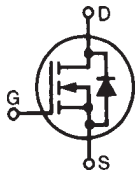
IXYS

TrenchMV™ Power MOSFET

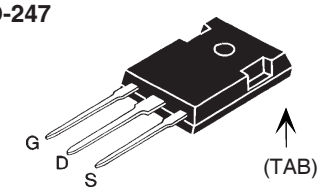
IXTH180N085T
IXTQ180N085T

V_{DSS} = 85V
I_{D25} = 180A
$R_{DS(on)}$ ≤ 5.5mΩ

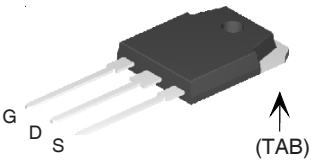
N-Channel Enhancement Mode
Avalanche rated
Fast Intrinsic Rectifier



TO-247



TO-3P



G = Gate D = Drain
S = Source TAB = Drain

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	T_J = 25°C to 175°C	85	V
V_{DGR}	T_J = 25°C to 175°C, R_{GS} = 1MΩ	85	V
V_{GSM}	Transient	±20	V
I_{D25}	T_C = 25°C	180	A
I_{LRMS}	Lead Current Limit, RMS	75	A
I_{DM}	T_C = 25°C, Pulse Width Limited by T_{JM}	480	A
I_A	T_C = 25°C	25	A
E_{AS}	T_C = 25°C	1.0	J
P_D	T_C = 25°C	430	W
T_J		-55 to +175	°C
T_{JM}		+175	°C
T_{stg}		-55 to +175	°C
T_L	1.6mm (0.063in) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
M_d	Mounting Torque (TO-247&TO-3P)	1.13/10	Nm/lb.in.
Weight	TO-247	6.0	g
	TO-3P	5.5	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0V, I_D = 250μA	85			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			5	μA
	T_J = 150°C			250	μA
$R_{DS(on)}$	V_{GS} = 10V, I_D = 25A, Note 1		4.5	5.5	mΩ

Features

- International Standard Packages
- 175°C Operating Temperature
- Avalanche Rated
- Fast Intrinsic Rectifier
- Low $R_{DS(on)}$

Advantages

- Easy to Mount
- Space Savings
- High Power Density

Applications

- Automotive
  - Motor Drives
  - DC/DC Conversion
  - 42V Power Bus
  - ABS Systems
- DC/DC Converters and Off-Line UPS
- Primary Switch for 24V and 48V Systems
- High Current Switching Applications
- Distributed Power Architechtures and VRMs
- Electronic Valve Train Systems
- High Voltage Synchronous Recifiers

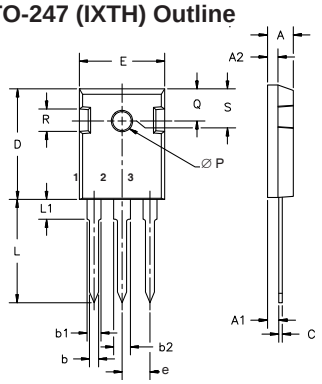
Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS} = 10V, I_D = 60A, Note 1	70	120		S
C_{iss}	V_{GS} = 0V, V_{DS} = 25V, f = 1MHz		8800		pF
C_{oss}			950		pF
C_{rss}			110		pF
$t_{d(on)}$	**Resistive Switching Times**		32		ns
t_r	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 25A		70		ns
$t_{d(off)}$	R_G = 5Ω (External)		55		ns
t_f			65		ns
$Q_{g(on)}$	V_{GS} = 10V, V_{DS} = 0.5 • V_{DSS}, I_D = 25A		170		nC
Q_{gs}			40		nC
Q_{gd}			46		nC
R_{thJC}				0.35	°C/W
R_{thCS}	(TO-247&TO-3P)		0.25		°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			180	A
I_{SM}	Repetitive, Pulse Width Limited by T_{JM}			480	A
V_{SD}	I_F = 25A, V_{GS} = 0V, Note 1			1.0	V
t_{rr}	I_F = 90A, V_{GS} = 0V, -di/dt = 100A/μs		63		ns
I_{RM}	V_R = 40V		4.1		A
Q_{RM}			129		nC

Note 1: Pulse Test, t ≤ 300μs; Duty Cycle, d ≤ 2%.

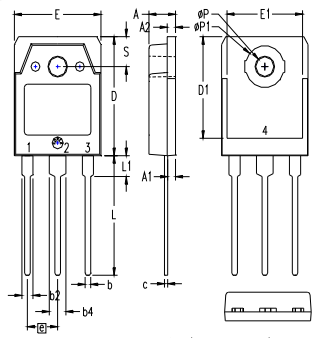
TO-247 (IXTH) Outline



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

Dim.	Millimeter Min.	Max.	Inches 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
ØP	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



2 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)
4 – DRAIN (COLLECTOR)

SYM	INCHES MIN	MAX	MILLIMETERS 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	.799	19.80	20.30
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

Fig. 1. Output Characteristics @ 25ºC

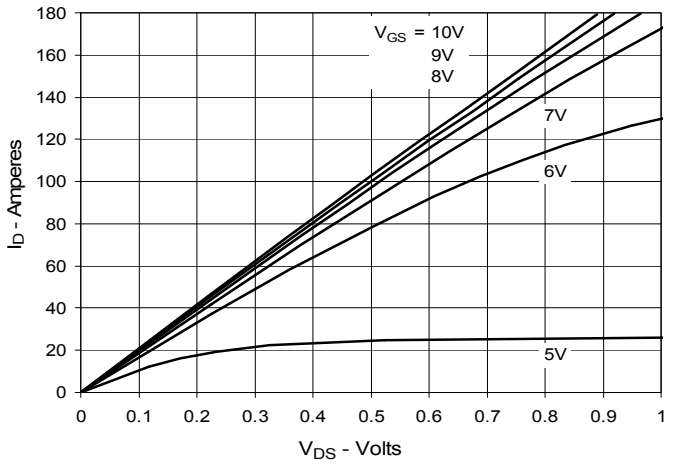


Fig. 2. Extended Output Characteristics @ 25ºC

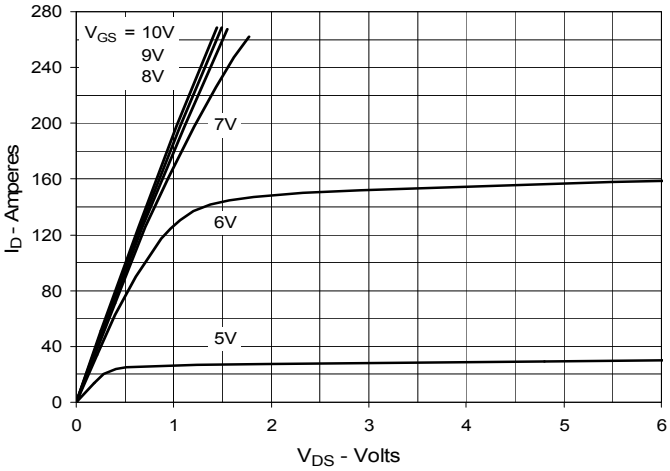


Fig. 3. Output Characteristics @ 150ºC

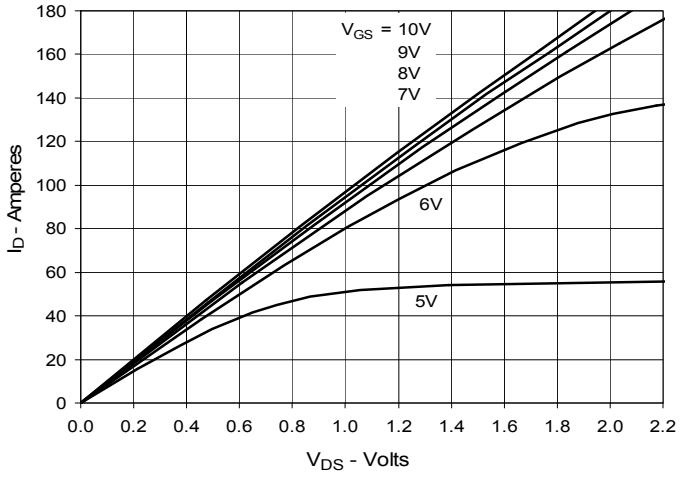


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 90A Value vs. Junction Temperature

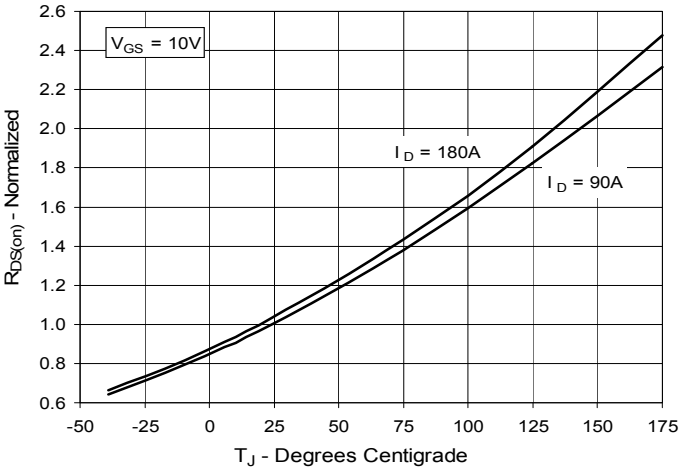


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 90A Value vs. Drain Current

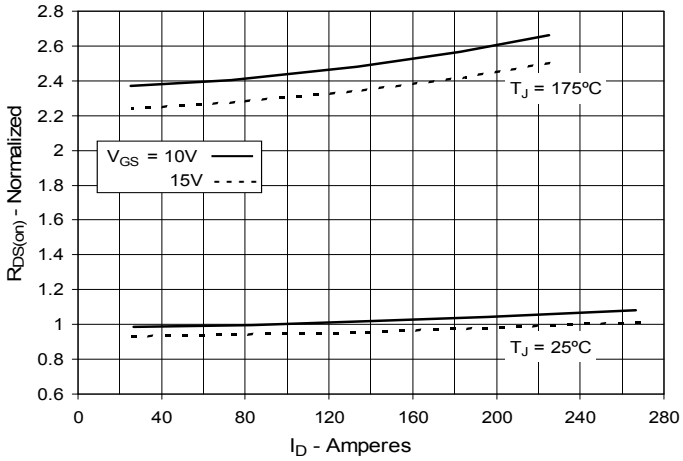


Fig. 6. Drain Current vs. Case Temperature

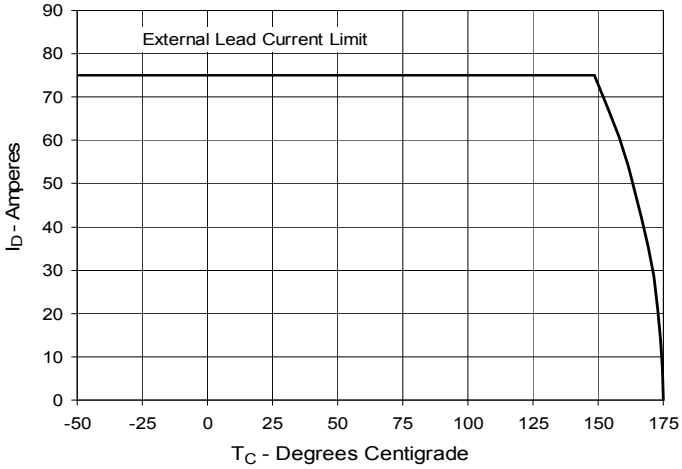


Fig. 7. Input Admittance

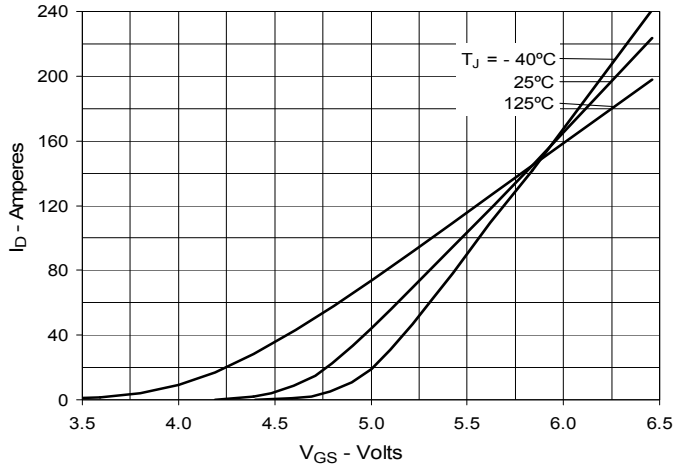


Fig. 8. Transconductance

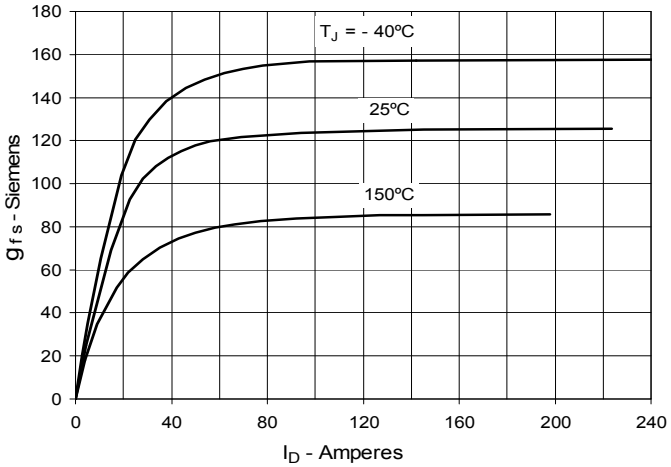


Fig. 9. Forward Voltage Drop of Intrinsic Diode

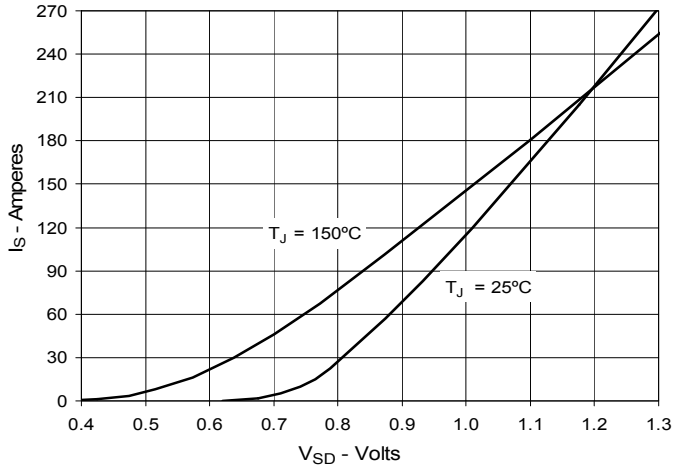


Fig. 10. Gate Charge

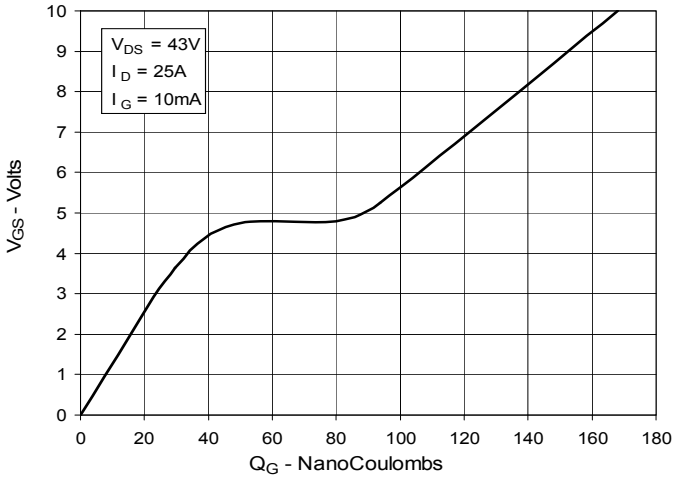


Fig. 11. Capacitance

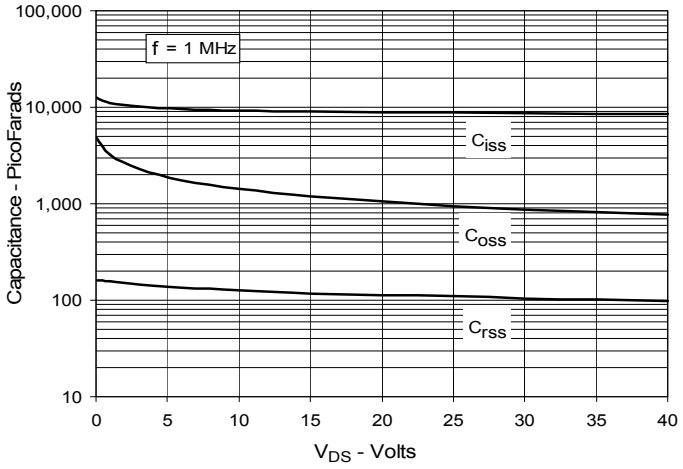


Fig. 12. Maximum Transient Thermal Impedance

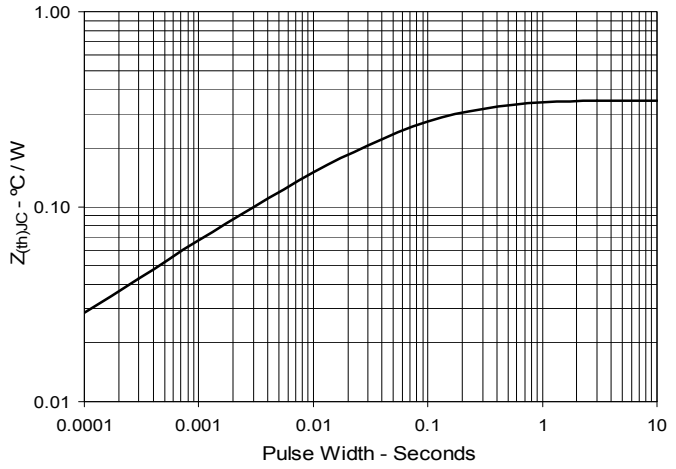


Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

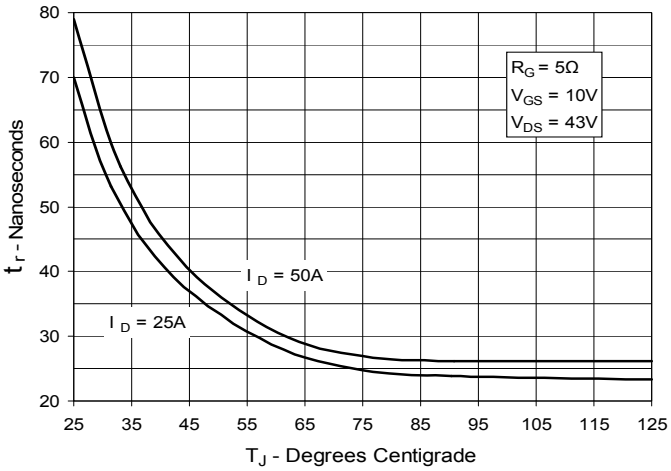


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

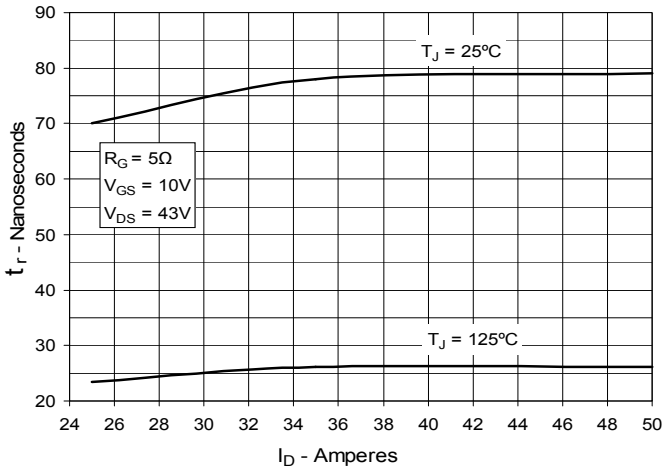


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

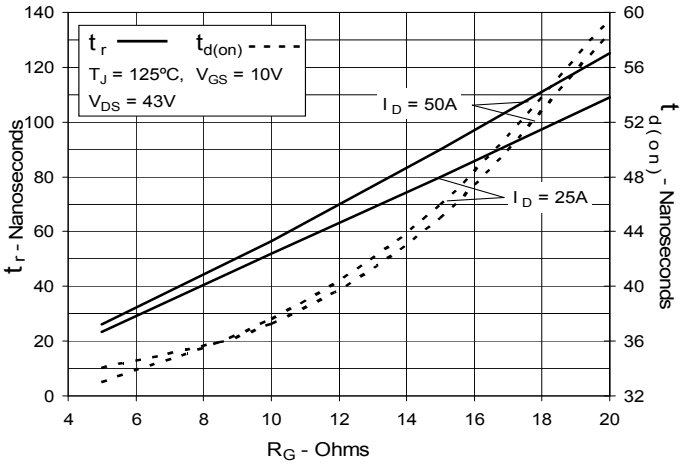


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

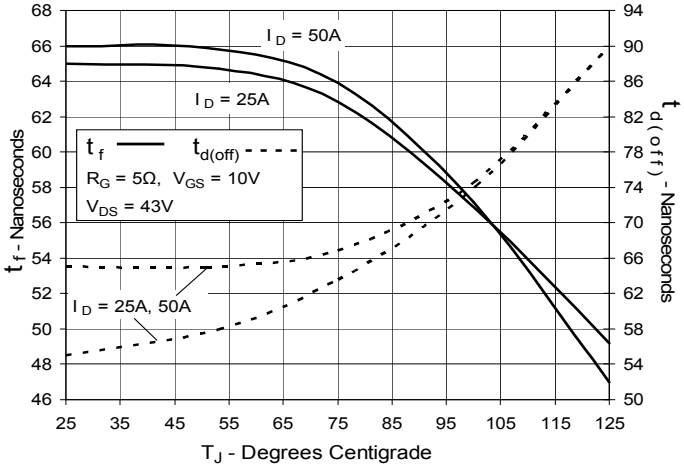


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

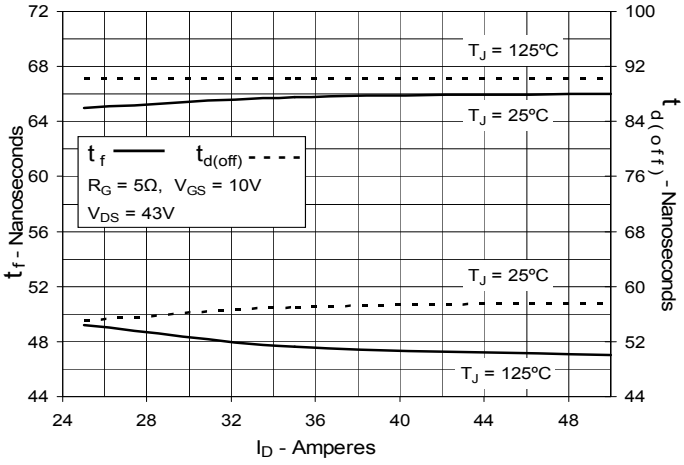


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance