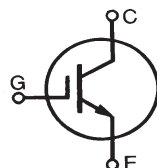


**GenX3™ 600V  
IGBTs**
**IXGK320N60B3  
IXGX320N60B3**

$$V_{CES} = 600V$$

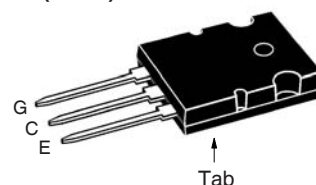
$$I_{C90} = 320A$$

$$V_{CE(sat)} \leq 1.6V$$

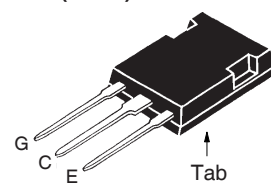
 Medium-Speed Low-V<sub>sat</sub> PT  
IGBTs for 5-40 kHz Switching


Symbol	Test Conditions	Maximum Ratings	
$V_{CES}$	$T_J = 25^\circ C$ to $150^\circ C$	600	V
$V_{CGR}$	$T_J = 25^\circ C$ to $150^\circ C$ , $R_{GE} = 1M\Omega$	600	V
$V_{GES}$	Continuous	$\pm 20$	V
$V_{GEM}$	Transient	$\pm 30$	V
$I_{C25}$	$T_C = 25^\circ C$ ( Chip Capability )	500	A
$I_{C90}$	$T_C = 90^\circ C$	320	A
$I_{LRMS}$	Terminal Current Limit	160	A
$I_{CM}$	$T_C = 25^\circ C$ , 1ms	1200	A
<b>SSOA</b>	$V_{GE} = 15V$ , $T_{VJ} = 125^\circ C$ , $R_G = 1\Omega$	$I_{CM} = 320$	A
<b>(RBSOA)</b>	Clamped Inductive Load	$V_{CE} \leq V_{CES}$	V
$P_C$	$T_C = 25^\circ C$	1700	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.
<b>Weight</b>	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 and Switching Losses
- High Current Capability
- Square RBSOA

**Advantages**

- High Power Density
- Low Gate Drive Requirement

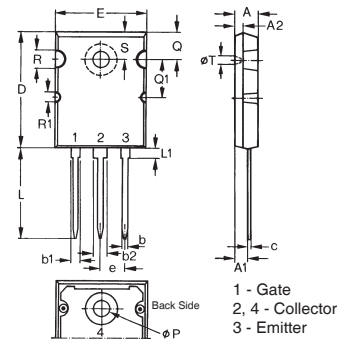
**Applications**

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

Symbol	Test Conditions ( $T_J = 25^\circ C$ , Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
$BV_{CES}$	$I_C = 1mA$ , $V_{GE} = 0V$	600		V
$V_{GE(th)}$	$I_C = 4mA$ , $V_{CE} = V_{GE}$	3.0		5.0 V
$I_{CES}$	$V_{CE} = V_{CES}$ , $V_{GE} = 0V$ $T_J = 125^\circ C$			75 $\mu A$ 2 mA
$I_{GES}$	$V_{CE} = 0V$ , $V_{GE} = \pm 20V$			$\pm 400$ nA
$V_{CE(sat)}$	$I_C = 100A$ , $V_{GE} = 15V$ , Note 1 $I_C = 320A$		1.4 2.0	1.6 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	70	125	S
$C_{ies}$	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		18	nF
$C_{oes}$			960	pF
$C_{res}$			130	pF
$Q_g$	$I_C = 320\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		585	nC
$Q_{ge}$			105	nC
$Q_{gc}$			215	nC
$t_{d(on)}$	<b>Inductive Load, <math>T_J = 25^\circ\text{C}</math></b> $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = 1\Omega$		44	ns
$t_{ri}$			66	ns
$E_{on}$			2.7	mJ
$t_{d(off)}$			250	ns
$t_{fi}$			165	ns
$E_{off}$			3.5	5.0 mJ
$t_{d(on)}$	<b>Inductive Load, <math>T_J = 125^\circ\text{C}</math></b> $I_C = 100\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = 1\Omega$		40	ns
$t_{ri}$			67	ns
$E_{on}$			3.5	mJ
$t_{d(off)}$			330	ns
$t_{fi}$			265	ns
$E_{off}$			5.4	mJ
$R_{thJC}$				0.073 $^\circ\text{C/W}$
$R_{thCS}$		0.15		$^\circ\text{C/W}$

**TO-264 AA ( IXGK ) Outline**



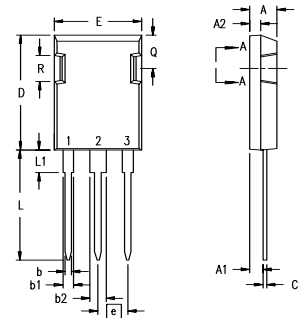
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

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

**PRELIMINARY TECHNICAL INFORMATION**

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

**PLUS247™ ( IXGX ) Outline**

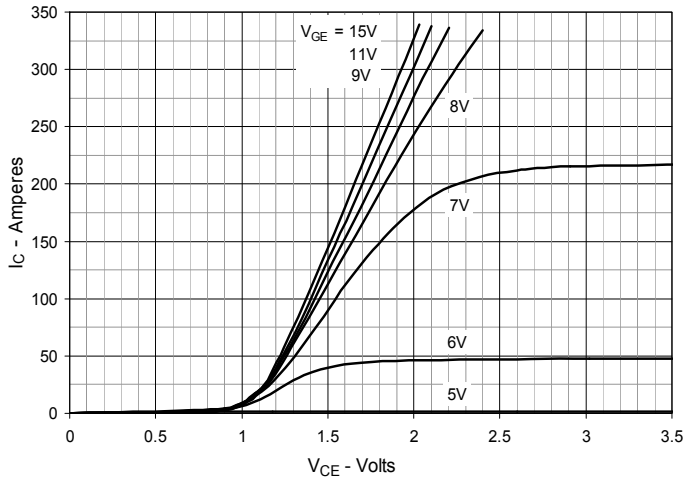


Terminals: 1 - Gate  
2 - Collector  
3 - Emitter

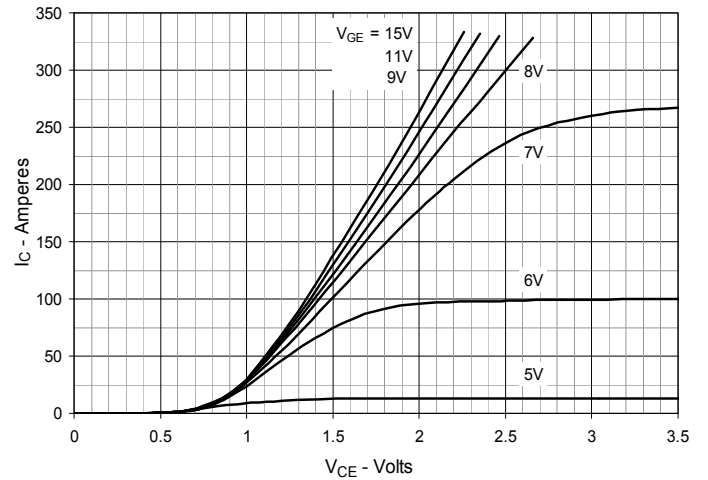
Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A <sub>1</sub>	2.29	2.54	.090	.100
A <sub>2</sub>	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b <sub>1</sub>	1.91	2.13	.075	.084
b <sub>2</sub>	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	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.

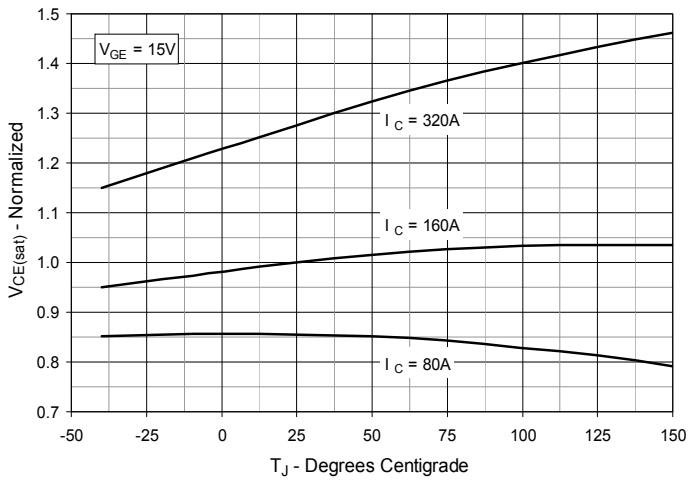
**Fig. 1. Output Characteristics @  $T_J = 25^\circ\text{C}$**



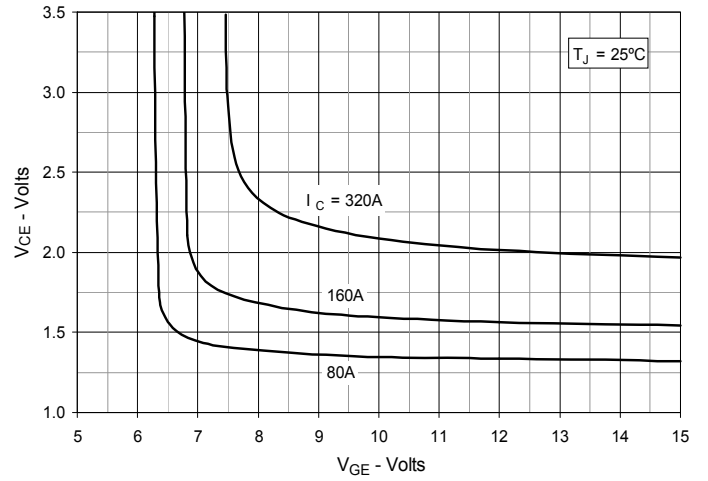
**Fig. 2. Output Characteristics @  $T_J = 125^\circ\text{C}$**



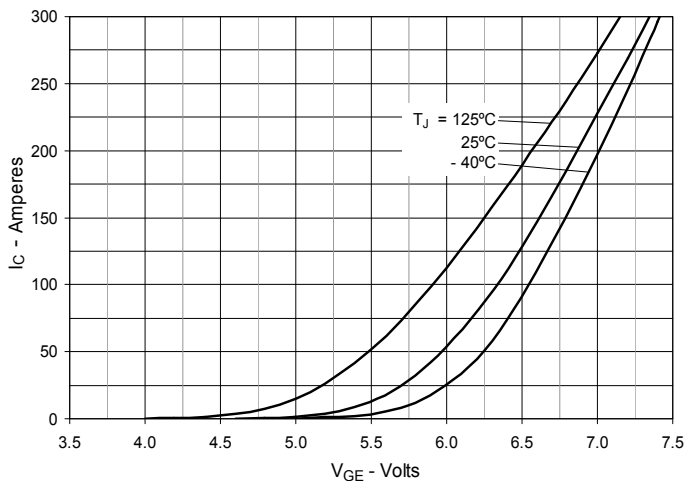
**Fig. 3. Dependence of  $V_{CE(sat)}$  on Junction Temperature**



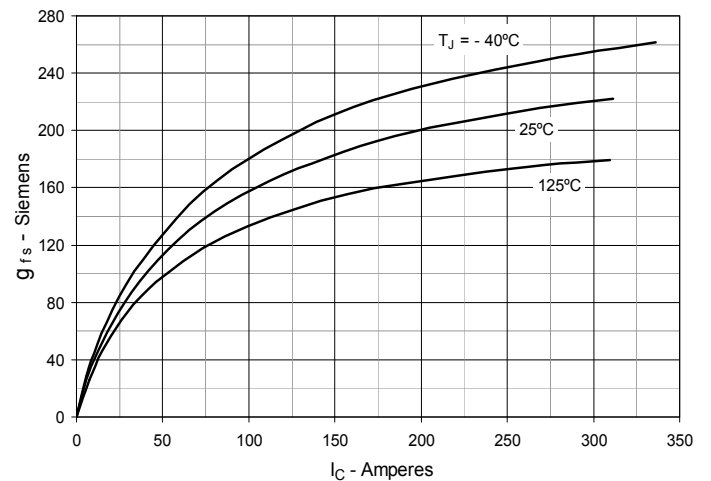
**Fig. 4. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage**



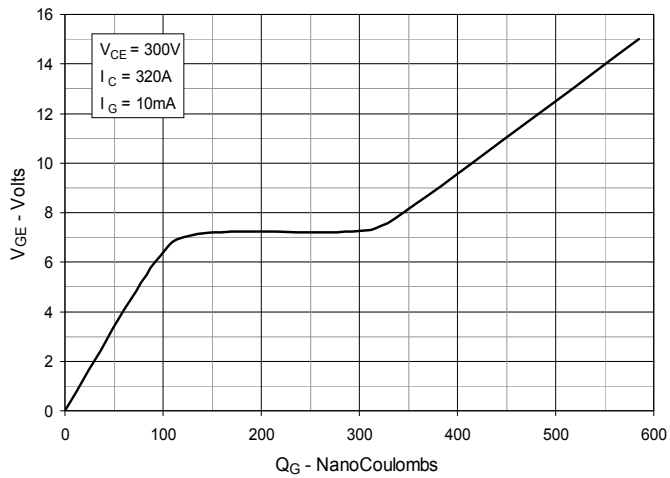
**Fig. 5. Input Admittance**



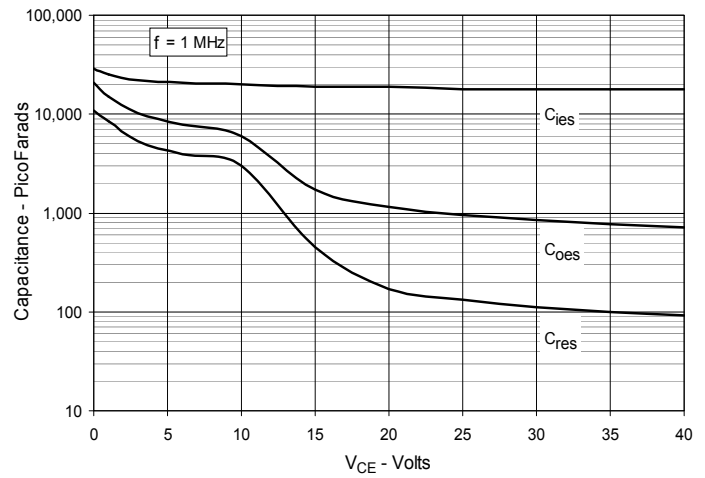
**Fig. 6. Transconductance**



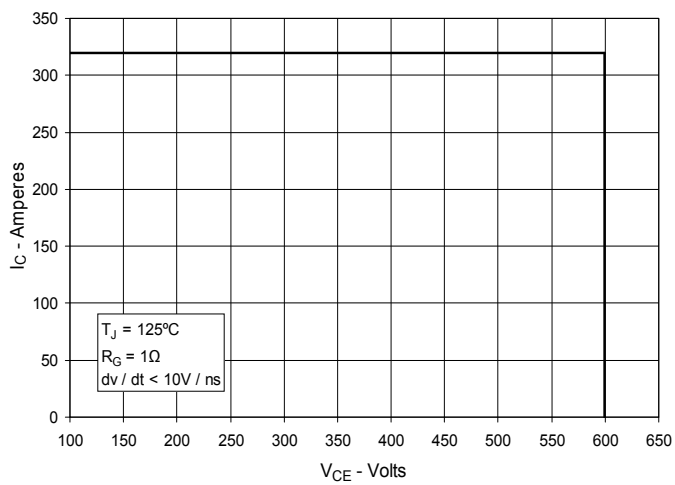
**Fig. 7. Gate Charge**



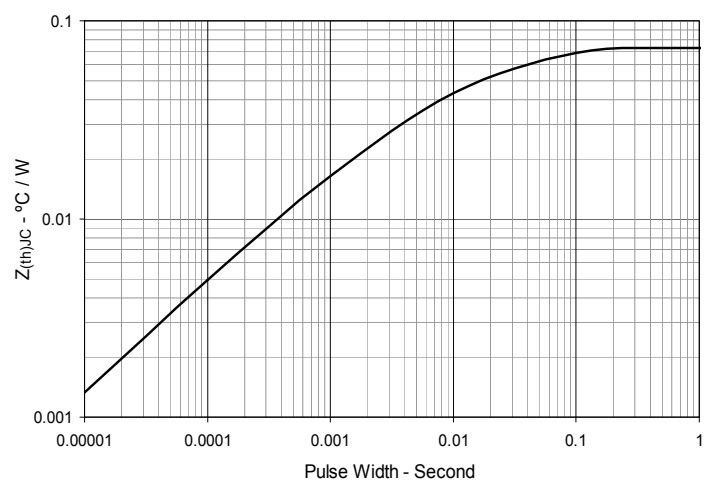
**Fig. 8. Capacitance**



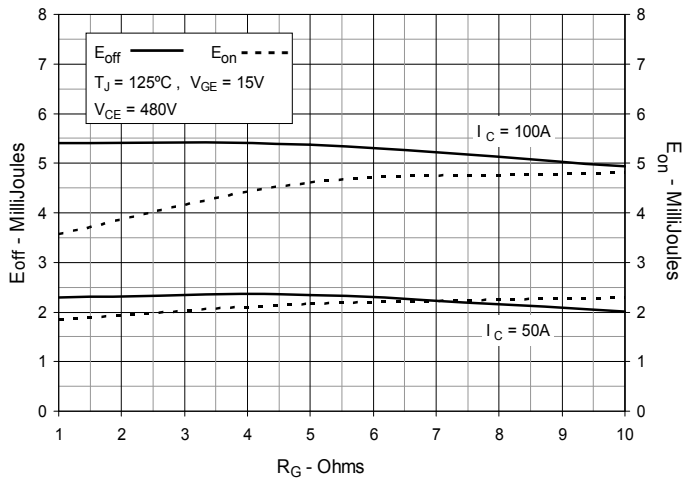
**Fig. 9. Reverse-Bias Safe Operating Area**



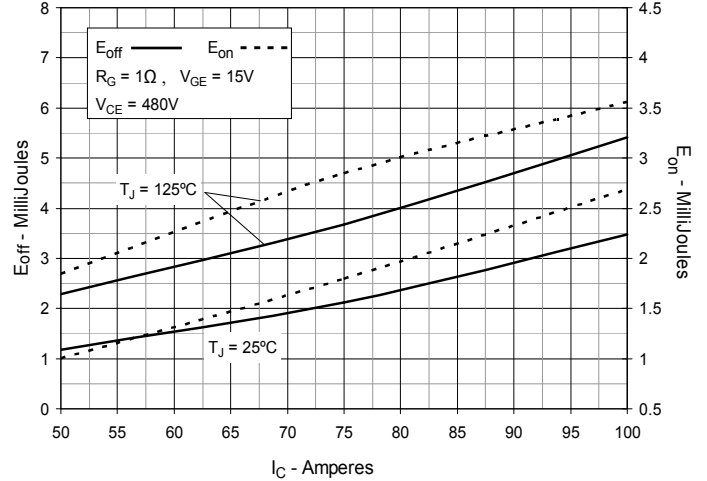
**Fig. 10. Maximum Transient Thermal Impedance**



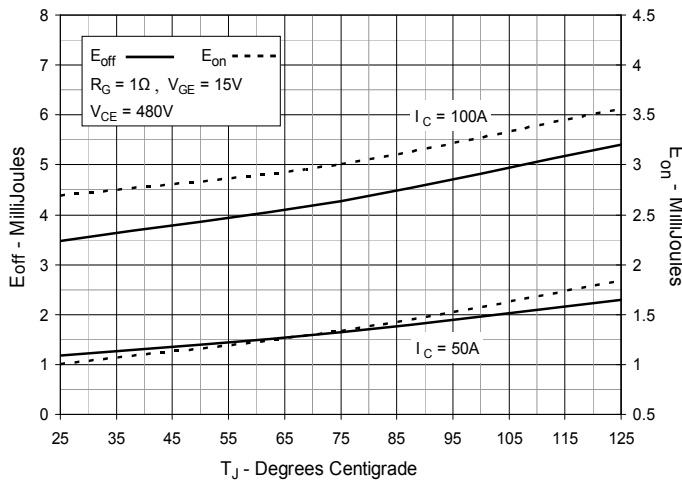
**Fig. 11. Inductive Switching Energy Loss vs. Gate Resistance**



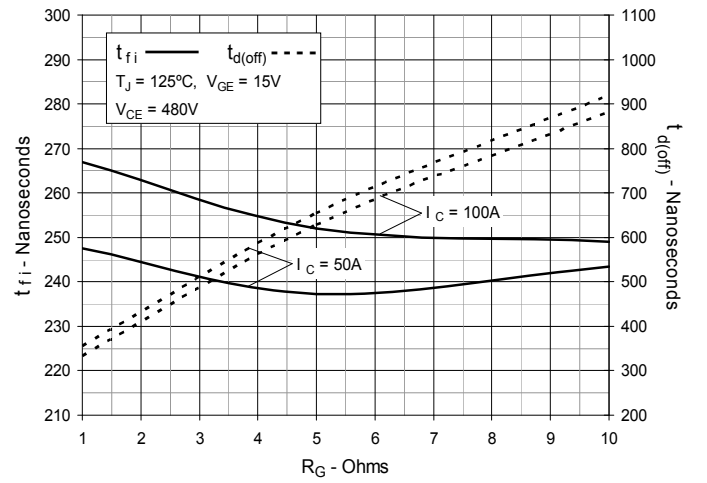
**Fig. 12. Inductive Switching Energy Loss vs. Collector Current**



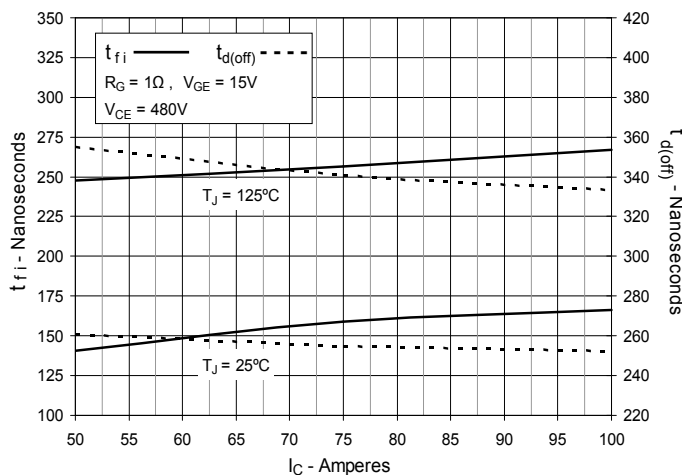
**Fig. 13. Inductive Switching Energy Loss vs. Junction Temperature**



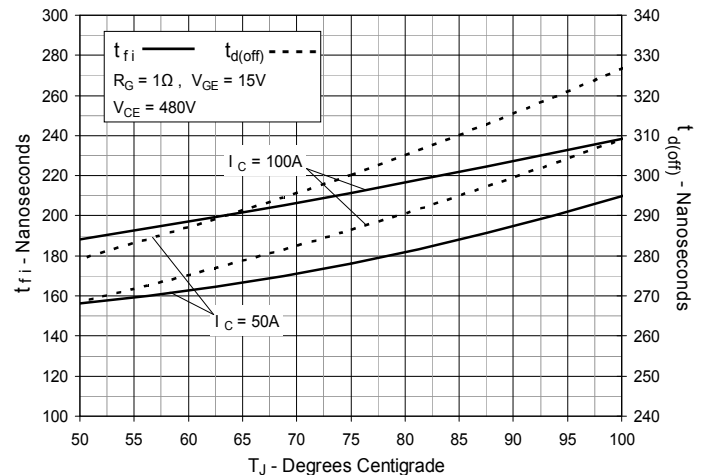
**Fig. 14. Inductive Turn-off Switching Times vs. Gate Resistance**



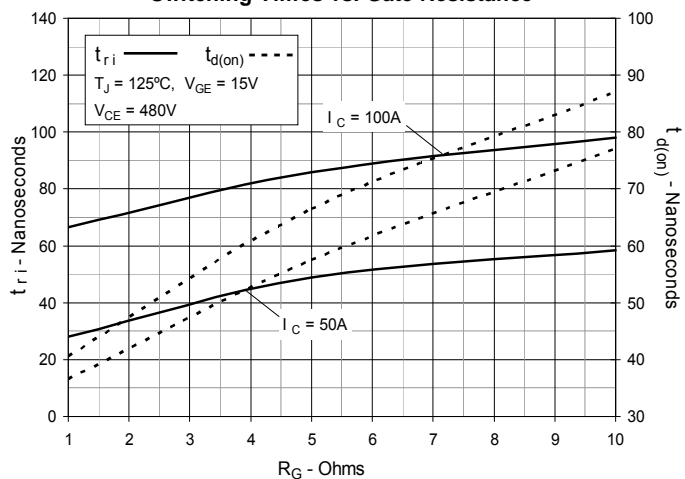
**Fig. 15. Inductive Turn-off Switching Times vs. Collector Current**



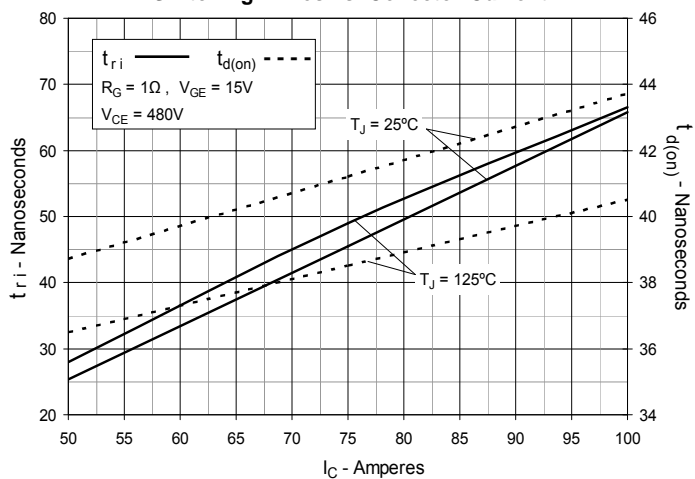
**Fig. 16. Inductive Turn-off Switching Times vs. Junction Temperature**



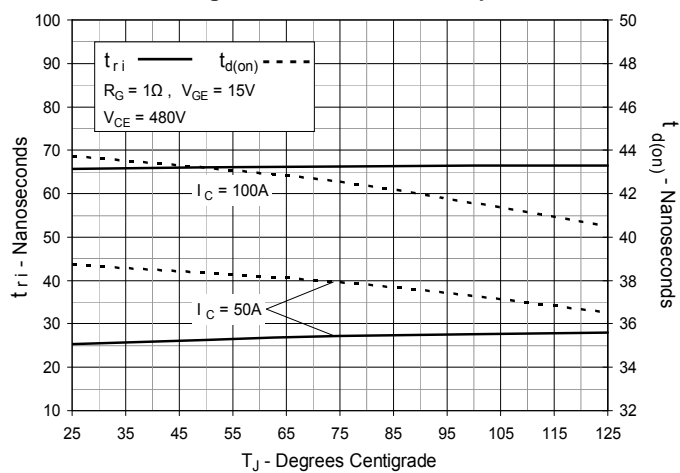
**Fig. 17. Inductive Turn-on  
Switching Times vs. Gate Resistance**



**Fig. 18. Inductive Turn-on  
Switching Times vs. Collector Current**



**Fig. 19. Inductive Turn-on  
Switching Times vs. Junction Temperature**





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