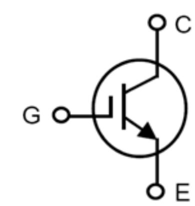
Advance Technical Information

1200V XPT™ GenX4™ IGBT

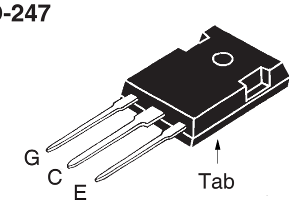
IXYH30N120C4

V_{CES} = 1200V
I_{C110} = 30A
$V_{CE(sat)}$ ≤ 2.4V
$t_{fi(typ)}$ = 53ns

High-Speed Low-Vsat PT IGBT for up to 20-50kHz Switching



TO-247



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 175°C	1200	V
V_{CGR}	T_J = 25°C to 175°C, R_{GE} = 1MΩ	1200	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	94	A
I_{C110}	T_C = 110°C	30	A
I_{CM}	T_C = 25°C, 1ms	166	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 5Ω Clamped Inductive Load	I_{CM} = 60 $V_{CE} \leq 0.8 \bullet V_{CES}$	A
P_C	T_C = 25°C	500	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	°C
M_d	Mounting Torque	1.13/10	Nm/lb.in.
Weight		6	g

Features

- Optimized for Low Switching Losses
- Positive Thermal Coefficient of Vce(sat)
- 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	1200			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	4.0		6.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			10	μA
	T_J = 150°C			500	μA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 25A, V_{GE} = 15V, Note 1		2.0	2.4	V
	T_J = 150°C		2.4		V

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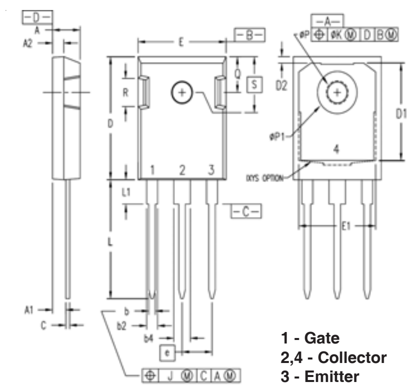
Symbol	Test Conditions (TJ = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	I_C = 25A, V_{CE} = 10V, Note 1	9.0	15.5	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1150	pF
C_{oes}			70	pF
C_{res}			40	pF
$Q_{g(on)}$	I_C = 25A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		57	nC
Q_{ge}			10	nC
Q_{gc}			26	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		18	ns
t_{ri}	I_C = 25A, V_{GE} = 15V		58	ns
E_{on}	V_{CE} = 0.8 • V_{CES}, R_G = 5Ω		4.8	mJ
$t_{d(off)}$	Note 2		205	ns
t_{fi}			53	ns
E_{off}			1.5	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		16	ns
t_{ri}	I_C = 25A, V_{GE} = 15V		40	ns
E_{on}	V_{CE} = 0.8 • V_{CES}, R_G = 5Ω		5.6	mJ
$t_{d(off)}$	Note 2		260	ns
t_{fi}			100	ns
E_{off}			2.7	mJ
R_{thJC}				0.30 °C/W
R_{thCS}			0.21	°C/W

TO-247 (IXYH) Outline



1 - Gate
2,4 - Collector
3 - Emitter

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.190	.205	4.83	5.21
A1	.090	.100	2.29	2.54
A2	.075	.085	1.91	2.16
b	.045	.055	1.14	1.40
b2	.075	.087	1.91	2.20
b4	.115	.126	2.92	3.20
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
D1	.650	.690	16.51	17.53
D2	.035	.050	0.89	1.27
E	.620	.635	15.75	16.13
E1	.545	.565	13.84	14.35
e	.215 BSC		5.45 BSC	
J	--	.010	--	0.25
K	--	.025	--	0.64
L	.780	.810	19.81	20.57
L1	.150	.170	3.81	4.32
øP	.140	.144	3.55	3.65
øP1	.275	.290	6.99	7.37
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.242 BSC		6.15 BSC	

Notes:

1. Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Switching times & energy losses may increase for higher V_{CE}(clamp), T_J or R_G.

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 @ $T_J = 25^oC$

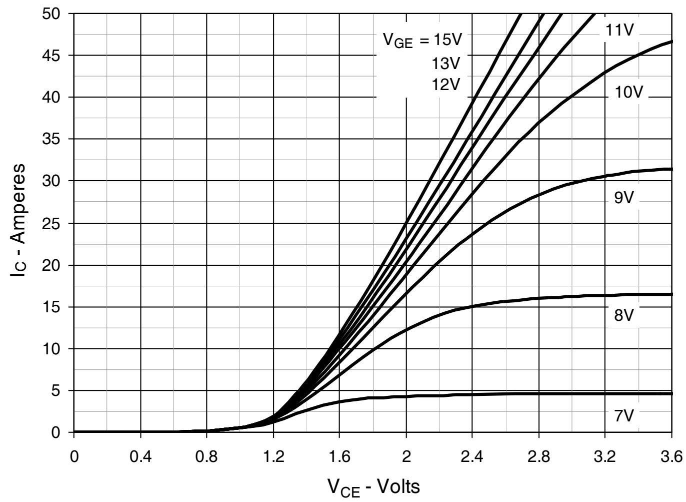


Fig. 2. Extended Output Characteristics @ $T_J = 25^oC$

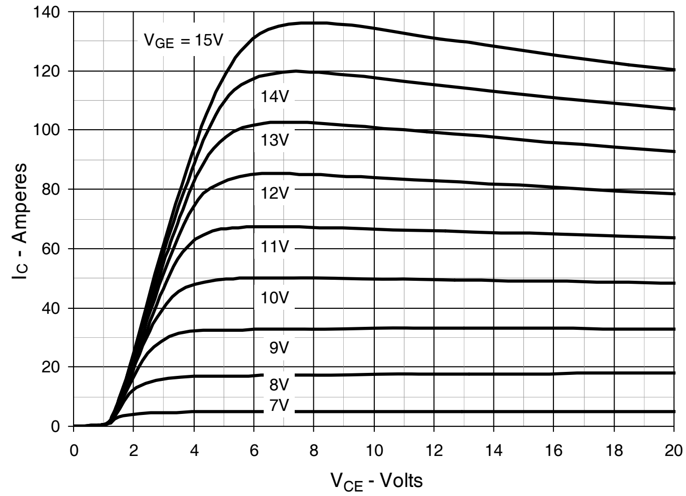


Fig. 3. Output Characteristics @ $T_J = 150^oC$

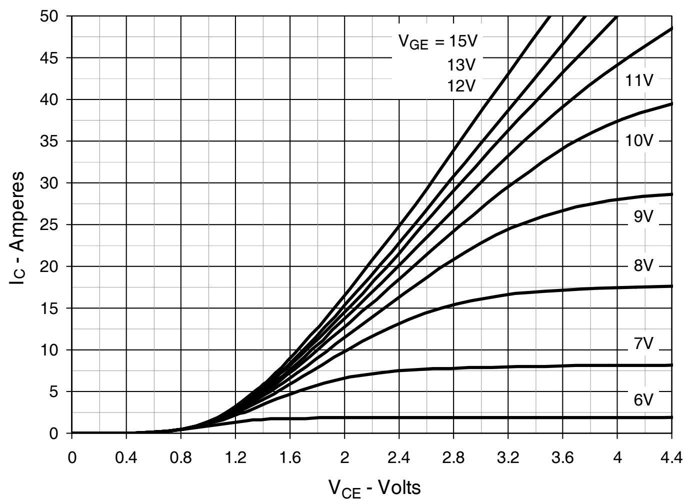


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

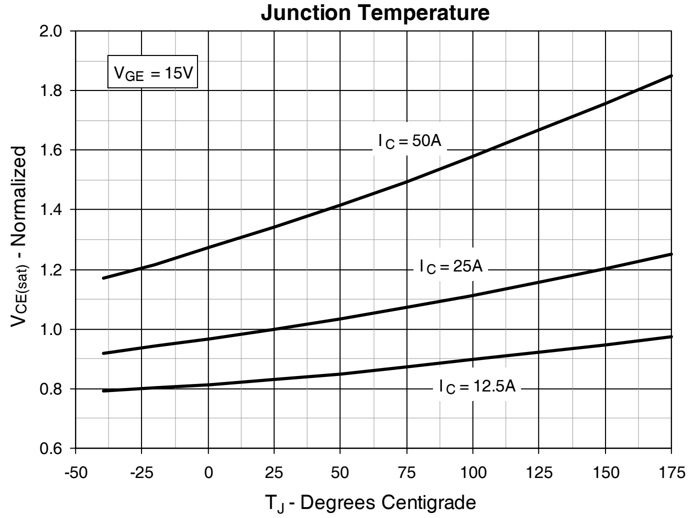


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

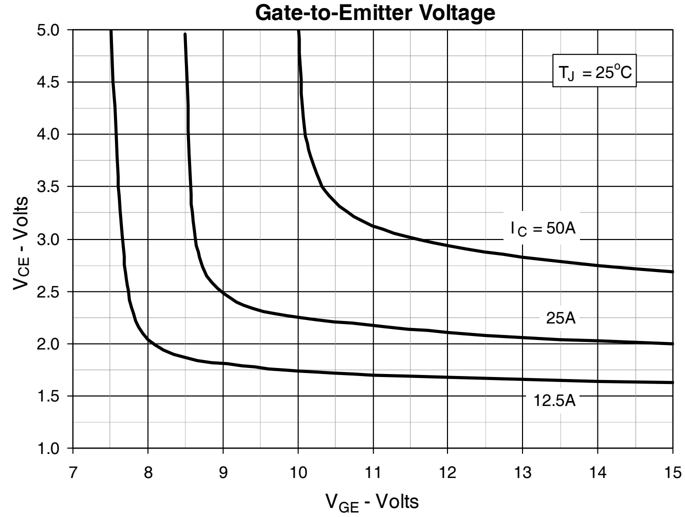


Fig. 6. Input Admittance

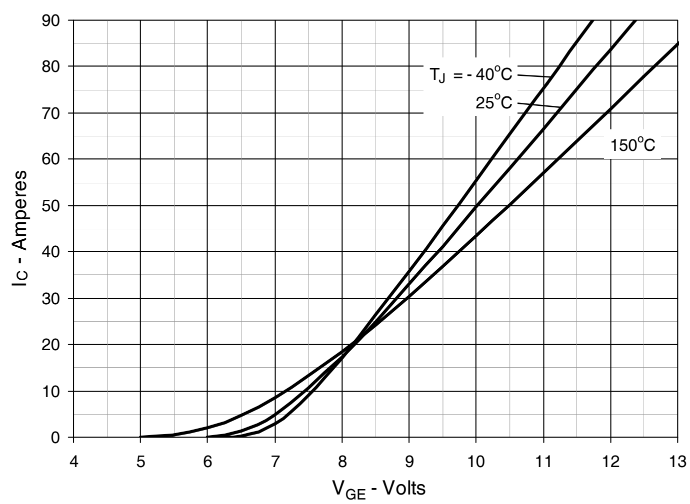


Fig. 7. Transconductance

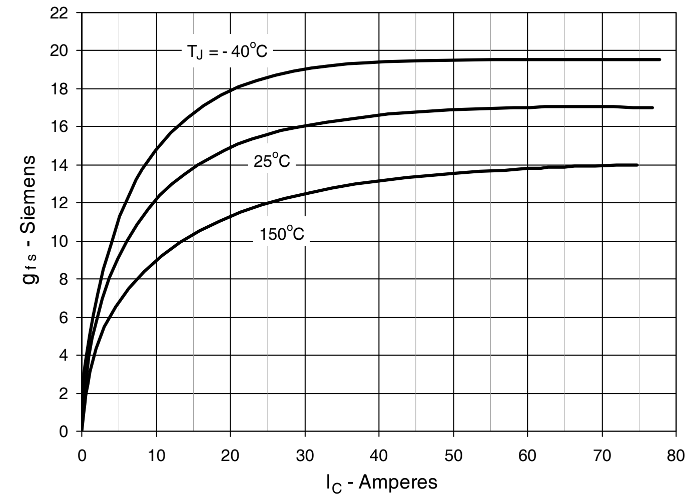


Fig. 8. Gate Charge

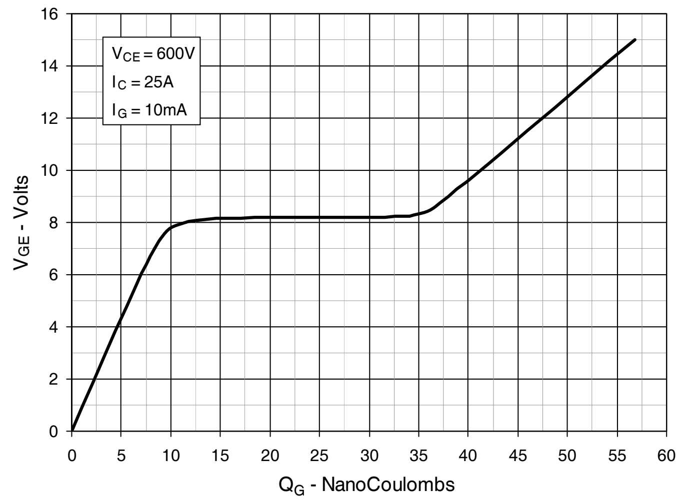


Fig. 9. Capacitance

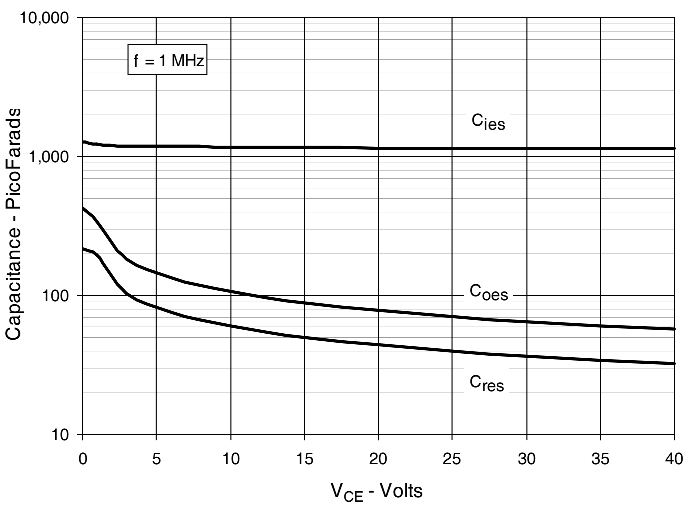


Fig. 10. Reverse-Bias Safe Operating Area

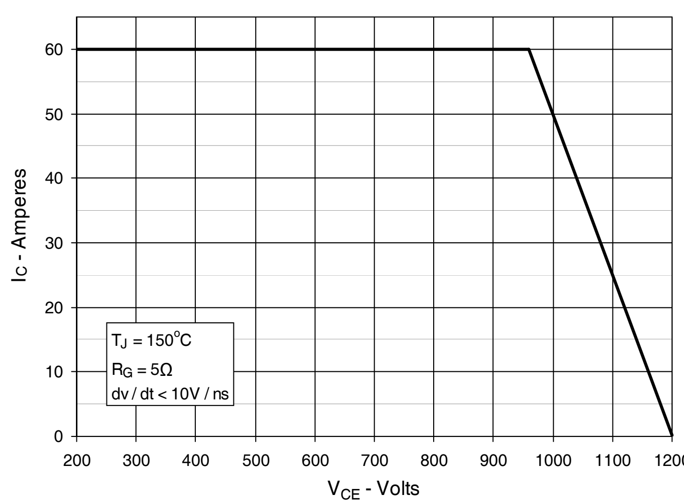


Fig. 11. Maximum Transient Thermal Impedance

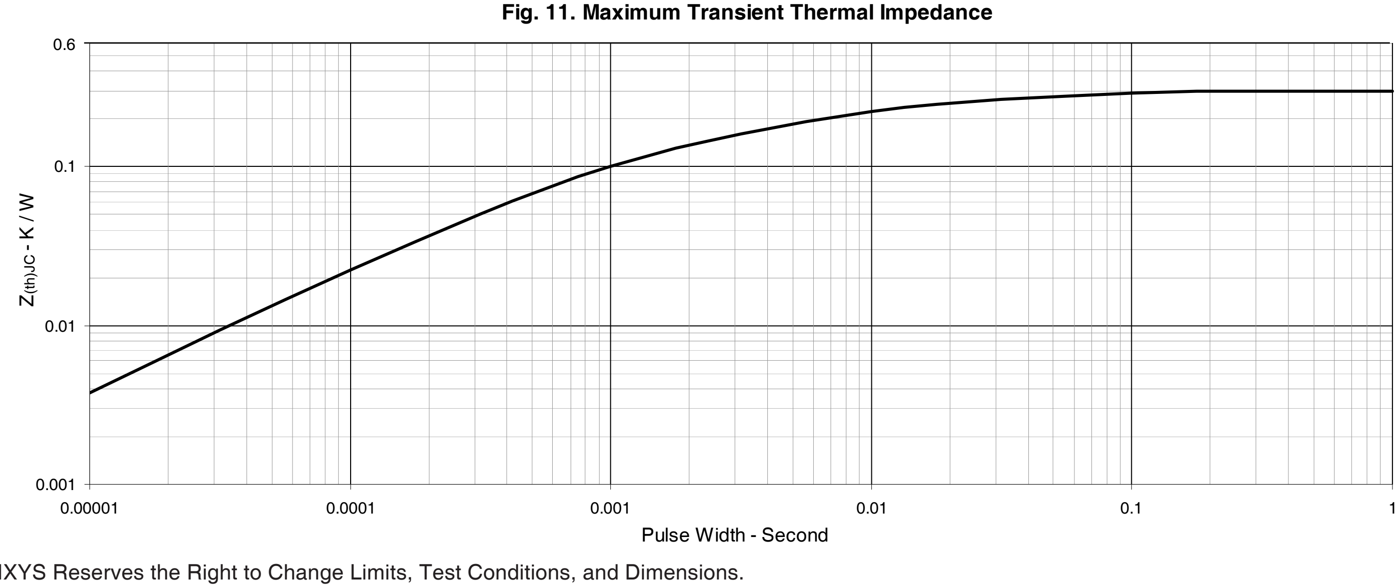


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

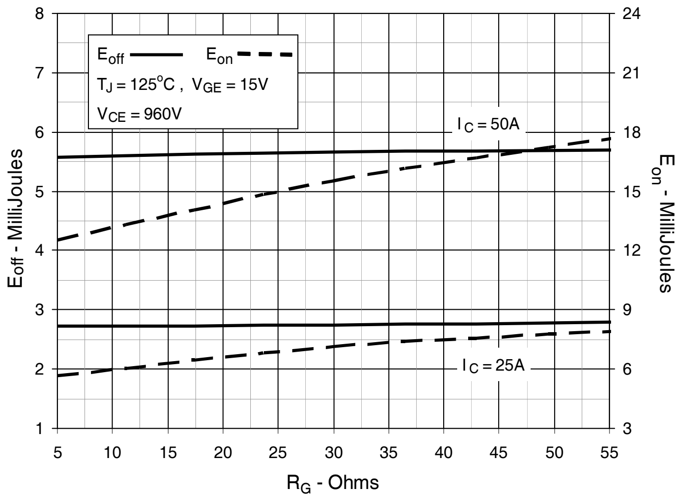


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

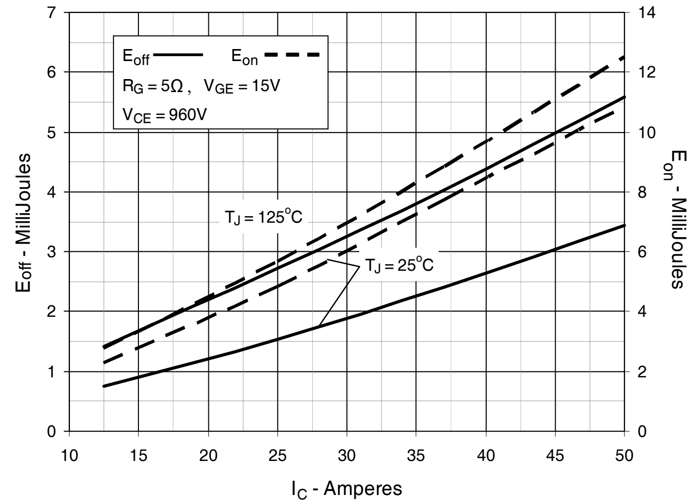


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

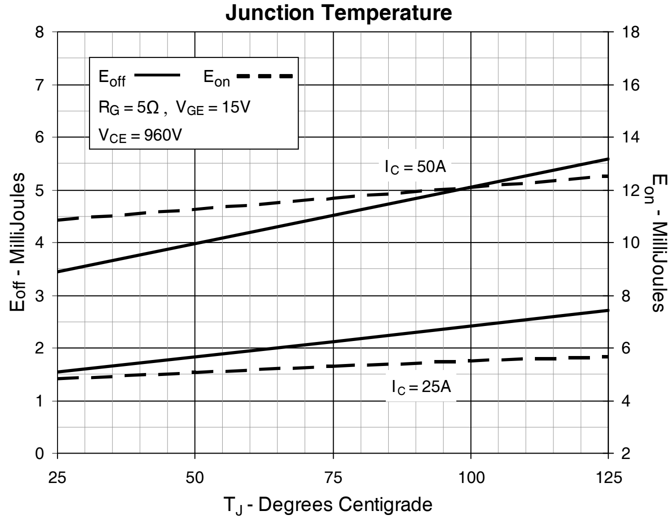


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

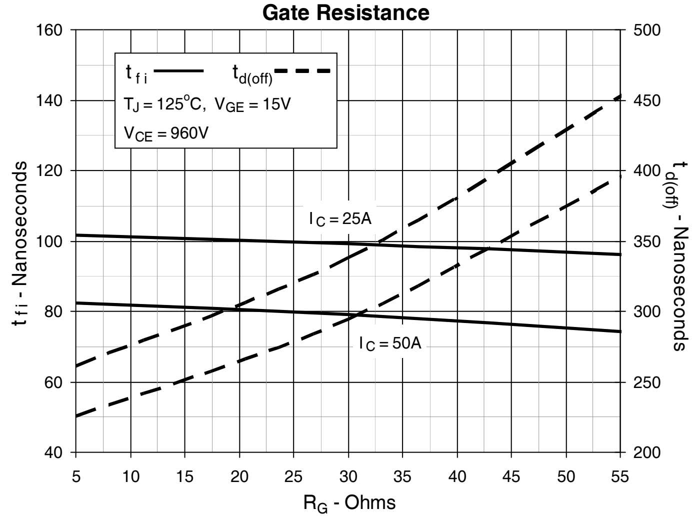


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

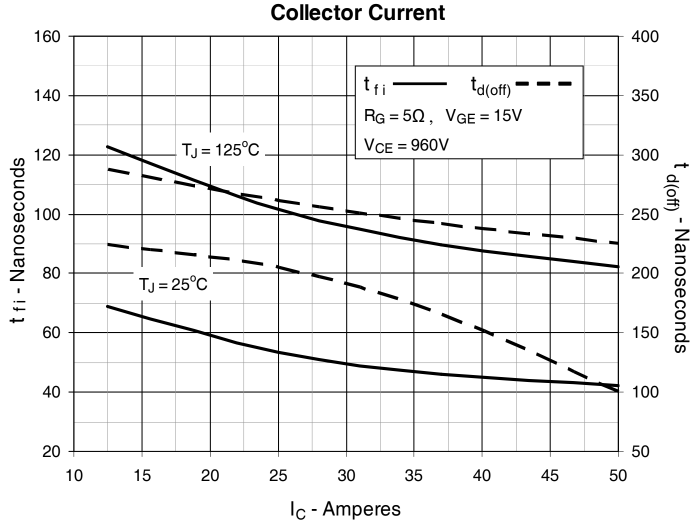


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

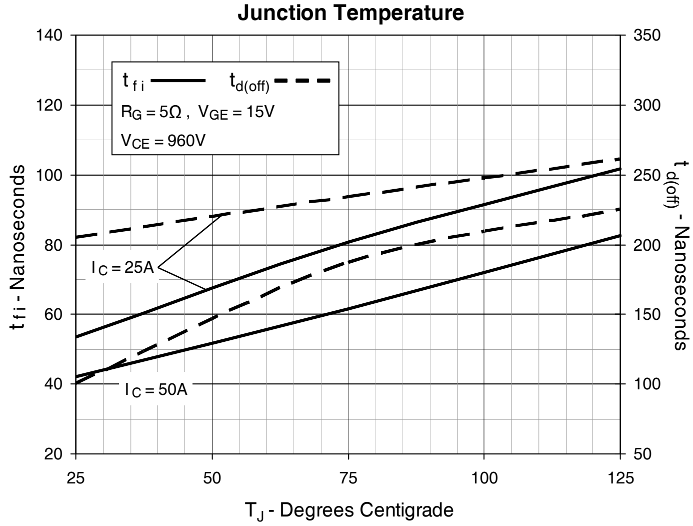


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

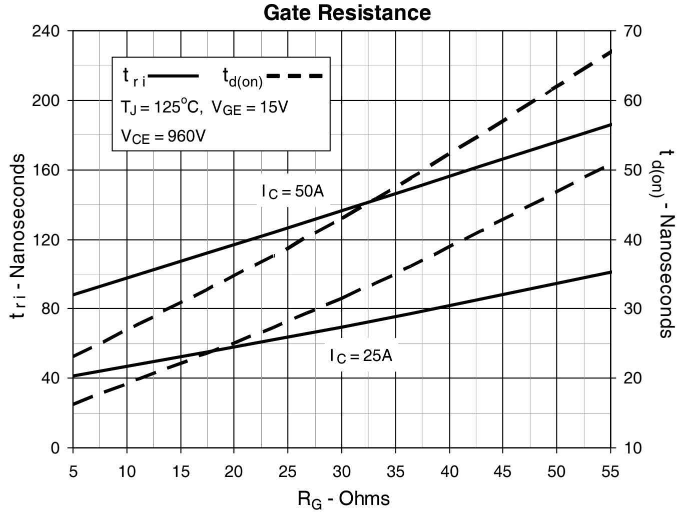


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

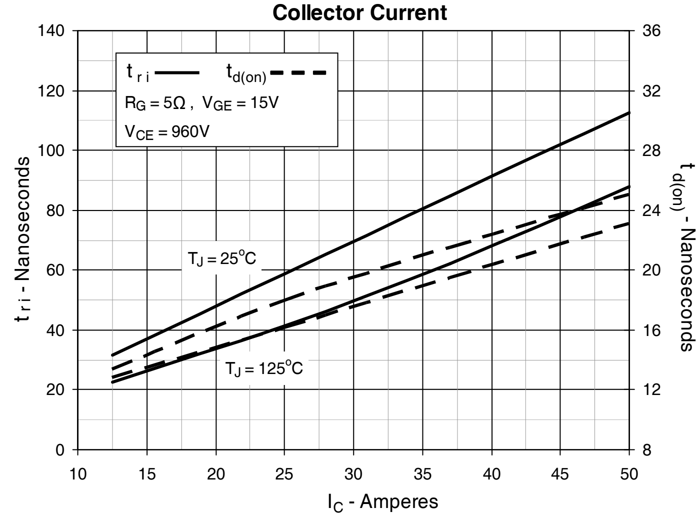
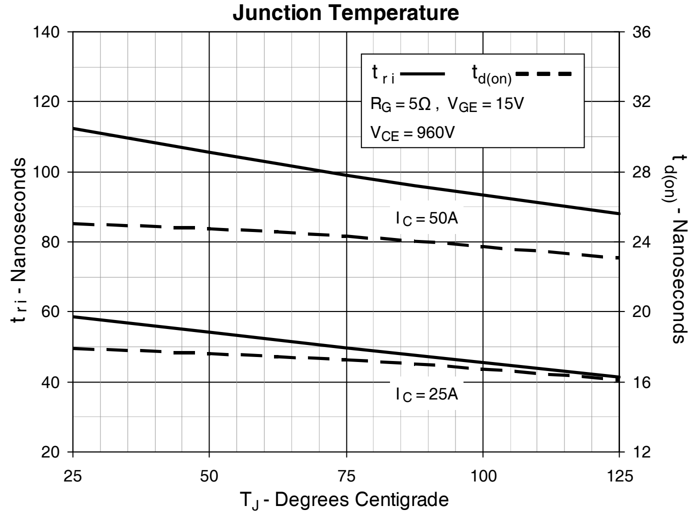


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



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A Littelfuse Technology