IXYS

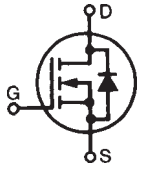
Preliminary Technical Information

TrenchT2™ GigaMOS™ HiperFET™ Power MOSFETs

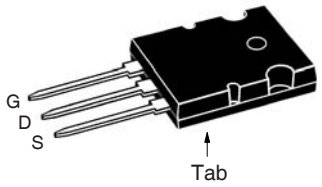
IXFK520N075T2
IXFX520N075T2

V_{DSS} = 75V
I_{D25} = 520A
$R_{DS(on)}$ ≤ 2.2mΩ

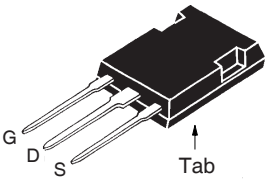
N-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Diode



TO-264 (IXFK)



PLUS247 (IXFX)



G = Gate D = Drain
S = Source Tab = Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	75	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	75	V
V_{GSS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	T_C = 25°C (Chip Capability)	520	A
$I_{L(RMS)}$	External Lead Current Limit	160	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	1350	A
I_A	T_C = 25°C	200	A
E_{AS}	T_C = 25°C	3	J
P_D	T_C = 25°C	1250	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
M_d	Mounting Torque (TO-264)	1.13/10	Nm/lb.in
F_C	Mounting Force (PLUS247)	20..120 /4.5..27	N/lb
Weight	TO-264	10	g
	PLUS247	6	g

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 3mA	75			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			25	μA
	T_J = 150°C			2	mA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 100A, Notes 1 & 2			2.2	mΩ

Features

- International Standard Packages
- 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 Off-Line UPS
- Primary-Side Switch
- 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	65	105		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		41		nF
C_{oss}			4150		pF
C_{rss}			530		pF
R_{Gi}	Gate Input Resistance		1.36		Ω
$t_{d(on)}$	**Resistive Switching Times**		48		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 200A		36		ns
$t_{d(off)}$	R_G = 1Ω (External)		80		ns
t_f			35		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{DSS}		545		nC
Q_{gs}			177		nC
Q_{gd}			135		nC
R_{thJC}				0.12	°C/W
R_{thCS}			0.15		°C/W

Source-Drain Diode

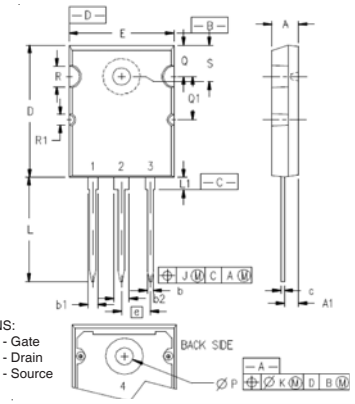
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			520	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			1600	A
V_{SD}	I_F = 100A, V_{GS} = 0V, Note 1			1.25	V
t_{rr}	I_F = 150A, V_{GS} = 0V			150	ns
I_{RM}	-di/dt = 100A/μs		7		A
Q_{RM}	V_R = 37.5V		357		nC

Notes 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Includes lead resistance.

PRELIMANARY TECHNICAL INFORMATION

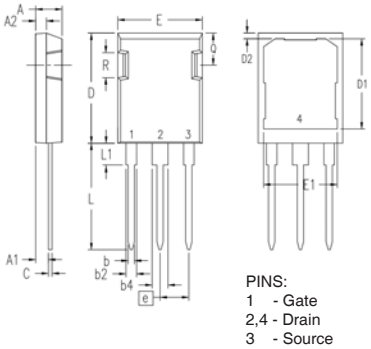
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test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

TO-264 Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
ØP	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

PLUS247™ Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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
b2	.075	.087	1.91	2.20
b4	.115	.126	2.92	3.20
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
D1	.650	.690	16.51	17.53
D2	.035	.050	0.89	1.27
E	.620	.635	15.75	16.13
E1	.545	.565	13.84	14.35
e	.215 BSC		5.45 BSC	
L	.780	.810	19.81	20.57
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83

Fig. 1. Output Characteristics @ T_J = 25ºC

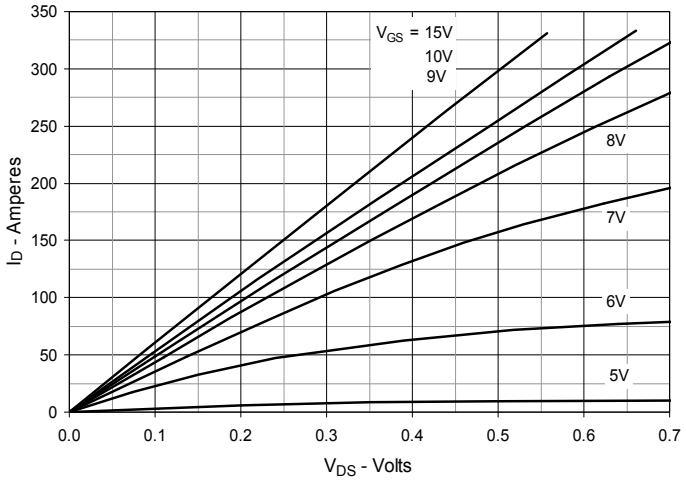


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

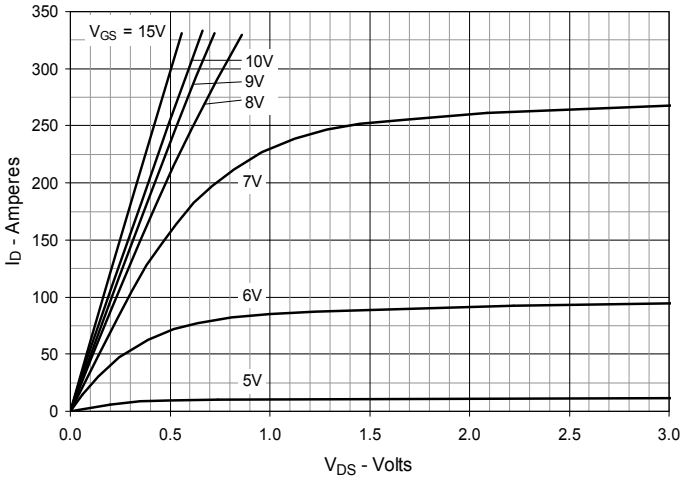


Fig. 3. Output Characteristics @ T_J = 150ºC

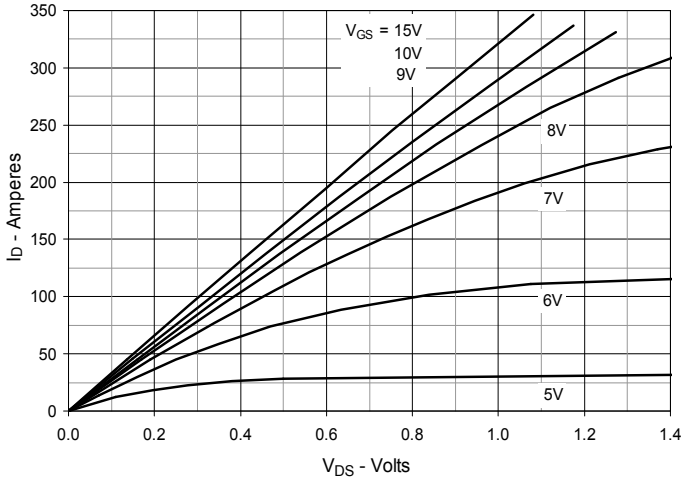


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 150A Value vs. Junction Temperature

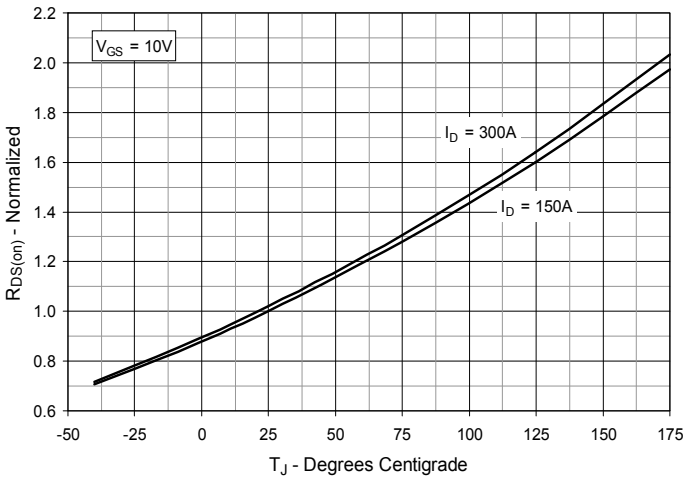


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 150A Value vs. Drain Current

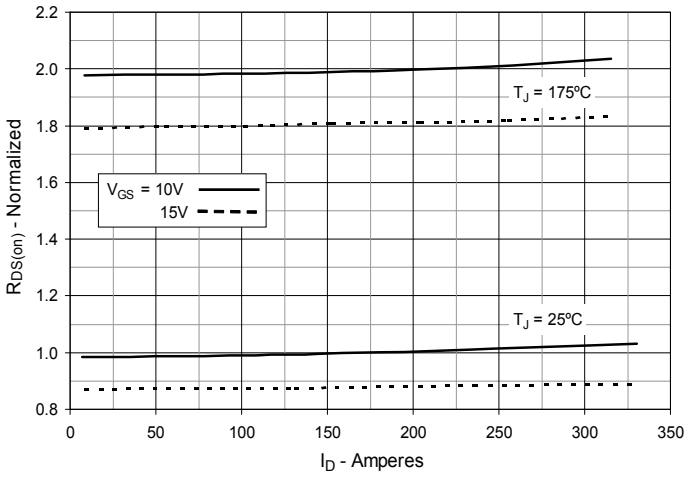


Fig. 6. Drain Current vs. Case Temperature

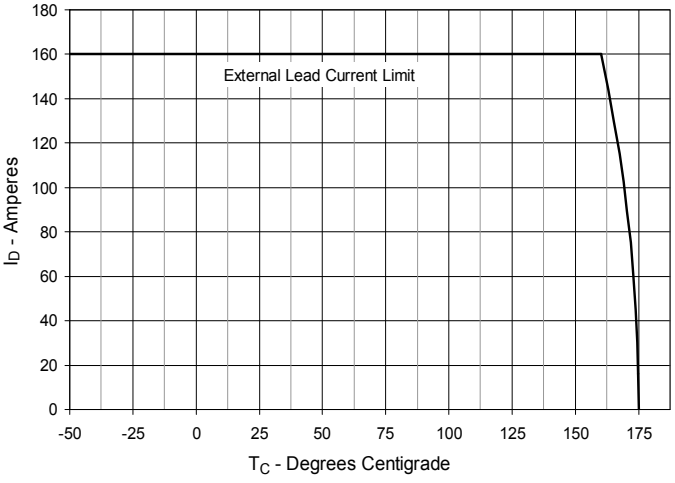


Fig. 7. Input Admittance

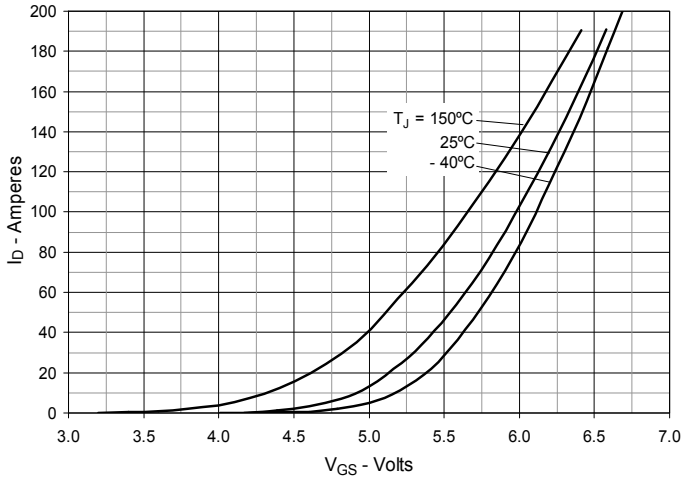


Fig. 8. Transconductance

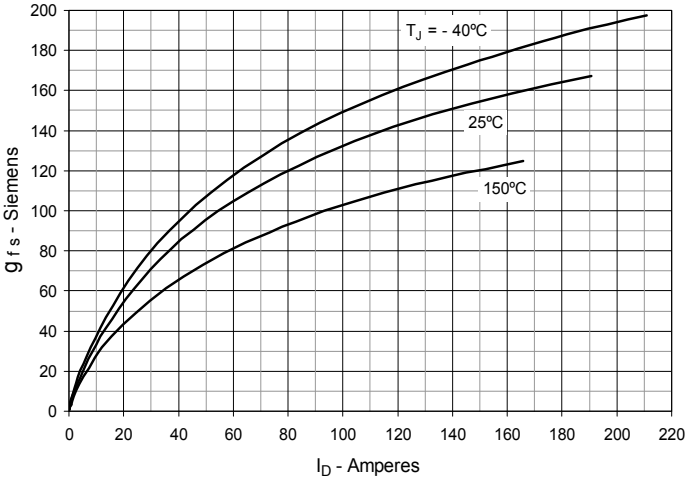


Fig. 9. Forward Voltage Drop of Intrinsic Diode

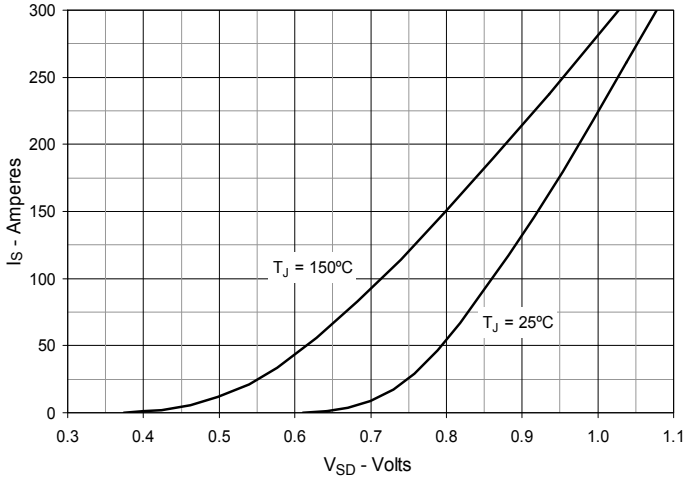


Fig. 10. Gate Charge

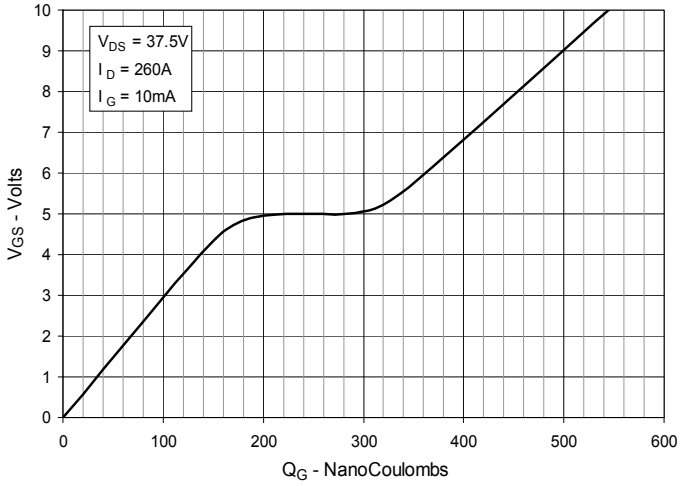


Fig. 11. Capacitance

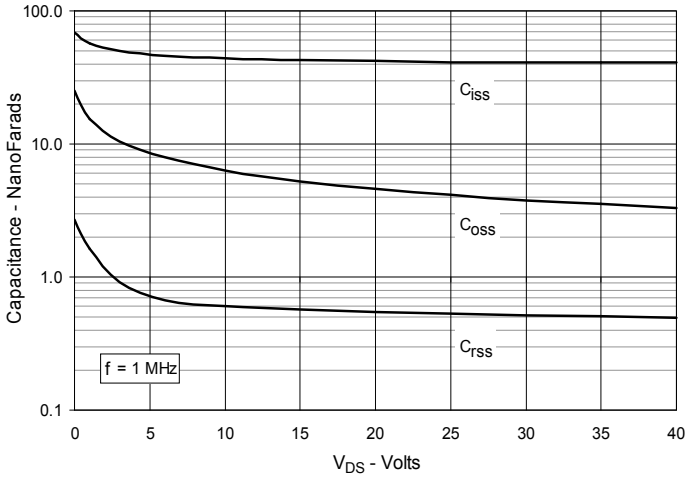


Fig. 12. Forward-Bias Safe Operating Area

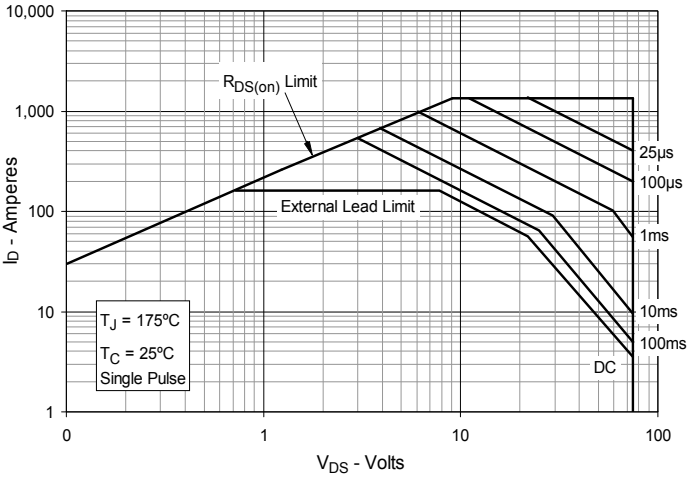


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

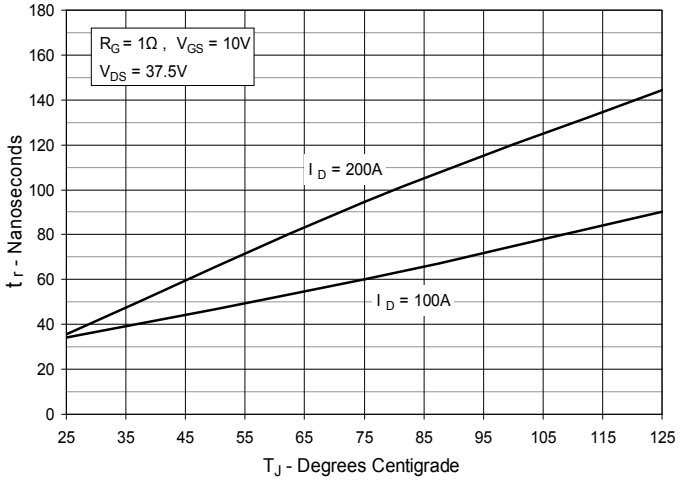


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

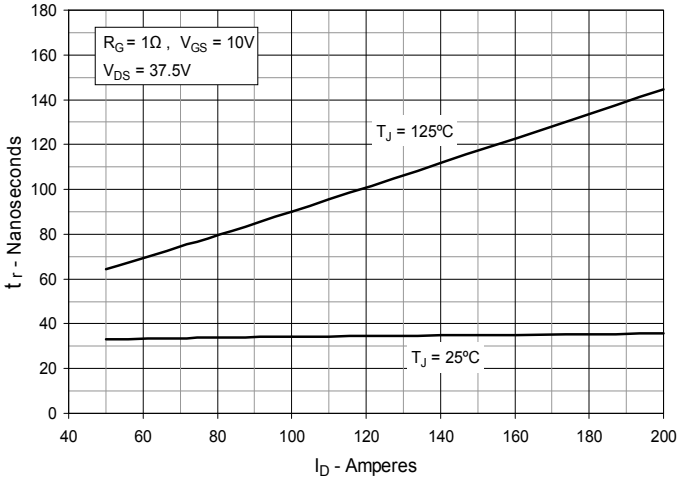


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

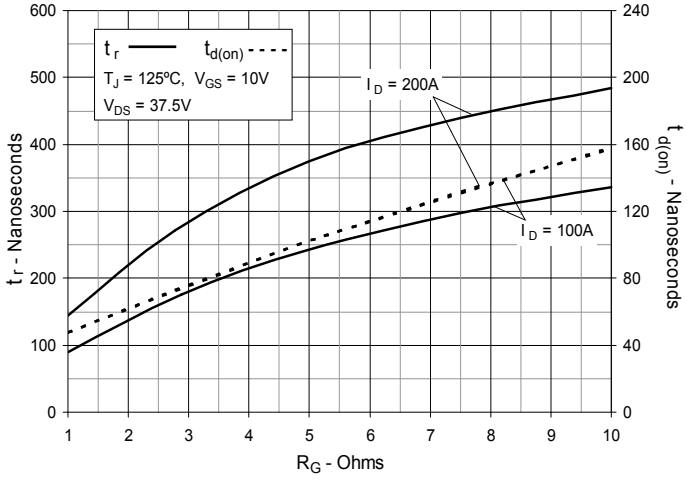


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

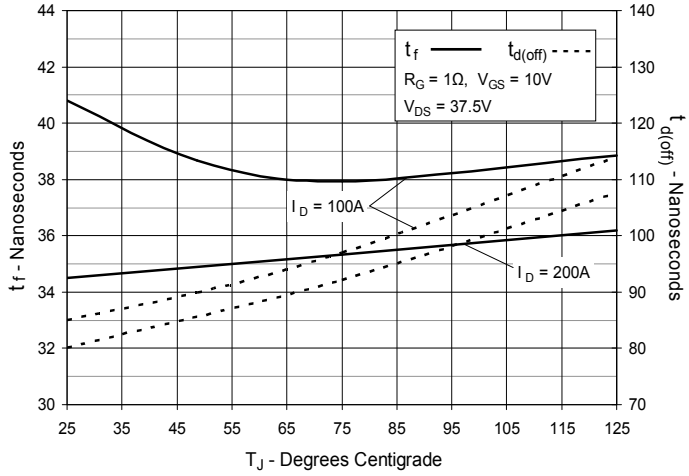


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

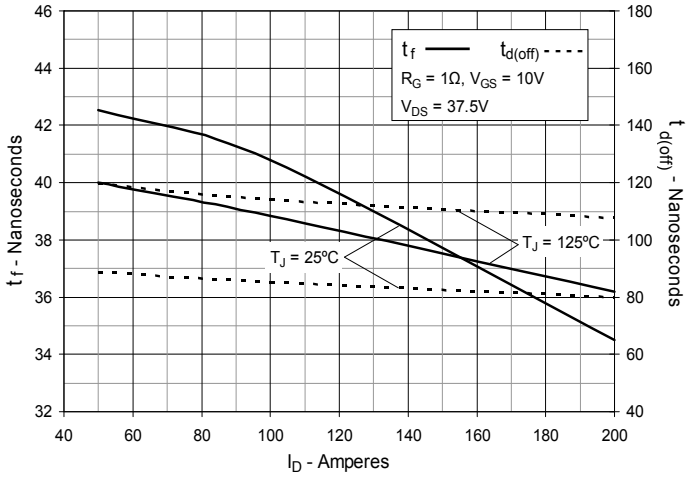


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

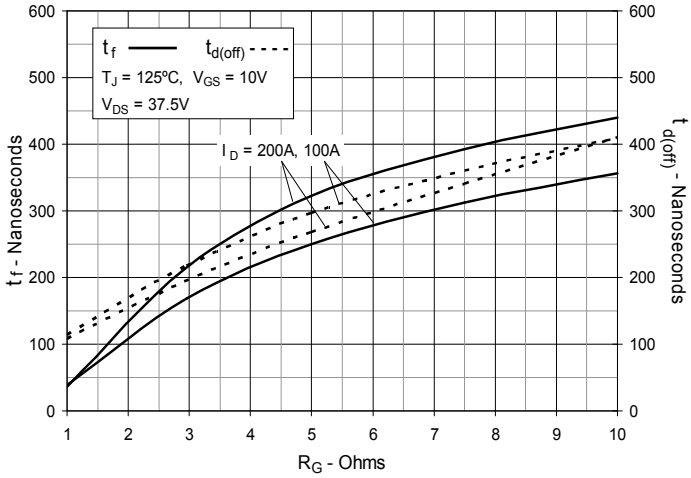


Fig. 19. Maximum Transient Thermal Impedance