IXYS

Preliminary Technical Information

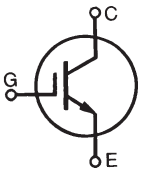
GenX3™ 300V IGBT

IXGH120N30C3*

***Obsolete Part Number**

V_{CES} = 300V
I_{C110} = 120A
$V_{CE(sat)}$ ≤ 2.1V
$t_{fi(typ)}$ = 86ns

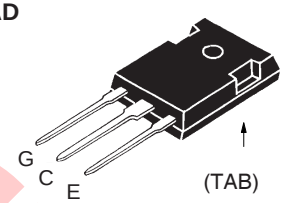
High speed PT IGBTs for 50-150kHz switching



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	300	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	300	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)	120	A
I_{CM}	T_C = 25°C, 1ms	600	A
I_A	T_C = 25°C	120	A
E_{AS}	T_C = 25°C	850	mJ
SSOA (RBSOA)	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 2Ω Clamped inductive load @ ≤ 300V	I_{CM} = 240	A
P_C	T_C = 25°C	540	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum lead temperature for soldering	300	°C
T_{SOLD}	1.6mm (0.062 in.) from case for 10s	260	°C
M_d	Mounting torque	1.13/10	Nm/lb.in.
Weight		6	g

Symbol	Test Conditions		Characteristic Values (T_J = 25°C, unless otherwise specified) Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V		300			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}		2.5		5.0	V
I_{CES}	V_{CE} = V_{CES} V_{GE} = 0V	 T_J = 125°C			50 1.0	μA mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V				±100	nA
$V_{CE(sat)}$	I_C = 120A, V_{GE} = 15V	 T_J = 125°C		1.75 1.70	2.10	V V

TO-247 AD (IXGH)



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

Features

- High Frequency IGBT
- Square RBSOA
- High avalanche capability
- Drive simplicity with MOS Gate Turn-On
- High current handling capability

Applications

- PFC Circuits
- PDP Systems
- Switched-mode and resonant-mode converters and inverters
- SMPS
- AC motor speed control
- DC servo and robot drives
- DC choppers

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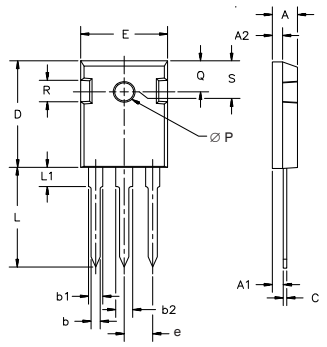
Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 60A, V_{CE} = 10V, Pulse test, t ≤ 300µs; duty cycle, d ≤ 2%.	50	83		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		8700		pF
C_{oes}			715		pF
C_{res}			195		pF
Q_g	I_C = I_{C110}, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		230		nC
Q_{ge}			32		nC
Q_{gc}			87		nC
$t_{d(on)}$	**Inductive Load, T_J = 25°C** I_C = 60A, V_{GE} = 15V V_{CE} = 200V, R_G = 2Ω		28		ns
t_{ri}			37		ns
E_{on}			0.23		mJ
$t_{d(off)}$			109	160	ns
t_{fi}			86		ns
E_{off}			0.73	1.3	mJ
$t_{d(on)}$	**Inductive Load, T_J = 125°C** I_C = 60A, V_{GE} = 15V V_{CE} = 200V, R_G = 2Ω		28		ns
t_{ri}			38		ns
E_{on}			0.37		mJ
$t_{d(off)}$			120		ns
t_{fi}			113		ns
E_{off}			0.88		mJ
R_{thJC}				0.23	°C/W
R_{thCK}			0.21		°C/W

TO-247 AD Outline



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	

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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.

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IXYS MOSFETs and IGBTs are covered by one or moreof 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 4,850,072 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

Fig. 1. Output Characteristics @ 25ºC

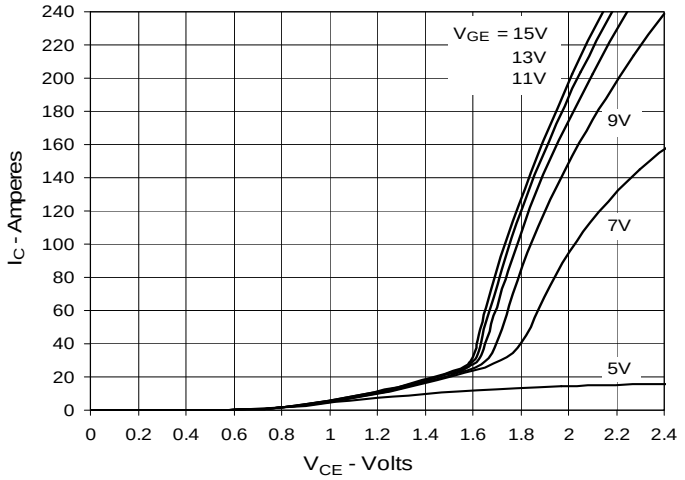

Fig. 2. Extended Output Characteristics @ 25ºC

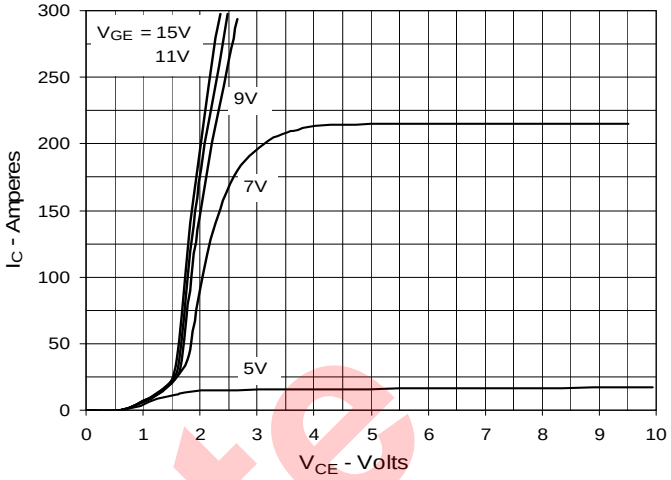

Fig. 3. Output Characteristics @ 125ºC

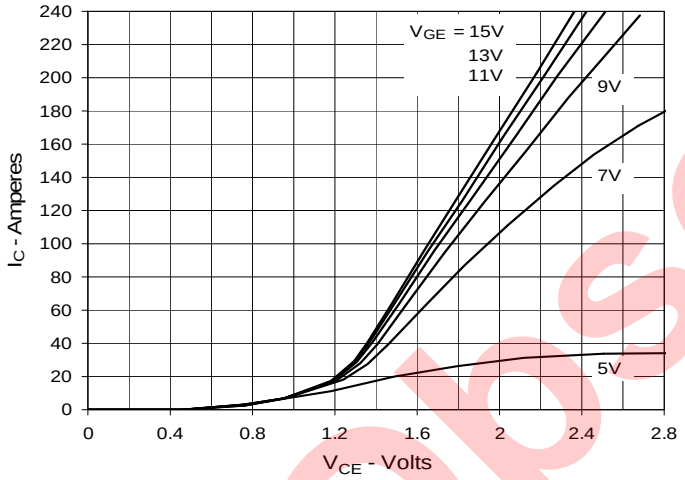

Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

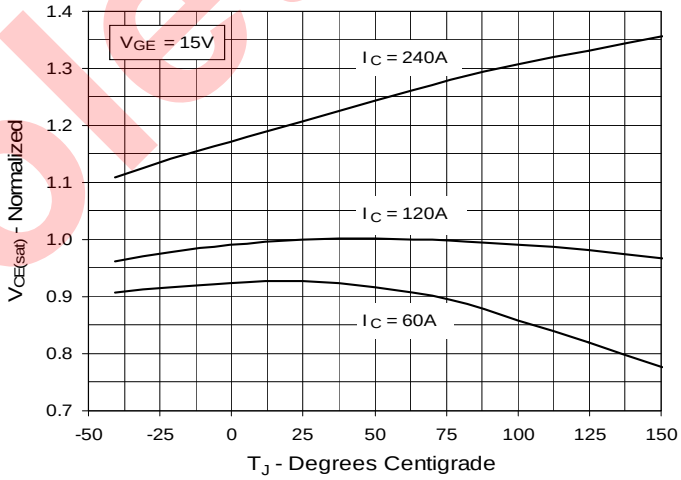

Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

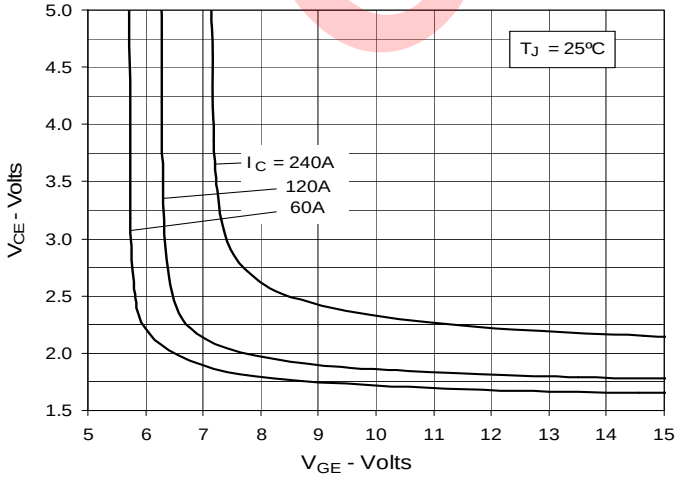

Fig. 6. Input Admittance

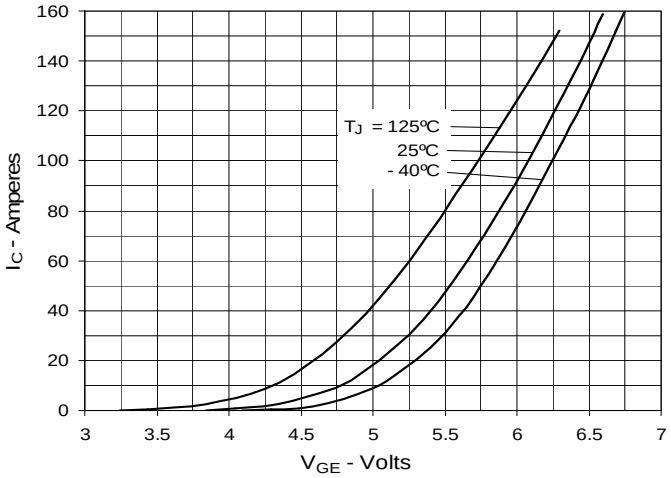

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Fig. 7. Transconductance

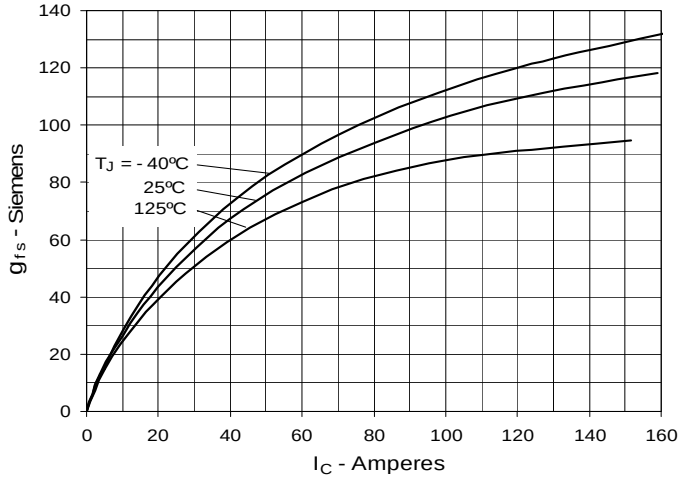

Fig. 8. Gate Charge

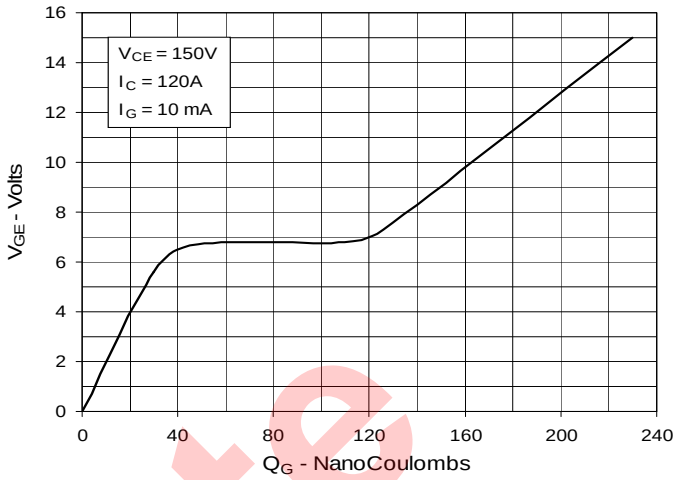

Fig. 9. Capacitance

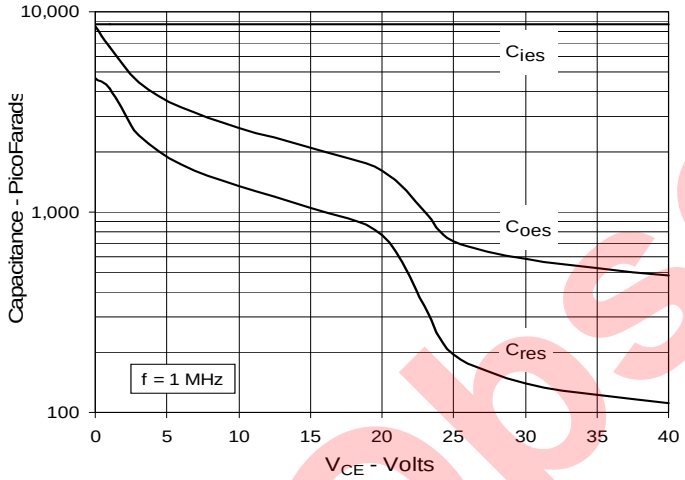

Fig. 10. Reverse-Bias Safe Operating Area

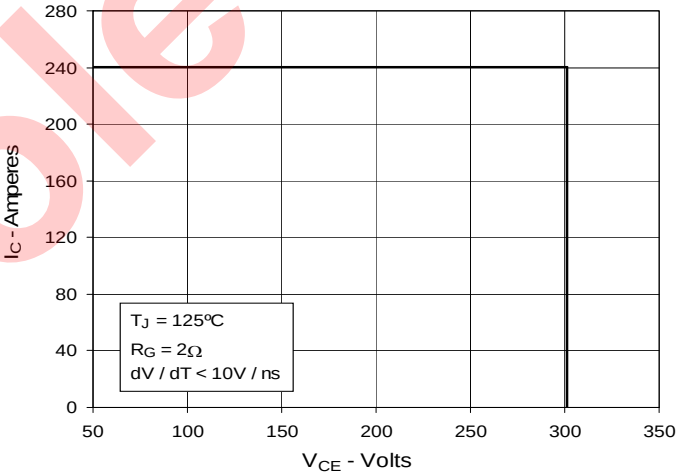

Fig. 11. Maximum Transient Thermal Impedance

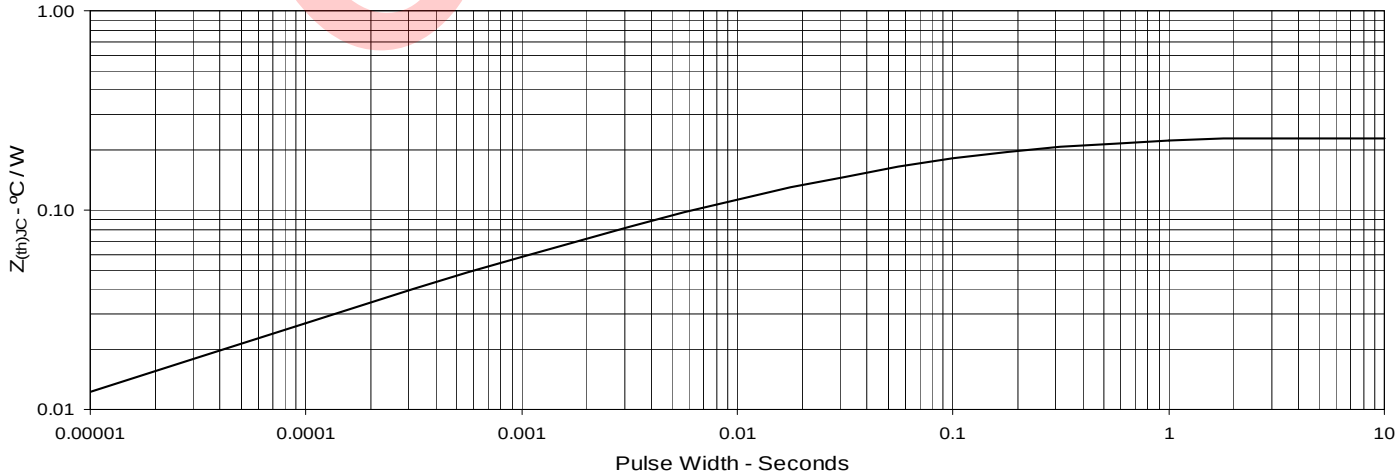

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Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

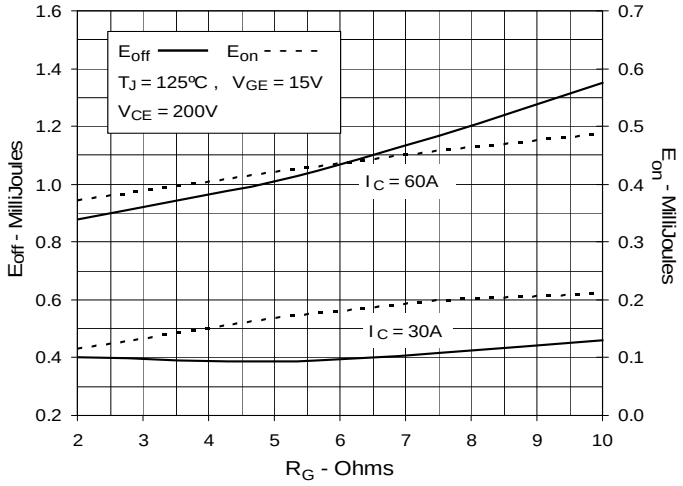

Fig. 13. Inductive Swiching Energy Loss vs. Collector Current

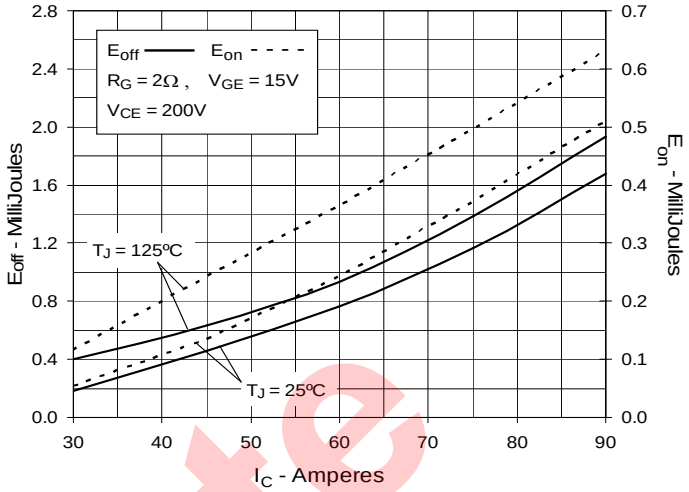

Fig. 14. Inductive Swiching Energy Loss vs. Junction Temperature

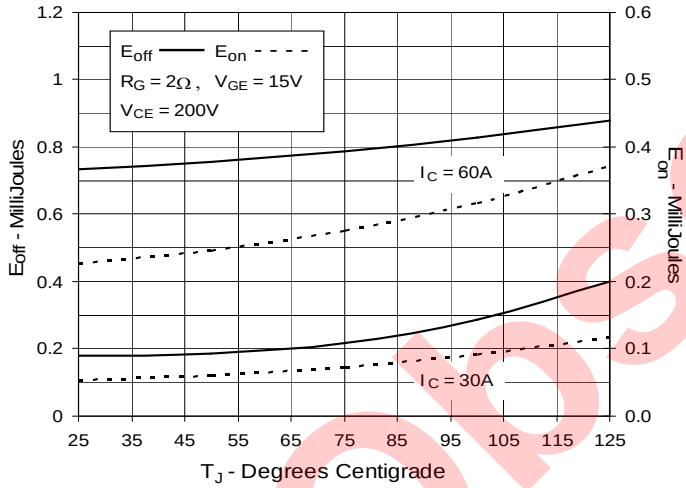

Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

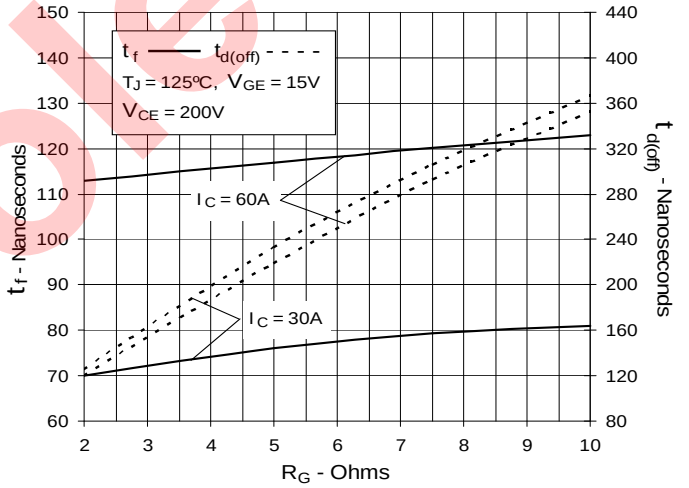

Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

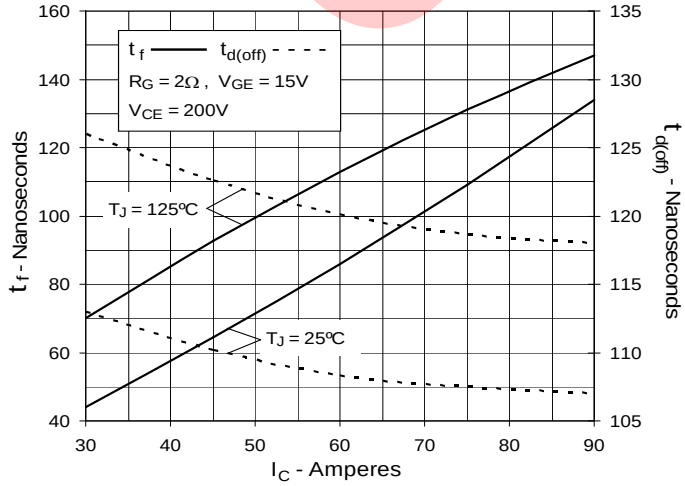

Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

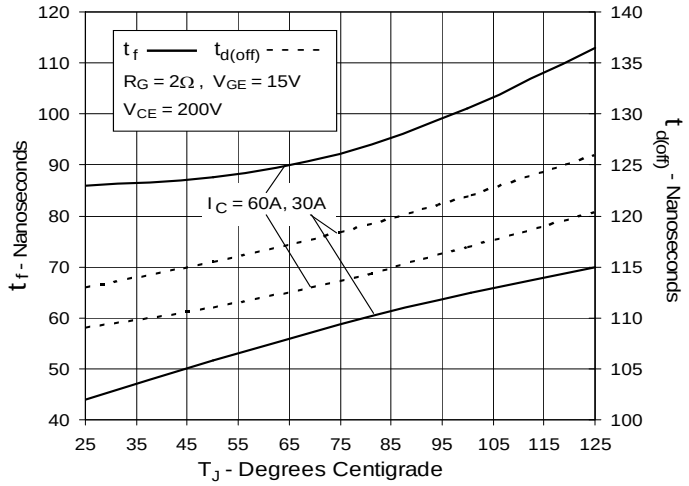

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Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

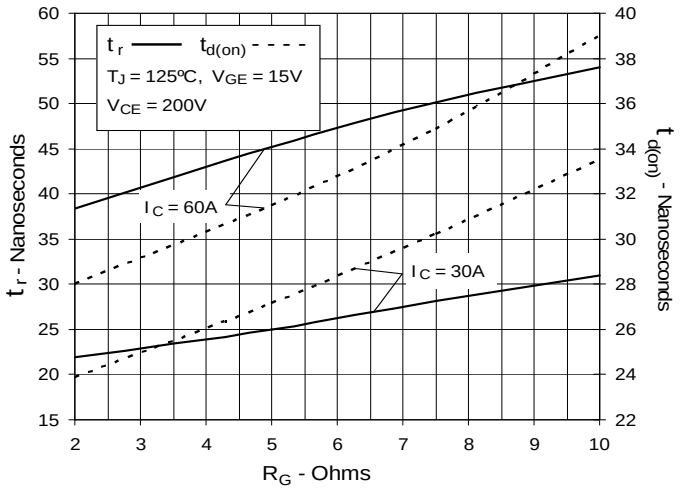


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

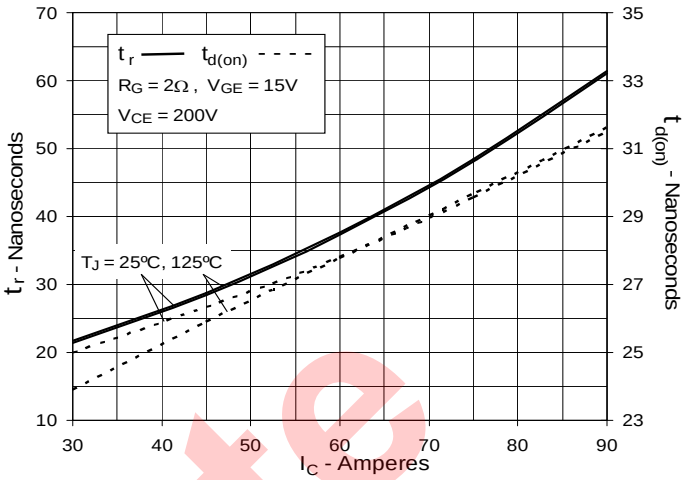
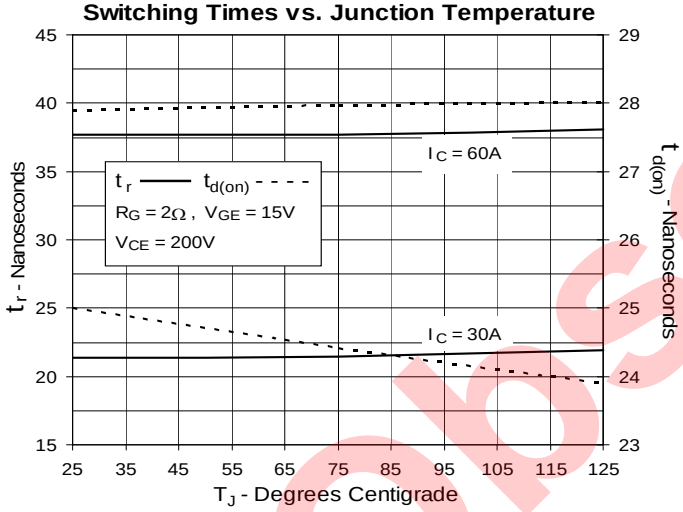


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



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