

TrenchMV™ Power MOSFET

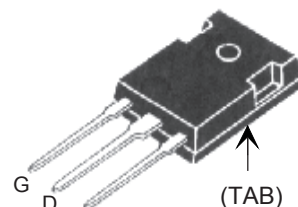
IXTH182N055T
IXTQ182N055T

$$\begin{aligned} V_{DSS} &= 55 \text{ V} \\ I_{D25} &= 182 \text{ A} \\ R_{DS(on)} &\leq 5.0 \text{ m}\Omega \end{aligned}$$

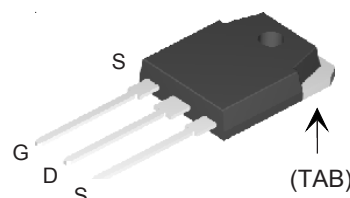
N-Channel Enhancement Mode
Avalanche Rated



TO-247 (IXTH)



TO-3P (IXTQ)



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

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}$	55	V
V_{DGR}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}; R_{GS} = 1 \text{ M}\Omega$	55	V
V_{GSM}	Transient	± 20	V
I_{D25}	$T_C = 25^\circ\text{C}$	182	A
I_{LRMS}	Lead Current Limit, RMS	75	A
I_{DM}	$T_C = 25^\circ\text{C}$, pulse width limited by T_{JM}	490	A
I_{AR}	$T_C = 25^\circ\text{C}$	25	A
E_{AS}	$T_C = 25^\circ\text{C}$	1.0	J
dv/dt	$I_S \leq I_{DM}$, $di/dt \leq 100 \text{ A}/\mu\text{s}$, $V_{DD} \leq V_{DSS}$ $T_J \leq 175^\circ\text{C}$, $R_G = 5 \Omega$	3	V/ns
P_D	$T_C = 25^\circ\text{C}$	360	W
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
T_L	1.6 mm (0.062 in.) from case for 10 s	300	$^\circ\text{C}$
T_{SOLD}	Plastic body for 10 seconds	260	$^\circ\text{C}$
M_d	Mounting torque	1.13 / 10	Nm/lb.in.
Weight	TO-3P	5.5	g
	TO-247	6	g

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0 \text{ V}$, $I_D = 250 \mu\text{A}$	55		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250 \mu\text{A}$	2.0		4.0 V
I_{GSS}	$V_{GS} = \pm 20 \text{ V}$, $V_{DS} = 0 \text{ V}$			$\pm 200 \text{ nA}$
I_{DSS}	$V_{DS} = V_{DSS}$			5 μA
	$V_{GS} = 0 \text{ V}$ $T_J = 150^\circ\text{C}$			250 μA
$R_{DS(on)}$	$V_{GS} = 10 \text{ V}$, $I_D = 25 \text{ A}$, Notes 1, 2	3.5	5.0	m Ω

Features

- Ultra-low On Resistance
- Unclamped Inductive Switching (UIS) rated
- Low package inductance
 - easy to drive and to protect
- 175 $^\circ\text{C}$ 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	Characteristic Values		
		Min.	Typ.	Max.
(T _J = 25° C unless otherwise specified)				
g_{fs}	V _{DS} = 10 V; I _D = 60 A, Note 1	65	100	S
C_{iss}	V _{GS} = 0 V, V _{DS} = 25 V, f = 1 MHz			4850 pF
C_{oss}				954 pF
C_{rss}				212 pF
t_{d(on)}	Resistive Switching Times			36 ns
t_r	V _{GS} = 10 V, V _{DS} = 0.5 V _{DSS} , I _D = 25 A			35 ns
t_{d(off)}	R _G = 5 Ω (External)			53 ns
t_f				38 ns
Q_{g(on)}	V _{GS} = 10 V, V _{DS} = 30 V, I _D = 25 A			114 nC
Q_{gs}				30 nC
Q_{gd}				32 nC
R_{thJC}	TO-3P			0.42 °C/W
R_{thCS}		0.25		°C/W

Source-Drain Diode

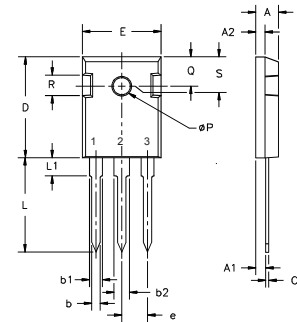
Symbol	Test Conditions	Characteristic Values		
T _J = 25° C unless otherwise specified)		Min.	Typ.	Max.
I _S	V _{GS} = 0 V			182 A
I _{SM}	Pulse width limited by T _{JM}			490 A
V _{SD}	I _F = 25 A, V _{GS} = 0 V, Note 1			1.0 V
t _{rr}	I _F = 25 A, -di/dt = 100 A/μs V _R = 25 V, V _{GS} = 0 V	70		ns

- 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.

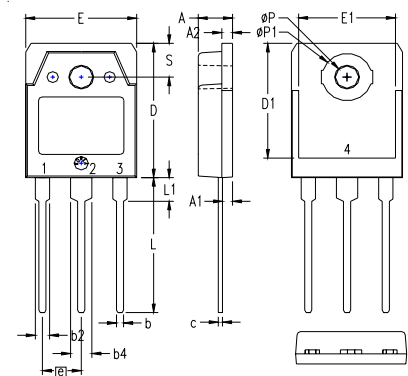
TO-247AD Outline



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
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

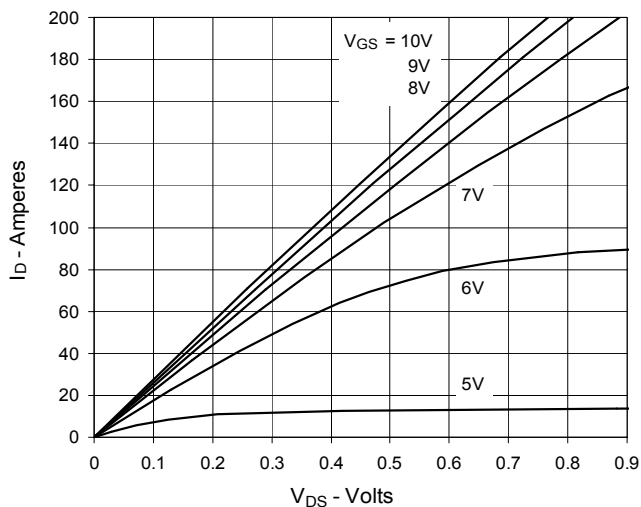
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.193	4.70	4.90
A1	.051	.059	1.30	1.50
A2	.057	.065	1.45	1.65
b	.035	.045	0.90	1.15
b2	.075	.087	1.90	2.20
b4	.114	.126	2.90	3.20
c	.022	.031	0.55	0.80
D	.780	.791	19.80	20.10
D1	.665	.677	16.90	17.20
E	.610	.622	15.50	15.80
E1	.531	.539	13.50	13.70
e	.215 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.

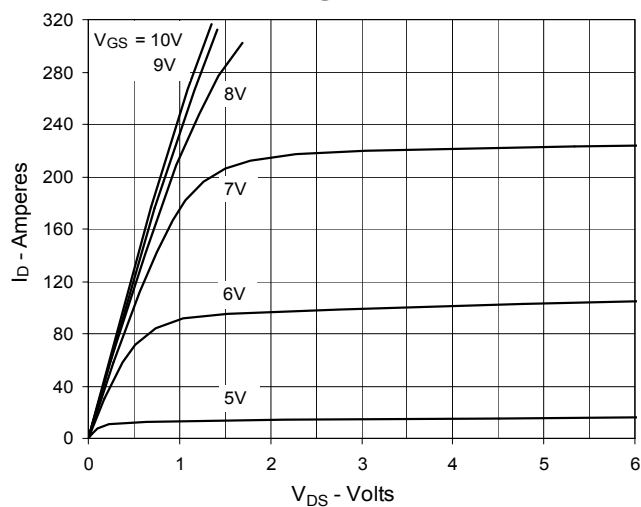
IXYS reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2
	4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537

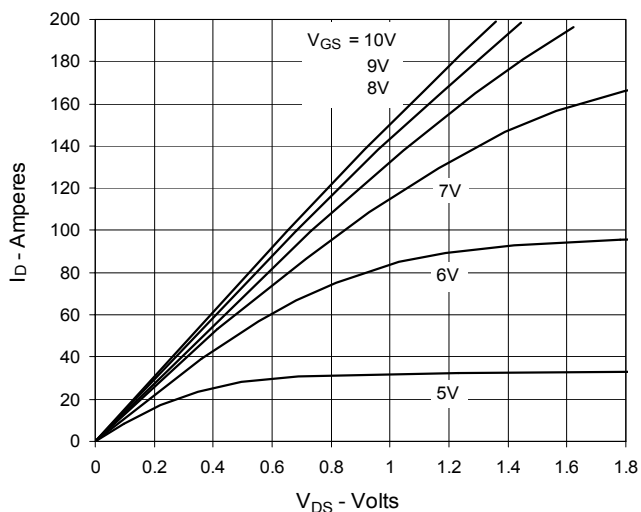
**Fig. 1. Output Characteristics
@ 25°C**



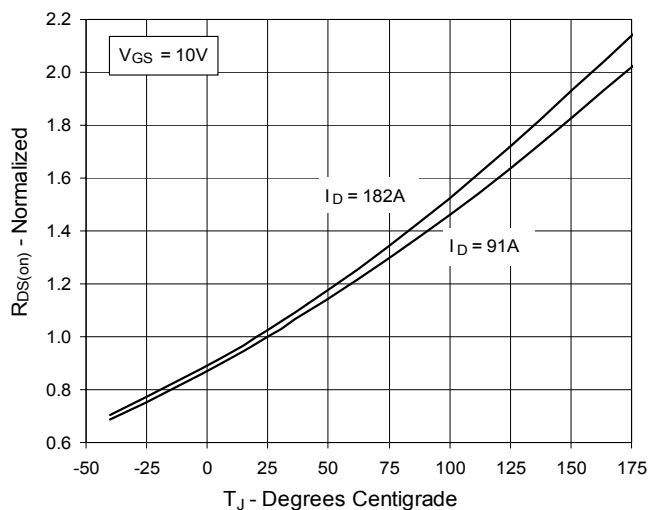
**Fig. 2. Extended Output Characteristics
@ 25°C**



**Fig. 3. Output Characteristics
@ 150°C**



**Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 91A$ Value
vs. Junction Temperature**



**Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 91A$ Value
vs. Drain Current**

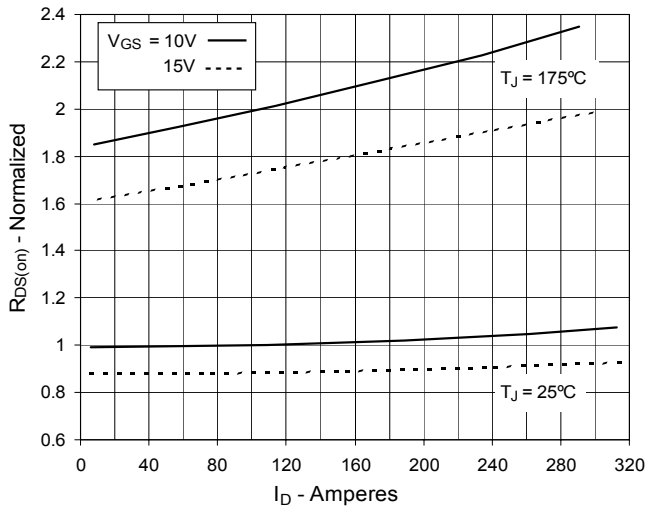


Fig. 6. Drain Current vs. Case Temperature

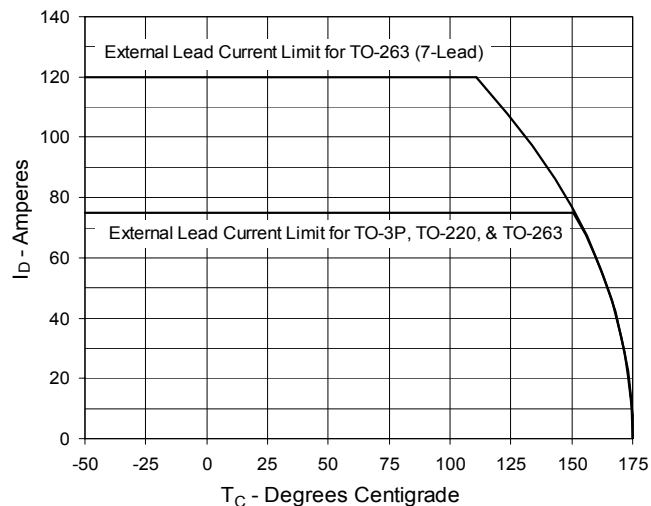


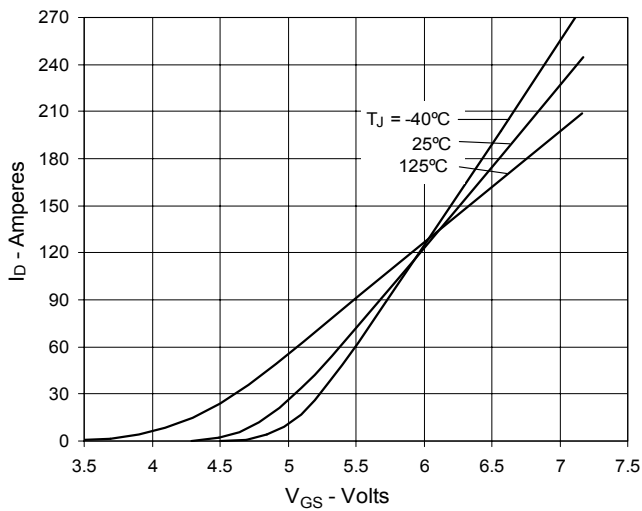
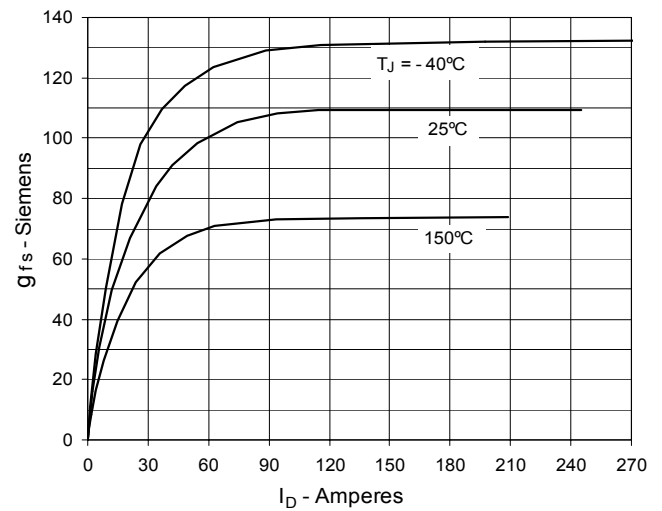
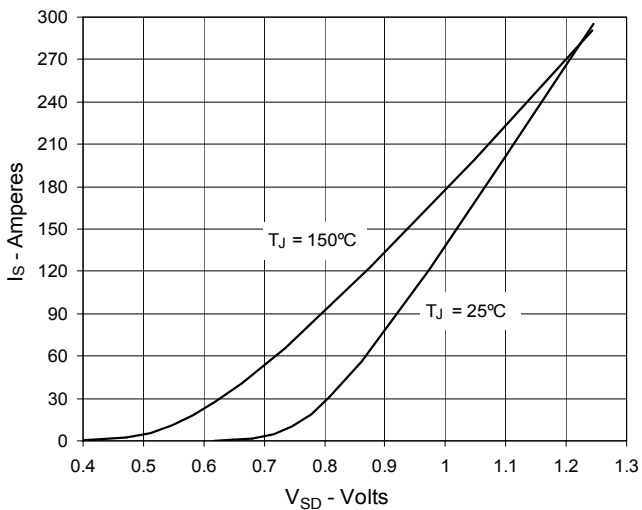
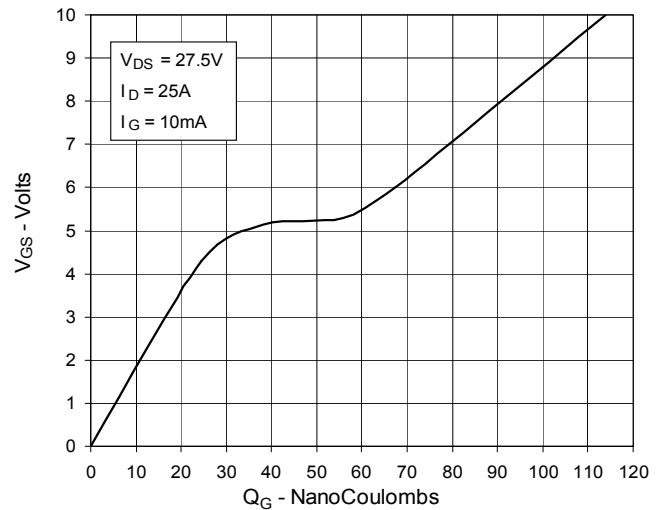
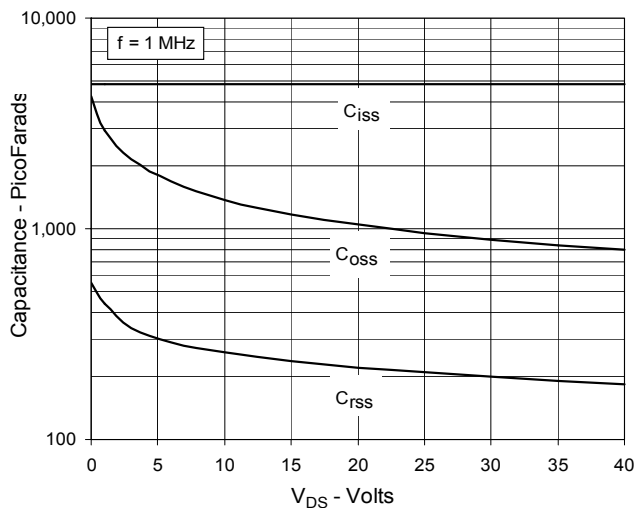
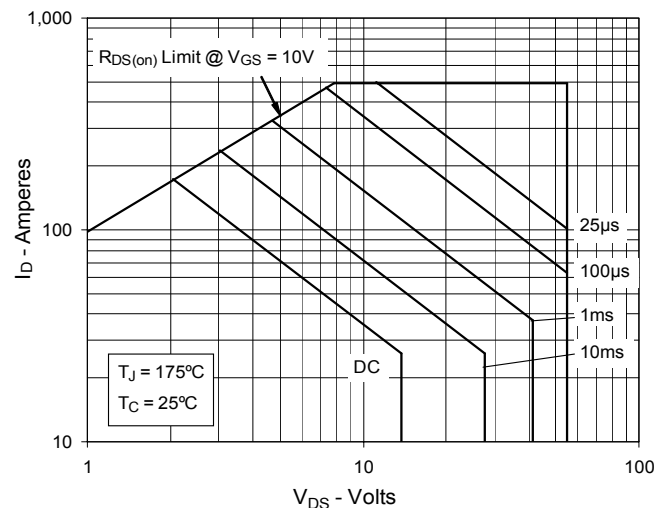
Fig. 7. Input Admittance

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

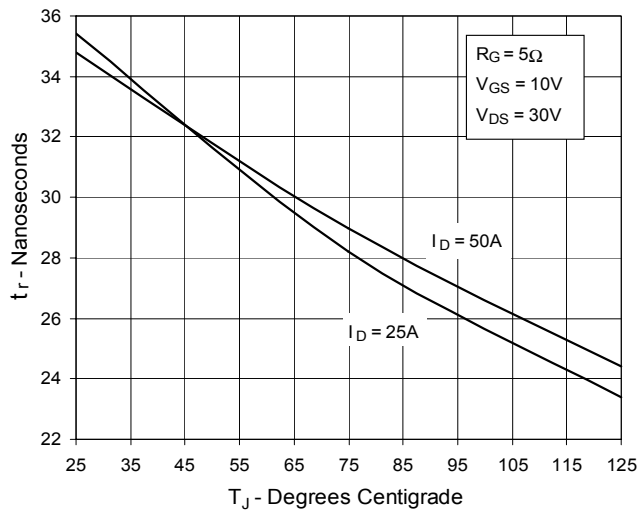


Fig. 14. Resistive Turn-on
Rise Time vs. Drain Current

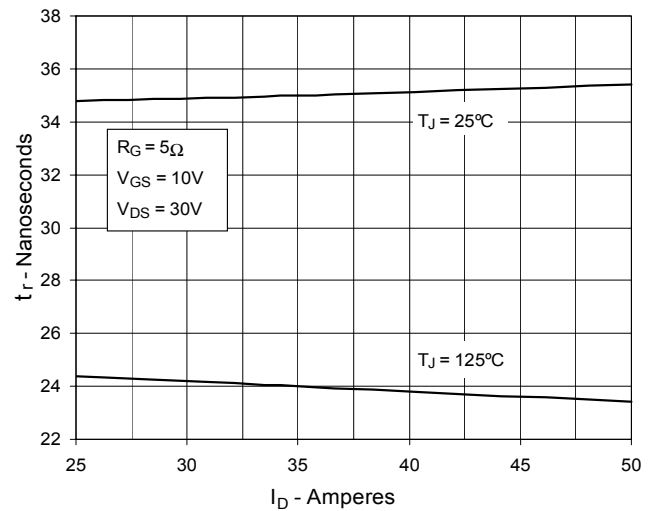


Fig. 15. Resistive Turn-on
Switching Times vs. Gate Resistance

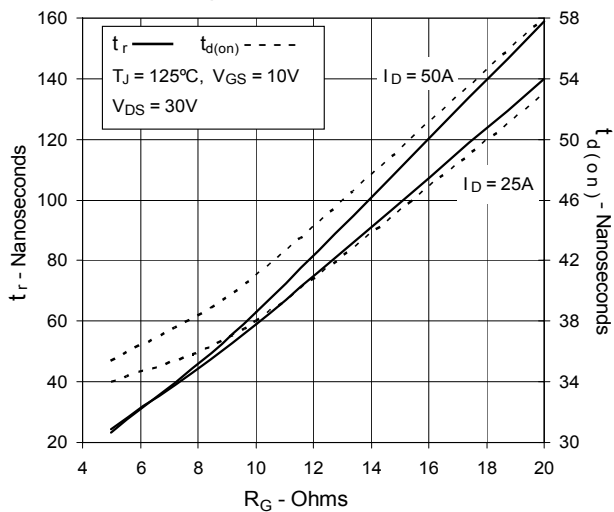


Fig. 16. Resistive Turn-off
Switching Times vs. Junction Temperature

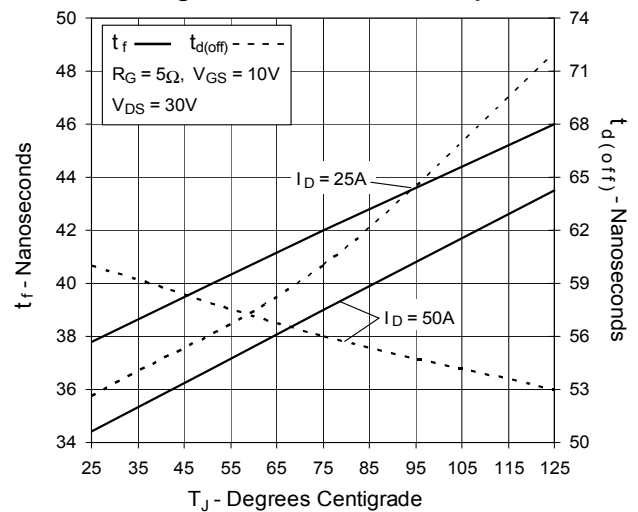


Fig. 17. Resistive Turn-off
Switching Times vs. Drain Current

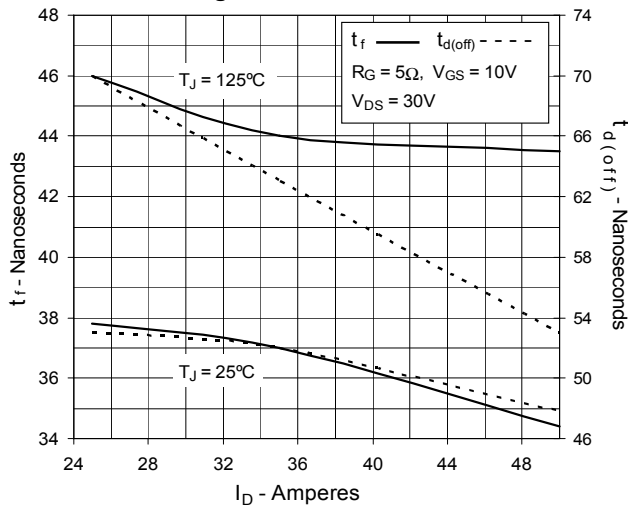


Fig. 18. Resistive Turn-off
Switching Times vs. Gate Resistance

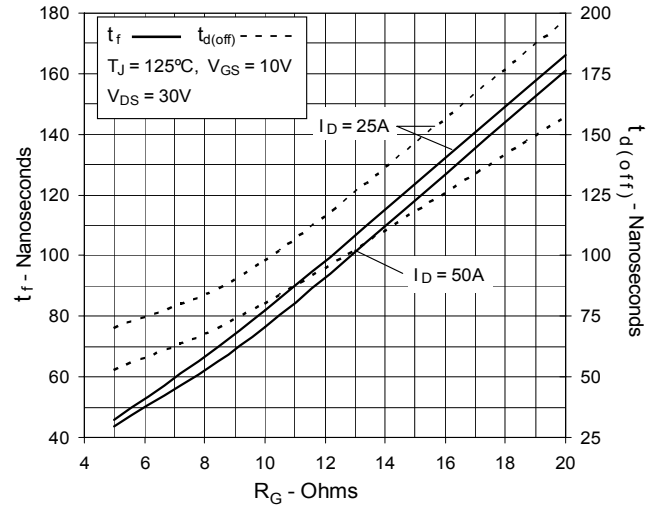
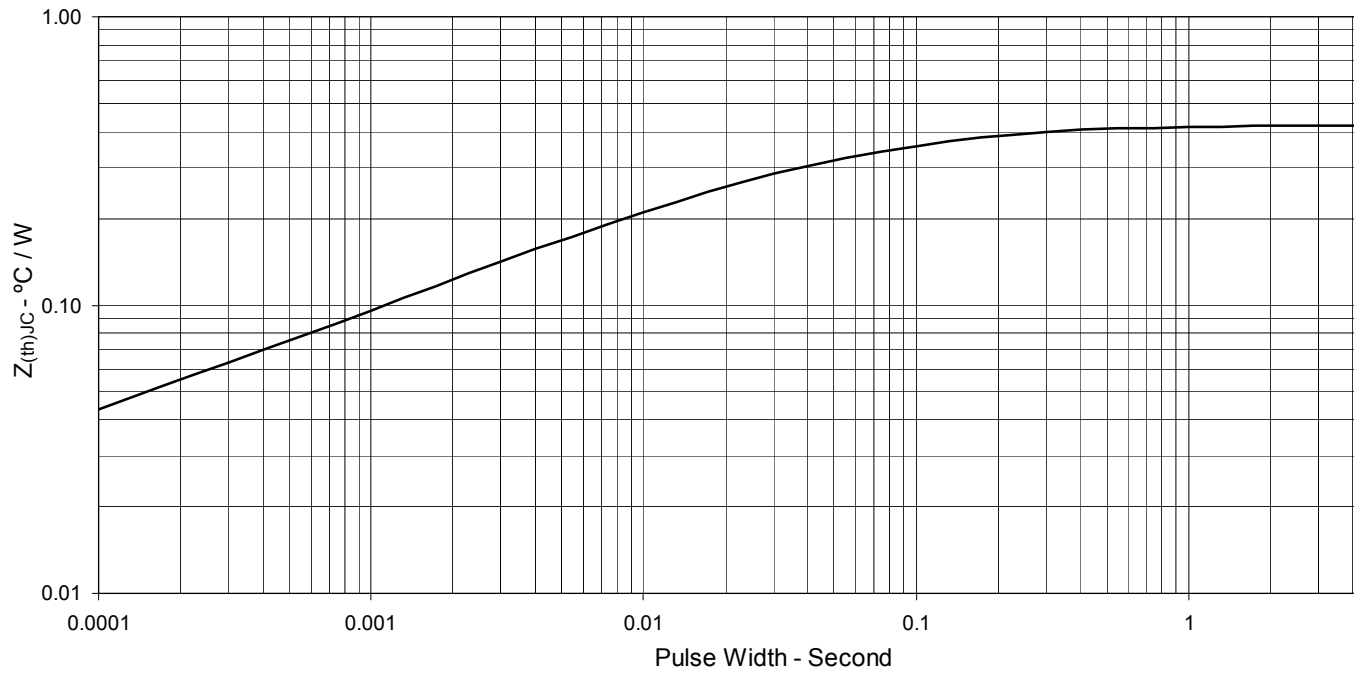


Fig. 19. Maximum Transient Thermal Impedance





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