

Trench™ Power MOSFET

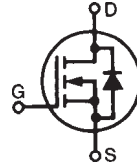
IXTP60N28TM-A

$$V_{DSS} = 280V$$

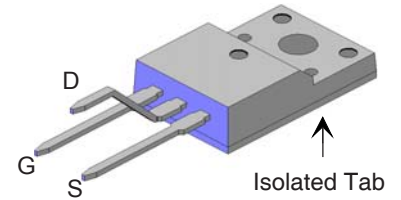
$$I_{D25} = 18A$$

$$R_{DS(on)} \leq 58m\Omega$$

N-Channel Enhancement Mode
Avalanche Rated



OVERMOLDED TO-220 W/ FORMED
LEAD (IXTP...M-A)



G = Gate D = Drain
S = Source

Symbol	Test Conditions	Maximum Ratings	
V_{DSS}	$T_J = 25^\circ C$ to $150^\circ C$	280	V
V_{DGR}	$T_J = 25^\circ C$ to $150^\circ C$, $R_{GS} = 1M\Omega$	280	V
V_{GSS}	Continuous	± 20	V
V_{GSM}	Transient	± 30	V
I_{D25}	$T_C = 25^\circ C$	18	A
I_{DM}	$T_C = 25^\circ C$, pulse width limited by T_{JM}	140	A
dV/dt	$I_S \leq I_{DM}$, $V_{DD} \leq V_{DSS}$, $T_J \leq 150^\circ C$	15	V/ns
P_D	$T_C = 25^\circ C$	50	W
T_J		-55 ... +150	$^\circ C$
T_{JM}		150	$^\circ C$
T_{stg}		-55 ... +150	$^\circ C$
T_L	1.6mm (0.062 in.) from case for 10s	300	$^\circ C$
T_{SOLD}	Plastic body for 10 seconds	260	$^\circ C$
M_d	Mounting torque	1.13 / 10	Nm/lb.in.
Weight		2.5	g

Features

- Plastic overmolded tab for electrical isolation
- Low $R_{DS(ON)}$
 - for minimum on-state conduction losses
- Fast switching

Applications

- PDP Screen Drivers, ER circuit

Symbol	Test Conditions ($T_J = 25^\circ C$, unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{DSS}	$V_{GS} = 0V$, $I_D = 1mA$	280		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	3.0		5.0 V
I_{GSS}	$V_{GS} = \pm 20V$, $V_{DS} = 0V$			± 100 nA
I_{DSS}	$V_{DS} = V_{DSS}$ $V_{GS} = 0V$ $T_J = 125^\circ C$			5 μA 250 μA
$R_{DS(on)}$	$V_{GS} = 10V$, $I_D = 30A$, Note 1			58 m Ω

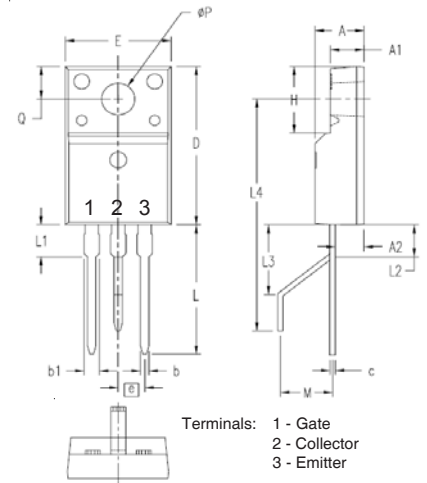
Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$(T_J = 25^\circ\text{C unless otherwise specified})$				
g_{fs}	$V_{DS} = 10\text{V}, I_D = 30\text{A}, \text{Note 1}$	40	70	S
C_{iss}	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$		5070	pF
C_{oss}			455	pF
C_{rss}			54	pF
$Q_{g(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 30\text{A}$		84	nC
Q_{gs}			24	nC
Q_{gd}			23	nC
$t_{d(on)}$	Resistive Switching Times $T_J = 25^\circ\text{C}$ $V_{GS} = 15\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 30\text{A}$ $R_G = 15\Omega$ (External)		15	ns
t_r			24	ns
$t_{d(off)}$			56	ns
t_f			23	ns
$t_{d(on)}$	Resistive Switching Times $T_J = 125^\circ\text{C}$ $V_{GS} = 15\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 30\text{A}$ $R_G = 15\Omega$ (External)		14	ns
t_r			22	ns
$t_{d(off)}$			60	ns
t_f			17	ns
R_{thJC}				2.5 $^\circ\text{C/W}$

Source-Drain Diode

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$T_J = 25^\circ\text{C unless otherwise specified}$				
I_s	$V_{GS} = 0\text{V}$			60 A
I_{SM}	Repetitive, pulse width limited by T_{JM}			180 A
V_{SD}	$I_F = I_s, V_{GS} = 0\text{V}, \text{Note 1}$			1.3 V
t_{rr}	$I_F = 30\text{A}, -di/dt = 150\text{A}/\mu\text{s}, V_R = 100\text{V}, V_{GS} = 0\text{V}$		170	ns

Notes: 1. Pulse test, $t \leq 300\mu\text{s}$; duty cycle, $d \leq 2\%$.

OVERMOLDED TO-220 W/ FORMED LEAD (IOTP...M-A)



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.177	.193	4.50	4.90
A1	.092	.108	2.34	2.74
A2	.101	.117	2.56	2.96
b	.028	.035	0.70	0.90
b1	.050	.058	1.27	1.47
c	.016	.024	0.40	0.60
D	.617	.633	15.67	16.07
E	.392	.408	9.96	10.36
e	.100 BSC		2.54 BSC	
H	.255	.271	6.48	6.88
L	.500	.523	12.70	13.30
L1	.119	.135	3.03	3.43
L2	.098	.138	2.50	3.50
L3	.256	.295	6.50	7.50
L4	.906	.945	23.00	24.00
M	.177	.216	4.50	5.50
$\emptyset P$.121	.129	3.08	3.28
Q	.126	.134	3.20	3.40

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.

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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	7,157,338B2
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	

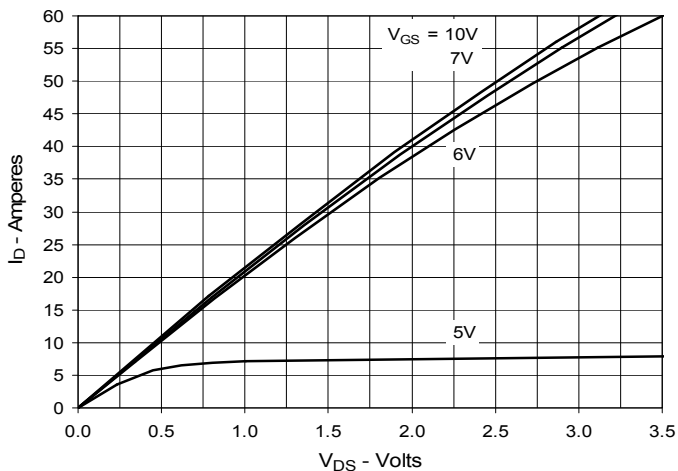
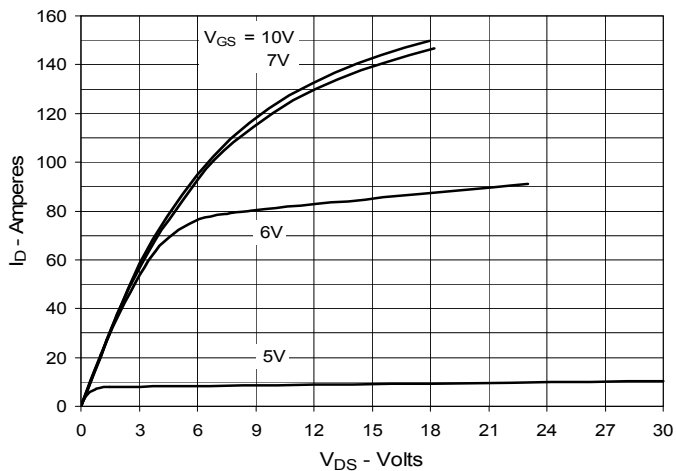
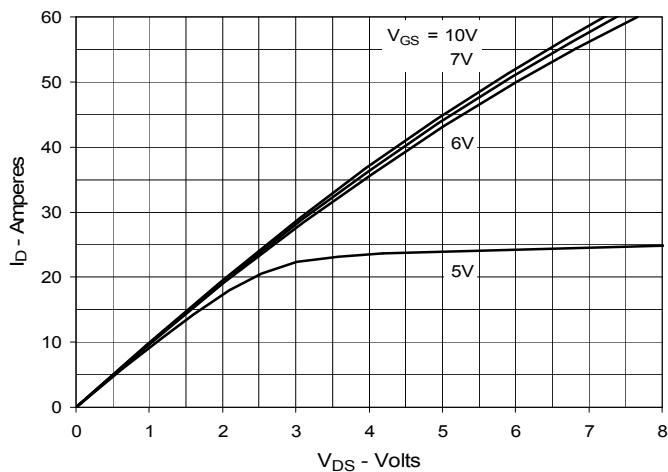
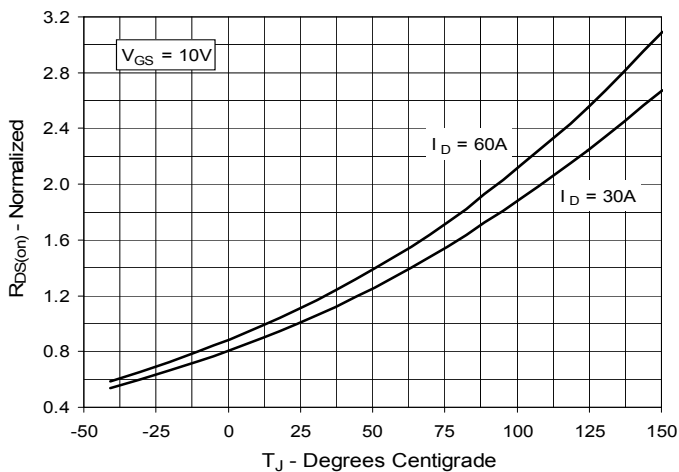
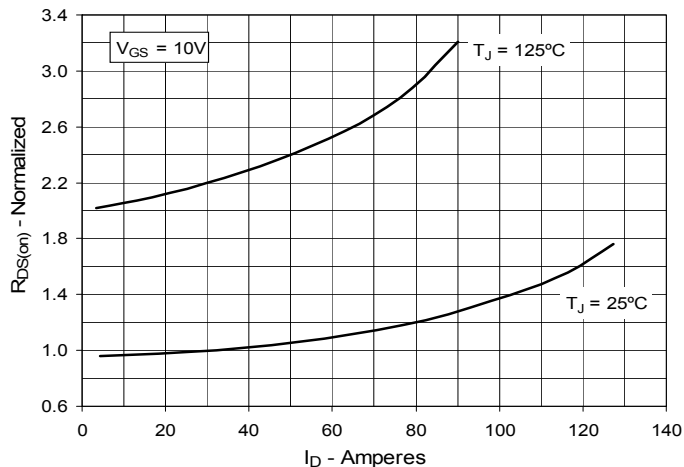
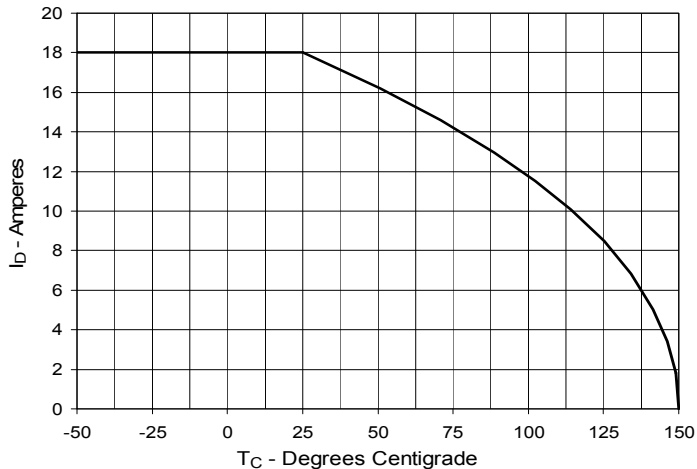
**Fig. 1. Output Characteristics
@ 25°C**

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

**Fig. 3. Output Characteristics
@ 125°C**

**Fig. 4. $R_{DS(on)}$ Normalized to $I_D = 30\text{A}$ Value
vs. Junction Temperature**

**Fig. 5. $R_{DS(on)}$ Normalized to $I_D = 30\text{A}$ Value
vs. Drain Current**

**Fig. 6. Maximum Drain Current vs.
Case Temperature**


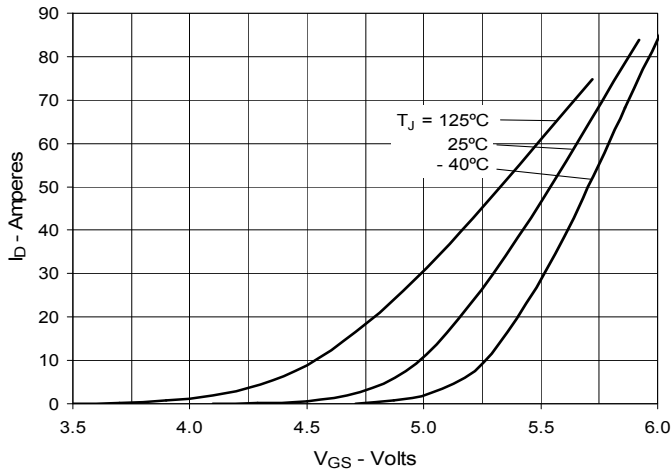
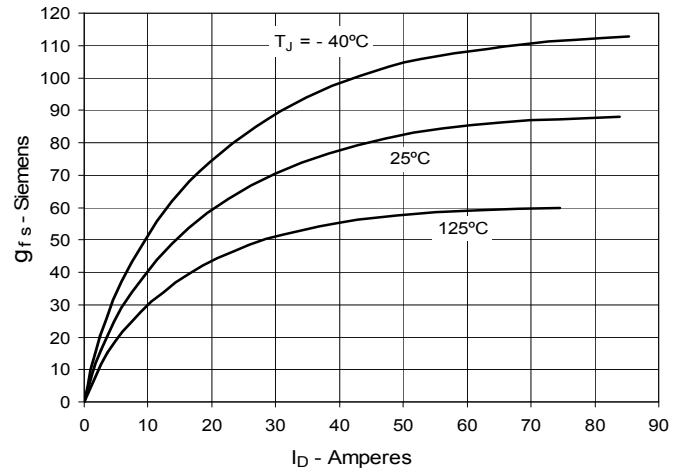
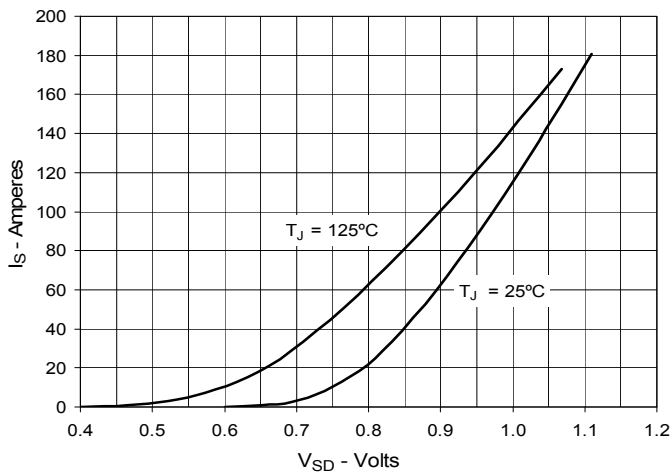
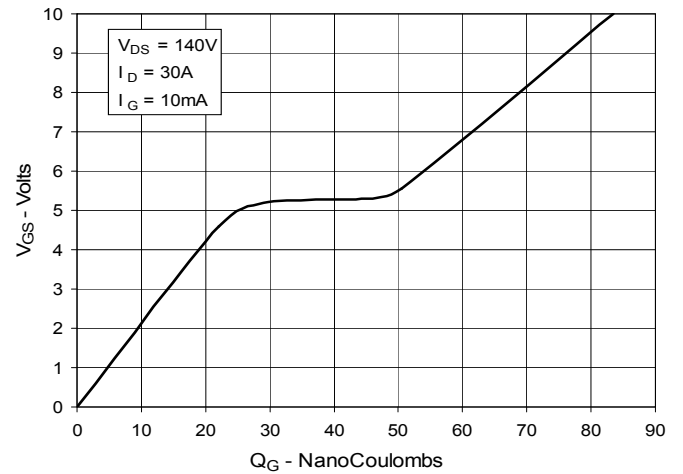
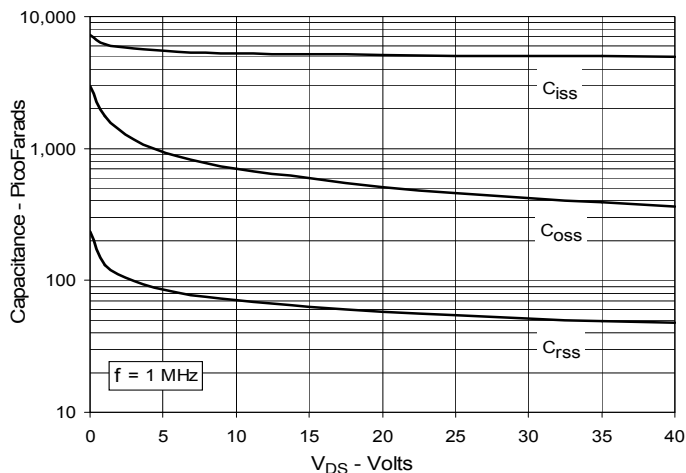
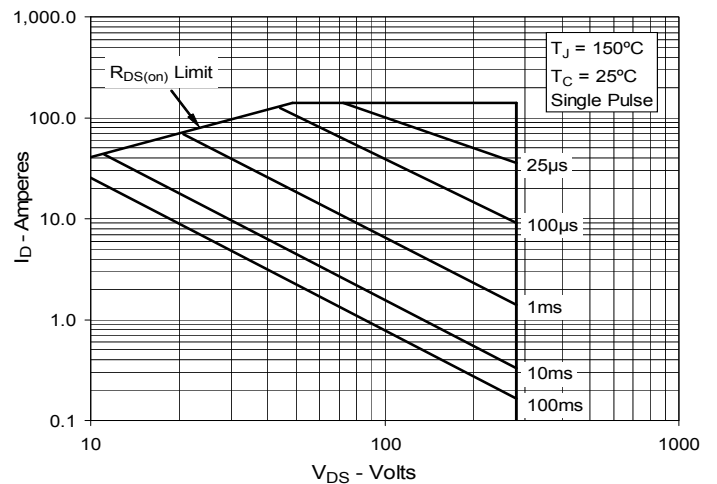
Fig. 7. Input Admittance

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

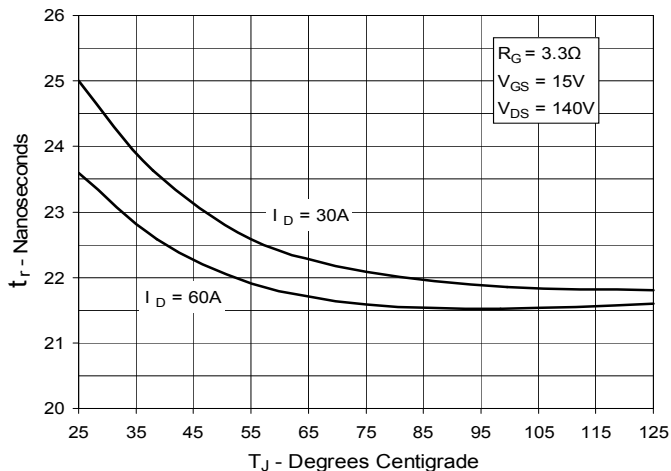


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

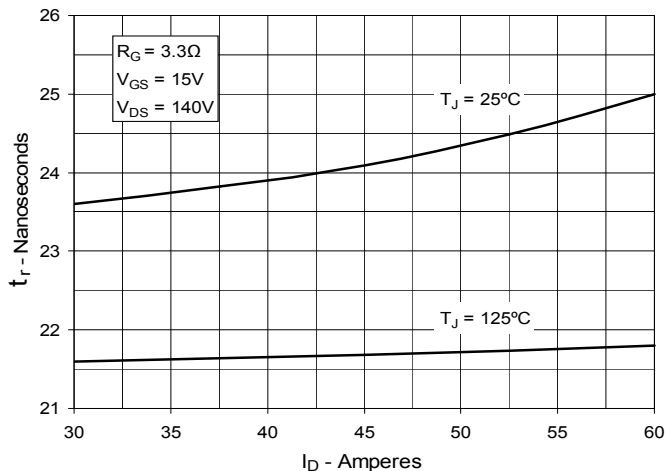


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

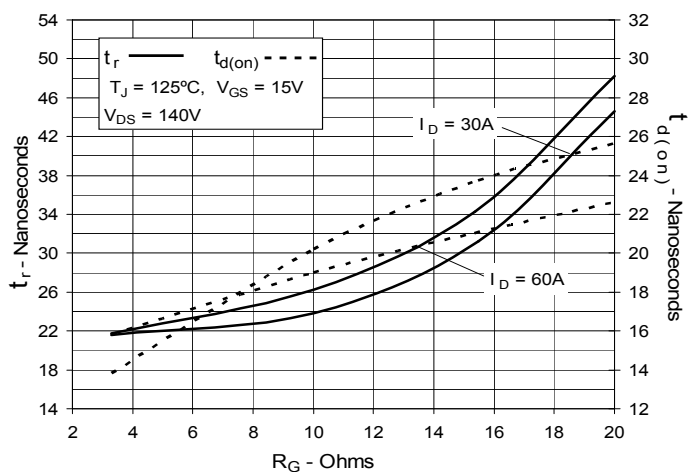


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

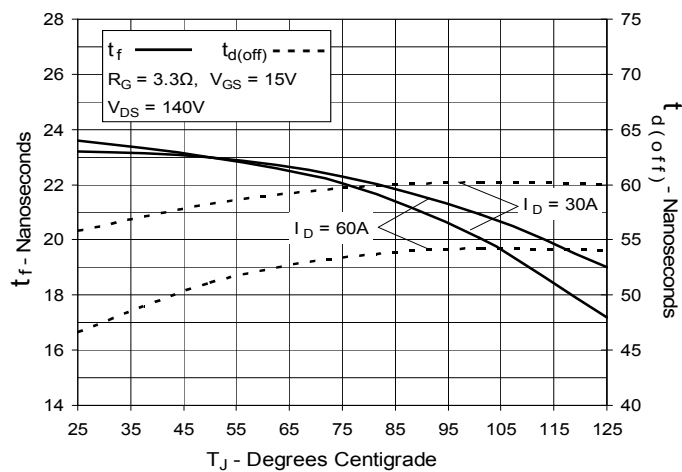


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

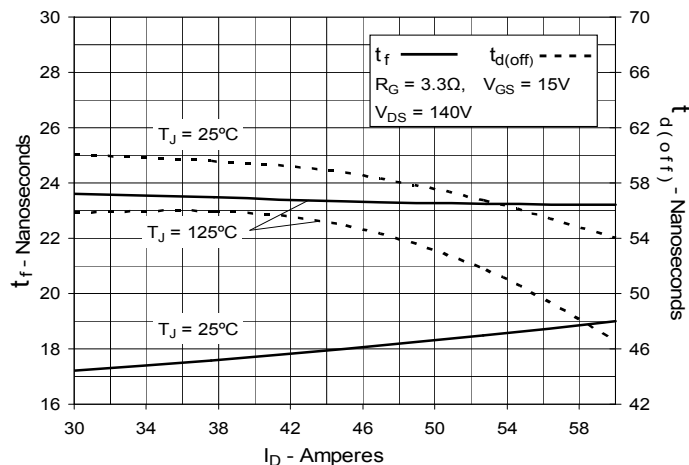


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance

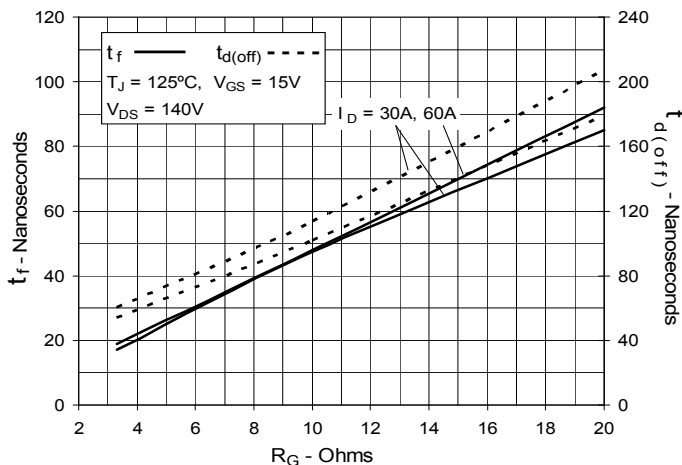


Fig. 19. Maximum Transient Thermal Impedance

