

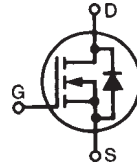
**TrenchT2™**  
**Power MOSFET**
**IXTA140N12T2**  
**IXTP140N12T2**

$$V_{DSS} = 120V$$

$$I_{D25} = 140A$$

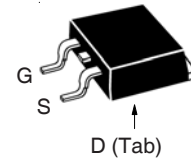
$$R_{DS(on)} \leq 10m\Omega$$

N-Channel Enhancement Mode  
 Avalanche Rated  
 Fast Intrinsic Rectifier

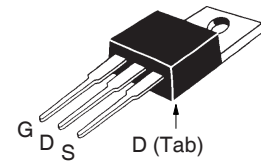


Symbol	Test Conditions	Maximum Ratings	
$V_{DSS}$	$T_J = 25^\circ C$ to $175^\circ C$	120	V
$V_{DGR}$	$T_J = 25^\circ C$ to $175^\circ C$ , $R_{GS} = 1M\Omega$	120	V
$V_{GSS}$	Continuous	$\pm 20$	V
$V_{GSM}$	Transient	$\pm 30$	V
$I_{D25}$	$T_C = 25^\circ C$	140	A
$I_{DM}$	$T_C = 25^\circ C$ , Pulse Width Limited by $T_{JM}$	350	A
$I_A$	$T_C = 25^\circ C$	70	A
$E_{AS}$	$T_C = 25^\circ C$	1.3	J
$P_D$	$T_C = 25^\circ C$	577	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	$^\circ C$
$T_{SOLD}$	Plastic Body for 10s	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-263AA (IXTA)



TO-220AB (IXTP)



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

**Features**

- International Standard Packages
- 175°C Operating Temperature
- Avalanche Rated
- Low  $R_{DS(on)}$
- Fast Intrinsic Rectifier
- High Current Handling Capability

**Advantages**

- Easy to Mount
- Space Savings
- High Power Density

**Applications**

- Synchronous Rectification
- DC/DC Converters and Off-Line UPS
- Primary- Side Switch
- High Current Switching Applications

Symbol	Test Conditions ( $T_J = 25^\circ C$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{DSS}$	$V_{GS} = 0V$ , $I_D = 250\mu A$	120		V
$V_{GS(th)}$	$V_{DS} = V_{GS}$ , $I_D = 250\mu A$	2.5		4.5 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 $\mu A$
				500 $\mu A$
$R_{DS(on)}$	$V_{GS} = 10V$ , $I_D = 0.5 \cdot I_{D25}$ , Notes 1, 2	8		10 m $\Omega$

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$V_{DS} = 10\text{V}$ , $I_D = 0.5 \cdot I_{D25}$ , Note 1	66	110	S
$C_{iss}$	$V_{GS} = 0\text{V}$ , $V_{DS} = 25\text{V}$ , $f = 1\text{MHz}$		9700	pF
$C_{oss}$			850	pF
$C_{rss}$			58	pF
$t_{d(on)}$	<b>Resistive Switching Times</b> $V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$ $R_G = 2\Omega$ (External)		27	ns
$t_r$			30	ns
$t_{d(off)}$			39	ns
$t_f$			17	ns
$Q_{g(on)}$	$V_{GS} = 10\text{V}$ , $V_{DS} = 0.5 \cdot V_{DSS}$ , $I_D = 0.5 \cdot I_{D25}$		174	nC
$Q_{gs}$			52	nC
$Q_{gd}$			40	nC
$R_{thJC}$	TO-220		0.50	$^\circ\text{C/W}$
$R_{thCH}$				$^\circ\text{C/W}$

### Source-Drain Diode

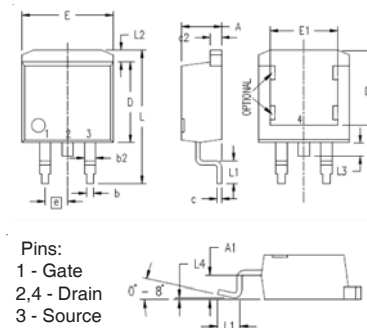
Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$I_S$	$V_{GS} = 0\text{V}$			140 A
$I_{SM}$	Repetitive, Pulse Width Limited by $T_{JM}$			560 A
$V_{SD}$	$I_F = I_S$ , $V_{GS} = 0\text{V}$ , Note 1			1.4 V
$t_{rr}$	$I_F = 0.5 \cdot I_{D25}$ , $V_{GS} = 0\text{V}$ $-di/dt = 100\text{A}/\mu\text{s}$ $V_R = 60\text{V}$		65	ns
$I_{RM}$			13	A
$Q_{RM}$			430	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.

### ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

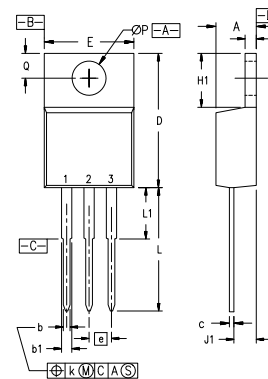
### TO-263 Outline



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

SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.575	.625	14.61	15.88
L1	.090	.110	2.29	2.79
L2	.040	.055	1.02	1.40
L3	.050	.070	1.27	1.78
L4	0	.005	0	0.13

### TO-220 Outline



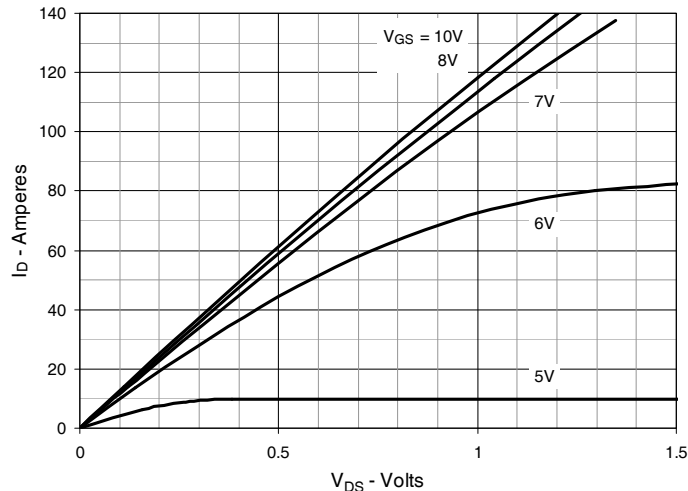
- Pins: 1 - Gate 2 - Drain  
3 - Source

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

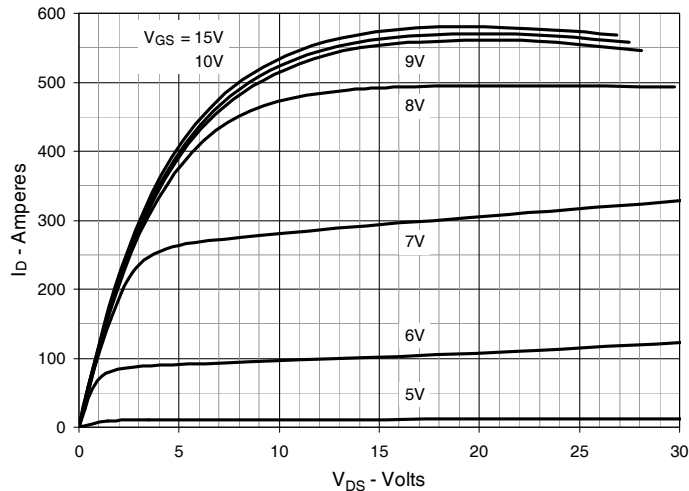
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IXYS MOSFETs and IGBTs are covered 4,835,592 4,931,844 5,049,961 5,237,481 6,162,665 6,404,065 B1 6,683,344 6,727,585 7,005,734 B2 7,157,338B2  
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4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

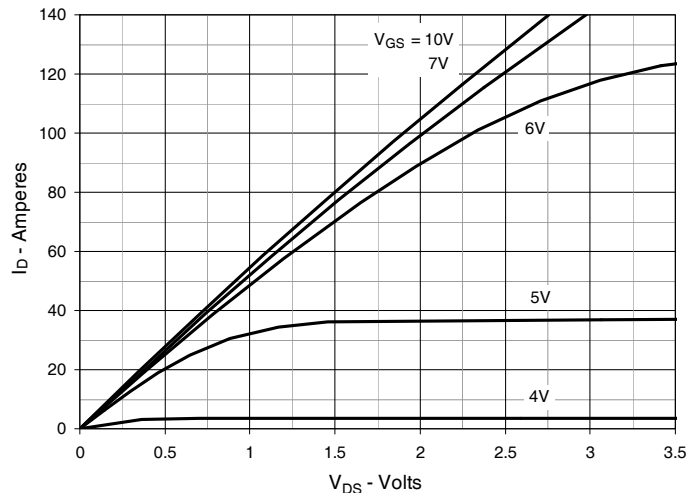
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



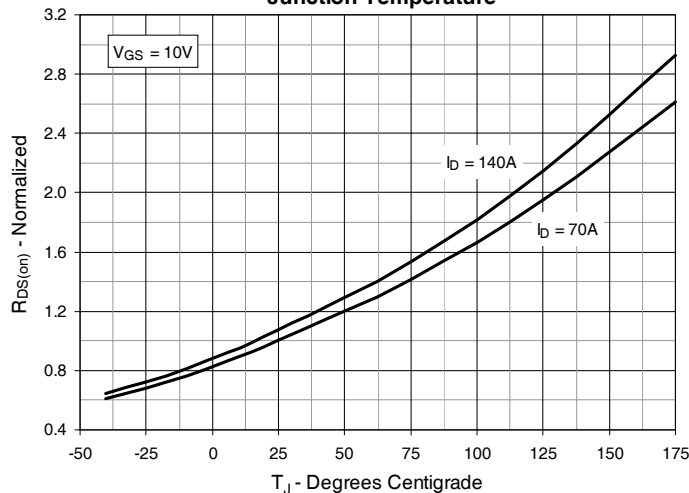
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



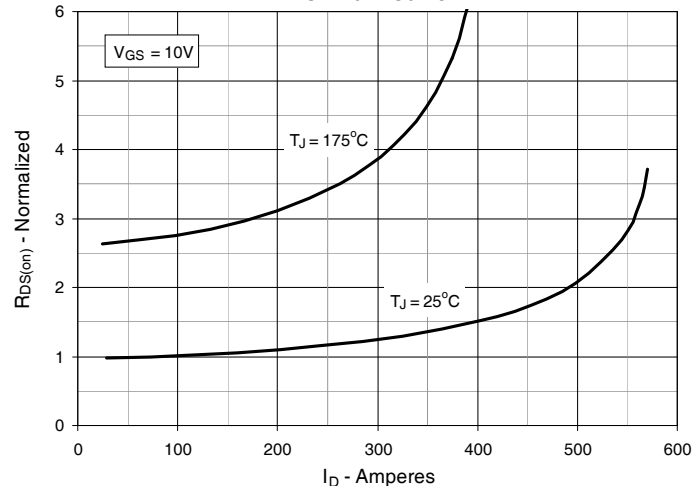
**Fig. 3. Output Characteristics @  $T_J = 150^\circ\text{C}$**



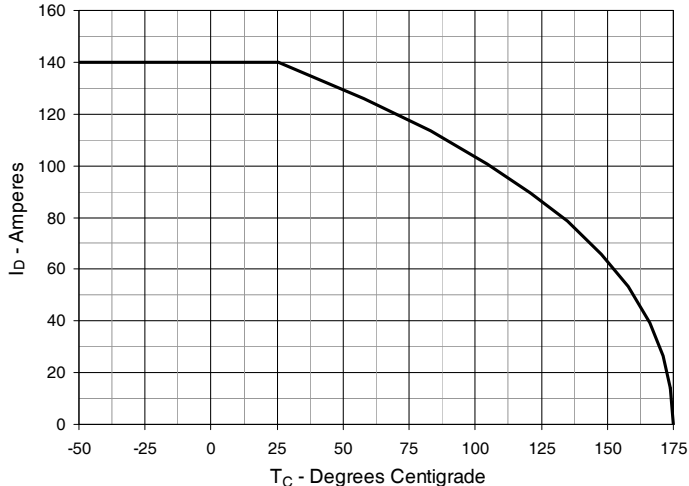
**Fig. 4. Normalized  $R_{DS(on)}$  to  $I_D = 70\text{A}$  Value vs. Junction Temperature**



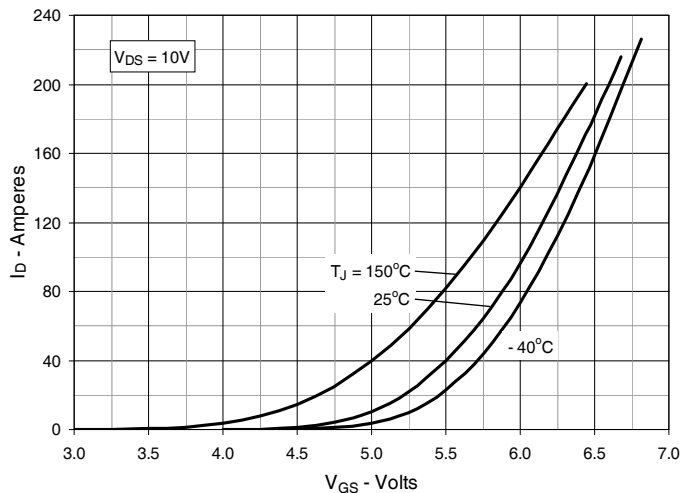
**Fig. 5. Normalized  $R_{DS(on)}$  to  $I_D = 70\text{A}$  vs. Drain Current**



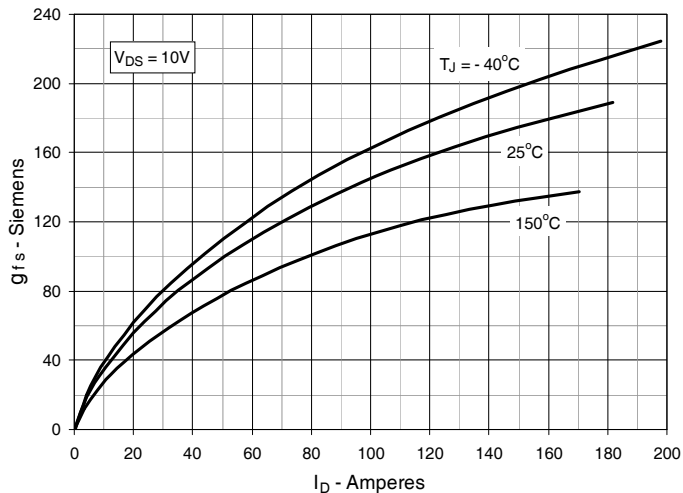
**Fig. 6. Drain Current vs. Case Temperature**



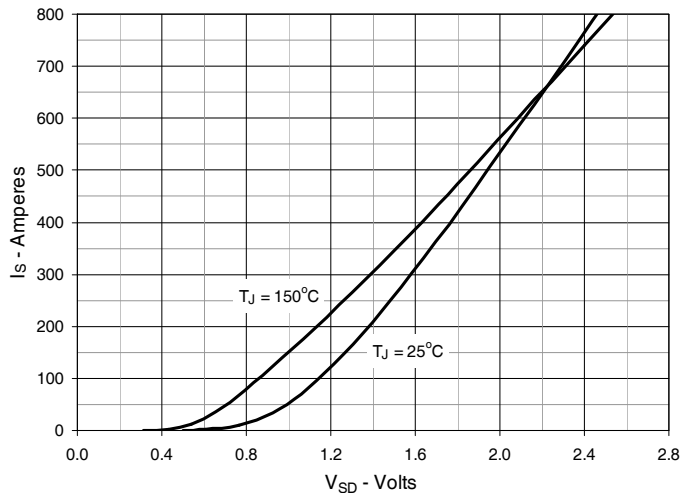
**Fig. 7. Input Admittance**



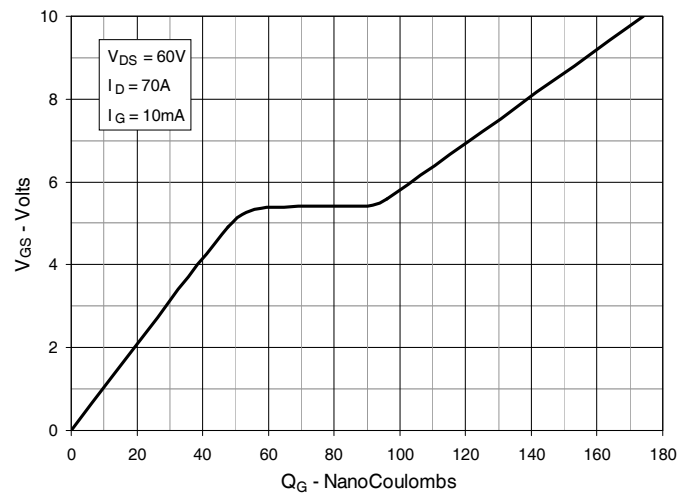
**Fig. 8. Transconductance**



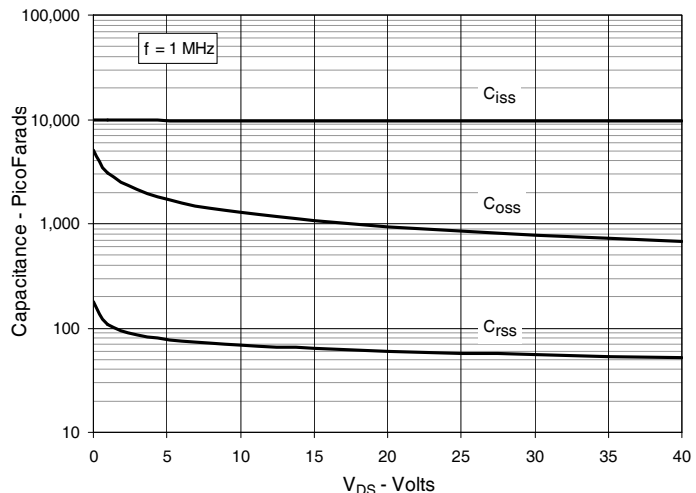
**Fig. 9. Forward Voltage Drop of Intrinsic Diode**



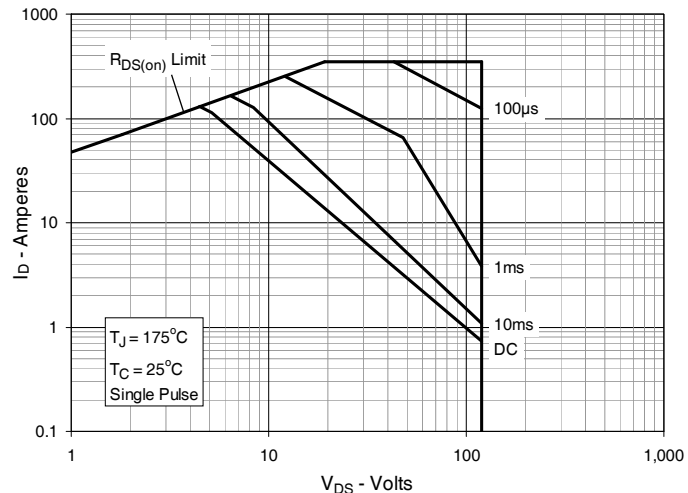
**Fig. 10. Gate Charge**



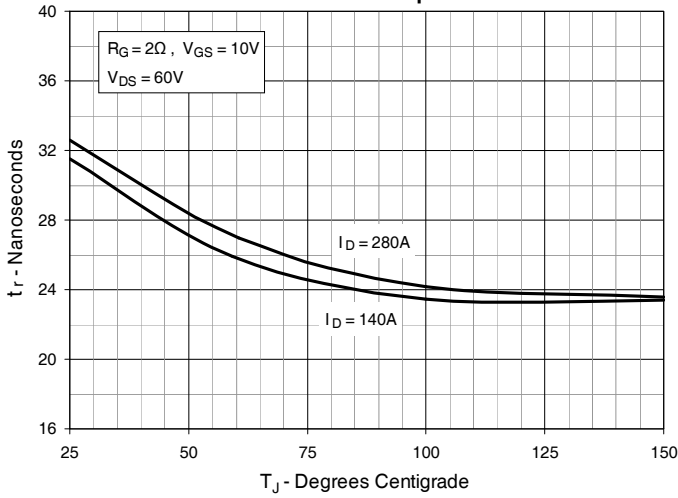
**Fig. 11. Capacitance**



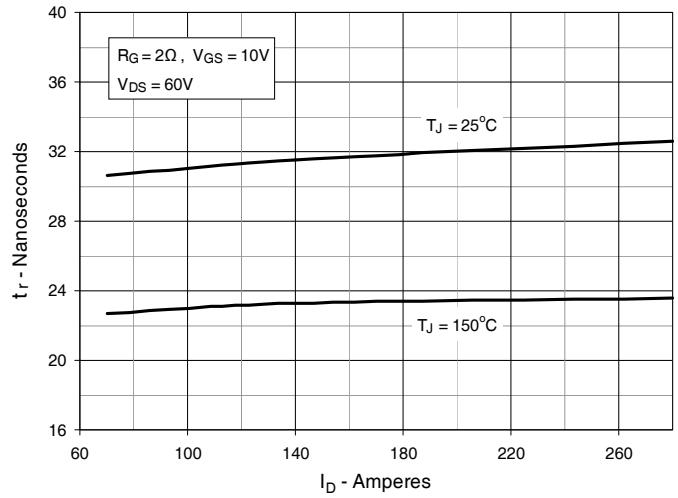
**Fig. 12. Forward-Bias Safe Operating Area**



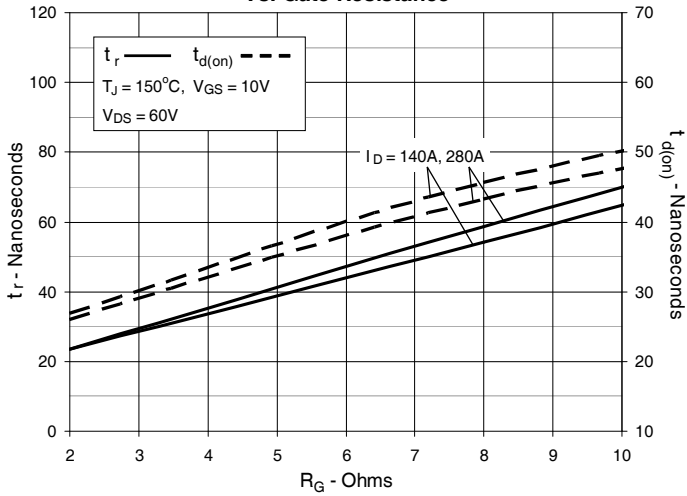
**Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature**



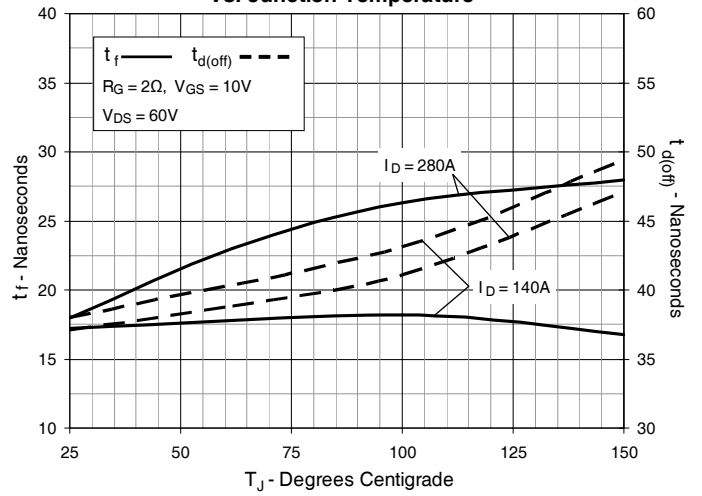
**Fig. 14. Resistive Turn-on Rise Time vs. Drain Current**



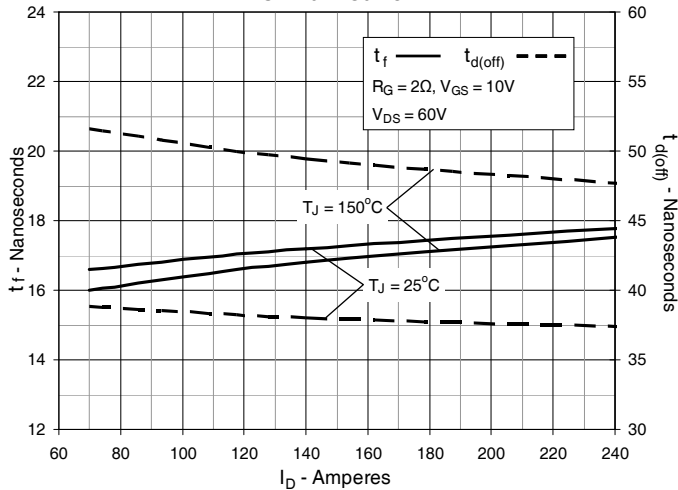
**Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance**



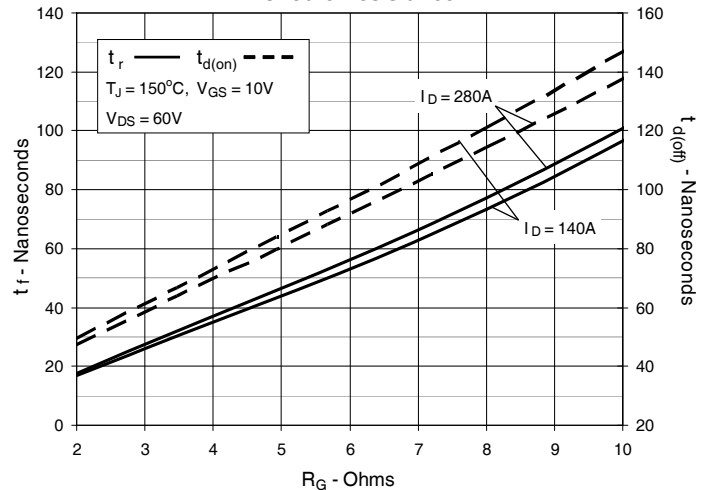
**Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature**

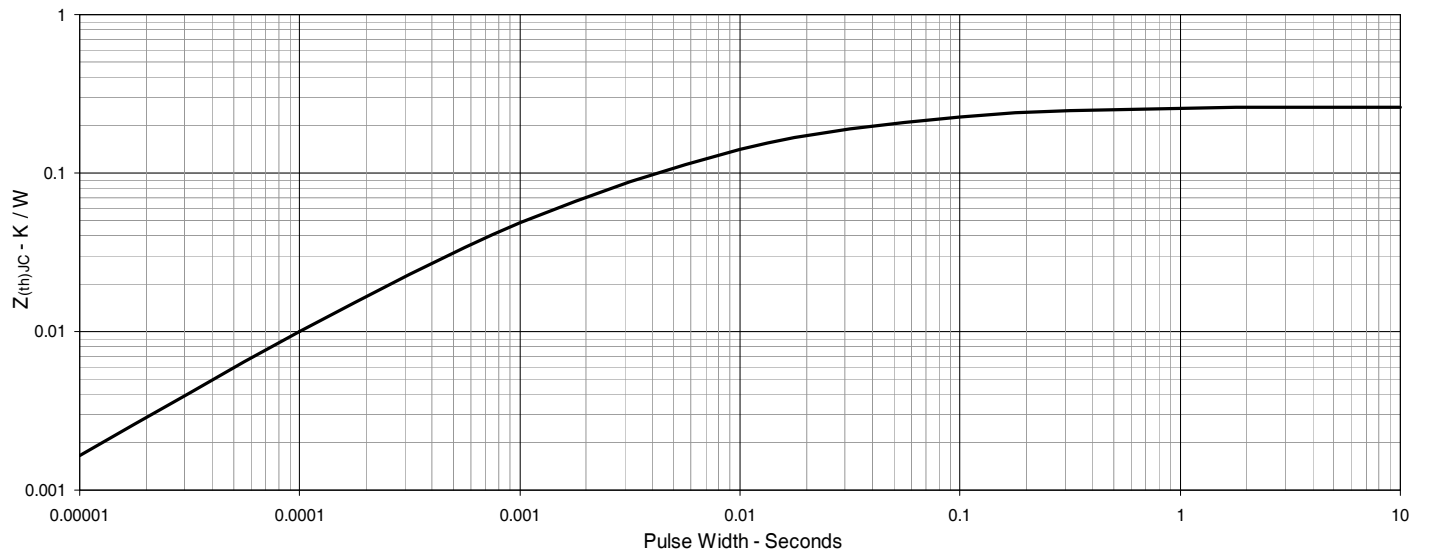


**Fig. 17. Resistive Turn-off Switching Times vs. Drain Current**



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



**Fig. 19. Maximum Transient Thermal Impedance**

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