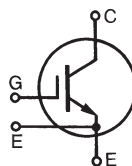


Ultra-Low-V_{sat} PT IGBT for
up to 10kHz Switching



$$V_{CES} = 300V$$

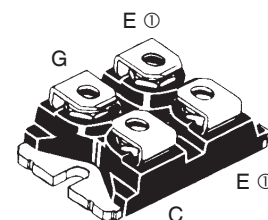
$$I_{C25} = 400A$$

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

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}	$T_C = 25^{\circ}C$ (Chip Capability)	400	A
I_{C110}	$T_C = 110^{\circ}C$	200	A
I_{LRMS}	Terminal Current Limit	200	A
I_{CM}	$T_C = 25^{\circ}C$, 1ms	1200	A
SSOA	$V_{GE} = 15V$, $T_{VJ} = 125^{\circ}C$, $R_G = 1\Omega$	$I_{CM} = 400$	A
(RBSOA)	Clamped Inductive Load	@ $0.8 \cdot V_{CES}$	V
P_C	$T_C = 25^{\circ}C$	735	W
T_J		-55 ... +150	$^{\circ}C$
T_{JM}		150	$^{\circ}C$
T_{stg}		-55 ... +150	$^{\circ}C$
V_{ISOL}	50/60Hz	t = 1min	2500 V~
	$I_{ISOL} \leq 1mA$	t = 1s	3000 V~
M_d	Mounting Torque	1.5/13	Nm/lb.in.
	Terminal Connection Torque (M4)	1.3/11.5	Nm/lb.in.
Weight		30	g

SOT-227B, miniBLOC

E153432



G = Gate, C = Collector, E = Emitter

① Either Emitter Terminal Can Be Used
as Main or Kelvin Emitter

Features

- Optimized for Low Conduction Losses
- High Current Capability
- International Standard Package
- miniBLOC, with Aluminium Nitride Isolation

Advantages

- High Power Density
- Low Gate Drive Requirement

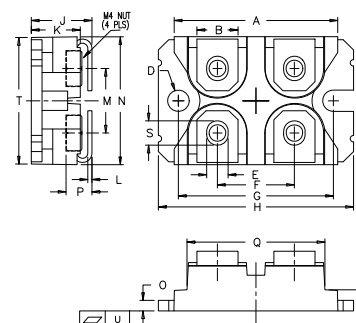
Applications

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

Symbol	Test Conditions ($T_J = 25^{\circ}C$, 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 $I_C = 400A$			1.15 V
			1.70	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
$Q_{g(on)}$	$I_C = 100\text{V}$, $V_{GE} = 15\text{V}$, $V_{CE} = 0.5 \cdot V_{CES}$		560	nC
Q_{ge}			83	C
Q_{gc}			185	nC
$t_{d(on)}$	Resistive Load, $T_J = 25^\circ\text{C}$ $I_C = 100\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}$, $R_G = 1\Omega$		45	ns
t_r			45	ns
$t_{d(off)}$			210	ns
t_f			107	ns
$t_{d(on)}$	Resistive Load, $T_J = 125^\circ\text{C}$ $I_C = 100\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}$, $R_G = 1\Omega$		47	ns
t_r			53	ns
$t_{d(off)}$			240	ns
t_f			315	ns
R_{thJC}				0.17 $^\circ\text{C/W}$
R_{thCK}		0.05		$^\circ\text{C/W}$

SOT-227B miniBLOC (IXGN)



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

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

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	

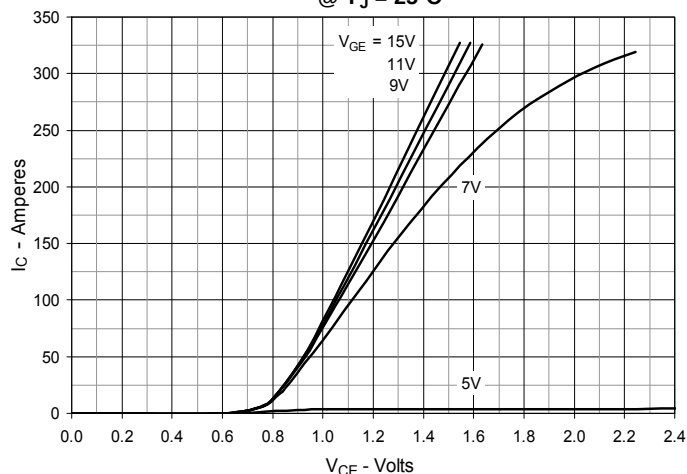
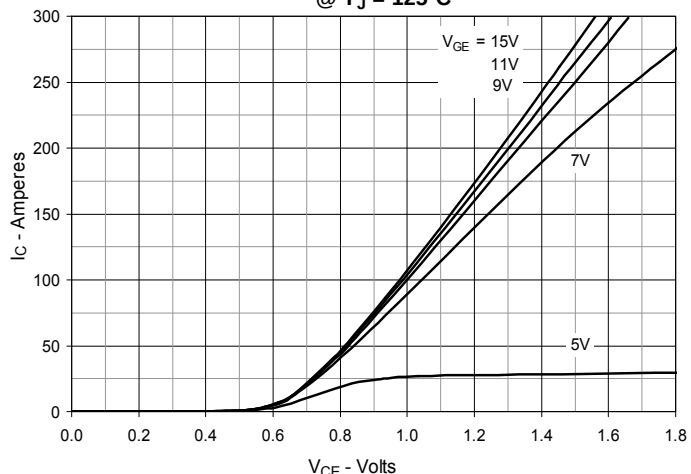
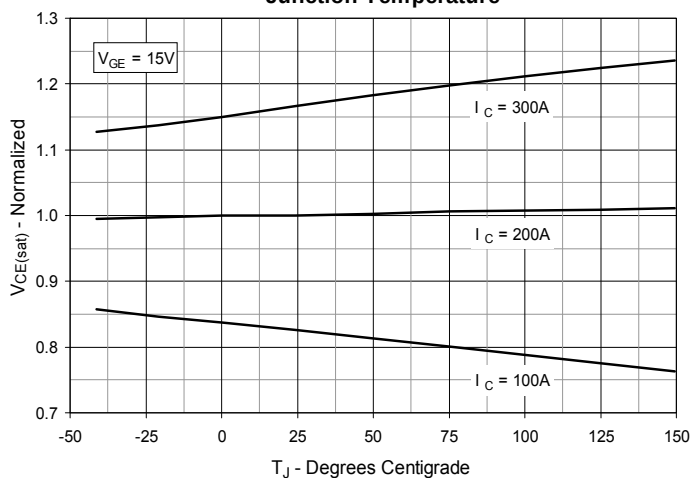
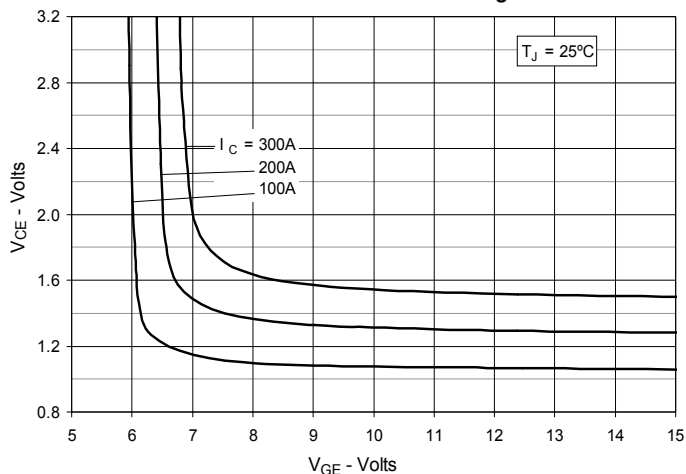
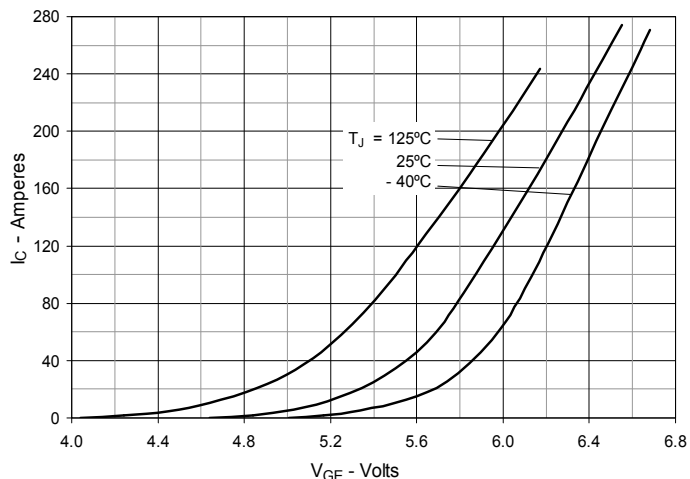
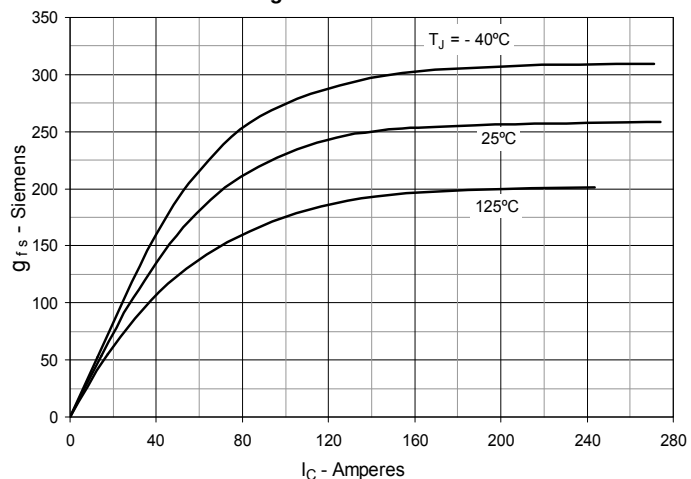
Fig. 1. Output Characteristics
@ $T_J = 25^\circ\text{C}$

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


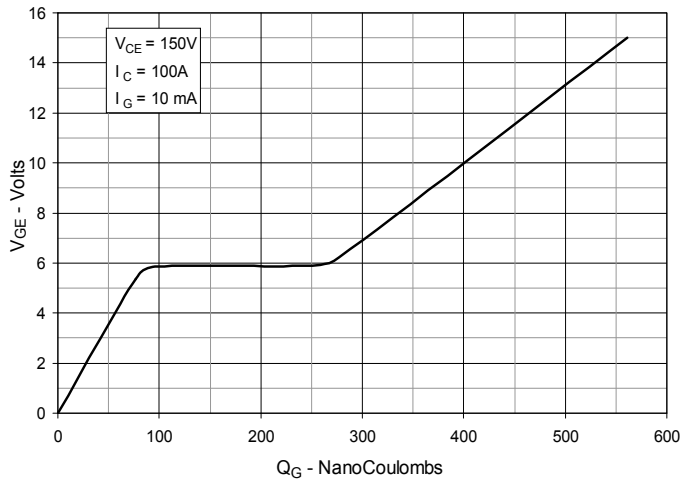
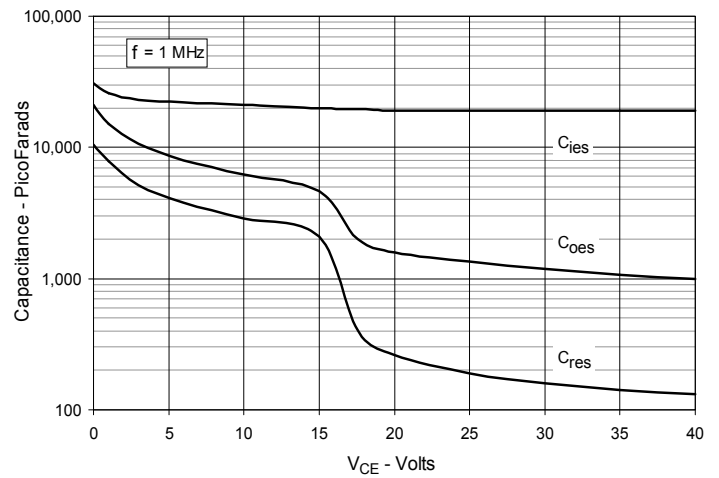
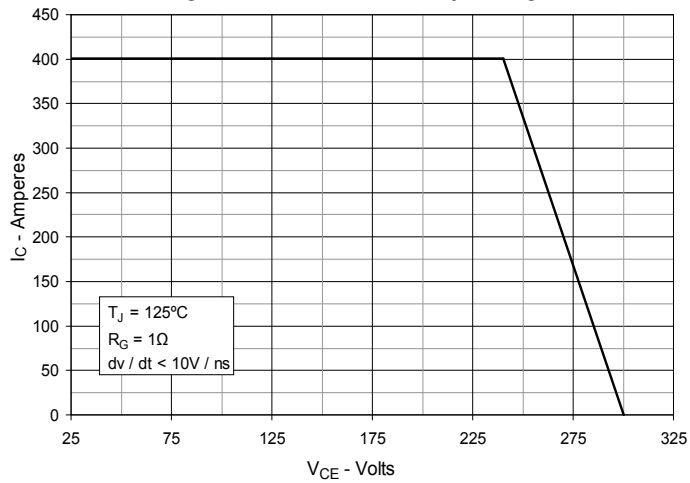
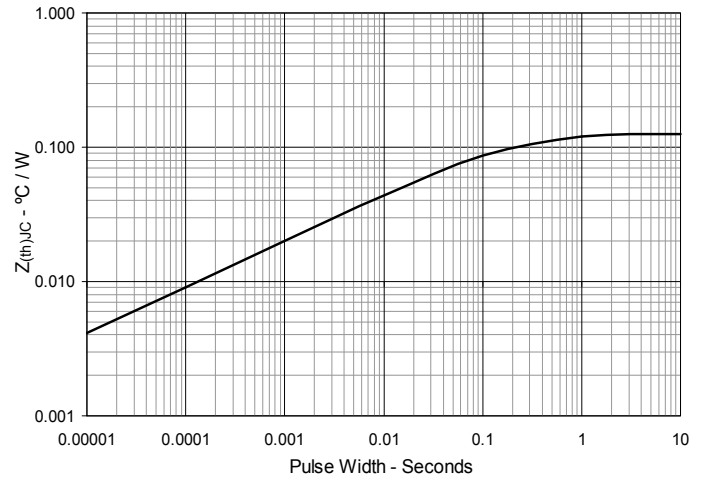
Fig. 7. Gate Charge

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

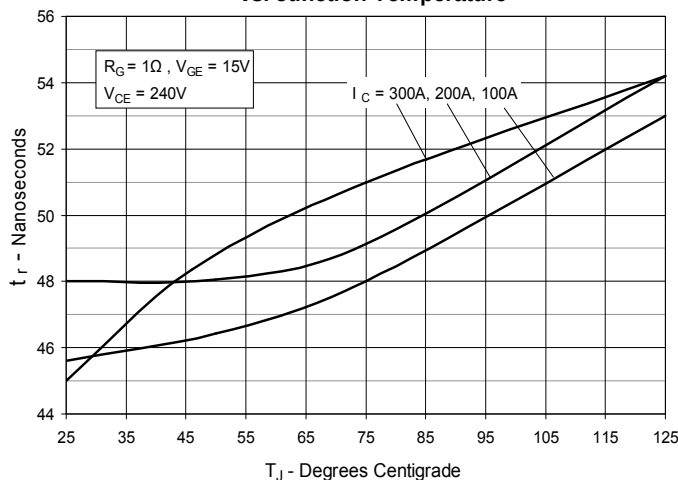


Fig. 12. Resistive Turn-on Rise Time vs. Collector Current

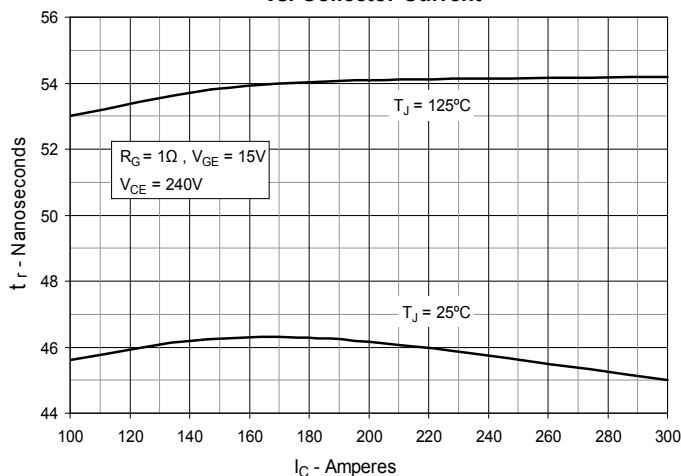


Fig. 13. Resistive Turn-on Switching Times vs. Gate Resistance

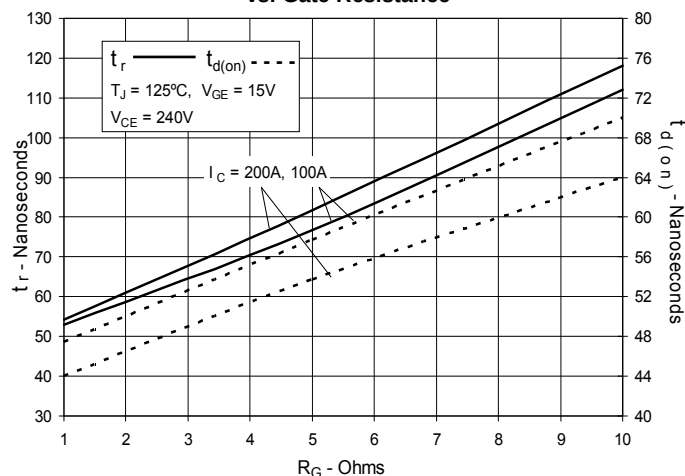


Fig. 14. Resistive Turn-off Switching Times vs. Junction Temperature

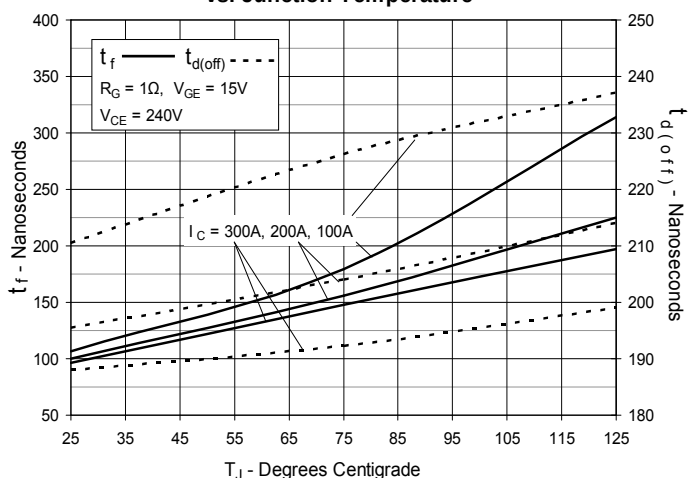


Fig. 15. Resistive Turn-off Switching Times vs. Gate Resistance

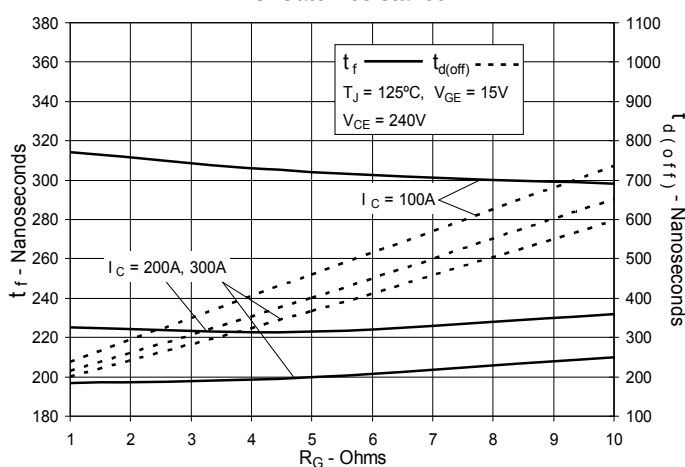
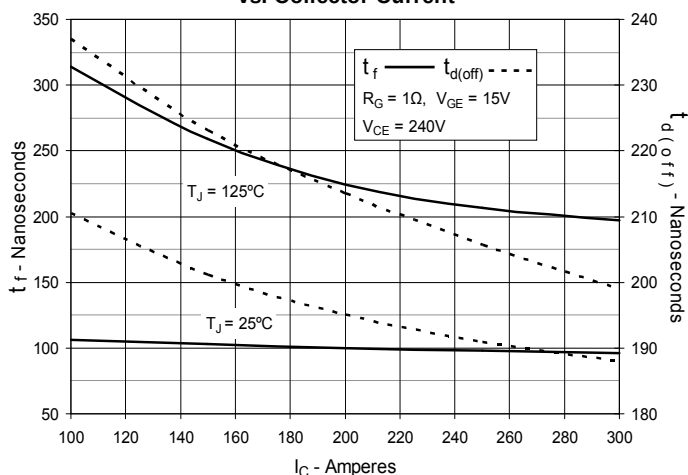


Fig. 16. Resistive Turn-off Switching Times vs. Collector Current





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