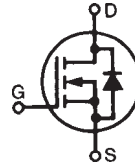
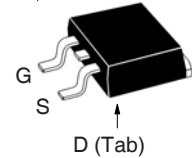
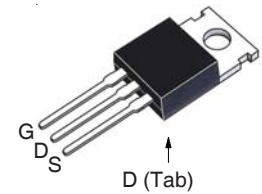


**Trench™ HiperFET™  
Power MOSFET**
**IXFA130N10T  
IXFP130N10T**
 $V_{DSS} = 100V$   
 $I_{D25} = 130A$   
 $R_{DS(on)} \leq 9.1m\Omega$ 

 N-Channel Enhancement Mode  
 Avalanche Rated  
 Fast Intrinsic Diode

**TO-263  
(IXFA)**

**TO-220  
(IXFP)**

 G = Gate      D = Drain  
 S = Source    Tab = Drain

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
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ C$	130	A
$I_{LRMS}$	Lead Current Limit, RMS	120	A
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$	350	A
$I_A$	$T_C = 25^\circ C$	65	A
$E_{AS}$	$T_C = 25^\circ C$	750	mJ
$P_D$	$T_C = 25^\circ C$	360	W
$T_J$		-55 ... +175	$^\circ C$
$T_{JM}$		175	$^\circ C$
$T_{stg}$		-55 ... +175	$^\circ C$
$T_L$	Maximum Lead Temperature for Soldering	300	$^\circ C$
$T_{SOLD}$	1.6 mm (0.062in.) from Case for 10s	260	$^\circ C$
$F_C$	Mounting Force (TO-263)	10..65 / 2.2..14.6	N/lb
$M_d$	Mounting Torque (TO-220)	1.13 / 10	Nm/lb.in
<b>Weight</b>	TO-263	2.5	g
	TO-220	3.0	g

**Features**

- Ultra-Low On Resistance
- Avalanche Rated
- Low Package Inductance
  - Easy to Drive and to Protect
- $175^\circ C$  Operating Temperature
- Fast Intrinsic Diode

**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 Architectures and VRMs
- Electronic Valve Train Systems
- High Current Switching Applications
- 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
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 1mA$	2.5		V
$I_{GSS}$	$V_{GS} = \pm 20V$ , $V_{DS} = 0V$		$\pm 200$	nA
$I_{DSS}$	$V_{DS} = V_{DSS}$ , $V_{GS} = 0V$ $T_J = 150^\circ C$		10 500	$\mu A$ $\mu A$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 25A$ , Notes 1, 2		9.1	m $\Omega$

Symbol	Test Conditions	Characteristic Values				
		Min.	Typ.	Max.		
$(T_J = 25^\circ\text{C Unless Otherwise Specified})$						
$g_{fs}$	$V_{DS} = 10\text{V}, I_D = 60\text{A}, \text{Note 1}$	55	93	S		
$C_{iss}$	$V_{GS} = 0\text{V}, V_{DS} = 25\text{V}, f = 1\text{MHz}$		5080	pF		
$C_{oss}$					630	pF
$C_{rss}$					95	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 25\text{A}$ $R_G = 5\Omega \text{ (External)}$		30	ns		
$t_r$					47	ns
$t_{d(off)}$					44	ns
$t_f$					28	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}, V_{DS} = 0.5 \cdot V_{DSS}, I_D = 25\text{A}$		104	nC		
$Q_{gs}$					30	nC
$Q_{gd}$					29	nC
$R_{thJC}$	TO-220		0.50	0.42	$^\circ\text{C/W}$	
$R_{thCH}$				$^\circ\text{C/W}$		

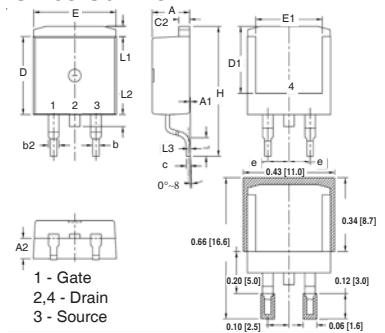
**Source-Drain Diode**

Symbol	Test Conditions	Characteristic Values			
		Min.	Typ.	Max.	
$(T_J = 25^\circ\text{C Unless Otherwise Specified})$					
$I_S$	$V_{GS} = 0\text{V}$			130	A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			350	A
$V_{SD}$	$I_F = 25\text{A}, V_{GS} = 0\text{V}, \text{Note 1}$			1.0	V
$t_{rr}$	$I_F = 65\text{A}, -di/dt = 100\text{A}/\mu\text{s}$ $V_R = 0.5 \cdot V_{DSS}, V_{GS} = 0\text{V}$		67	ns	
$I_{RM}$					4.7
$Q_{rr}$			160	nC	

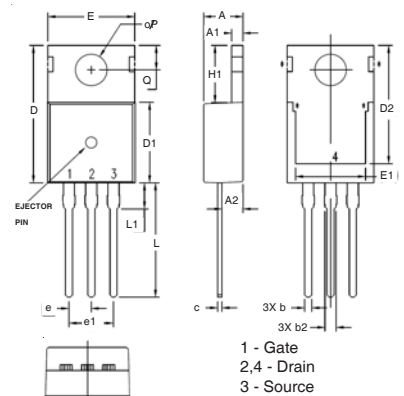
- Notes: 1. Pulse test,  $t \leq 300 \mu\text{s}$ ; duty cycle,  $d \leq 2\%$ .  
 2. On through-hole packages,  $R_{DS(on)}$  Kelvin test contact location must be 5 mm or less from the package body.

**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-263 Outline**


SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.170	.185	4.30	4.70
A1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
b	.028	.035	0.70	0.90
b2	.046	.060	1.18	1.52
C	.018	.024	0.45	0.60
C2	.049	.060	1.25	1.52
D	.340	.370	8.63	9.40
D1	.300	.327	7.62	8.30
E	.380	.410	9.65	10.41
E1	.270	.330	6.86	8.38
(e)	.100 BSC		2.54 BSC	
H	.580	.620	14.73	15.75
L	.075	.105	1.91	2.67
L1	.039	.060	1.00	1.52
L2	—	.070	—	1.77
(L3)	.010 BSC		0.254 BSC	

**TO-220 Outline**


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
b	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
c	.014	.026	0.35	0.65
D	.587	.626	14.90	15.90
D1	.335	.370	8.50	9.40
(D2)	.500	.531	12.70	13.50
E	.382	.406	9.70	10.30
(E1)	.283	.323	7.20	8.20
e	.100 BSC		2.54 BSC	
e1	.200 BSC		5.08 BSC	
H1	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
∅P	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20

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	7,157,338B2
	4,860,072	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 @  $T_J = 25^\circ\text{C}$

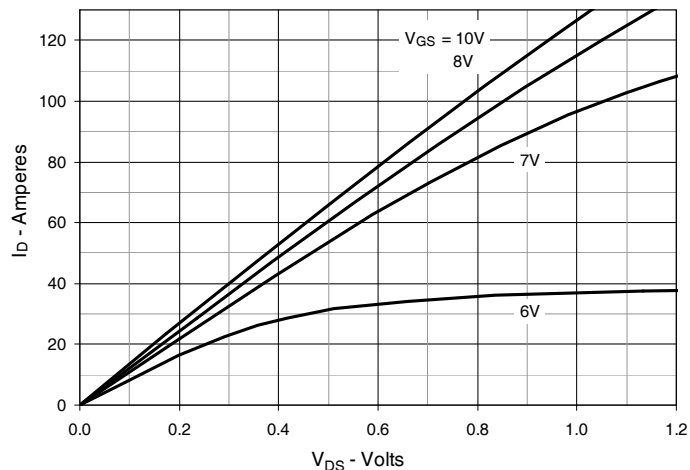


Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$

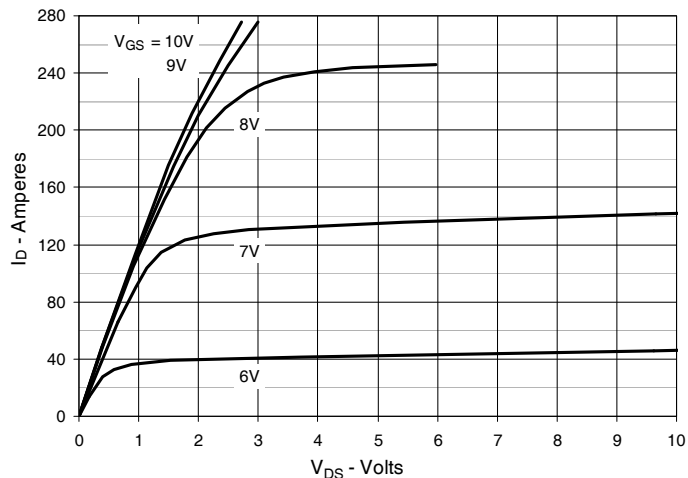


Fig. 3. Output Characteristics @  $T_J = 150^\circ\text{C}$

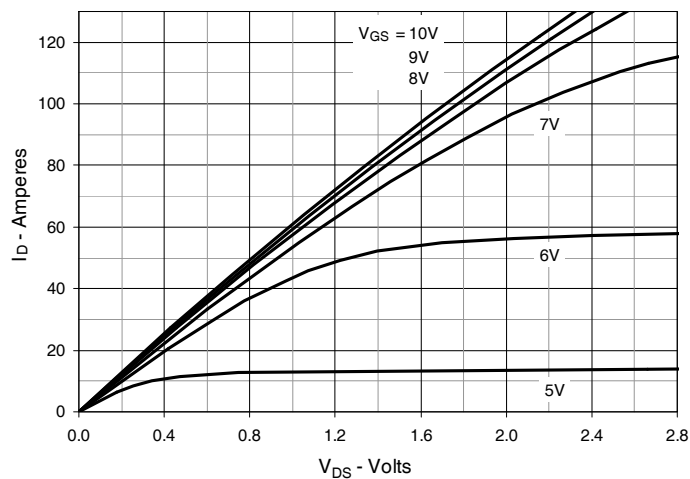


Fig. 4.  $R_{DS(on)}$  Normalized to  $I_D = 65\text{A}$  Value vs. Junction Temperature

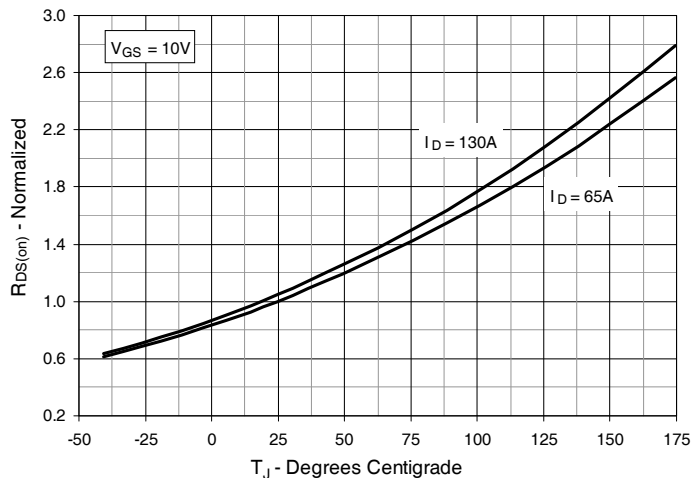


Fig. 5.  $R_{DS(on)}$  Normalized to  $I_D = 65\text{A}$  Value vs. Drain Current

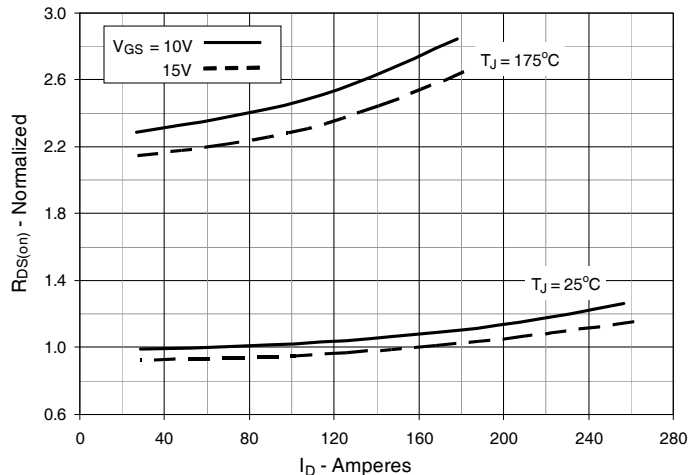


Fig. 6. Drain Current vs. Case Temperature

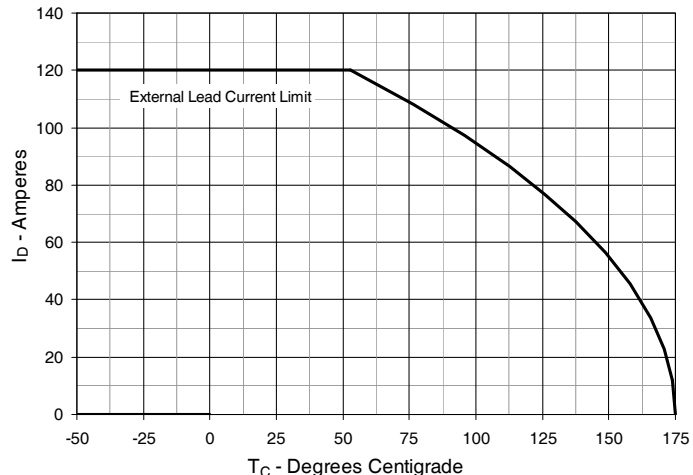


Fig. 7. Input Admittance

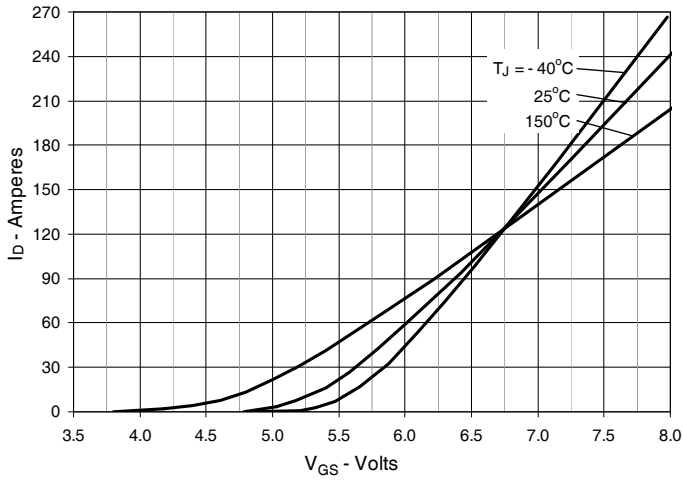


Fig. 8. Transconductance

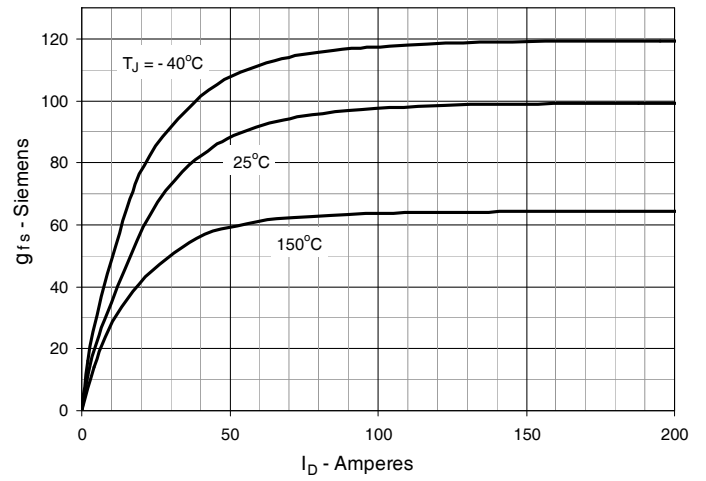


Fig. 9. Forward Voltage Drop of Intrinsic Diode

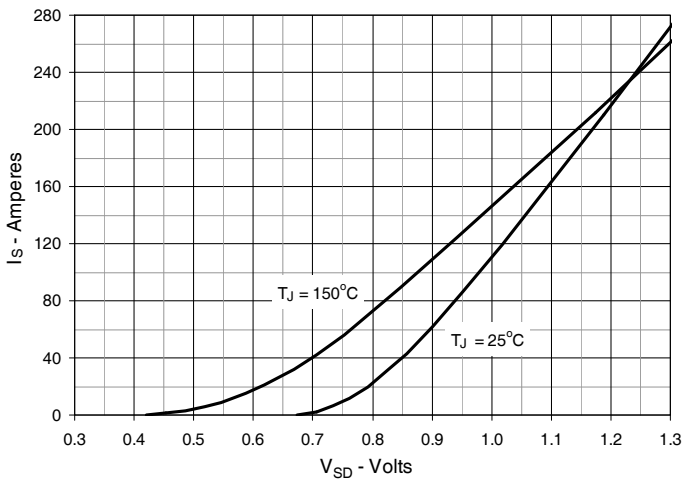


Fig. 10. Gate Charge

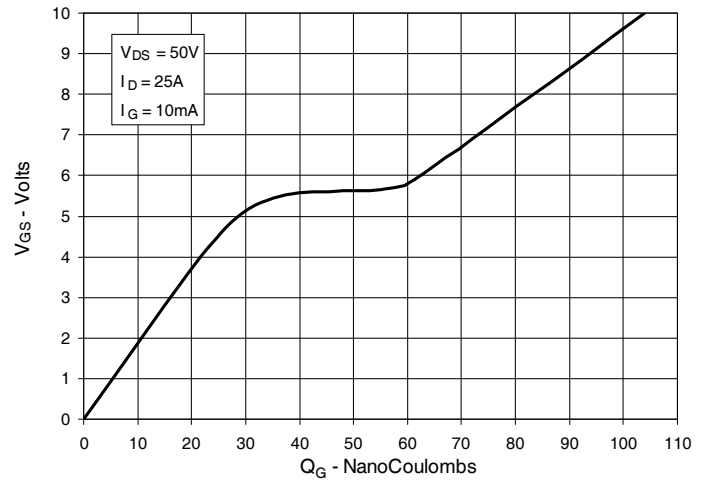


Fig. 11. Capacitance

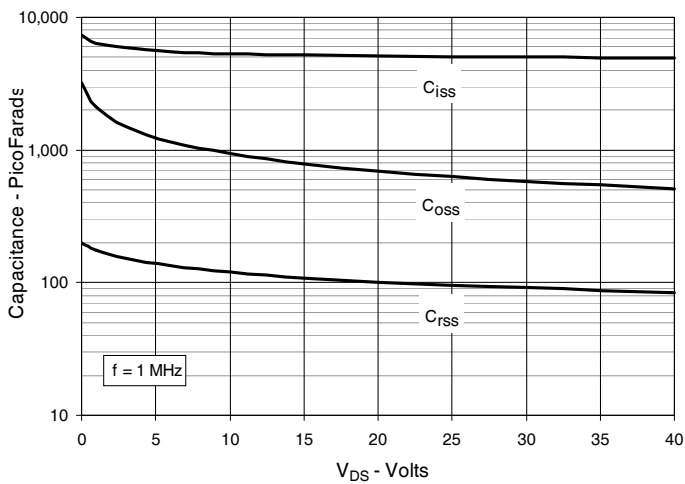
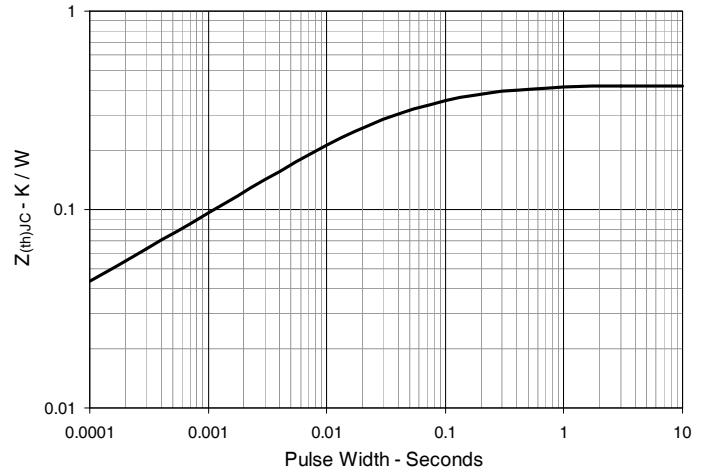
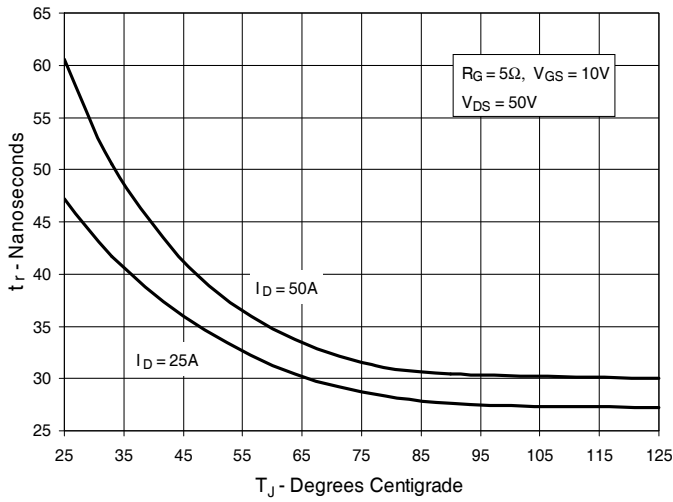


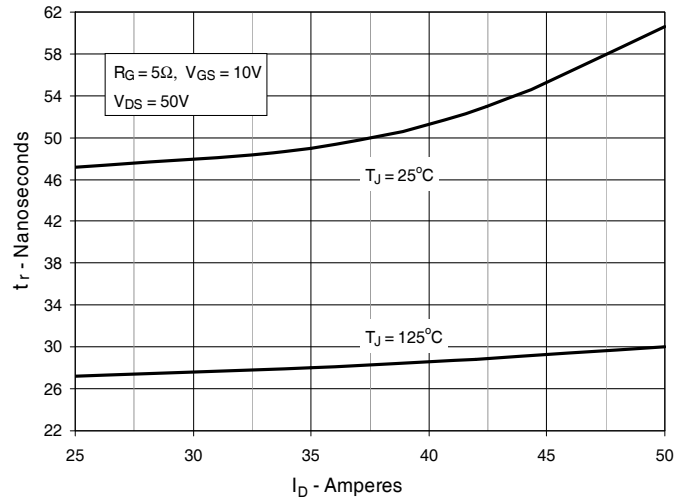
Fig. 12. Maximum Transient Thermal Impedance



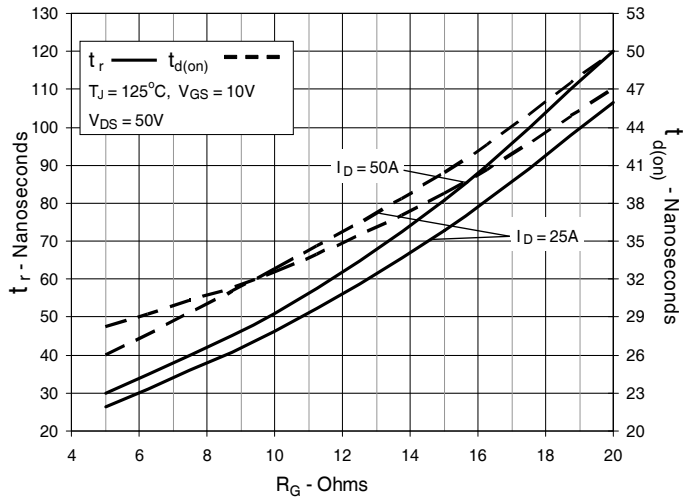
**Fig. 13. Resistive Turn-on**  
Rise Time vs. Junction Temperature



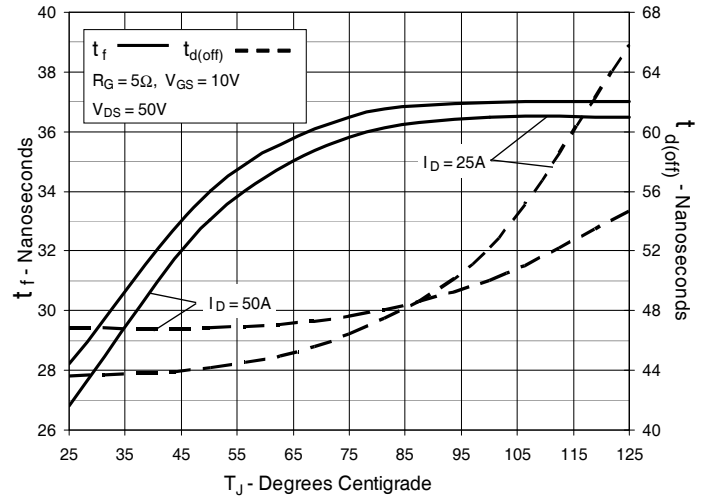
**Fig. 14. Resistive Turn-on**  
Rise Time vs. Drain Current



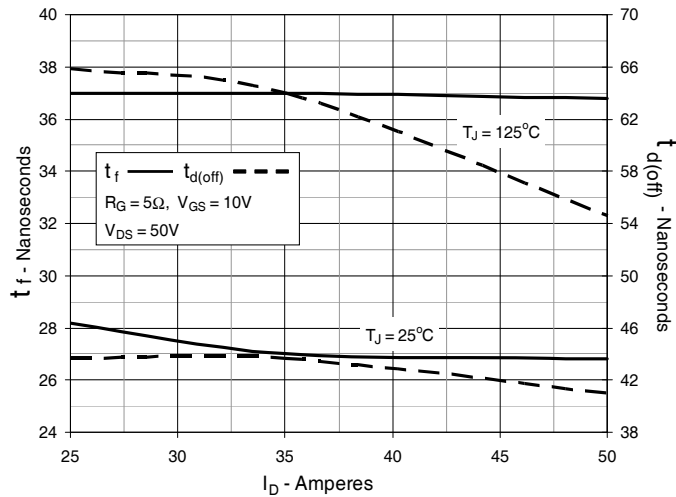
**Fig. 15. Resistive Turn-on**  
Switching Times vs. Gate Resistance



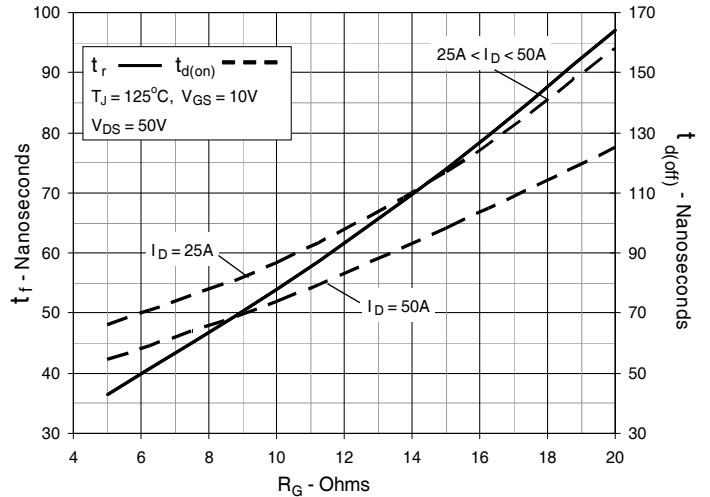
**Fig. 16. Resistive Turn-off**  
Switching Times vs. Junction Temperature



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



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





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