IXYS

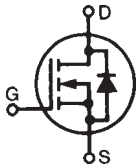
Preliminary Technical Information

TrenchMV™ Power MOSFET

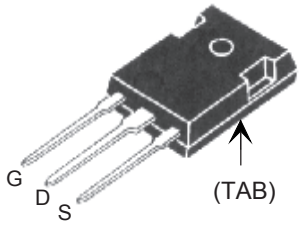
IXTH180N10T
IXTQ180N10T

V_{DSS} = 100 V
I_{D25} = 180 A
$R_{DS(on)}$ ≤ 6.4 mΩ

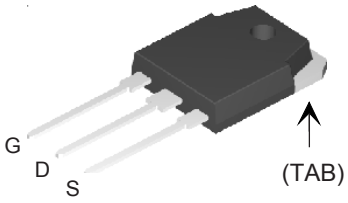
N-Channel Enhancement Mode
Avalanche Rated



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	100	V
V_{DGR}	T_J = 25° C to 175° C; R_{GS} = 1 MΩ	100	V
V_{GSM}	Transient	± 30	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}	450	A
I_{AR}	T_C = 25° C	25	A
E_{AS}	T_C = 25° C	750	mJ
dv/dt	$I_S \le I_{DM}$, di/dt ≤100 A/μs, $V_{DD} \le V_{DSS}$ T_J ≤175° C, R_G = 3.3 Ω	3	V/ns
P_D	T_C = 25° C	480	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

Symbol (T_J = 25° C unless otherwise specified)	Test Conditions	Characteristic Values Min.	Typ.	Max.	
BV_{DSS}	V_{GS} = 0 V, I_D = 250 μA	100			V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, I_D = 250 μA	2.5		4.5	V
I_{GSS}	V_{GS} = ±20 V, V_{DS} = 0 V			± 200	nA
I_{DSS}	$V_{DS} = V_{DSS}$ V_{GS} = 0 V			5	μA
	T_J = 150° C			250	μA
$R_{DS(on)}$	V_{GS} = 10 V, I_D = 25 A, Notes 1, 2		5.4	6.4	mΩ

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
  - 42V Power Bus
  - ABS Systems
- DC/DC Converters and Off-line UPS
- Primary Switch for 24V and 48V Systems
- Distributed Power Architechtures and VRMs
- Electronic Valve Train Systems
- High Current Switching Applications
- High Voltage Synchronous Recifier

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Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	V_{DS}= 10 V; I_D = 60 A, Note 1	70	110		S
C_{iss}			6900		pF
C_{oss}	V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz		923		pF
C_{rss}			162		pF
$t_{d(on)}$	**Resistive Switching Times**		33		ns
t_r	V_{GS} = 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 25 A		54		ns
$t_{d(off)}$	R_G = 3.3 Ω (External)		42		ns
t_f			31		ns
$Q_{g(on)}$			151		nC
Q_{gs}	V_{GS}= 10 V, V_{DS} = 0.5 V_{DSS}, I_D = 25 A		39		nC
Q_{gd}			45		nC
R_{thJC}				0.31	°C/W
R_{thCS}			0.25		°C/W

Source-Drain Diode

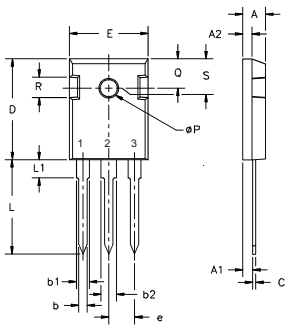
Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
I_S	V_{GS} = 0 V			180	A
I_{SM}	Pulse width limited by T_{JM}			450	A
V_{SD}	I_F = 25 A, V_{GS} = 0 V, Note 1			0.95	V
t_{rr}	I_F = 25 A, -di/dt = 100 A/μs V_R = 50 V, V_{GS} = 0 V		100		ns

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.

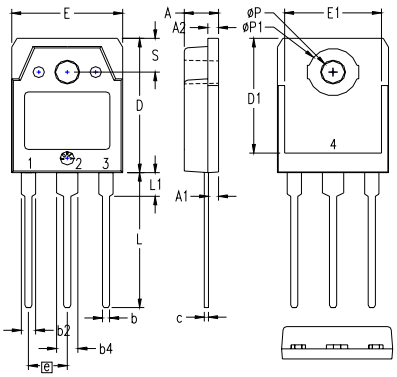
TO-247AD Outline



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



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

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	.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.

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

IXYS MOSFETs and IGBTs are covered by one or moreof the following U.S. patents: 4,835,592 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405B2 6,710,463 6,727,585 6,759,692 6771478 B2 7,005,734 B2 7,063,975 B2 7,071,537

Fig. 1. Output Characteristics @ 25ºC

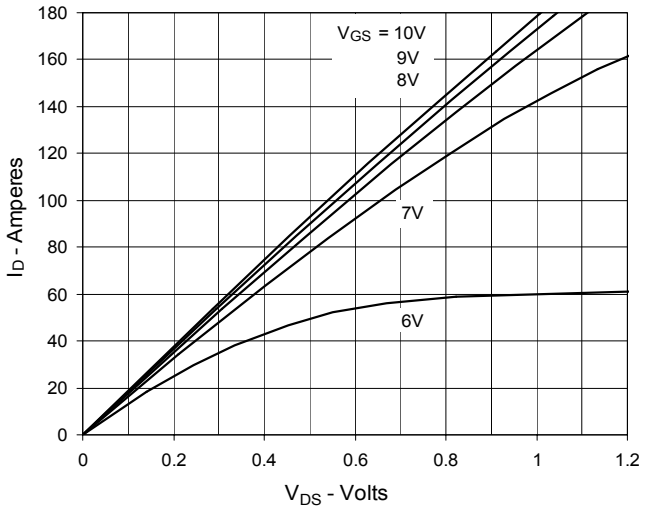


Fig. 2. Extended Output Characteristics @ 25ºC

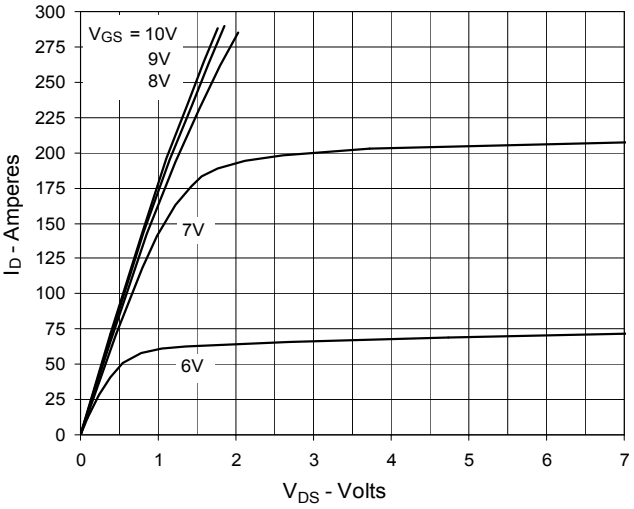


Fig. 3. Output Characteristics @ 150ºC

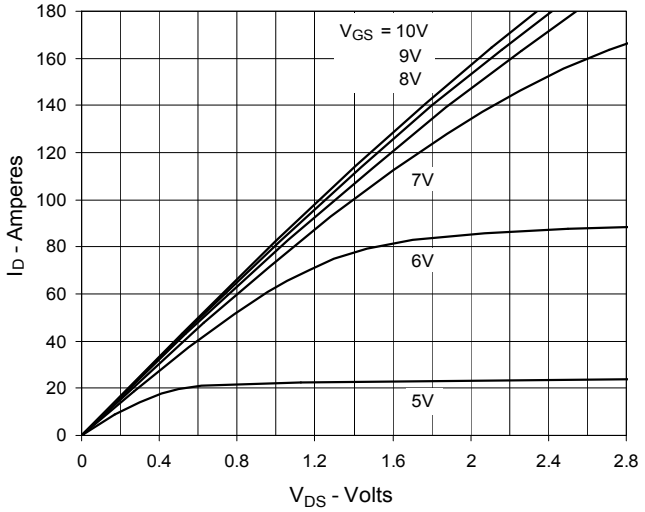


Fig. 4. $R_{DS(on)}$ Normalized to I_D = 90A Value vs. Junction Temperature

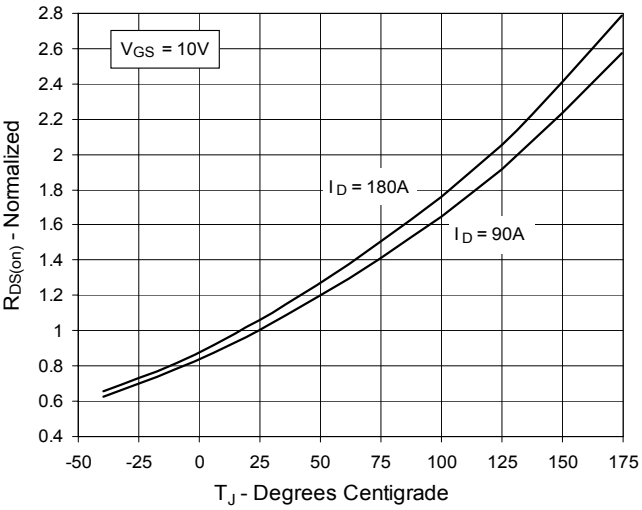


Fig. 5. $R_{DS(on)}$ Normalized to I_D = 90A Value vs. Drain Current

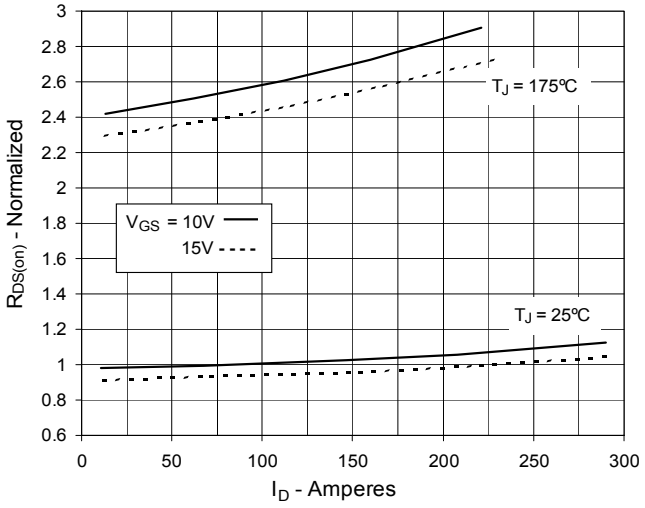
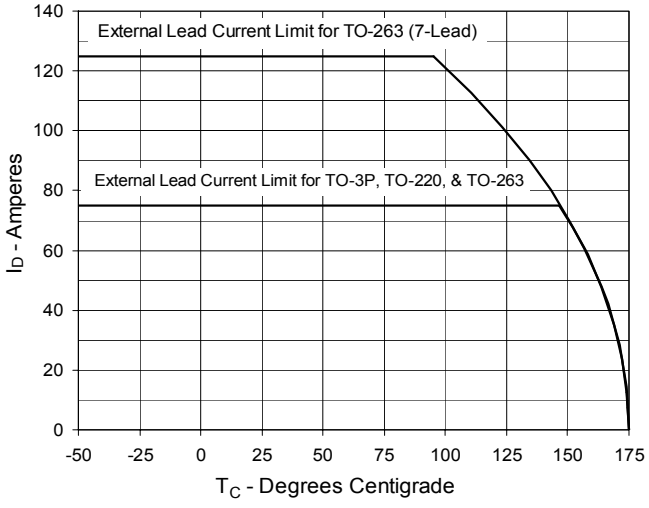


Fig. 6. Drain Current vs. Case Temperature



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Fig. 7. Input Admittance

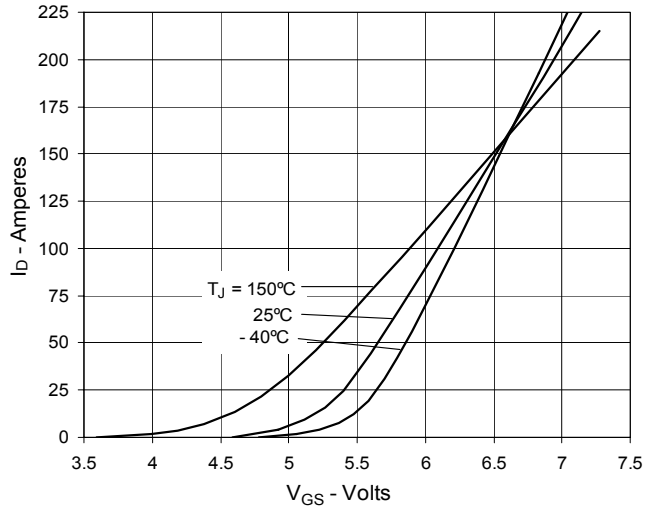


Fig. 8. Transconductance

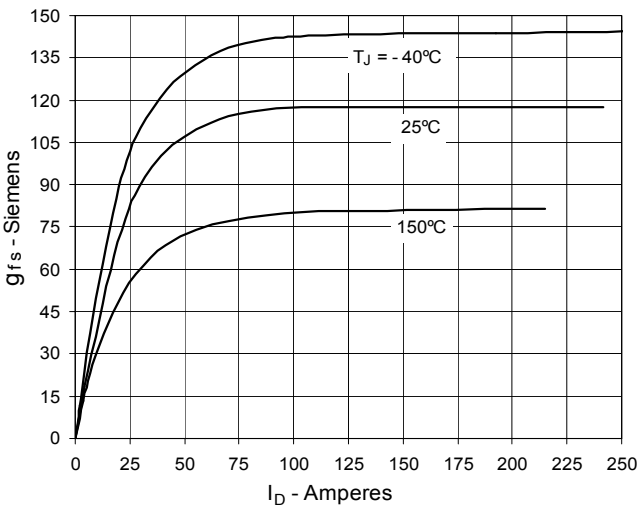


Fig. 9. Forward Voltage Drop of Intrinsic Diode

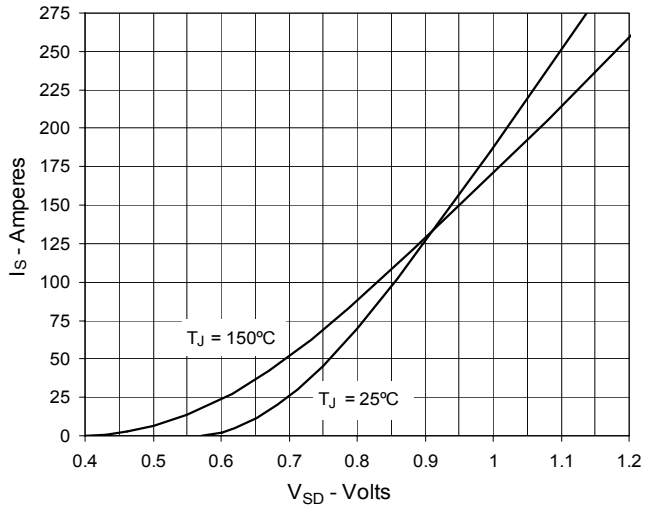


Fig. 10. Gate Charge

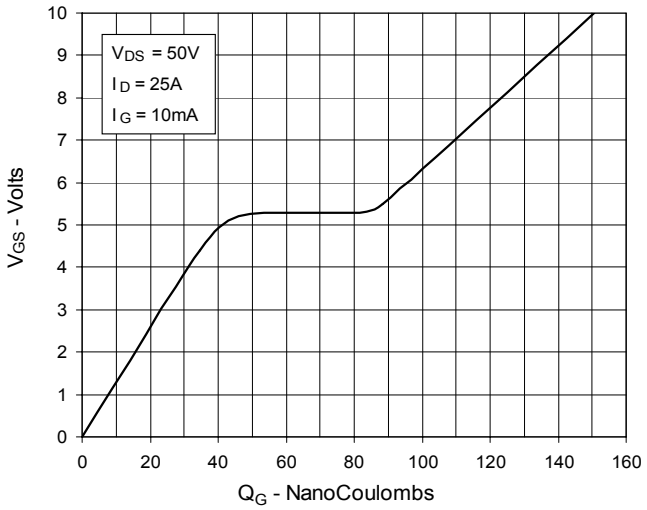


Fig. 11. Capacitance

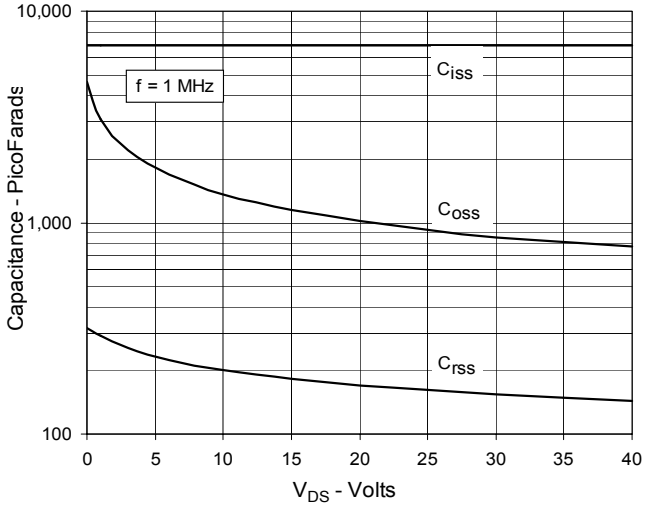
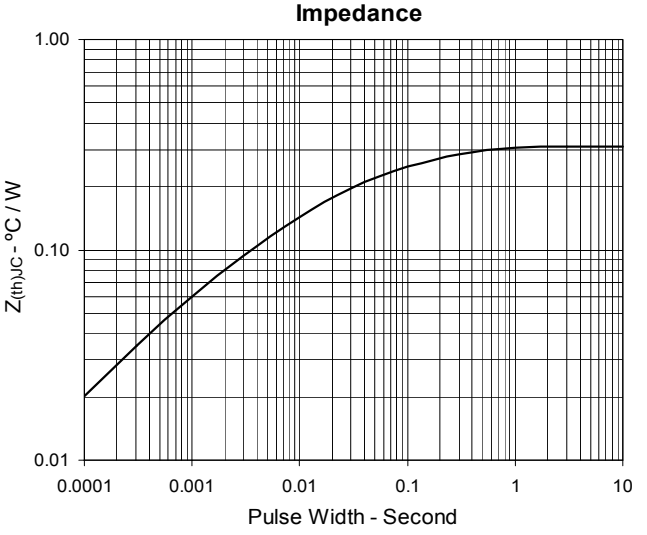


Fig. 12. Maximum Transient Thermal Impedance



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

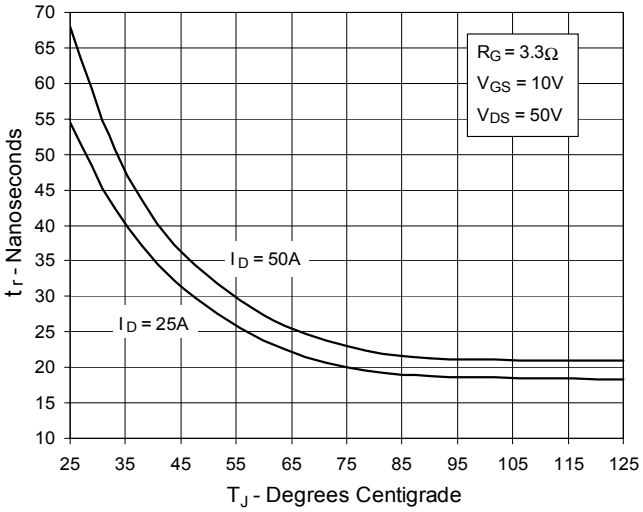


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

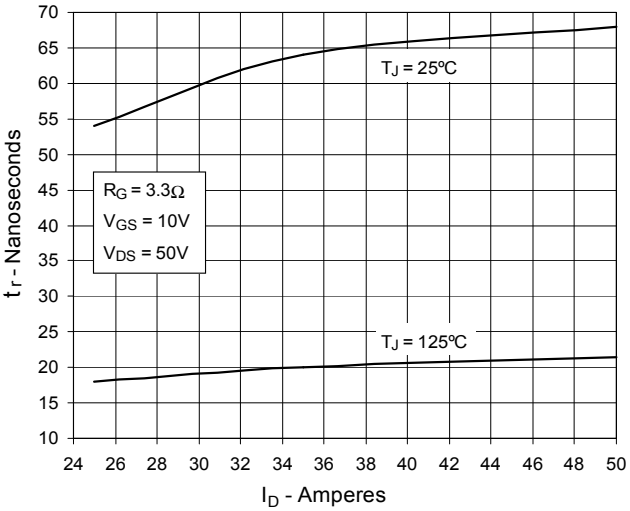


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

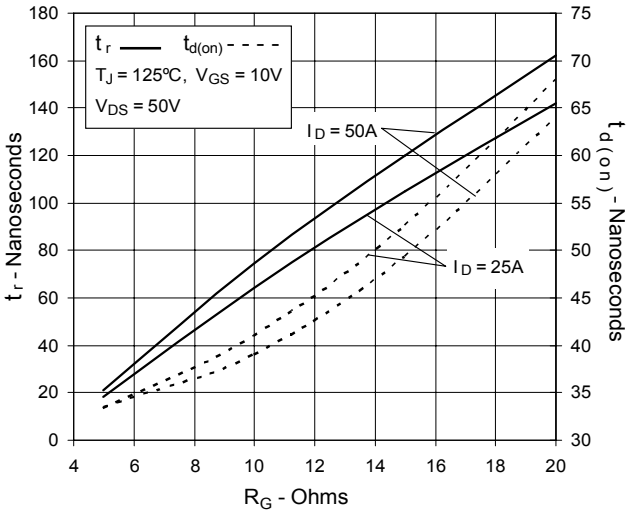


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

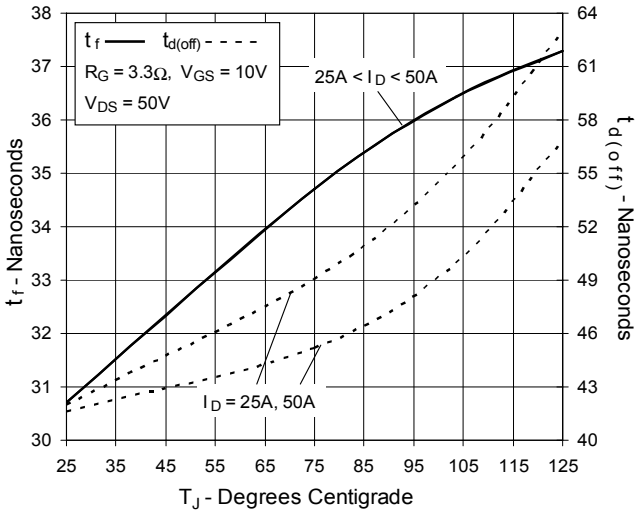


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

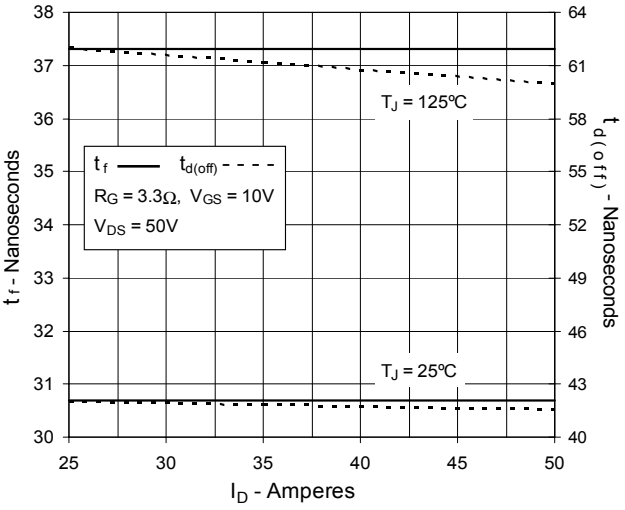
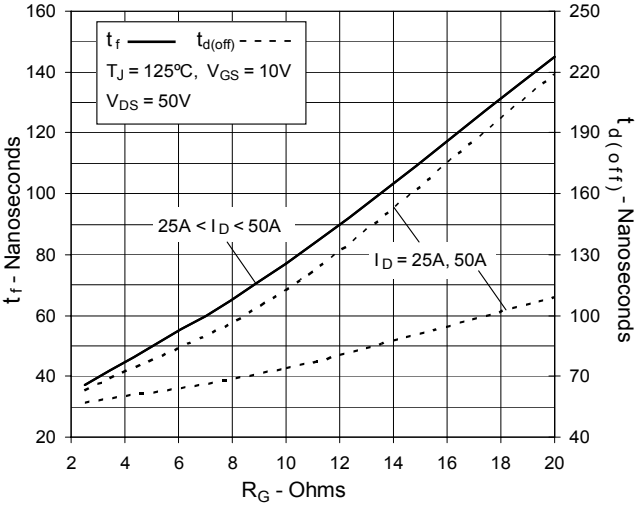


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



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