

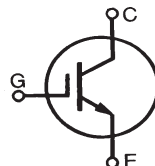
GenX3™ 300V IGBT

IXGK400N30A3

IXGX400N30A3*

*Obsolete Part Number

Ultra-low V_{sat} PT IGBTs for
up to 10kHz switching

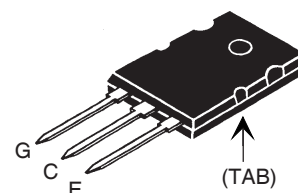


$$V_{CES} = 300V$$

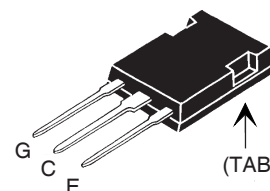
$$I_{C25} = 400A$$

$$V_{CE(sat)} \leq 1.15V$$

TO-264



PLUS247™



G = Gate
C = Collector

E = Emitter
TAB = Collector

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^{\circ}C$ to $150^{\circ}C$	300	V
V_{CGR}	$T_J = 25^{\circ}C$ to $150^{\circ}C$, $R_{GE} = 1M\Omega$	300	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^{\circ}C$	400	A
I_{C110}	$T_C = 110^{\circ}C$	200	A
I_{LRMS}	Terminal Current Limit	75	A
I_{CM}	$T_C = 25^{\circ}C$, 1ms	400	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^{\circ}C$, $R_G = 1\Omega$ Clamped inductive load	$I_{CM} = 400$ @ $0.8 \cdot V_{CES}$	A
P_C	$T_C = 25^{\circ}C$	1000	W
T_J		-55 ... +150	$^{\circ}C$
T_{JM}		150	$^{\circ}C$
T_{stg}		-55 ... +150	$^{\circ}C$
T_L	Maximum lead temperature for soldering	300	$^{\circ}C$
T_{SOLD}	1.6 mm (0.062 in.) from case for 10	260	$^{\circ}C$
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

Symbol	Test Conditions ($T_J = 25^{\circ}C$, 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}	$V_{CE} = V_{CES}$ $V_{GE} = 0V$ $T_J = 125^{\circ}C$			50 μA 2 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 400 nA
$V_{CE(sat)}$	$I_C = 100A$, $V_{GE} = 15V$, Note 1 $I_C = 400A$	1.70		1.15 V V

Features

- Optimized for low switching losses
- Square RBSOA
- High avalanche capability
- International standard packages

Advantages

- High power density
- Low gate drive requirement

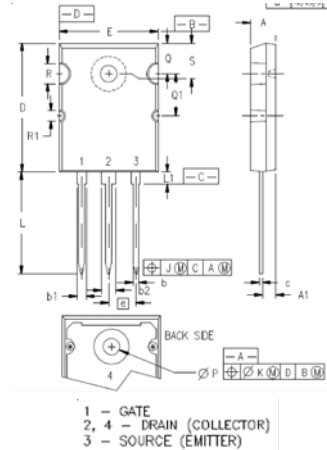
Applications

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

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, 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, $T_J = 25^\circ\text{C}$ $I_C = 100\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 240\text{V}$, $R_G = 1\Omega$		45	ns
t_r			45	ns
$t_{d(off)}$			210	ns
t_f			107	ns
$t_{d(on)}$			47	ns
t_r	Resistive load, $T_J = 125^\circ\text{C}$ $I_C = 100\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 240\text{V}$, $R_G = 1\Omega$		53	ns
$t_{d(off)}$			240	ns
t_f			315	ns
R_{thJC}			0.125	$^\circ\text{C/W}$
R_{thCK}		0.15		$^\circ\text{C/W}$

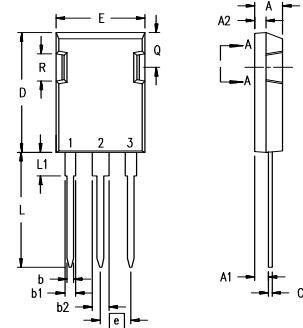
Note: 1. Pulse test, $t \leq 300\mu\text{s}$; duty cycle, $d \leq 2\%$.

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	.799	19.30	20.29
e	.215 BSC		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
ØP	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.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
@ 25°C

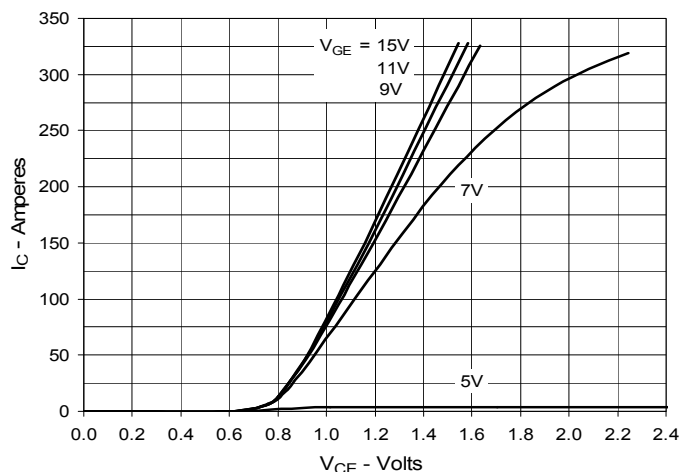


Fig. 2. Output Characteristics
@ 125°C

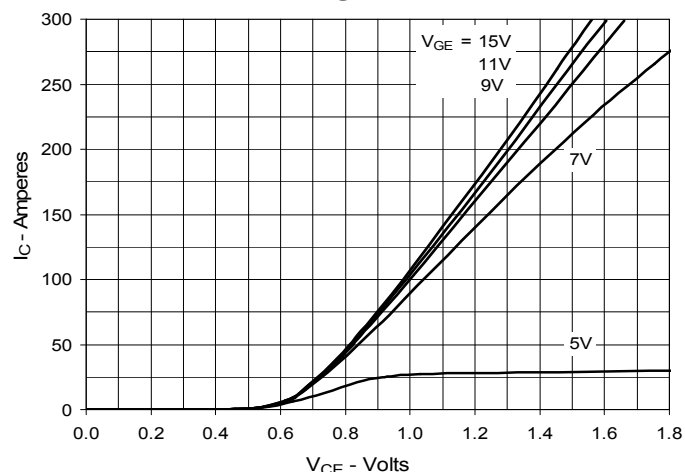


Fig. 3. Dependence of $V_{CE(sat)}$ on
Junction Temperature

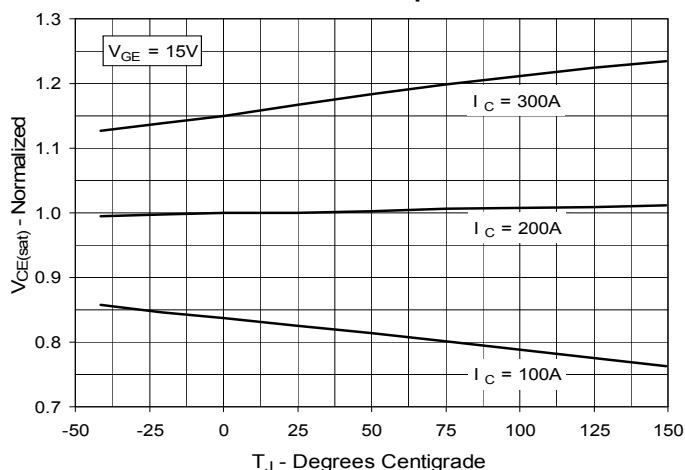


Fig. 4. Collector-to-Emitter Voltage
vs. Gate-to-Emitter Voltage

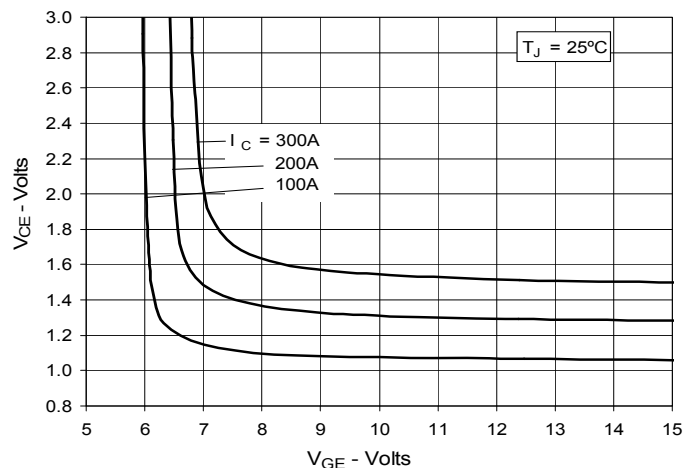


Fig. 5. Input Admittance

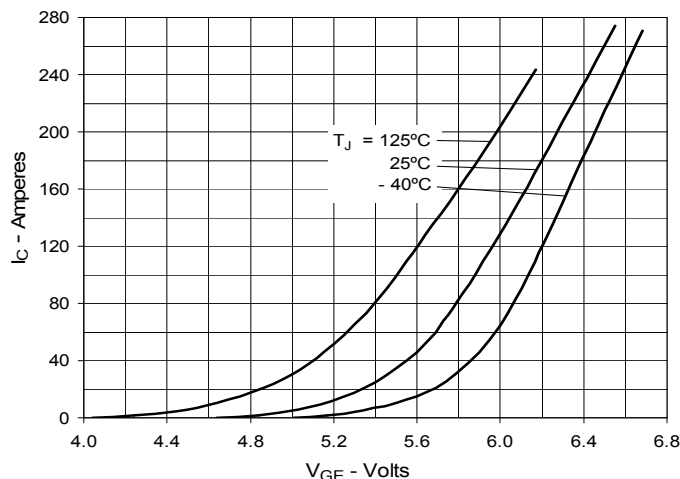


Fig. 6. Transconductance

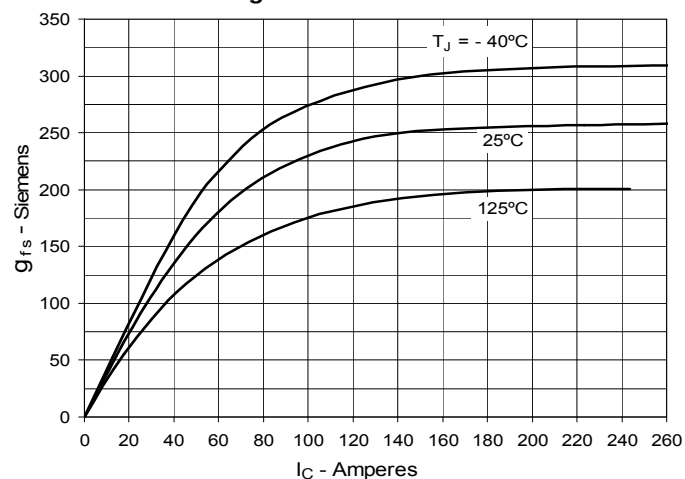


Fig. 7. Gate Charge

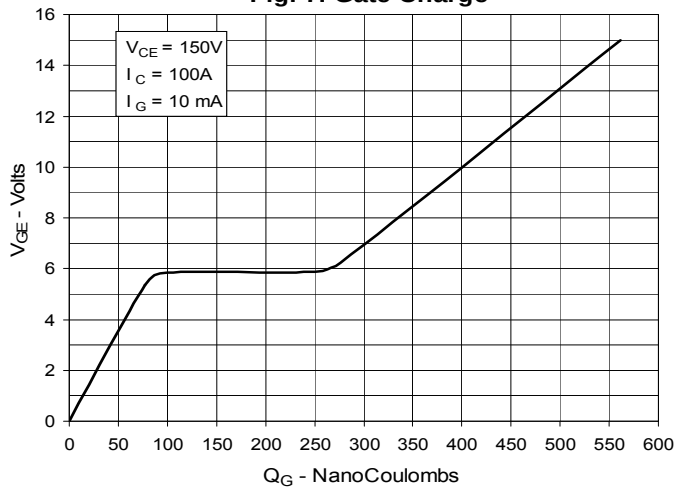


Fig. 8. Capacitance

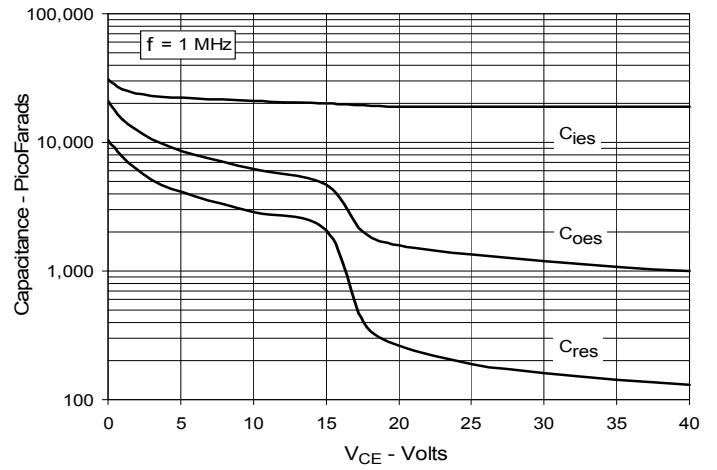


Fig. 9. Reverse-Bias Safe Operating Area

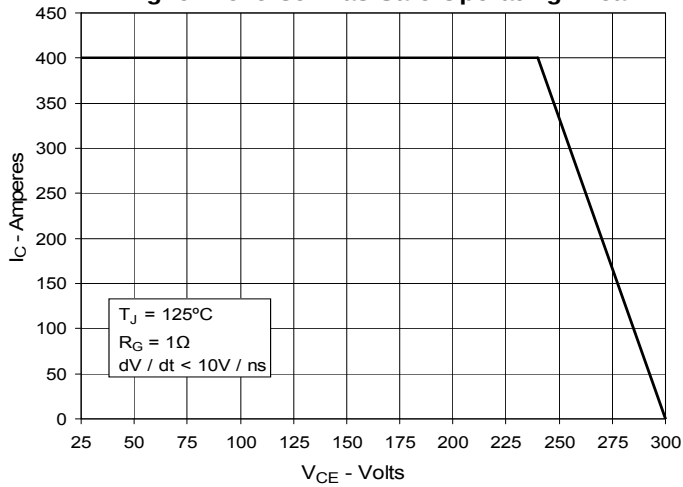


Fig. 10. Maximum Transient Thermal Impedance

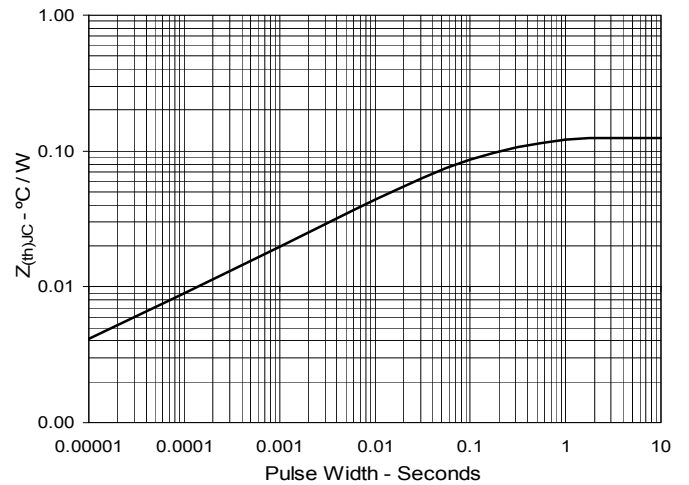
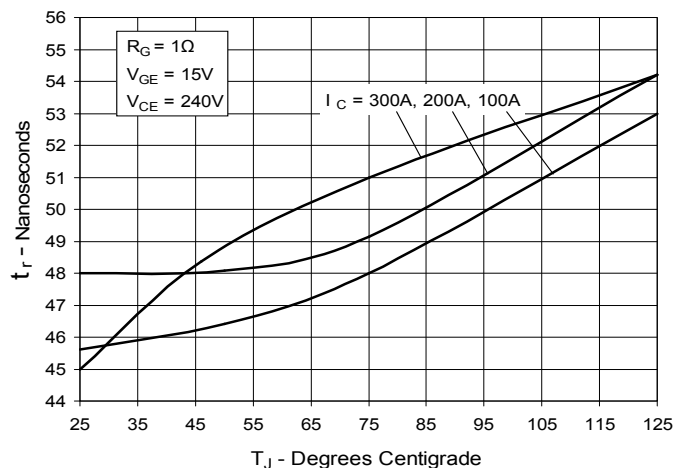
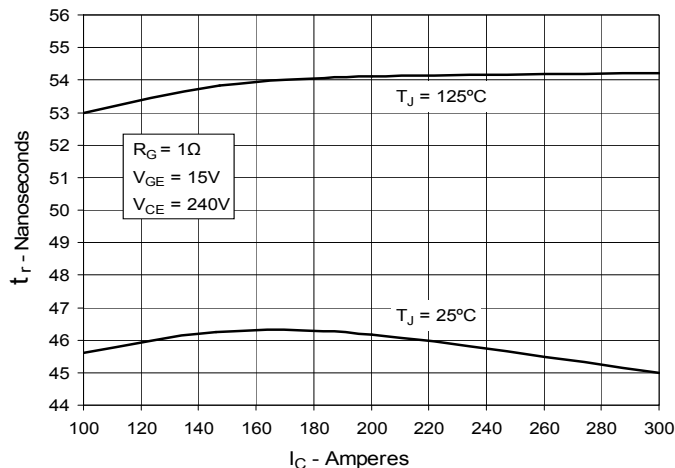
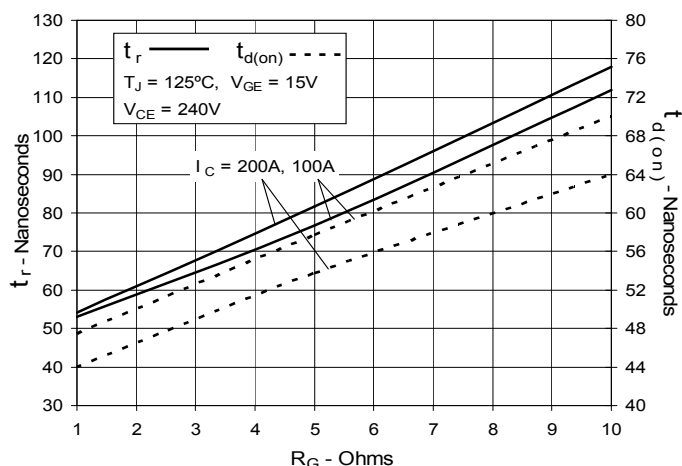
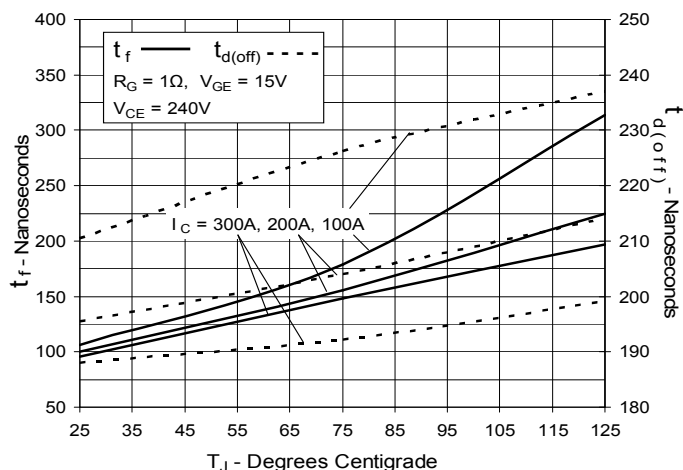
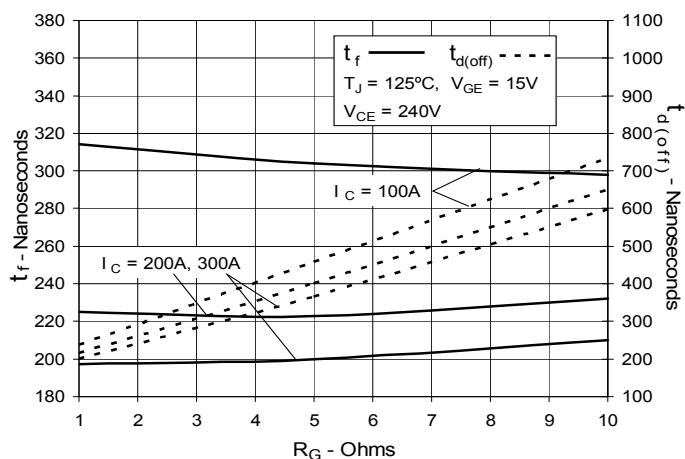
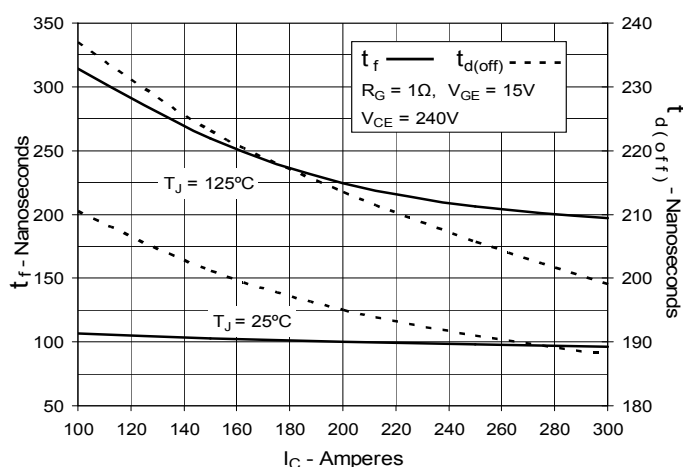


Fig. 11. Resistive Turn-on Rise Time vs. Junction Temperature

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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