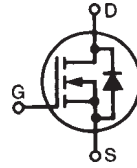


TrenchT2™ Power MOSFET

IXTA220N04T2
IXTP220N04T2

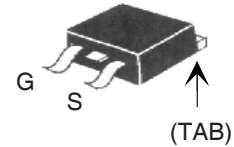
N-Channel Enhancement Mode
Avalanche Rated



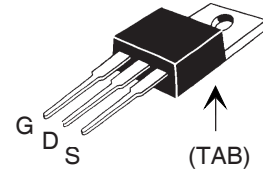
$$\begin{aligned} V_{DSS} &= 40V \\ I_{D25} &= 220A \\ R_{DS(on)} &\leq 3.5m\Omega \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C}$ to 175°C	40	V
V_{DGR}	$T_J = 25^\circ\text{C}$ to 175°C , $R_{GS} = 1M\Omega$	40	V
V_{GSM}	Transient	± 20	V
I_{D25}	$T_C = 25^\circ\text{C}$	220	A
I_{LRMS}	Lead Current Limit, RMS	75	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	660	A
I_{AR}	$T_C = 25^\circ\text{C}$	110	A
E_{AS}	$T_C = 25^\circ\text{C}$	600	mJ
P_D	$T_C = 25^\circ\text{C}$	360	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 (0.062in.) from case for 10s	300	$^\circ\text{C}$
T_{SOLD}	Plastic body for 10 seconds	260	$^\circ\text{C}$
M_d	Mounting torque (TO-220)	1.13/10	Nm/lb.in.
Weight	TO-263	2.5	g
	TO-220	3.0	g

TO-263 (IXTA)



TO-220 (IXTP)



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

Features

- International standard packages
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
 - easy to drive and to protect
- 175 $^\circ\text{C}$ Operating Temperature

Advantages

- Easy to mount
- Space savings
- High power density

Applications

- Synchronous Buck Converters
- High Current Switching Power Supplies
- Battery Powered Electric Motors
- Resonant-mode power supplies
- Electronics Ballast Application
- Class D Audio Amplifiers

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 250\mu\text{A}$	40		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$	2.0		4.0 V
I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$			± 200 nA
I_{DSS}	$V_{DS} = V_{DSS}$			5 μA
	$V_{GS} = 0V$ $T_J = 150^\circ\text{C}$			50 μA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 50A$, Notes 1, 2	2.8	3.5	m Ω

Symbol	Test Conditions	Characteristic Values		
	($T_J = 25^\circ\text{C}$, unless otherwise specified)	Min.	Typ.	Max.
g_{fs}	$V_{DS} = 10\text{V}$, $I_D = 60\text{A}$, Note 1	40	66	S
C_{iss}	$V_{GS} = 0\text{V}$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$		6820	pF
C_{oss}			1185	pF
C_{rss}			250	pF
$t_{d(on)}$	Resistive Switching Times $V_{GS} = 10\text{V}$, $V_{DS} = 20\text{V}$, $I_D = 50\text{A}$ $R_G = 3.3\Omega$ (External)		15	ns
t_r			21	ns
$t_{d(off)}$			31	ns
t_f			21	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$, $V_{DS} = 0.5 \cdot V_{DSS}$, $I_D = 0.5 \cdot I_{D25}$		112	nC
Q_{gs}			33	nC
Q_{gd}			30	nC
R_{thJC}	TO-220			0.42 $^\circ\text{C/W}$
R_{thCH}		0.50		$^\circ\text{C/W}$

Source-Drain Diode

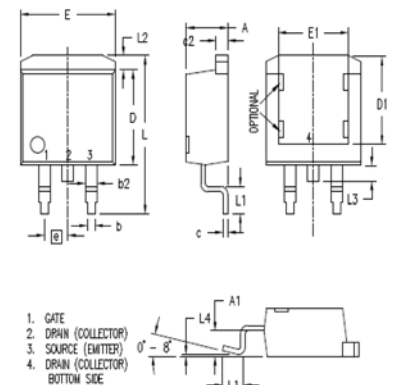
Symbol	Test Conditions	Characteristic Values		
	($T_J = 25^\circ\text{C}$, unless otherwise specified)	Min.	Typ.	Max.
I_S	$V_{GS} = 0\text{V}$			220 A
I_{SM}	Repetitive, Pulse width limited by T_{JM}			660 A
V_{SD}	$I_F = 50\text{A}$, $V_{GS} = 0\text{V}$, Note 1			1.0 V
t_{rr}	$I_F = 110\text{A}$, $V_{GS} = 0\text{V}$ $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 20\text{V}$		45	ns
I_{RM}			1.4	A
Q_{RM}			32	nC

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

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.

TO-263 (IXTA) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.575	.625	14.61	15.88
L1	.090	.110	2.29	2.79
L2	.040	.055	1.02	1.40
L3	.050	.070	1.27	1.78
L4	0	.005	0	0.13

TO-220 (IXTP) Outline

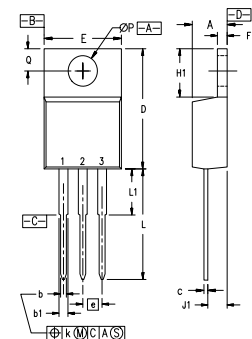


Fig. 1. Output Characteristics
@ 25°C

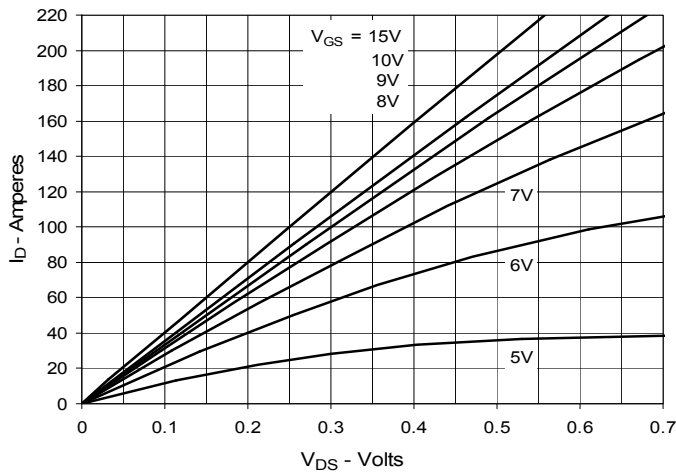


Fig. 2. Extended Output Characteristics
@ 25°C

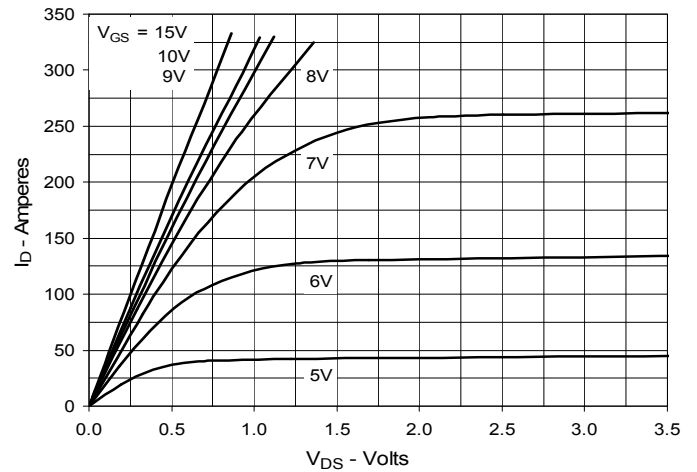


Fig. 3. Output Characteristics
@ 150°C

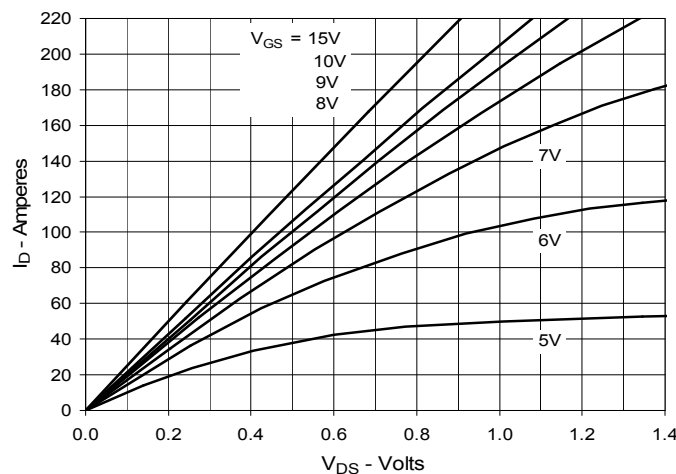


Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 110A$ Value
vs. Junction Temperature

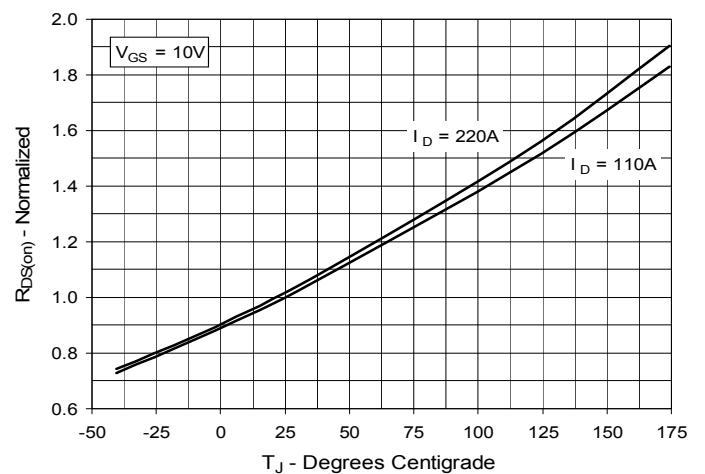


Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 110A$ Value
vs. Drain Current

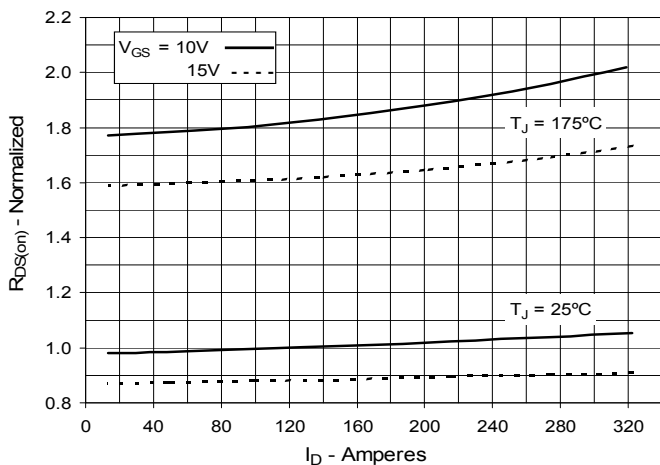


Fig. 6. Drain Current vs. Case Temperature

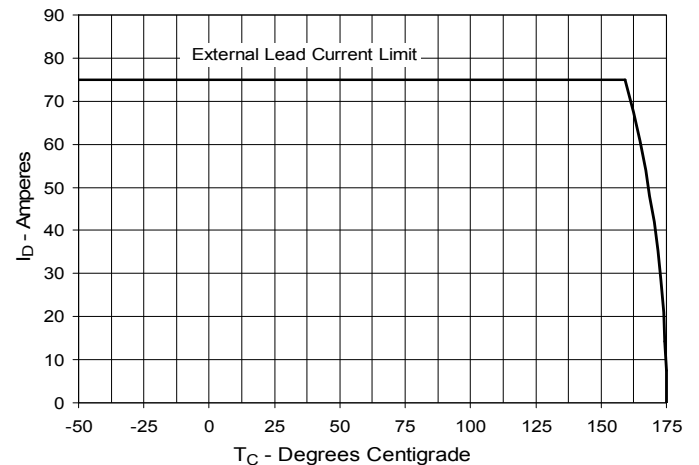


Fig. 7. Input Admittance

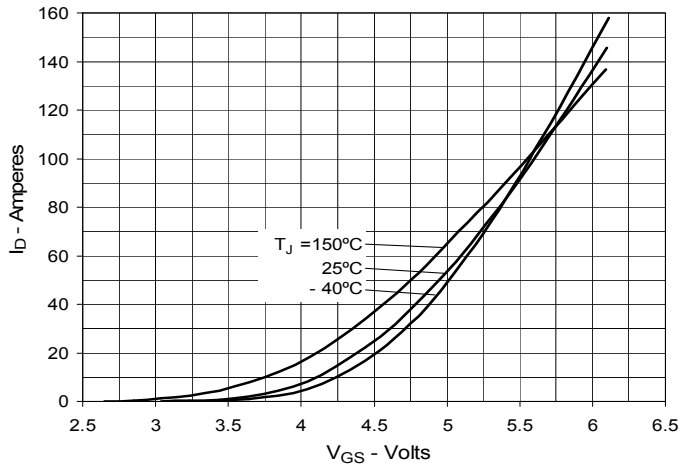


Fig. 8. Transconductance

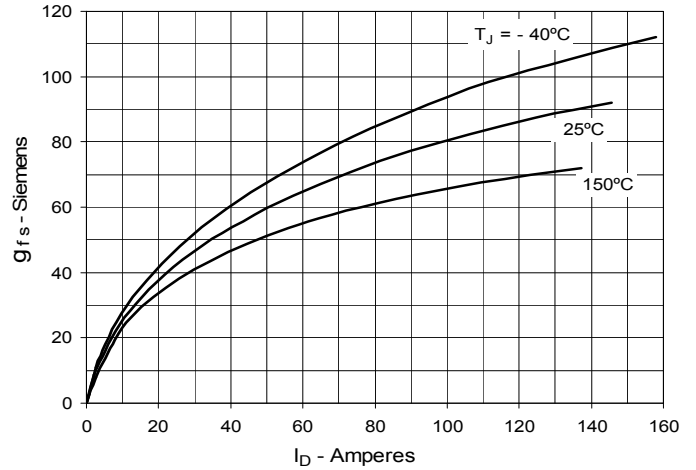


Fig. 9. Forward Voltage Drop of Intrinsic Diode

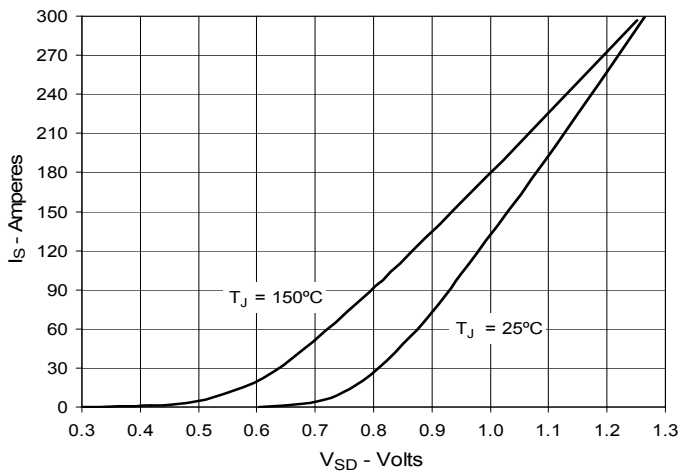


Fig. 10. Gate Charge

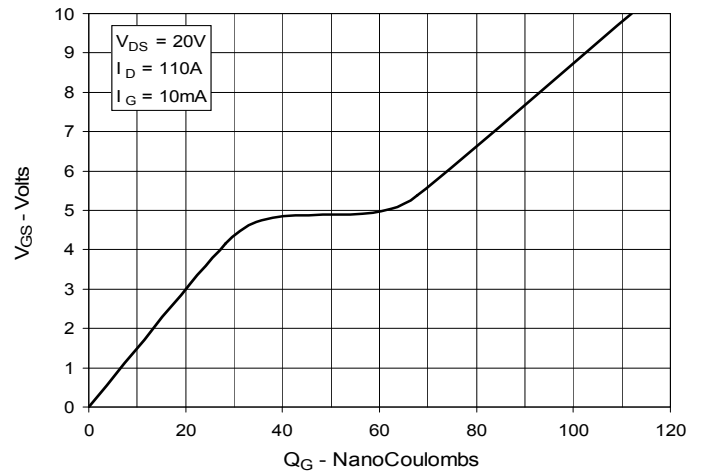


Fig. 11. Capacitance

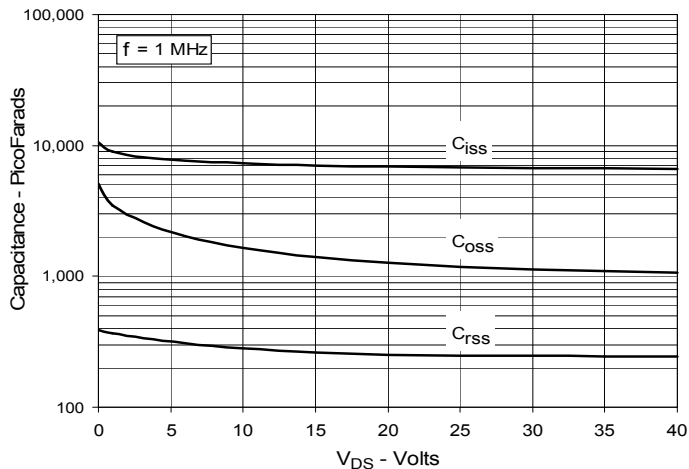
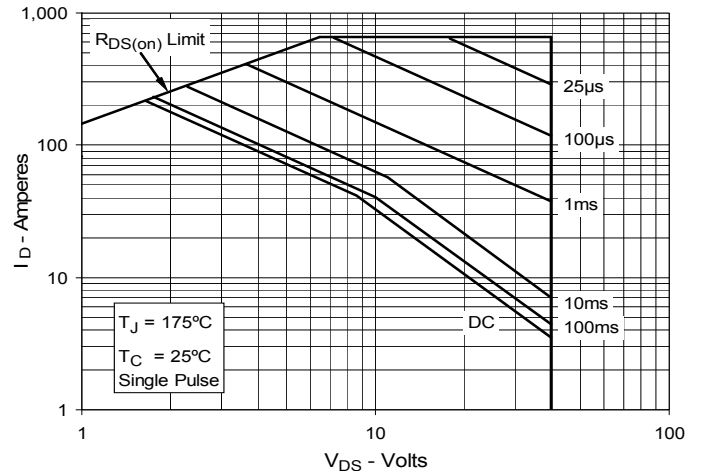
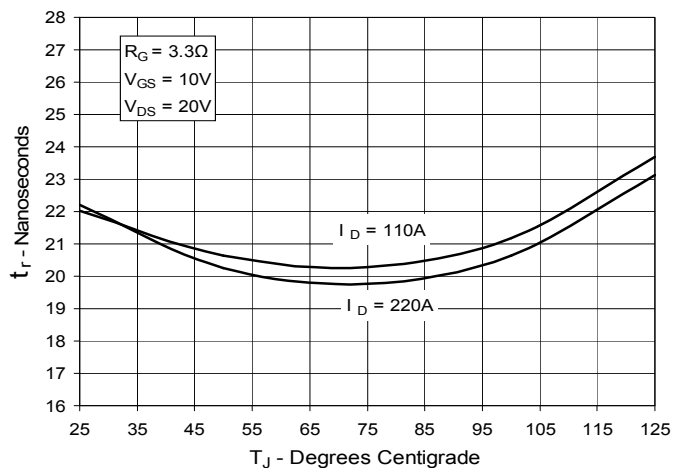


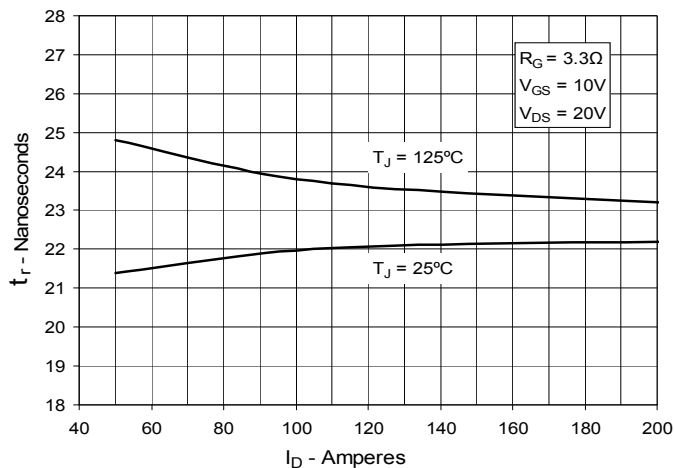
Fig. 12. Forward-Bias Safe Operating Area



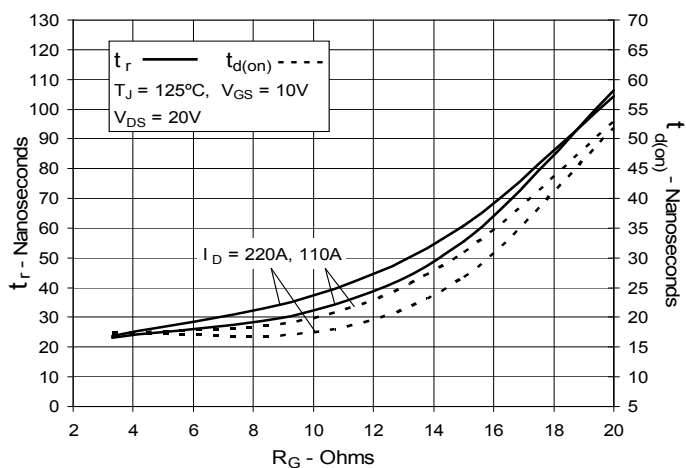
**Fig. 13. Resistive Turn-on
Rise Time vs. Junction Temperature**



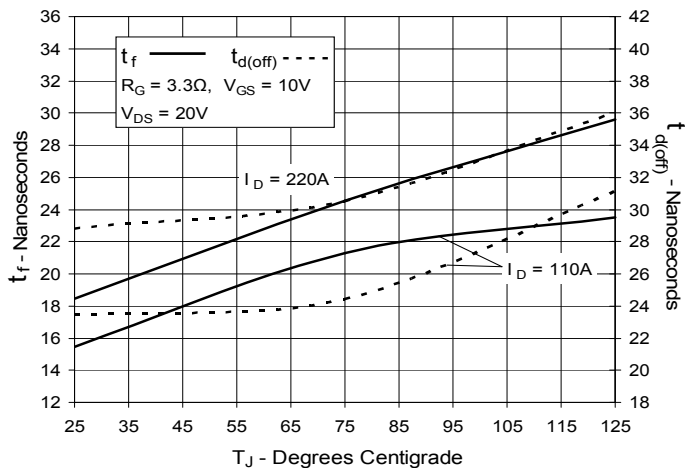
**Fig. 14. Resistive Turn-on
Rise Time vs. Drain Current**



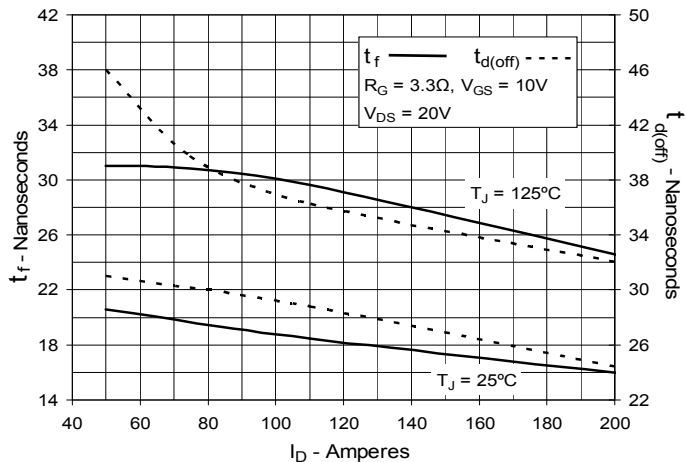
**Fig. 15. Resistive Turn-on
Switching Times vs. Gate Resistance**



**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**

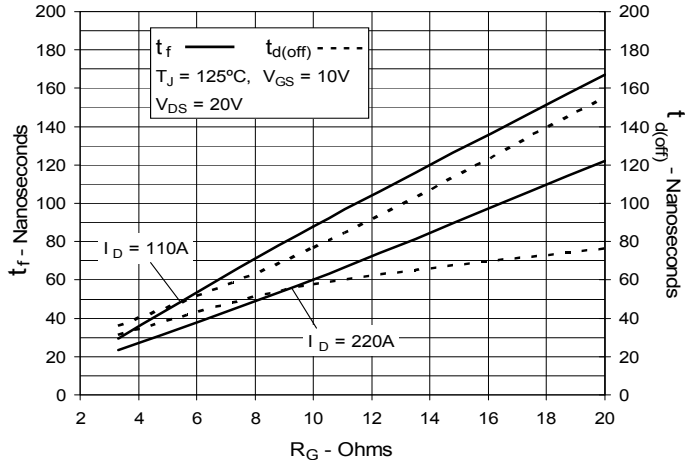


Fig. 19. Maximum Transient Thermal Impedance

