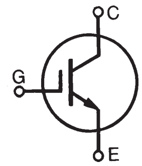
IXYS

Preliminary Technical Information

HiPerFAST™ IGBT IXGR120N60C2

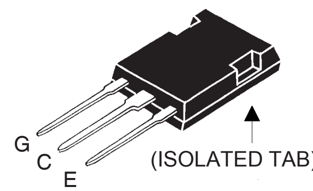
ISOPLUS247™

Lightspeed 2™ Series
(Electrically Isolated Back Surface)



V_{CES} = 600V
I_{C110} = 60A
$V_{CE(sat)}$ ≤ 2.7V
$t_{fi(typ)}$ = 80ns

ISOPLUS247



G = Gate C = Collector
E = Emitter

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	600	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	600	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C (limited by leads)	75	A
I_{C110}	T_C = 110°C (chip capability)	60	A
I_{CM}	T_C = 25°C, 1ms	500	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 1Ω Clamped inductive load @ V_{CE} ≤ 600V	I_{CM} = 200	A
P_C	T_C = 25°C	300	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
V_{ISOL}	50/60Hz, RMS, t = 1minute	2500	V~
	I_{ISOL} ≤ 1mA t = 1 seconds	3000	V~
F_C	Mounting force	20..120/4.5..27	N/lb
T_L	Maximum lead temperature for soldering	300	°C
T_{SOLD}	Plastic body for 10 seconds	260	°C
Weight		5	g

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 1mA, V_{GE} = 0V		600			V
$V_{GE(th)}$	I_C = 500μA, V_{CE} = V_{GE}		3.0		5.5	V
I_{CES}	V_{CE} = V_{CES}				100	μA
	V_{GE} = 0V	T_J = 125°C			2	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V				± 200	nA
$V_{CE(sat)}$	I_C = 100A, V_{GE} = 15V, Note 1			2.1	2.7	V
		T_J = 125°C		1.6		V

Features

- DCB Isolated mounting tab
- Meets TO-247AD package Outline
- High current handling capability
- Latest generation HDMOS™ process
- Square RBSOA
- Very High Frequency
- 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

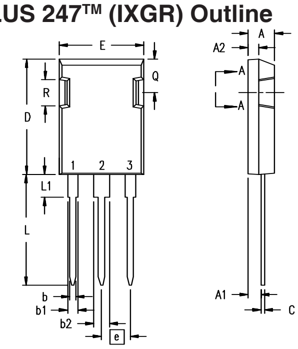
Advantages

- Easy assembly
- High power density
- Very fast switching speeds for high frequency applications

IXYS

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ	Max.	
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	50	78		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		14.6		nF
C_{oes}			820		pF
C_{res}			280		pF
$Q_{g(on)}$	I_C = 100A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		370		nC
Q_{ge}			85		nC
Q_{gc}			155		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		40		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		60		ns
E_{on}	V_{CE} = 400V, R_G = 1Ω		1.7		mJ
$t_{d(off)}$			120	180	ns
t_{fi}			80		ns
E_{off}			1.0	1.8	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		40		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		60		ns
E_{on}	V_{CE} = 400V, R_G = 1Ω		2.1		mJ
$t_{d(off)}$			165		ns
t_{fi}			92		ns
E_{off}			1.24		mJ
R_{thJC}				0.42	°C/W
R_{thJC}			0.15		°C/W

PLUS 247™ (IXGR) Outline



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

Dim.	Millimeter Min.	Max.	Inches 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

Note: 1. Pulse test, t ≤ 300μs; duty cycle, d ≤ 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.

Fig. 1. Output Characteristics @ 25ºC

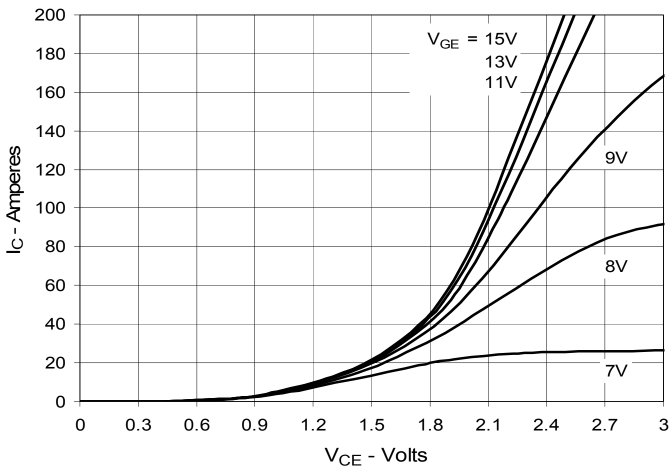


Fig. 2. Extended Output Characteristics @ 25ºC

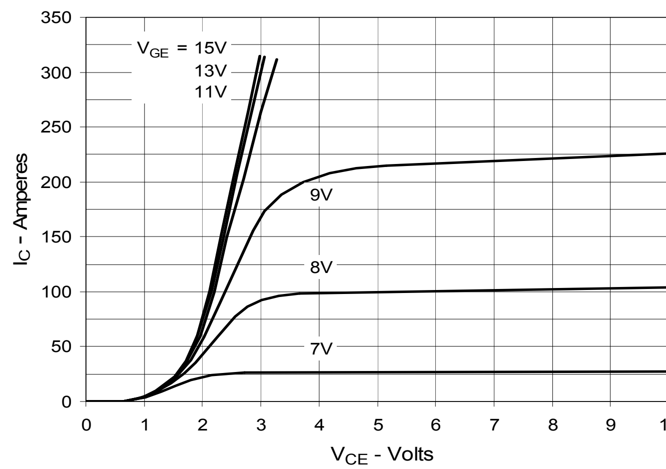


Fig. 3. Output Characteristics @ 125ºC

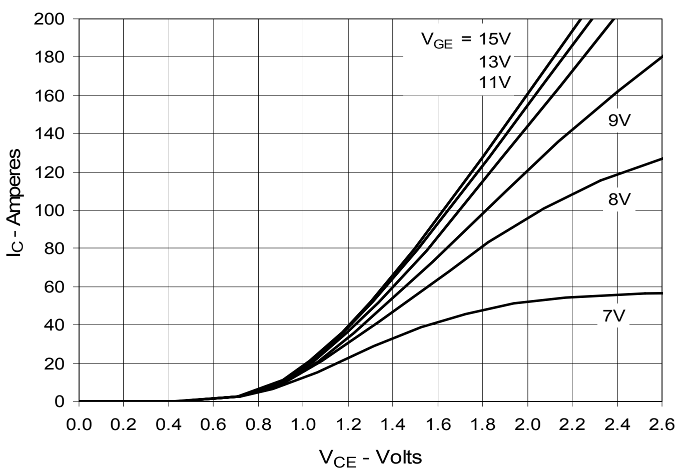


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

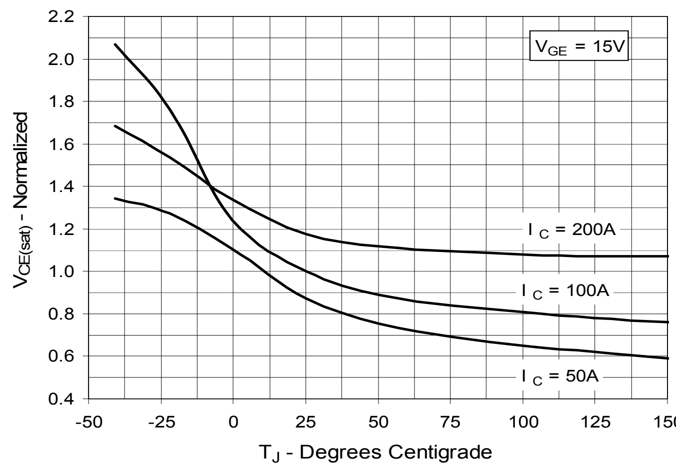


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

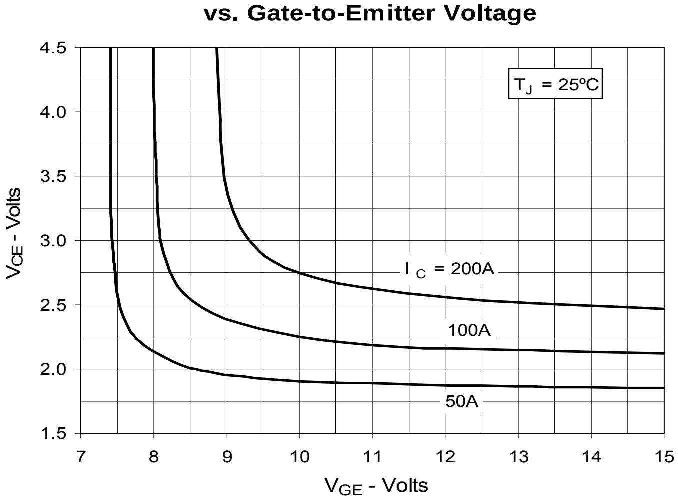
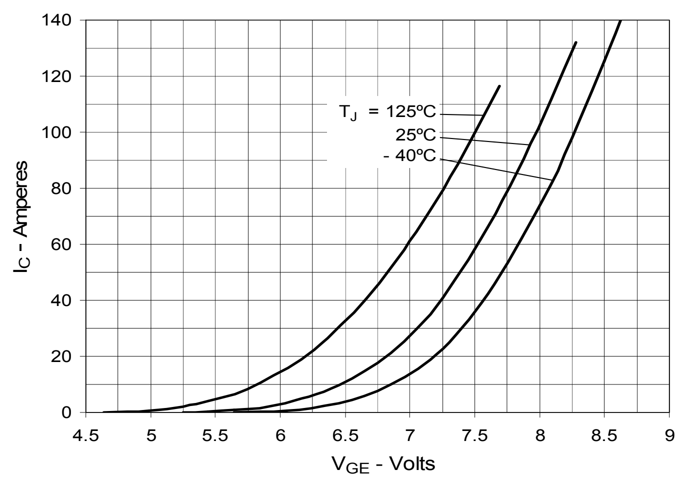


Fig. 6. Input Admittance



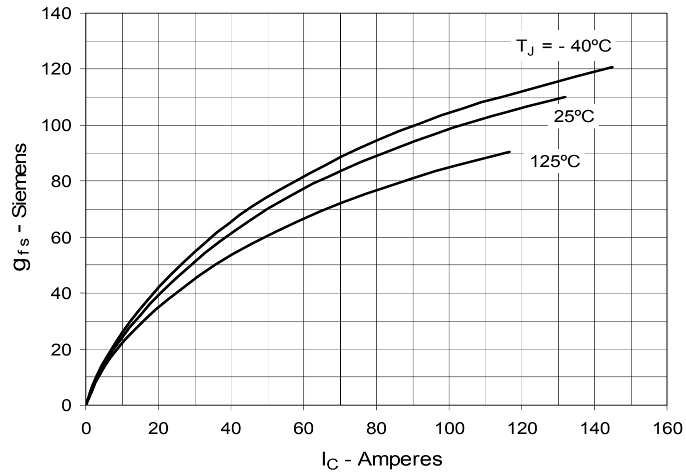


Fig. 7. Transconductance

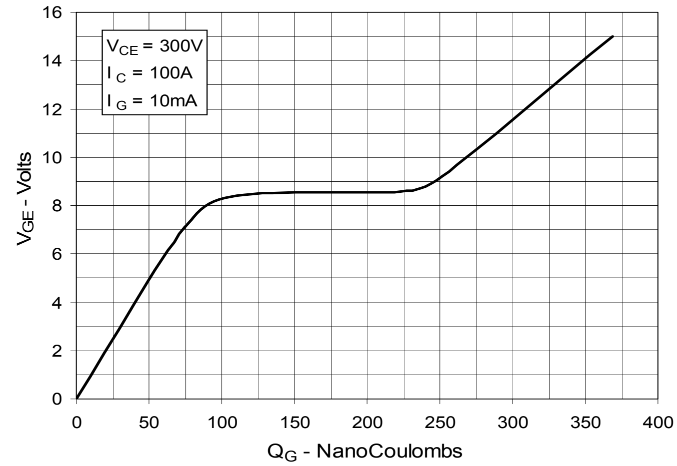


Fig. 8. Gate Charge

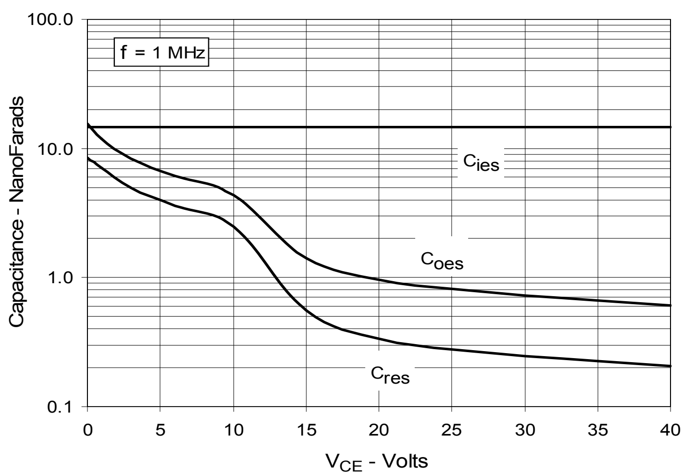


Fig. 9. Capacitance

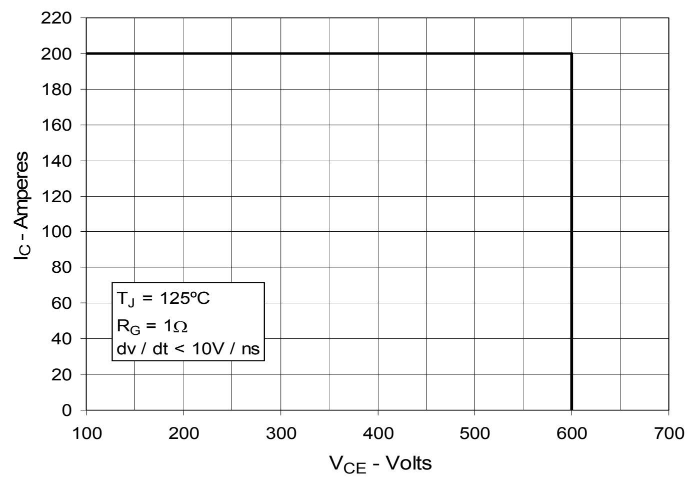


Fig. 10. Reverse-Bias Safe Operating Area

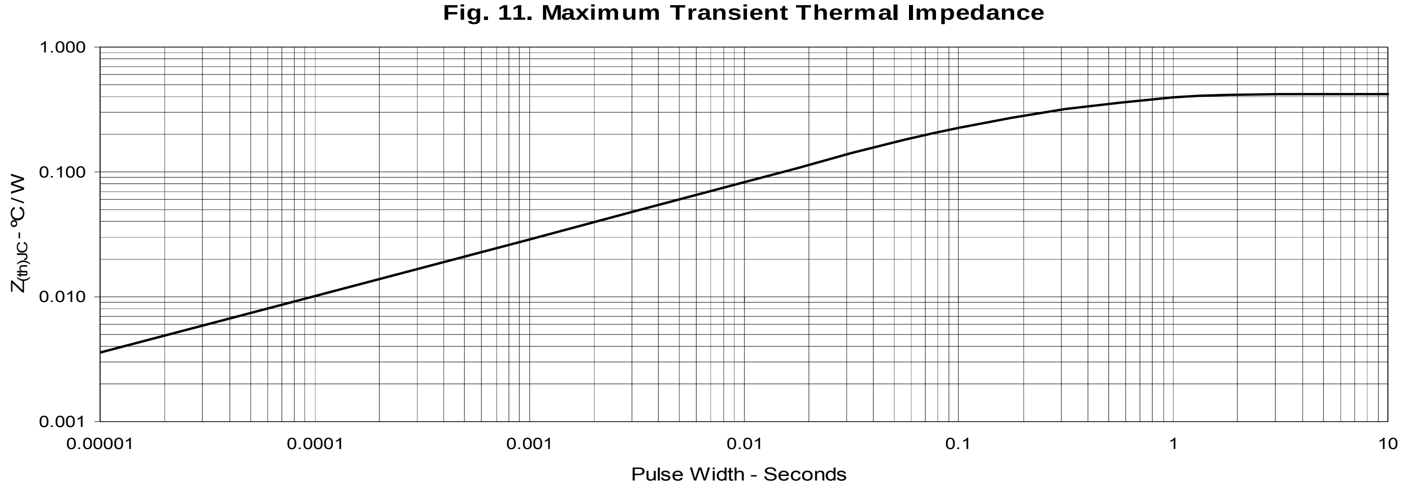


Fig. 11. Maximum Transient Thermal Impedance

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

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

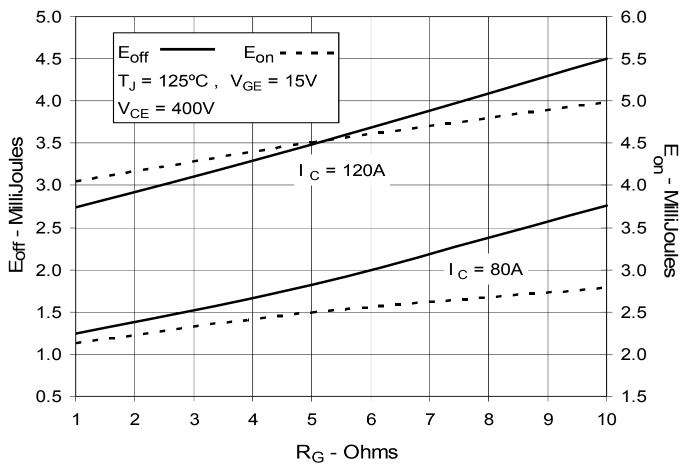


Fig. 13. Inductive Swiching Energy Loss vs. Collector Current

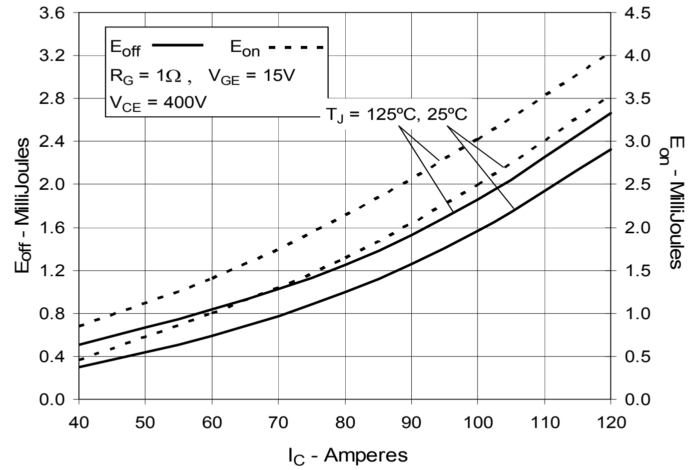


Fig. 14. Inductive Swiching Energy Loss vs. Junction Temperature

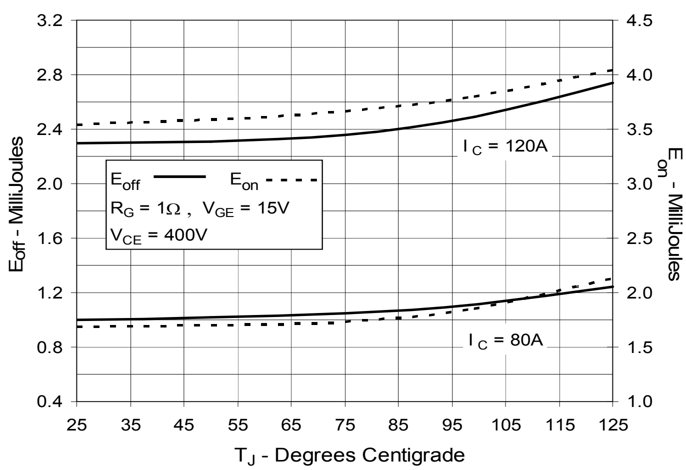


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

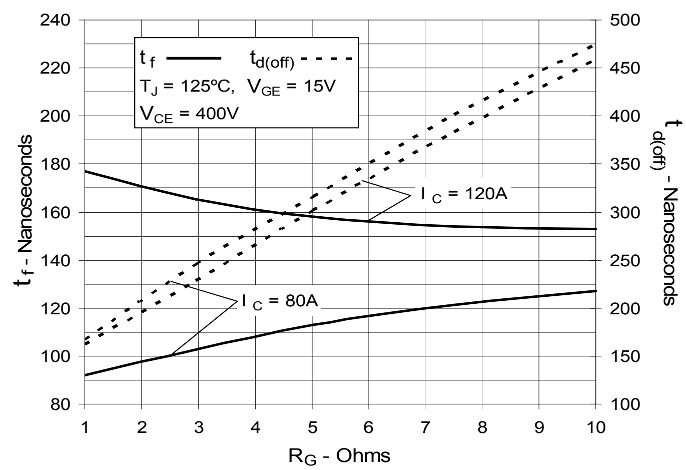


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

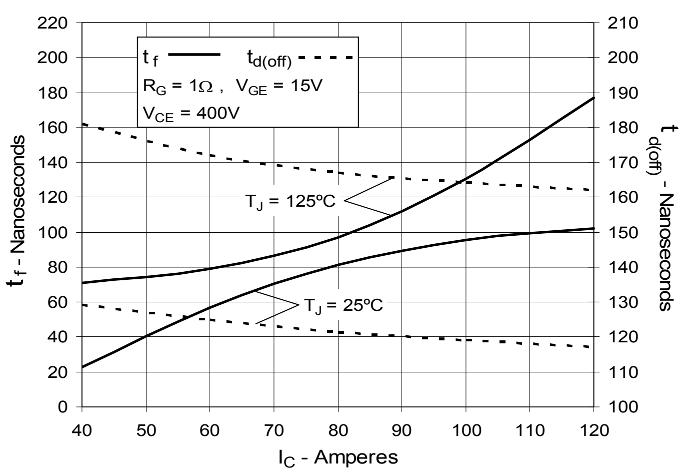


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

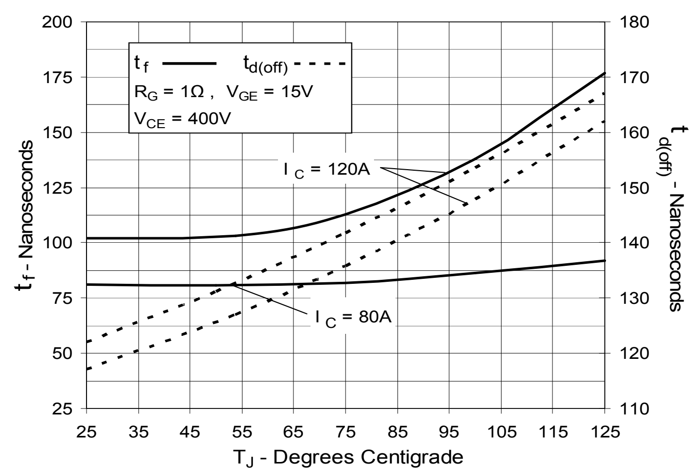


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

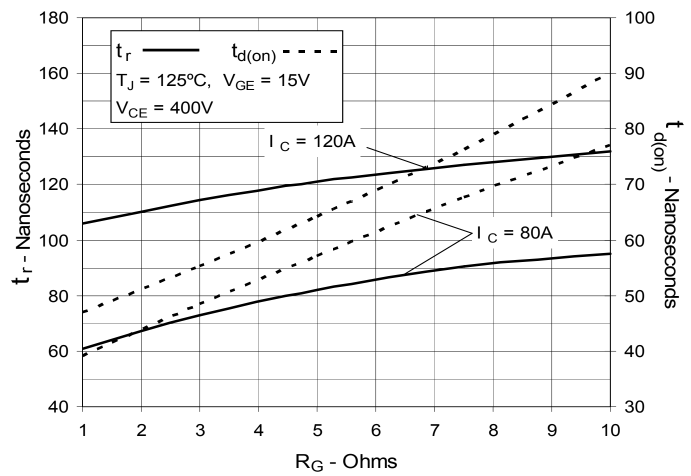


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

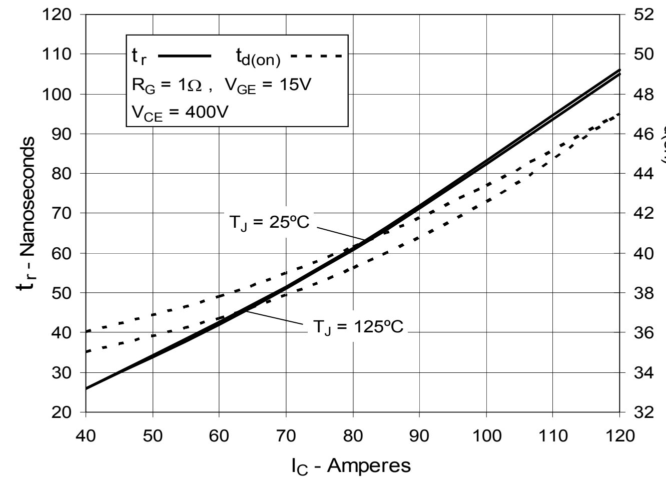


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature