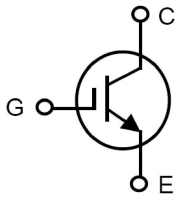
XPT™ 650V IGBT GenX4™

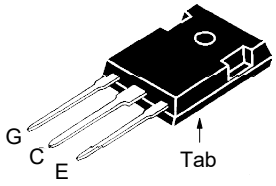
IXXH30N65B4

V_{CES} = 650V
I_{C110} = 30A
$V_{CE(sat)}$ ≤ 2.0V
$t_{fi(typ)}$ = 50ns

Extreme Light Punch Through
IGBT for 5-30 kHz 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	650	V
V_{CGR}	T_J = 25°C to 175°C, R_{GE} = 1MΩ	650	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C (Chip Capability)	70	A
I_{C110}	T_C = 110°C	30	A
I_{CM}	T_C = 25°C, 1ms	146	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 15Ω Clamped Inductive Load	I_{CM} = 60 @$V_{CE} \leq V_{CES}$	A
t_{sc} **(SCSOA)**	V_{GE} = 15V, V_{CE} = 360V, T_J = 150°C R_G = 82Ω, Non Repetitive	10	μs
P_C	T_C = 25°C	230	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_L	Maximum Lead Temperature for Soldering 1.6 mm (0.062 in.) from Case for 10s	300	°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	650			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			250	μA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 30A, V_{GE} = 15V, Note 1		1.66	2.10	V
	T_J = 150°C		1.87		V

Features

- Optimized for 5-30kHz Switching
- Square RBSOA
- Short Circuit Capability
- International Standard Package

Advantages

- High Power Density
- Extremely Rugged
- Low Gate Drive Requirement

Applications

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

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Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.
g_{fs}	I_C = 30A, V_{CE} = 10V, Note 1	25	42	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1460	pF
C_{oes}			70	pF
C_{res}			22	pF
$Q_{g(on)}$	I_C = 30A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		52	nC
Q_{ge}			10	nC
Q_{gc}			22	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		20	ns
t_{ri}	I_C = 30A, V_{GE} = 15V		65	ns
E_{on}	V_{CE} = 400V, R_G = 15Ω		1.04	mJ
$t_{d(off)}$	Note 2		150	ns
t_{fi}			50	ns
E_{off}			0.73	mJ
$t_{d(on)}$	**Inductive load, T_J = 150°C**		19	ns
t_{ri}	I_C = 30A, V_{GE} = 15V		46	ns
E_{on}	V_{CE} = 400V, R_G = 15Ω		1.87	mJ
$t_{d(off)}$	Note 2		146	ns
t_{fi}			60	ns
E_{off}			1.07	mJ
R_{thJC}				0.65 °C/W
R_{thCS}			0.21	°C/W

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.

Littelfuse reserves the right to change limits, test conditions, and dimensions.

IXYS MOSFETs and IGBTs are covered by one or more of the following U.S. patents: 4,835,592 4,860,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ T_J = 25ºC

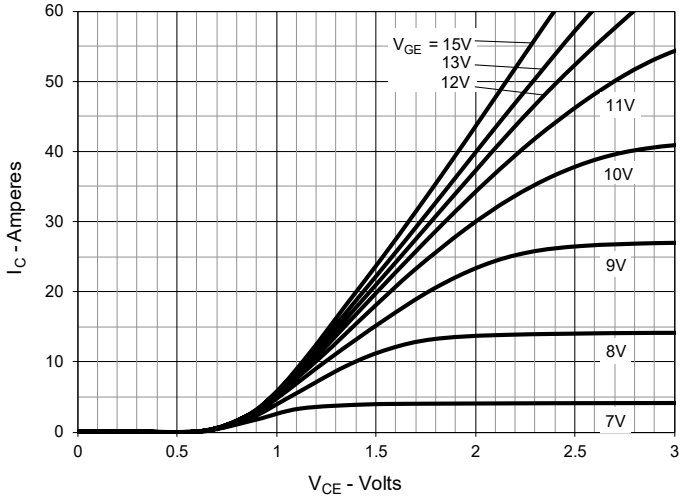


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

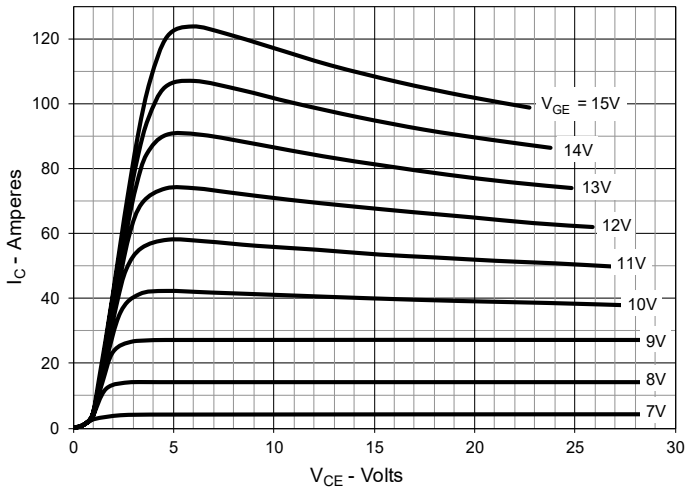


Fig. 3. Output Characteristics @ T_J = 150ºC

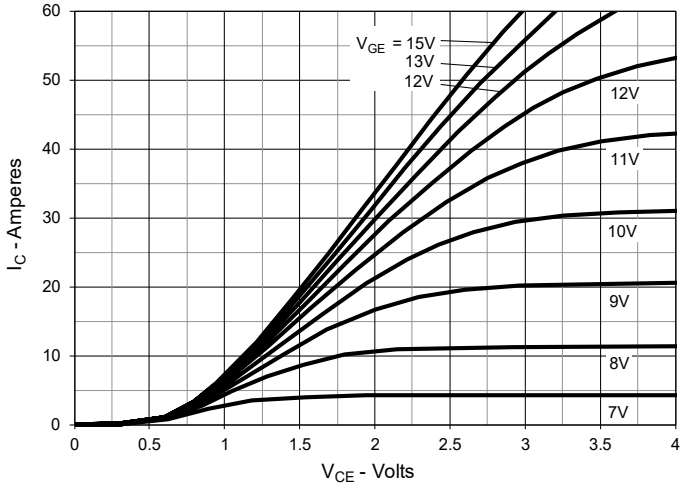


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

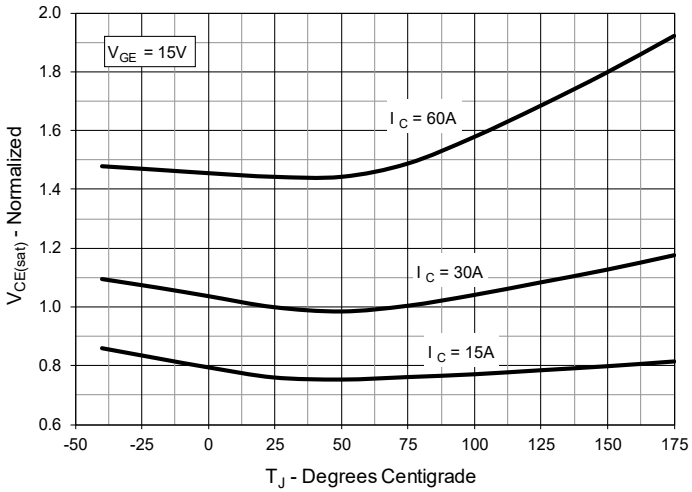


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

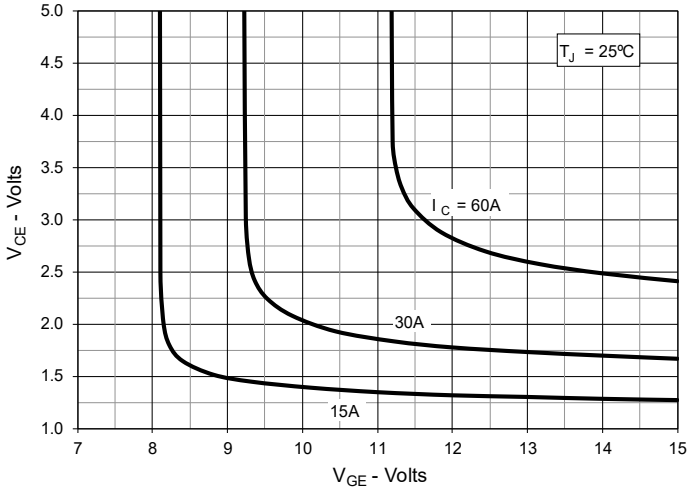
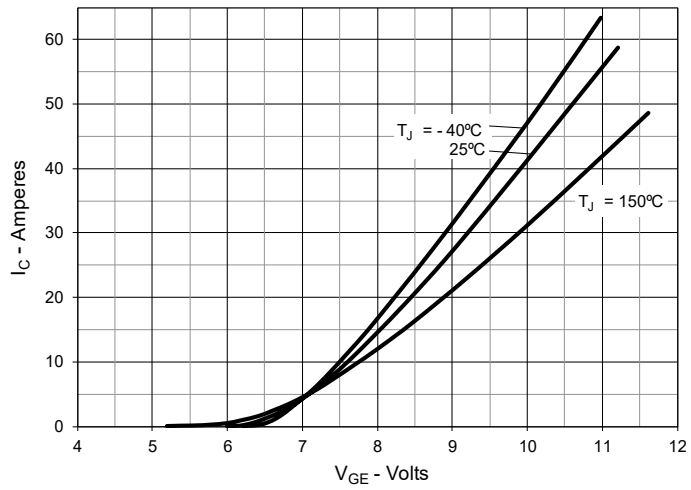


Fig. 6. Input Admittance



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Fig. 7. Transconductance

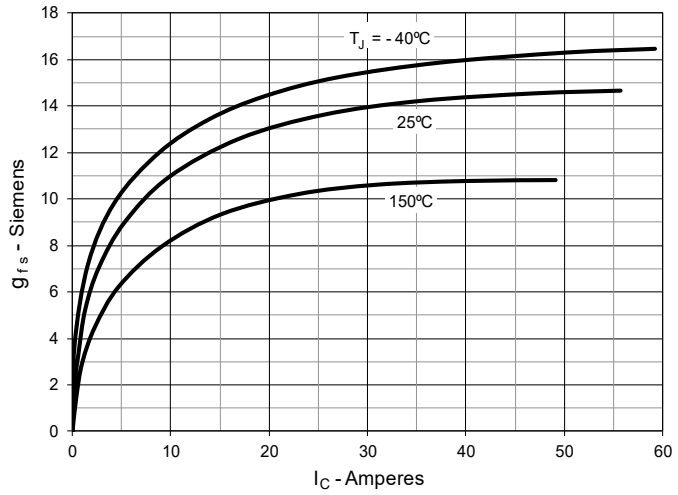


Fig. 8. Gate Charge

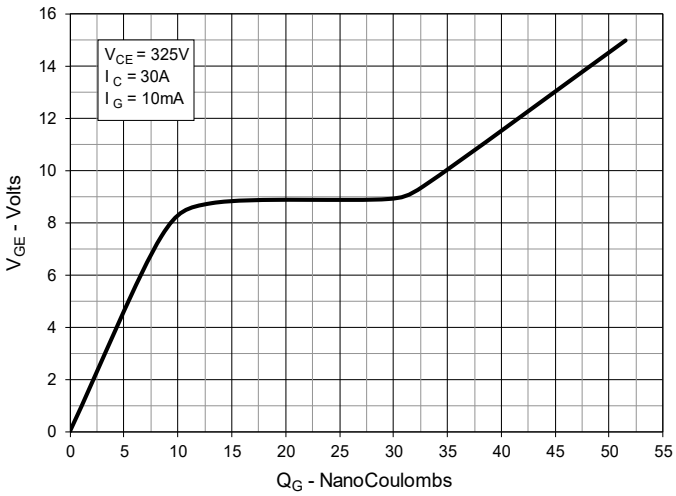


Fig. 9. Capacitance

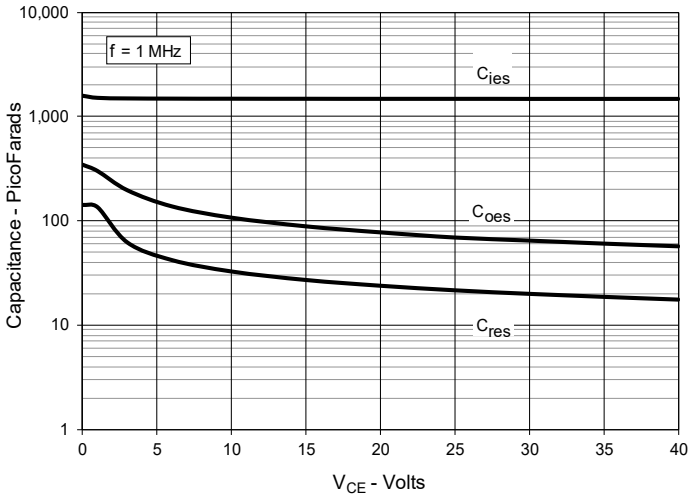


Fig. 10. Reverse-Bias Safe Operating Area

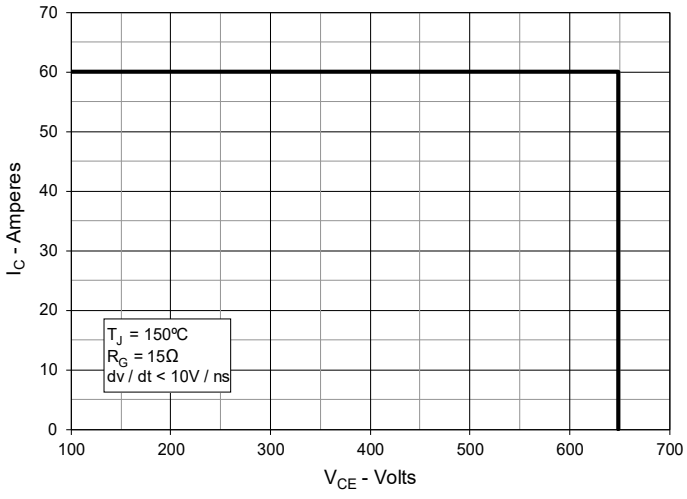
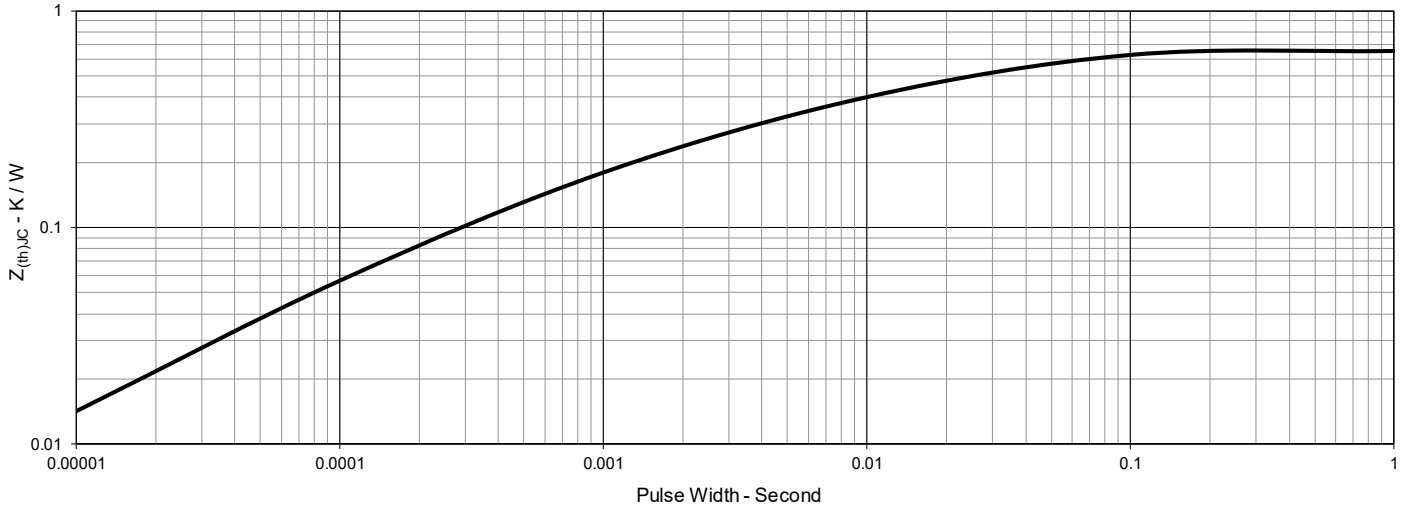


Fig. 11. Maximum Transient Thermal Impedance



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

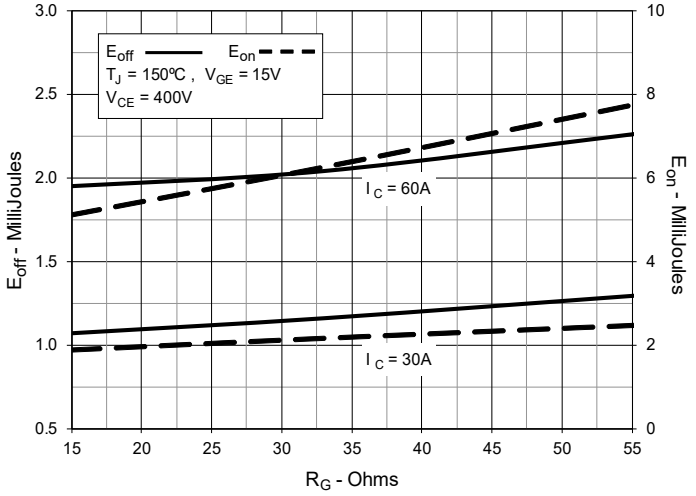


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

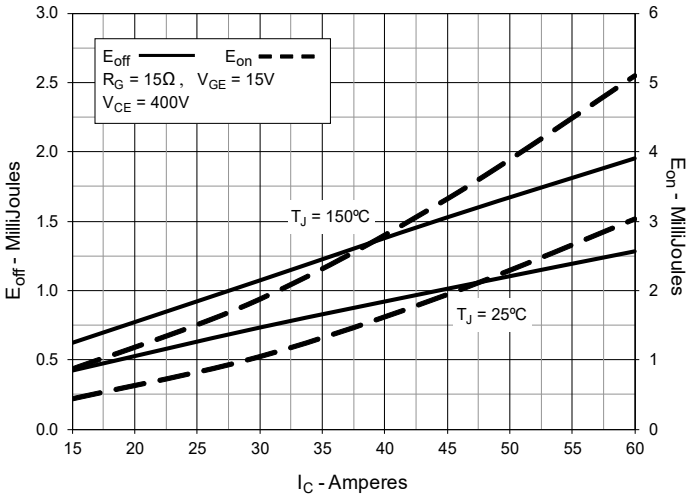


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

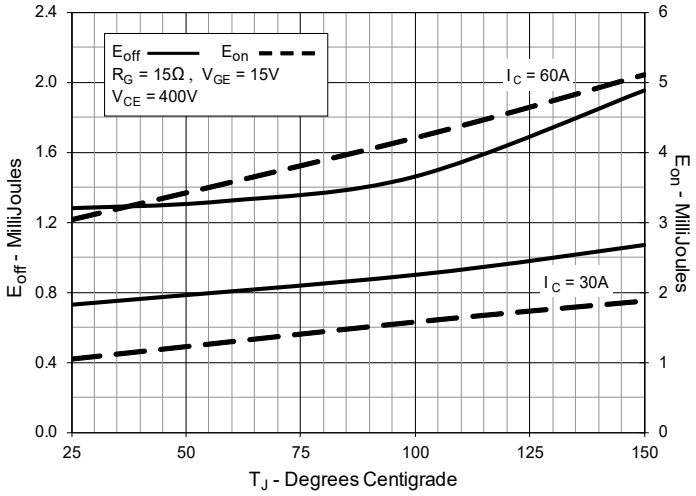


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

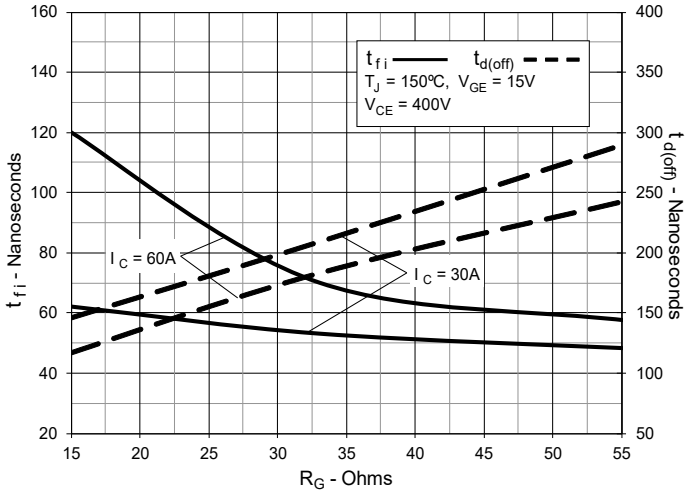


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

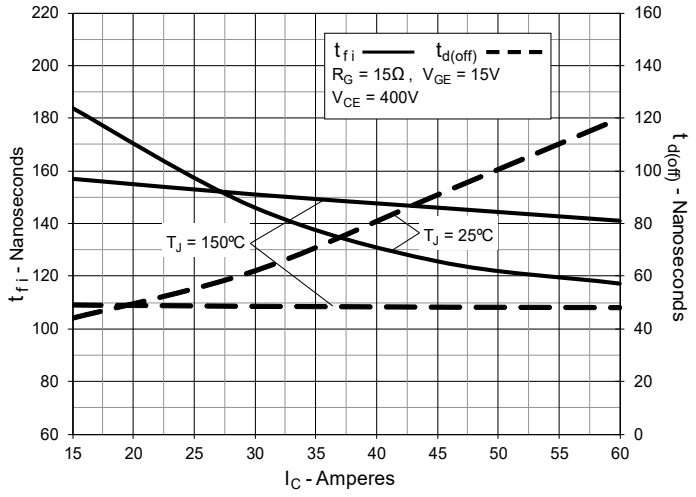
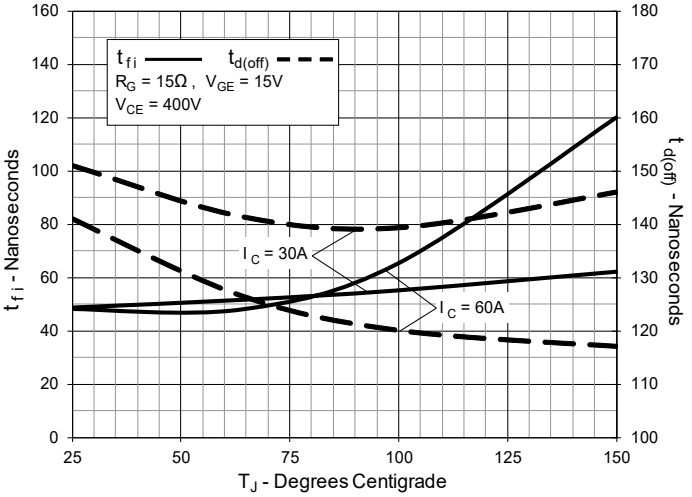


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature



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

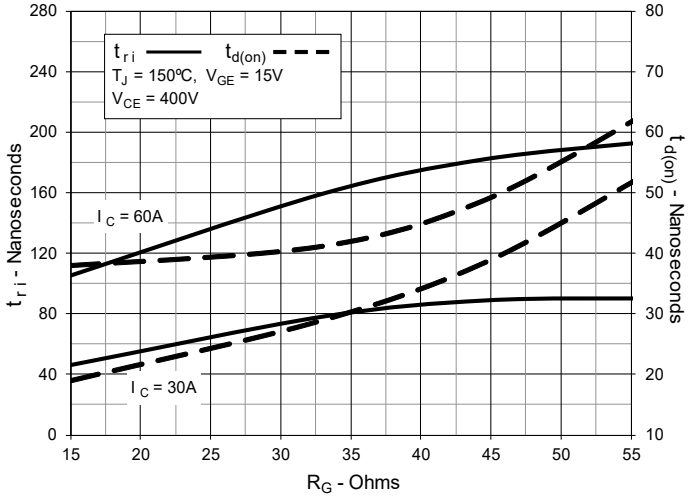


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

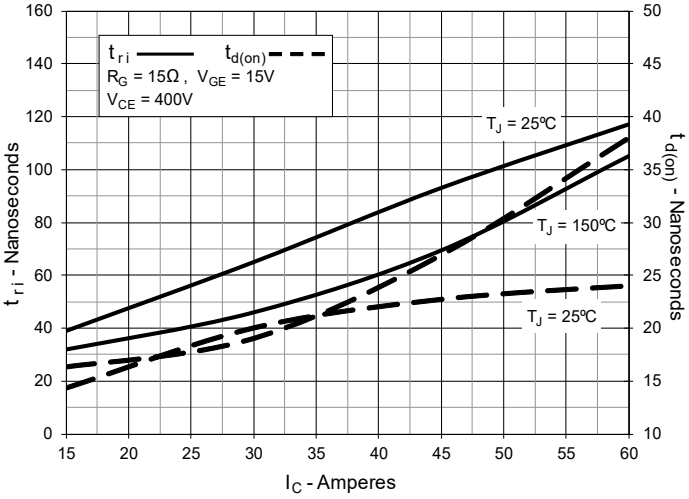
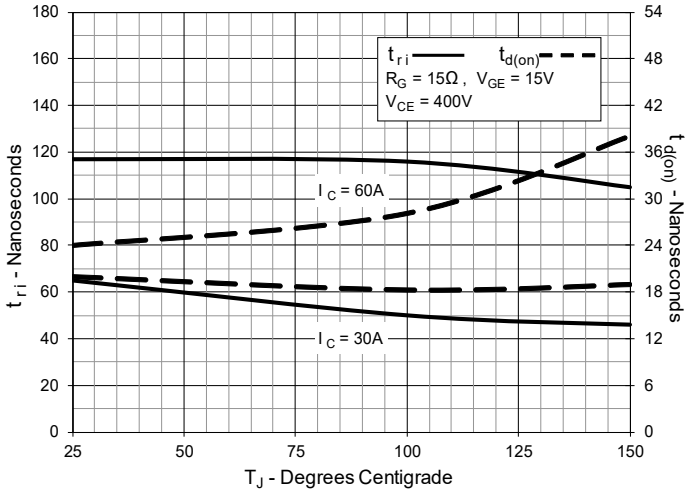
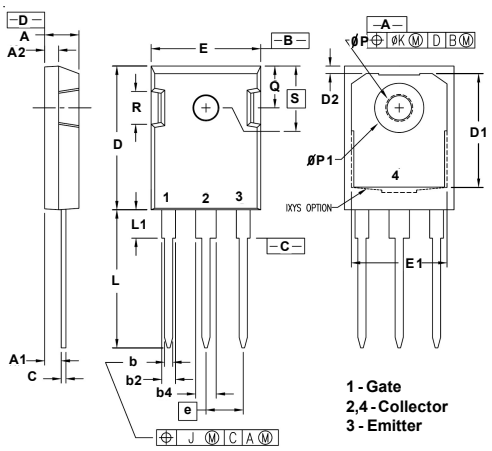


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



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TO-247 Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	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	

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