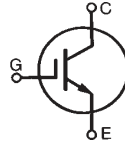


# GenX3™ 1200V IGBTs

# IXGH32N120A3 IXGT32N120A3

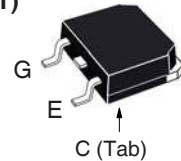
$V_{CES} = 1200V$   
 $I_{C110} = 32A$   
 $V_{CE(sat)} \leq 2.35V$

Ultra-Low  $V_{sat}$  PT IGBTs for up to 3 kHz Switching

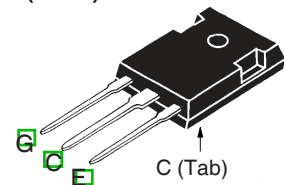


Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ C$ to $150^\circ C$	1200	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	1200	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	75	A
$I_{C110}$	$T_C = 110^\circ C$	32	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	230	A
$I_A$	$T_C = 25^\circ C$	20	A
$E_{AS}$	$T_C = 25^\circ C$	120	mJ
<b>SSOA</b>	$V_{GE} = 15V$ , $T_J = 125^\circ C$ , $R_G = 20\Omega$	$I_{CM} = 150$	A
<b>(RBSOA)</b>	Clamped Inductive Load	$V_{CE} \leq 0.8 \cdot V_{CES}$	
$P_C$	$T_C = 25^\circ C$	300	W
$T_J$		-55 ... +150	$^\circ C$
$T_{JM}$		150	$^\circ C$
$T_{stg}$		-55 ... +150	$^\circ C$
$T_L$	1.6mm (0.063in) from Case for 10s	300	$^\circ C$
$T_{SOLD}$	Plastic Body for 10s	260	$^\circ C$
$M_d$	Mounting Torque (TO-247)	1.13/10	Nm/lb.in.
<b>Weight</b>	TO-247	6.0	g
	TO-268	4.0	g

TO-268 (IXGT)



TO-247 (IXGH)



G = Gate      C = Collector  
 E = Emitter    Tab = Collector

## Features

- Optimized for Low Conduction Losses
- International Standard Packages

## Advantages

- High Power Density
- Low Gate Drive Requirement

## Applications

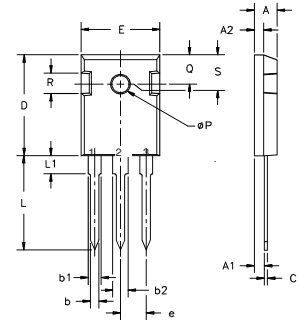
- Power Inverters
- Capacitor Discharge
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts
- Inrush Current Protection Circuits

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250\mu A$ , $V_{GE} = 0V$	1200		V
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	3.0		5.0 V
$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			50 $\mu A$ 1 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = I_{C110}$ , $V_{GE} = 15V$ , Note 1			2.35 V
	$I_C = 400A$ , $V_{GE} = 30V$ , Note 1		11	V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 50\text{A}$ , $V_{CE} = 10\text{V}$ , Note 1	14	20	S
$I_{C(on)}$	$V_{CE} = 10\text{V}$ , $V_{GE} = 15\text{V}$ , Note 1		94	A
$C_{ies}$	$V_{CE} = 25\text{V}$ , $V_{GE} = 0\text{V}$ , $f = 1\text{MHz}$		2150	pF
$C_{oes}$			130	pF
$C_{res}$			14	pF
$Q_g$	$I_C = 50\text{A}$ , $V_{GE} = 15\text{V}$ , $V_{CE} = 0.5 \cdot V_{CES}$		89	nC
$Q_{ge}$			15	nC
$Q_{gc}$			34	nC
$t_{d(on)}$	<b>Resistive Switching Times, <math>T_J = 25^\circ\text{C}</math></b> $V_{GE} = 20\text{V}$ , $V_{CE} = 0.8 \cdot V_{CES}$ , $I_C = 100\text{A}$ $R_G = 10\Omega$ (External)		39	ns
$t_r$			200	ns
$t_{d(off)}$			140	ns
$t_f$			1240	ns
$R_{thJC}$	TO-247			0.42 $^\circ\text{C/W}$
$R_{thCK}$			0.21	$^\circ\text{C/W}$

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

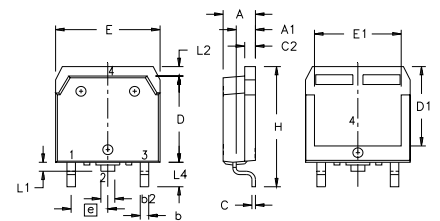
### TO-247 AD Outline



Terminals: 1 - Gate  
3 - Emitter  
2 - Collector

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	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
L <sub>1</sub>		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-268 Outline



Terminals: 1 - Gate  
3 - Emitter  
2, 4 - Collector

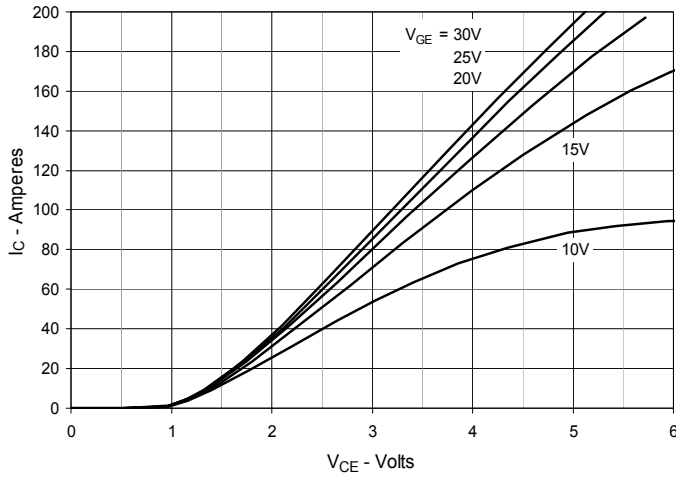
SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A <sub>1</sub>	.106	.114	2.70	2.90
A <sub>2</sub>	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b <sub>2</sub>	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C <sub>2</sub>	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D <sub>1</sub>	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E <sub>1</sub>	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L <sub>1</sub>	.047	.055	1.20	1.40
L <sub>2</sub>	.039	.045	1.00	1.15
L <sub>3</sub>	.010 BSC		0.25 BSC	
L <sub>4</sub>	.150	.161	3.80	4.10

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

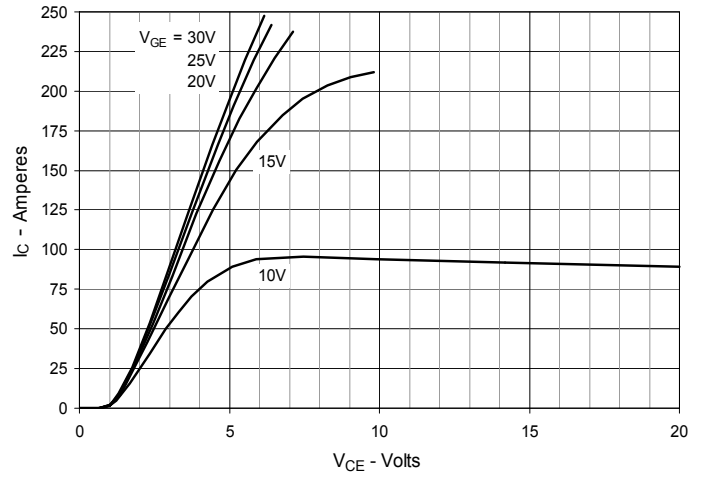
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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
4,850,072	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	

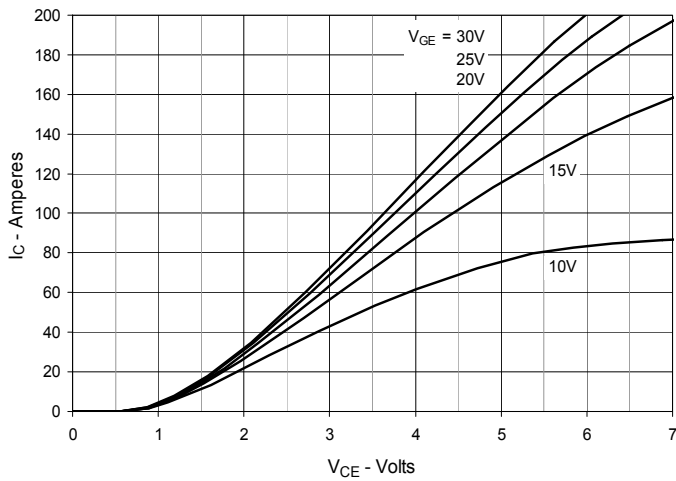
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



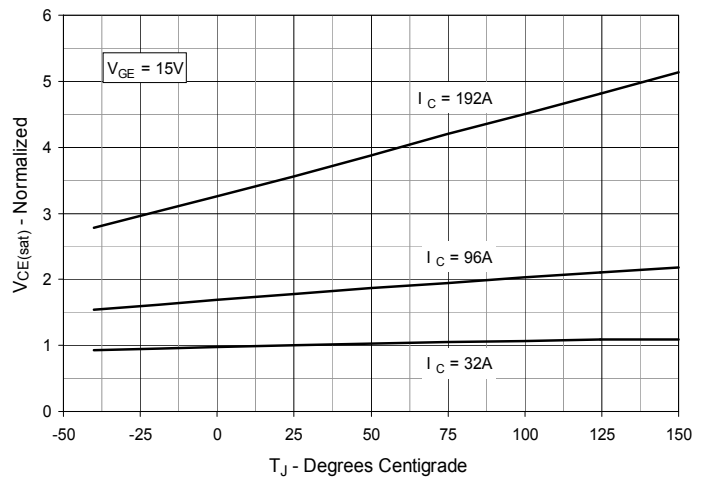
**Fig. 2. Extended Output Characteristics @  $T_J = 25^\circ\text{C}$**



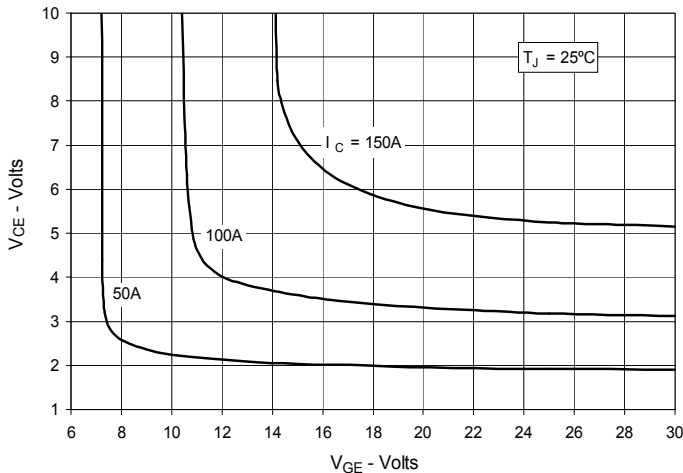
**Fig. 3. Output Characteristics @  $T_J = 125^\circ\text{C}$**



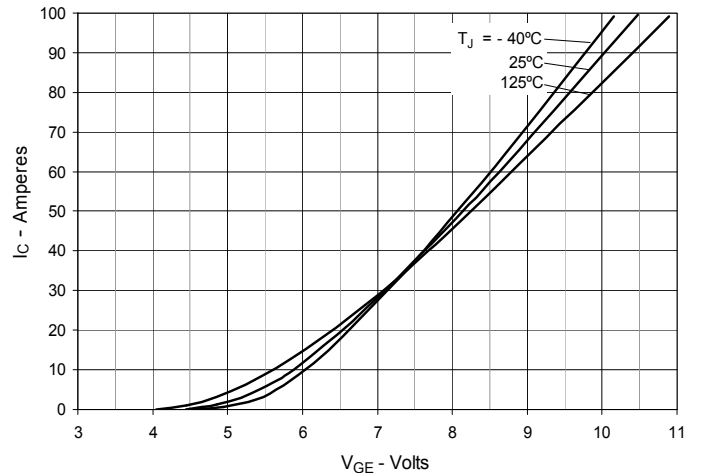
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



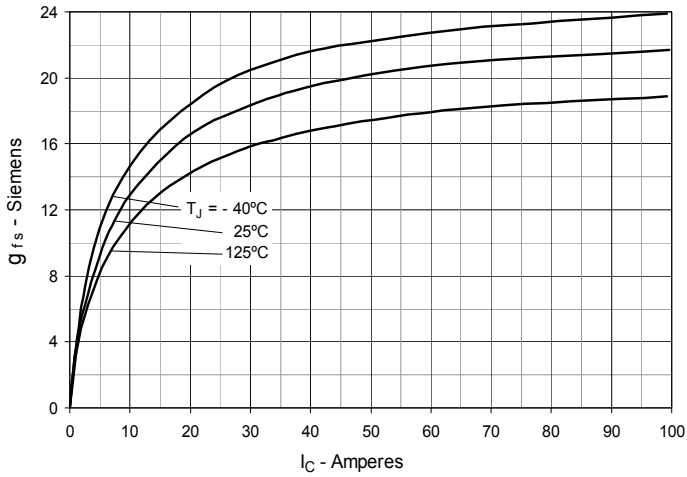
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



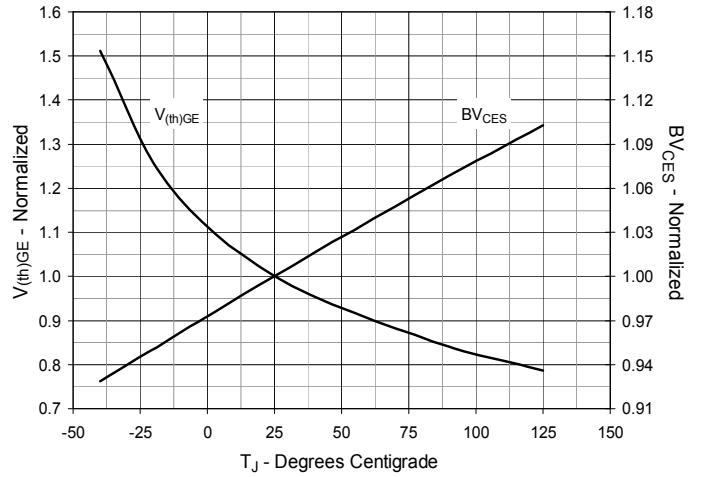
**Fig. 6. Input Admittance**



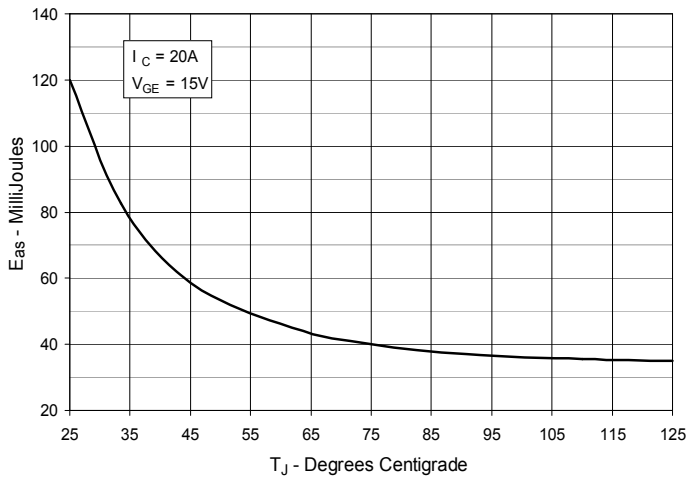
**Fig. 7. Transconductance**



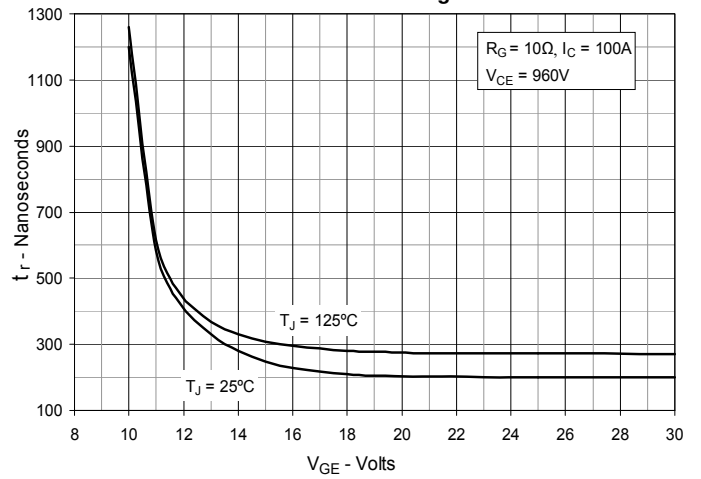
**Fig. 8. Dependence of  $BV_{CES}$  &  $V_{(th)GE}$  on Junction Temperature**



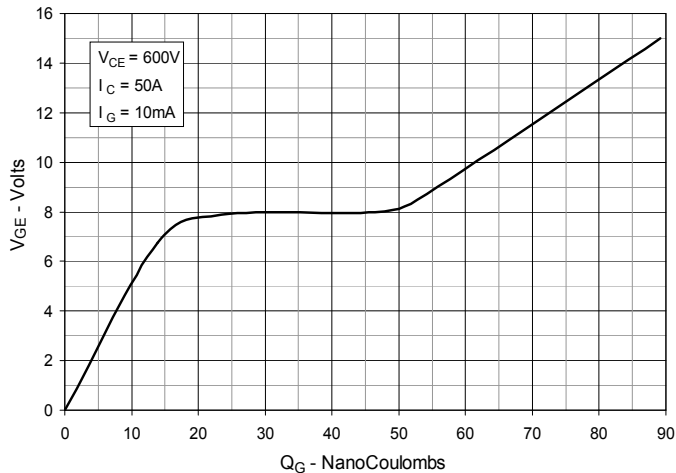
**Fig. 9. Single-Pulsed Avalanche Energy vs. Junction Temperature**



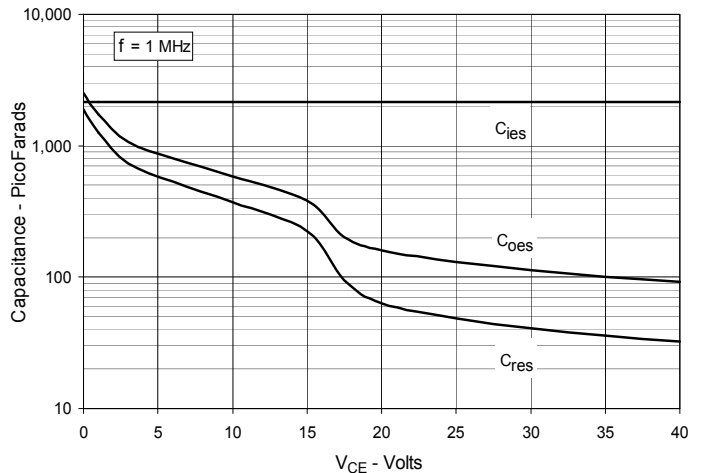
**Fig. 10. Resistive Turn-on Rise Time vs. Gate Voltage**



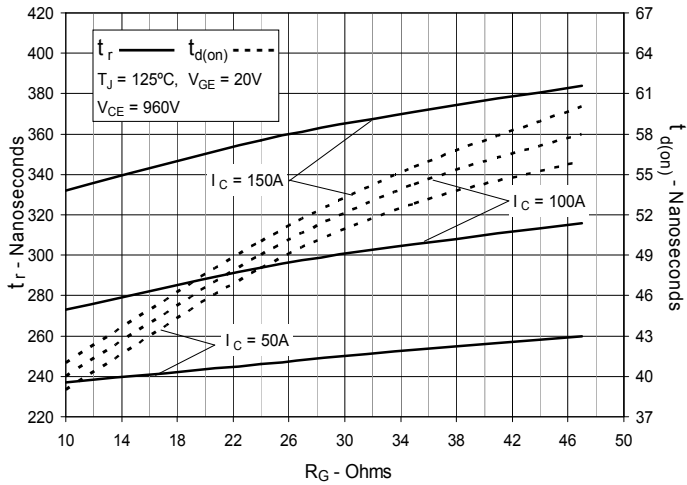
**Fig. 11. Gate Charge**



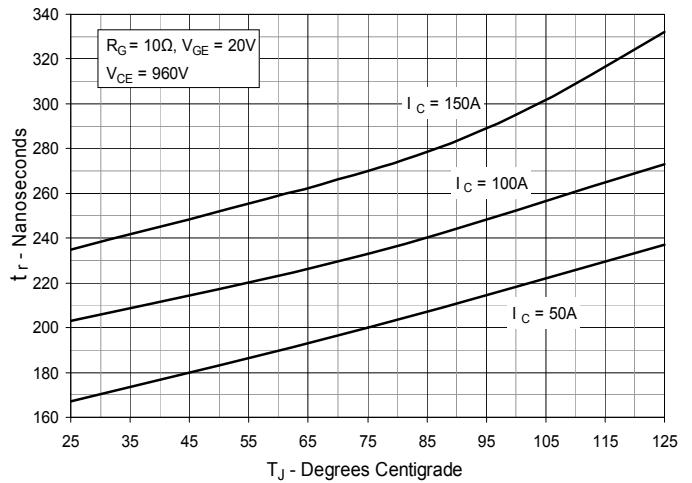
**Fig. 12. Capacitance**



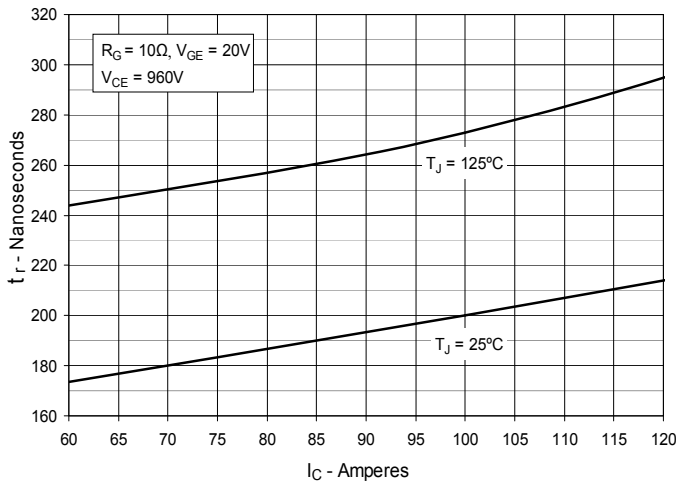
**Fig. 13. Resistive Turn-on Switching Times vs. Gate Resistance**



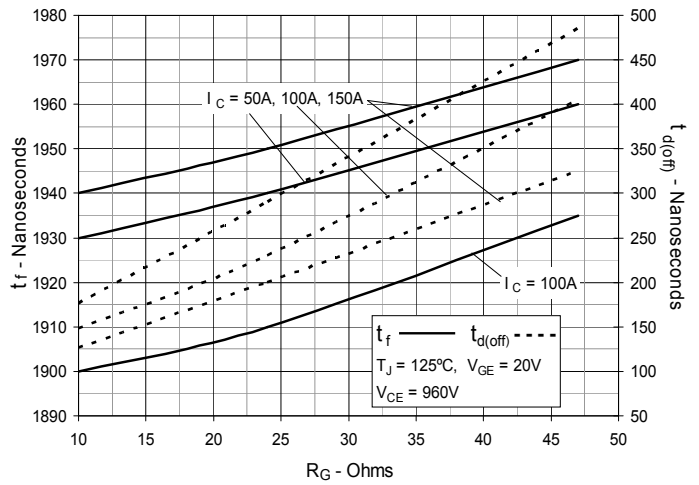
**Fig. 14. Resistive Turn-on Rise Time vs. Junction Temperature**



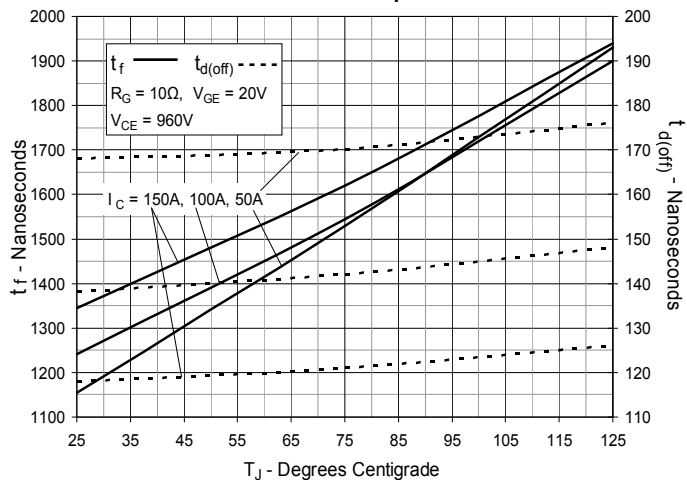
**Fig. 15. Resistive Turn-on Rise Time vs. Collector Current**



**Fig. 16. Resistive Turn-off Switching Times vs. Gate Resistance**



**Fig. 17. Resistive Turn-off Switching Times vs. Junction Temperature**



**Fig. 18. Resistive Turn-off Switching Times vs. Collector Current**

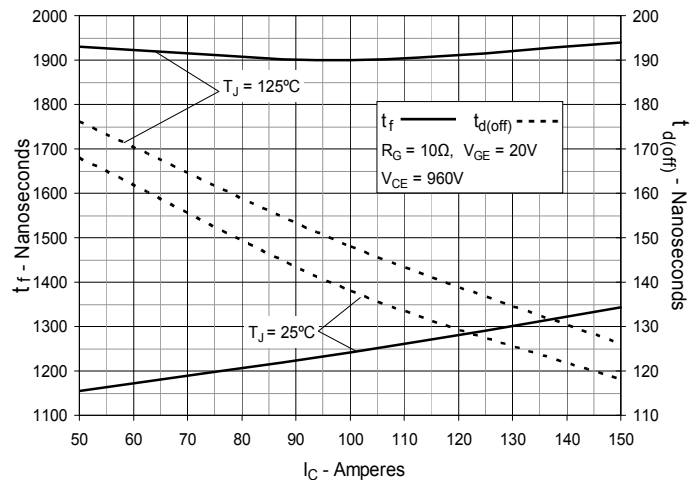


Fig. 19. Reverse-Bias Safe Operating Area

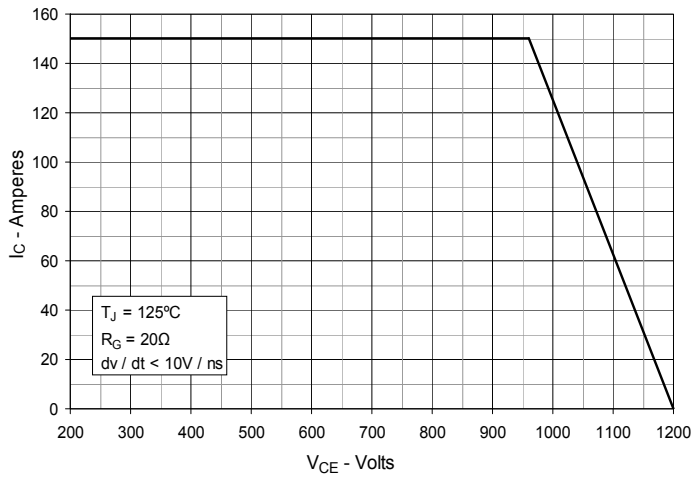
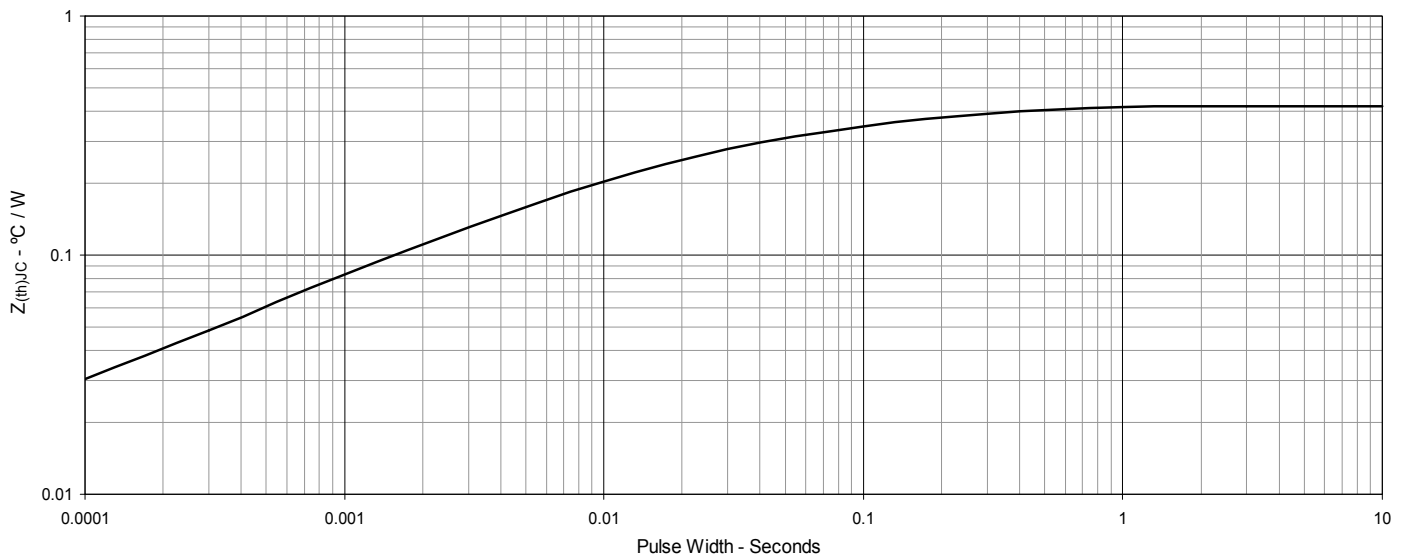


Fig. 20. Maximum Transient Thermal Impedance





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