WINSOURCE ELECTRONICS

THE DATASHEET OF

IXTH220N055T

IXYS

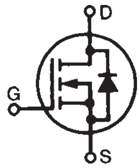
Preliminary Technical Information

TrenchMV™ Power MOSFET

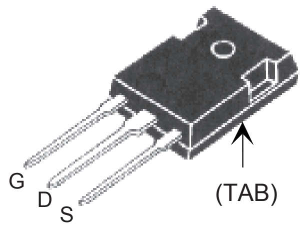
IXTH220N055T
IXTQ220N055T

V_{DSS} = 55 V
I_{D25} = 220 A
$R_{DS(on)} \leq$ 4.0 mΩ

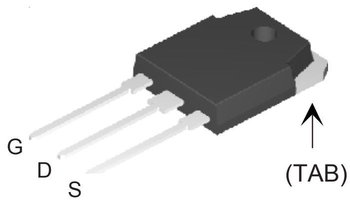
N-Channel Enhancement Mode
Avalanche Rated



TO-247 (IXTH)



TO-3P (IXTQ)



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} = 1 MΩ	55	V
V_{GSM}	Transient	± 20	V
I_{D25}	T_C = 25°C	220	A
I_{LRMS}	Lead Current Limit, RMS	75	A
I_{DM}	T_C = 25°C, pulse width limited by T_{JM}	600	A
I_{AR}	T_C = 25°C	25	A
E_{AS}	T_C = 25°C	1.0	J
dv/dt	$I_S \leq I_{DM}$, di/dt ≤100 A/µs, $V_{DD} \leq V_{DSS}$ $T_J \leq$175°C, R_G = 5 Ω	3	V/ns
P_D	T_C = 25°C	430	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	1.6 mm (0.062 in.) from case for 10 s	300	°C
T_{SOLD}	Plastic body for 10 seconds	260	°C
M_d	Mounting torque	1.13 / 10	Nm/lb.in.
Weight	TO-3P	5.5	g
	TO-247	6	g

Features
- Ultra-low On Resistance
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
  - easy to drive and to protect
- 175 °C Operating Temperature

Advantages
- Easy to mount
- Space savings
- High power density

Applications
- Automotive
  - Motor Drives
  - High Side Switch
  - 12V Battery
  - ABS Systems
- DC/DC Converters and Off-line UPS
- Primary- Side Switch
- High Current Switching Applications

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0 V, I_D = 250 µA		55			V
$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = 1 mA		2.0		4.0	V
I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V				± 200	nA
I_{DSS}	V_{DS} = V_{DSS}				5	µA
	V_{GS} = 0 V	T_J = 150°C			250	µA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 25 A, Notes 1, 2			3.1	4.0	mΩ

Symbol	Test Conditions	Characteristic Values			
(T_J = 25° C unless otherwise specified)		Min.	Typ.	Max.	
g_{fs}	V_{DS}= 10 V; I_D = 60 A, Note 1	75	120		S
C_{iss}			7200		pF
C_{oss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		1270		pF
C_{rss}			285		pF
$t_{d(on)}$	**Resistive Switching Times**		36		ns
t_r	V_{GS} = 10 V, V_{DS} = 30 V, I_D = 25 A		62		ns
$t_{d(off)}$	R_G = 5 Ω (External)		53		ns
t_f			53		ns
$Q_{g(on)}$			158		nC
Q_{gs}	V_{GS}= 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 25 A		42		nC
Q_{gd}			46		nC
R_{thJC}				0.35	°C/W
R_{thCH}			0.25		°C/W

Source-Drain Diode

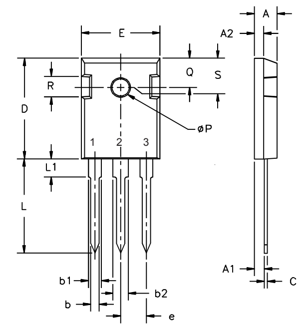
Symbol	Test Conditions	Characteristic Values			
T_J = 25° C unless otherwise specified)		Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			220	A
I_{SM}	Pulse width limited by T_{JM}			600	A
V_{SD}	I_F = 25 A, V_{GS} = 0 V, Note 1			1.0	V
t_{rr}	I_F = 25 A, -di/dt = 100 A/µs V_R = 25 V, V_{GS} = 0 V		70		ns

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

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.

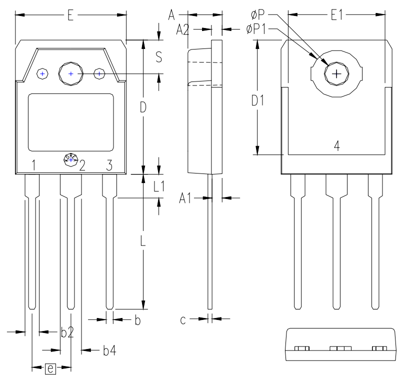
TO-247 AD Outline



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

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

TO-3P (IXTQ) Outline



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

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.791	19.80	20.10
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 BSC		5.45 BSC	
L	.779	.795	19.80	20.20
L1	.134	.142	3.40	3.60
øP	.126	.134	3.20	3.40
øP1	.272	.280	6.90	7.10
S	.193	.201	4.90	5.10

All metal area are tin plated.

Fig. 1. Output Characteristics @ 25ºC

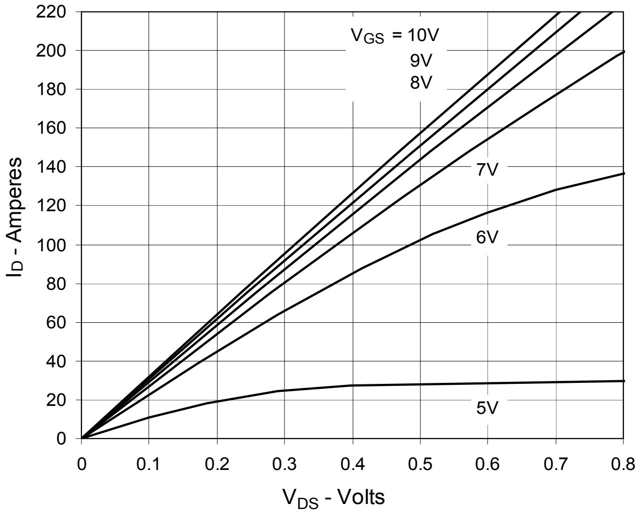


Fig. 2. Extended Output Characteristics @ 25ºC

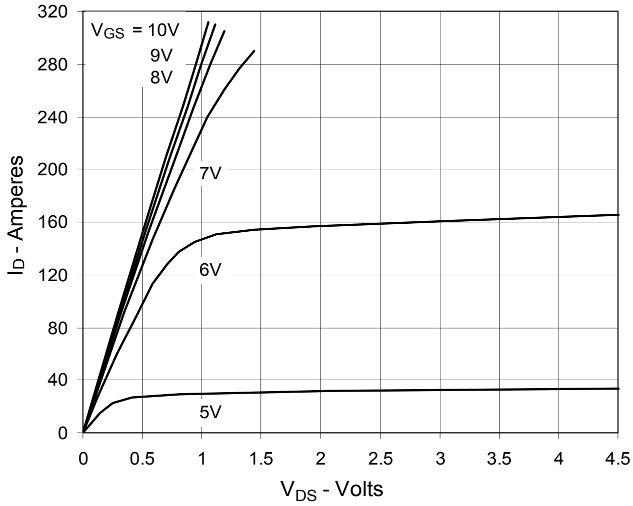


Fig. 3. Output Characteristics @ 150ºC

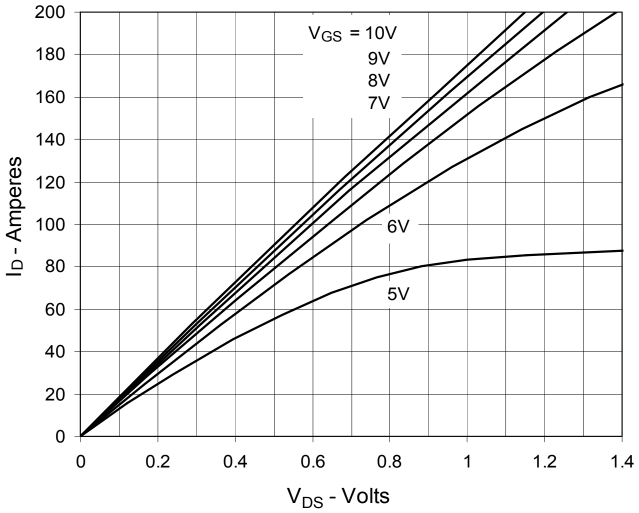


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 110A Value vs. Junction Temperature

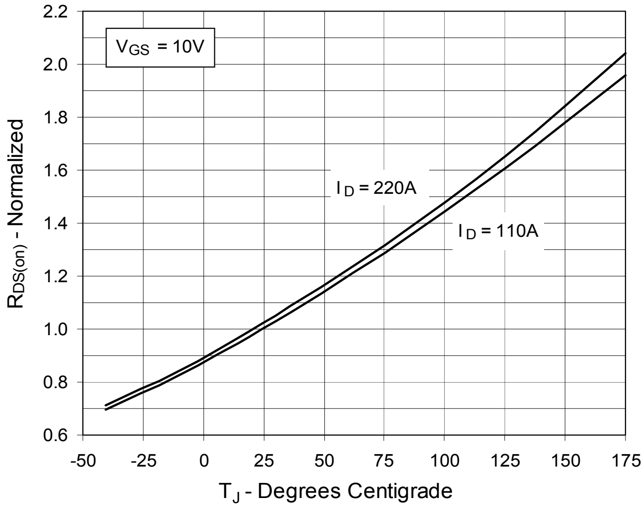


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 110A Value vs. Drain Current

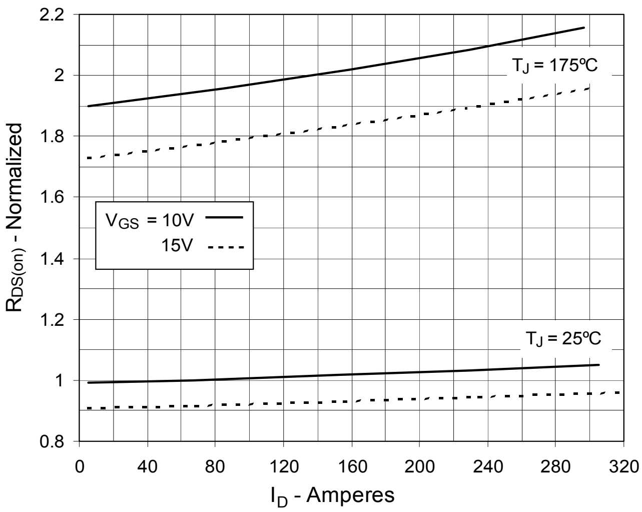


Fig. 6. Drain Current vs. Case Temperature

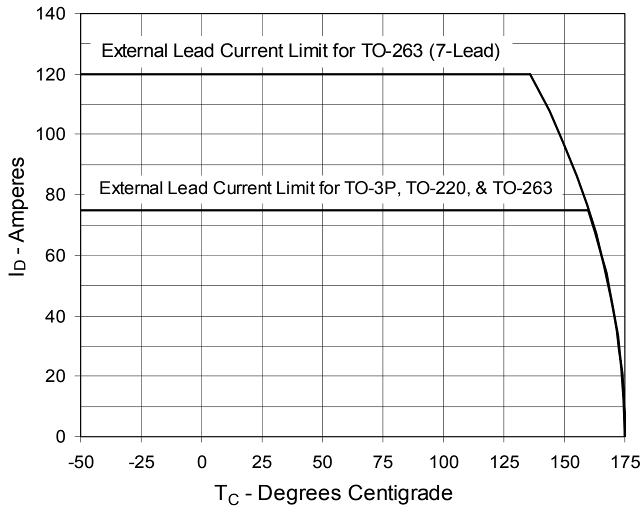


Fig. 7. Input Admittance

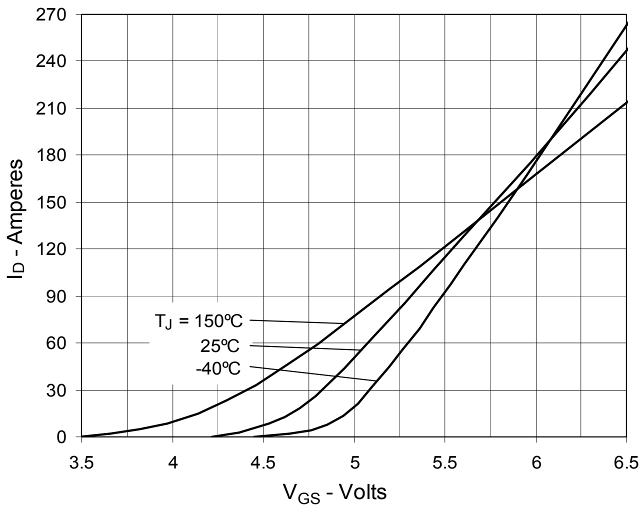


Fig. 8. Transconductance

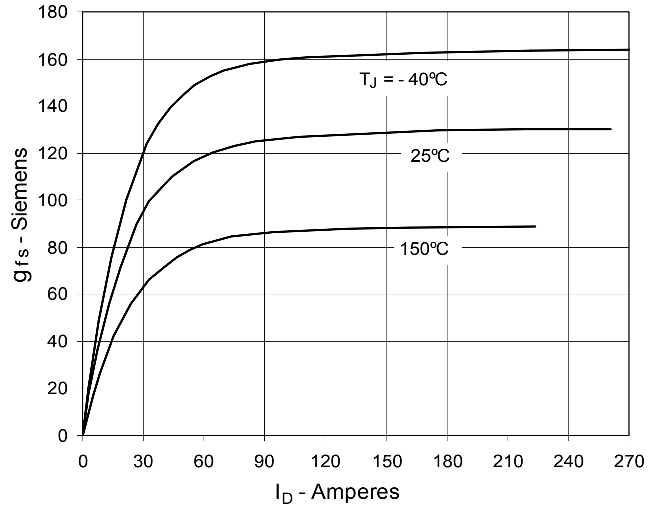


Fig. 9. Forward Voltage Drop of Intrinsic Diode

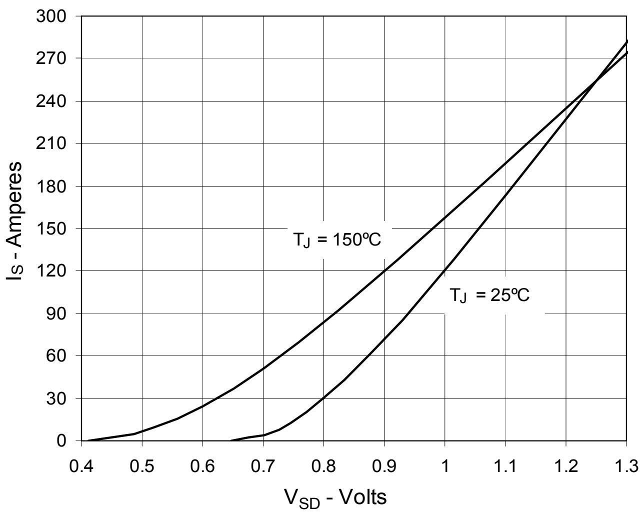


Fig. 10. Gate Charge

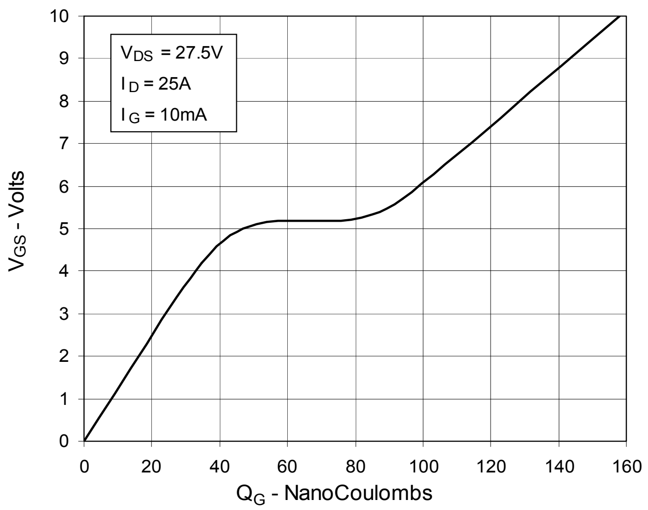


Fig. 11. Capacitance

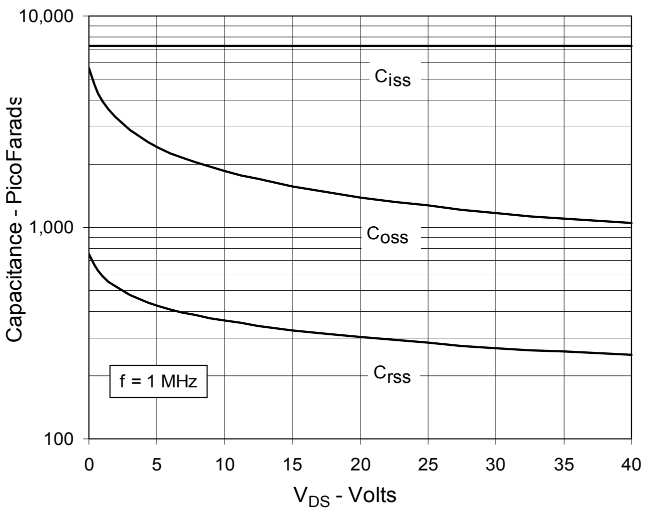
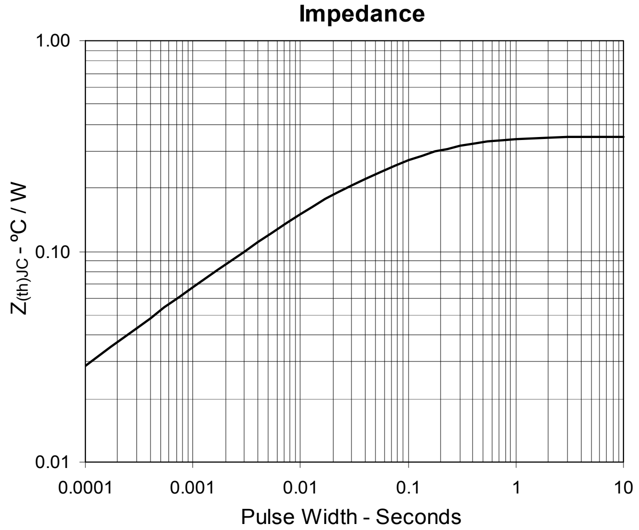


Fig. 12. Maximum Transient Thermal Impedance



IXYS reserves the right to change limits, test conditions, and dimensions.

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

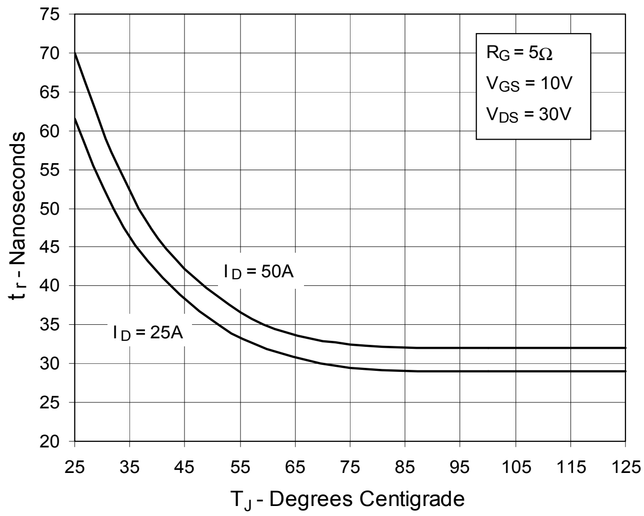


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

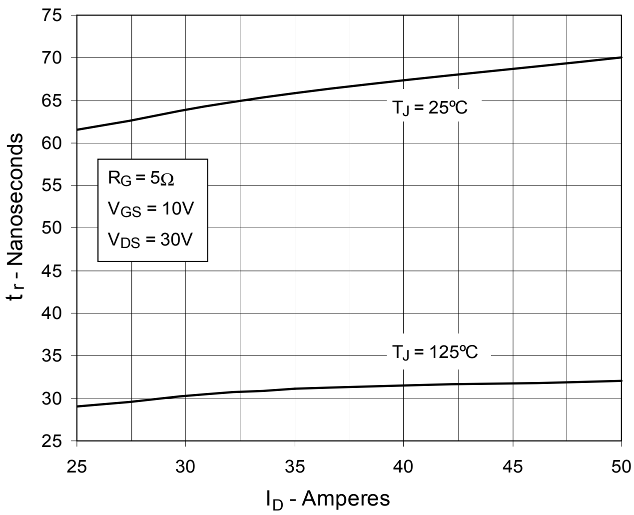


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

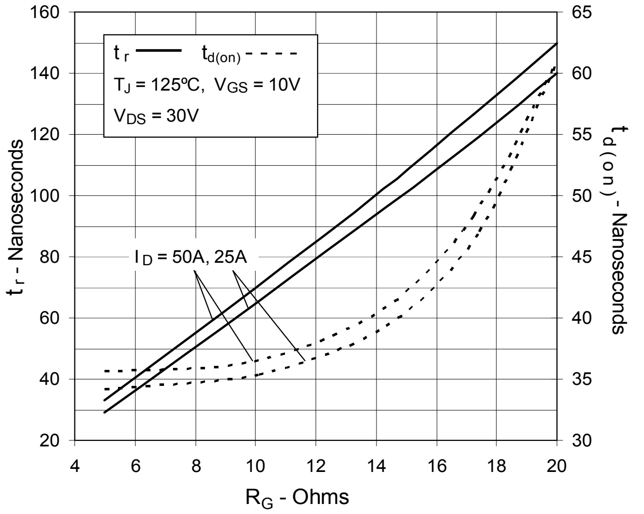


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

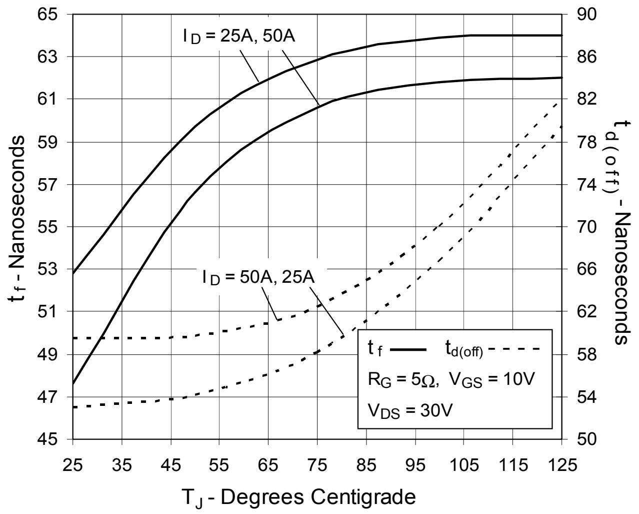


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

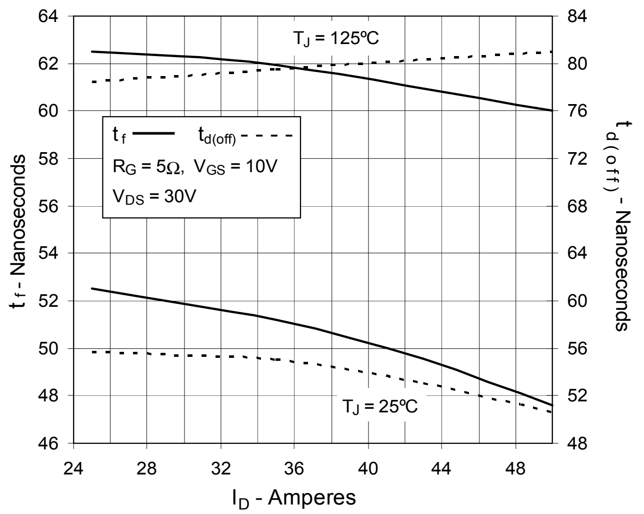


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance