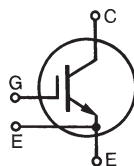


Ultra-Low-V_{sat} PT IGBT for
up to 5kHz Switching

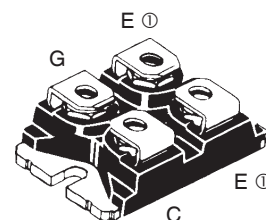


$$\begin{aligned} V_{CES} &= 600V \\ I_{C25} &= 400A \\ V_{CE(sat)} &\leq 1.25V \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C}$ to 150°C	600	V
V_{CGR}	$T_J = 25^\circ\text{C}$ to 150°C , $R_{GE} = 1M\Omega$	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Chip Capability)	400	A
I_{C110}	$T_C = 110^\circ\text{C}$	190	A
I_{LRMS}	Terminal Current Limit	200	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1ms	800	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 0.5\Omega$ Clamped Inductive Load	$I_{CM} = 400$ @ $0.8 \cdot V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	830	W
T_J		-55 ... +150	$^\circ\text{C}$
T_{JM}		150	$^\circ\text{C}$
T_{stg}		-55 ... +150	$^\circ\text{C}$
V_{ISOL}	50/60Hz $I_{ISOL} \leq 1mA$	$t = 1min$ $t = 1s$	2500 3000 V~ V~
M_d	Mounting Torque Terminal Connection Torque (M4)	1.5/13 1.3/11.5	Nm/lb.in. 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
- Square RBSOA
- High Current Capability
- Isolation Voltage 3000 V~
- International Standard Package

Advantages

- High Power Density
- Low Gate Drive Requirement

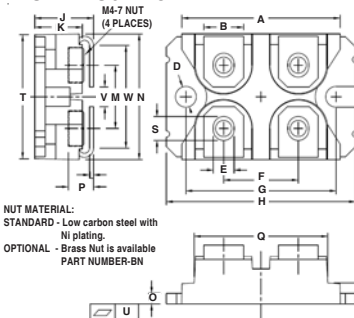
Applications

- 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.
BV_{CES}	$I_C = 1mA$, $V_{GE} = 0V$	600		V
$V_{GE(th)}$	$I_C = 250\mu A$, $V_{CE} = V_{GE}$	3.0		5.5 V
I_{CES}	$V_{CE} = V_{CES}$, $V_{GE} = 0V$ $T_J = 125^\circ\text{C}$			250 μA 2.5 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 400 nA
$V_{CE(sat)}$	$I_C = 100A$, $V_{GE} = 15V$, Note 1 $I_C = 400A$		1.05 1.55	1.25 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	85	140	S
C_{ies}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		32	nF
C_{oes}			1450	pF
C_{res}			66	pF
$Q_{g(on)}$	$I_C = 100\text{V}$, $V_{GE} = 15\text{V}$, $V_{CE} = 0.5 \cdot V_{CES}$		870	nC
Q_{ge}			120	nC
Q_{gc}			300	nC
$t_{d(on)}$	Resistive load, $T_J = 25^{\circ}\text{C}$ $I_C = 100\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}$, $R_G = 0.5\Omega$		25	ns
t_r			95	ns
$t_{d(off)}$			170	ns
t_f			270	ns
$t_{d(on)}$	Resistive load, $T_J = 125^{\circ}\text{C}$ $I_C = 100\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}$, $R_G = 0.5\Omega$		27	ns
t_r			97	ns
$t_{d(off)}$			190	ns
t_f			650	ns
R_{thJC}				0.15 $^{\circ}\text{C/W}$
R_{thCK}			0.05	$^{\circ}\text{C/W}$

TO-227 Outline



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	1.489	1.505	37.80	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
V	.130	.180	3.30	4.57
W	.780	.830	19.81	21.08

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
4,860,072	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	

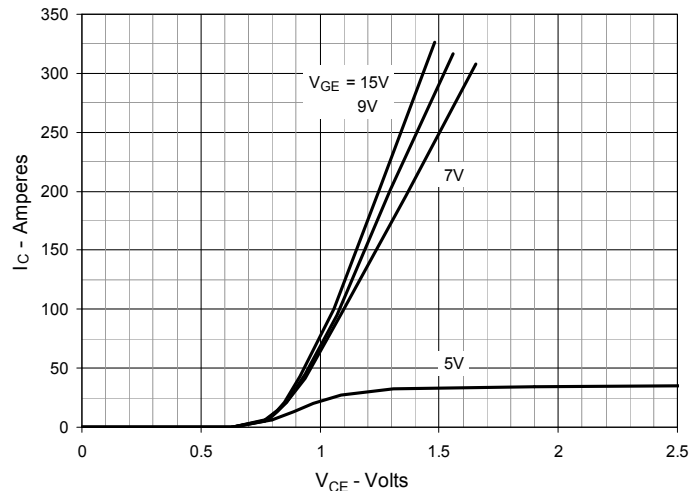
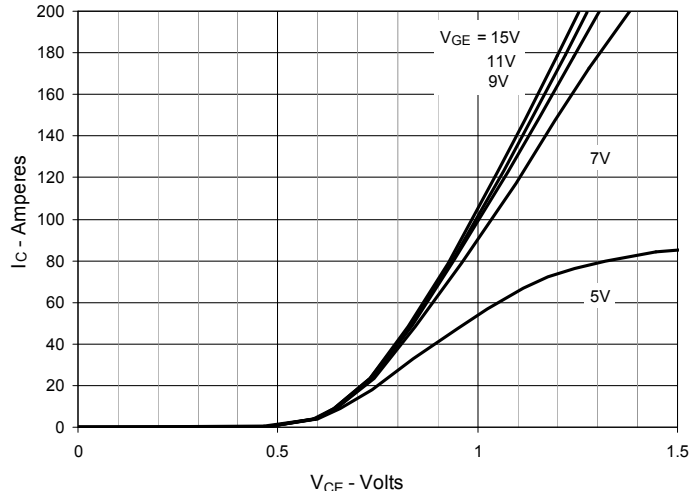
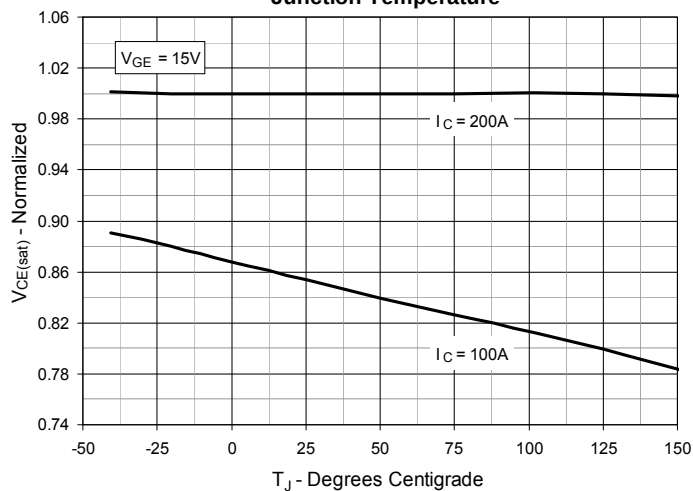
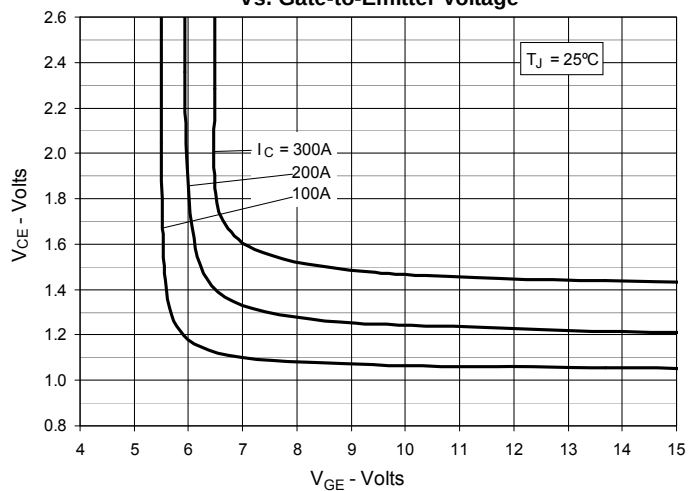
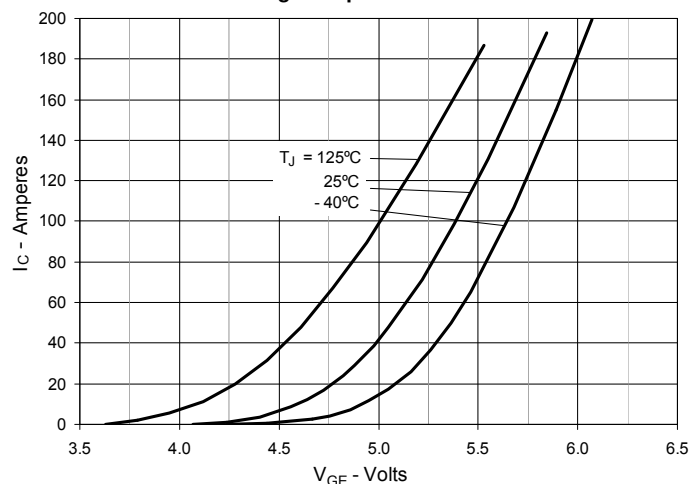
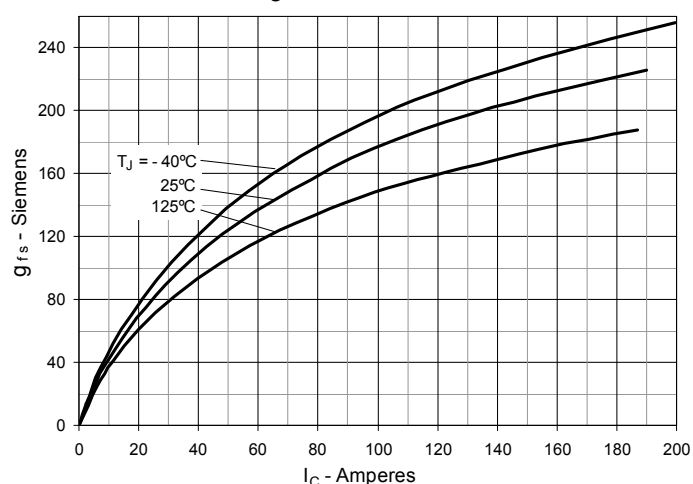
Fig. 1. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

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


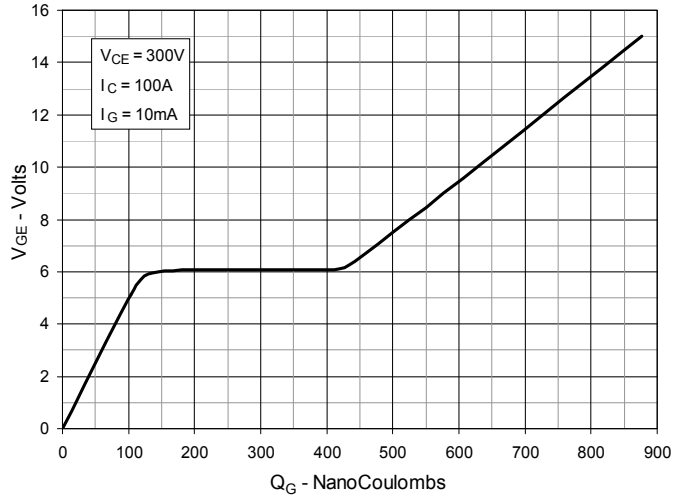
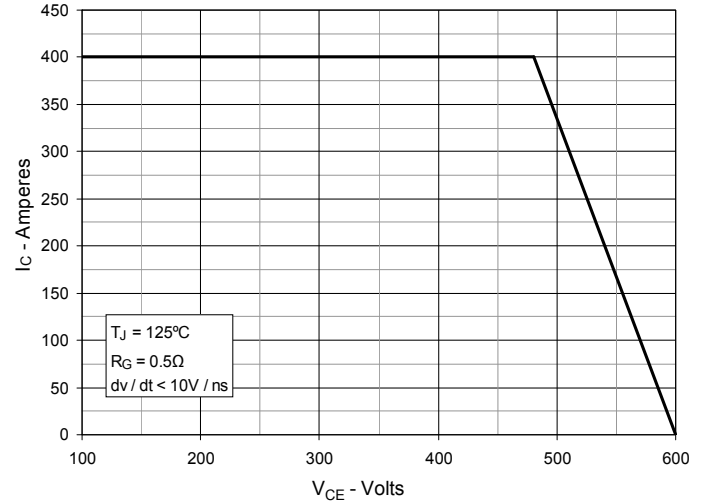
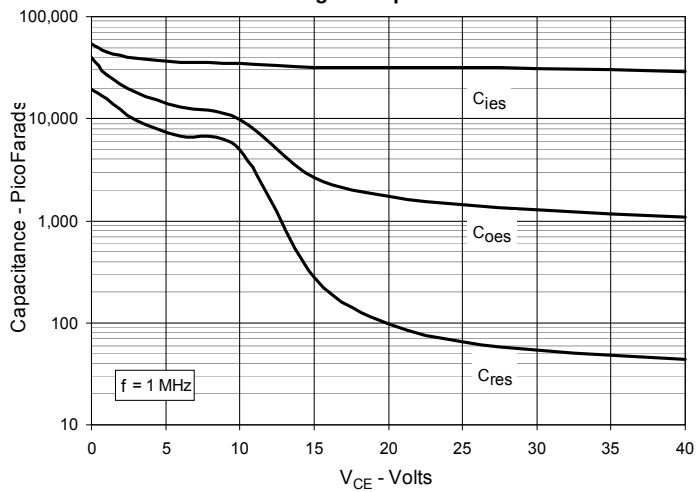
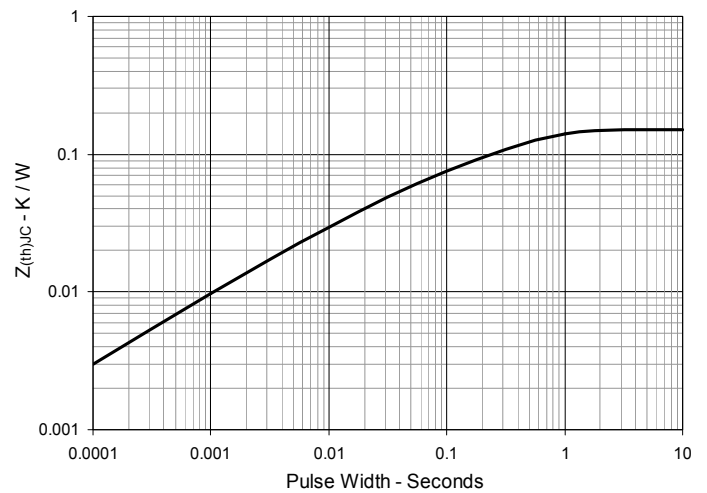
Fig. 7. Gate Charge

Fig. 8. Reverse-Bias Safe Operating Area

Fig. 9. Capacitance

Fig. 10. Maximum Transient Thermal Impedance


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

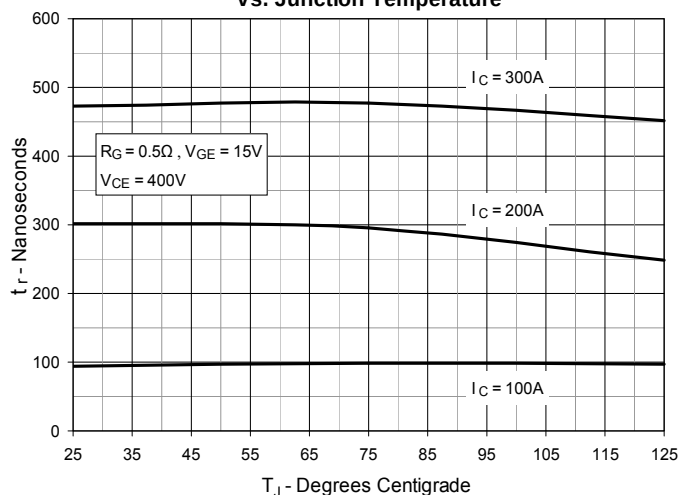


Fig. 12. Resistive Turn-on Rise Time vs. Collector Current

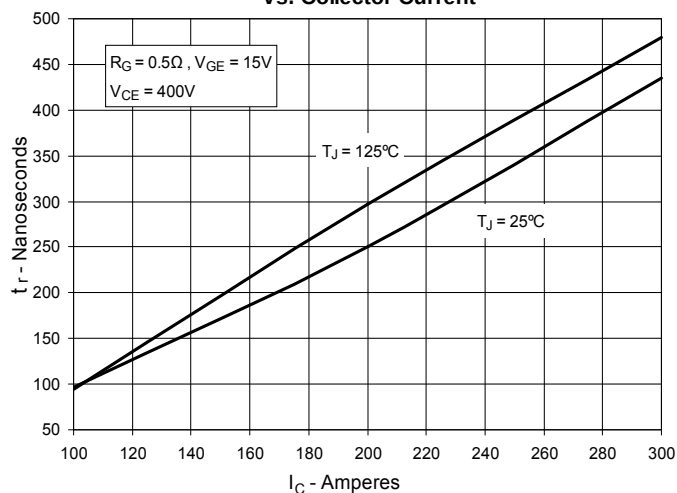


Fig. 13. Resistive Turn-on Switching Times vs. Gate Resistance

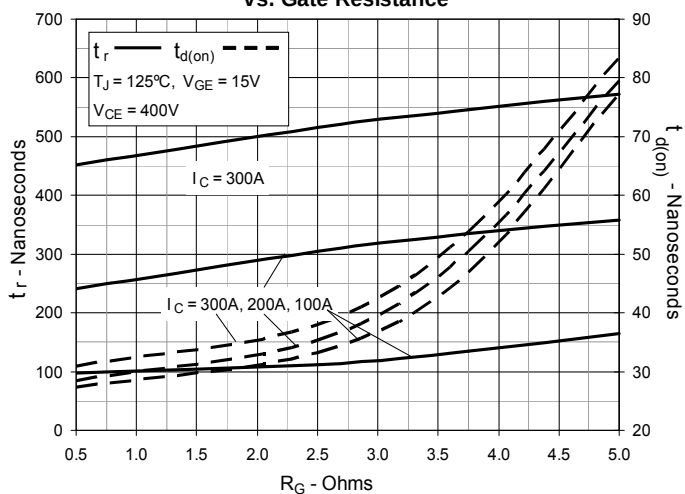


Fig. 14. Resistive Turn-off Switching Times vs. Junction Temperature

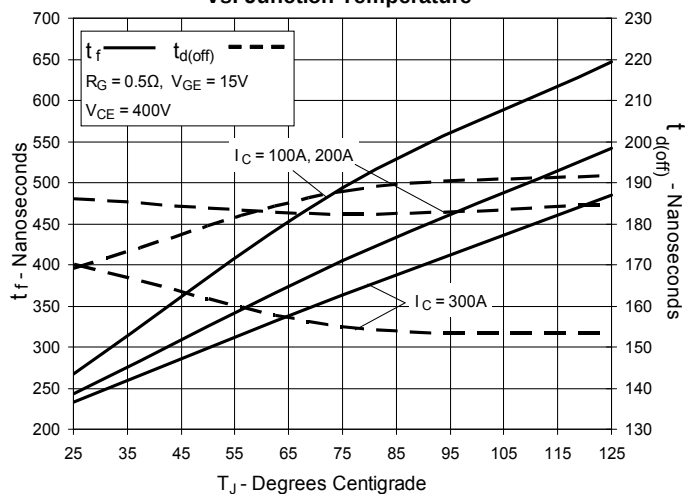


Fig. 15. Resistive Turn-off Switching Times vs. Collector Current

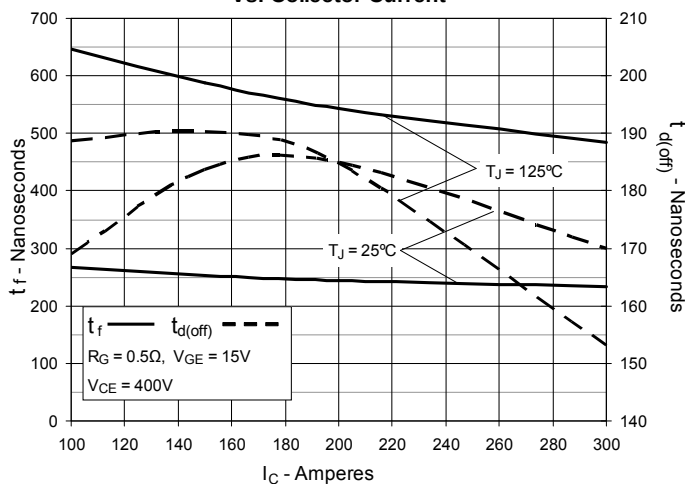
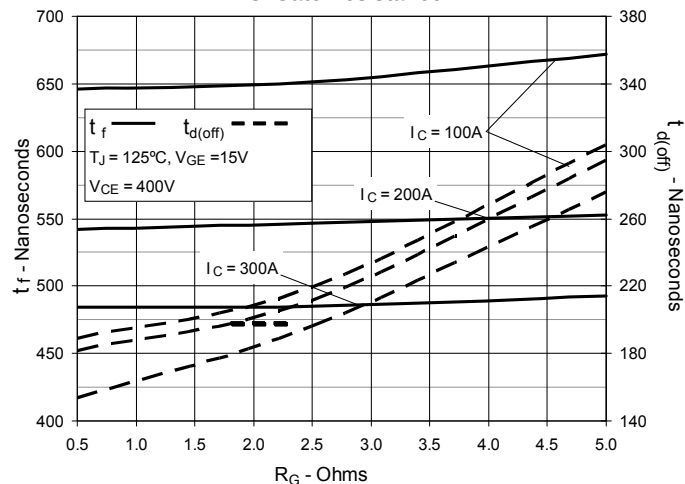


Fig. 16. Resistive Turn-off Switching Times vs. Gate Resistance





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