IXYS

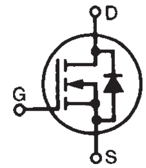
Advance Technical Information

GigaMOS™ TrenchT2 HiperFET™ Power MOSFET

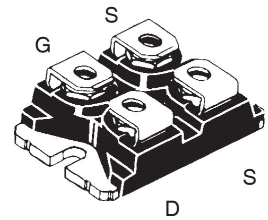
IXFN320N17T2

V_{DSS}	=	170V
I_{D25}	=	260A
$R_{DS(on)}$	≤	5.2mΩ
t_{rr}	≤	150ns

N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



miniBLOC, SOT-227
E153432



G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	170	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	170	V
V_{GSS}	Continuous	±20	V
V_{GSM}	Transient	±30	V
I_{D25}	T_C = 25°C (Chip Capability)	260	A
$I_{L(RMS)}$	External Lead Current Limit	200	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	800	A
I_A	T_C = 25°C	100	A
E_{AS}	T_C = 25°C	5	J
dV/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le$ 175°C	20	V/ns
P_D	T_C = 25°C	1070	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
V_{ISOL}	50/60 Hz, RMS t = 1 minute	2500	V~
	$I_{ISOL} \le$ 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 = 3mA	170			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 8mA	2.5		5.0	V
I_{GSS}	V_{GS} = ±20V, V_{DS} = 0V			±200	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			50	µA
	T_J = 150°C			5	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 60A, Note 1			5.2	mΩ

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

Features

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

Advantages

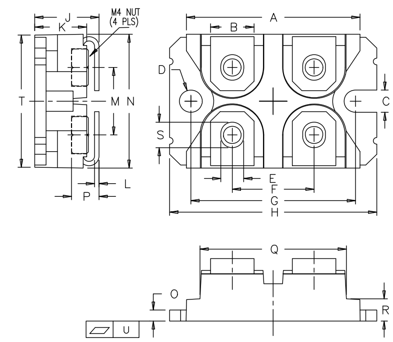
- Easy to Mount
- Space Savings
- High Power Density

Applications

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

Symbol	Test Conditions ($T_J = 25°C$ Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	$V_{DS} = 10V$, $I_D = 60A$, Note 1	120	190		S
C_{iss}	$V_{GS} = 0V$, $V_{DS} = 25V$, f = 1MHz		45		nF
C_{oss}			2890		pF
C_{rss}			410		pF
R_{Gi}	Gate Input Resistance		1.96		Ω
$t_{d(on)}$	**Resistive Switching Times** $V_{GS} = 10V$, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = 100A$ $R_G = 1\Omega$ (External)		46		ns
t_r			170		ns
$t_{d(off)}$			115		ns
t_f			230		ns
$Q_{g(on)}$	$V_{GS} = 10V$, $V_{DS} = 0.5 \bullet V_{DSS}$, $I_D = 160A$		640		nC
Q_{gs}			185		nC
Q_{gd}			175		nC
R_{thJC}				0.14	°C/W
R_{thCS}			0.05		°C/W

SOT-227B (IXFN) 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

Source-Drain Diode

Symbol	Test Conditions ($T_J = 25°C$, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	$V_{GS} = 0V$			320	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			1280	A
V_{SD}	$I_F = 100A$, $V_{GS} = 0V$, Note 1			1.25	V
t_{rr}	$I_F = 160A$, -di/dt = 100A/μs $V_R = 60V$, $V_{GS} = 0V$			150	ns
Q_{RM}			0.53		μC
I_{RM}			9.00		A

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

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.

Fig. 1. Output Characteristics @ $T_J = 25ºC$

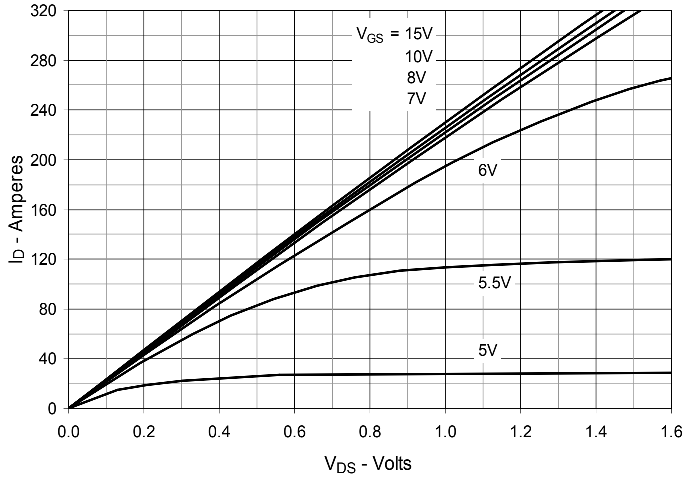


Fig. 2. Extended Output Characteristics @ $T_J = 25ºC$

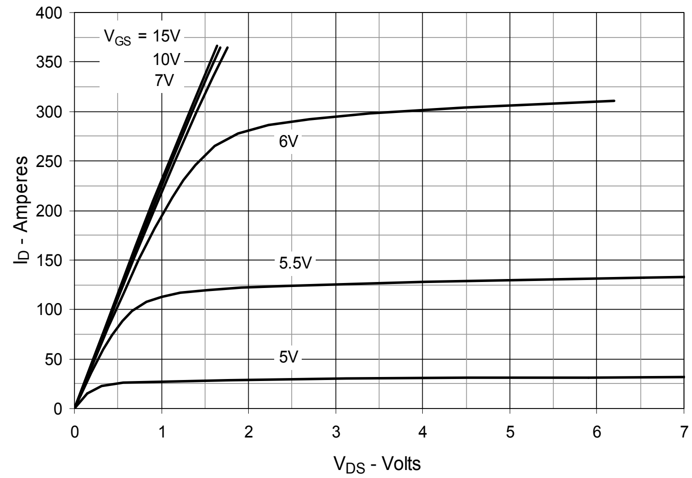


Fig. 3. Output Characteristics @ $T_J = 150ºC$

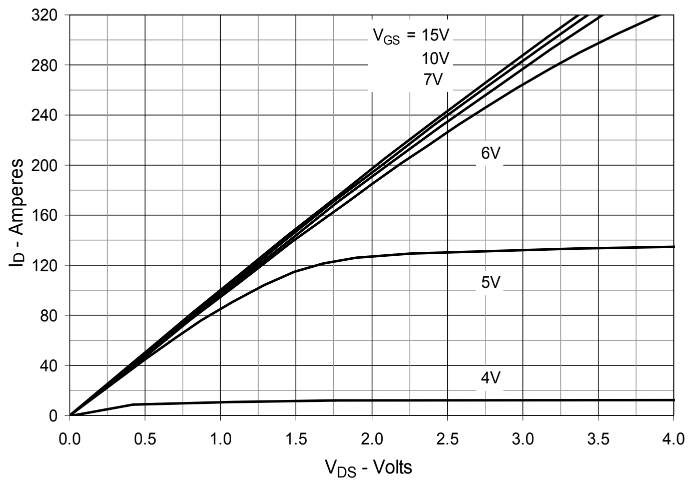


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 160A Value vs. Junction Temperature

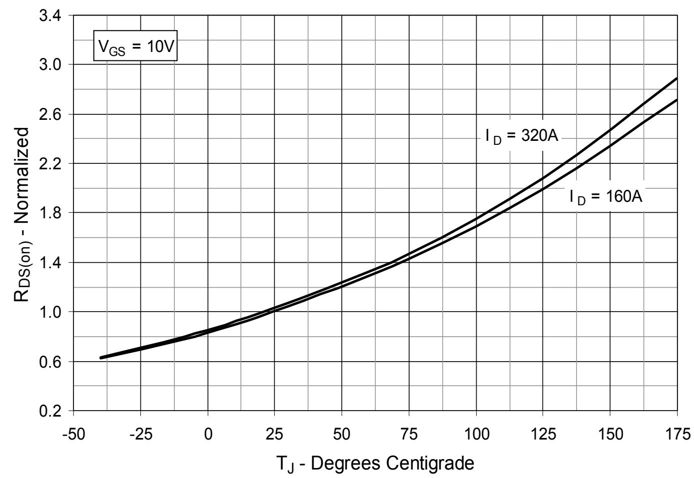


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 160A Value vs. Drain Current

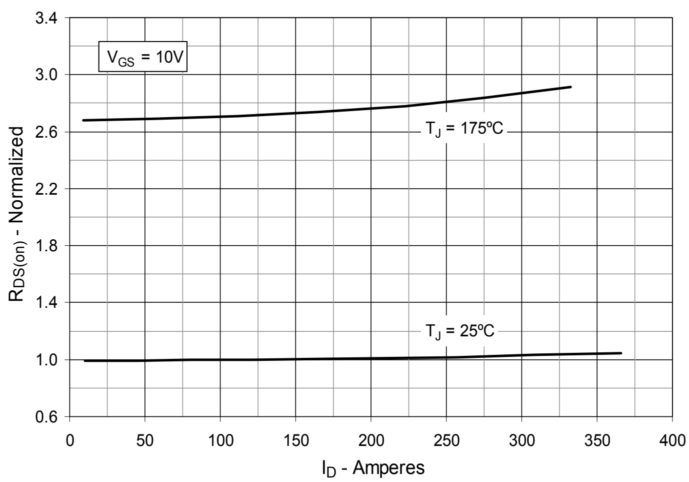


Fig. 6. Drain Current vs. Case Temperature

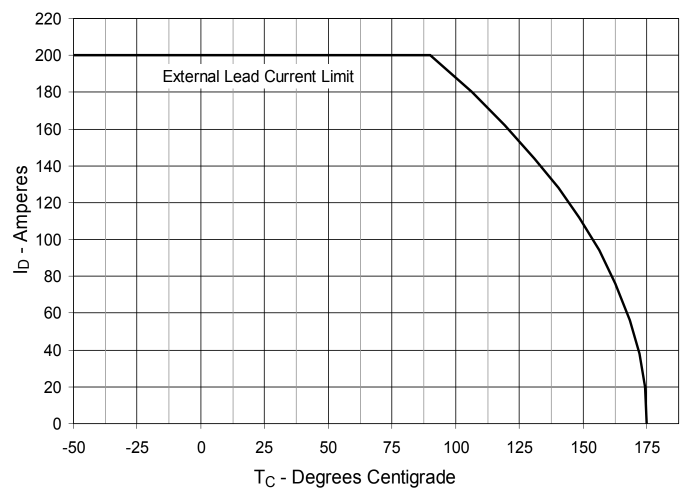


Fig. 7. Input Admittance

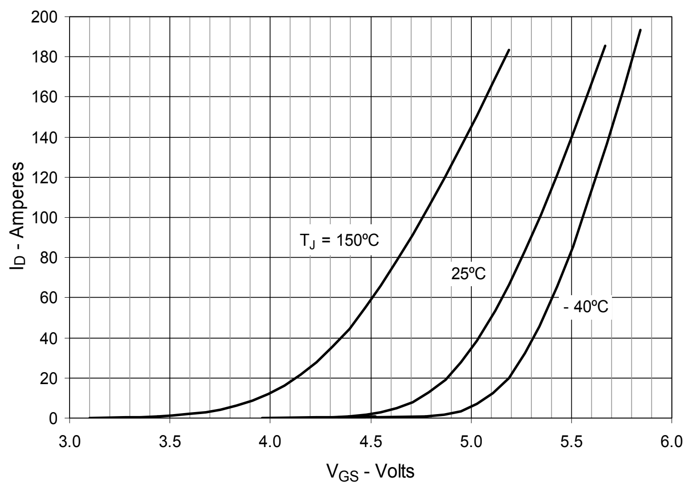


Fig. 8. Transconductance

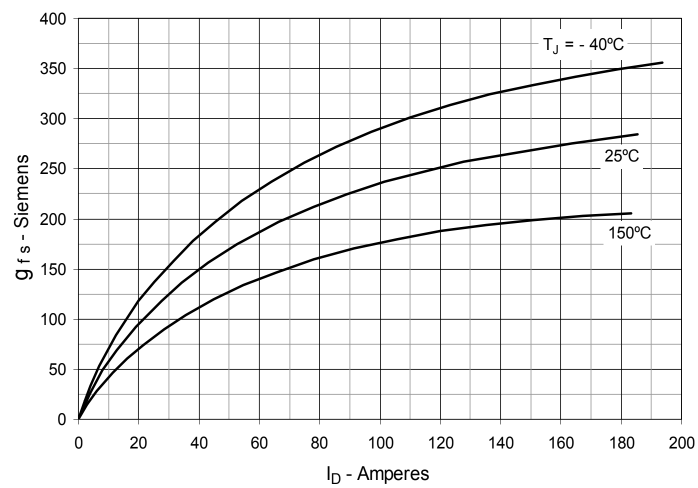


Fig. 9. Forward Voltage Drop of Intrinsic Diode

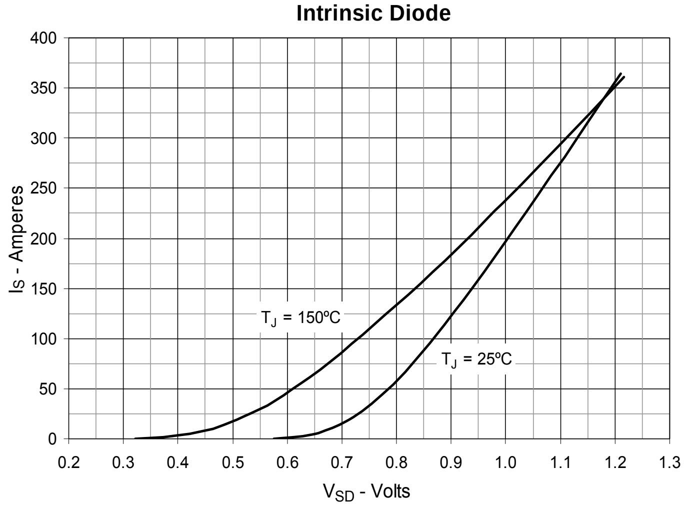


Fig. 10. Gate Charge

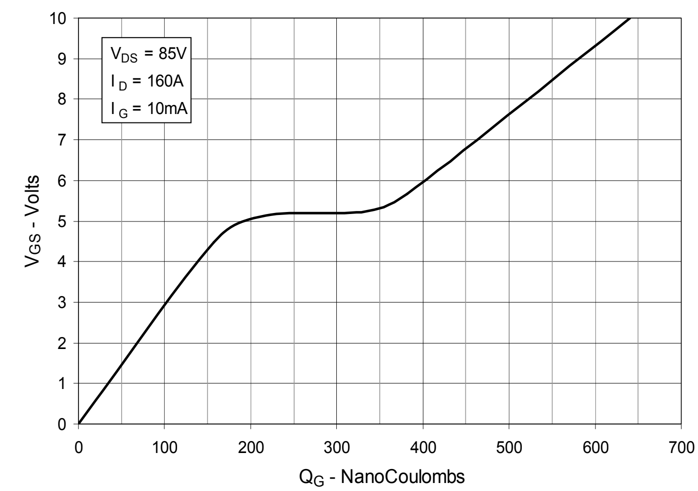


Fig. 11. Capacitance

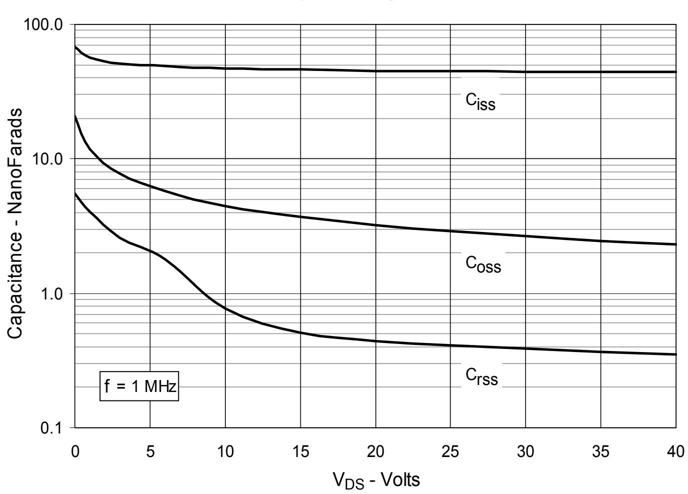
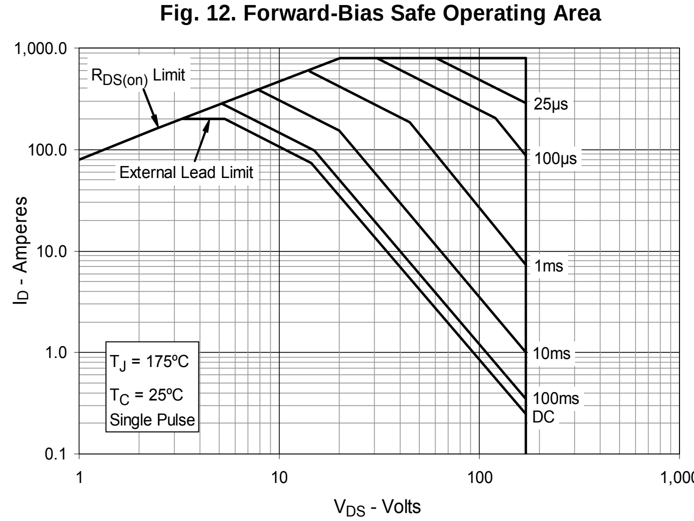


Fig. 12. Forward-Bias Safe Operating Area



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

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

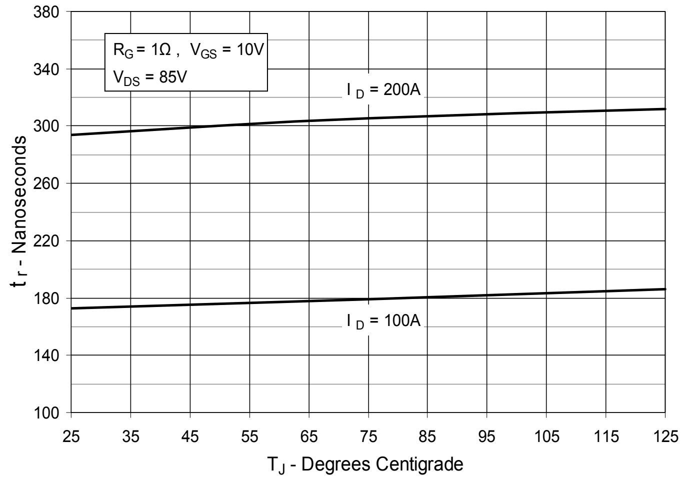


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

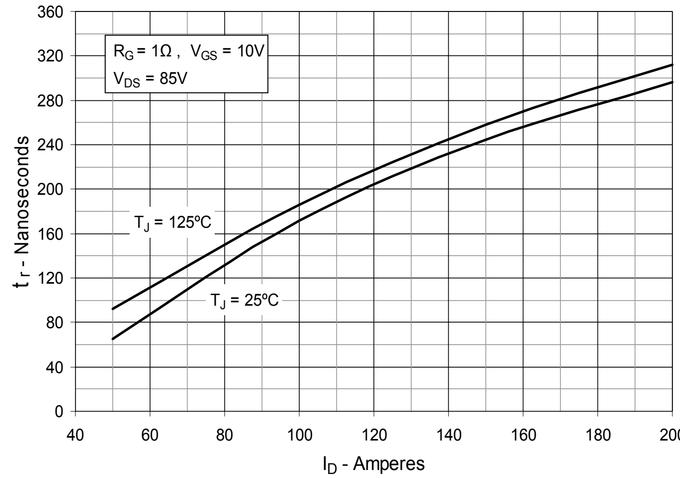


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

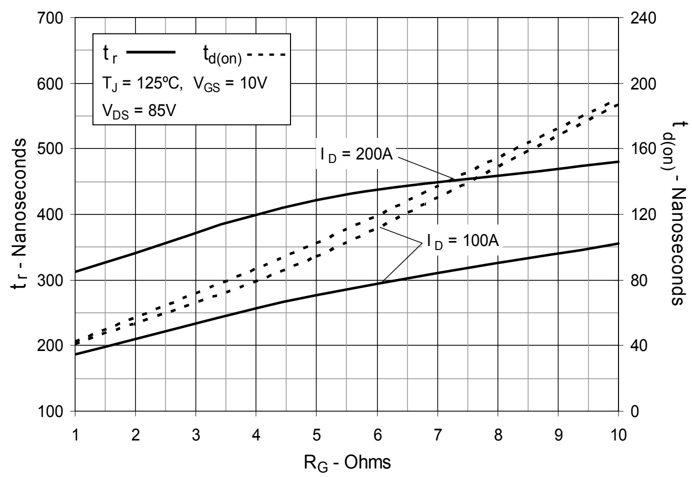


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

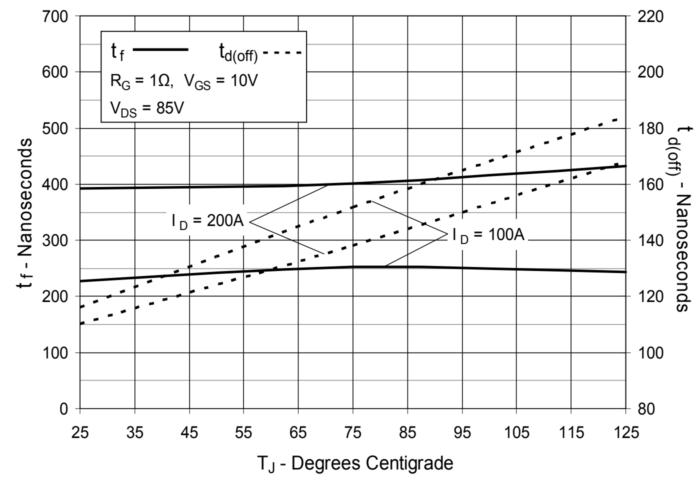


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

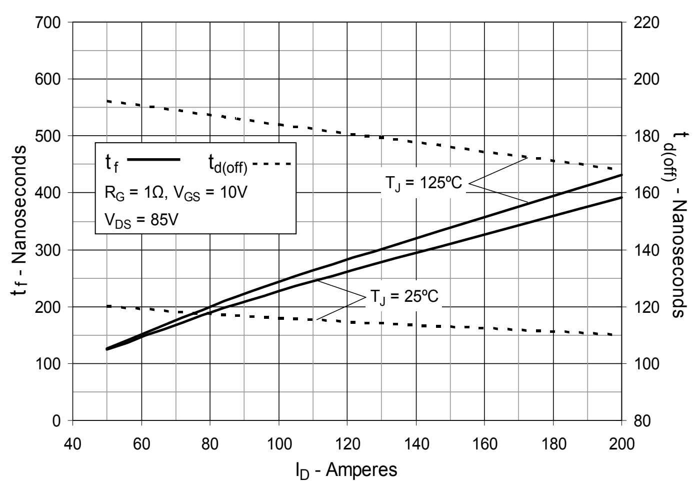


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

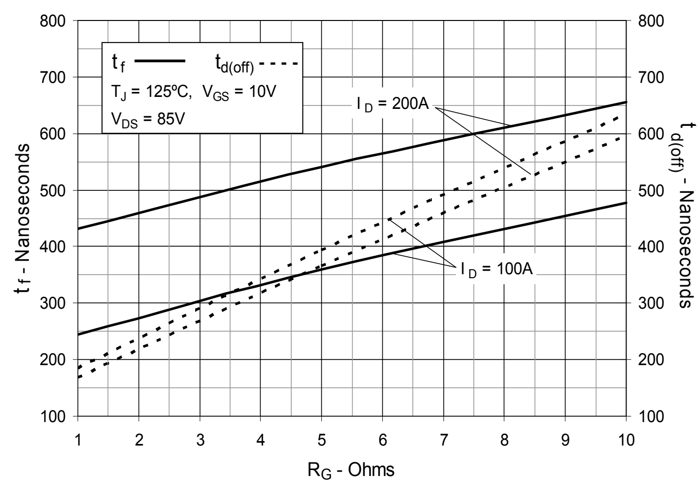


Fig. 19. Maximium Transient Thermal Impedance