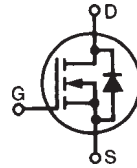


# TrenchMV™ Power MOSFET

## IXTA60N10T IXTP60N10T

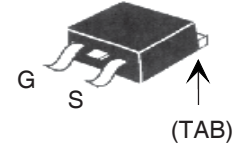
N-Channel Enhancement Mode  
Avalanche Rated



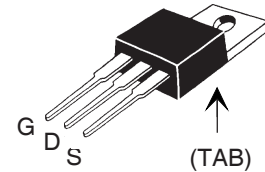
$V_{DSS} = 100V$   
 $I_{D25} = 60A$   
 $R_{DS(on)} \leq 18m\Omega$

Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $175^\circ C$	100	V
$V_{DGR}$	$T_J = 25^\circ C$ to $175^\circ C$ , $R_{GS} = 1M\Omega$	100	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ C$	60	A
$I_{DM}$	$T_C = 25^\circ C$ , pulse width limited by $T_{JM}$	180	A
$I_A$	$T_C = 25^\circ C$	10	A
$E_{AS}$	$T_C = 25^\circ C$	500	mJ
$P_D$	$T_C = 25^\circ C$	176	W
$T_J$		-55 ... +175	$^\circ C$
$T_{JM}$		175	$^\circ C$
$T_{stg}$		-55 ... +175	$^\circ C$
$T_L$	1.6mm (0.062in.) from case for 10s	300	$^\circ C$
$T_{SOLD}$	Plastic body for 10 seconds	260	$^\circ C$
$M_d$	Mounting torque (TO-220)	1.13/10	Nm/lb.in
Weight	TO-263	2.5	g
	TO-220	3.0	g

TO-263 (IXTA)



TO-220 (IXTP)



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

### Features

- International standard packages
- 175°C Operating Temperature
- Avalanche Rated
- Low  $R_{DS(on)}$

### Advantages

- Easy to mount
- Space savings
- High power density

### Applications

- DC/DC Converters and Off-line UPS
- Primary Switch for 24V and 48V Systems
- High Current Switching Applications
- Distributed Power Architectures and VRMs
- Electronic Valve Train Systems
- High Voltage Synchronous Rectifier

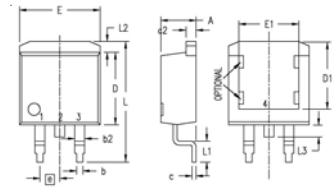
Symbol	Test Conditions ( $T_J = 25^\circ C$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 250\mu A$	100		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 50\mu A$	2.5		V
$I_{GSS}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$			$\pm 100$ nA
$I_{DSS}$	$V_{DS} = V_{DSS}$			1 $\mu A$
	$V_{GS} = 0V$ $T_J = 150^\circ C$			100 $\mu A$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 25A$ , Notes 1, 2	14.8		18 m $\Omega$

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$(T_J = 25^\circ\text{C unless otherwise specified})$				
$g_{fs}$	$V_{DS} = 10\text{V}, I_D = 0.5 \cdot I_{D25}, \text{ Note 1}$	25	42	S
$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$		2650	pF
$C_{oss}$			335	pF
$C_{rss}$			60	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 10\text{A}$ $R_G = 15\Omega \text{ (External)}$		27	ns
$t_r$			40	ns
$t_{d(off)}$			43	ns
$t_f$			37	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 10\text{A}$		49	nC
$Q_{gs}$			15	nC
$Q_{gd}$			11	nC
$R_{thJC}$				0.85 $^\circ\text{C/W}$
$R_{thCH}$	TO-220		0.50	$^\circ\text{C/W}$

**Source-Drain Diode**

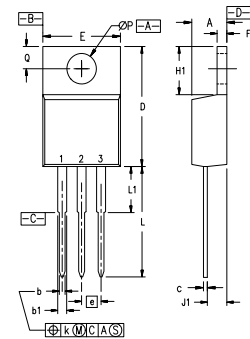
Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$T_J = 25^\circ\text{C unless otherwise specified}$				
$I_S$	$V_{GS} = 0\text{V}$			60 A
$I_{SM}$	Repetitive, pulse width limited by $T_{JM}$			240 A
$V_{SD}$	$I_F = 25\text{A}, V_{GS} = 0\text{V}, \text{ Note 1}$			1.2 V
$t_{rr}$	$I_F = 0.5 \cdot I_S, V_{GS} = 0\text{V}$ $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 0.5 \cdot V_{DSS}$		59	ns
$I_{RM}$			3.8	A
$Q_{RM}$			112	nC

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

**TO-263 (IXTA) Outline**


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

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.06	4.83	.160	.190
A1	2.03	2.79	.080	.110
b	0.51	0.99	.020	.039
b2	1.14	1.40	.045	.055
c	0.46	0.74	.018	.029
c2	1.14	1.40	.045	.055
D	8.64	9.65	.340	.380
D1	7.11	8.13	.280	.320
E	9.65	10.29	.380	.405
E1	6.86	8.13	.270	.320
e	2.54	BSC	.100	BSC
L	14.61	15.88	.575	.625
L1	2.29	2.79	.090	.110
L2	1.02	1.40	.040	.055
L3	1.27	1.78	.050	.070
L4	0	0.38	0	.015
R	0.46	0.74	.018	.029

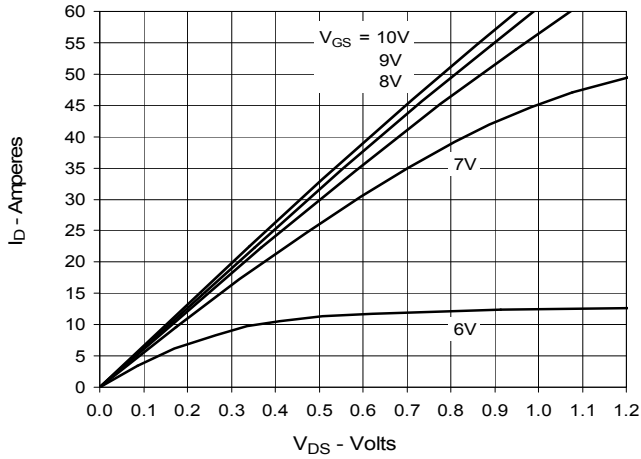
**TO-220 (IXTP) Outline**


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

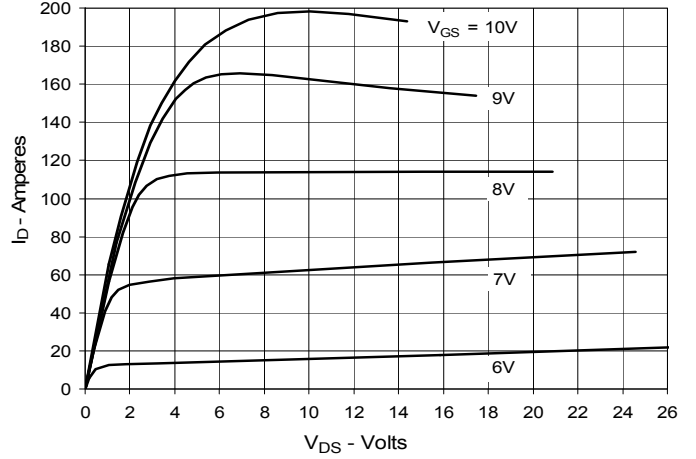
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

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

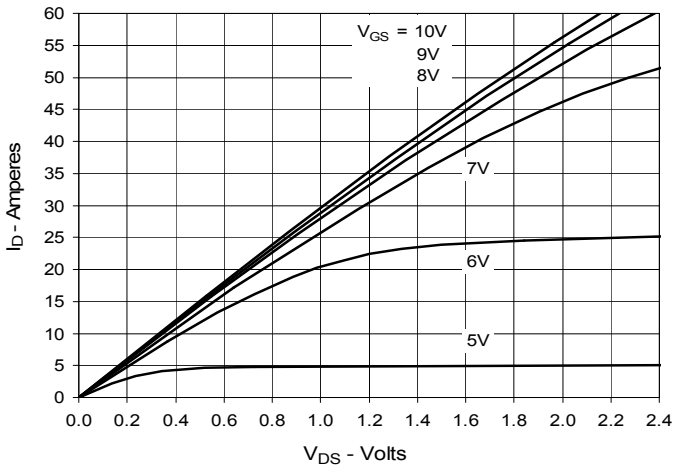
**Fig. 1. Output Characteristics @ 25°C**



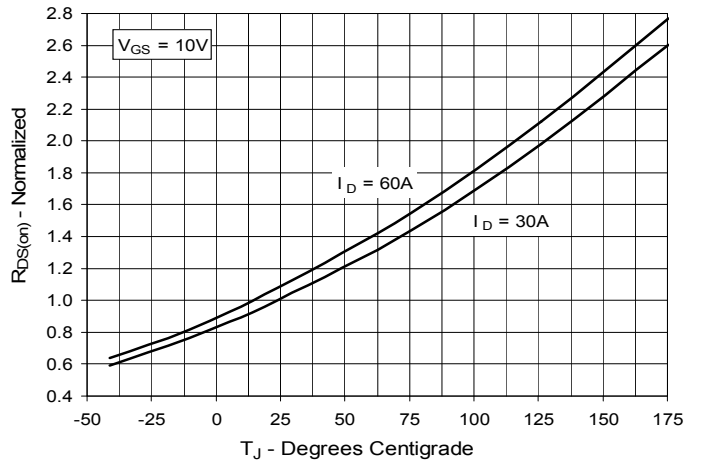
**Fig. 2. Extended Output Characteristics @ 25°C**



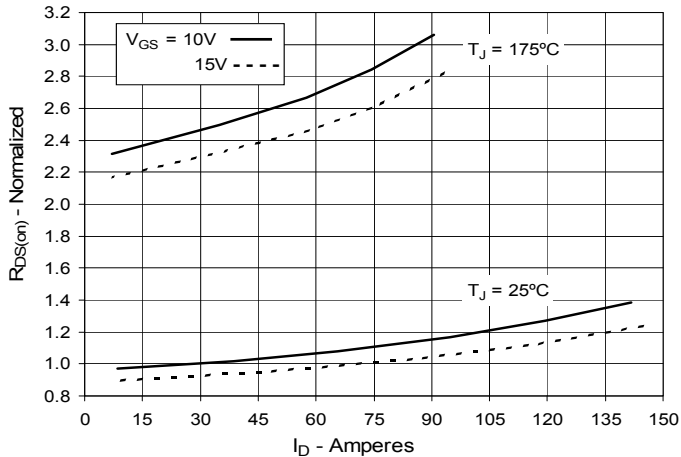
**Fig. 3. Output Characteristics @ 150°C**



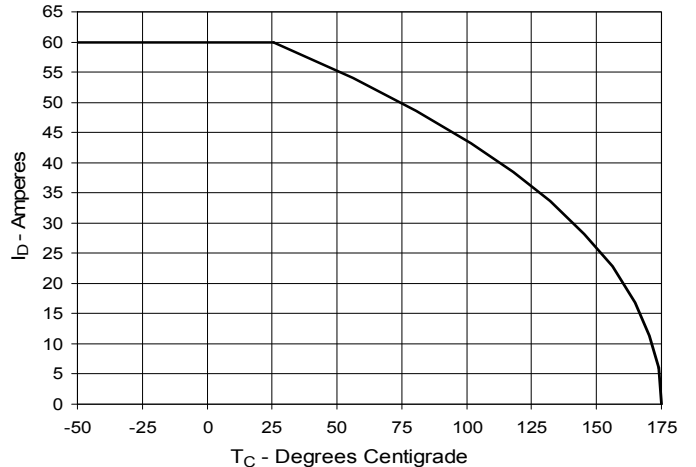
**Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 30A$  Value vs. Junction Temperature**



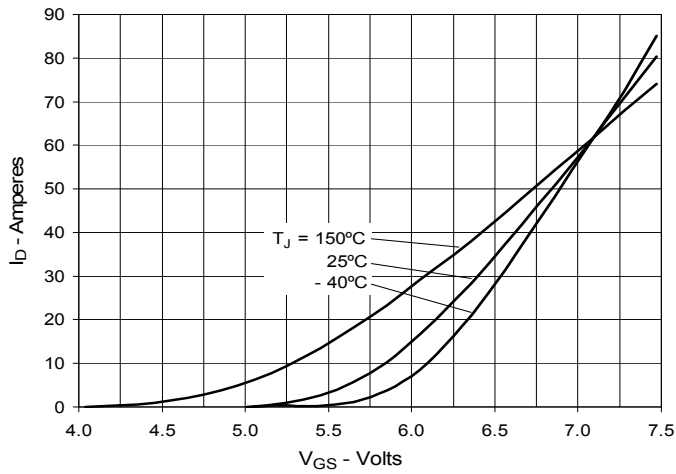
**Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 30A$  Value vs. Drain Current**



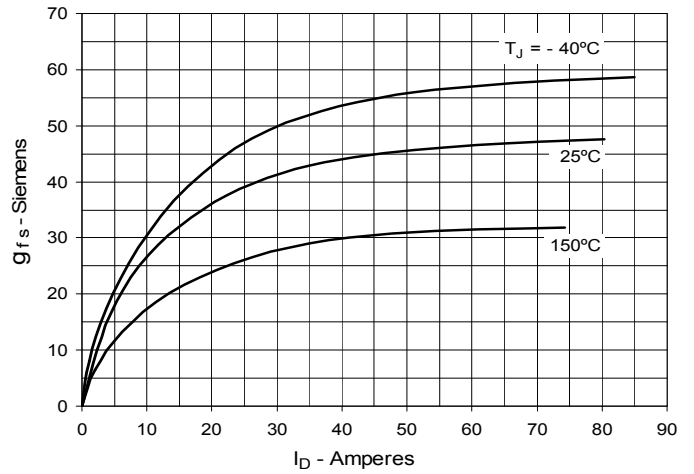
**Fig. 6. Drain Current vs. Case Temperature**



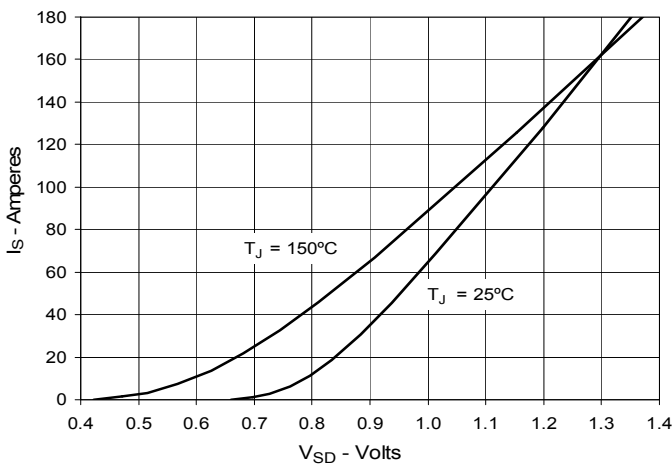
**Fig. 7. Input Admittance**



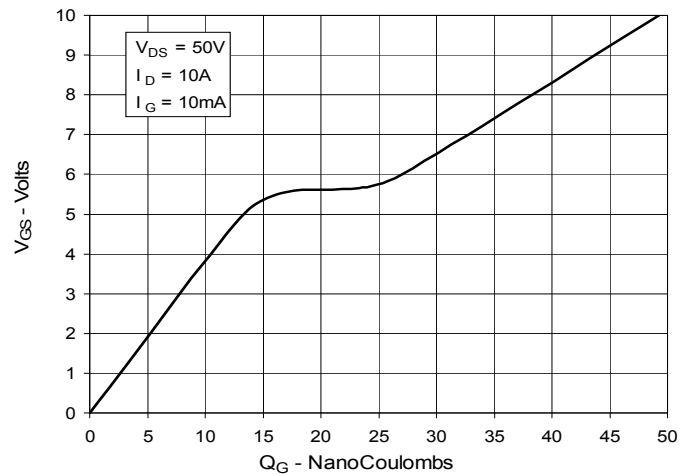
**Fig. 8. Transconductance**



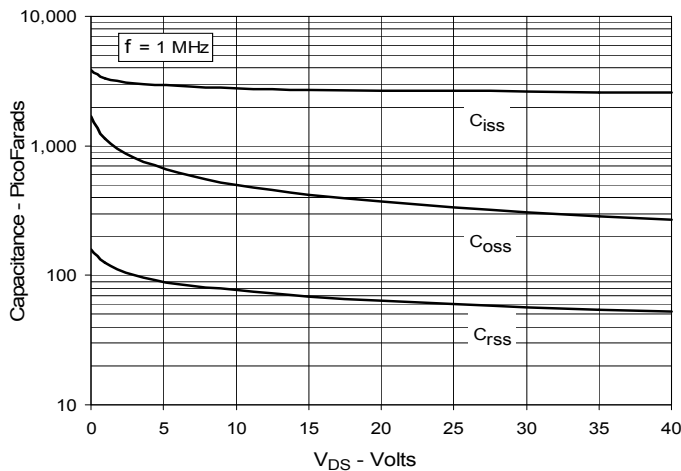
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



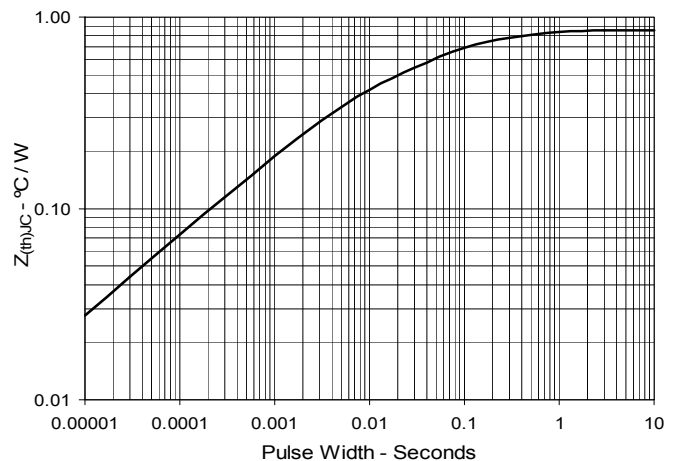
**Fig. 10. Gate Charge**



**Fig. 11. Capacitance**

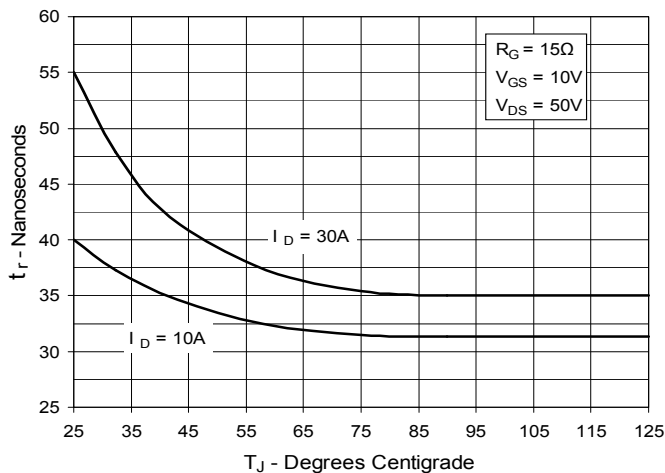


**Fig. 12. Maximum Transient Thermal Impedance**

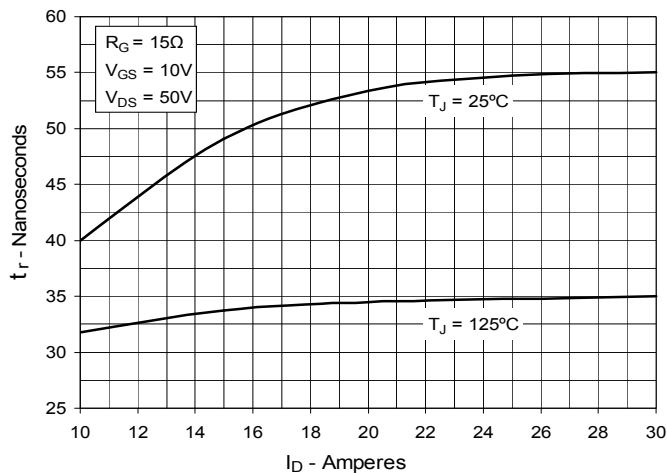


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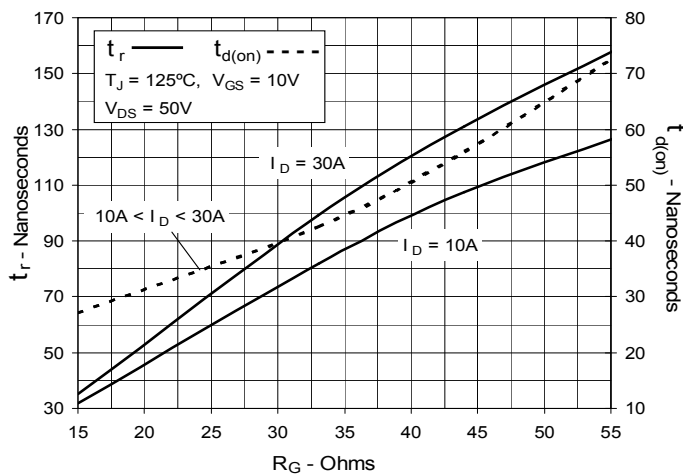
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



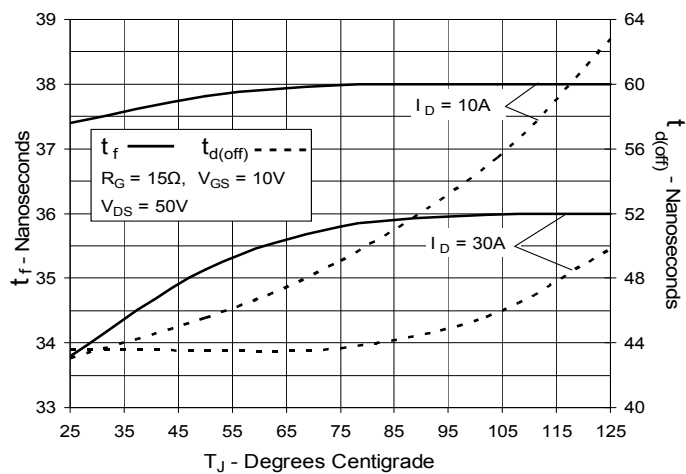
**Fig. 14. Resistive Turn-on Rise Time vs. Drain Current**



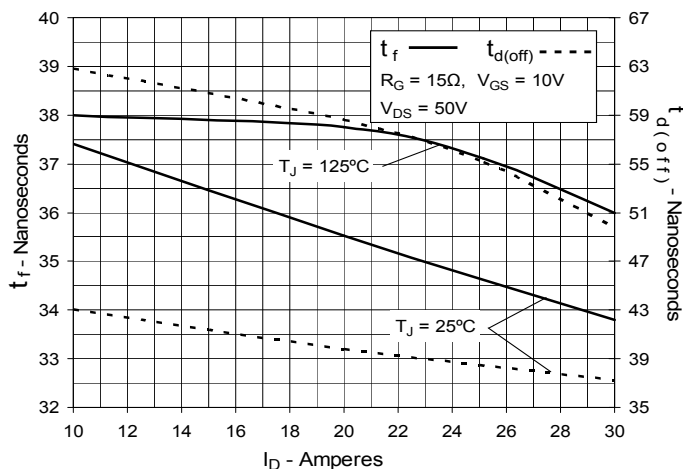
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



**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**

