IXYS

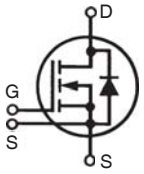
Advance Technical Information

TrenchT4™ Power MOSFET

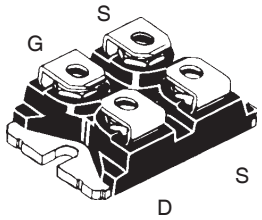
IXTN660N04T4

V_{DSS} = 40V
I_{D25} = 660A
$R_{DS(on)}$ ≤ 0.85mΩ

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



miniBLOC, SOT-227
E153432



G = Gate D = Drain
S = Source

Either Source Terminal S can be used as the Source Terminal or the Kelvin Source (Gate Return) Terminal.

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		±15	V
I_{D25}	T_C = 25°C (Chip Capability)		660	A
$I_{L(RMS)}$	External Lead Current Limit		200	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}		1800	A
I_A	T_C = 25°C		330	A
E_{AS}	T_C = 25°C		5	J
P_D	T_C = 25°C		1040	W
T_J			-55 ... +175	°C
T_{JM}			175	°C
T_{stg}			-55 ... +175	°C
V_{ISOL}	50/60 Hz, RMS	t = 1 minute	2500	V~
	I_{ISOL} ≤ 1mA	t = 1 second	3000	V~
M_d	Mounting Torque		1.5/13	Nm/lb.in
	Terminal Connection Torque		1.3/11.5	Nm/lb.in
Weight			30	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} = ±15V, V_{DS} = 0V			±200	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			10	μA
	T_J = 150°C			1.5	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 100A, Note 1			0.85	mΩ

Features

- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation
- 175°C Operating Temperature
- Isolation Voltage 2500 V~
- High Current Handling Capability
- Fast Intrinsic Diode
- Avalanche Rated
- Low $R_{DS(on)}$

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- DC-DC Converters and Offi-Line UPS
- Primary-Side Switch
- High Speed Power Switching Applications

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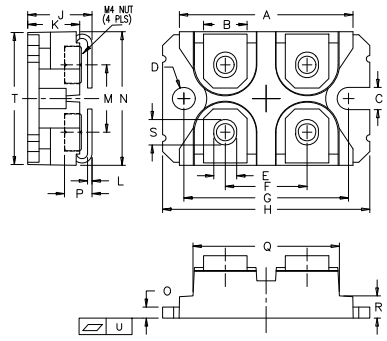
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	110	180		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		44.0		nF
C_{oss}			6.5		nF
C_{rss}			3.5		nF
R_{Gi}	Gate Input Resistance		2.5		Ω
$t_{d(on)}$	**Resistive Switching Times**		40		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{DSS}		430		ns
$t_{d(off)}$	R_G = 1Ω (External)		386		ns
t_f			260		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{DSS}		860		nC
Q_{gs}			240		nC
Q_{gd}			290		nC
R_{thJC}				0.144	°C/W
R_{thCS}			0.05		°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			660	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			2640	A
V_{SD}	I_F = 100A, V_{GS} = 0V, Note 1			1.4	V
t_{rr}	I_F = 150A, V_{GS} = 0V		60		ns
I_{RM}	-di/dt = 100A/μs		2.1		A
Q_{RM}	V_R = 30V		63		nC

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

SOT-227B (IXTN) Outline



(M4 screws (4x) supplied)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

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 4,860,072 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 @ T_J = 25ºC

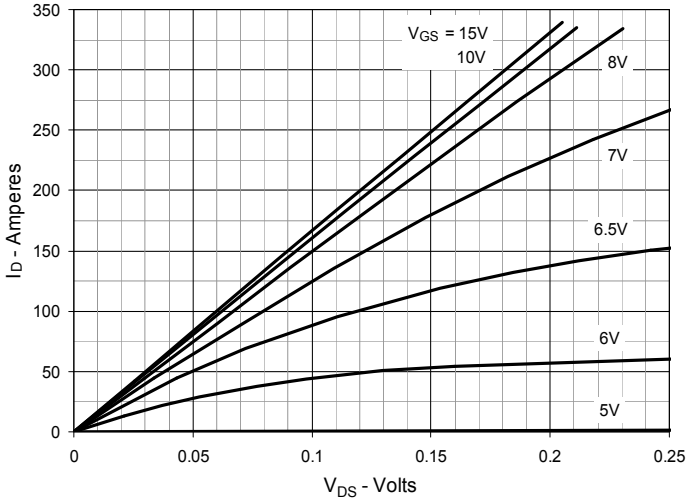


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

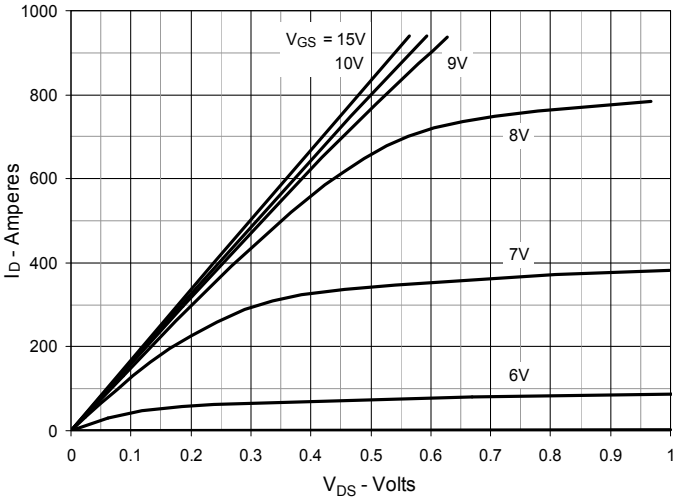


Fig. 3. Output Characteristics @ T_J = 150ºC

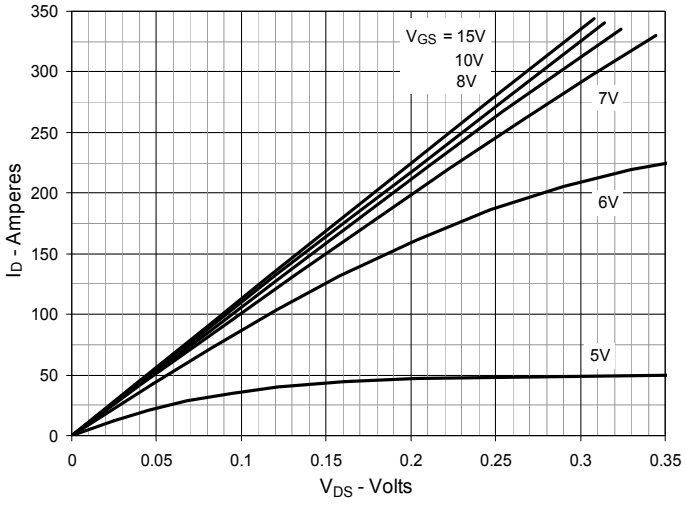


Fig. 4. Normalized $R_{DS(on)}$ vs. Junction Temperature

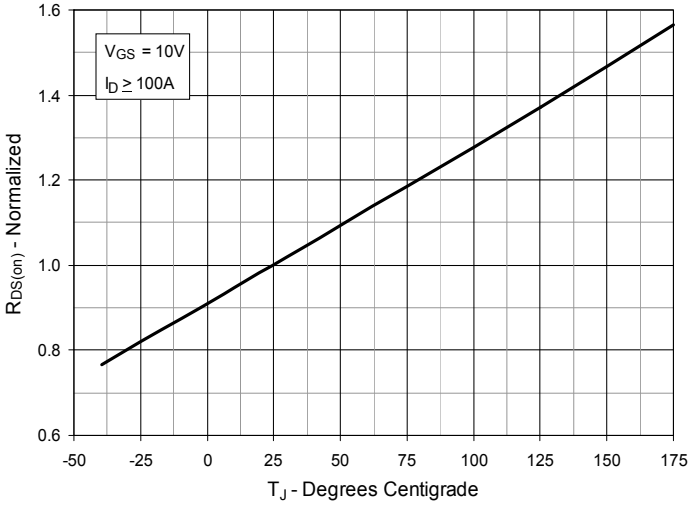


Fig. 5. Normalized $R_{DS(on)}$ to I_D = 100A vs. Drain Current

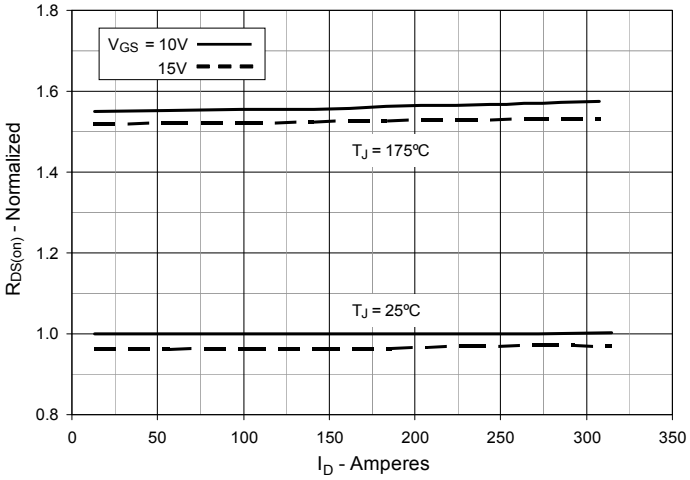
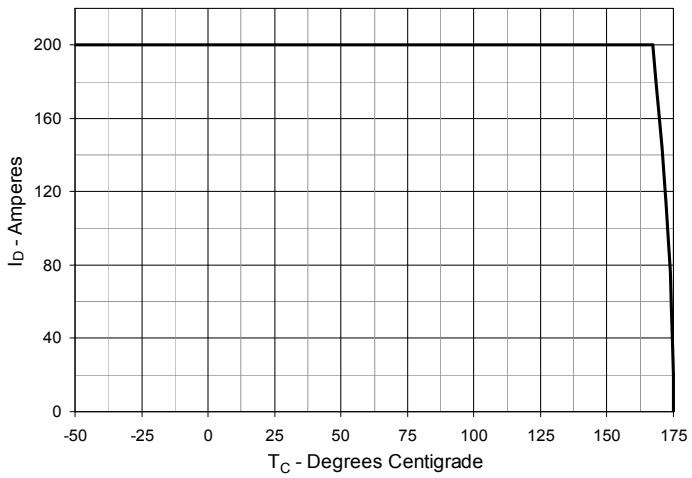


Fig. 6. Drain Current vs. Case Temperature



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Fig. 7. Input Admittance

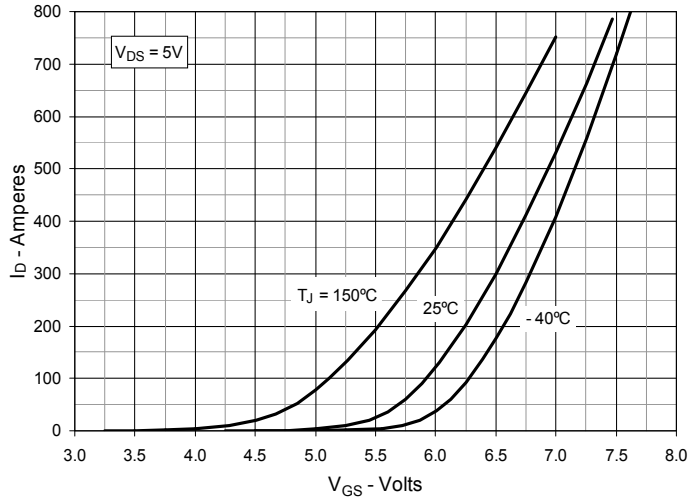


Fig. 8. Transconductance

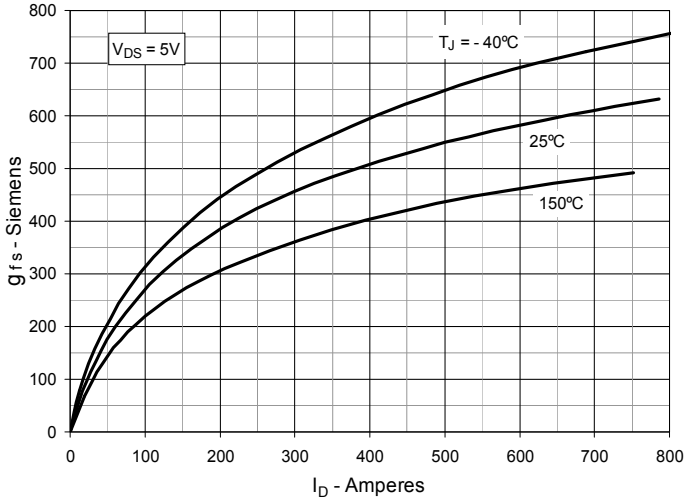


Fig. 9. Forward Voltage Drop of Intrinsic Diode

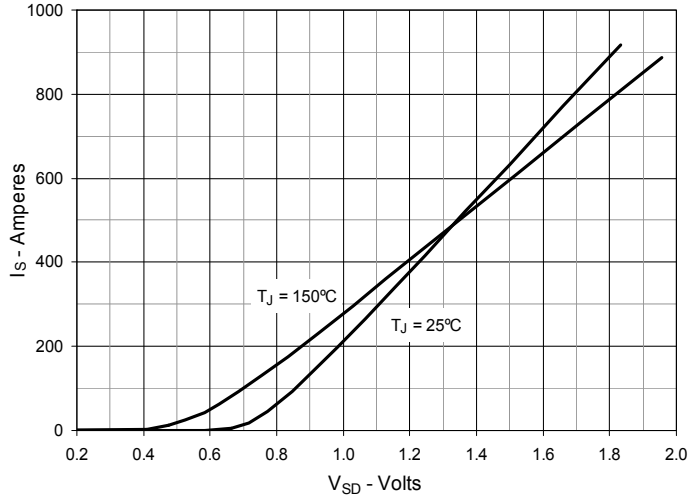


Fig. 10. Gate Charge

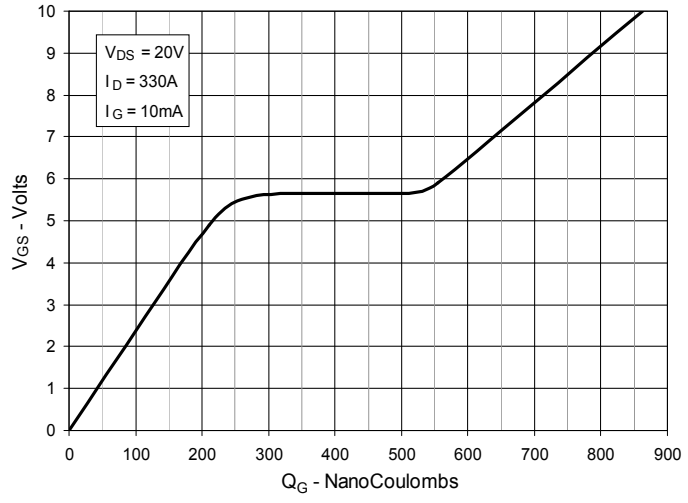


Fig. 11. Capacitance

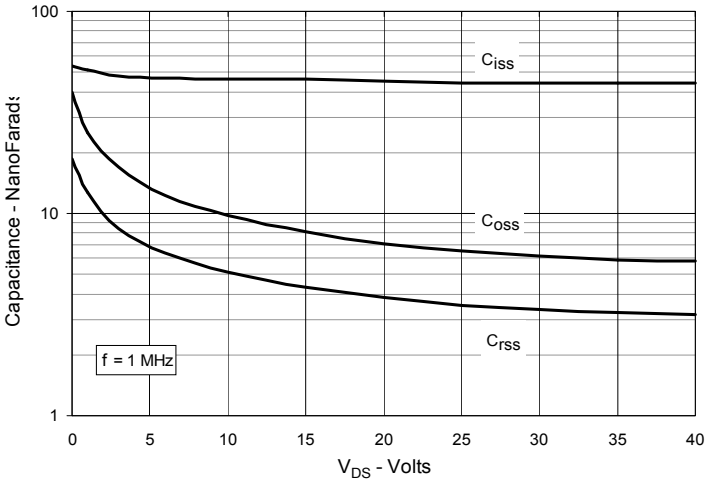
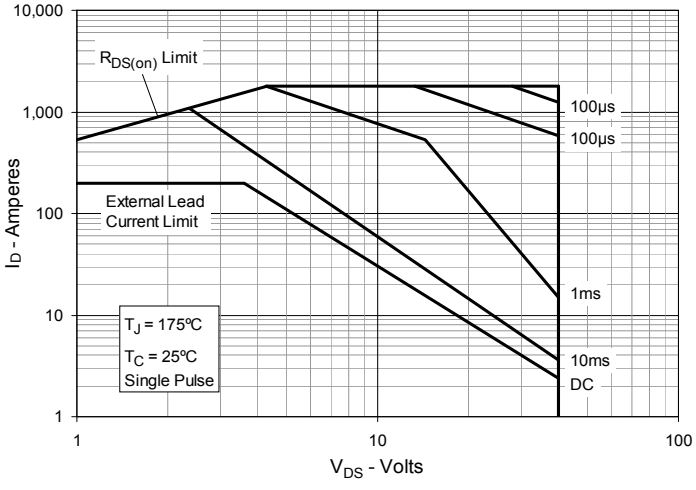


Fig. 12. Forward-Bias Safe Operating Area



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

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

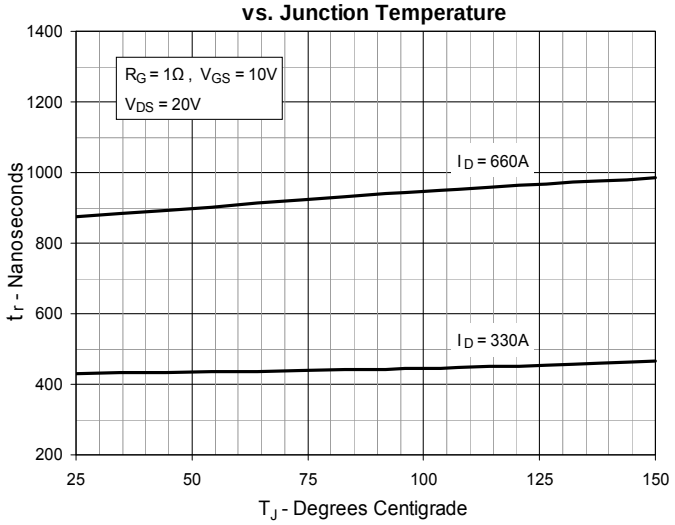


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

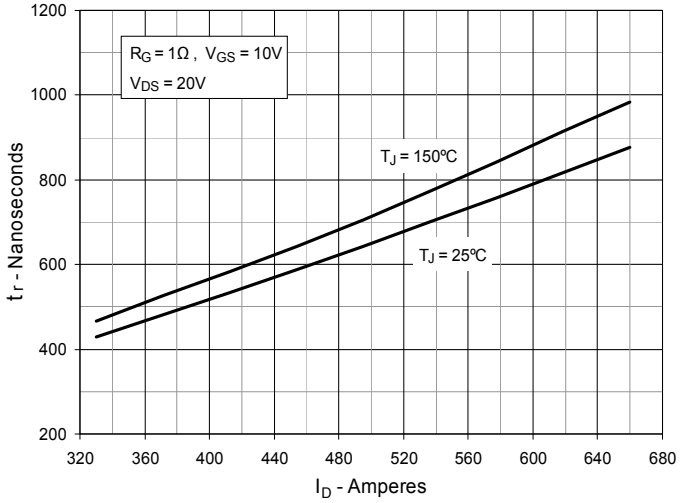


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

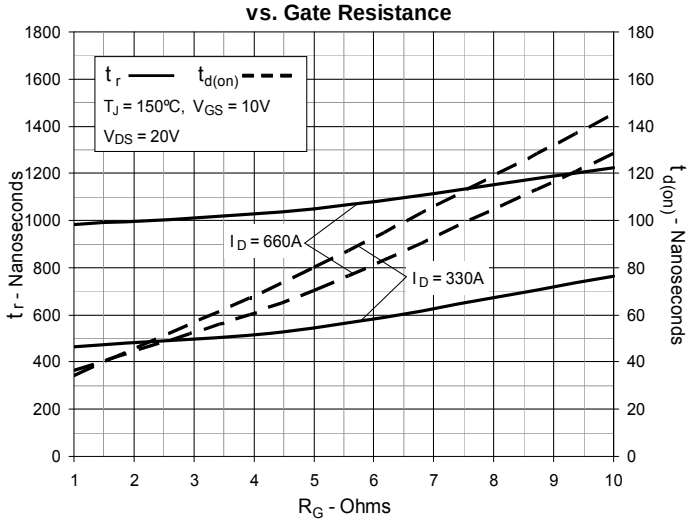


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

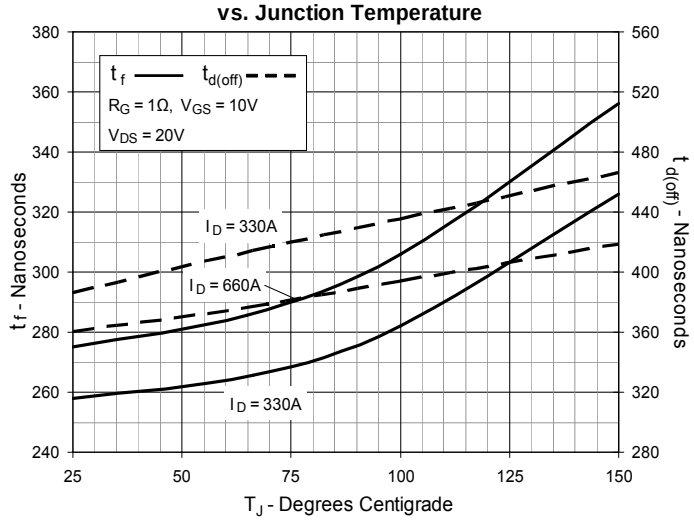


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

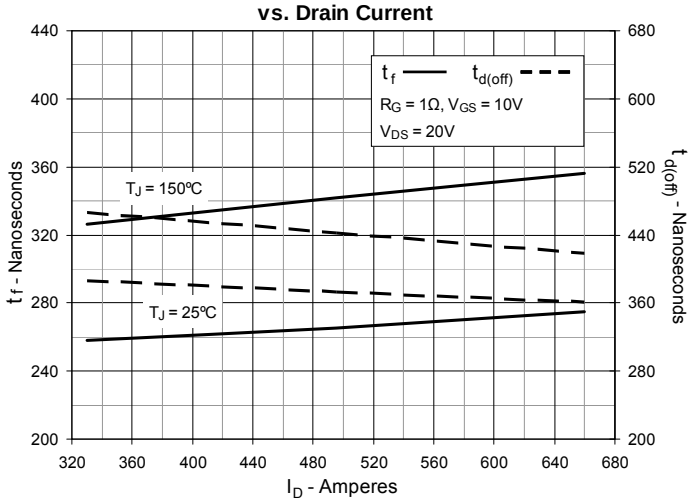
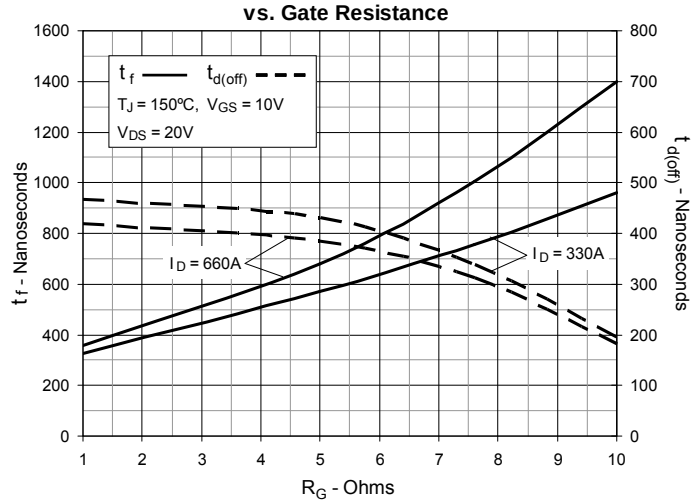
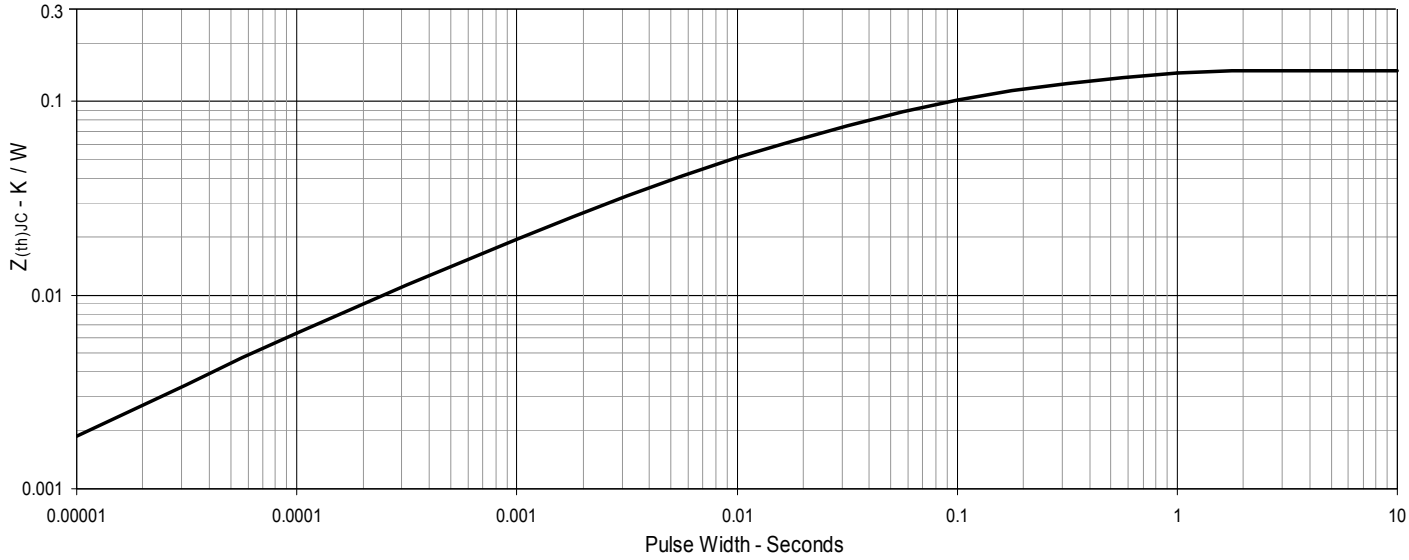


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



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Fig. 19. Maximum Transient Thermal Impedance





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