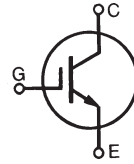


HiPerFAST™ IGBT

Lightspeed 2™ Series

IXGK120N60C2

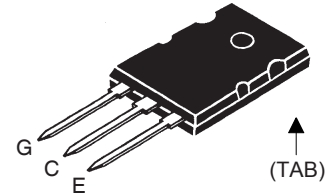
IXGX120N60C2



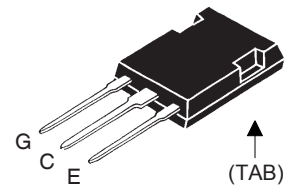
$$\begin{aligned} V_{CES} &= 600V \\ I_{C110} &= 120A \\ V_{CE(sat)} &\leq 2.5V \\ t_{fi(typ)} &= 80ns \end{aligned}$$

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}	$T_C = 25^\circ\text{C}$ (limited by leads)	75	A
I_{C110}	$T_C = 110^\circ\text{C}$ (chip capability)	120	A
I_{CM}	$T_C = 25^\circ\text{C}$, 1ms	500	A
SSOA (RBSOA)	$V_{GE} = 15V$, $T_{VJ} = 125^\circ\text{C}$, $R_G = 1\Omega$ Clamped inductive load @ $V_{CE} \leq 600V$	$I_{CM} = 200$	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	$^\circ\text{C}$
M_d	Mounting torque (TO-264)	1.13 / 10	Nm/lb.in
F_C	Mounting force (PLUS247)	20..120/4.5..27	N/lb
T_L	Maximum lead temperature for soldering	300	$^\circ\text{C}$
T_{SOLD}	Plastic body for 10 seconds	260	$^\circ\text{C}$
Weight	TO-264	10	g
	PLUS247	6	g

TO-264(IXGK)



PLUS247(IXGX)



G = Gate C = Collector
E = Emitter TAB = Collector

Features

- Very high frequency IGBT
- Square RBSOA
- High current handling capability
- MOS Gate turn-on
 - drive simplicity

Applications

- Uninterruptible power supplies (UPS)
- Switched-mode and resonant-mode power supplies
- AC motor speed control
- DC servo and robot drives
- DC choppers

Advantages

- High power density
- Very fast switching speeds for high frequency applications
- High power surface mountable packages

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
$V_{GE(th)}$	$I_C = 500\mu A$, $V_{CE} = V_{GE}$	3.0		5.5 V
I_{CES}	$V_{CE} = V_{CES}$ $V_{GE} = 0V$ $T_J = 125^\circ\text{C}$			100 μA 2 mA
I_{GES}	$V_{CE} = 0V$, $V_{GE} = \pm 20V$			± 200 nA
$V_{CE(sat)}$	$I_C = 100A$, $V_{GE} = 15V$, Note 1 $T_J = 125^\circ\text{C}$	2.1 1.6	2.5	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	50	78	S
C_{ies}	$V_{CE} = 25\text{V}$, $V_{GE} = 0\text{V}$, $f = 1\text{MHz}$		14.6	nF
C_{oes}			820	pF
C_{res}			280	pF
$Q_{g(on)}$	$I_C = 100\text{A}$, $V_{GE} = 15\text{V}$, $V_{CE} = 0.5 \cdot V_{CES}$		370	nC
Q_{ge}			85	nC
Q_{gc}			155	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 80\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}$, $R_G = 1\Omega$		40	ns
t_{ri}			60	ns
E_{on}			1.7	mJ
$t_{d(off)}$			120	ns
t_{fi}			80	ns
E_{off}			1.0	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^\circ\text{C}$ $I_C = 80\text{A}$, $V_{GE} = 15\text{V}$ $V_{CE} = 400\text{V}$, $R_G = 1\Omega$		40	ns
t_{ri}			60	ns
E_{on}			2.1	mJ
$t_{d(off)}$			165	ns
t_{fi}			92	ns
E_{off}			1.24	mJ
R_{thJC}			0.15	$^\circ\text{C/W}$
R_{thJC}			0.15	$^\circ\text{C/W}$

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

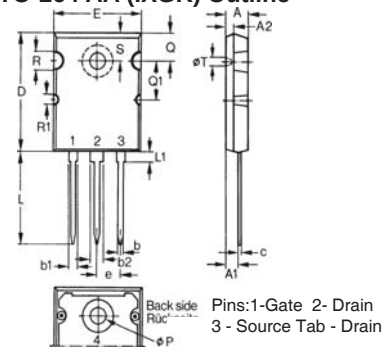
PRELIMINARY TECHNICAL INFORMATION

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.

IXYS reserves the right to change limits, test conditions, and dimensions.

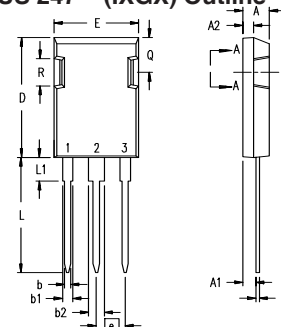
IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents:	4,835,592	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338 B2
	4,850,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
	4,881,106	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	

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

PLUS 247™ (IXGX) Outline



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

Dim.	Millimeter		Inches	
	Min.	Max.	Min.	Max.
A	4.83	5.21	.190	.205
A1	2.29	2.54	.090	.100
A2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b1	1.91	2.13	.075	.084
b2	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	.244
R	4.32	4.83	.170	.190

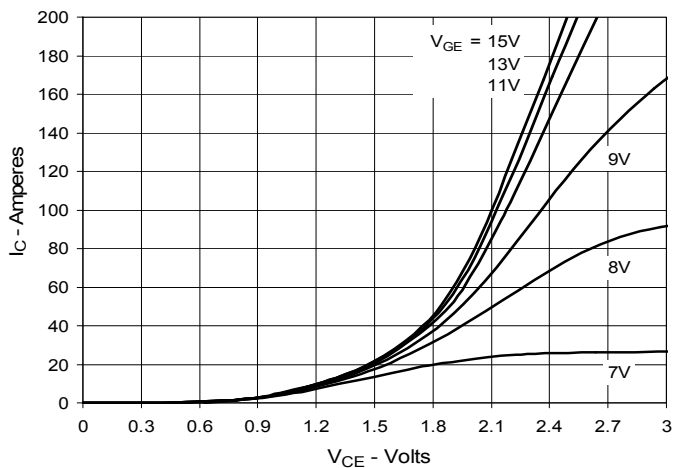
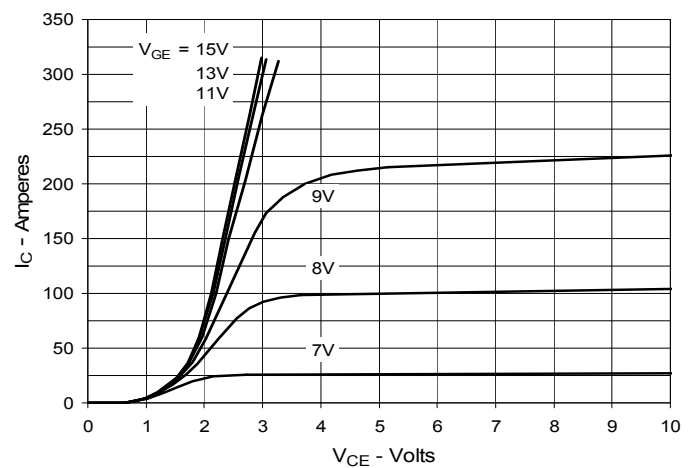
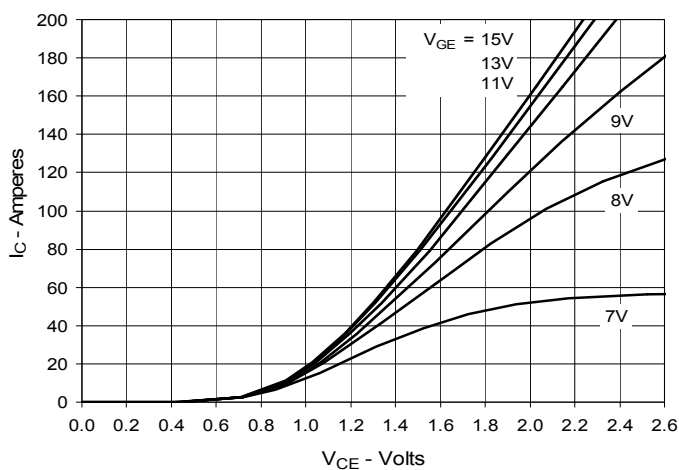
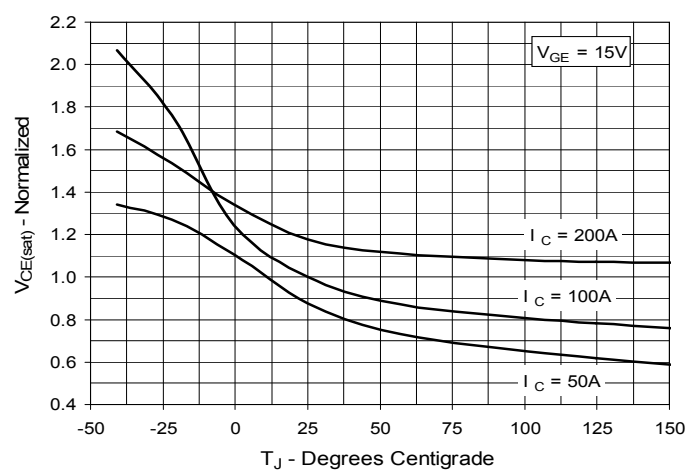
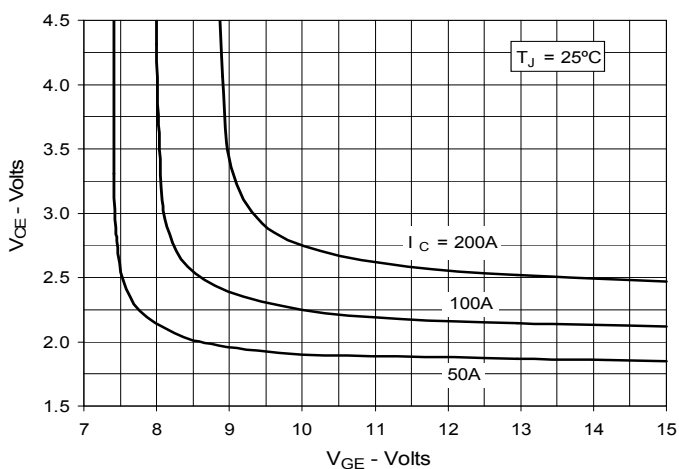
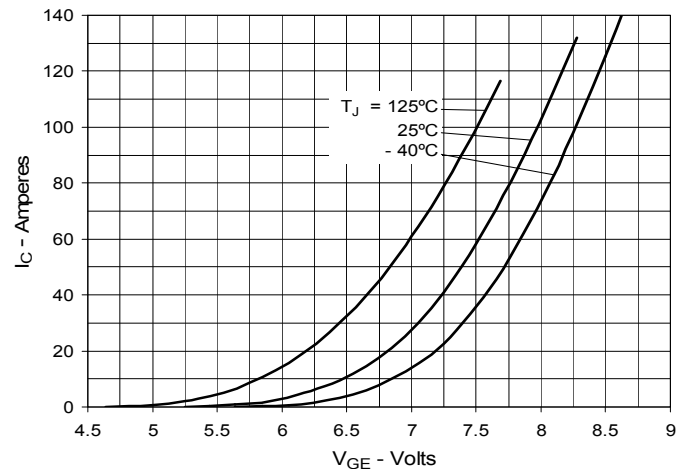
Fig. 1. Output Characteristics
@ 25°C

Fig. 2. Extended Output Characteristics
@ 25°C

Fig. 3. Output Characteristics
@ 125°C

Fig. 4. Dependence of $V_{CE(sat)}$ on
Junction Temperature

Fig. 5. Collector-to-Emitter Voltage
vs. Gate-to-Emitter Voltage

Fig. 6. Input Admittance


Fig. 7. Transconductance

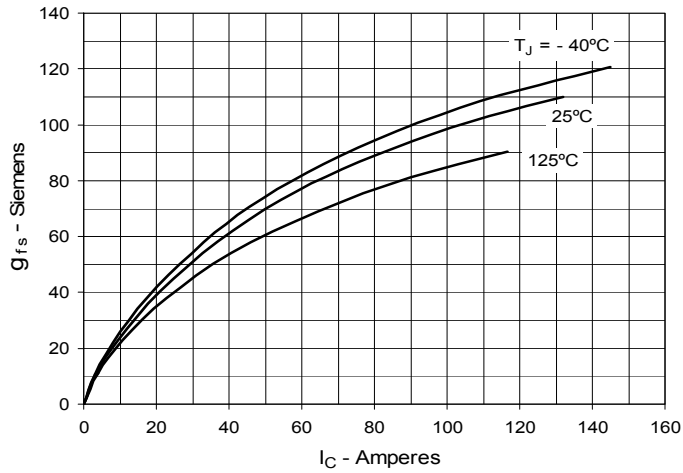


Fig. 8. Gate Charge

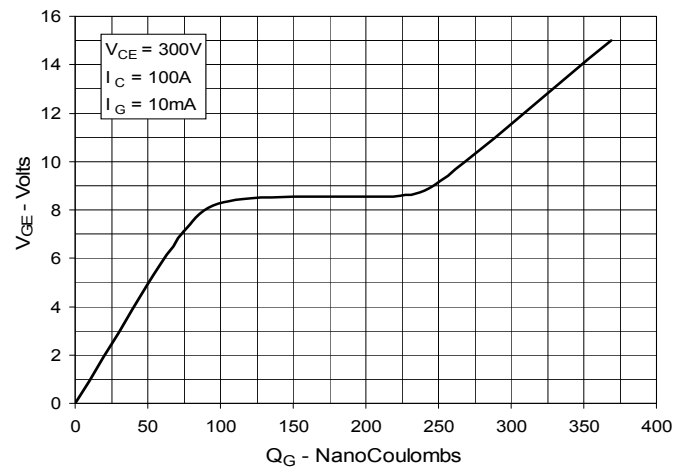


Fig. 9. Capacitance

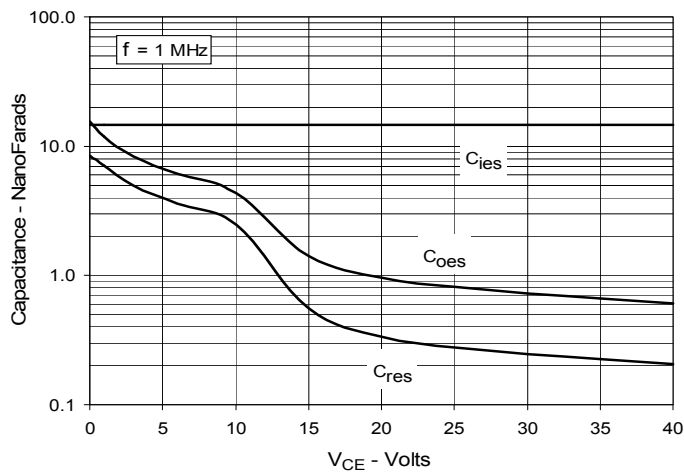


Fig. 10. Reverse-Bias Safe Operating Area

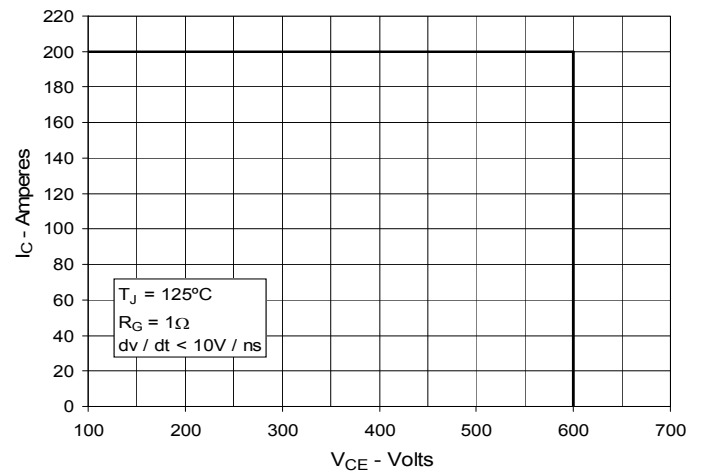
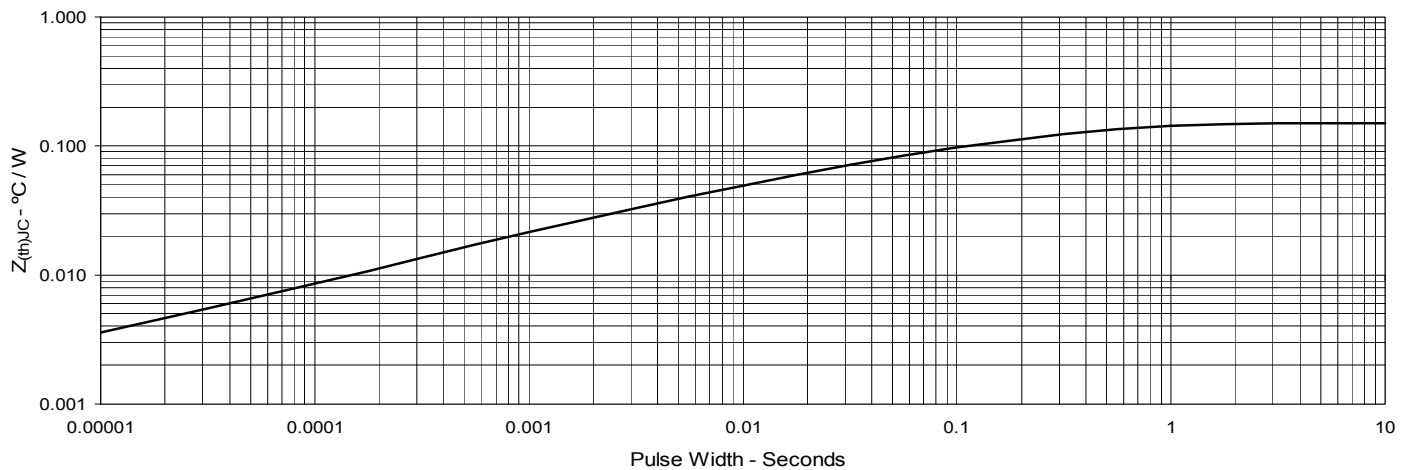
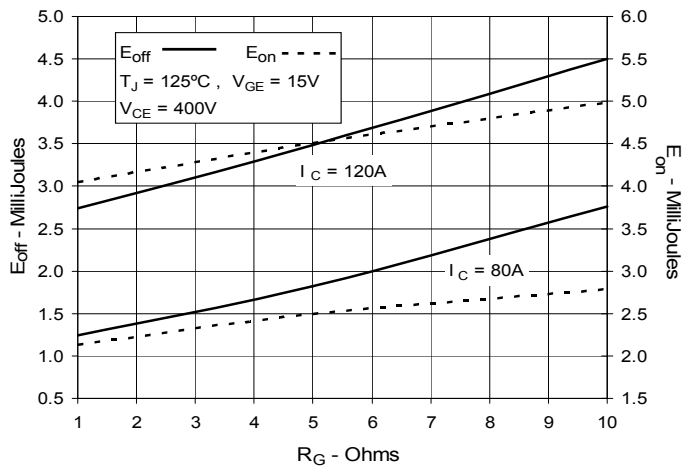


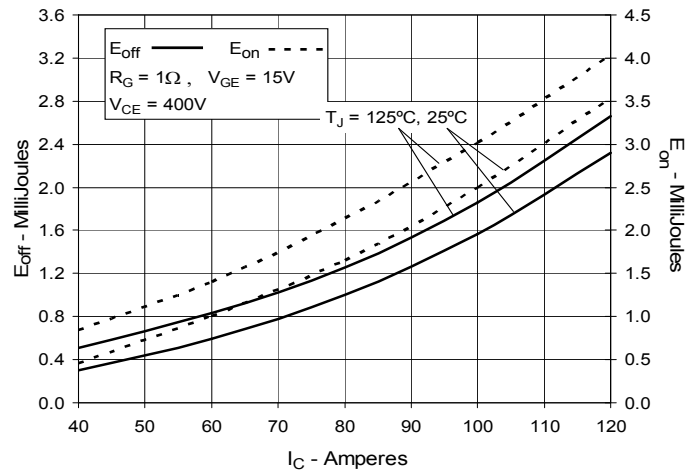
Fig. 11. Maximum Transient Thermal Impedance



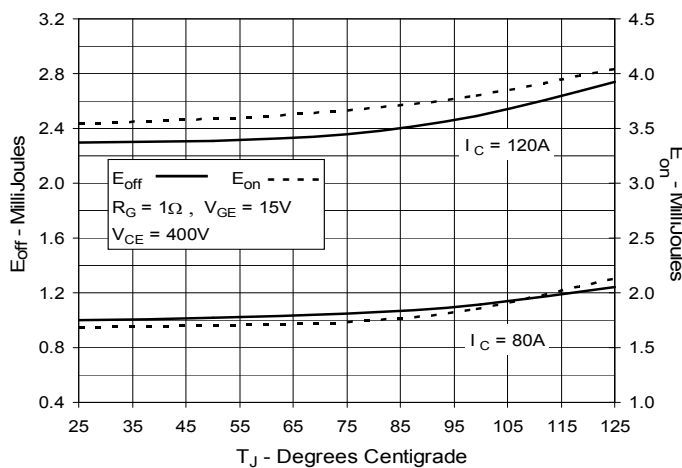
**Fig. 12. Inductive Switching
Energy Loss vs. Gate Resistance**



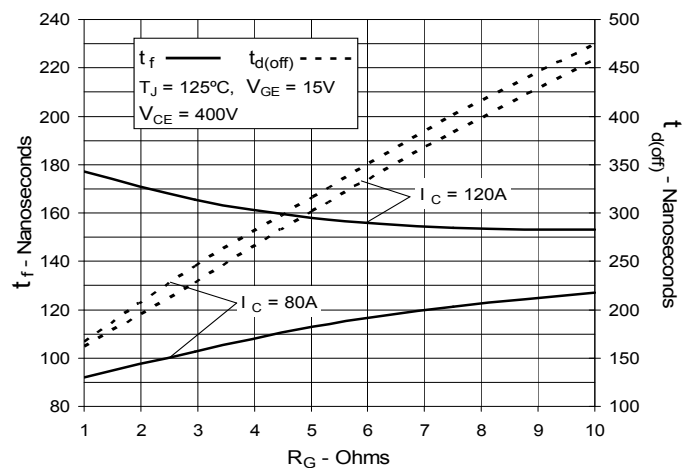
**Fig. 13. Inductive Switching
Energy Loss vs. Collector Current**



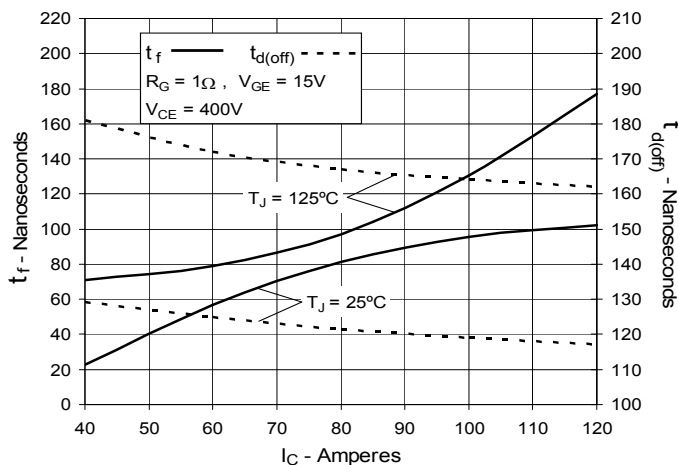
**Fig. 14. Inductive Switching
Energy Loss vs. Junction Temperature**



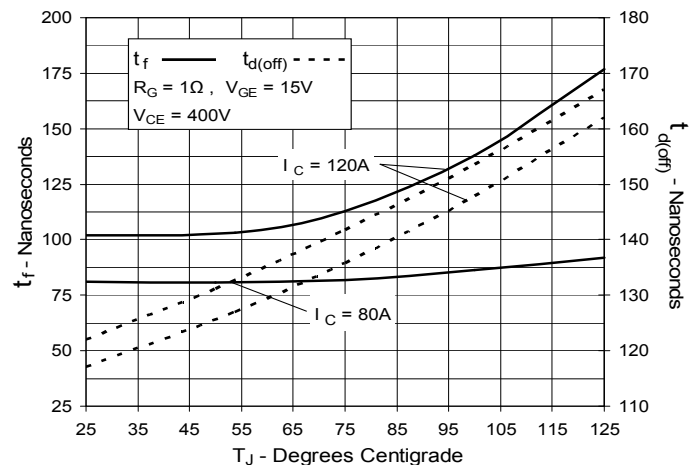
**Fig. 15. Inductive Turn-off
Switching Times vs. Gate Resistance**



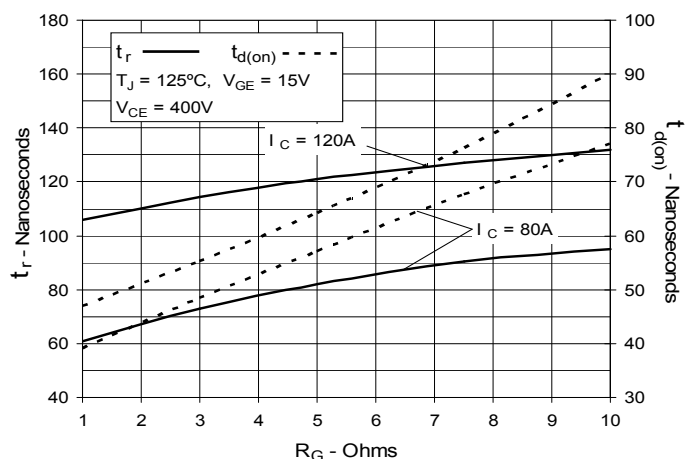
**Fig. 16. Inductive Turn-off
Switching Times vs. Collector Current**



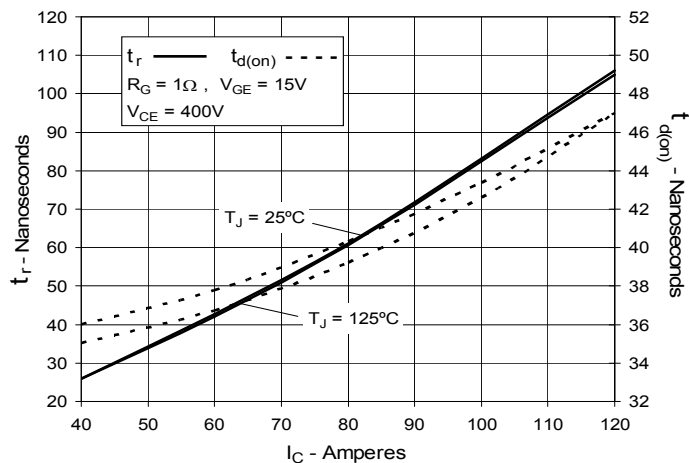
**Fig. 17. Inductive Turn-off
Switching Times vs. Junction Temperature**



**Fig. 18. Inductive Turn-on
Switching Times vs. Gate Resistance**



**Fig. 19. Inductive Turn-on
Switching Times vs. Collector Current**



**Fig. 20. Inductive Turn-on
Switching Times vs. Junction Temperature**

