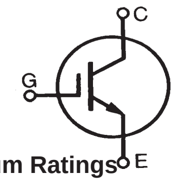
IXYS

Preliminary Technical Information

GenX3™ 1200V IGBT   IXGH40N120C3

V_{CES} = 1200V
I_{C110} = 40A
$V_{CE(sat)}$ ≤ 4.4V
$t_{fi(typ)}$ = 57ns

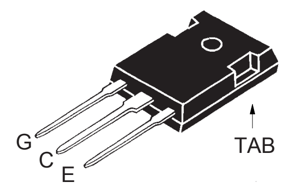
High speed PT IGBTs for 20 - 50 kHz switching



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1200	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1200	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	40	A
I_{CM}	T_C = 25°C, 1ms	200	A
I_A	T_C = 25°C	30	A
E_{AS}	T_C = 25°C	500	mJ
SSOA (RBSOA)	V_{GE}= 15V, T_J = 125°C, R_G = 3Ω Clamped inductive load @V_{CE}≤ 1200V	I_{CM} = 80	A
P_C	T_C = 25°C	380	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting torque	1.13 / 10	Nm/lb.in.
T_L	Maximum lead temperature for soldering	300	°C
T_{SOLD}	1.6mm (0.062 in.) from case for 10s	260	°C
Weight		6	g

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V		1200			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}		3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}				75	μA
	V_{GE} = 0V	T_J = 125°C			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V				±100	nA
$V_{CE(sat)}$	I_C = 30A, V_{GE} = 15V, Note 1				4.4	V
		T_J = 125°C		2.7		V

TO-247 (IXGH)



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

Features

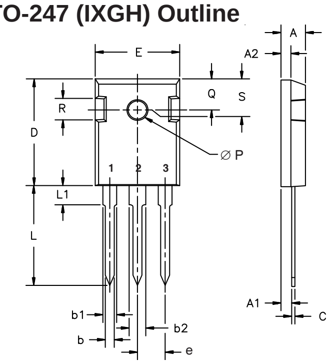
- International standard packages: JEDEC TO-247AD
- IGBT and anti-parallel FRED in one package
- MOS Gate turn-on
  - drive simplicity

Applications

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

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 30A, V_{CE} = 10V, Note 1	18	30		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		2930		pF
C_{oes}			225		pF
C_{res}			93		pF
Q_g	I_C = 40A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		142		nC
Q_{ge}			19		nC
Q_{gc}			62		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		17		ns
t_{ri}	I_C = 30A, V_{GE} = 15V		33		ns
E_{on}	V_{CE} = 600V, R_G = 3Ω		1.8		mJ
$t_{d(off)}$	Note 1		130		ns
t_{fi}			57		ns
E_{off}			0.55	1.0	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		17		ns
t_{ri}	I_C = 30A, V_{GE} = 15V		35		ns
E_{on}	V_{CE} = 600V, R_G = 3Ω		3.5		mJ
$t_{d(off)}$	Note 1		177		ns
t_{fi}			298		ns
E_{off}			1.6		mJ
R_{thJC}				0.33	°C/W
R_{thCK}			0.21		°C/W

TO-247 (IXGH) Outline



Terminals: 1 - Gate 2 - Drain
3 - Source Tab - Drain

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

Notes: 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

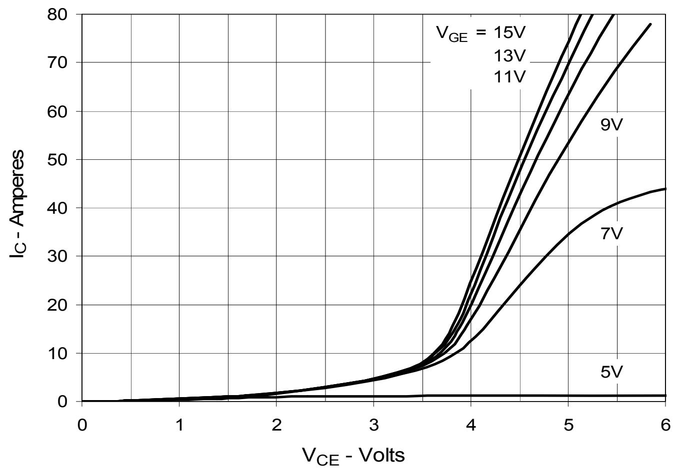


Fig. 2. Extended Output Characteristics @ 25ºC

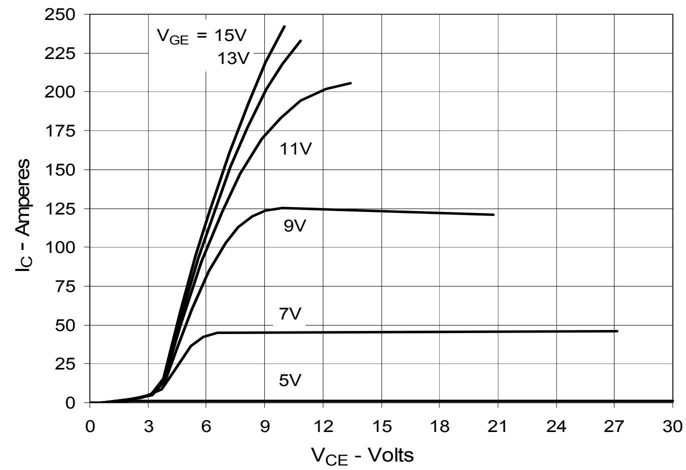


Fig. 3. Output Characteristics @ 125ºC

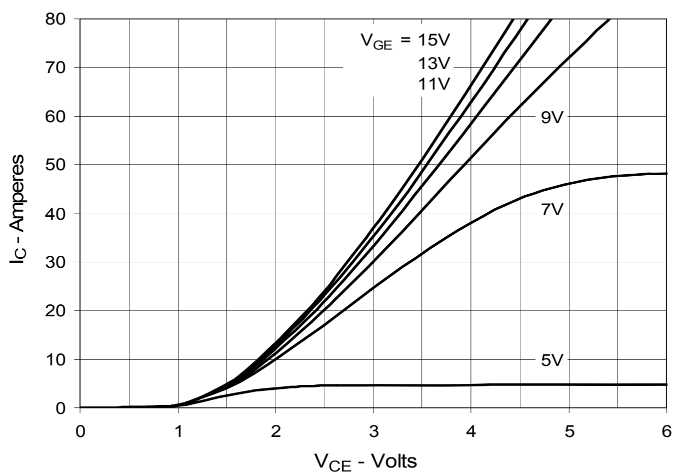


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

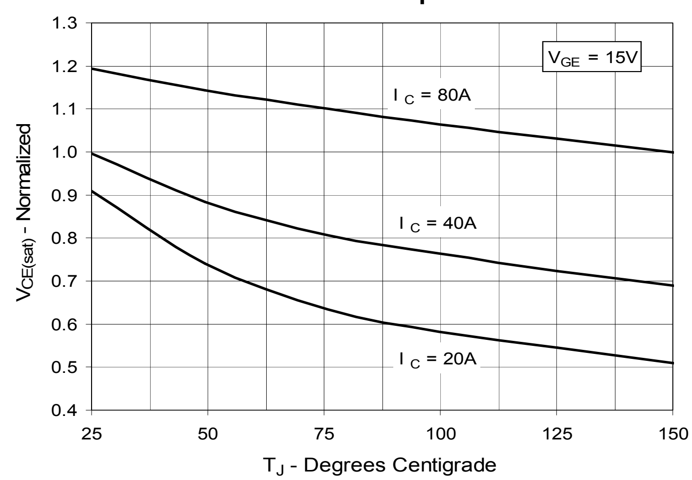


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

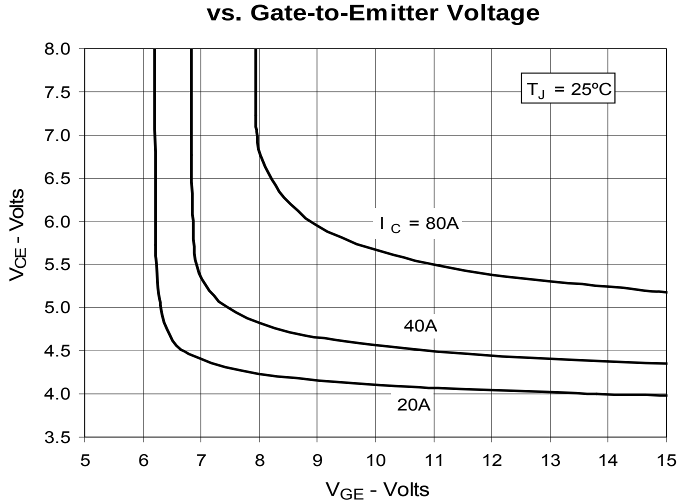


Fig. 6. Input Admittance

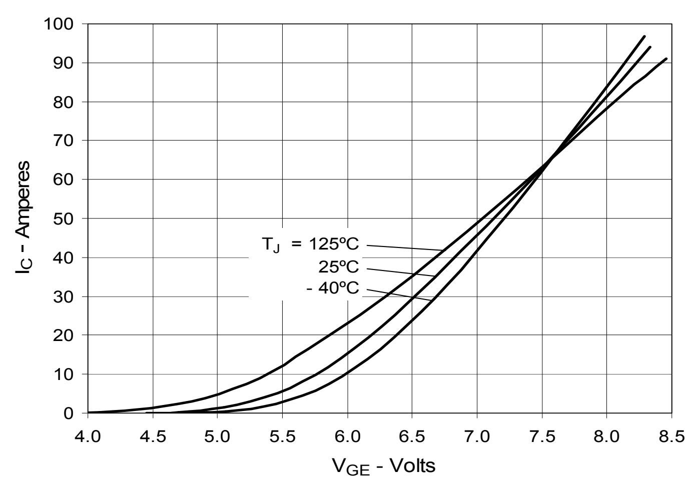


Fig. 7. Transconductance

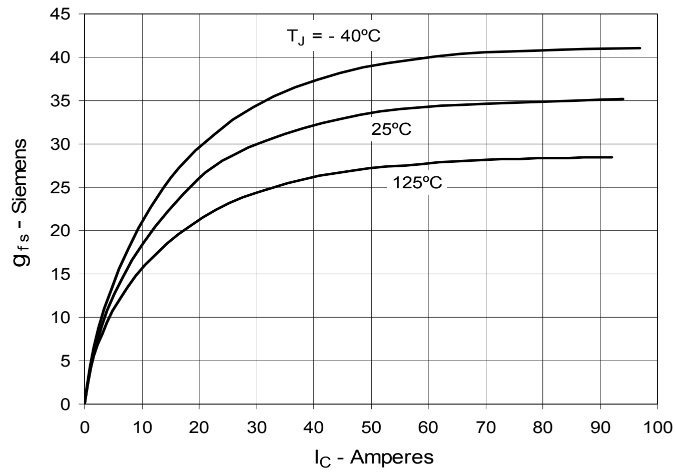


Fig. 8. Gate Charge

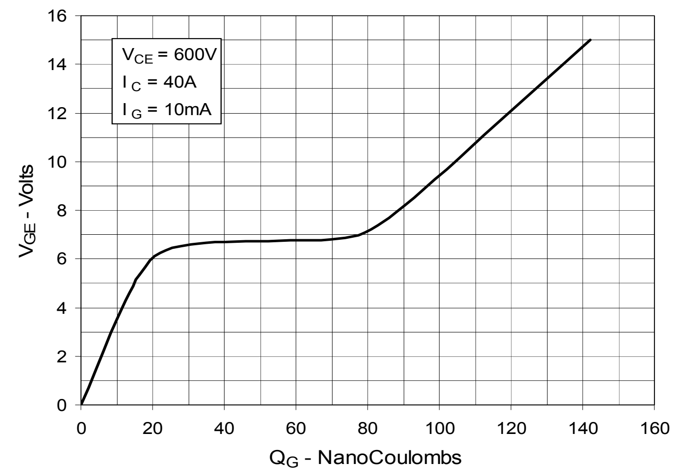


Fig. 9. Capacitance

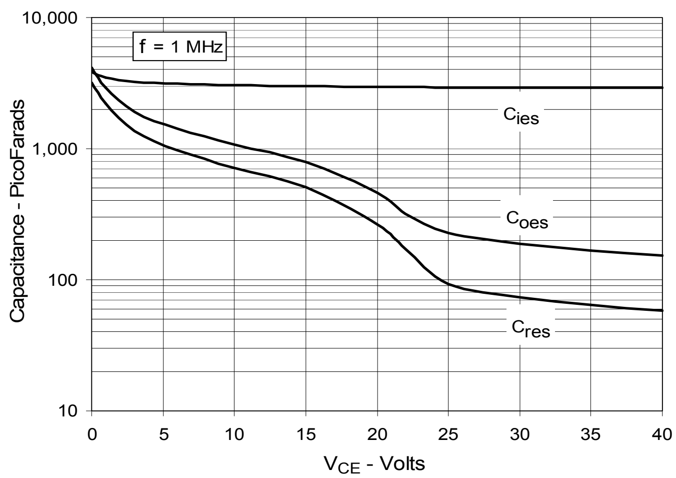


Fig. 10. Reverse-Bias Safe Operating Area

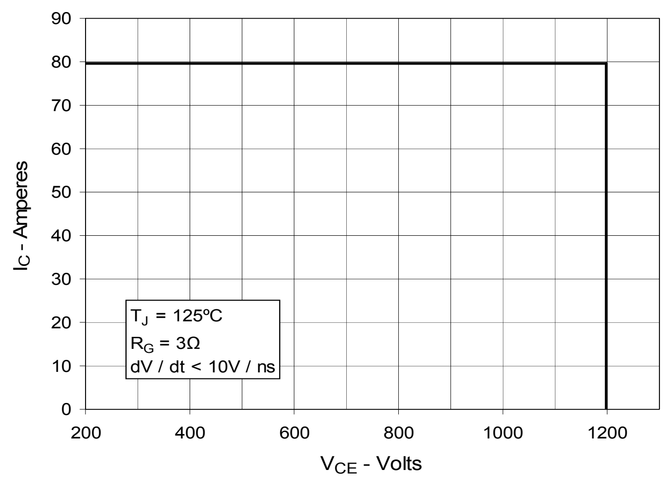
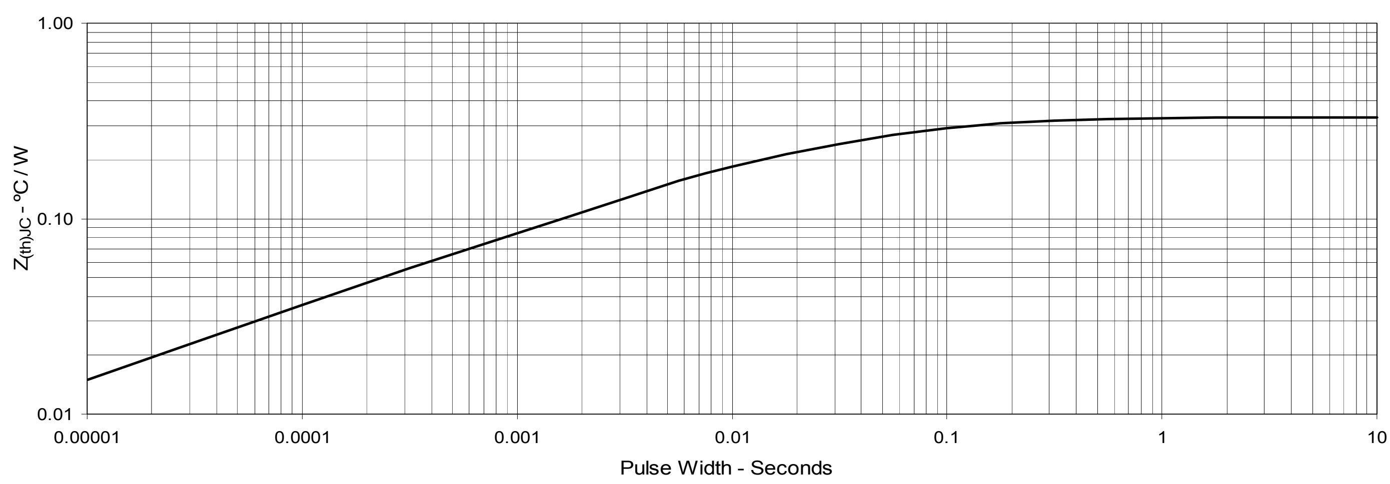


Fig. 11. Maximum Transient Thermal Impedance



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

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

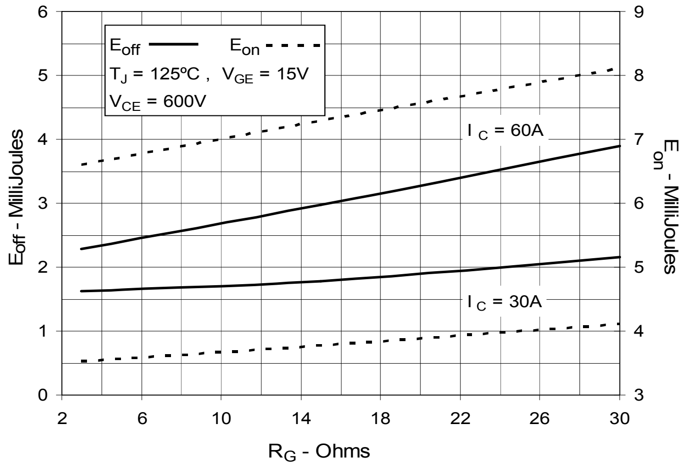


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

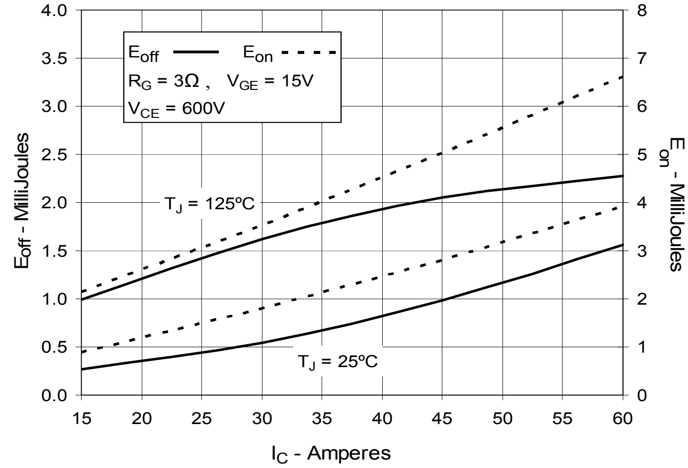


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

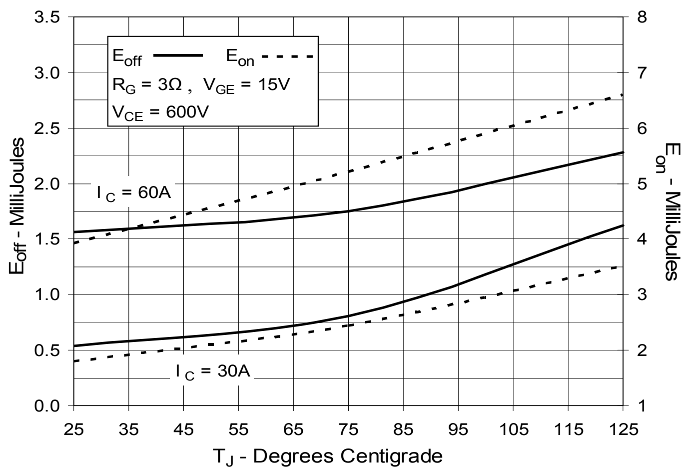


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

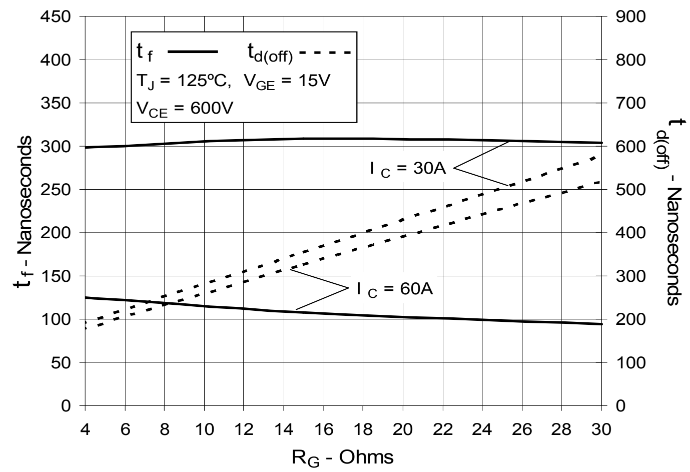


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

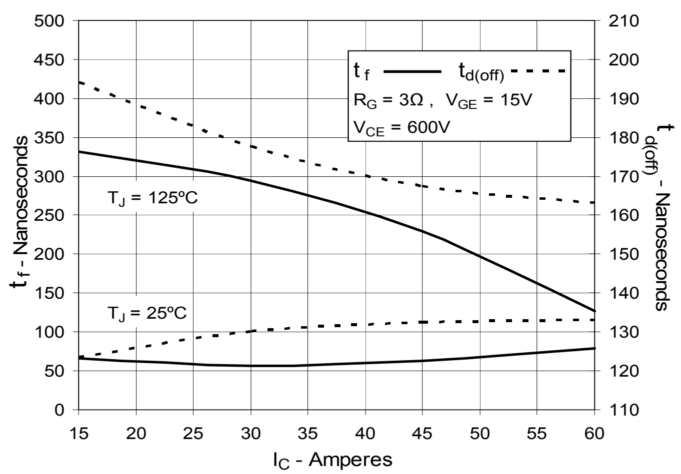


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

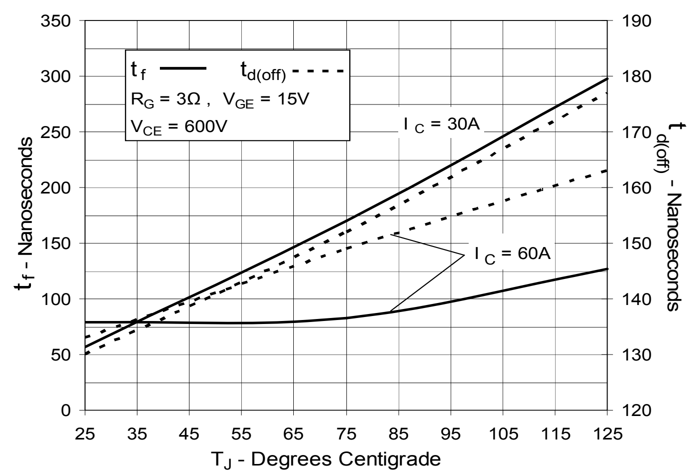


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

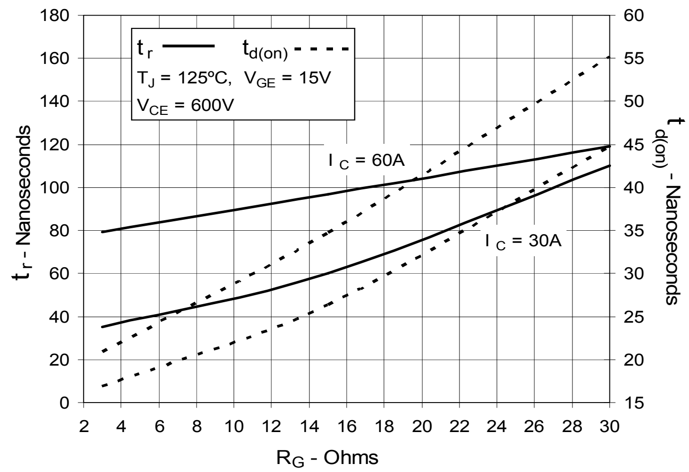


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

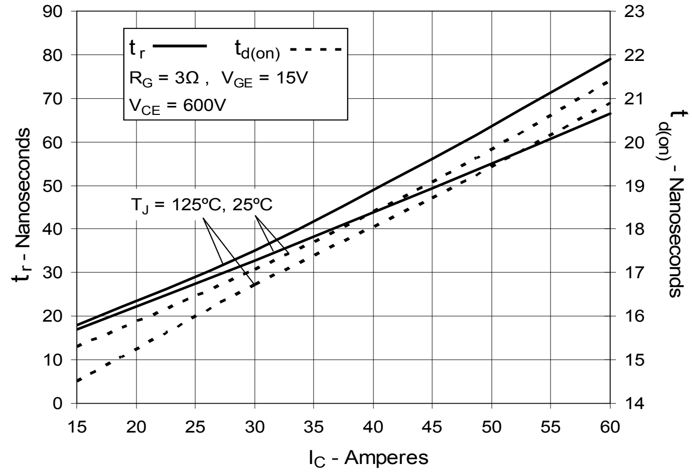


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature