IXYS

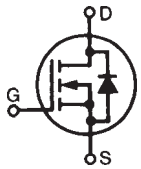
Preliminary Technical Information

TrenchT2™ Power MOSFET

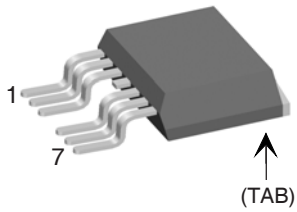
IXTA300N04T2-7

V_{DSS} = 40V
I_{D25} = 300A
$R_{DS(on)}$ ≤ 2.5mΩ

N-Channel Enhancement Mode
Avalanche Rated



TO-263 (7-lead)



Pins: 1 - Gate
2, 3 - Source
5,6,7 - Source
TAB (8) - Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	40	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	40	V
V_{GSM}	Transient	± 20	V
I_{D25}	T_C = 25°C	300	A
I_{LRMS}	Lead Current Limit, RMS	160	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	900	A
I_A	T_C = 25°C	100	A
E_{AS}	T_C = 25°C	600	mJ
P_D	T_C = 25°C	480	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	1.6mm (0.062in.) from case for 10s	300	°C
T_{sold}	Plastic body for 10 seconds	260	°C
Weight		3	g

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	40			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250μA	2.0		4.0	V
I_{GSS}	V_{GS} = ± 20V, V_{DS} = 0V			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$			5	μA
	V_{GS} = 0V T_J = 150°C			150	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 50A, Notes 1, 2			2.5	mΩ

Features

- International standard package
- 175°C Operating Temperature
- Avalanche rated
- High current handling capability
- Low $R_{DS(on)}$

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

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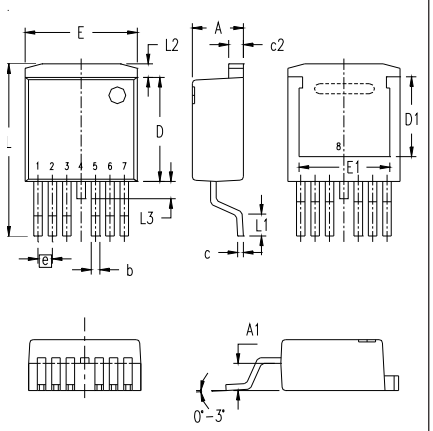
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	55	94		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		10.7		nF
C_{oss}			1630		pF
C_{rss}			263		pF
$t_{d(on)}$	**Resistive Switching Times**		22		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 100A		17		ns
$t_{d(off)}$	R_G = 2Ω (External)		32		ns
t_f			13		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		145		nC
Q_{gs}			44		nC
Q_{gd}			36		nC
R_{thJC}				0.31	°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			300	A
I_{SM}	Repetitive, Pulse width limited by T_{JM}			1000	A
V_{SD}	I_F = 100A, V_{GS} = 0V, Note 1			1.3	V
t_{rr}	I_F = 150A, V_{GS} = 0V		53		ns
I_{RM}	-di/dt = 100A/μs		1.8		A
Q_{RM}	V_R = 20V		47.7		nC

TO-263 (7-lead) (IXTA..7) Outline



Pins: 1 - Gate
2, 3 - Source
4 - Drain
5,6,7 - Source
Tab (8) - Drain

SYM	INCHES MIN	INCHES MAX	MILLIMETER MIN	MILLIMETER MAX
A	.170	.185	4.30	4.70
A1	.085	.104	2.15	2.65
b	.026	.035	0.65	0.90
c	.016	.024	0.40	0.60
c2	.049	.055	1.25	1.40
D	.355	.370	9.00	9.40
D1	.272	.280	6.90	7.10
E	.386	.402	9.80	10.20
E1	.311	.319	7.90	8.10
e	.050 BSC		1.27 BSC	
L	.591	.614	15.00	15.60
L1	.091	.110	2.30	2.80
L2	.039	.059	1.00	1.50
L3	.000	.059	0.00	1.50

Notes: 1. Pulse test, t ≤ 300μs; duty cycle, d ≤ 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.

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IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ 25ºC

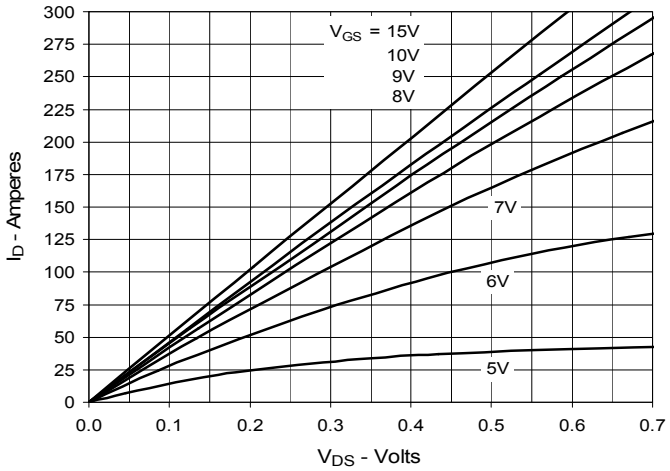

Fig. 2. Extended Output Characteristics @ 25ºC

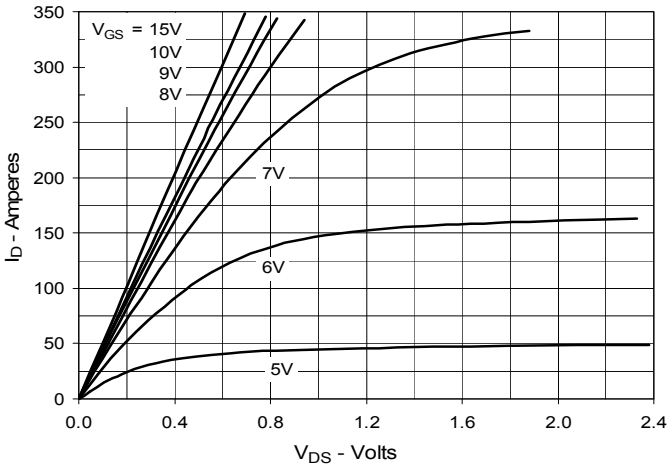

Fig. 3. Output Characteristics @ 150ºC

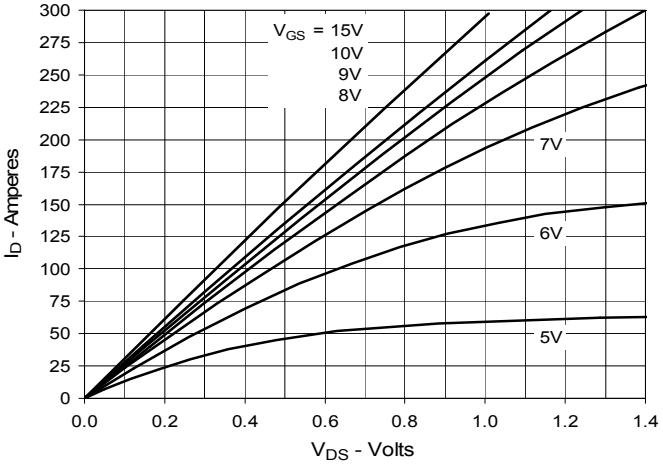

Fig. 4. $R_{DS(on)}$ Normalized to I_D = 150A Value vs. Junction Temperature

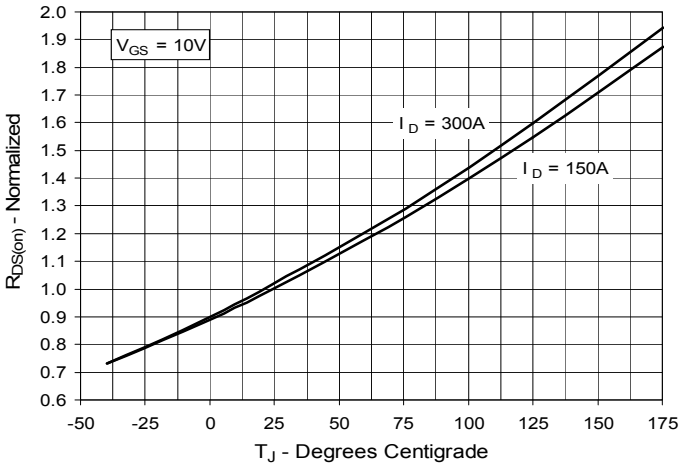

Fig. 5. $R_{DS(on)}$ Normalized to I_D = 150A Value vs. Drain Current

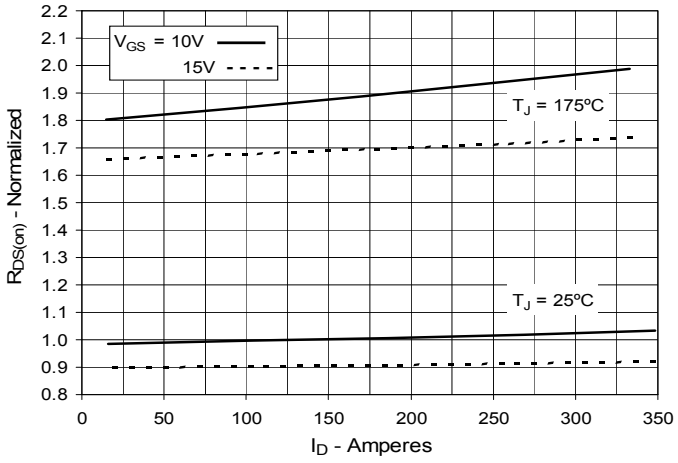

Fig. 6. Drain Current vs. Case Temperature

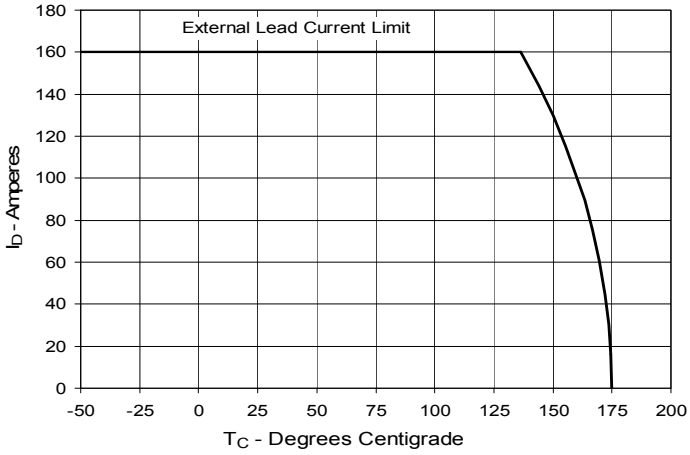

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Fig. 7. Input Admittance

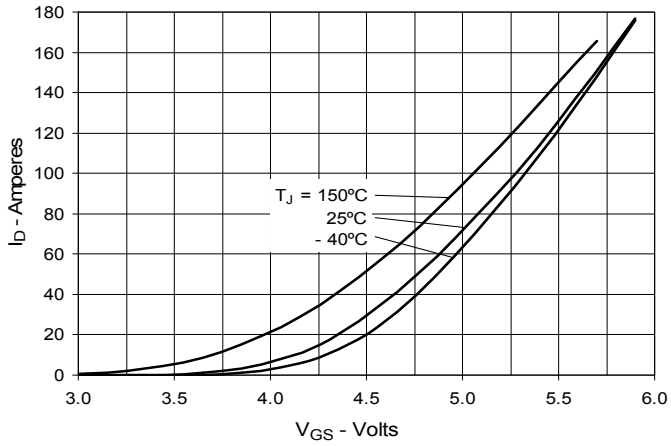

Fig. 8. Transconductance

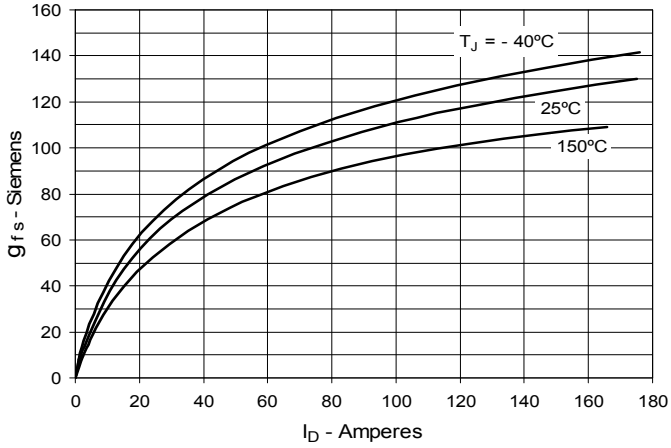

Fig. 9. Forward Voltage Drop of Intrinsic Diode

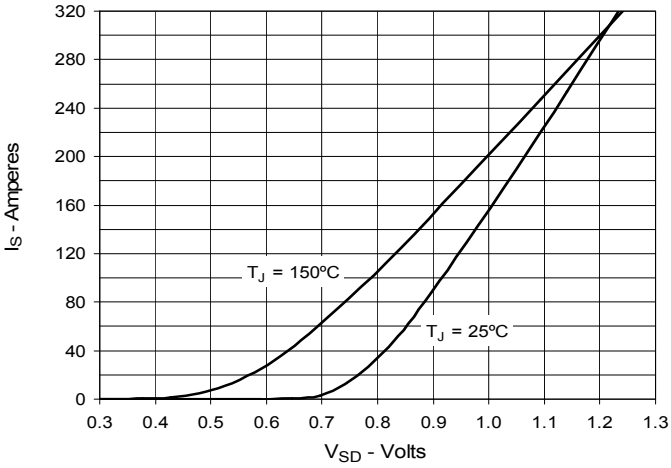

Fig. 10. Gate Charge

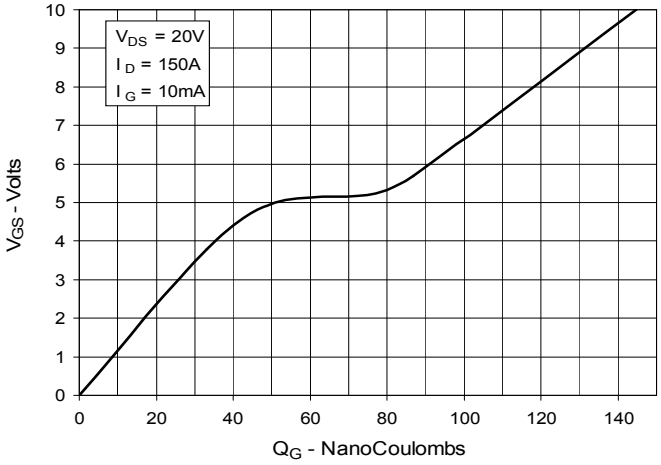

Fig. 11. Capacitance

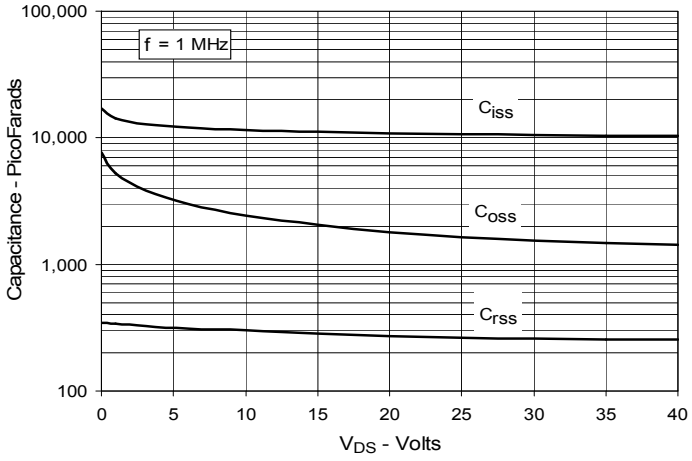

Fig. 12. Forward-Bias Safe Operating Area

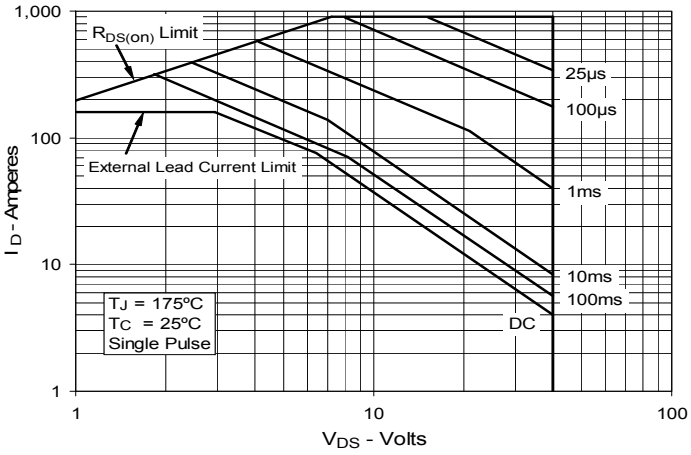

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Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

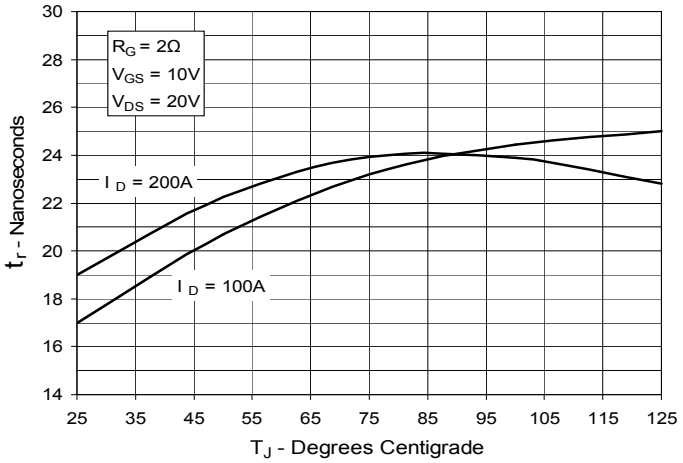

Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

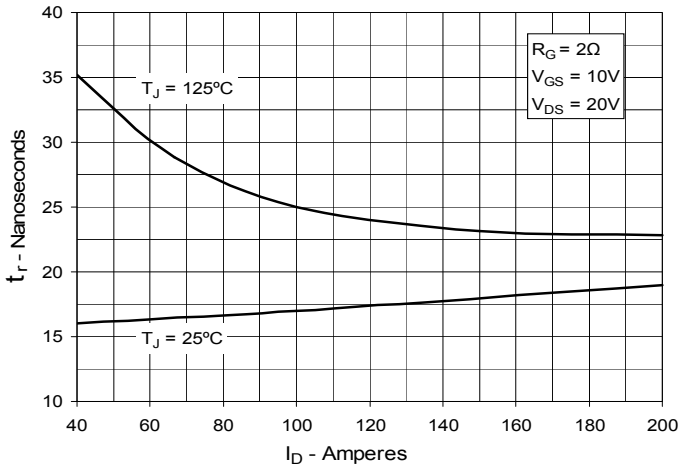

Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

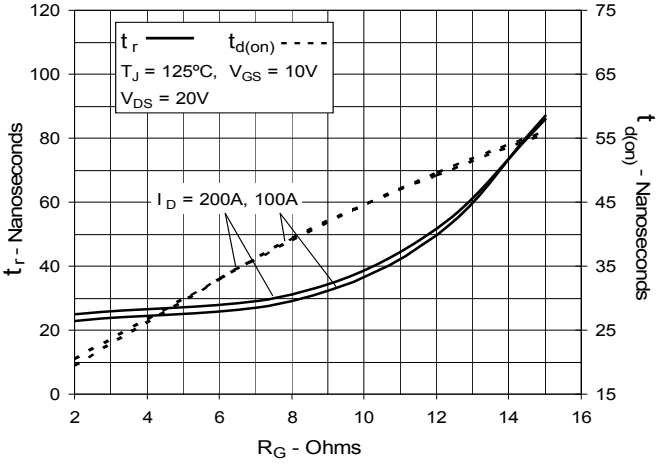

Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

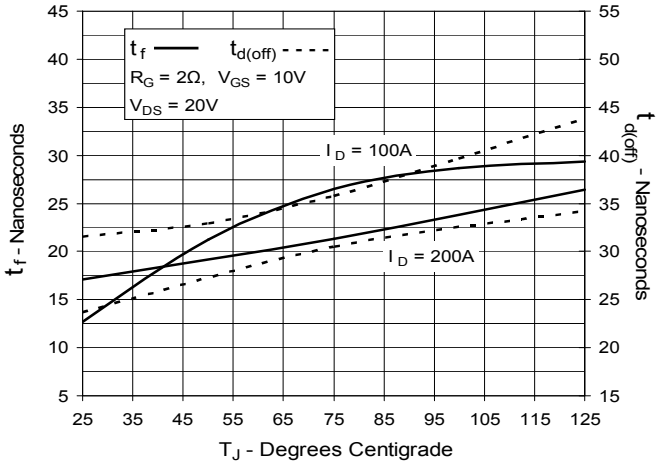

Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

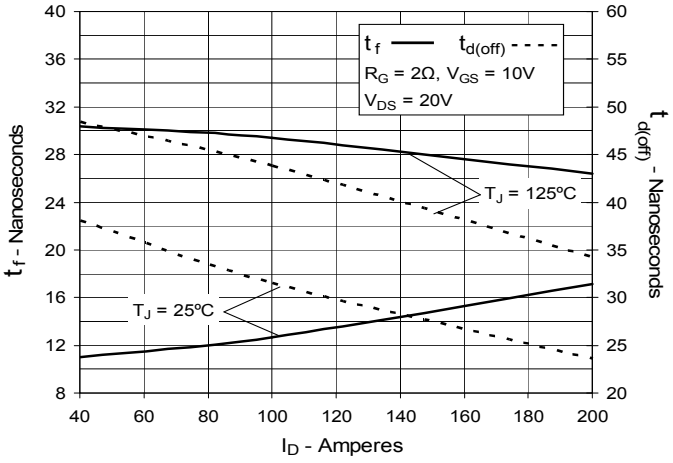

Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

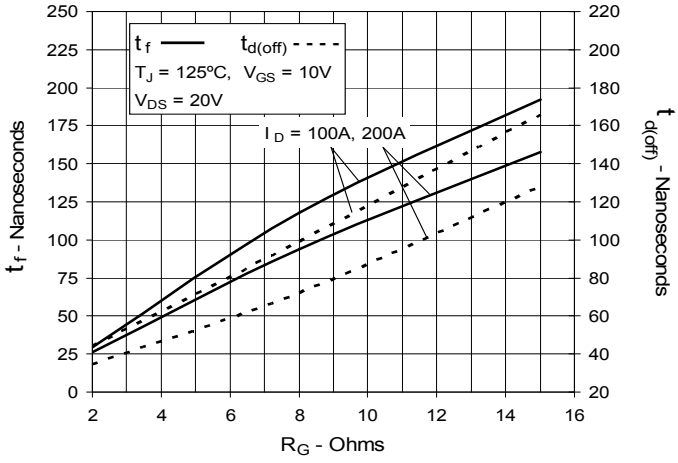

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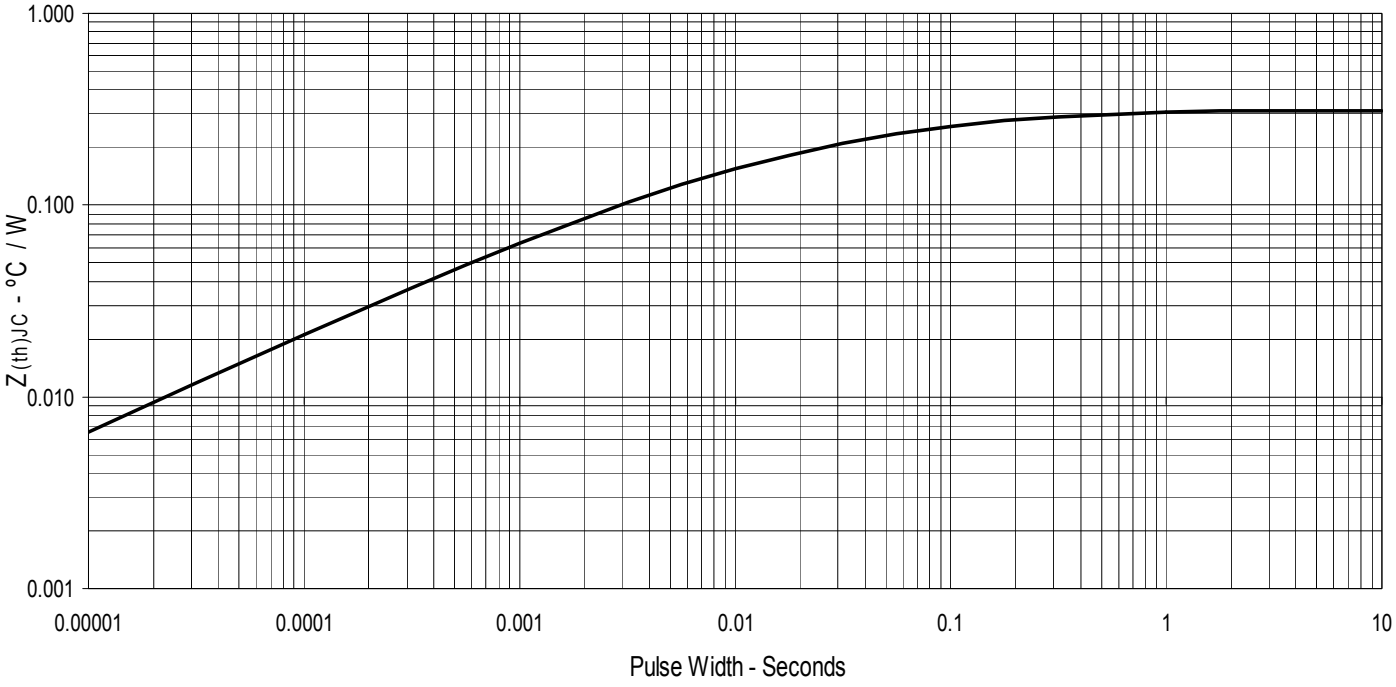
Fig. 19. Maximum Transient Thermal Impedance



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