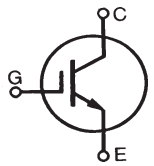
IXYS

Preliminary Technical Information

GenX3™ 600V IGBT IXGH90N60B3

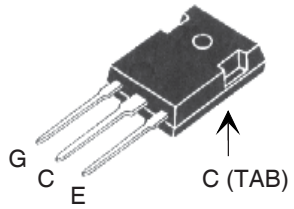
V_{CES} = 600V
I_{C110} = 90A
$V_{CE(sat)}$ ≤ 1.8V
$t_{fi(typ)}$ = 148ns

Medium speed low Vsat PT IGBTs 5-40 kHz switching



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)	90	A
I_{CM}	T_C = 25°C, 1ms	500	A
SSOA	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 2Ω	I_{CM} = 180	A
(RBSOA)	Clamped inductive load @ $V_{CE} \leq 600V$		
P_C	T_C = 25°C	660	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

TO-247 AD (IXGH)



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

Features

- Optimized for low conduction and switching losses
- Square RBSOA
- International standard package

Advantages

- High power density
- Low gate drive requirement

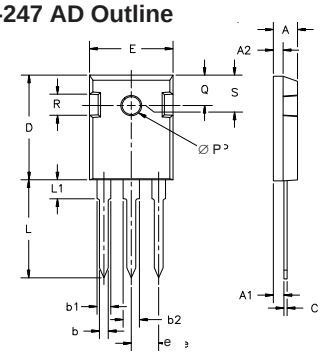
Applications

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

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	600			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			750	μA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 90A, V_{GE} = 15V, Note 1		1.55	1.80	V
	T_J = 125°C		1.62		V

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	55	90		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		8285		pF
C_{oes}			525		pF
C_{res}			140		pF
Q_g	I_C = 90A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		172		nC
Q_{ge}			28		nC
Q_{gc}			63		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** I_C = 60A, V_{GE} = 15V V_{CE} = 480V, R_G = 2Ω		31		ns
t_{ri}			47		ns
E_{on}			1.32		mJ
$t_{d(off)}$			150		ns
t_{fi}			148	250	ns
E_{off}			1.37	2.40	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C** I_C = 60A, V_{GE} = 15V V_{CE} = 480V, R_G = 2Ω		29		ns
t_{ri}			43		ns
E_{on}			1.93		mJ
$t_{d(off)}$			220		ns
t_{fi}			253		ns
E_{off}			2.80		mJ
R_{thJC}				0.19	°C/W
R_{thCS}			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

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

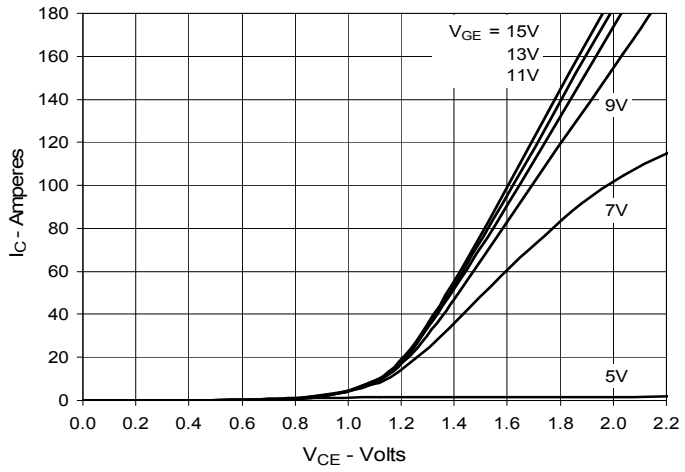


Fig. 2. Extended Output Characteristics @ 25ºC

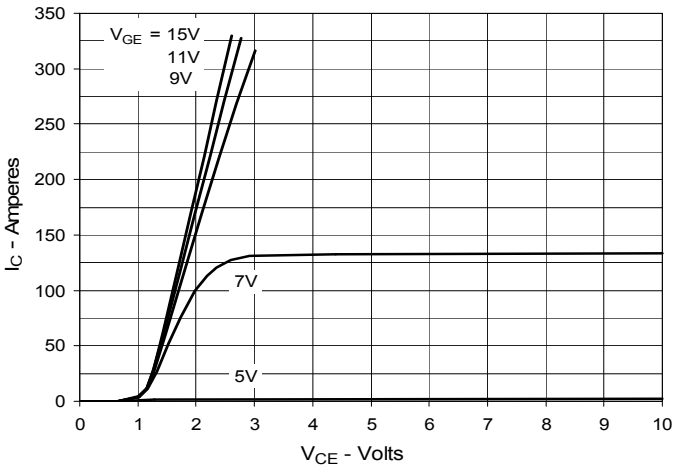


Fig. 3. Output Characteristics @ 125ºC

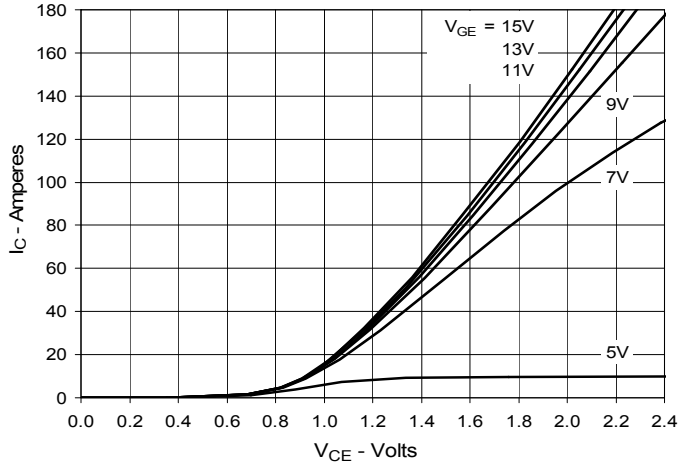


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

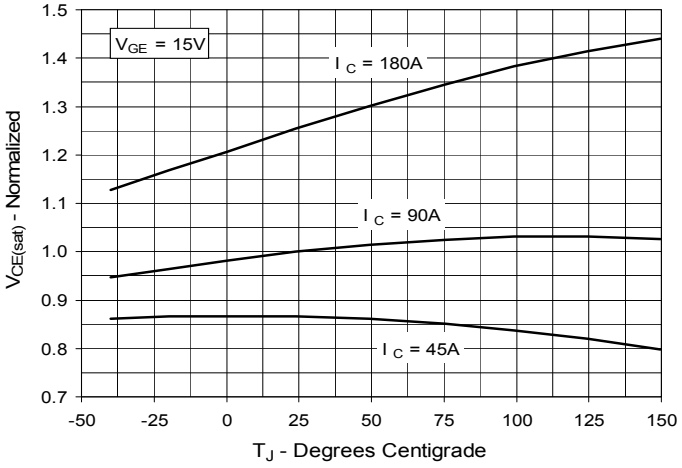


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

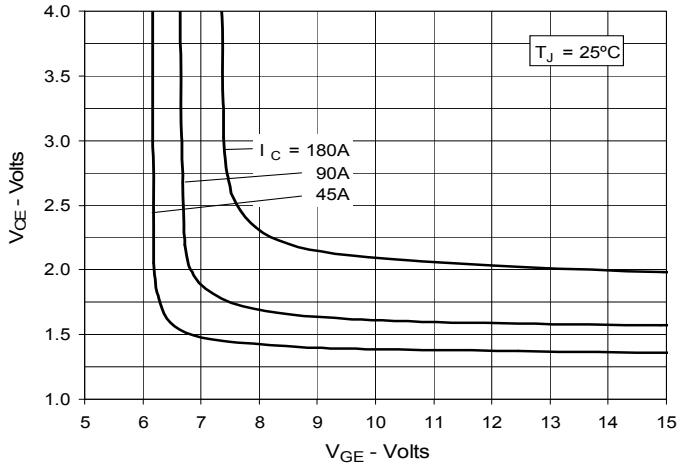


Fig. 6. Input Admittance

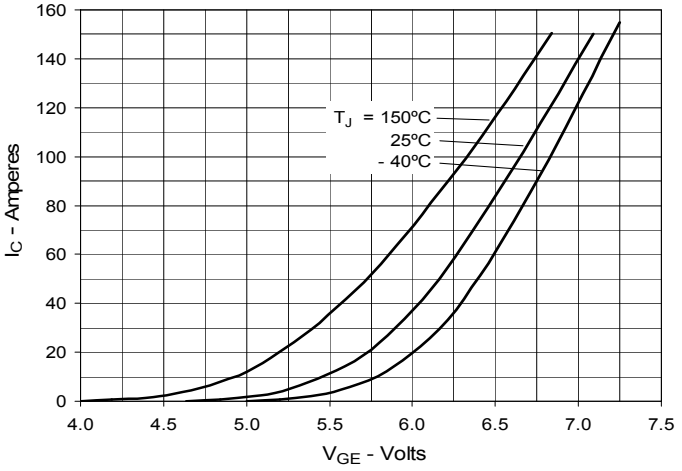


Fig. 7. Transconductance

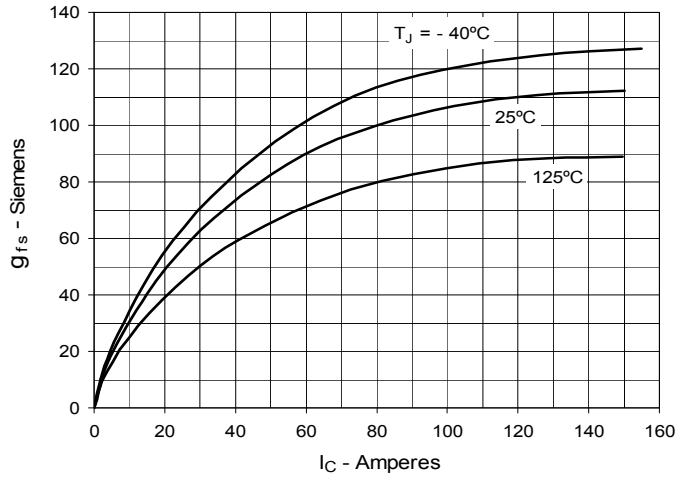


Fig. 8. Gate Charge

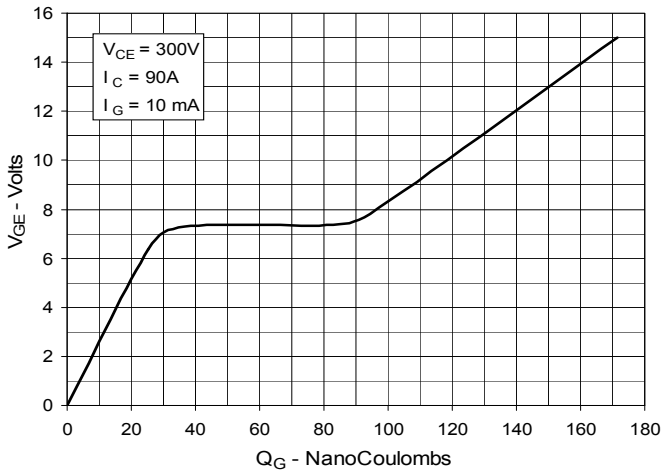


Fig. 9. Capacitance

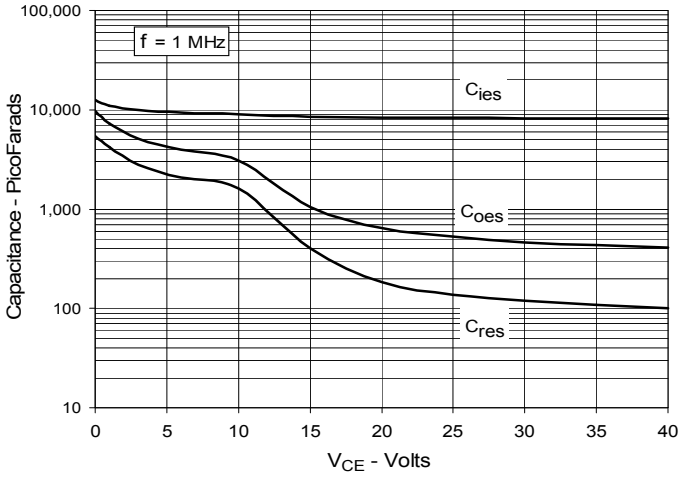


Fig. 10. Reverse-Bias Safe Operating Area

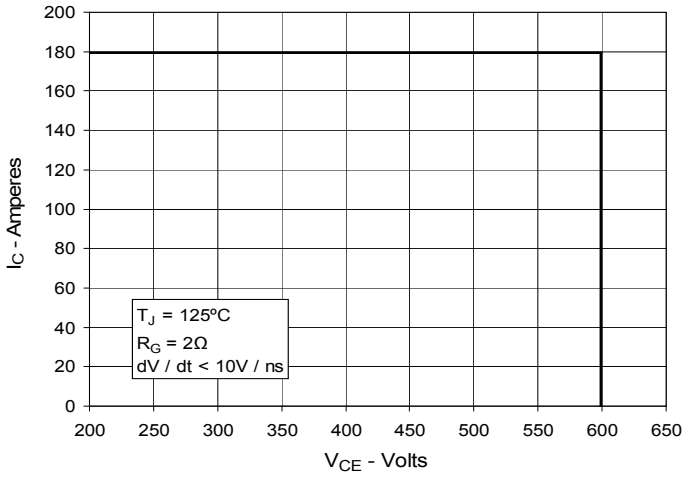


Fig. 11. Maximum Transient Thermal Impedance

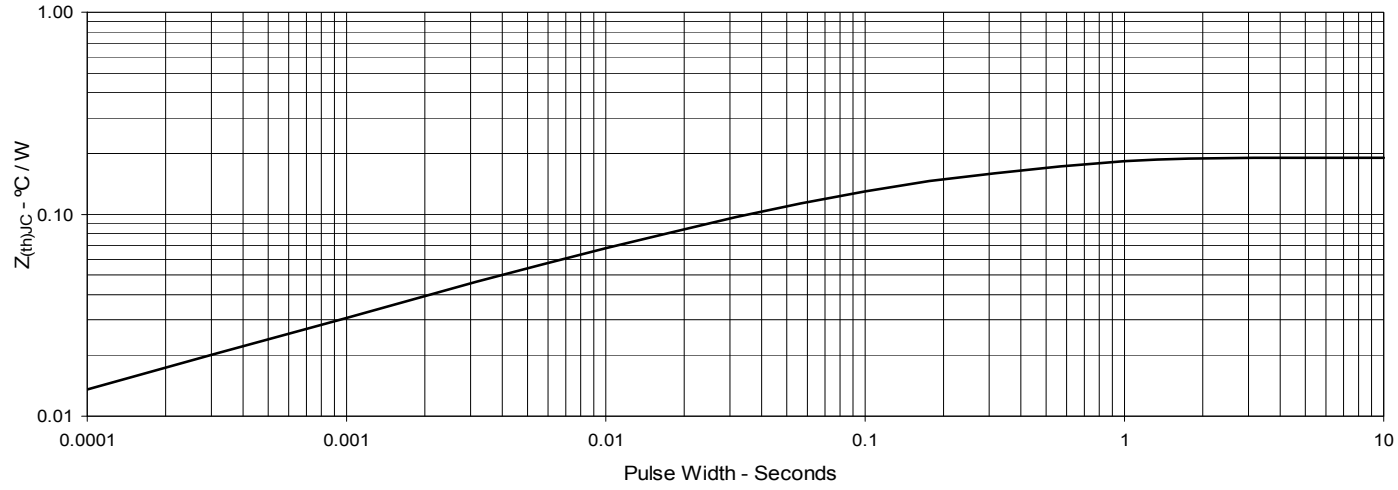


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

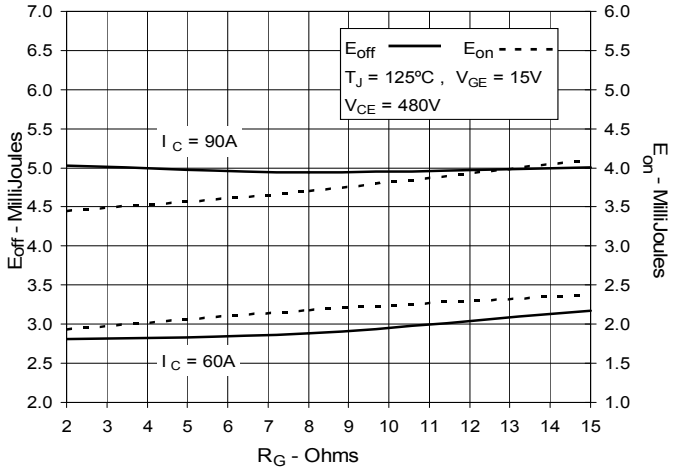


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

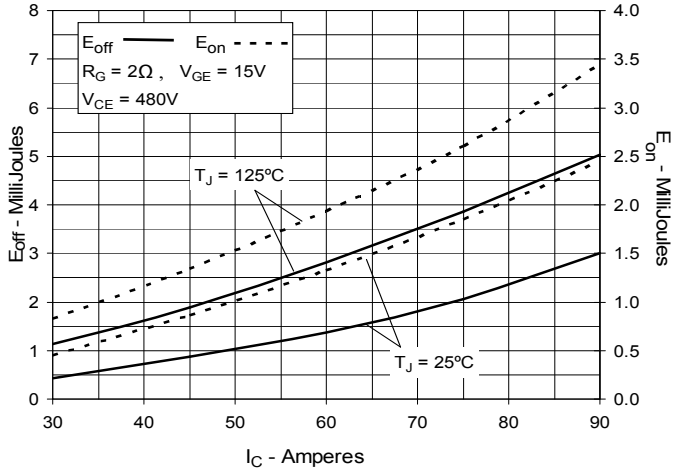


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

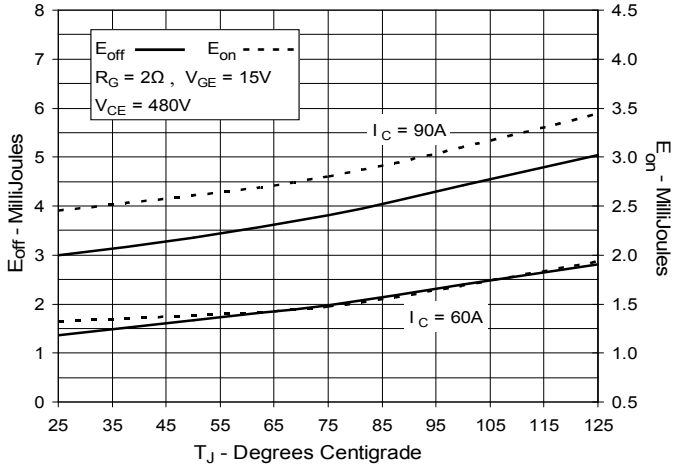


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

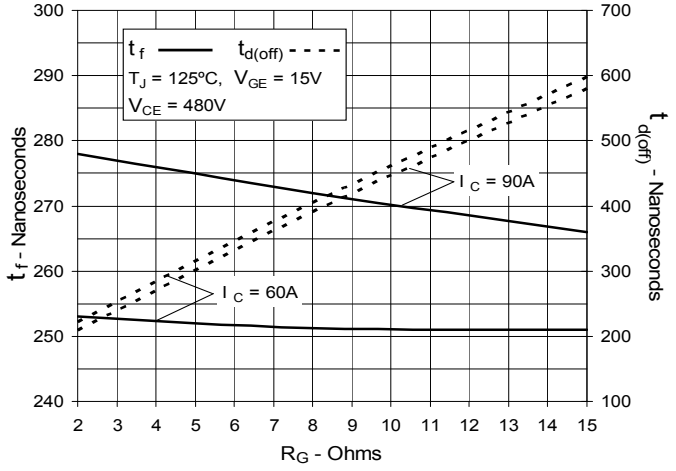


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

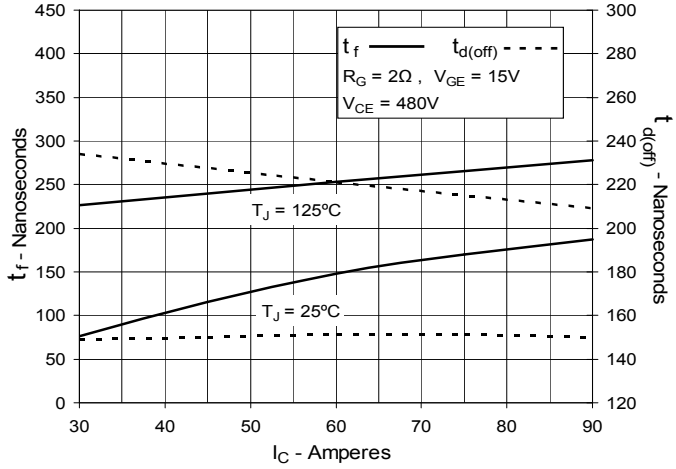


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

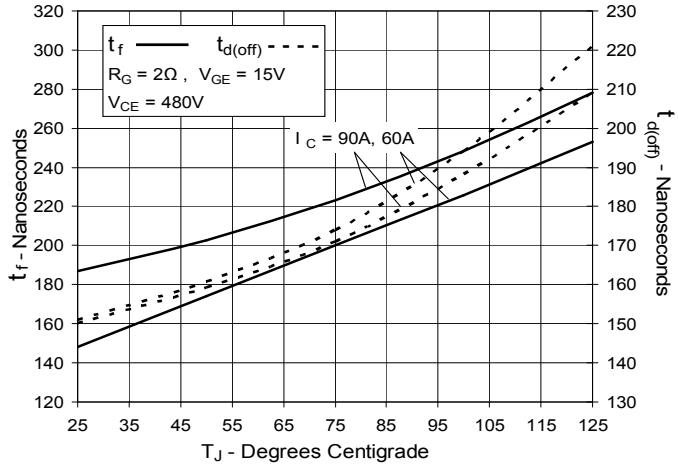


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

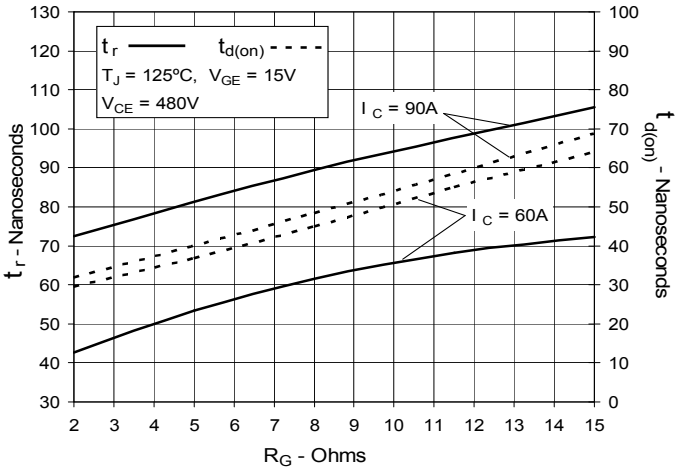


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

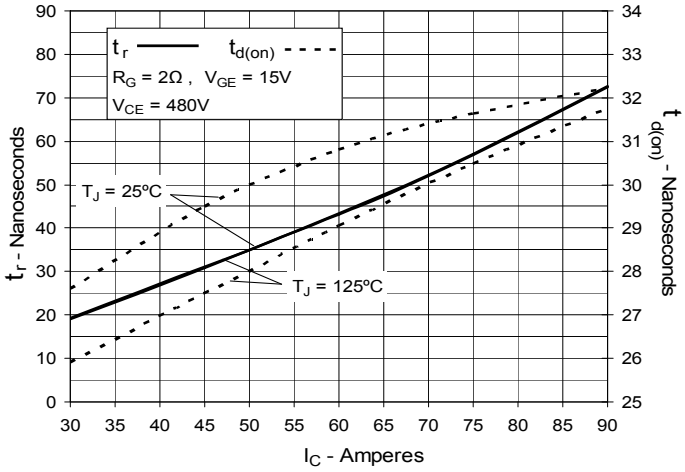


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature