

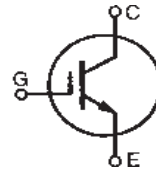
GenX3™ 300V IGBTs

IXGK400N30A3

IXGX400N30A3*

*Obsolete Part Number

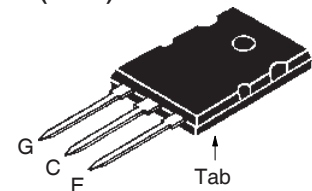
Ultra-Low V_{sat} PT IGBTs for up to 10kHz Switching



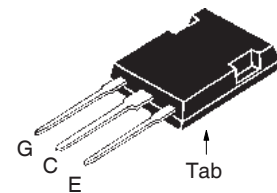
V_{CES} = 300V
I_{C25} = 400A
V_{CE(sat)} ≤ 1.15V

Symbol	Test Conditions	Maximum Ratings	
V _{CES}	T _J = 25°C to 150°C	300	V
V _{CGR}	T _J = 25°C to 150°C, R _{GE} = 1MΩ	300	V
V _{GES}	Continuous	±20	V
V _{GEM}	Transient	±30	V
I _{C25}	T _C = 25°C (Chip Capability)	400	A
I _{C110}	T _C = 110°C	200	A
I _{LRMS}	Terminal Current Limit	160	A
I _{CM}	T _C = 25°C, 1ms	1200	A
SSOA (RBSOA)	V _{GE} = 15V, T _{VJ} = 125°C, R _G = 1Ω Clamped Inductive Load	I _{CM} = 400 @ 0.8 • V _{CES}	A
P _C	T _C = 25°C	1000	W
T _J		-55 ... +150	°C
T _{JM}		150	°C
T _{stg}		-55 ... +150	°C
T _L	Maximum Lead Temperature for Soldering	300	°C
T _{SOLD}	1.6 mm (0.062 in.) from Case for 10	260	°C
M _d	Mounting Torque (IXGK)	1.13/10	Nm/lb.in.
F _C	Mounting Force (IXGX)	20..120/4.5..27	N/lb.
Weight	TO-264	10	g
	PLUS247	6	g

TO-264 (IXGK)



PLUS247™ (IXGX)



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

Features

- Optimized for Low Conduction Losses
- High Avalanche Capability
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

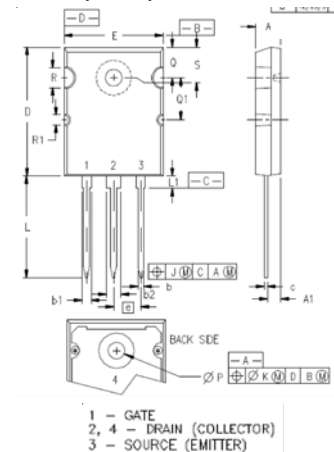
Applications

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

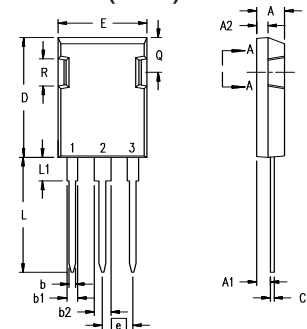
Symbol	Test Conditions (T _J = 25°C, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV _{CES}	I _C = 1mA, V _{GE} = 0V	300		V
V _{GE(th)}	I _C = 4mA, V _{CE} = V _{GE}	3.0		5.0 V
I _{CES}	V _{CE} = V _{CES} , V _{GE} = 0V T _J = 125°C			50 μA 2 mA
I _{GES}	V _{CE} = 0V, V _{GE} = ±20V			±400 nA
V _{CE(sat)}	I _C = 100A, V _{GE} = 15V, Note 1 I _C = 400A	1.70		1.15 V V

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 60\text{A}$, $V_{CE} = 10\text{V}$, Note 1	100	170	S
C_{ies}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		19	nF
C_{oes}			1350	pF
C_{res}			190	pF
$Q_{g(on)}$	$I_C = 100\text{A}$, $V_{GE} = 15\text{V}$, $V_{CE} = 0.5 \cdot V_{CES}$		560	nC
Q_{ge}			83	nC
Q_{gc}			185	nC
$t_{d(on)}$	Resistive load, $T_J = 25^\circ\text{C}$		45	ns
t_r			45	ns
$t_{d(off)}$	$I_C = 100\text{A}$, $V_{GE} = 15\text{V}$		210	ns
t_f		$V_{CE} = 240\text{V}$, $R_G = 1\Omega$		107
$t_{d(on)}$	Resistive load, $T_J = 125^\circ\text{C}$		47	ns
t_r			53	ns
$t_{d(off)}$	$I_C = 100\text{A}$, $V_{GE} = 15\text{V}$		240	ns
t_f		$V_{CE} = 240\text{V}$, $R_G = 1\Omega$		315
R_{thJC}				0.125 $^\circ\text{C/W}$
R_{thCK}		0.15		$^\circ\text{C/W}$

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

TO-264 (IXGK) Outline


SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.789	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
$\varnothing R$.155	.187	3.94	4.75
$\varnothing R1$.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

PLUS247™ (IXGX) Outline


Terminals: 1 - Gate
 2 - Drain (Collector)
 3 - Source (Emitter)

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A ₁	2.29	2.54	.090	.100
A ₂	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b ₁	1.91	2.13	.075	.084
b ₂	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

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 @ $T_J = 25^\circ\text{C}$

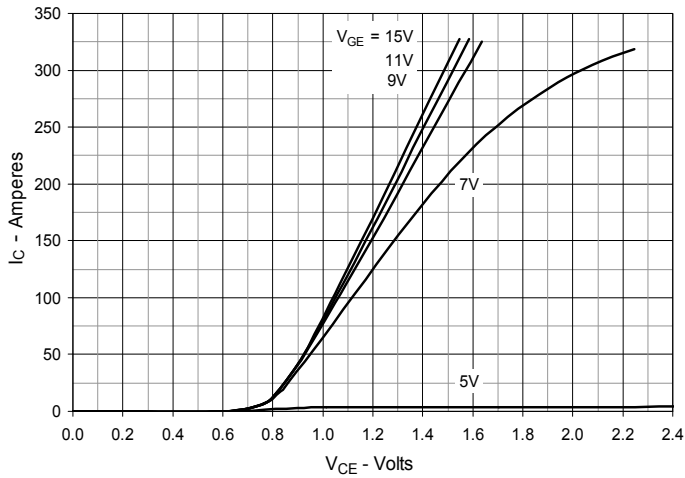


Fig. 2. Output Characteristics @ $T_J = 125^\circ\text{C}$

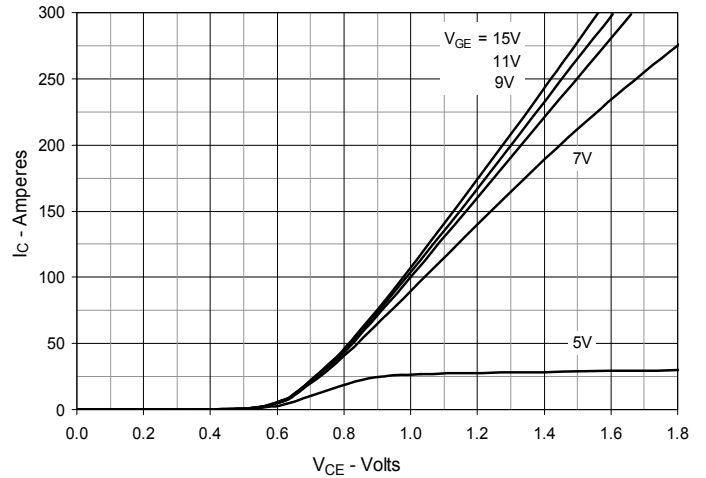


Fig. 3. Dependence of $V_{CE(sat)}$ on Junction Temperature

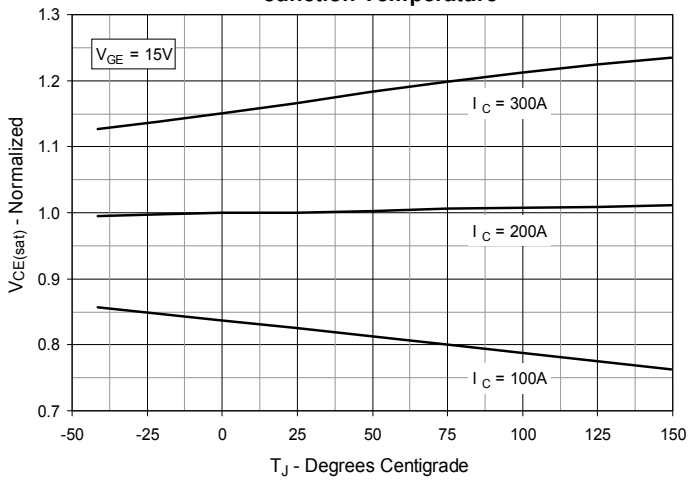


Fig. 4. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

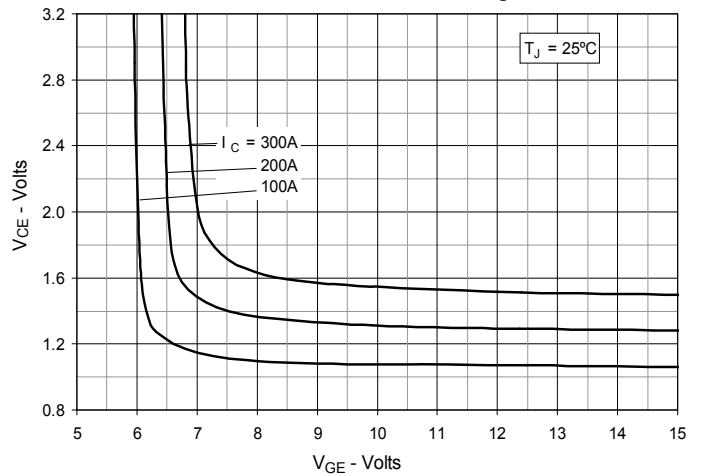


Fig. 5. Input Admittance

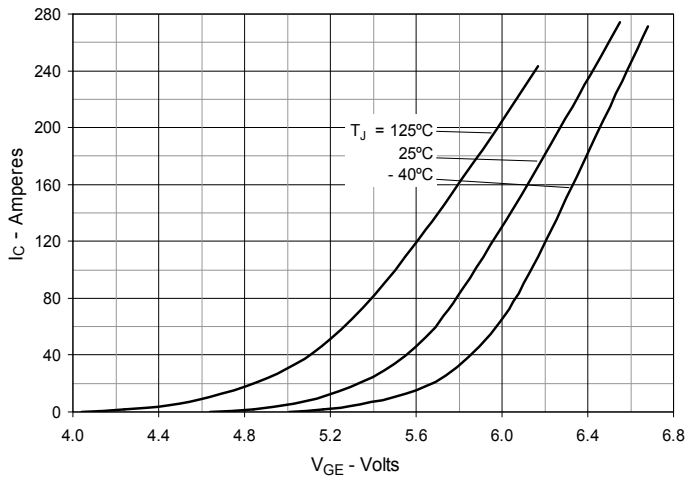


Fig. 6. Transconductance

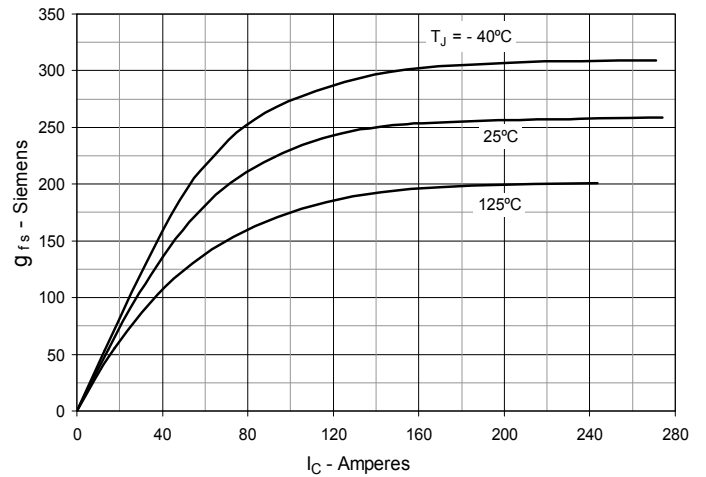


Fig. 7. Gate Charge

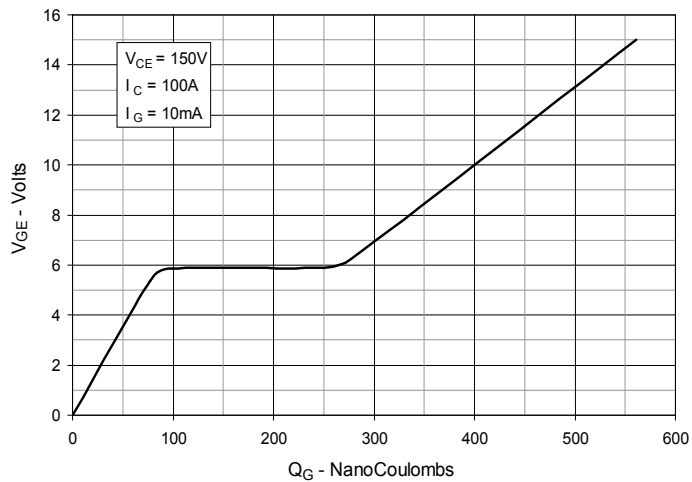


Fig. 8. Capacitance

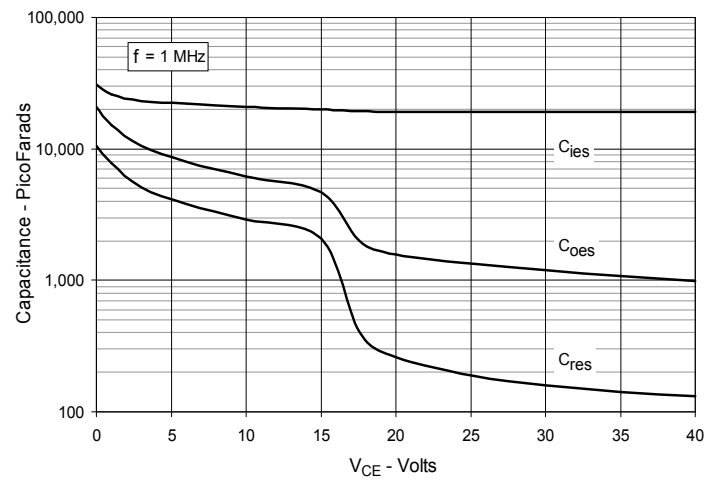


Fig. 9. Reverse-Bias Safe Operating Area

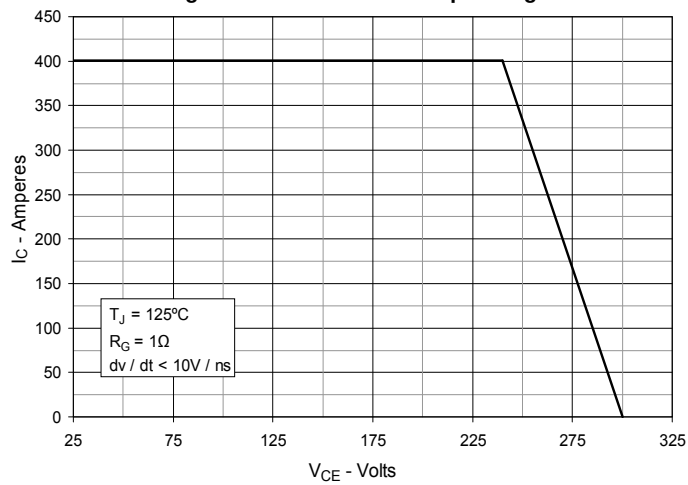


Fig. 10. Maximum Transient Thermal Impedance

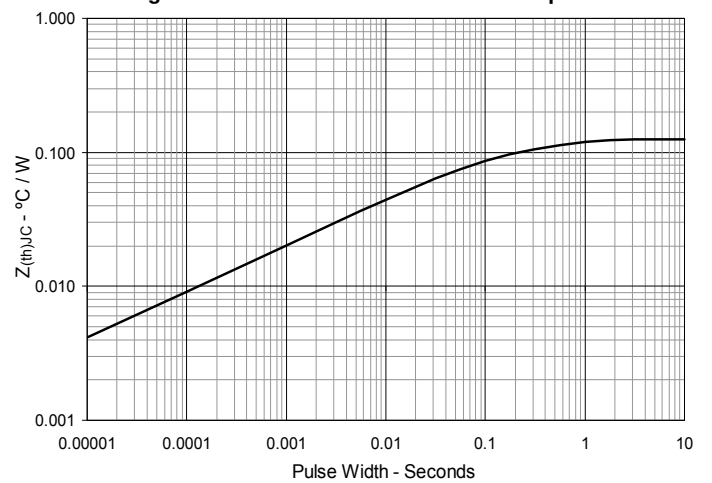


Fig. 11. Resistive Turn-on Rise Time vs. Junction Temperature

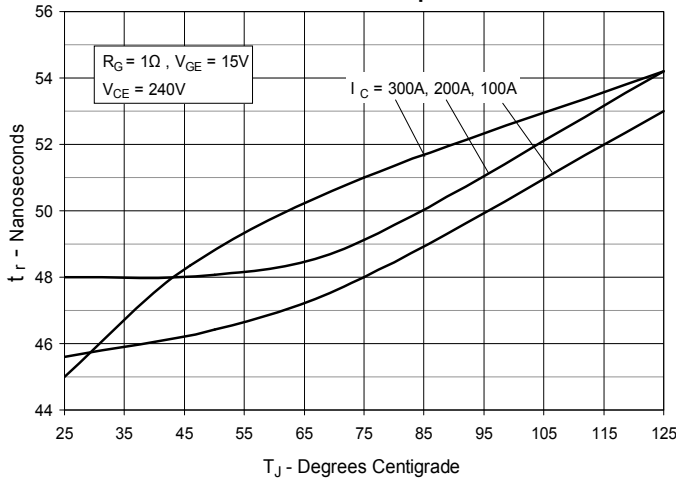


Fig. 12. Resistive Turn-on Rise Time vs. Collector Current

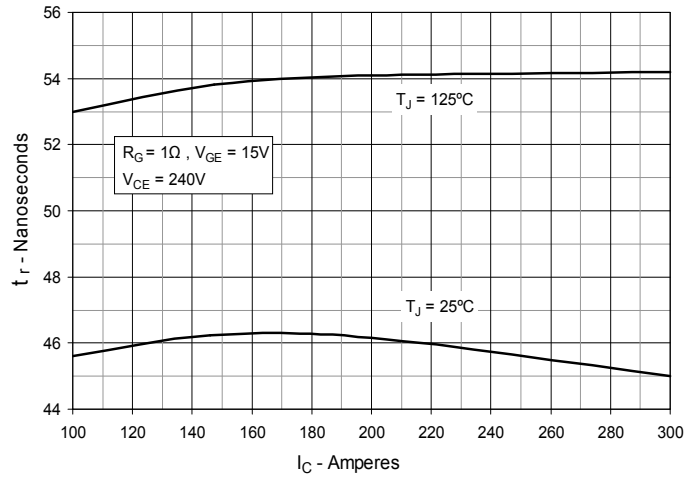


Fig. 13. Resistive Turn-on Switching Times vs. Gate Resistance

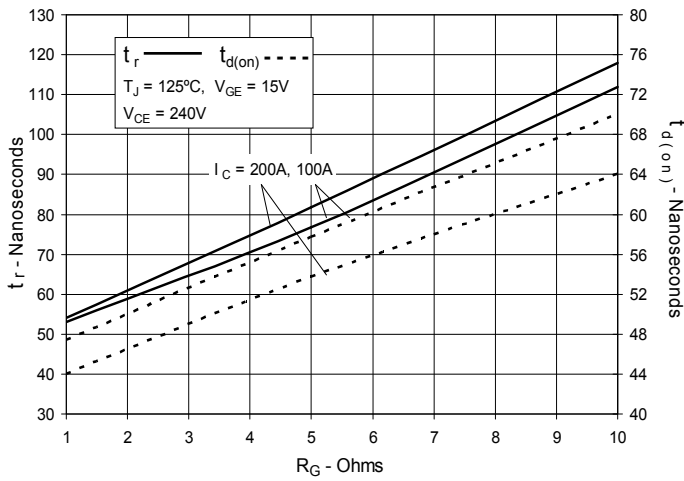


Fig. 14. Resistive Turn-off Switching Times vs. Junction Temperature

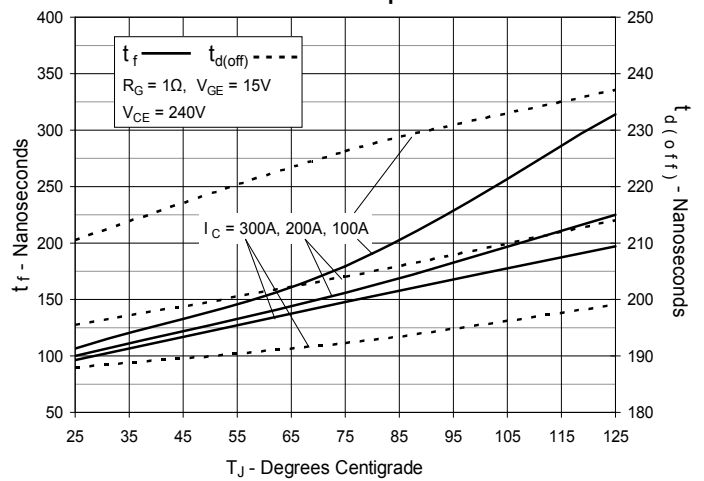


Fig. 15. Resistive Turn-off Switching Times vs. Gate Resistance

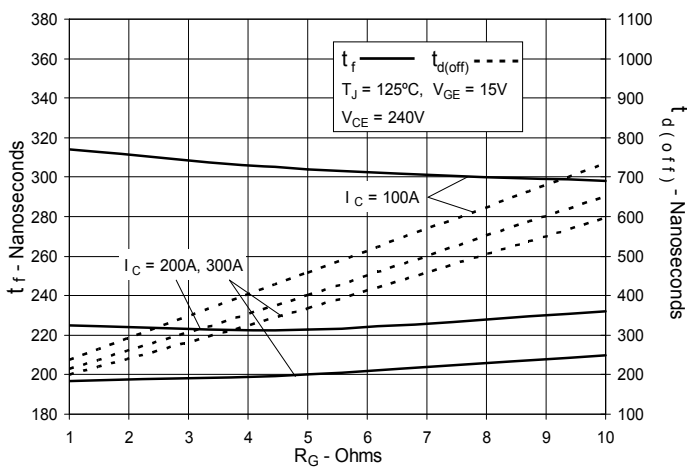
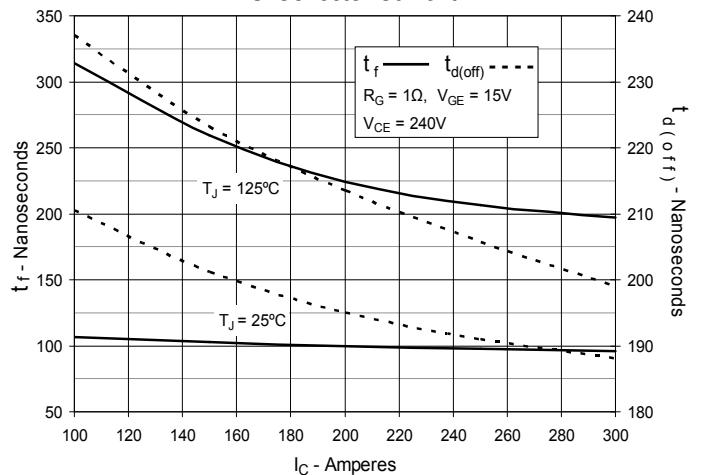


Fig. 16. Resistive Turn-off Switching Times vs. Collector Current





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