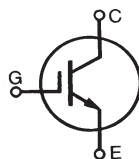


# High Voltage IGBTs

## for Capacitor Discharge Applications

# IXGH2N250

# IXGT2N250



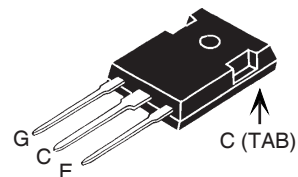
$$V_{CES} = 2500V$$

$$I_{C110} = 2A$$

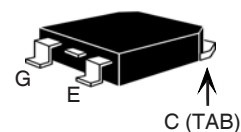
$$V_{CE(sat)} \leq 3.1V$$

Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_C = 25^\circ C$ to $150^\circ C$	2500	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	2500	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	5.5	A
$I_{C110}$	$T_C = 110^\circ C$	2.0	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	13.5	A
<b>SSOA</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 50\Omega$	$I_{CM} = 6$	A
<b>(RBSOA)</b>	Clamped Inductive Load	$V_{CE} \leq 2000$	V
$P_C$	$T_C = 25^\circ C$	32	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 (TO-247)	1.13/10	Nm/lb.in.
<b>Weight</b>	TO-247	6	g
	TO-268	4	g

TO-247 (IXGH)



TO-268 (IXGT)



G = Gate      C = Collector  
E = Emitter    TAB = Collector

### Features

- Optimized for Low Conduction and Switching Losses
- International Standard Packages

### Advantages

- High Power Density
- Low Gate Drive Requirement

### Applications

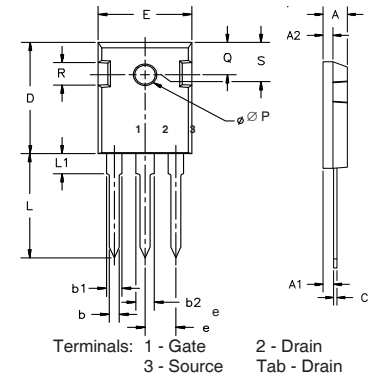
- Switched-Mode and Resonant-Mode Power Supplies
- Uninterruptible Power Supplies (UPS)
- Capacitor Discharge Circuits

Symbol	Test Conditions ( $T_J = 25^\circ C$ Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250\mu A$ , $V_{GE} = 0V$	2500		V
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	3.0		5.5 V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			10 $\mu A$ 100 $\mu A$
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = I_{C110}$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$		2.6 3.1	V V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = I_{C110}, V_{CE} = 10\text{V}$ , Note 1	0.7	1.2	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		144	pF
$C_{oes}$			8.7	pF
$C_{res}$			3.2	pF
$Q_g$	$I_C = I_{C110}, V_{GE} = 15\text{V}, V_{CE} = 1000\text{V}$		10.5	nC
$Q_{ge}$			6.4	nC
$Q_{gc}$			1.0	nC
$t_{d(on)}$	<b>Resistive Switching times, <math>T_J = 25^\circ\text{C}</math></b>		22	ns
$t_r$		$I_C = I_{C110}, V_{GE} = 15\text{V}$	74	ns
$t_{d(off)}$	$V_{CE} = 1800\text{V}, R_G = 50\Omega$		70	ns
$t_f$			100	ns
$t_{d(on)}$	<b>Resistive Switching times, <math>T_J = 125^\circ\text{C}</math></b>		26	ns
$t_r$		$I_C = I_{C110}, V_{GE} = 15\text{V}$	89	ns
$t_{d(off)}$	$V_{CE} = 1800\text{V}, R_G = 50\Omega$		74	ns
$t_f$			204	ns
$R_{thJC}$	(TO-247)			3.9 $^\circ\text{C/W}$
$R_{thCK}$			0.21	$^\circ\text{C/W}$

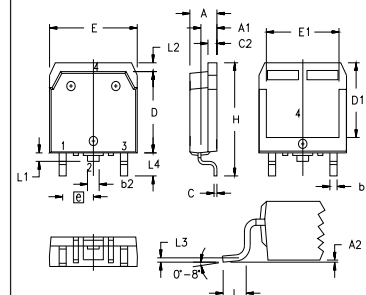
Note 1. Pulse test,  $t \leq 300\mu\text{s}$ ; duty cycle,  $d \leq 2\%$ .

### TO-247 (IXGH) Outline



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
L1		4.50		.177
∅P	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 (IXGT) Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.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
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

### ADVANCE TECHNICAL INFORMATION

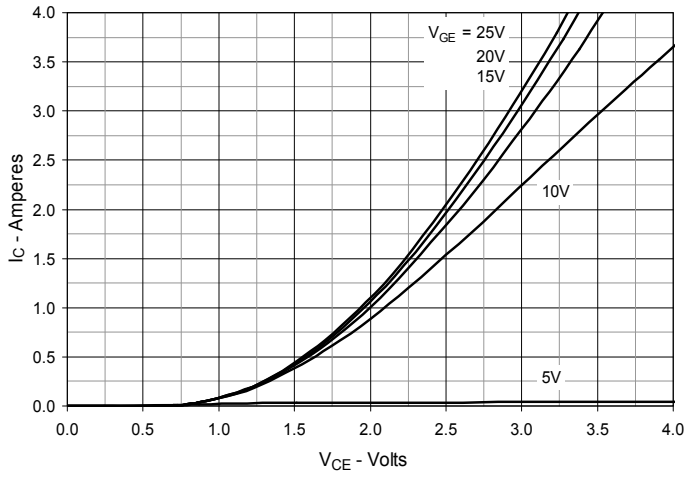
The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test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

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

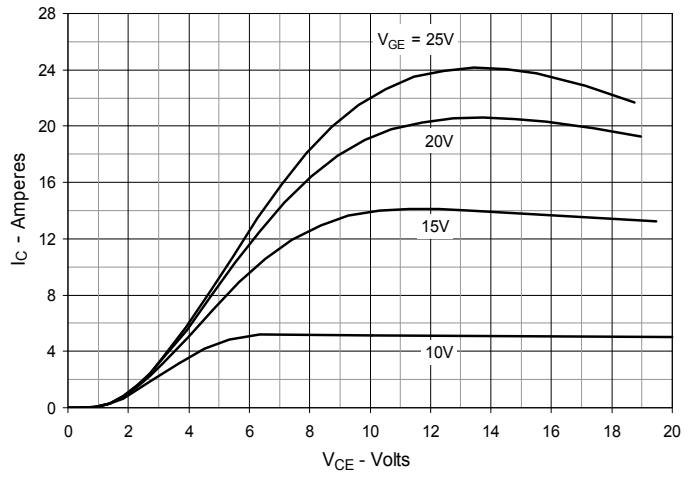
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:

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	

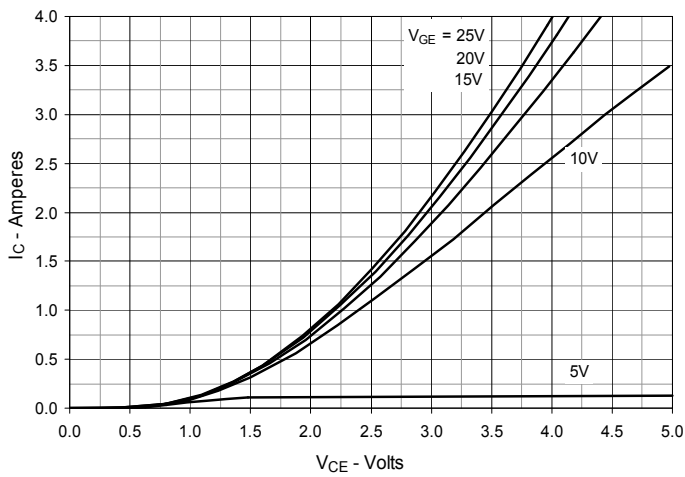
**Fig. 1. Output Characteristics @ 25°C**



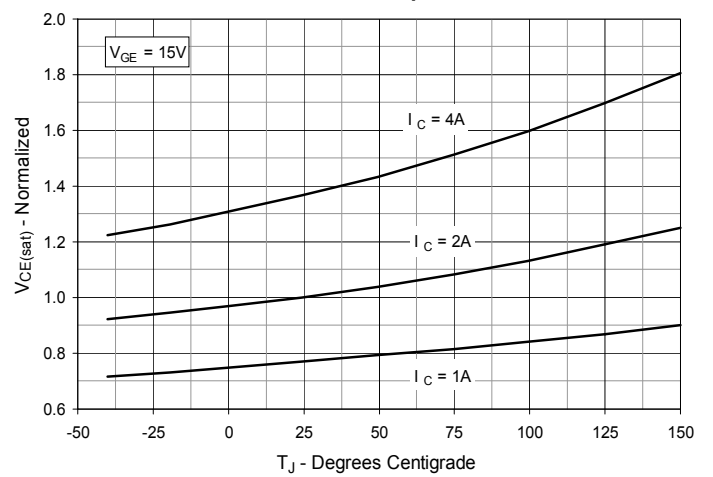
**Fig. 2. Extended Output Characteristics @ 25°C**



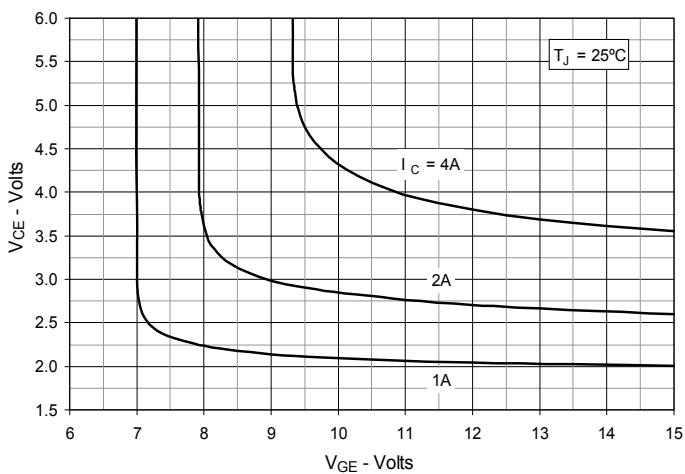
**Fig. 3. Output Characteristics @ 125°C**



**Fig. 4. Dependence of V<sub>CE(sat)</sub> on Junction Temperature**



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



**Fig. 6. Input Admittance**

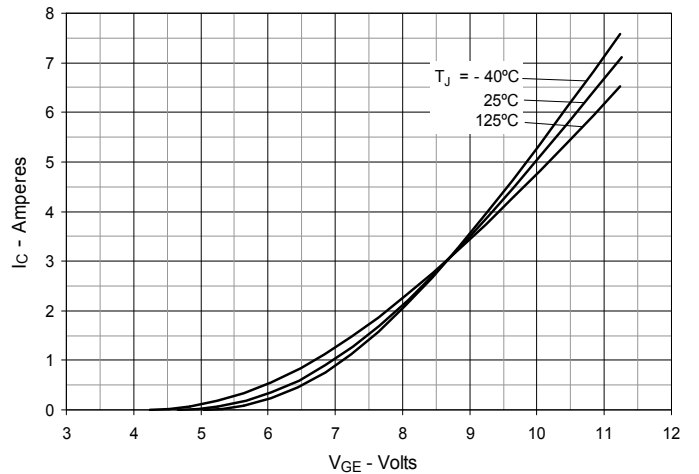


Fig. 7. Transconductance

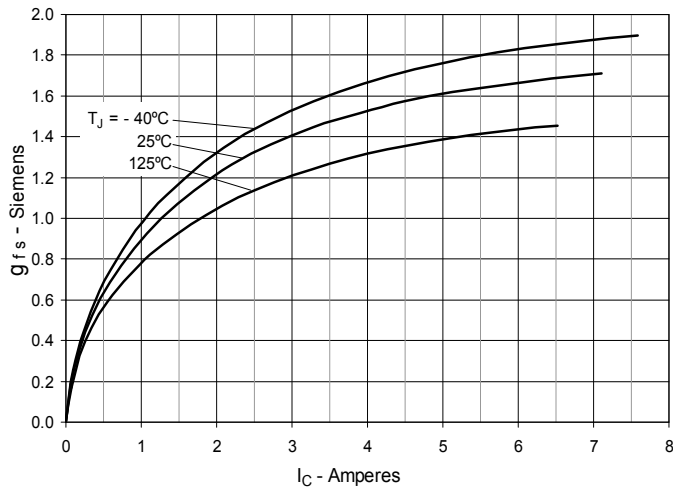


Fig. 8. Gate Charge

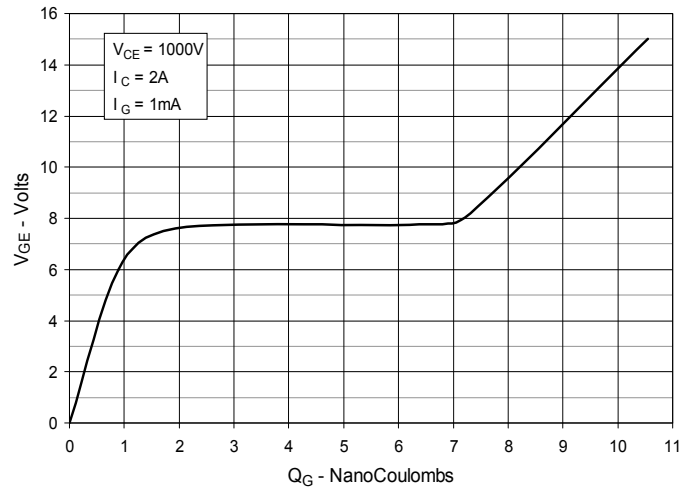


Fig. 9. Reverse-Bias Safe Operating Area

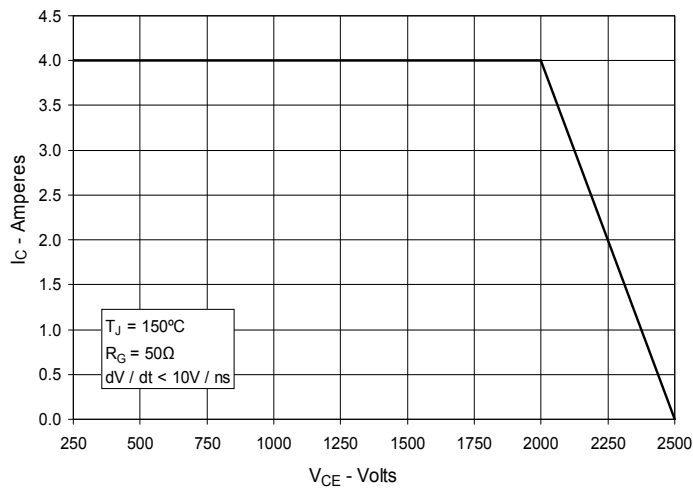


Fig. 10. Capacitance

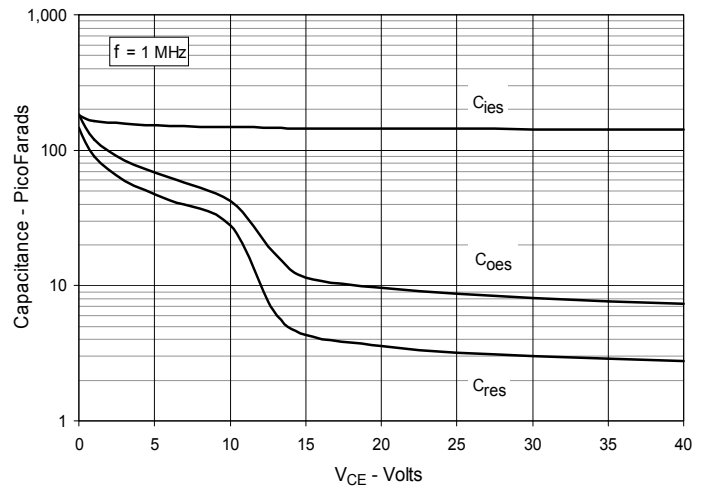
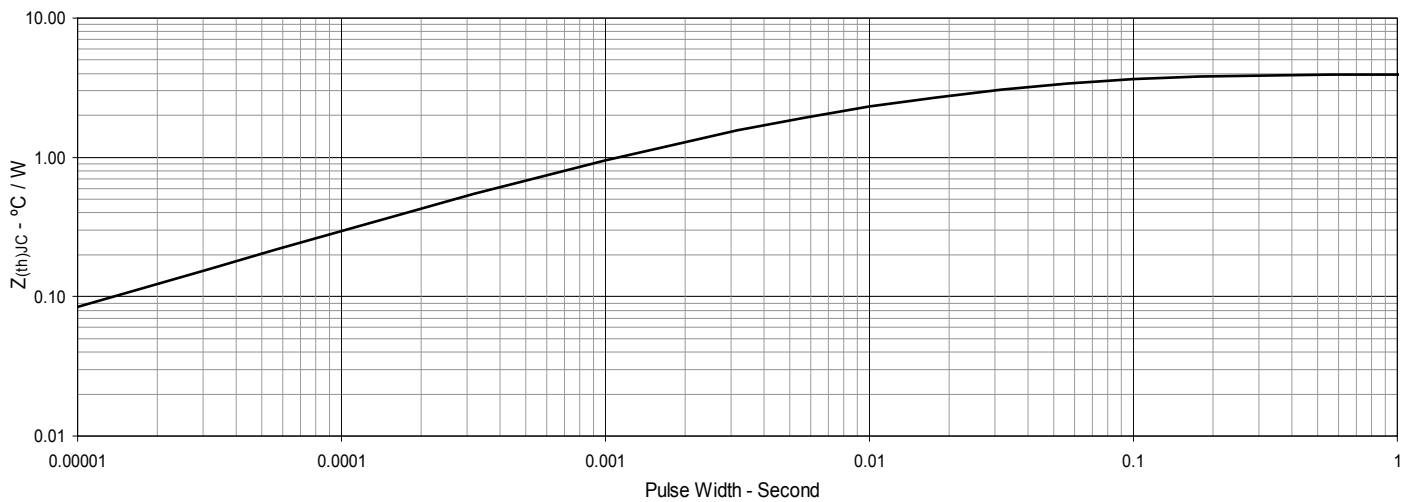
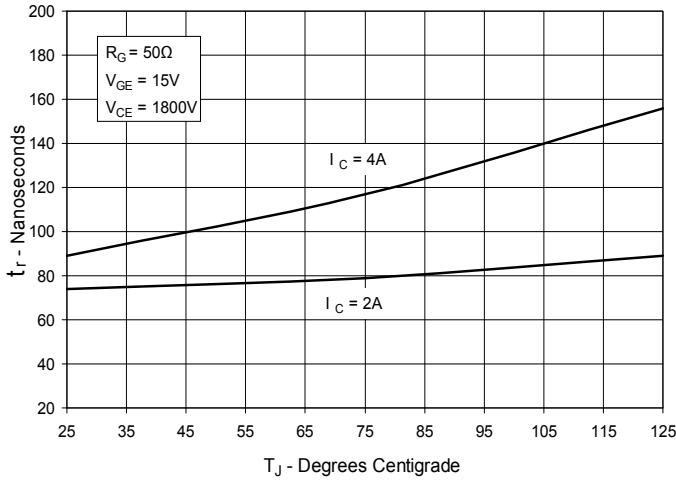


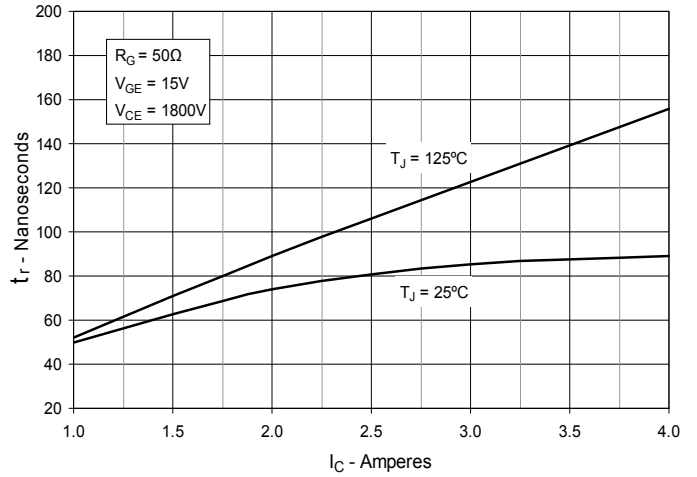
Fig. 11. Maximum Transient Thermal Impedance



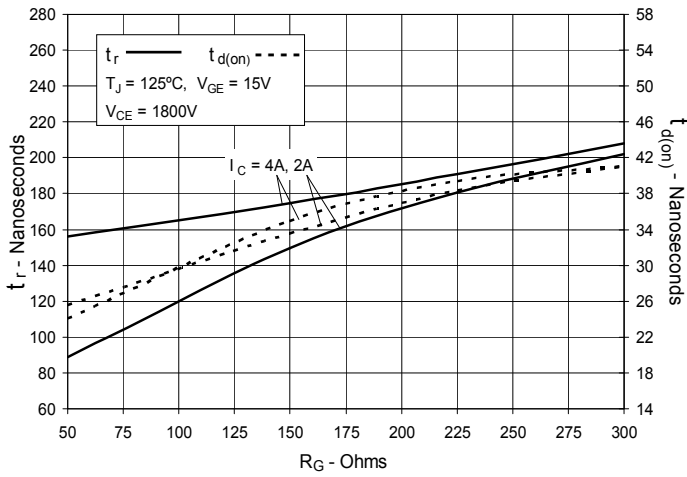
**Fig. 12. Resistive Turn-on Rise Time vs. Junction Temperature**



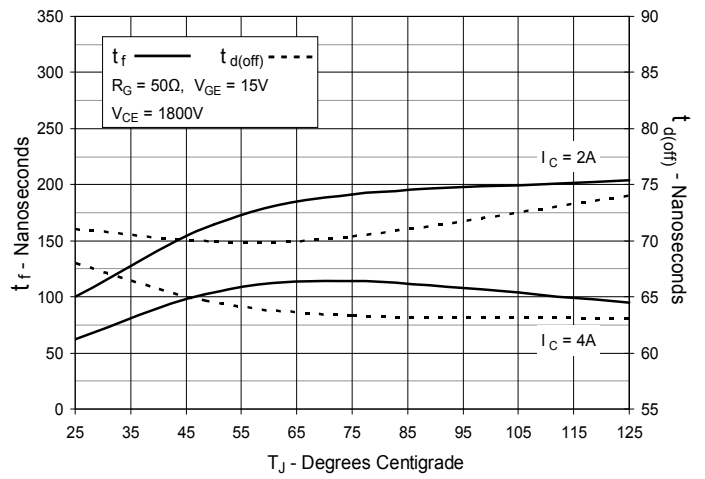
**Fig. 13. Resistive Turn-on Rise Time vs. Collector Current**



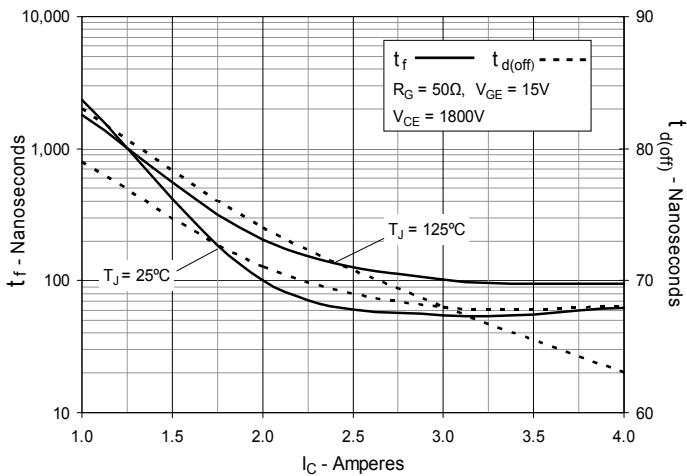
**Fig. 14. Resistive Turn-on Switching Times vs. Gate Resistance**



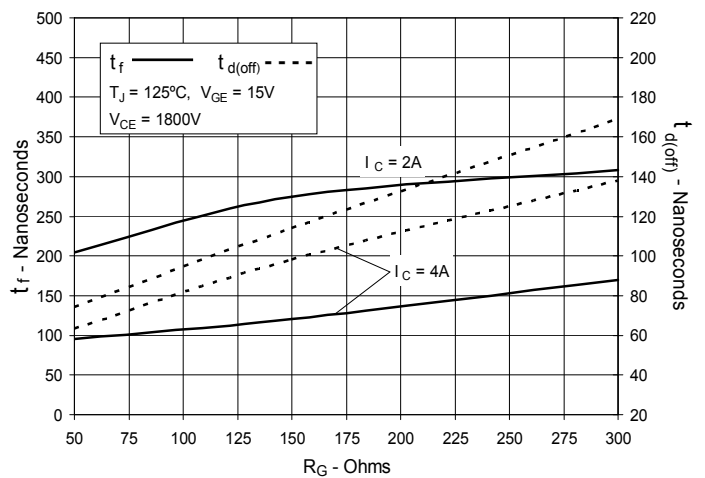
**Fig. 15. Resistive Turn-off Switching Times vs. Junction Temperature**



**Fig. 16. Resistive Turn-off Switching Times vs. Collector Current**



**Fig. 17. Resistive Turn-off Switching Times vs. Gate Resistance**





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