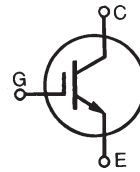


# High Voltage IGBT

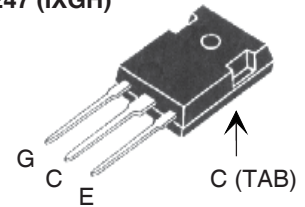
# IXGH10N170 IXGT10N170

$V_{CES} = 1700V$   
 $I_{C90} = 10A$   
 $V_{CE(sat)} \leq 4.0V$

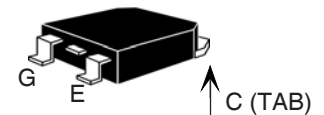


Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_C = 25^\circ C$ to $150^\circ C$	1700	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	1700	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$	20	A
$I_{C90}$	$T_C = 90^\circ C$	10	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	70	A
<b>SSOA</b> <b>(RBSOA)</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 16\Omega$ Clamped inductive load	$I_{CM} = 20$ @ $0.8 \cdot V_{CES}$	A
$P_C$	$T_C = 25^\circ C$	110	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

- International standard packages JEDEC TO-268 and JEDEC TO-247 AD
- High current handling capability
- MOS Gate turn-on - drive simplicity
- Rugged NPT structure
- Molding epoxies meet UL 94 V-0 flammability classification

## Applications

- Capacitor discharge & pulser circuits
- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies

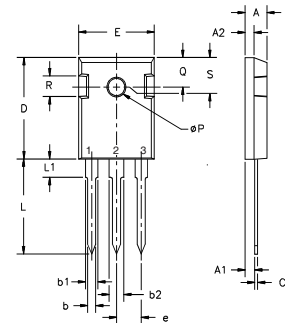
## Advantages

- High power density
- Suitable for surface mounting
- Easy to mount with 1 screw, (isolated mounting screw hole)

Symbol	Test Conditions	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 250\mu A$ , $V_{GE} = 0V$	1700		V
$V_{GE(th)}$	$I_C = 250\mu A$ , $V_{CE} = V_{GE}$	3.0		V
$I_{CES}$	$V_{CE} = 0.8 \cdot V_{CES}$ $V_{GE} = 0V$ $T_J = 125^\circ C$			50 $\mu A$ 500 $\mu A$
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 100$ nA
$V_{CE(sat)}$	$I_C = I_{C90}$ , $V_{GE} = 15V$ , Note 1 $T_J = 125^\circ C$		2.7 3.4	4.0 V

Symbol	Test Conditions ( $T_J = 25^\circ\text{C}$ unless otherwise specified)	Characteristic Values		
		Min.	Typ.	Max.
$g_{fs}$	$I_C = 10\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	3.8	6.3	S
$I_{C(ON)}$	$V_{CE} = 10\text{V}, V_{GE} = 10\text{V}$		33	A
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		700	pF
$C_{oes}$			40	pF
$C_{res}$			14	pF
$Q_g$	$I_C = 10\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		32	nC
$Q_{ge}$			4	nC
$Q_{gc}$			16	nC
$t_{d(on)}$	<b>Resistive load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 10\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 850\text{V}, R_G = 16\Omega$		30	ns
$t_r$			69	ns
$t_{d(off)}$			132	ns
$t_f$			600	ns
$t_{d(on)}$	<b>Resistive load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 10\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 850\text{V}, R_G = 16\Omega$		30	ns
$t_{ri}$			270	ns
$t_{d(off)}$			135	ns
$t_{fi}$			495	ns
$R_{thJC}$				1.1 $^\circ\text{C/W}$
$R_{thCS}$	(TO-247)	0.25		$^\circ\text{C/W}$

### TO-247 AD Outline

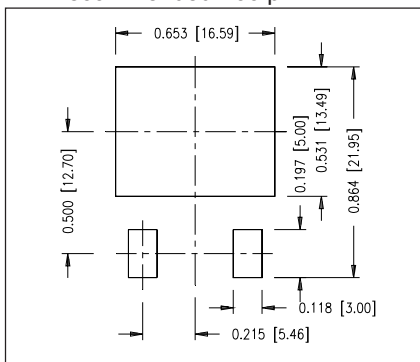


Terminals: 1 - Gate 2 - Drain

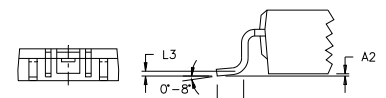
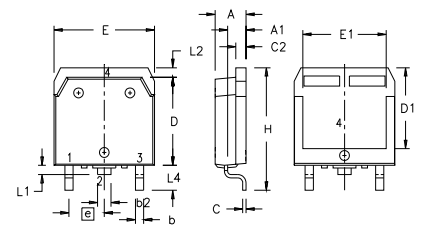
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.7	5.3	.185	.209
A <sub>1</sub>	2.2	2.54	.087	.102
A <sub>2</sub>	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b <sub>1</sub>	1.65	2.13	.065	.084
b <sub>2</sub>	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	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

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

### Min Recommended Footprint



### TO-268 Outline



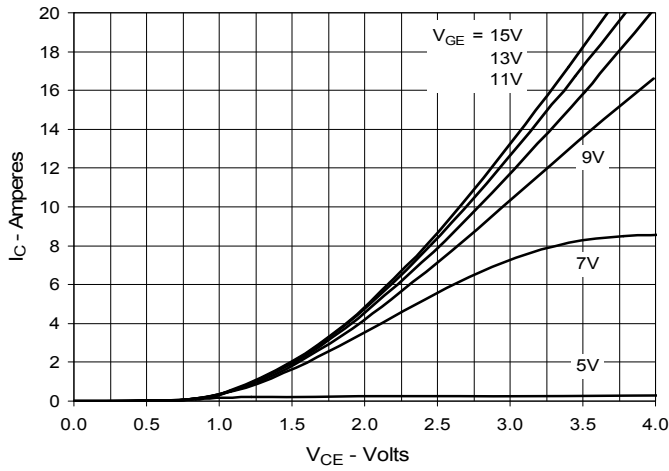
Terminals: 1 - Gate 2 - Drain

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

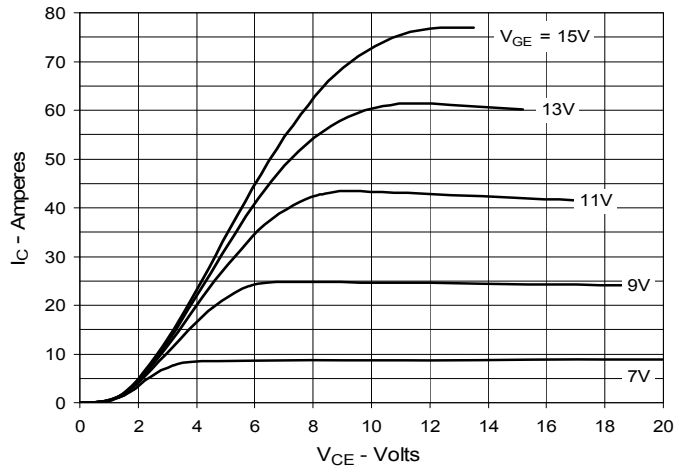
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by one or more of the following U.S. patents: 4,850,072 5,017,508 5,063,307 5,381,025 6,259,123 B1 6,534,343 6,710,405 B2 6,759,692 7,063,975 B2  
4,881,106 5,034,796 5,187,117 5,486,715 6,306,728 B1 6,583,505 6,710,463 6,771,478 B2 7,071,537

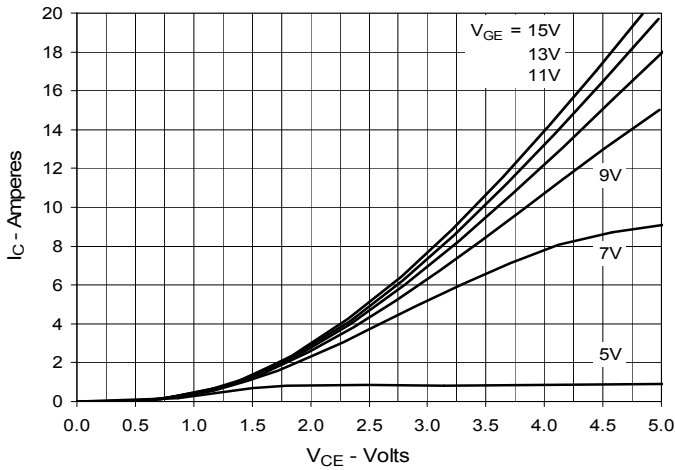
**Fig. 1. Output Characteristics @ 25°C**



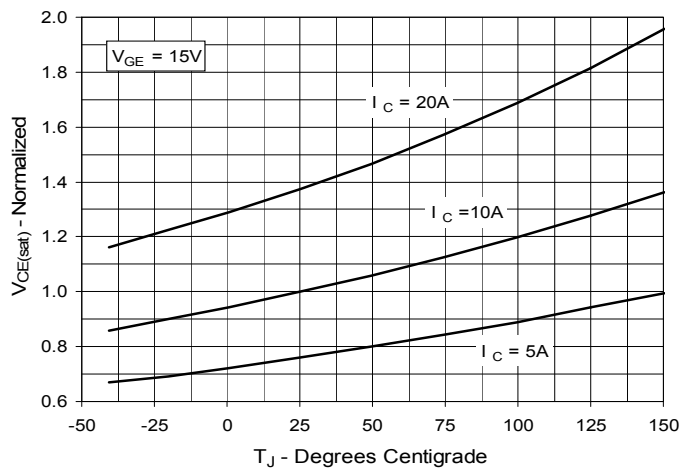
**Fig. 2. Extended Output Characteristics @ 25°C**



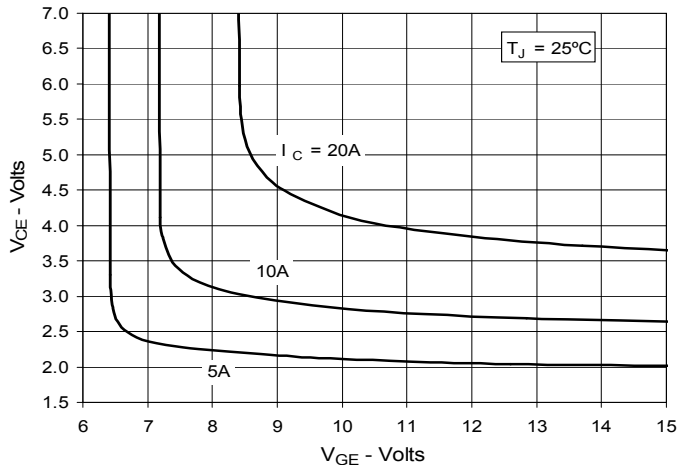
**Fig. 3. Output Characteristics @ 125°C**



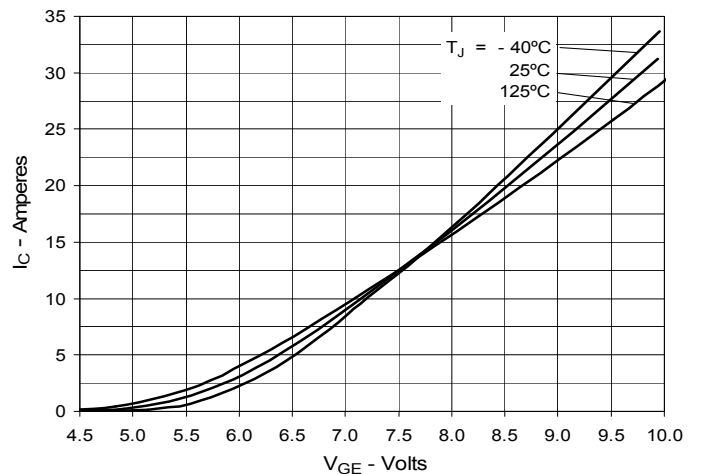
**Fig. 4. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



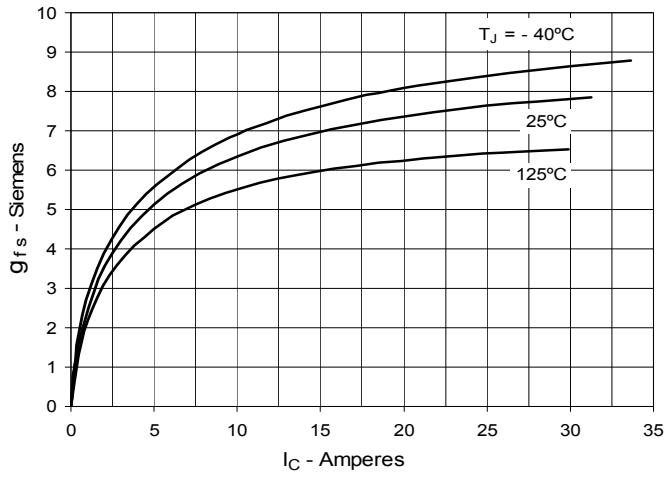
**Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



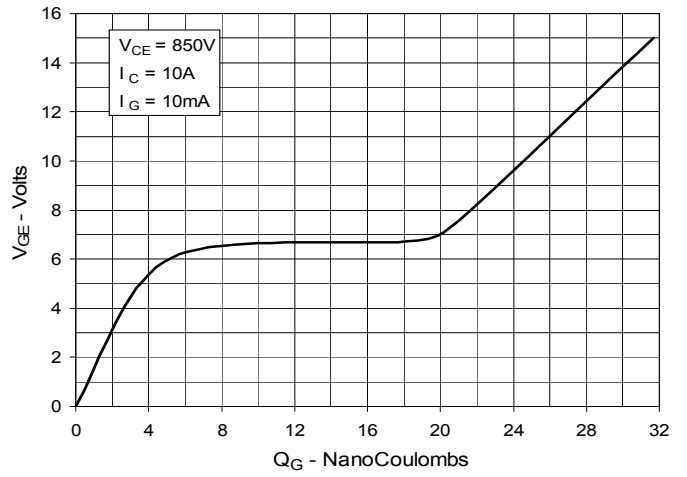
**Fig. 6. Input Admittance**



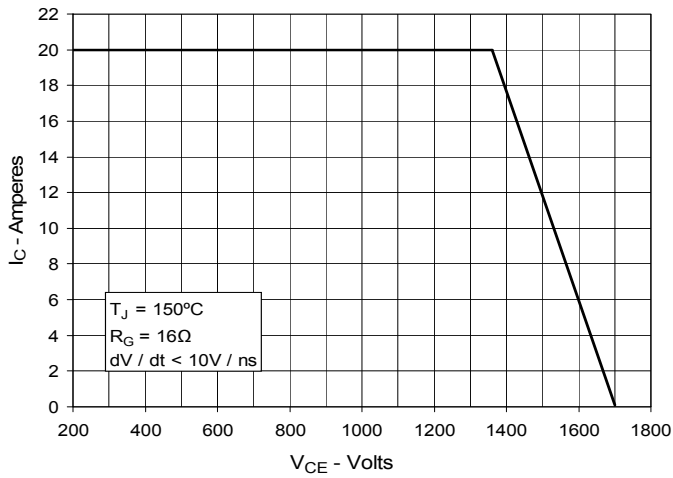
**Fig. 7. Transconductance**



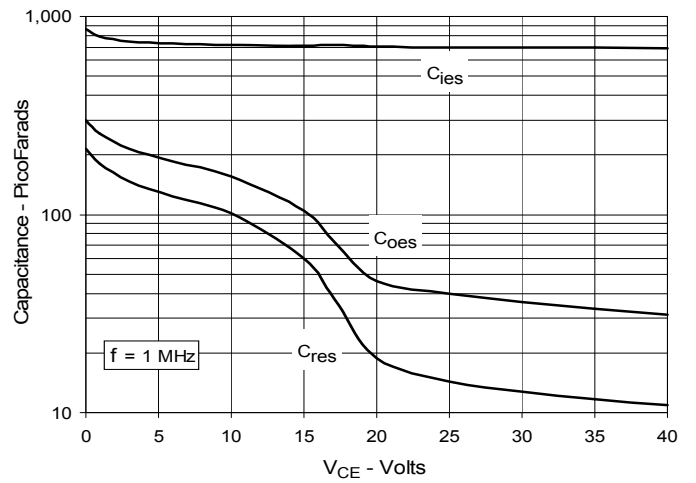
**Fig. 8. Gate Charge**



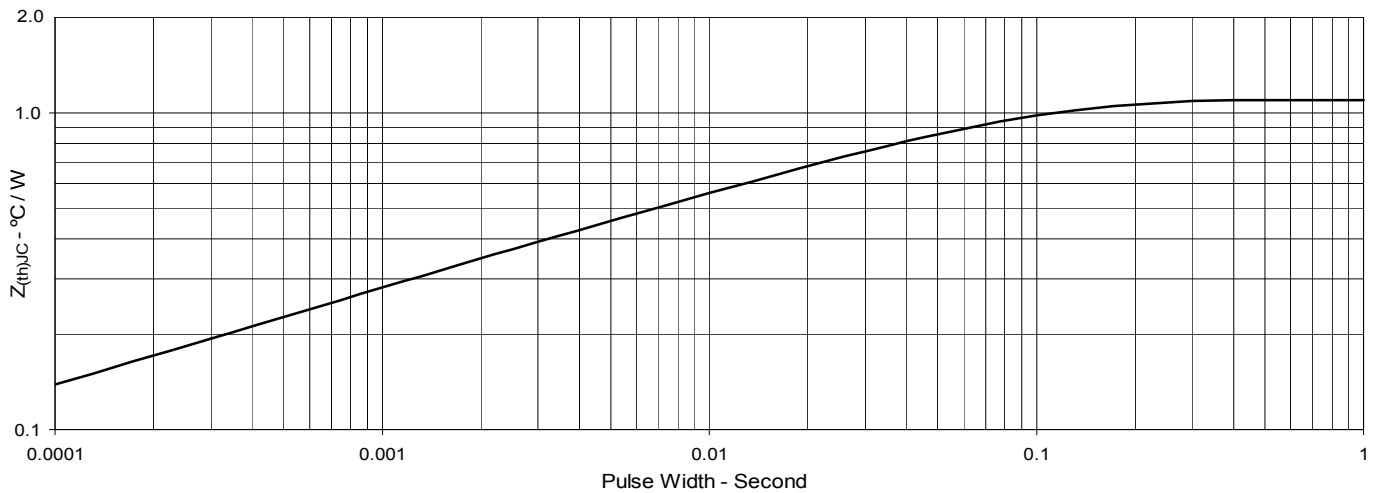
**Fig. 9. Reverse-Bias Safe Operating Area**



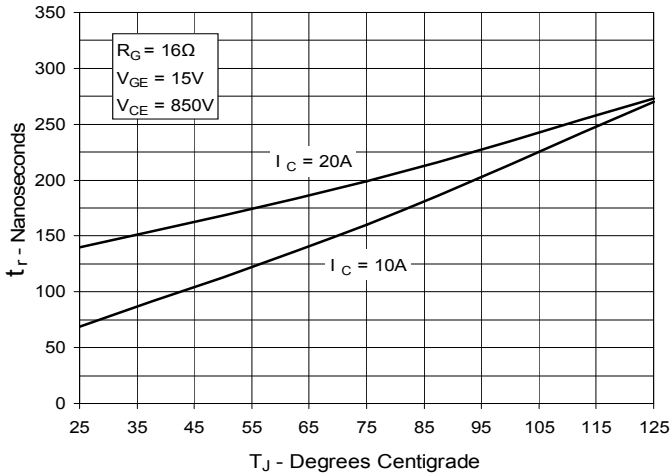
**Fig. 10. Capacitance**



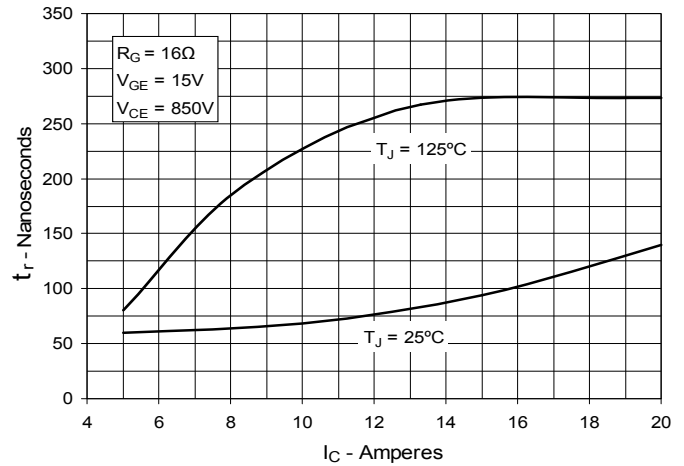
**Fig. 11. Maximum Transient Thermal Impedance**



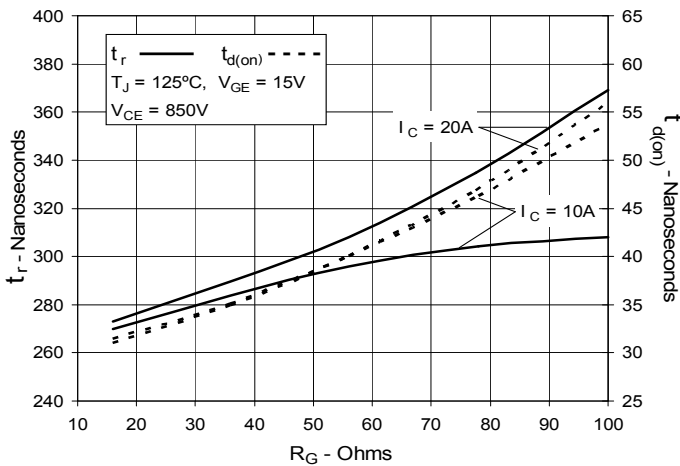
**Fig. 12. Resistive Turn-on Rise Time vs. Junction Temperature**



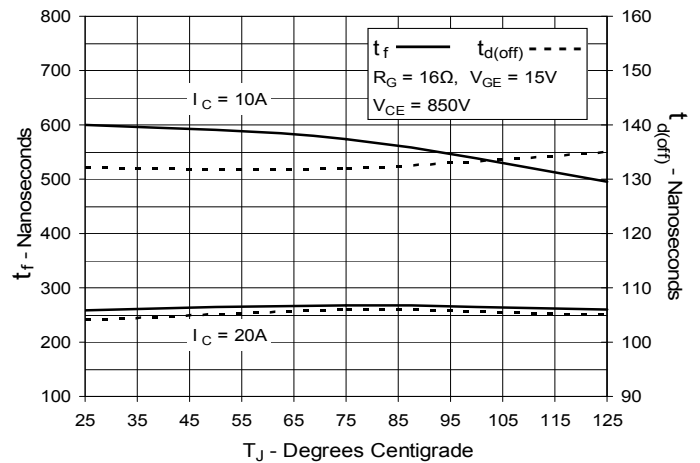
**Fig. 13. Resistive Turn-on Rise Time vs. Collector Current**



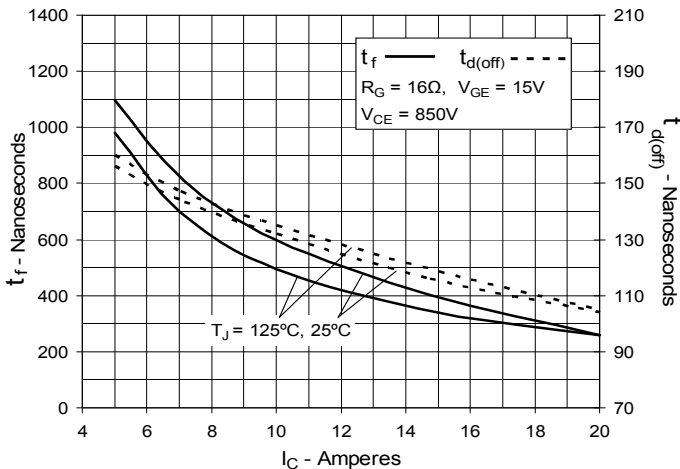
**Fig. 14. Resistive Turn-on Switching Times vs. Gate Resistance**



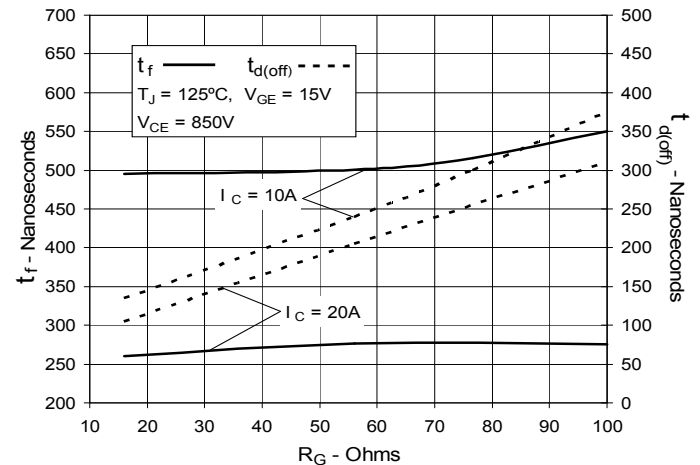
**Fig. 15. Resistive Turn-off Switching Times vs. Junction Temperature**



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



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



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