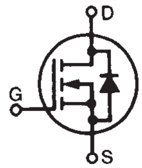
IXYS

TrenchT2™ Power MOSFET

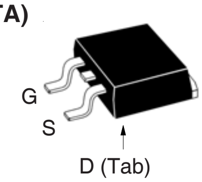
IXTA120N04T2
IXTP120N04T2

V_{DSS} = 40V
I_{D25} = 120A
$R_{DS(on)}$ ≤ 6.1mΩ

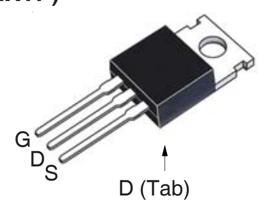
N-Channel Enhancement Mode
Avalanche Rated



TO-263 (IXTA)



TO-220 (IXTP)



G = Gate D = Drain
S = Source Tab = 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	120	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	360	A
I_A	T_C = 25°C	50	A
E_{AS}	T_C = 25°C	400	mJ
P_D	T_C = 25°C	200	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
F_C	Mounting Force (TO-263)	10..65 / 2.2..14.6	N/lb
M_d	Mounting Torque (TO-220)	1.13 / 10	Nm/lb.in
Weight	TO-263	2.5	g
	TO-220	3.0	g

Symbol	Test Conditions	Characteristic Values			
(T_J = 25°C Unless Otherwise Specified)		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			±100	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			2	μA
	T_J = 150°C			50	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A, Notes 1 & 2			6.1	mΩ

Features

- International Standard Packages
- Avalanche Rated
- Low Package Inductance
- Fast Intrinsic Rectifier
  175°C Operating Temperature
- High Current Handling Capability
- ROHS Compliant
- High Performance Trench
  Technology for extremely low $R_{DS(on)}$

Advantages

- High Power Density
- Easy to Mount
- Space Savings

Applications

- Automotive Engine Control
- Synchronous Buck Converter
  (for Notebook SystemPower &
  General Purpose Point & Load)
- DC/DC Converters
- High Current Switching Applications
- Power Train Management
- Distributed Power Architecture

© 2018 IXYS CORPORATION, All Rights Reserved

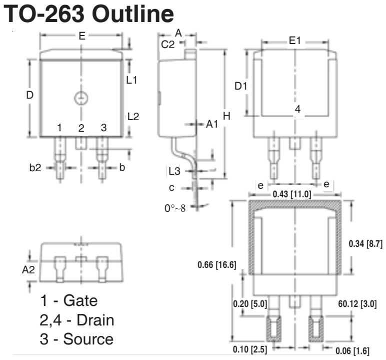
Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	28	47	S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		3240	pF
C_{oss}			557	pF
C_{rss}			140	pF
$t_{d(on)}$	**Resistive Switching Times** V_{GS} = 10V, V_{DS} = 20V, I_D = 60A R_G = 5Ω (External)		14	ns
t_r			8	ns
$t_{d(off)}$			16	ns
t_f			11	ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{DSS}		58	nC
Q_{gs}			17	nC
Q_{gd}			10	nC
R_{thJC}				0.75 °C/W
R_{thCS}	TO-220		0.50	°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			120 A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			480 A
V_{SD}	I_F = 60A, V_{GS} = 0V, Note 1			1.2 V
t_{rr}	I_F = 60A, V_{GS} = 0V, -di/dt = 100A/µs, V_R = 20V		35	ns
I_{RM}			1.6	A
Q_{RM}			28	nC

Notes: 1. Pulse test, $t \leq 300\mu s$; duty cycle, $d \leq 2\%$.
2. On through-hole packages, $R_{DS(on)}$ Kelvin test contact location must be 5mm or less from the package body.

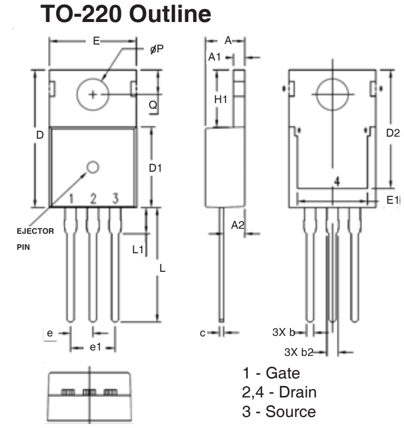
TO-263 Outline



1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES MIN	INCHES MAX	MILLIMETER MIN	MILLIMETER MAX
A	.170	.185	4.30	4.70
A1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
b	.028	.035	0.70	0.90
b2	.046	.060	1.18	1.52
C	.018	.024	0.45	0.60
C2	.049	.060	1.25	1.52
D	.340	.370	8.63	9.40
D1	.300	.327	7.62	8.30
E	.380	.410	9.65	10.41
E1	.270	.330	6.86	8.38
e	.100	BSC	2.54	BSC
H	.580	.620	14.73	15.75
L	.075	.105	1.91	2.67
L1	.039	.060	1.00	1.52
L2	—	.070	—	1.77
L3	.010	BSC	0.254	BSC

TO-220 Outline



1 - Gate
2,4 - Drain
3 - Source

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
b	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
c	.014	.026	0.35	0.65
D	.587	.626	14.90	15.90
D1	.335	.370	8.50	9.40
(D2)	.500	.531	12.70	13.50
E	.382	.406	9.70	10.30
(E1)	.283	.323	7.20	8.20
e	.100 BSC		2.54 BSC	
e1	.200 BSC		5.08 BSC	
H1	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
ØP	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20

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

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

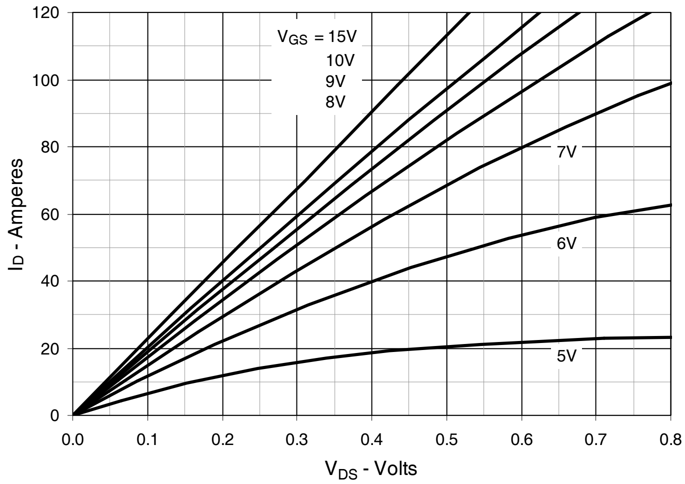


Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

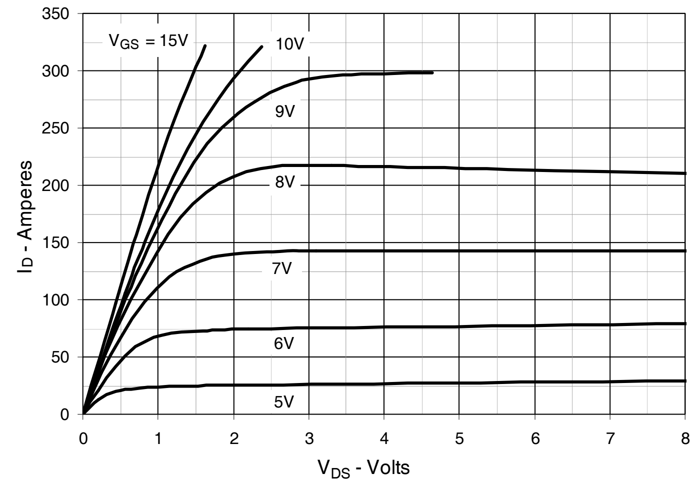


Fig. 3. Output Characteristics @ $T_J = 150^oC$

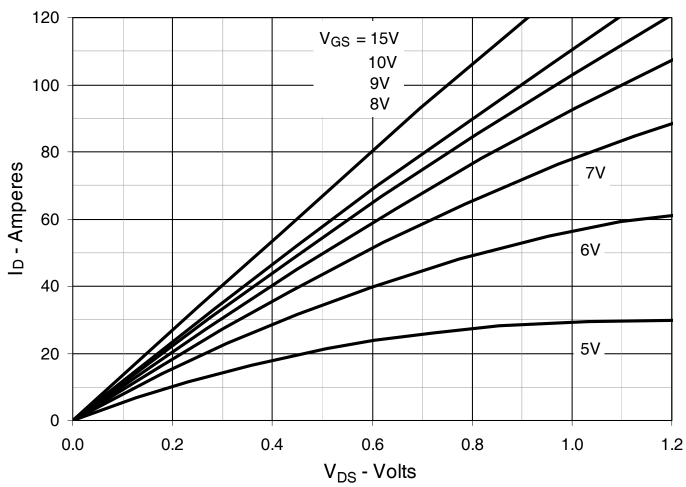


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 60A Value vs. Junction Temperature

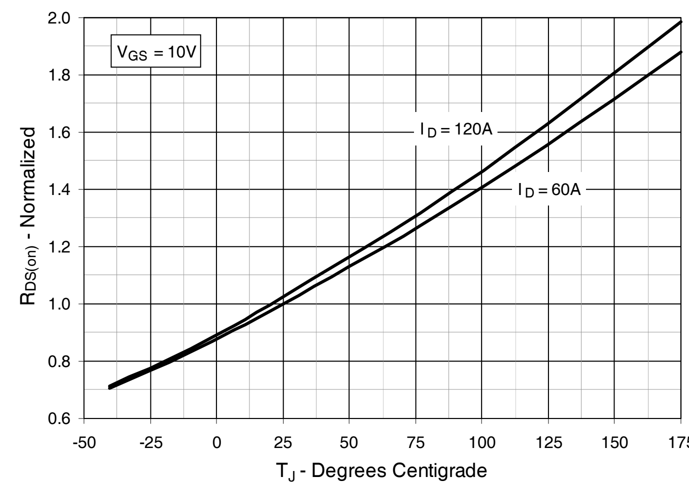


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 60A Value vs. Drain Current

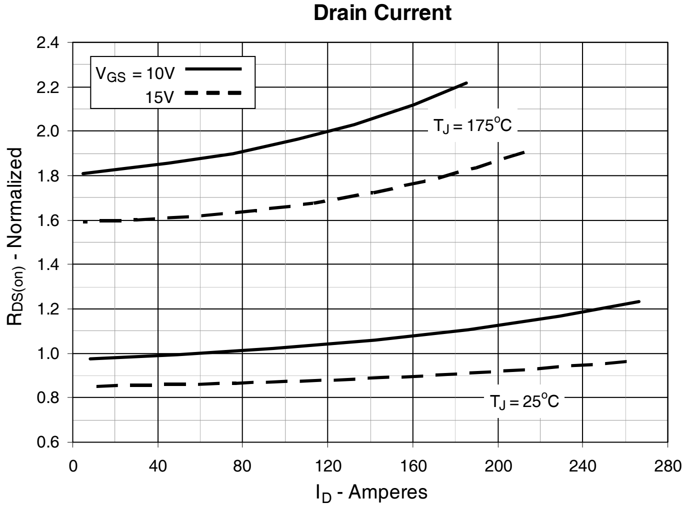
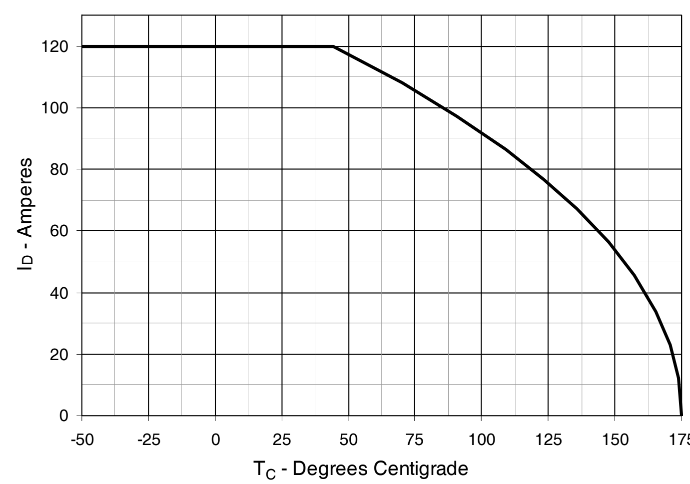


Fig. 6. Drain Current vs. Case Temperature



© 2018 IXYS CORPORATION, All Rights Reserved

Fig. 7. Input Admittance

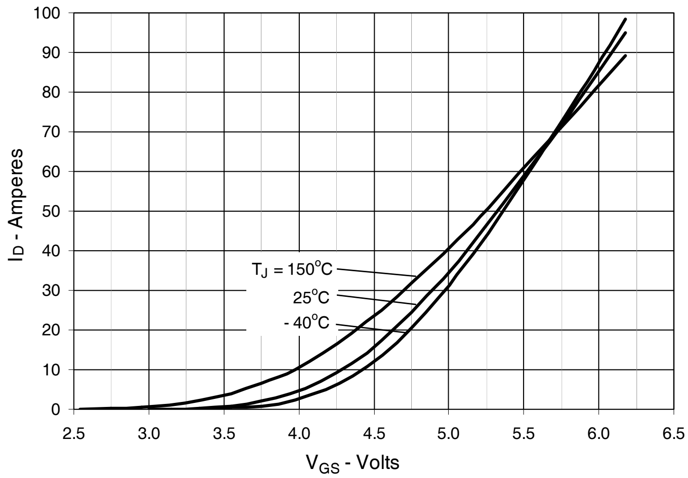


Fig. 8. Transconductance

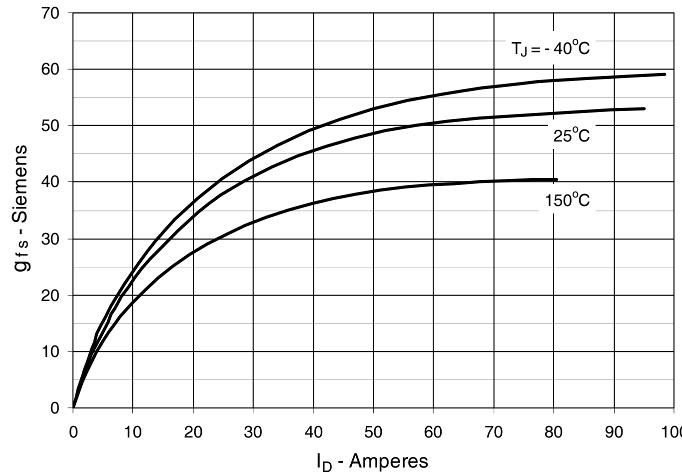


Fig. 9. Forward Voltage Drop of Intrinsic Diode

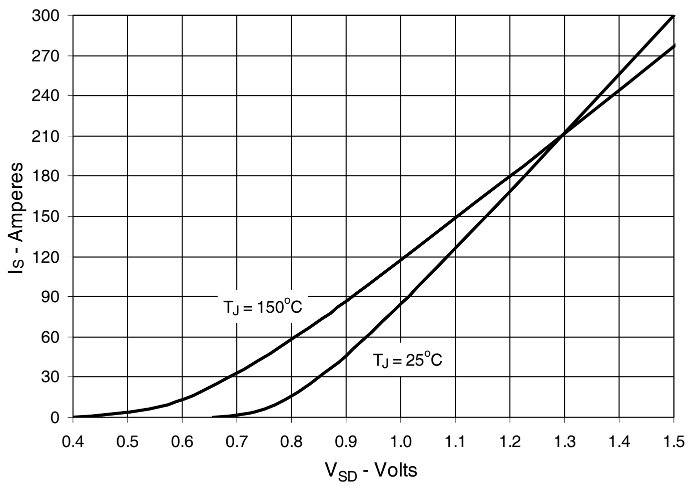


Fig. 10. Gate Charge

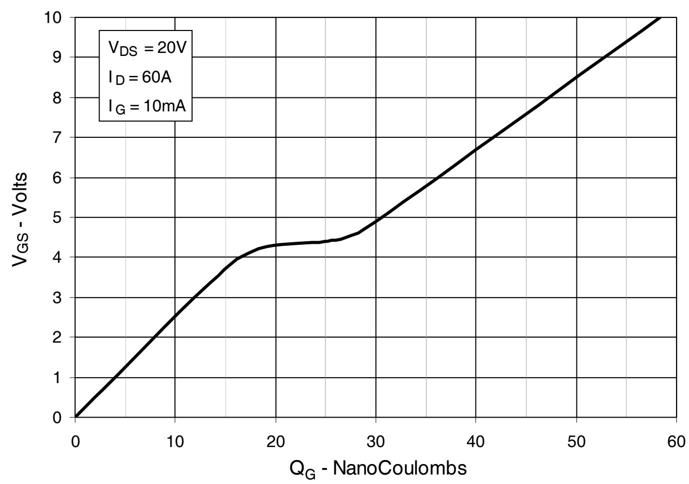


Fig. 11. Capacitance

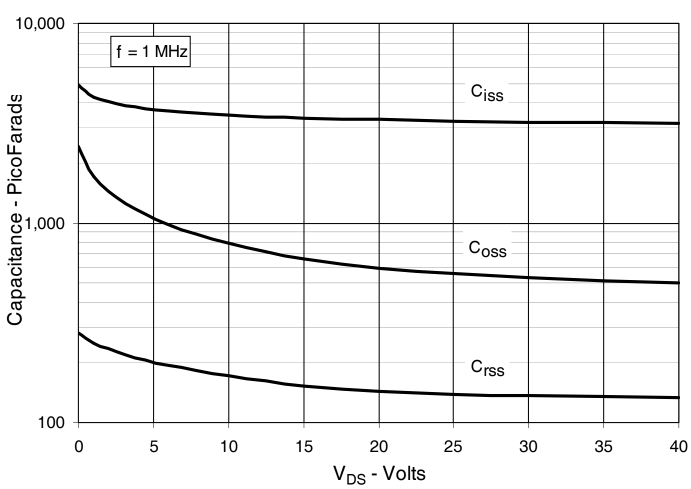


Fig. 12. Forward-Bias Safe Operating Area

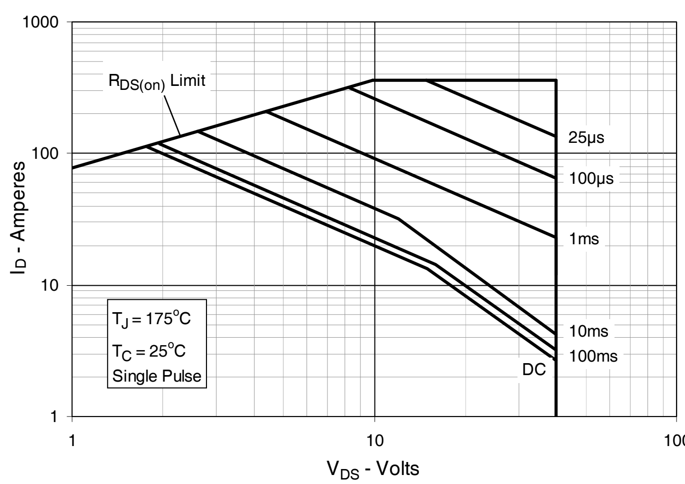


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

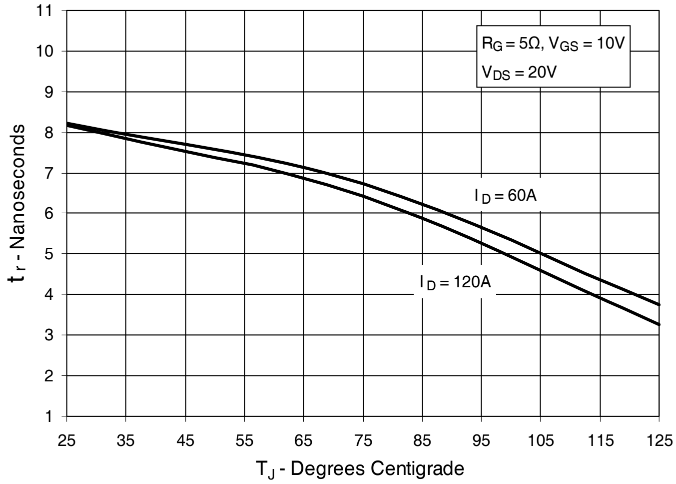


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

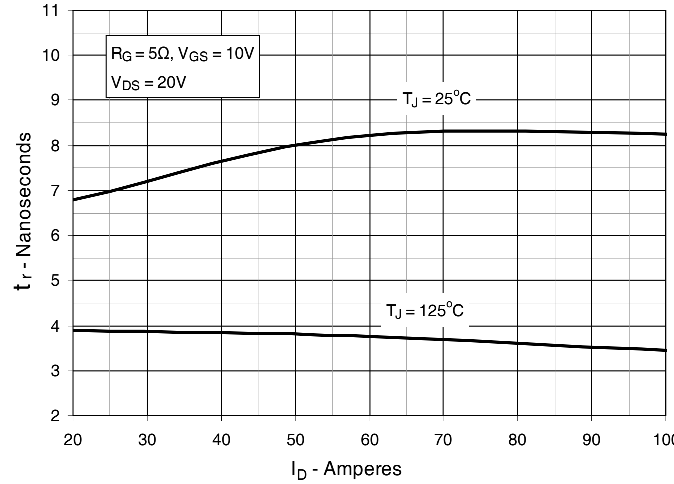


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

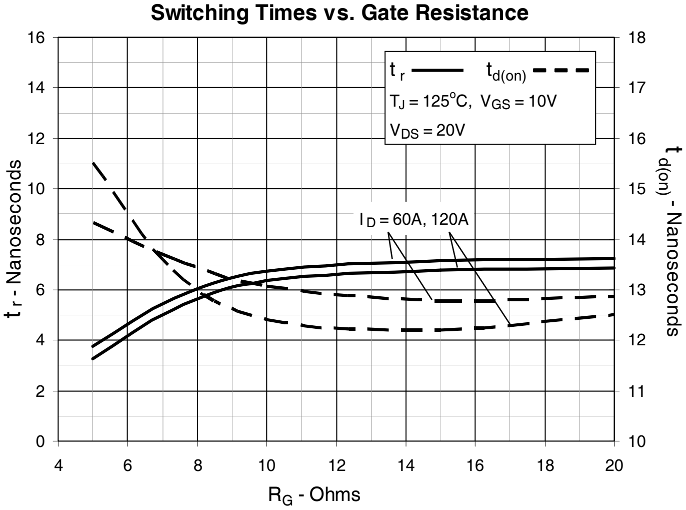


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

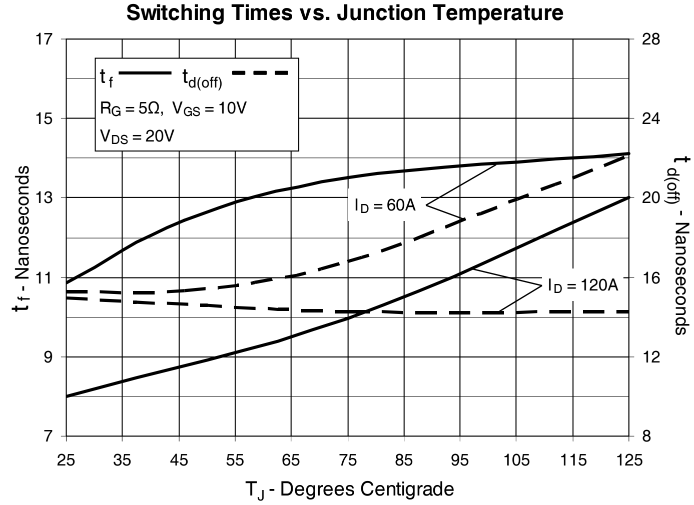


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

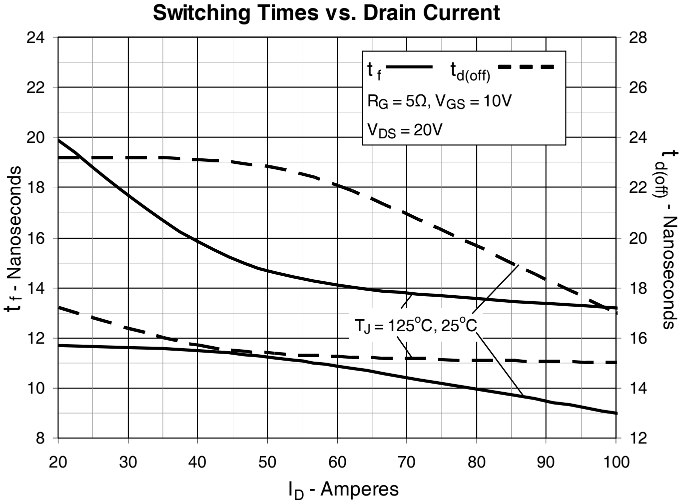
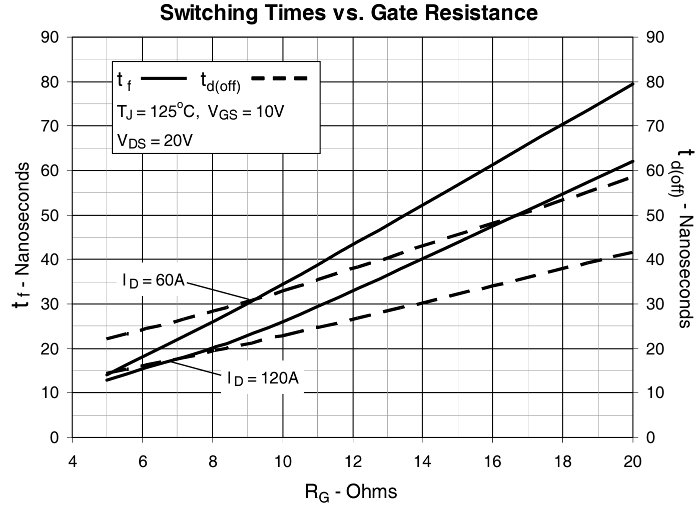
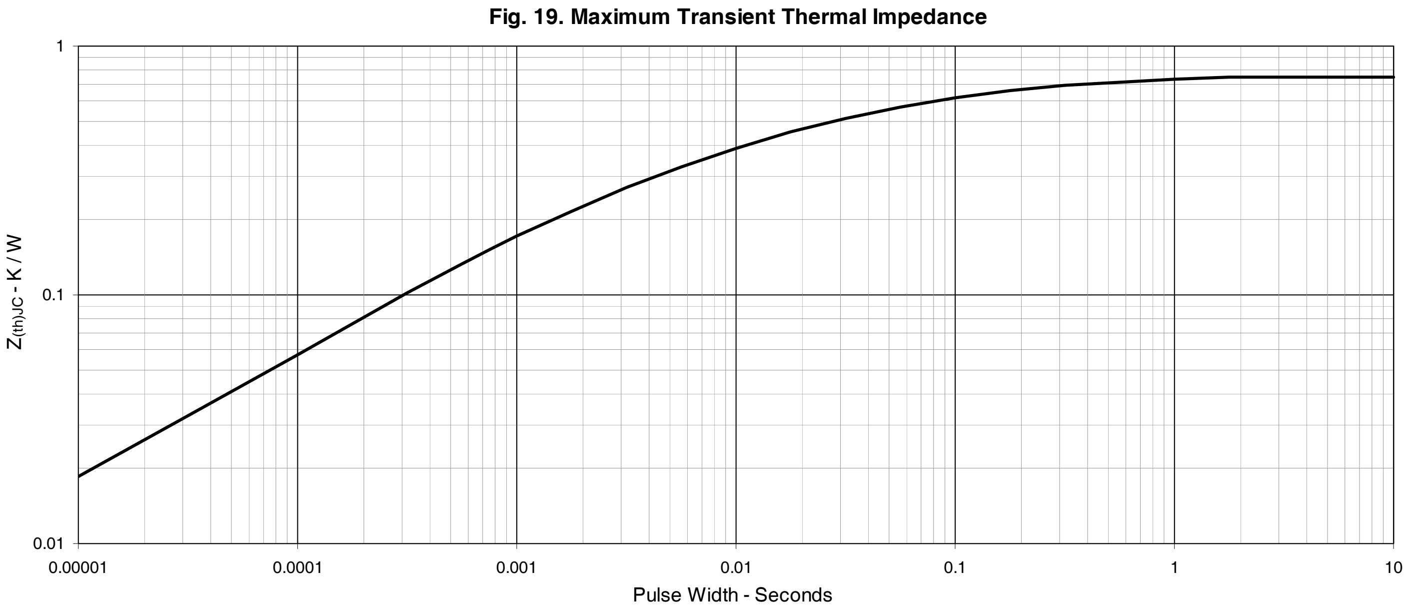


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



© 2018 IXYS CORPORATION, All Rights Reserved



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

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.