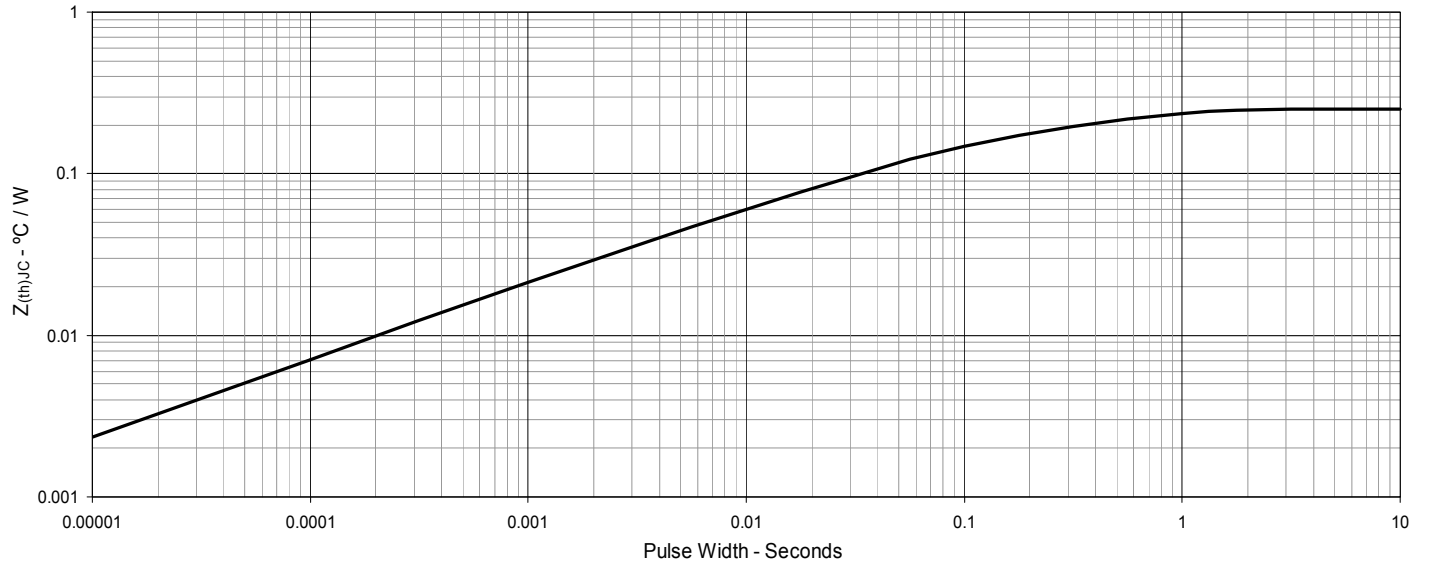


Fig. 19. Maximum Transient Thermal Impedance





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