IXYS

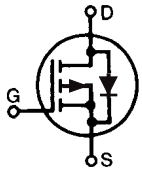
Preliminary Technical Information

TrenchP™ Power MOSFETs

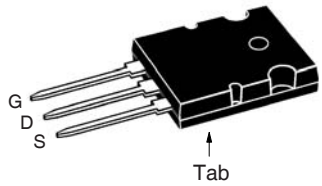
IXTK210P10T
IXTX210P10T

V_{DSS}	=	- 100V
I_{D25}	=	- 210A
$R_{DS(on)}$	≤	7.5mΩ
t_{rr}	≤	200ns

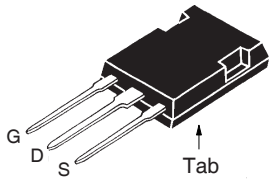
P-Channel Enhancement Mode
Avalanche Rated
Fast Intrinsic Rectifier



TO-264 (IXTK)



PLUS247 (IXTX)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	-100	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	-100	V
V_{GSS}	Continuous	±15	V
V_{GSM}	Transient	±25	V
I_{D25}	T_C = 25°C (Chip Capability)	- 210	A
I_{LRMS}	Lead Current Limit, RMS	-160	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	3	J
dv/dt	$I_S \le I_{DM}$, $V_{DD} \le V_{DSS}$, $T_J \le$ 150°C	10	V/ns
P_D	T_C = 25°C	1040	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body 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 = - 250μA	-100			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250μA	- 2.5		- 4.5	V
I_{GSS}	V_{GS} = ±15V, V_{DS} = 0V			±200	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			- 25	μA
	T_J = 125°C			- 300	μA
$R_{DS(on)}$	V_{GS} = -10V, I_D = 0.5 • I_{D25}, Note 1			7.5	mΩ

Features

- International Standard Packages
- High Current Handling Capability
- Avalanche Rated
- Extended FBSOA
- Fast Intrinsic Recitifier
- Low $R_{DS(ON)}$ and Q_G

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- High-Side Switching
- Push Pull Amplifiers
- DC Choppers
- Automatic Test Equipment
- Current Regulators
- Battery Charger Applications

© 2013 IXYS CORPORATION, All Rights Reserved

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	90	150		S
C_{iss}	V_{GS} = 0V, V_{DS} = - 25V, f = 1MHz		69.5		nF
C_{oss}			4070		pF
C_{rss}			1100		pF
$t_{d(on)}$	**Resistive Switching Times** V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25} R_G = 1Ω (External)		90		ns
t_r			98		ns
$t_{d(off)}$			165		ns
t_f			55		ns
$Q_{g(on)}$	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		740		nC
Q_{gs}			200		nC
Q_{gd}			155		nC
R_{thJC}				0.12	°C/W
R_{thCS}			0.15		°C/W

Source-Drain Diode

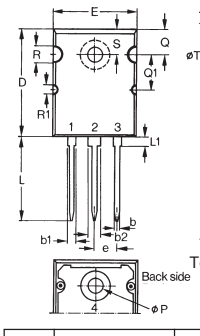
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0V			- 210	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			- 840	A
V_{SD}	I_F = -100A, V_{GS} = 0V, Note 1			-1.4	V
t_{rr}	I_F = -105A, -di/dt = -100A/µs V_R = -100V, V_{GS} = 0V			200	ns
Q_{RM}			930		nC
I_{RM}			12.4		A

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

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.

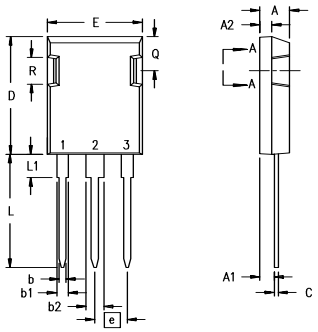
TO-264 AA Outline



Terminals: 1 - Gate
2 - Drain
3 - Source
4 - Drain

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

PLUS247™ Outline



Terminals: 1 - Gate
2 - Drain
3 - Source

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

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 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2 4,860,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2 4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

Fig. 1. Output Characteristics @ T_J = 25ºC

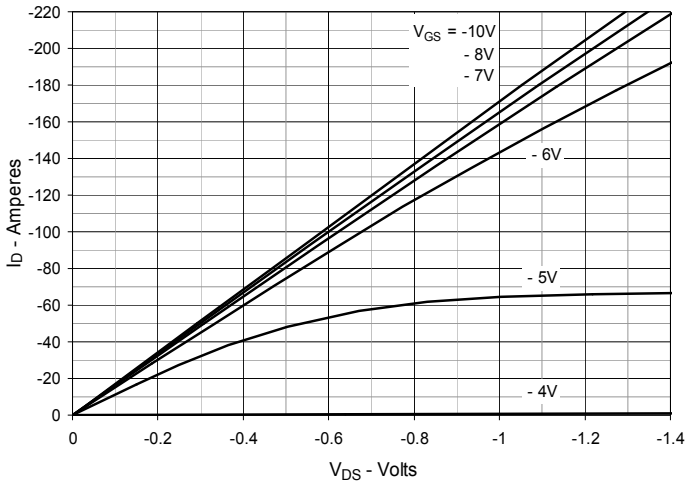


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

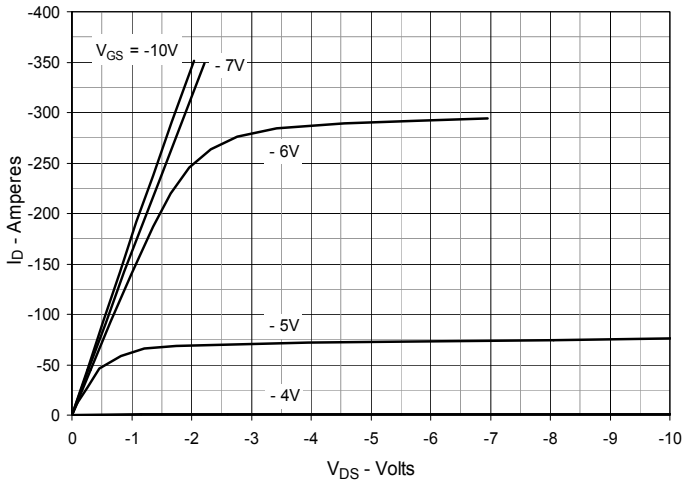


Fig. 3. Output Characteristics @ T_J = 125ºC

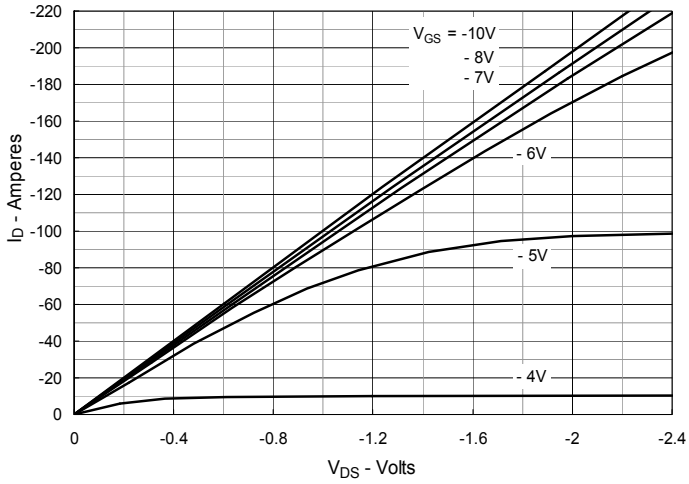


Fig. 4. $R_{DS(on)}$ Normalized to I_D = -105A Value vs. Junction Temperature

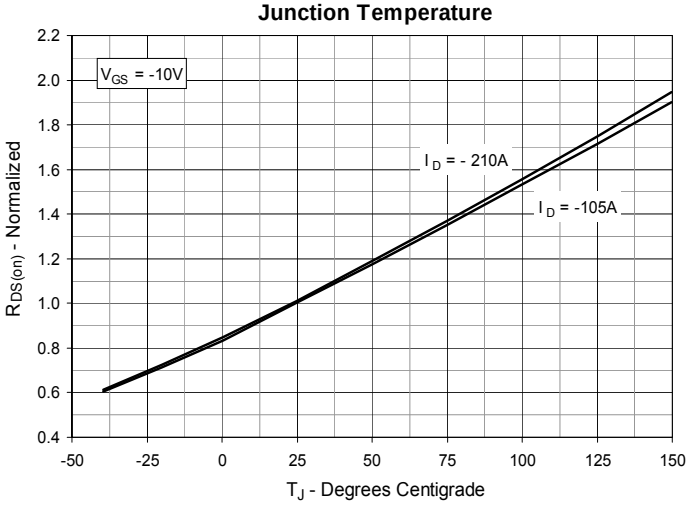


Fig. 5. $R_{DS(on)}$ Normalized to I_D = -105A Value vs. Drain Current

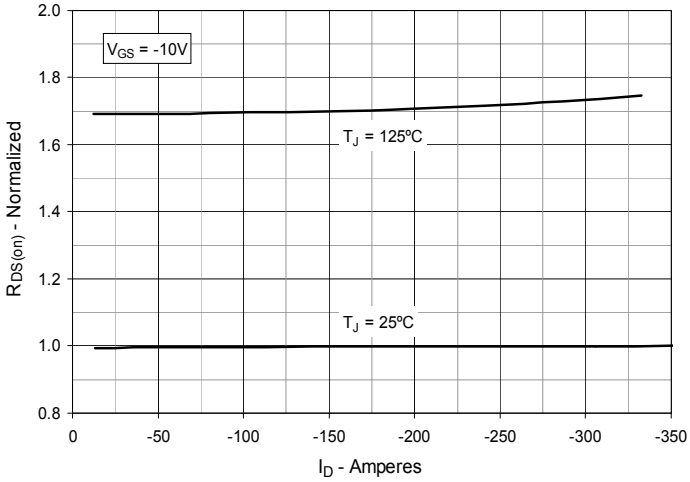
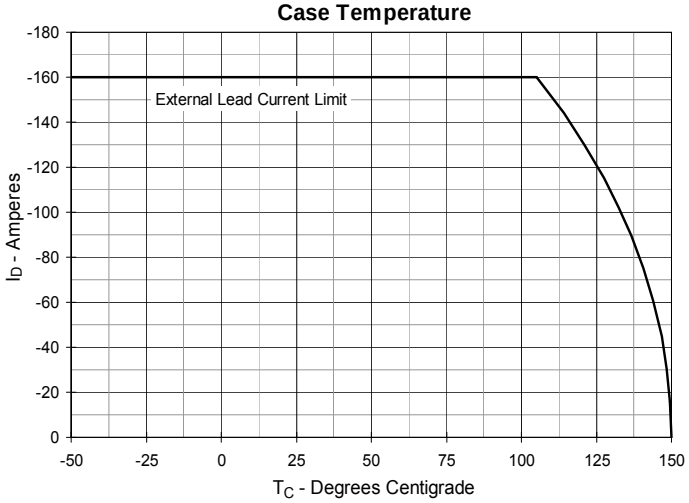


Fig. 6. Maximum Drain Current vs. Case Temperature



© 2013 IXYS CORPORATION, All Rights Reserved

Fig. 7. Input Admittance

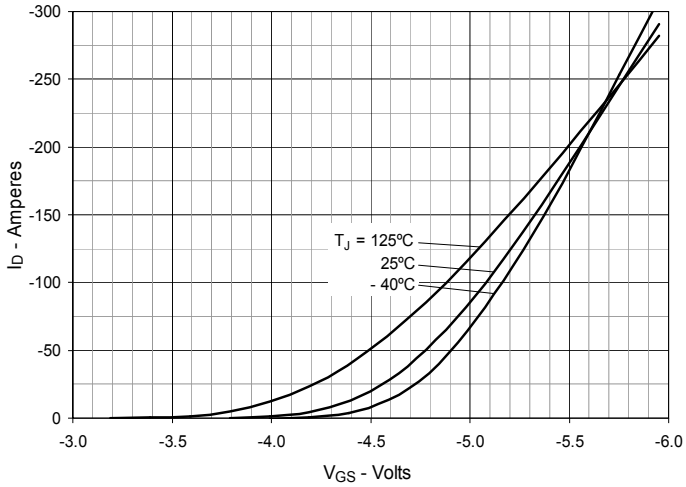


Fig. 8. Transconductance

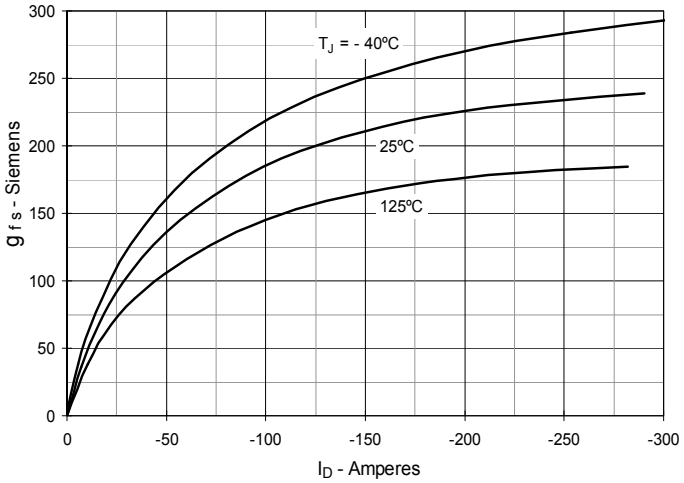


Fig. 9. Forward Voltage Drop of Intrinsic Diode

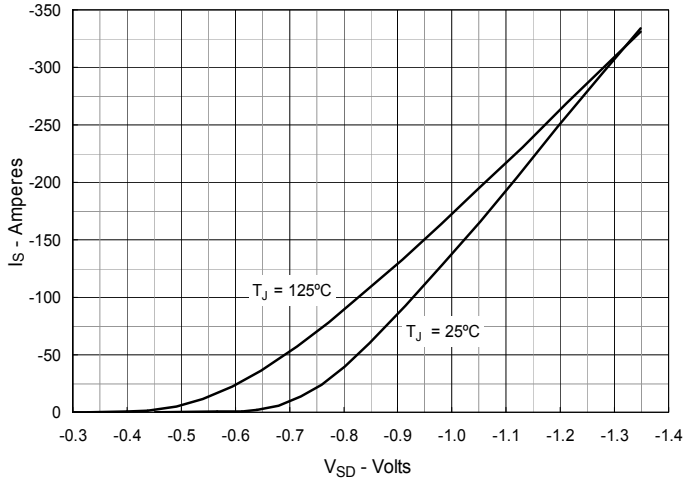


Fig. 10. Gate Charge

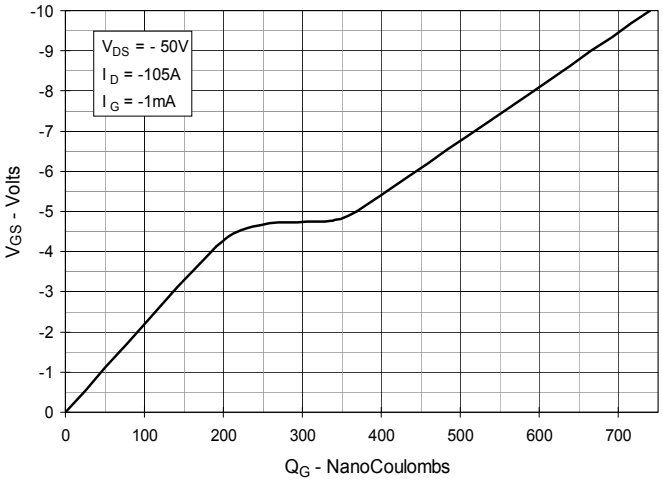


Fig. 11. Capacitance

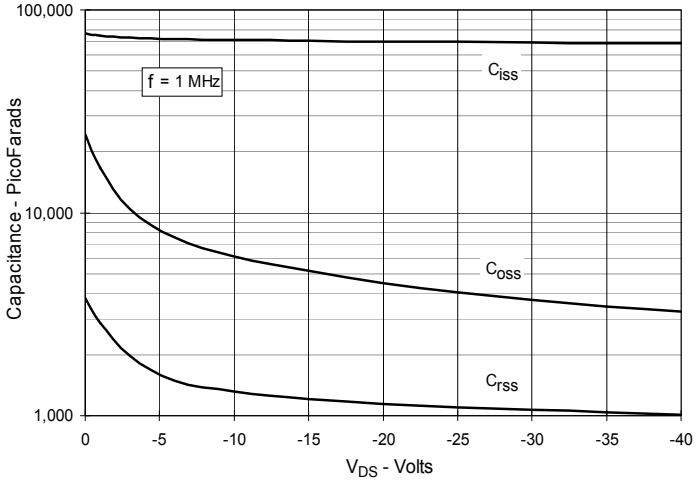
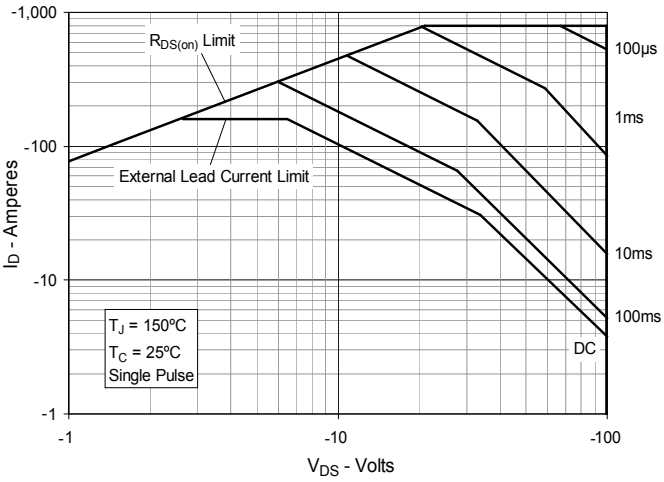


Fig. 12. Forward-Bias Safe Operating Area



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

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

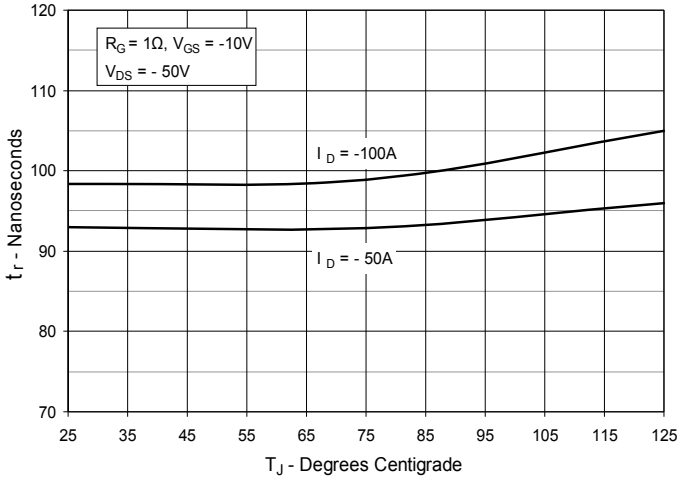


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

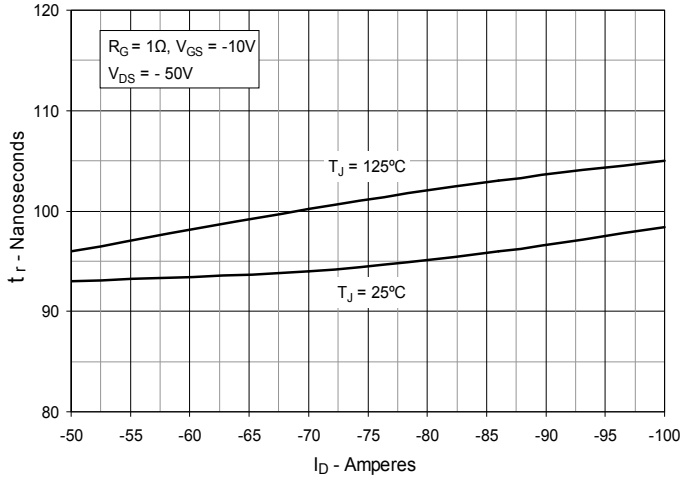


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

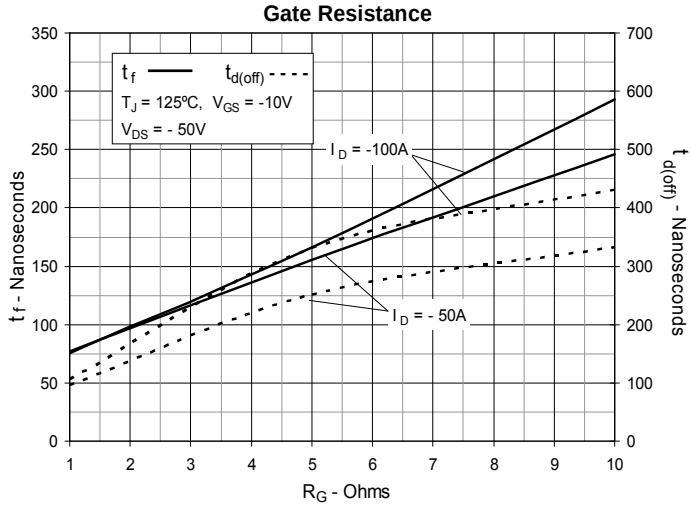


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

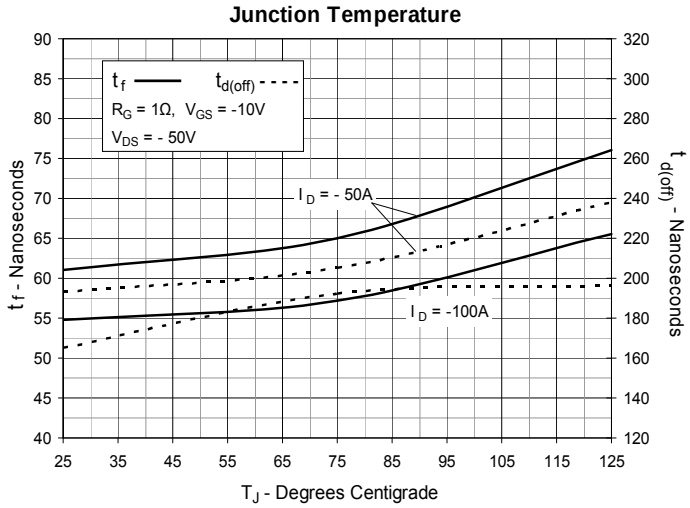


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

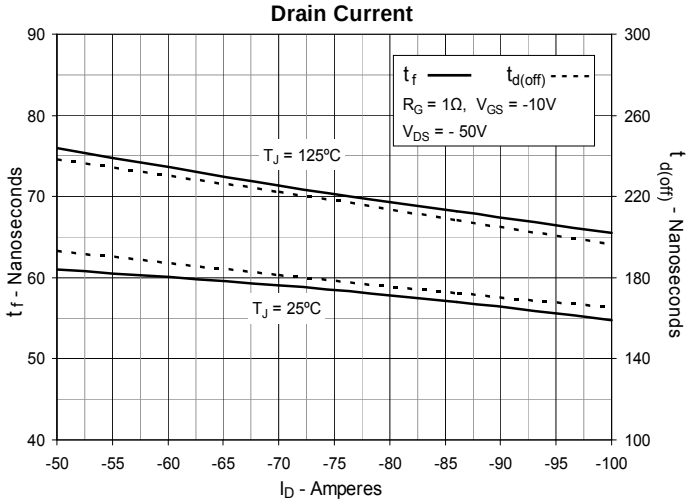
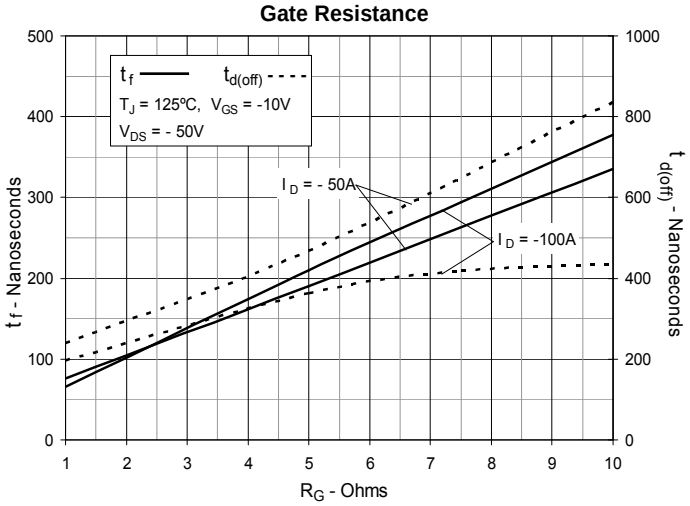
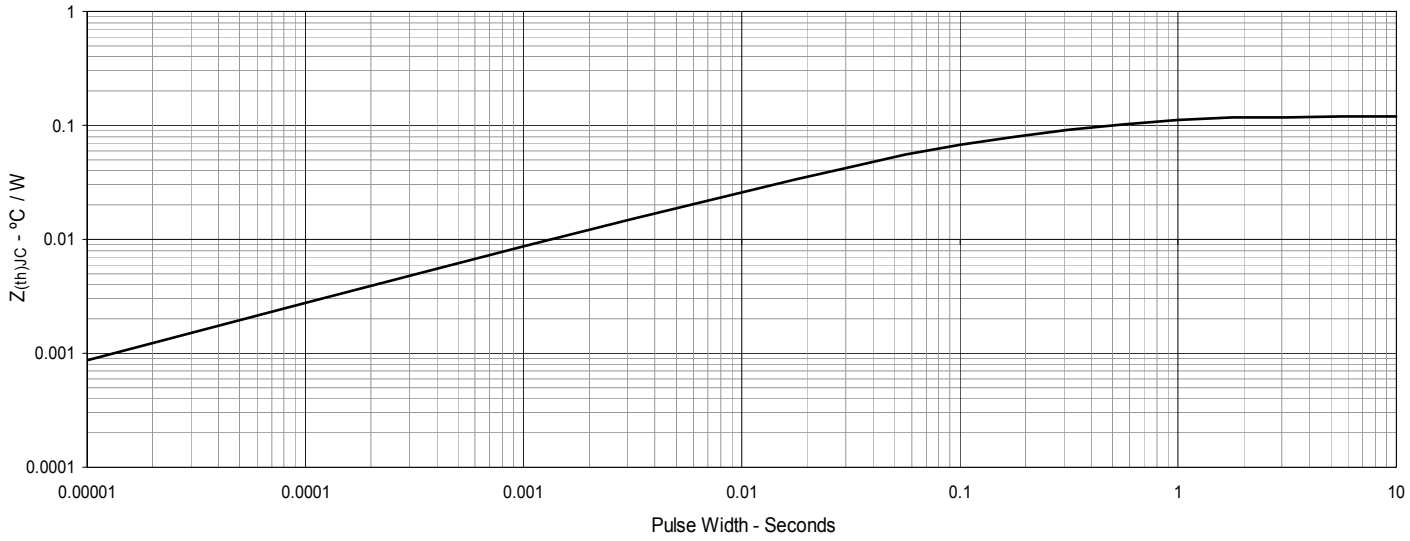


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



© 2013 IXYS CORPORATION, All Rights Reserved

Fig. 19. Maximum Transient Thermal Impedance



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

IXYS
A Littelfuse Technology

Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.