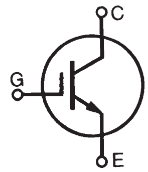
Advance Technical Information

GenX3™ 600V IGBT

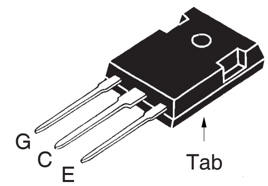
IXGH36N60B3

V_{CES} = 600V
I_{C110} = 36A
$V_{CE(sat)}$ ≤ 1.8V

Medium-Speed Low-Vsat PT IGBT
for 5 - 40kHz Switching



TO-247



G = Gate C = Collector
E = Emitter Tab = Collector

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	92	A
I_{C110}	T_C = 110°C	36	A
I_{CM}	T_C = 25°C, 1ms	200	A
SSOA (RBSOA)	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 5Ω Clamped Inductive Load	I_{CM} = 80 $V_{CE} \leq V_{CES}$	A
P_C	T_C = 25°C	250	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from Case for 10s	300	°C
T_{SOLD}	Plastic Body for 10s	260	°C
M_d	Mounting Torque	1.13/10	Nm/lb.in.
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	600			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			25	μA
	T_J = 125°C			250	μA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = 30A, V_{GE} = 15V, Note 1		1.5	1.8	V

Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- International Standard Package

Advantages

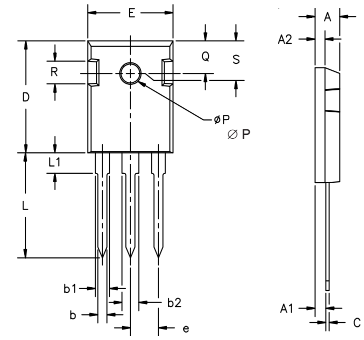
- High Power Density
- Low Gate Drive Requirement

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)	Min.	Typ.	Max.	
g_{fs}	I_C = 30A, V_{CE} = 10V, Note 1	28	42		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		2280		pF
C_{oes}			120		pF
C_{res}			32		pF
Q_g	I_C = 30A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		80		nC
Q_{ge}			12		nC
Q_{gc}			36		nC
$t_{d(on)}$	**Inductive Load, T_J = 25°C**		19		ns
t_{ri}	I_C = 30A, V_{GE} = 15V		24		ns
E_{on}	V_{CE} = 400V, R_G = 5Ω		0.54		mJ
$t_{d(off)}$			125	200	ns
t_{fi}			100	160	ns
E_{off}			0.8	1.5	mJ
$t_{d(on)}$	**Inductive Load, T_J = 125°C**		19		ns
t_{ri}	I_C = 30A, V_{GE} = 15V		26		ns
E_{on}	V_{CE} = 400V, R_G = 5Ω		0.9		mJ
$t_{d(off)}$			180		ns
t_{fi}			170		ns
E_{off}			1.5		mJ
R_{thJC}				0.50	°C/W
R_{thCS}			0.21		°C/W

TO-247 Outline (IXGH)



Terminals: 1 - Gate 2 - Collector
3 - Emitter

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	

Note 1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

Fig. 1. Output Characteristics @ T_J = 25ºC

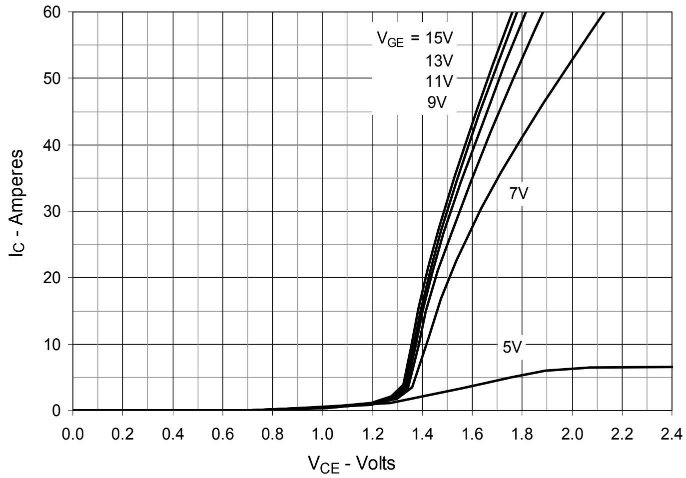


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

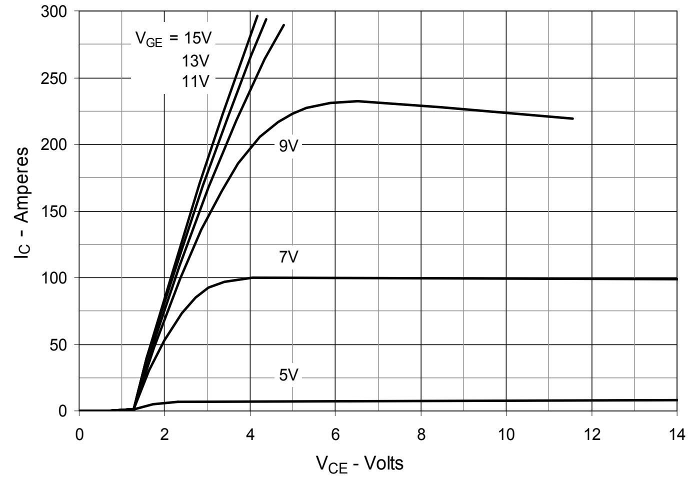


Fig. 3. Output Characteristics @ T_J = 125ºC

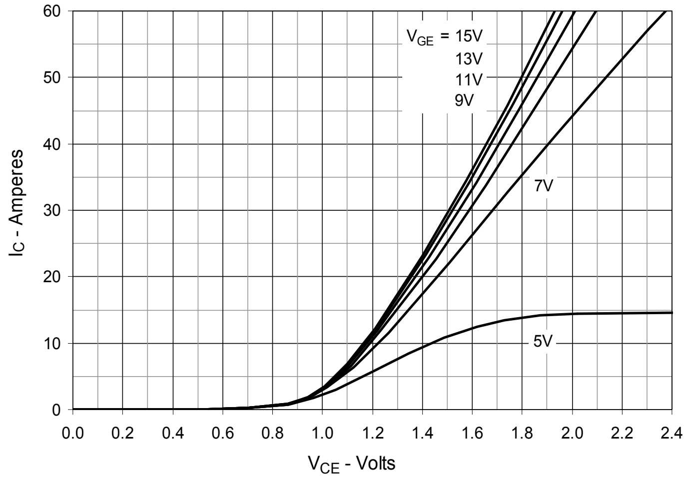


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

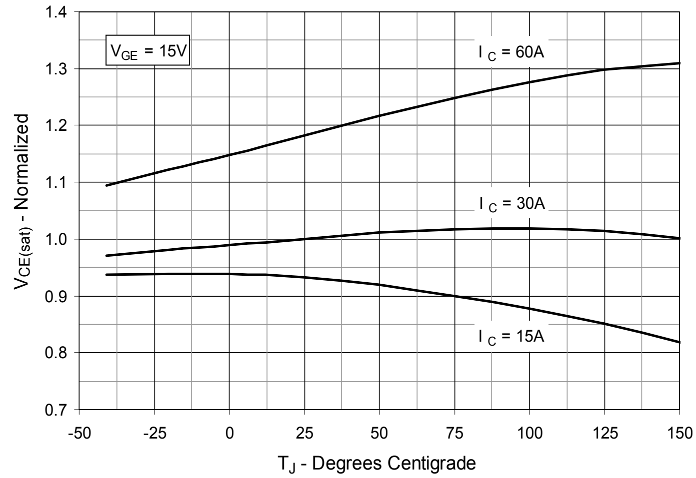


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

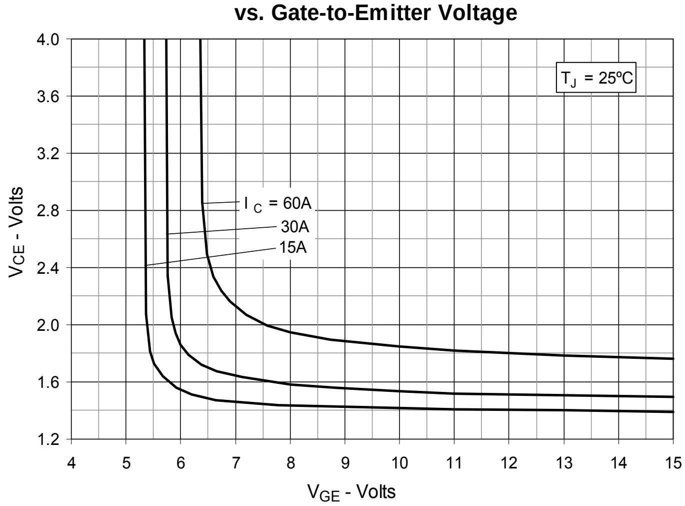
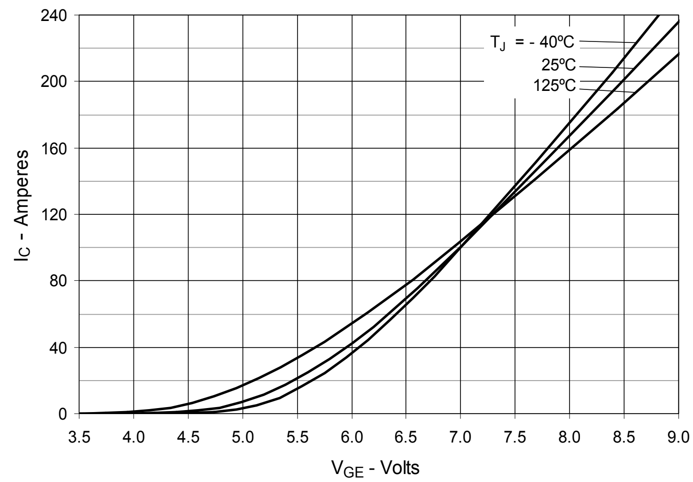


Fig. 6. Input Admittance



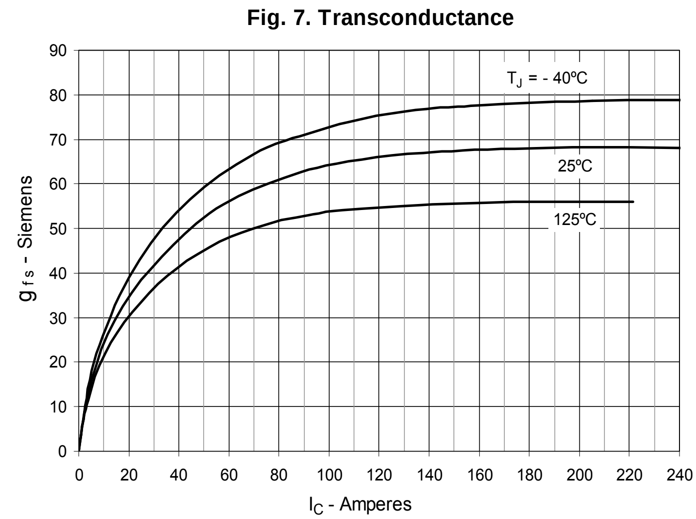


Fig. 7. Transconductance
g f s - Siemens
I_C - Amperes
T_J = - 40ºC
25ºC
125ºC

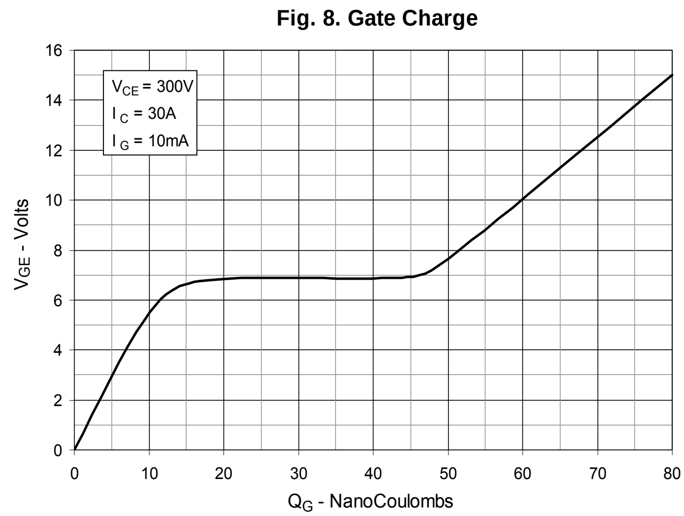


Fig. 8. Gate Charge
V_GE - Volts
Q_G - NanoCoulombs
V_CE = 300V
I_C = 30A
I_G = 10mA

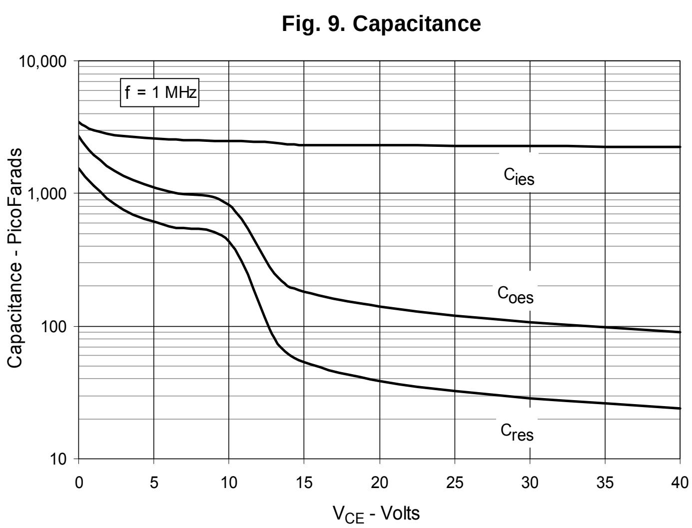


Fig. 9. Capacitance
Capacitance - PicoFarads
V_CE - Volts
f = 1 MHz
C_ies
C_oes
C_res

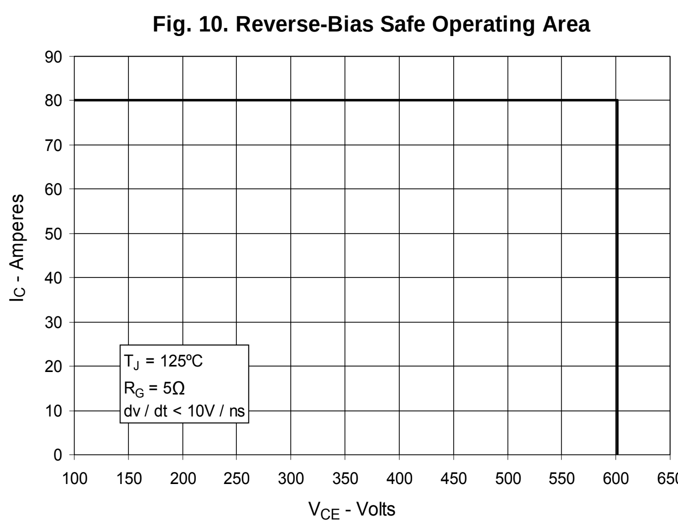


Fig. 10. Reverse-Bias Safe Operating Area
I_C - Amperes
V_CE - Volts
T_J = 125ºC
R_G = 5Ω
dv / dt < 10V / ns

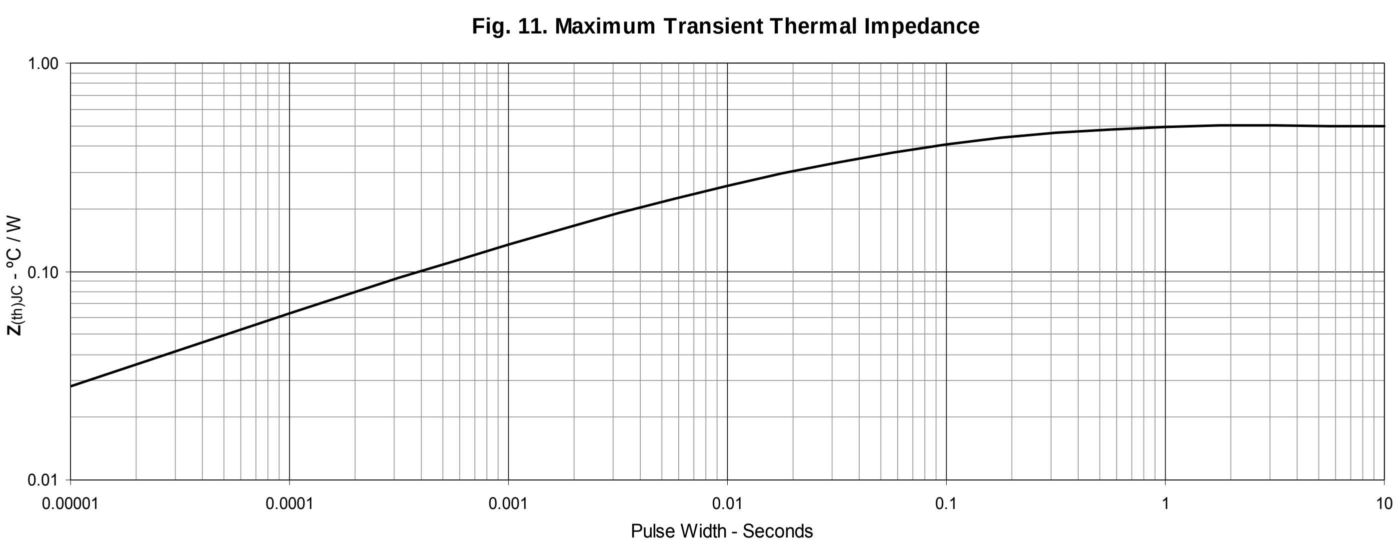


Fig. 11. Maximum Transient Thermal Impedance
Z(th)JC - ºC / W
Pulse Width - Seconds

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

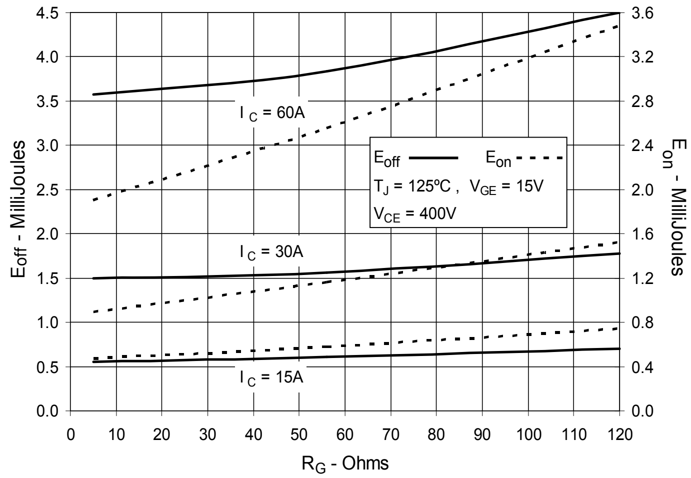


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

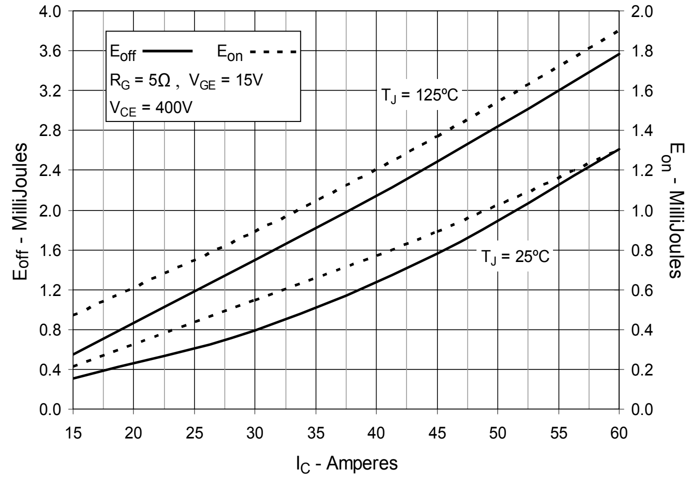


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

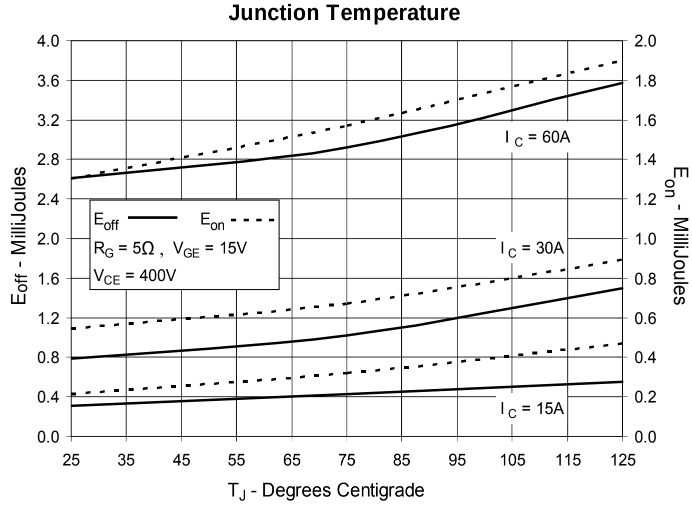


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

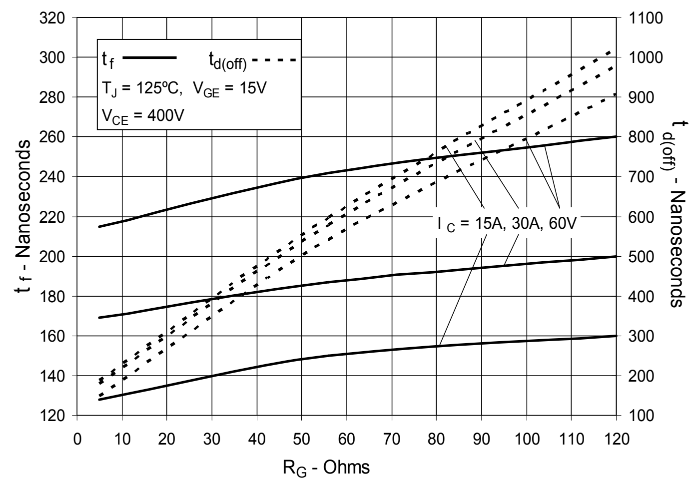


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

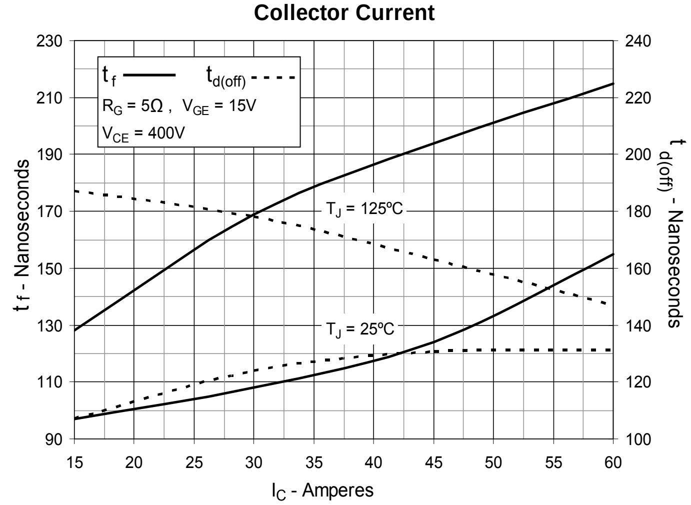


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

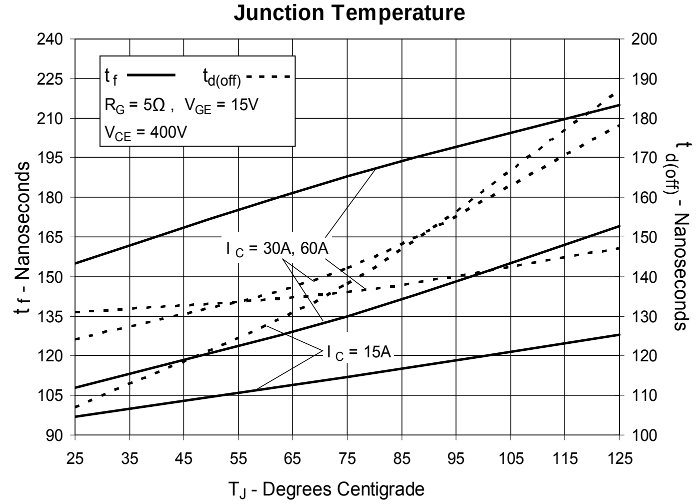


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

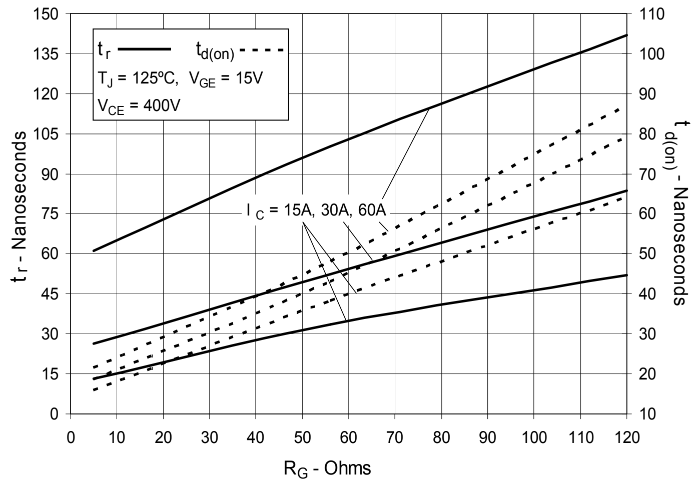


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

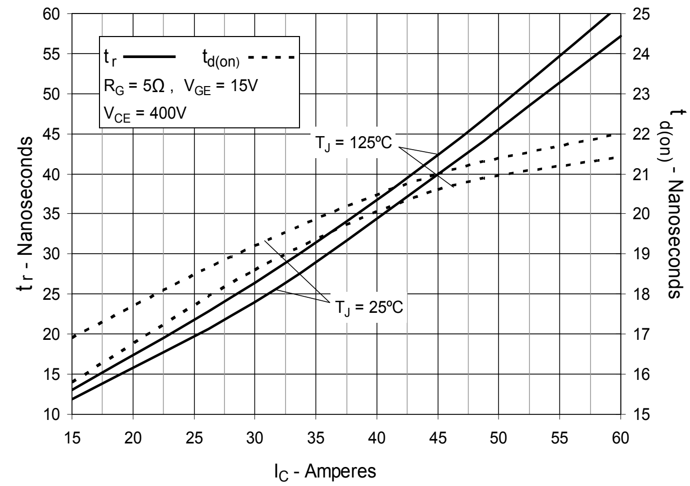


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature