IXYS

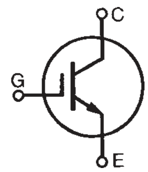
Preliminary Technical Information

GenX3™ 300V IGBT

IXGH85N30C3*

***Obsolete Part Number**

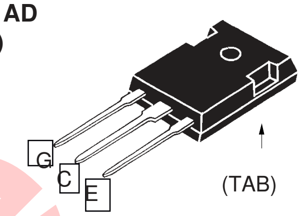
High Speed PT IGBTs for 50-150kHz switching



V_{CES}	=	300V	
I_{C110}	=	85A	
$V_{CE(sat)}$	≤	1.9V	
$t_{fi\ typ}$	=	70ns	

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)	85	A
I_{CM}	T_C = 25°C, 1ms	420	A
I_A	T_C = 25°C	85	A
E_{AS}	T_C = 25°C	400	mJ
SSOA (RBSOA)	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 3.3Ω Clamped inductive load @ ≤ 300V	I_{CM} = 170	A
P_C	T_C = 25°C	333	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}	1.6 mm (0.062 in.) from case for 10s	260	°C
M_d	Mounting torque (TO-247)	1.13/10	Nm/lb.in.
Weight		6	g

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

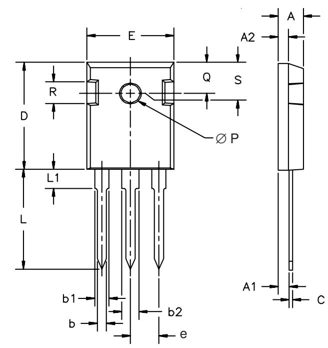
Applications

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

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}			30	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 = 85A, V_{GE} = 15V		1.64	1.9	V
	T_J = 125°C		1.67		V

Symbol	Test Conditions ($T_J = 25°C$, unless otherwise specified)	Min.	Typ.	Max.	
g_{fs}	$I_C = 0.5 \cdot I_{C110}$, $V_{CE} = 10V$, Pulse test, $t \leq 300\mu s$; duty cycle, $d \leq 2\%$.	35	60		S
C_{ies}	$V_{CE} = 25V$, $V_{GE} = 0V$, $f = 1MHz$		5100		pF
C_{oes}			310		pF
C_{res}			80		pF
Q_g	$I_C = I_{C110}$, $V_{GE} = 15V$, $V_{CE} = 0.5 \cdot V_{CES}$		136		nC
Q_{ge}			22		nC
Q_{gc}			48		nC
$t_{d(on)}$	**Inductive Load, $T_J = 25°C$** $I_C = 0.5 \cdot I_{C110}$, $V_{GE} = 15V$ $V_{CE} = 200V$, $R_G = 3.3\Omega$		25		ns
t_{ri}			34		ns
E_{on}			0.20		mJ
$t_{d(off)}$			100	160	ns
t_{fi}			70		ns
E_{off}			0.39	0.75	mJ
$t_{d(on)}$	**Inductive Load, $T_J = 125°C$** $I_C = 0.5 \cdot I_{C110}$, $V_{GE} = 15V$ $V_{CE} = 200V$, $R_G = 3.3\Omega$		22		ns
t_{ri}			33		ns
E_{on}			0.36		mJ
$t_{d(off)}$			120		ns
t_{fi}			101		ns
E_{off}			0.48		mJ
R_{thJC}				0.375	°C/W
R_{thCK}			0.21		°C/W

TO-247 AD Outline



Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches 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

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

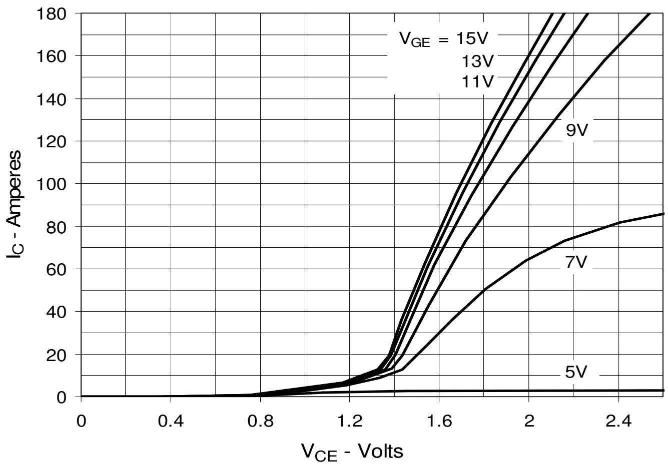


Fig. 2. Extended Output Characteristics @ 25ºC

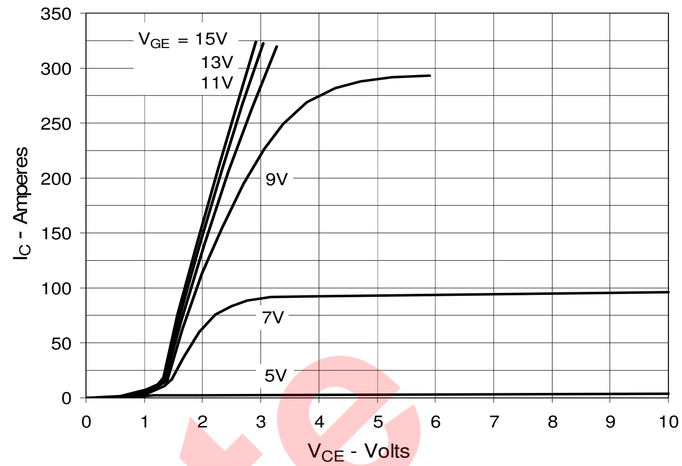


Fig. 3. Output Characteristics @ 125ºC

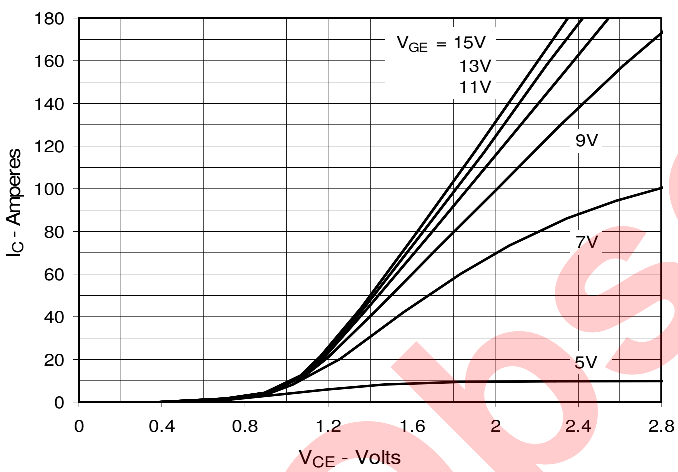


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

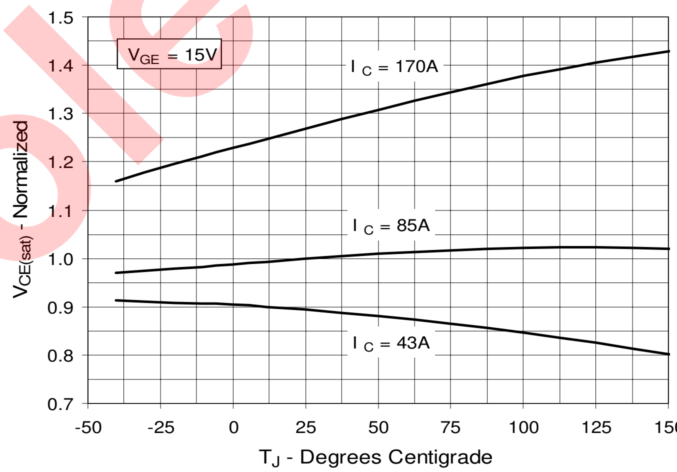


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

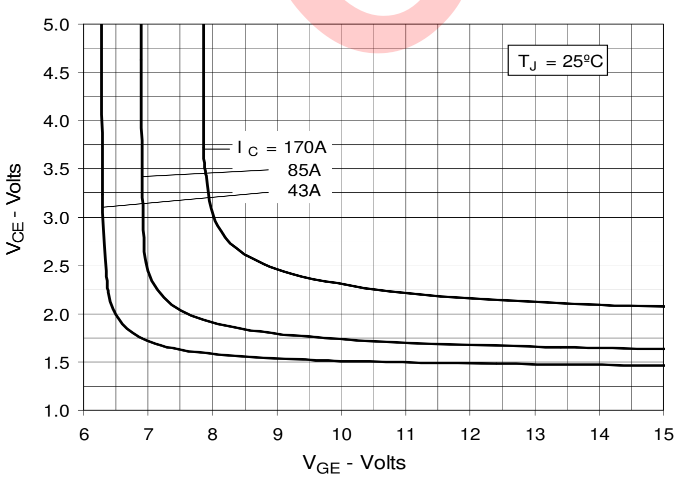
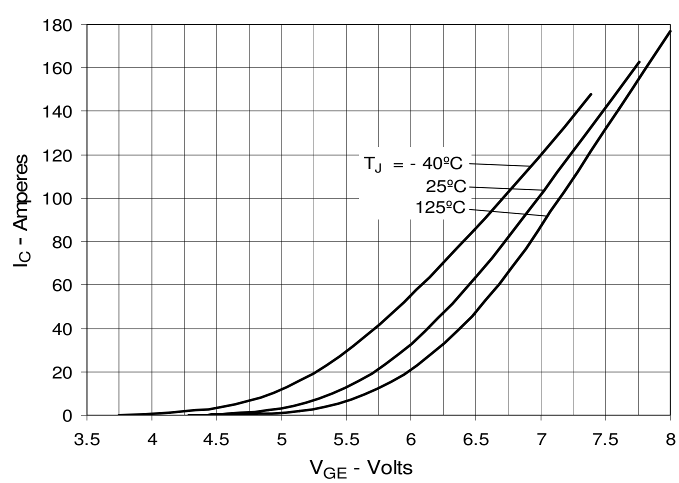


Fig. 6. Input Admittance



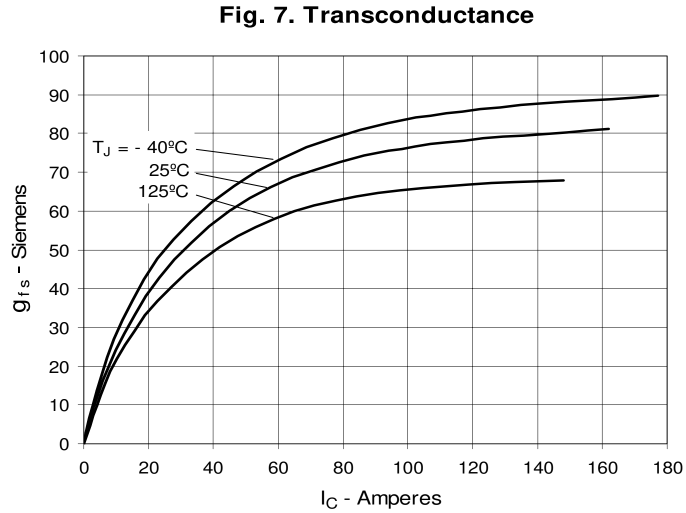


Fig. 7. Transconductance
T_J = - 40ºC
25ºC
125ºC
g_{fs} - Siemens
I_C - Amperes

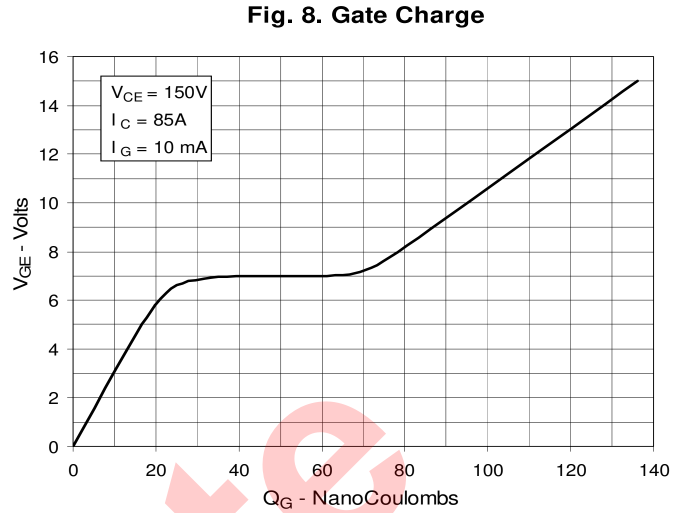


Fig. 8. Gate Charge
V_{CE} = 150V
I_C = 85A
I_G = 10 mA
V_{GE} - Volts
Q_G - NanoCoulombs

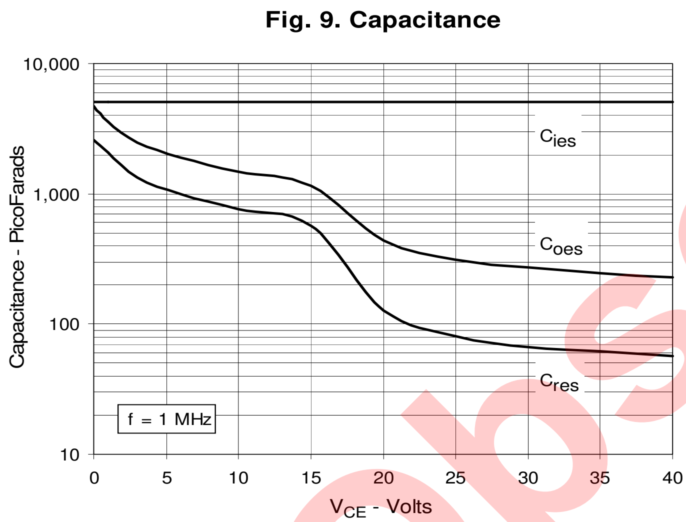


Fig. 9. Capacitance
C_{ies}
C_{oes}
C_{res}
f = 1 MHz
Capacitance - PicoFarads
V_{CE} - Volts

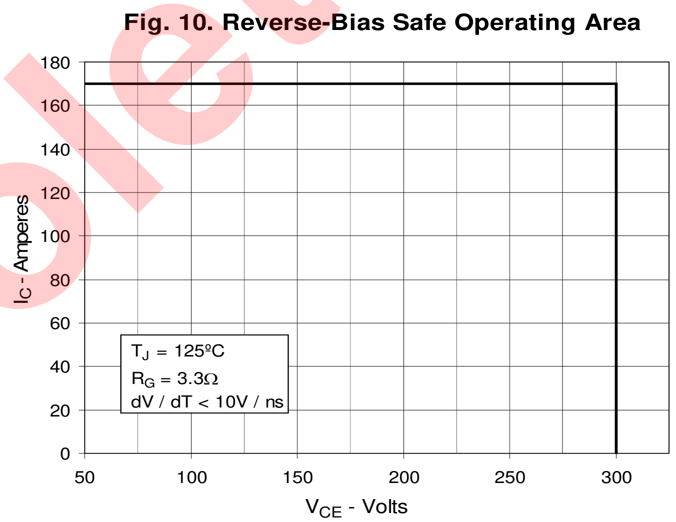


Fig. 10. Reverse-Bias Safe Operating Area
T_J = 125ºC
R_G = 3.3Ω
dV / dT < 10V / ns
I_C - Amperes
V_{CE} - Volts

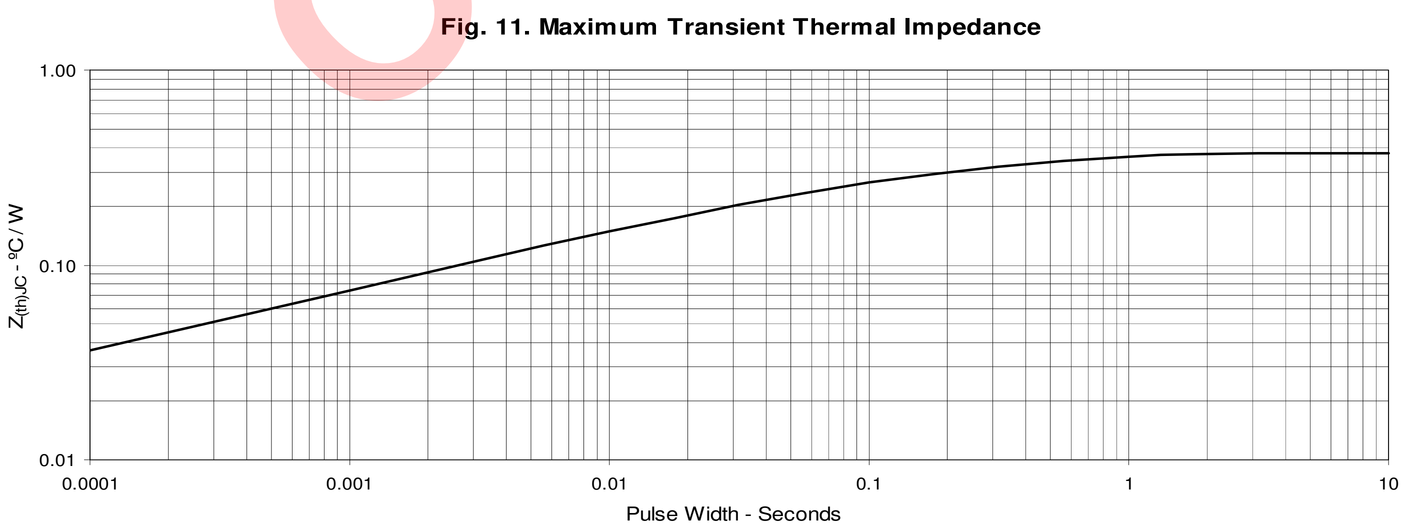


Fig. 11. Maximum Transient Thermal Impedance
$Z_{(th)JC}$ - ºC / W
Pulse Width - Seconds

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

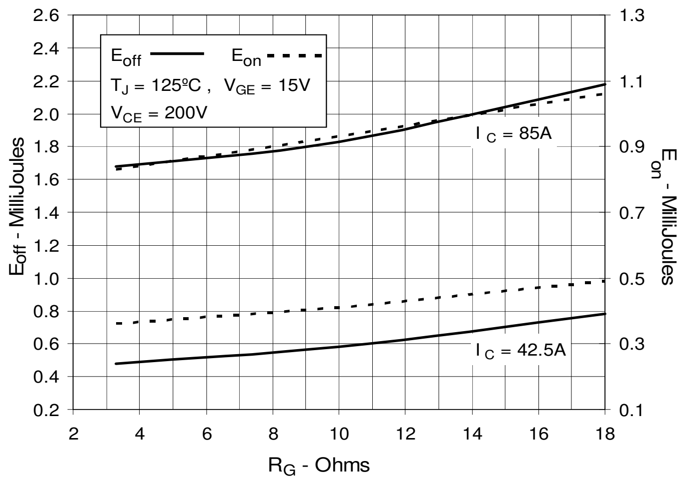


Fig. 13. Inductive Swiching Energy Loss vs. Collector Current

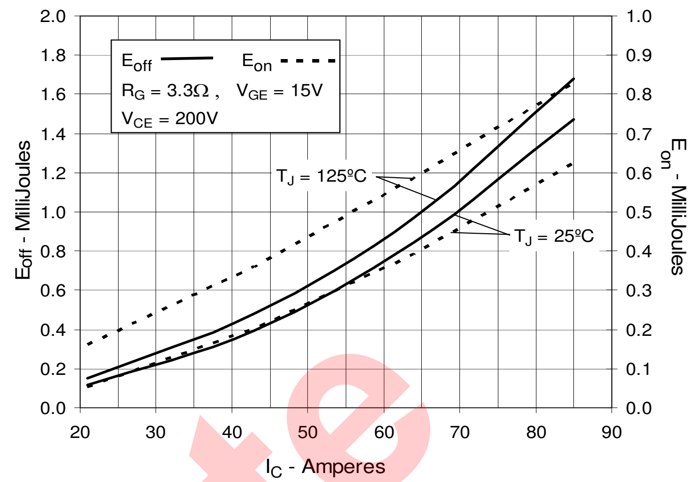


Fig. 14. Inductive Swiching Energy Loss vs. Junction Temperature

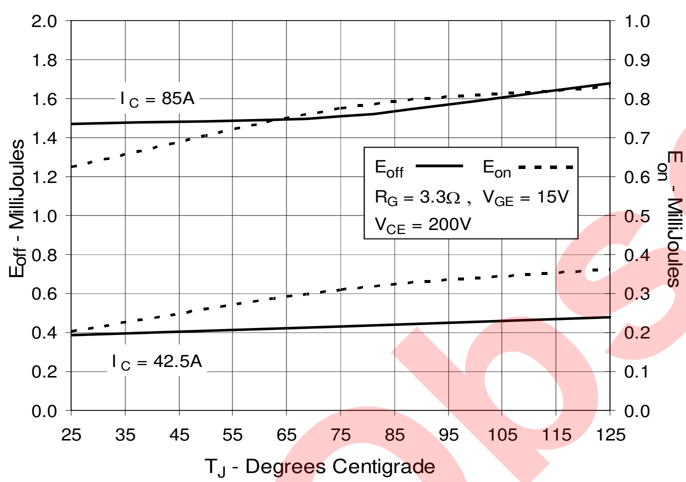


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

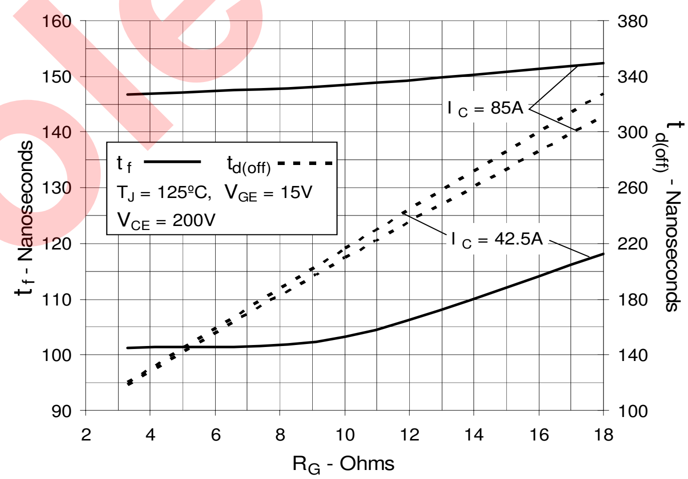


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

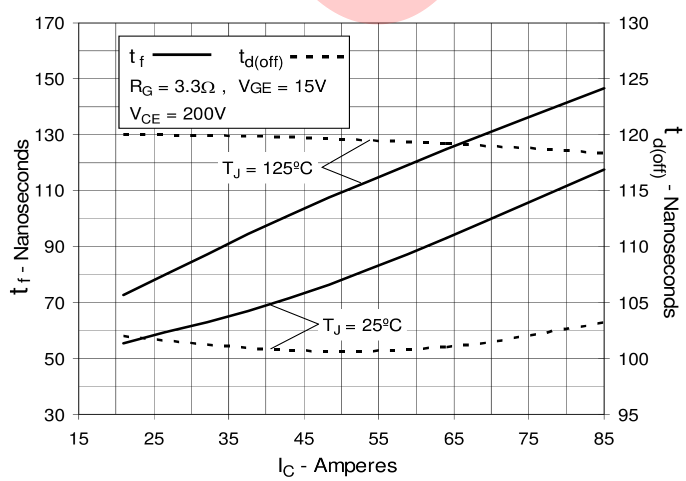


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

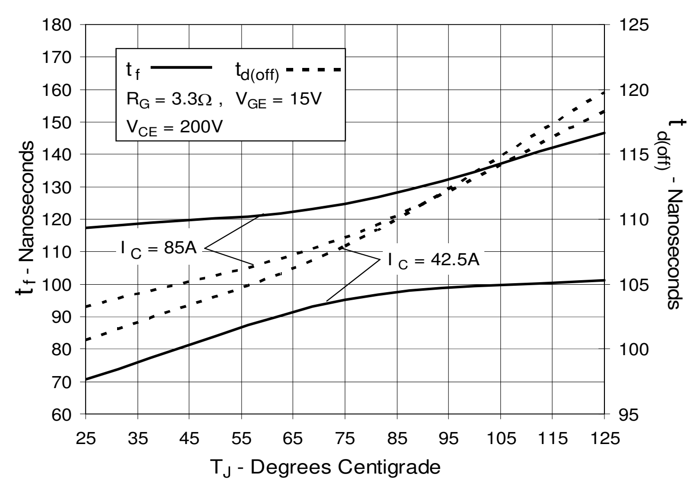


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

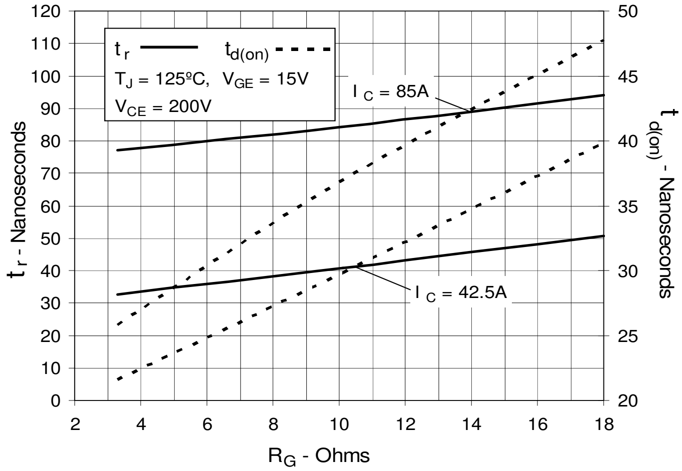


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

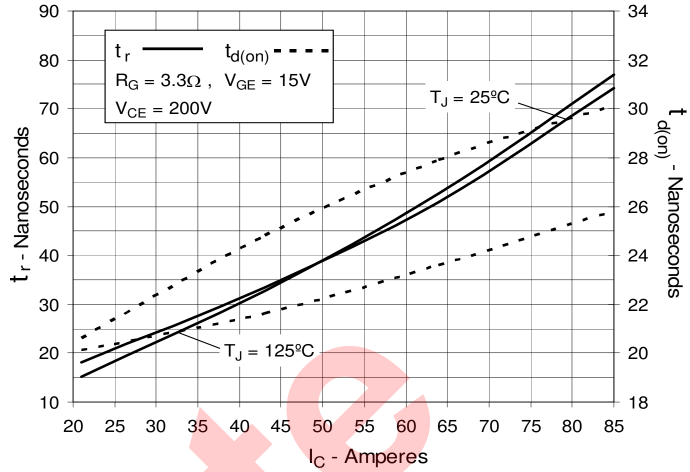


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature