IXYS

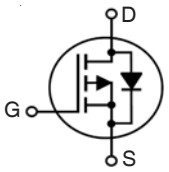
Preliminary Technical Information

TrenchP™ Power MOSFETs

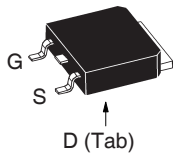
IXTY15P15T
IXTA15P15T
IXTP15P15T

V_{DSS} = -150V
I_{D25} = -15A
$R_{DS(on)}$ ≤ 240mΩ

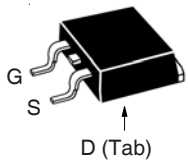
P-Channel Enhancement Mode
Avalanche Rated



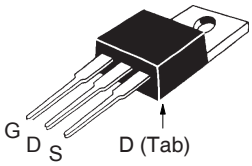
TO-252 (IXTY)



TO-263 AA (IXTA)



TO-220AB (IXTP)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 150°C	-150	V
V_{DGR}	T_J = 25°C to 150°C, R_{GS} = 1MΩ	-150	V
V_{GSS}	Continuous	± 15	V
V_{GSM}	Transient	± 25	V
I_{D25}	T_C = 25°C	-15	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	- 45	A
I_A	T_C = 25°C	-15	A
E_{AS}	T_C = 25°C	300	mJ
P_D	T_C = 25°C	150	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-220)	1.13 / 10	Nm/lb.in.
Weight	TO-252	0.35	g
	TO-263	2.50	g
	TO-220	3.00	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = - 250μA	-150			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = - 250μA	- 2.0		- 4.5	V
I_{GSS}	V_{GS} = ± 15V, V_{DS} = 0V			±50	nA
I_{DSS}	V_{DS} = V_{DSS}, V_{GS} = 0V			- 10	μA
	T_J = 125°C			- 250	μA
$R_{DS(on)}$	V_{GS} = -10V, I_D = 0.5 • I_{D25}, Note 1			240	mΩ

Features

- International Standard Packages
- Avalanche Rated
- Extended FBSOA
- Fast Intrinsic Diode
- 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

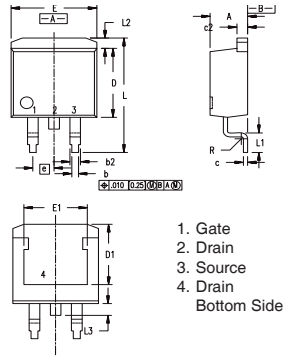
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	V_{DS} = -10V, I_D = 0.5 • I_{D25}, Note 1	9	15	S
C_{iss}	V_{GS} = 0V, V_{DS} = - 25V, f = 1MHz		3650	pF
C_{oss}			210	pF
C_{rss}			55	pF
$t_{d(on)}$	**Resistive Switching Times**		21	ns
t_r	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		14	ns
$t_{d(off)}$	R_G = 3Ω (External)		36	ns
t_f			11	ns
$Q_{g(on)}$	V_{GS} = -10V, V_{DS} = 0.5 • V_{DSS}, I_D = 0.5 • I_{D25}		48	nC
Q_{gs}			17	nC
Q_{gd}			12	nC
R_{thJC}				0.83 °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			-15 A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			- 60 A
V_{SD}	I_F = I_S, V_{GS} = 0V, Note 1			-1.3 V
t_{rr}	I_F = 0.5 • I_{D25}, -di/dt = -100A/μs		116	ns
Q_{RM}	V_R = - 100V, V_{GS} = 0V		638	nC
I_{RM}			- 11	A

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

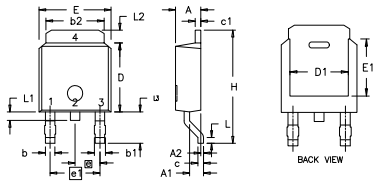
TO-263 Outline



1. Gate
2. Drain
3. Source
4. Drain
Bottom Side

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.06	4.83	.160	.190
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.40	0.74	.016	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	8.00	8.89	.280	.320
E	9.65	10.41	.380	.405
E1	6.22	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070
L4	0	0.13	0	.005

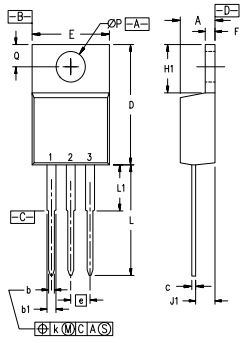
TO-252 Outline



Pins: 1 - Gate 2,4 - Drain
3 - Source

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	2.19	2.38	0.086	0.094
A1	0.89	1.14	0.035	0.045
A2	0	0.13	0	0.005
b	0.64	0.89	0.025	0.035
b1	0.76	1.14	0.030	0.045
b2	5.21	5.46	0.205	0.215
c	0.46	0.58	0.018	0.023
c1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D1	4.32	5.21	0.170	0.205
E	6.35	6.73	0.250	0.265
E1	4.32	5.21	0.170	0.205
e	2.28 BSC		0.090 BSC	
e1	4.57 BSC		0.180 BSC	
H	9.40	10.42	0.370	0.410
L	0.51	1.02	0.020	0.040
L1	0.64	1.02	0.025	0.040
L2	0.89	1.27	0.035	0.050
L3	2.54	2.92	0.100	0.115

TO-220 Outline



Pins: 1 - Gate 2 - Drain
3 - Source

SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

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.

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Fig. 1. Output Characteristics @ T_J = 25ºC

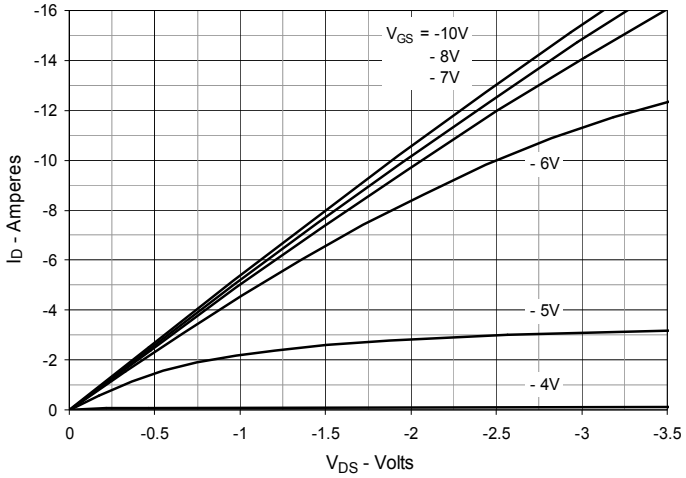

Fig. 2. Extended Output Characteristics @ T_J = 25ºC

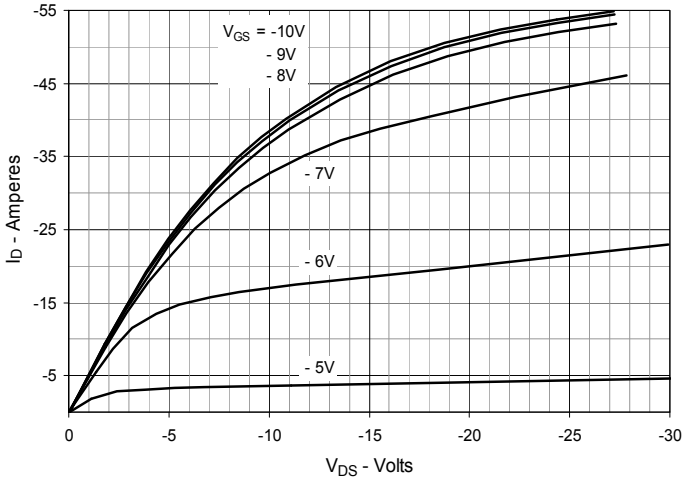

Fig. 3. Output Characteristics @ T_J = 125ºC

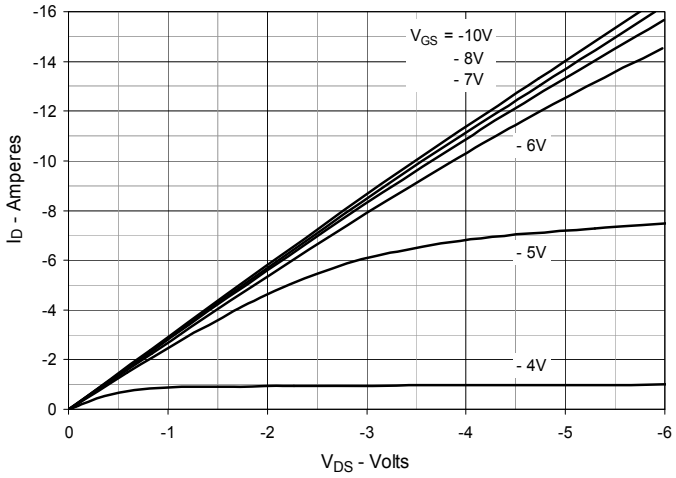

Fig. 4. $R_{DS(on)}$ Normalized to I_D = -7.5A Value vs. Junction Temperature

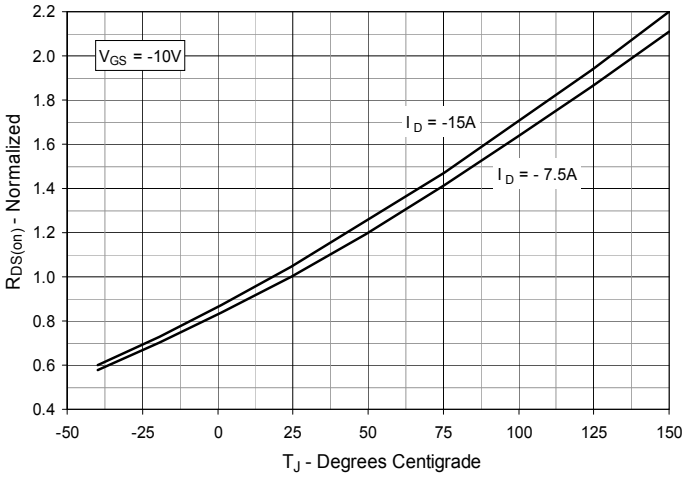

Fig. 5. $R_{DS(on)}$ Normalized to I_D = -7.5A Value vs. Drain Current

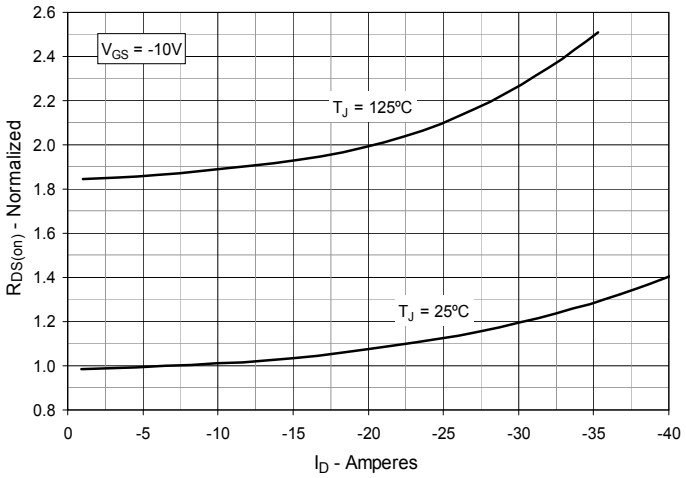

Fig. 6. Maximum Drain Current vs. Case Temperature

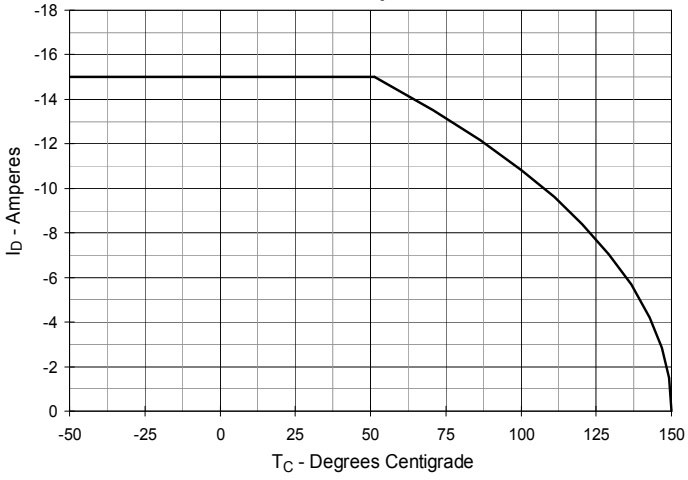

Fig. 7. Input Admittance

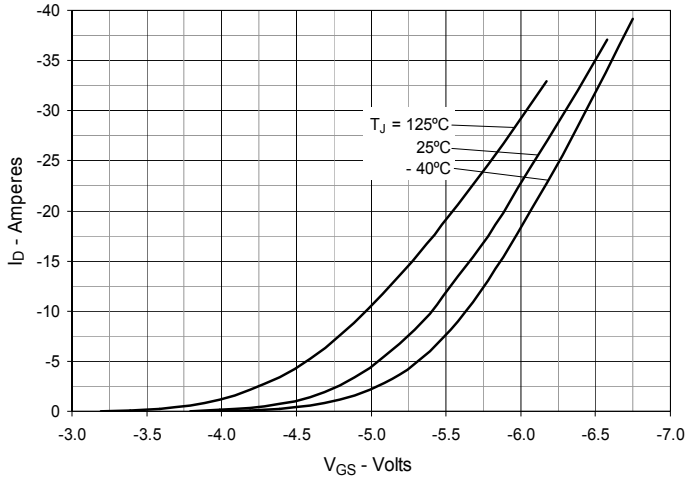

Fig. 8. Transconductance

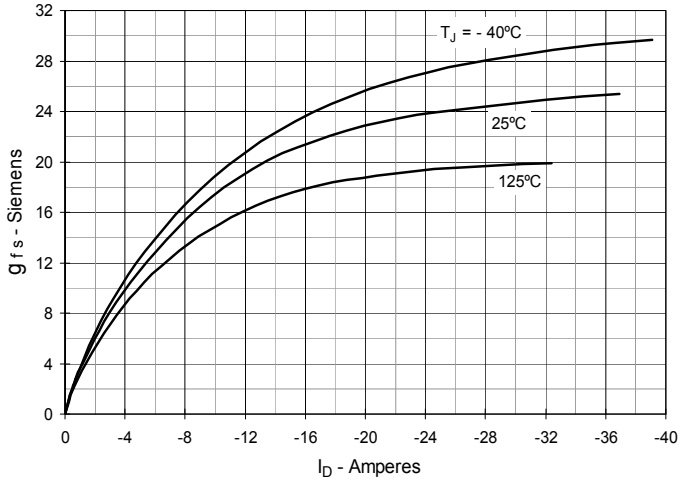

Fig. 9. Forward Voltage Drop of Intrinsic Diode

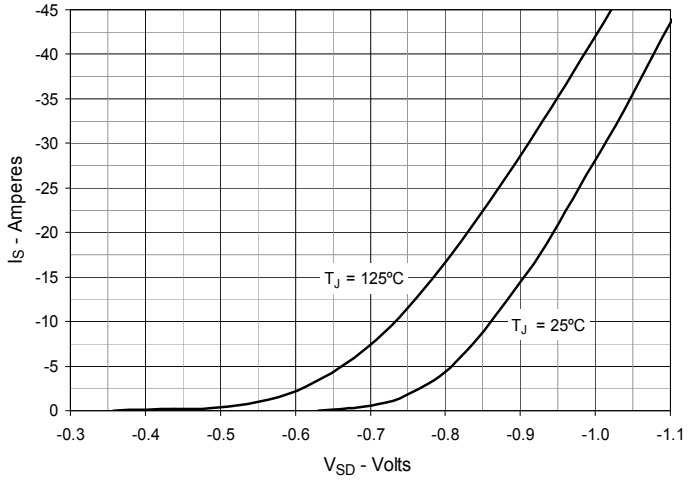

Fig. 10. Gate Charge

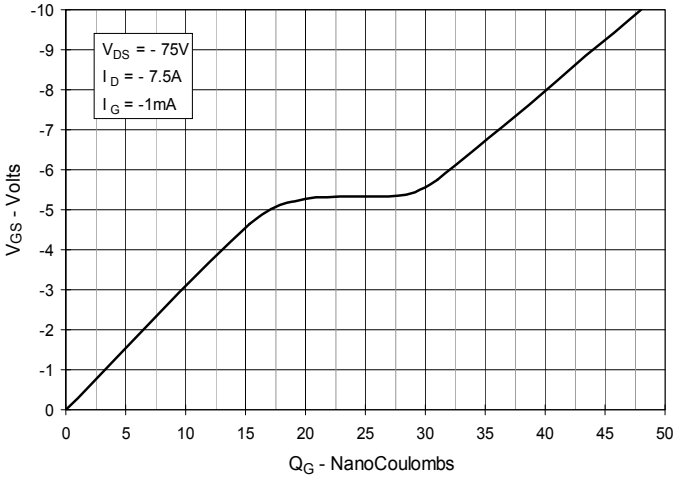

Fig. 11. Capacitance

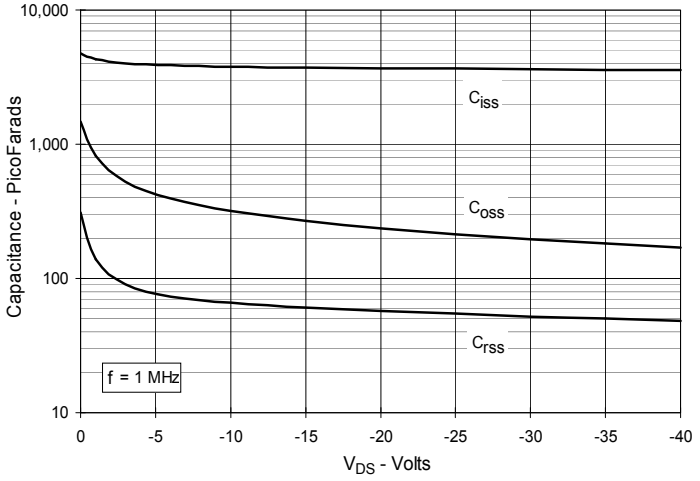

Fig. 12. Forward-Bias Safe Operating Area

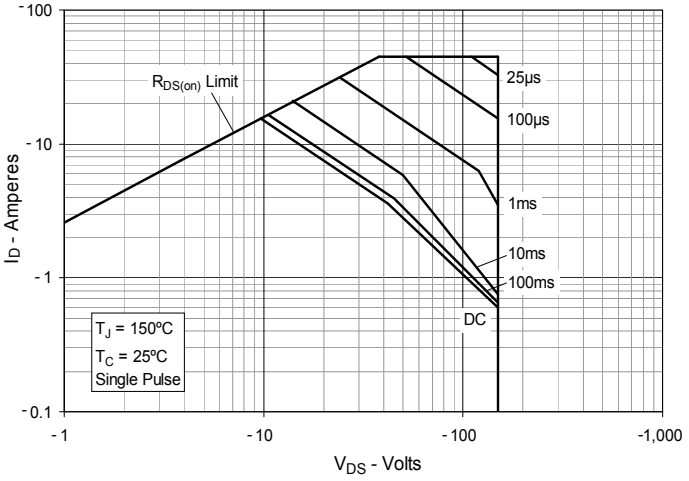

Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

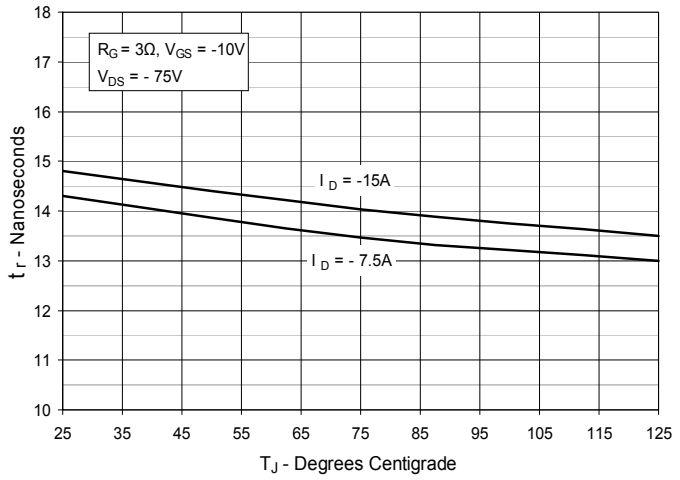

Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

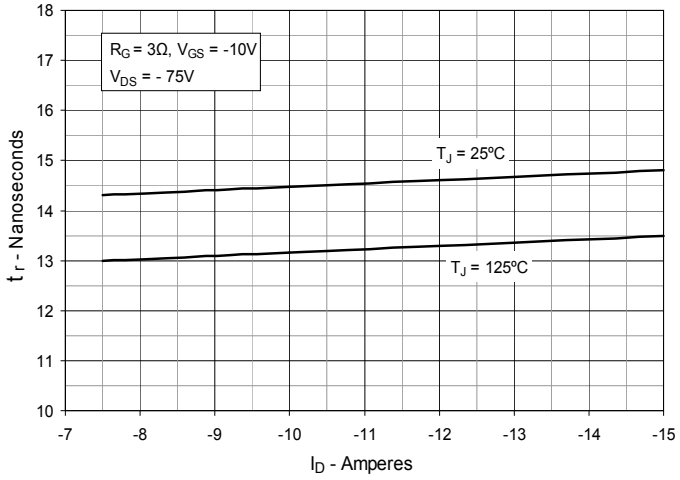

Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

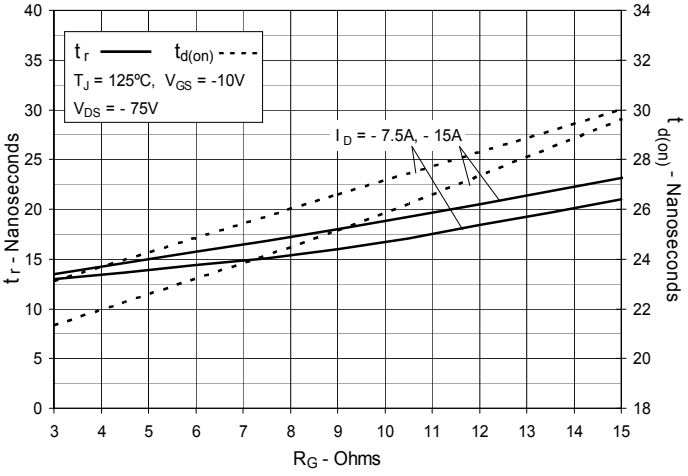

Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

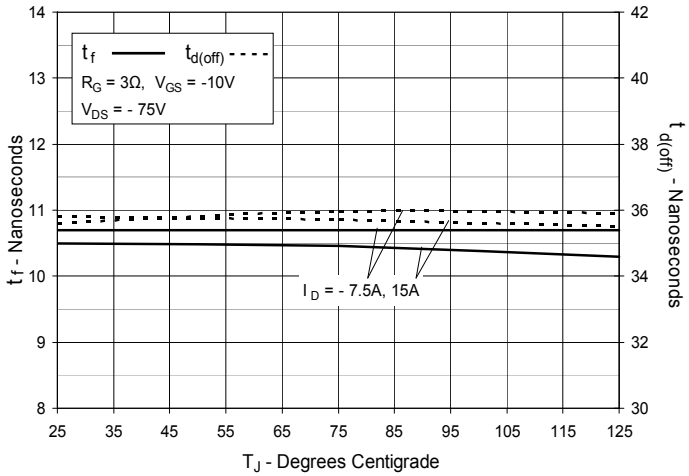

Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

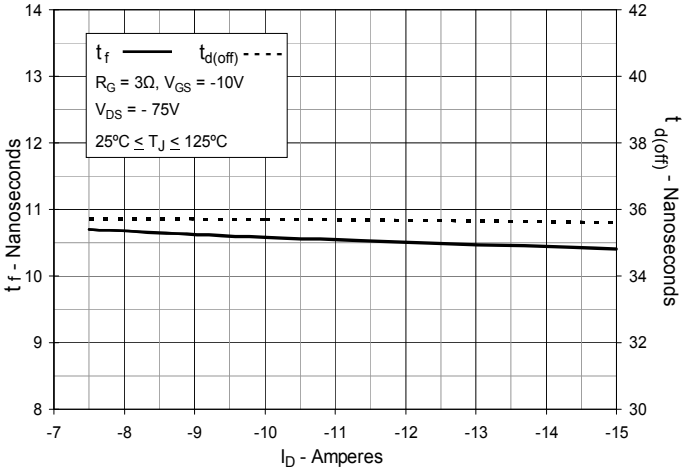

Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

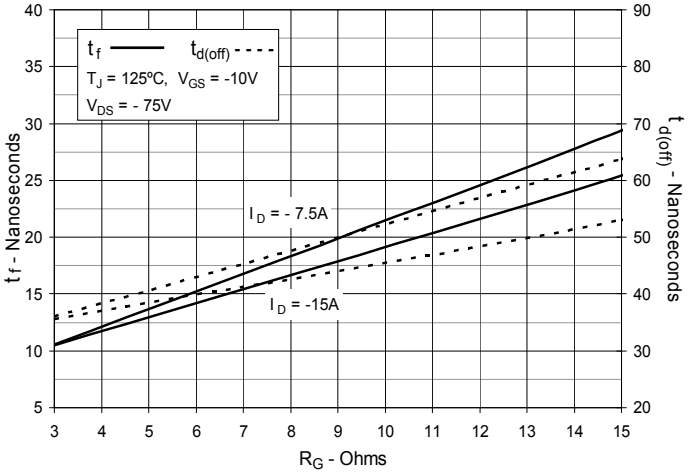

Fig. 19. Maximum Transient Thermal Impedance