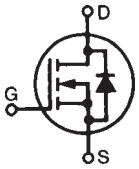
IXYS

TrenchT2™ Power MOSFETs

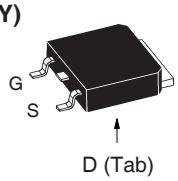
N-Channel Enhancement Mode
Avalanche Rated

IXTY90N055T2
IXTA90N055T2
IXTP90N055T2

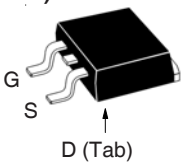
V_{DSS} = 55V
I_{D25} = 90A
$R_{DS(on)}$ ≤ 8.4mΩ



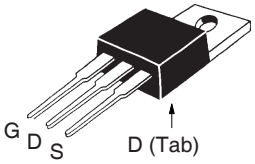
TO-252 (IXTY)



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 175°C	55	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	55	V
V_{GSM}	Transient	± 20	V
I_{D25}	T_C = 25°C	90	A
I_{LRMS}	Lead Current Limit, RMS	75	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	230	A
I_A	T_C = 25°C	50	A
E_{AS}	T_C = 25°C	300	mJ
P_D	T_C = 25°C	150	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	1.6mm (0.062in.) from Case for 10s	300	°C
	Plastic Body for 10 seconds	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	55			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250μA	2.0		4.0	V
I_{GSS}	V_{GS} = ± 20V, V_{DS} = 0V			±200	nA
I_{DSS}	$V_{DS} = V_{DSS}$, V_{GS} = 0V			2	μA
	T_J = 150°C			200	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A, Notes 1, 2		7.0	8.4	mΩ

Features

- International Standard Package
- 175°C Operating Temperature
- Avalanche Rated
- High Current Handling Capability
- Fast Intrinsic Rectifier
- Low $R_{DS(on)}$ and Q_G
- RoHS Compliant
- High Performance Trench

Advantages

- High Power Density
- Easy to Mount
- Space Savings
- Synchronous

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

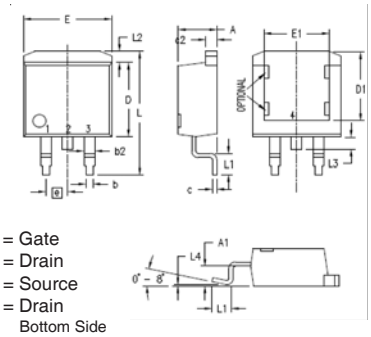
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 0.5 • I_{D25}, Note 1	25	43		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		2770		pF
C_{oss}			420		pF
C_{rss}			102		pF
$t_{d(on)}$	**Resistive Switching Times**		19		ns
t_r	V_{GS} = 10V, V_{DS} = 30V, I_D = 25A		21		ns
$t_{d(off)}$	R_G = 5Ω (External)		39		ns
t_f			19		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 25A		42		nC
Q_{gs}			14		nC
Q_{gd}			8.5		nC
R_{thJC}				1.00	°C/W
R_{thCH}	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			90	A
I_{SM}	Repetitive, Pulse width limited by T_{JM}			360	A
V_{SD}	I_F = 25A, V_{GS} = 0V, Note 1		0.85	1.0	V
t_{rr}	I_F = 45A, V_{GS} = 0V		37		ns
I_{RM}	-di/dt = 100A/μs		2.2		A
Q_{RM}	V_R = 27V		40		nC

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

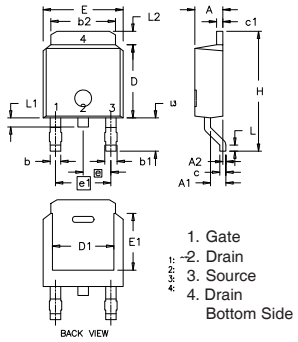
TO-263 Outline



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

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.575	.625	14.61	15.88
L1	.090	.110	2.29	2.79
L2	.040	.055	1.02	1.40
L3	.050	.070	1.27	1.78
L4	0	.005	0	0.13

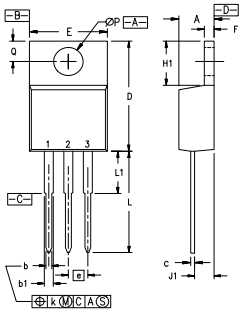
TO-252 AA Outline



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

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches 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	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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

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

Fig. 1. Output Characteristics @ T_J = 25ºC

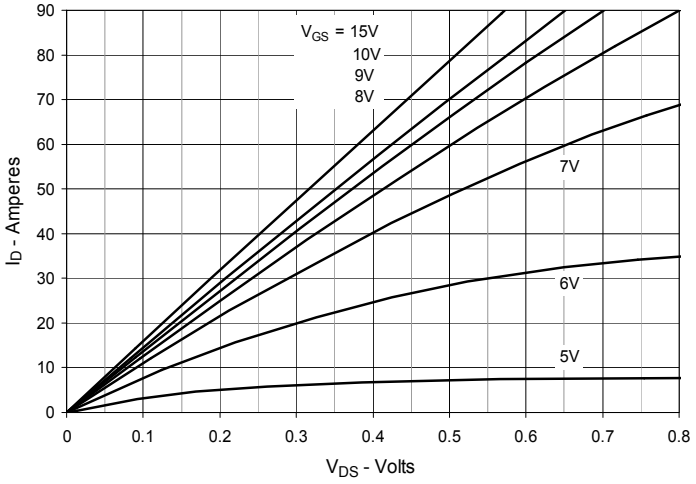


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

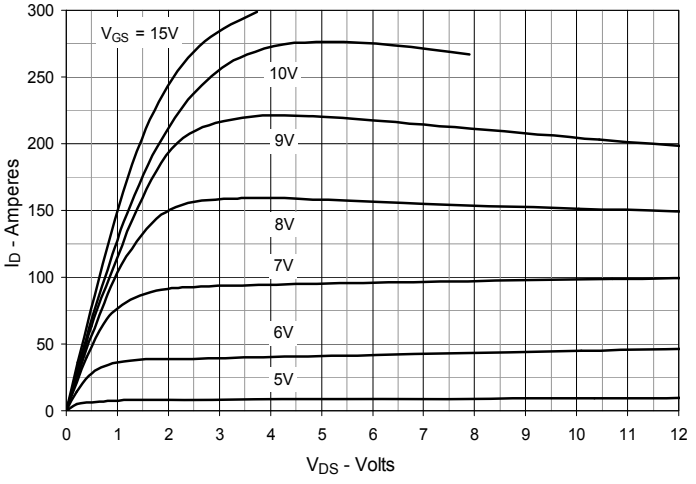


Fig. 3. Output Characteristics @ T_J = 150ºC

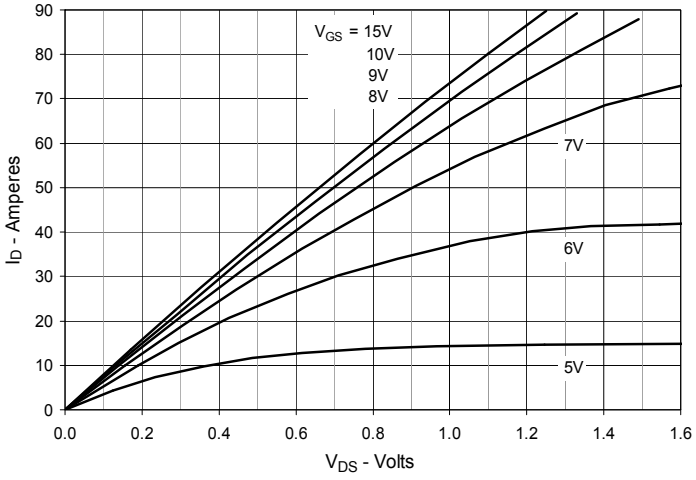


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 45A Value vs. Junction Temperature

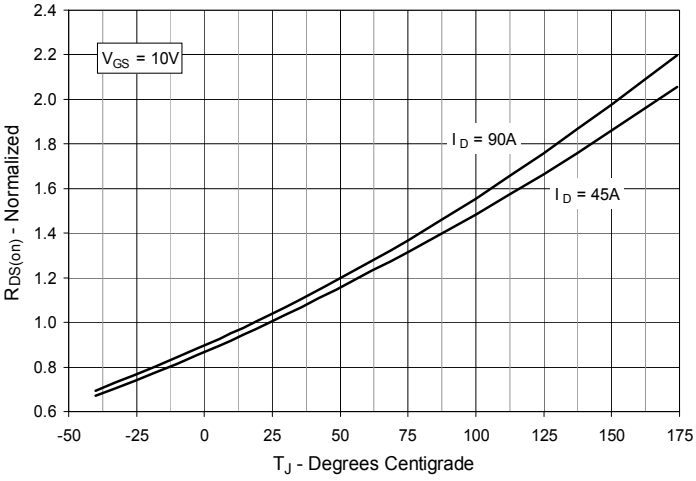


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 45A Value vs. Drain Current

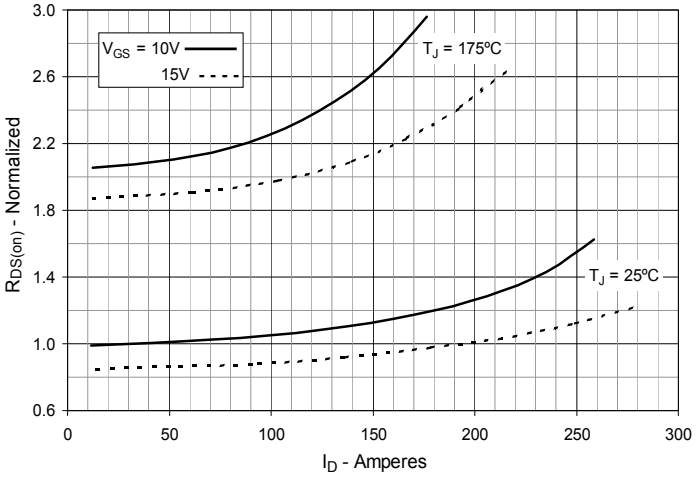


Fig. 6. Drain Current vs. Case Temperature

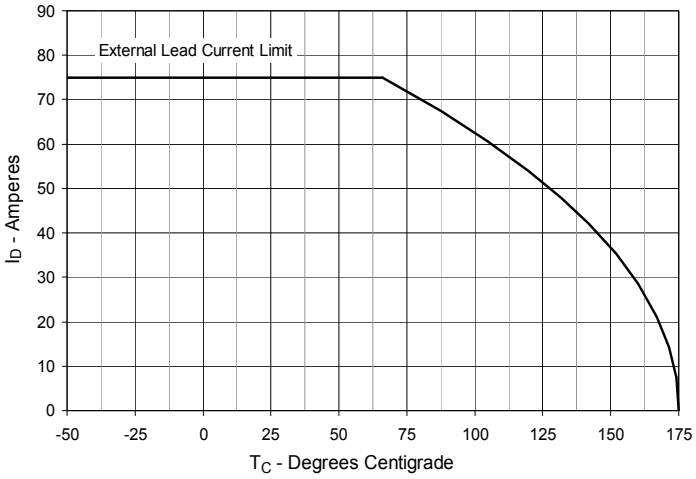


Fig. 7. Input Admittance

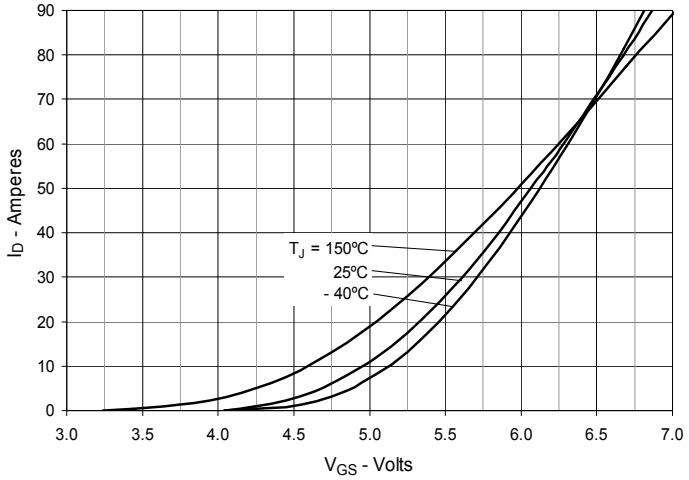


Fig. 8. Transconductance

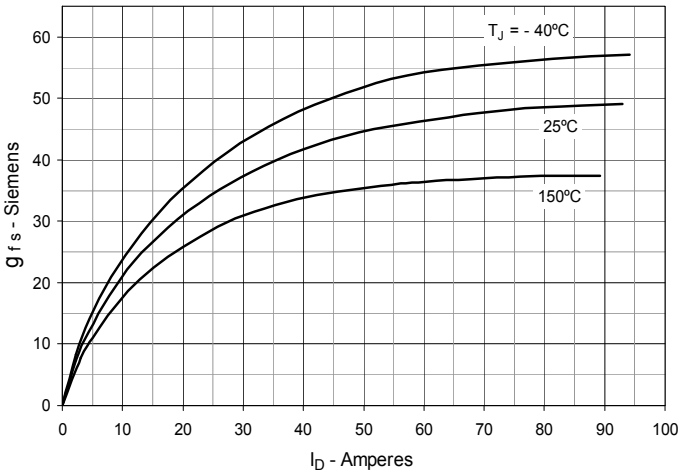


Fig. 9. Forward Voltage Drop of Intrinsic Diode

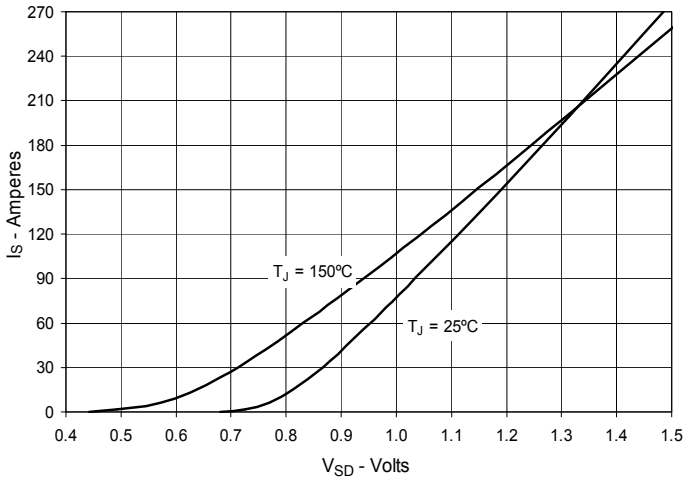


Fig. 10. Gate Charge

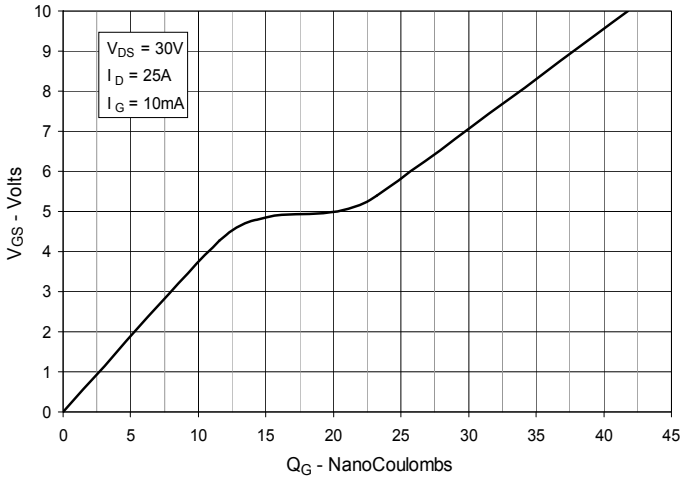


Fig. 11. Capacitance

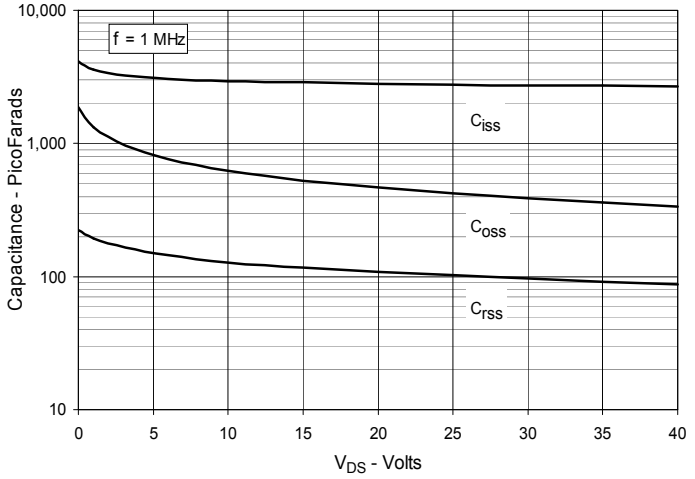


Fig. 12. Forward-Bias Safe Operating Area

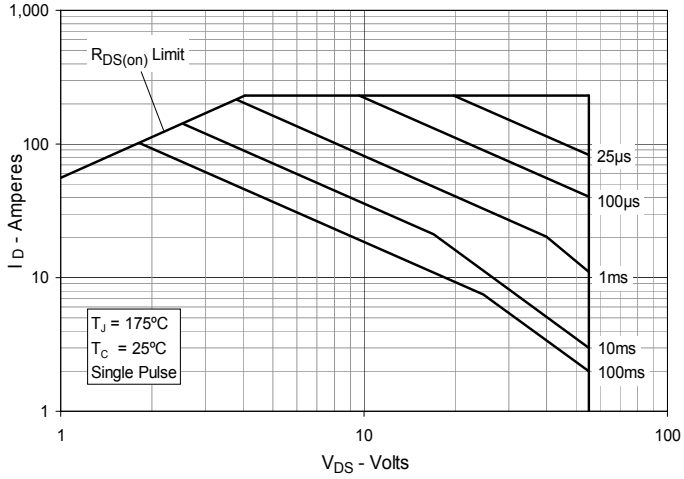


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

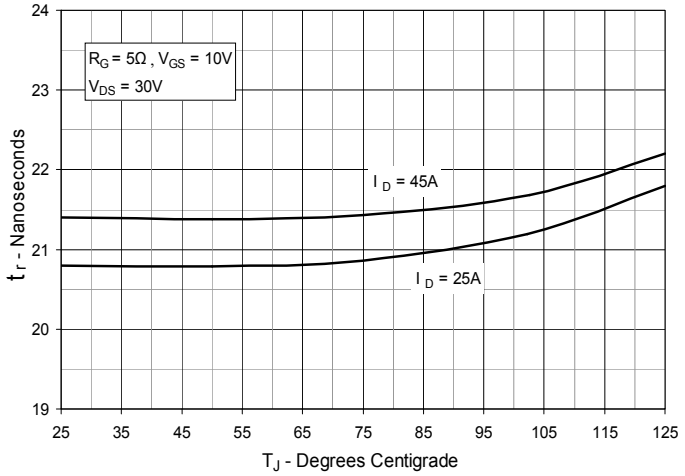


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

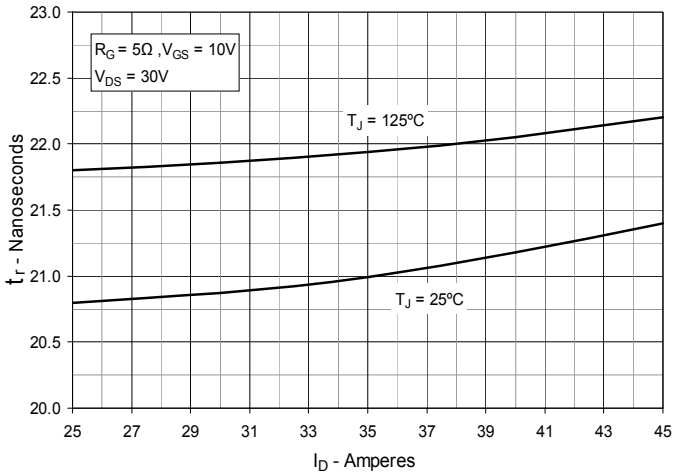


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

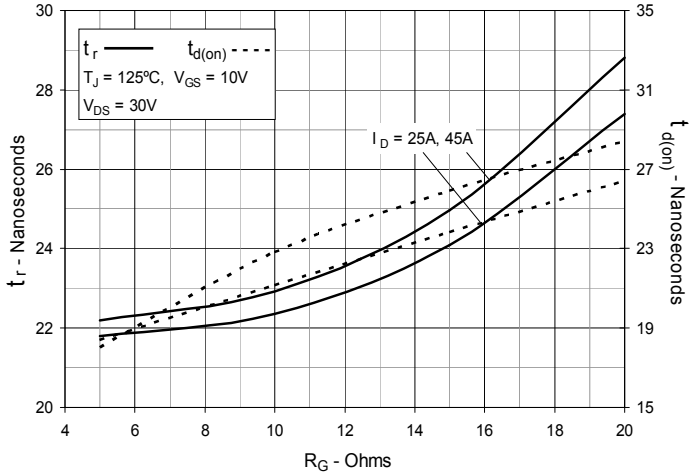


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

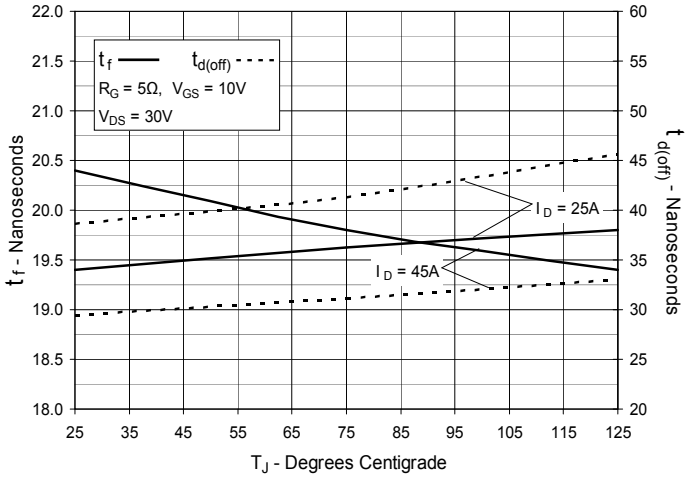


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

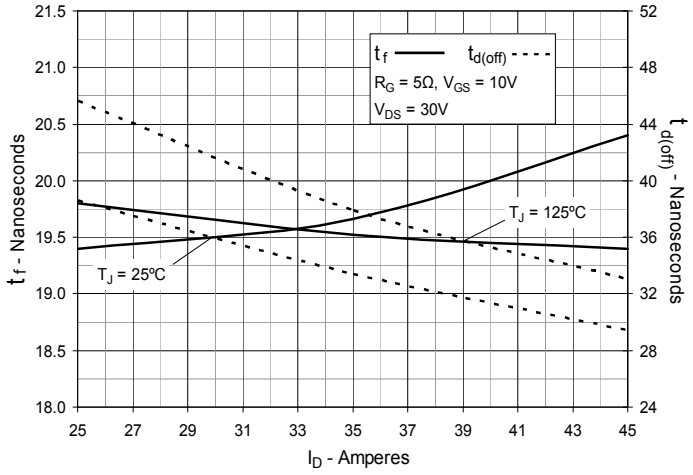


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

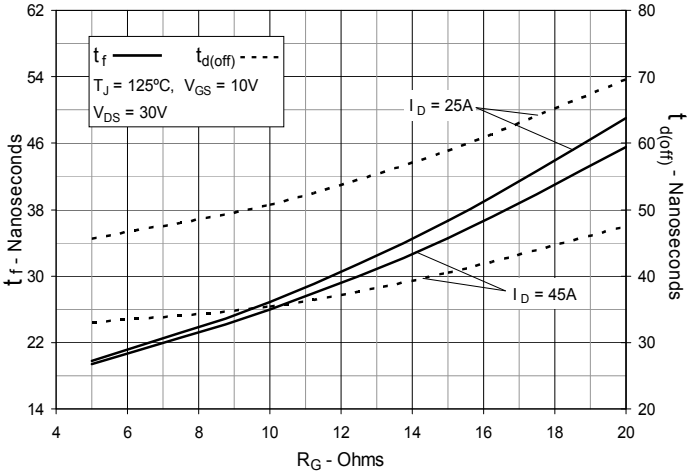


Fig. 19. Maximum Transient Thermal Impedance