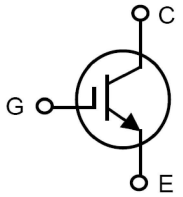
IXYS

1200V XPT™ Gen 4 IGBT

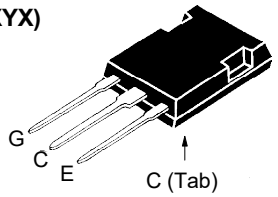
IXYX110N120C4

V_{CES} = 1200V
I_{C110} = 110A
$V_{CE(sat)}$ ≤ 2.40V
$t_{fi(typ)}$ = 37ns

High Speed IGBT for
20-50kHz Switching



PLUS247
(IXYX)



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 (Chip Capability)	310	A
I_{LRMS}	Terminal Current Limit	160	A
I_{C110}	T_C= 110°C	110	A
I_{CM}	T_C = 25°C, 1ms	740	A
SSOA	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 2Ω	I_{CM} = 220	A
(RBSOA)	Clamped Inductive Load	0.8 • V_{CES}	V
P_C	T_C = 25°C	1360	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 (0.062 in.) from Case for 10s	260	°C
F_C	Mounting Force	20..120 /4.5..27	N/lb
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	1200			V
$V_{GE(th)}$	I_C = 3mA, V_{CE} = V_{GE}	4.5		6.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			25	μA
	T_J = 150°C			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = I_{C110}, V_{GE} = 15V, Note 1		1.90	2.40	V
	T_J = 150°C		2.27		V

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.
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	40	68	S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		5420	pF
C_{oes}			335	pF
C_{res}			220	pF
$Q_{g(on)}$	$I_C = I_{C110}$, V_{GE} = 15V, $V_{CE} = 0.5 \bullet V_{CES}$		330	nC
Q_{ge}			55	nC
Q_{gc}			138	nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		40	ns
t_{ri}	I_C = 50A, V_{GE} = 15V		48	ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 2\Omega$		3.6	mJ
$t_{d(off)}$	Note 2		320	ns
t_{fi}			37	ns
E_{off}			1.9	mJ
$t_{d(on)}$	**Inductive load, T_J = 150°C**		36	ns
t_{ri}	I_C = 50A, V_{GE} = 15V		37	ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 2\Omega$		5.3	mJ
$t_{d(off)}$	Note 2		326	ns
t_{fi}			90	ns
E_{off}			3.2	mJ
R_{thJC}				0.11 °C/W
R_{thCS}			0.15	°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.

Fig. 1. Output Characteristics @ T_J = 25ºC

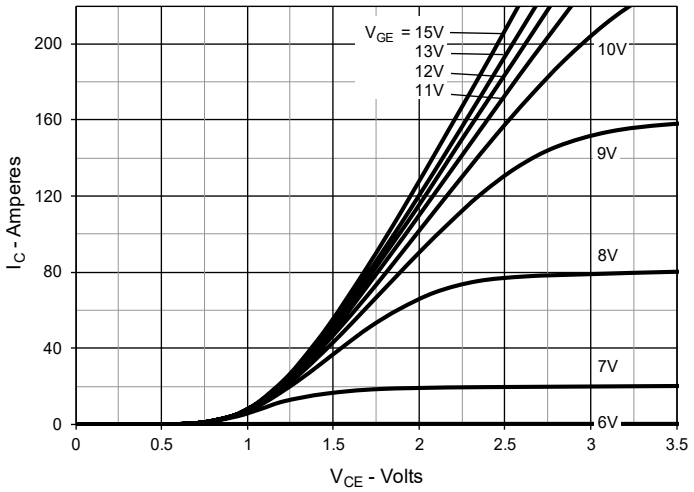


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

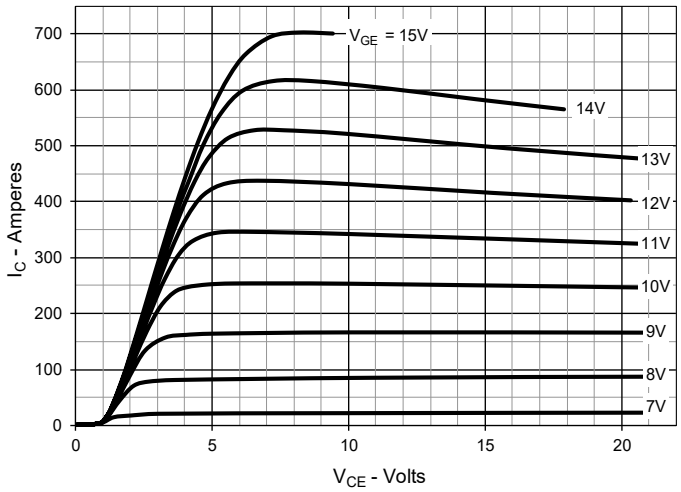


Fig. 3. Output Characteristics @ T_J = 150ºC

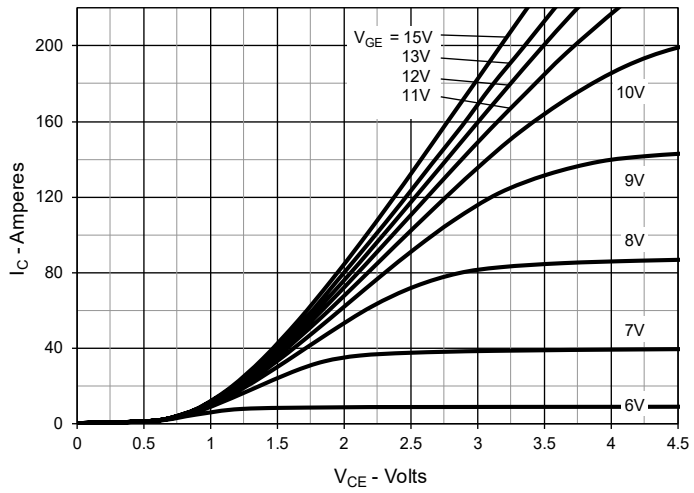


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

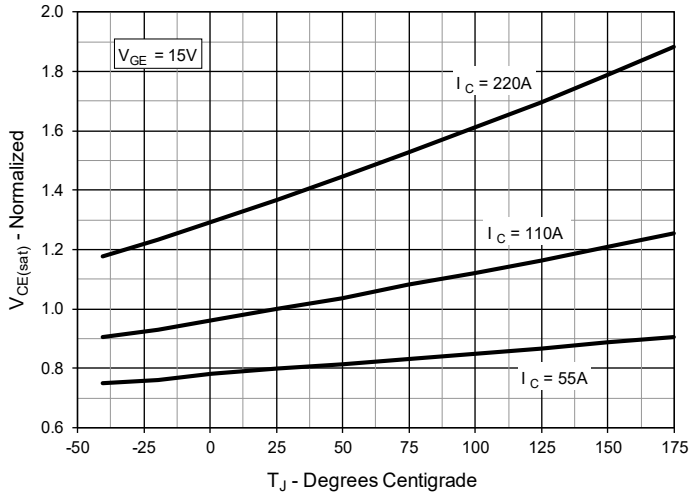


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

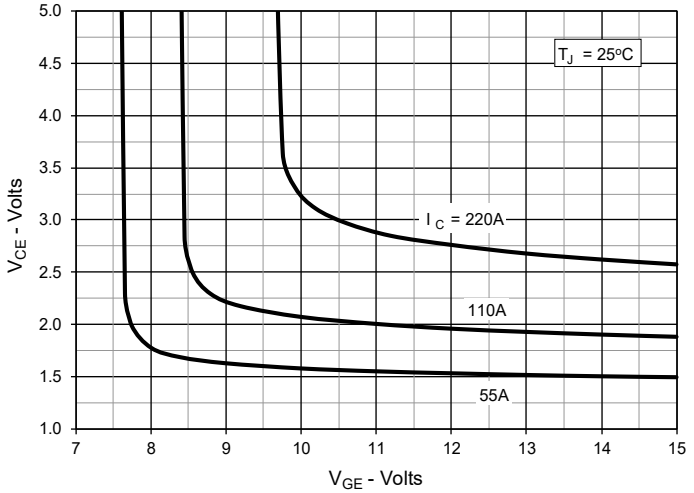


Fig. 6. Input Admittance

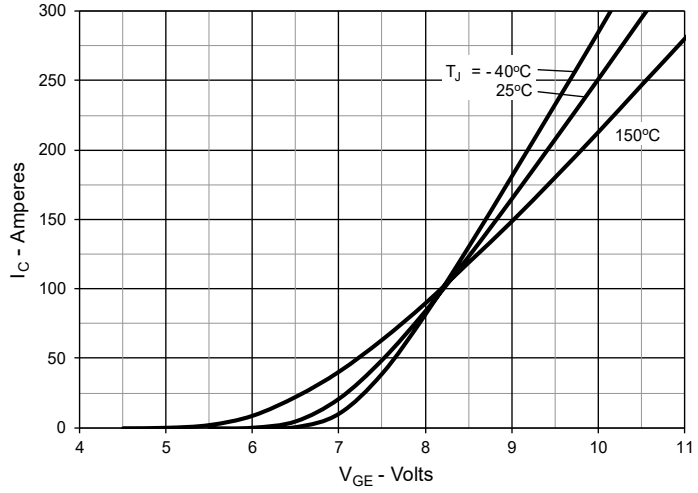


Fig. 7. Transconductance

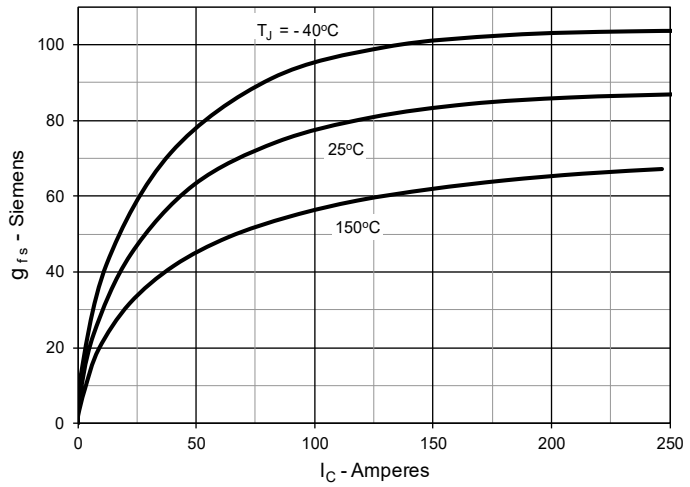


Fig. 8. Gate Charge

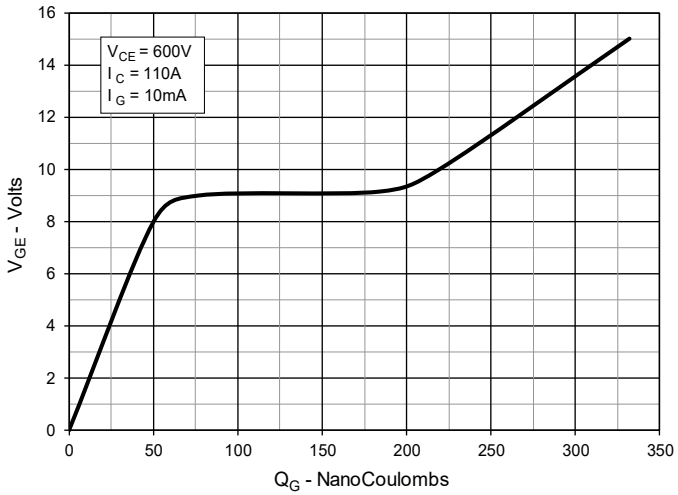


Fig. 9. Capacitance

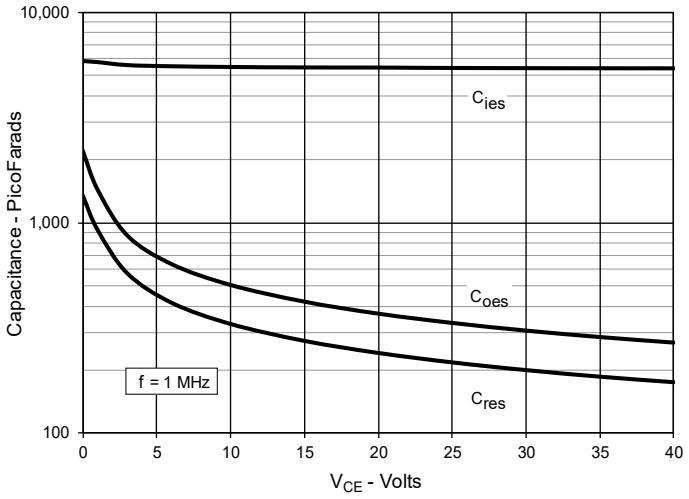


Fig. 10. Reverse-Bias Safe Operating Area

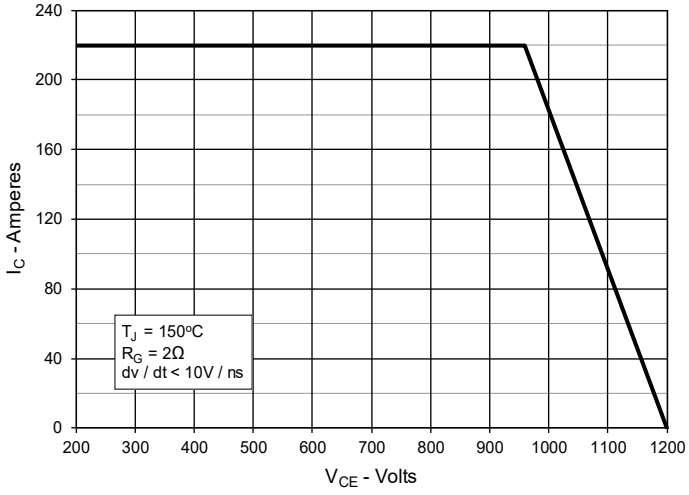


Fig. 11. Maximum Transient Thermal Impedance

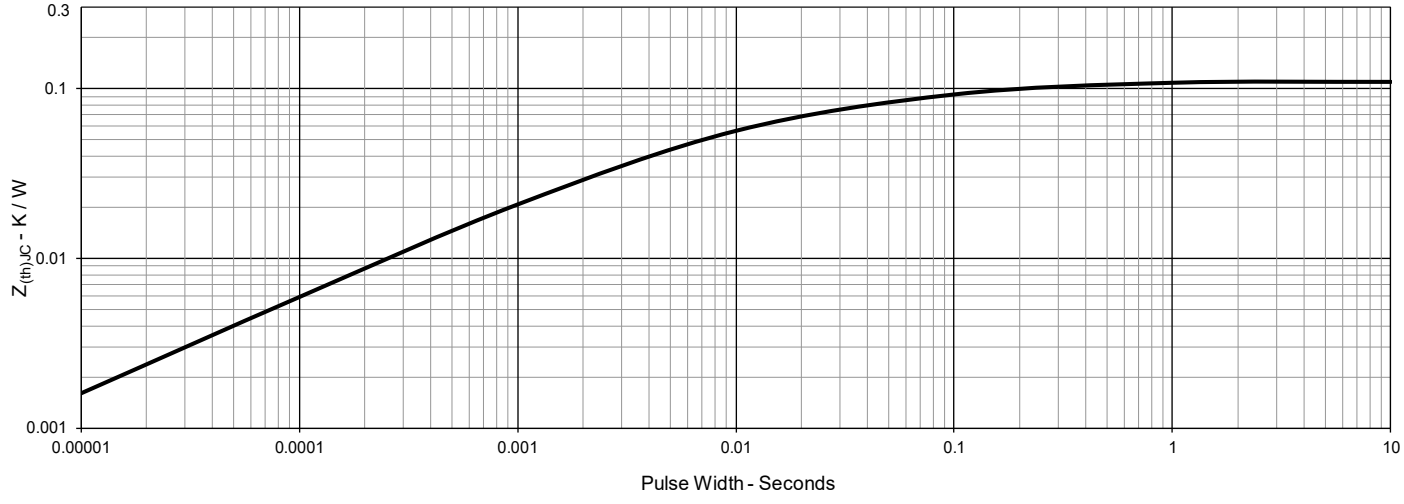


Fig. 12. Inductive Switching Energy Loss vs. Collector Current

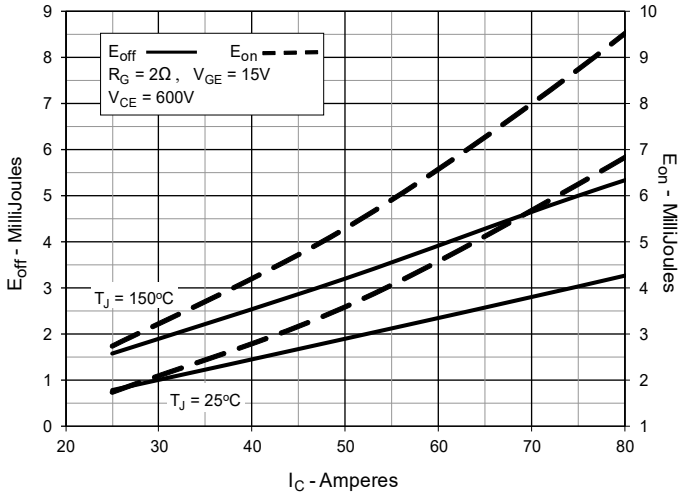


Fig. 13. Inductive Switching Energy Loss vs. Collector-Emitter Voltage

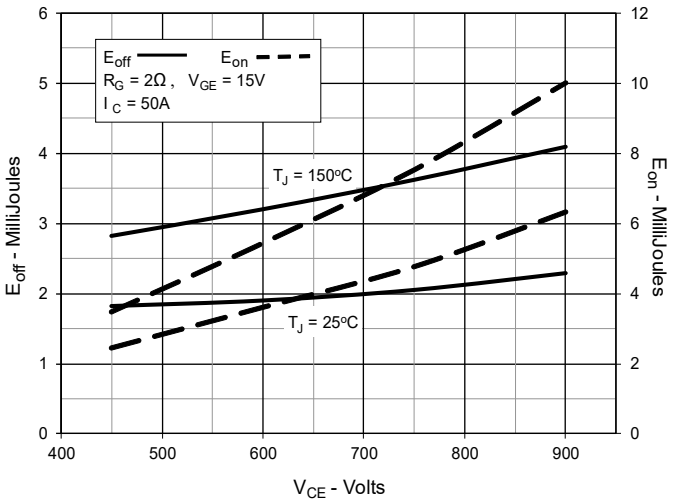


Fig. 14. Inductive Switching Energy Loss vs. Gate Resistance

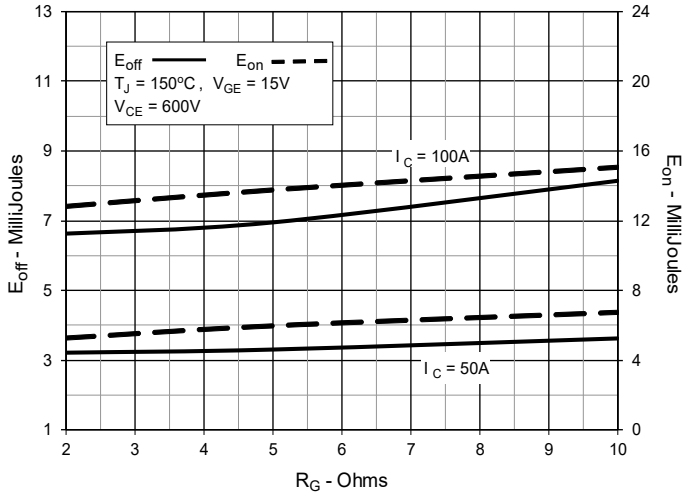


Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

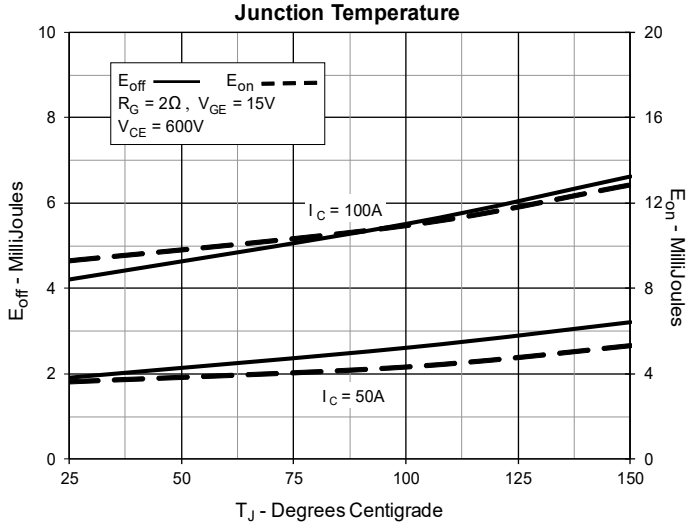


Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

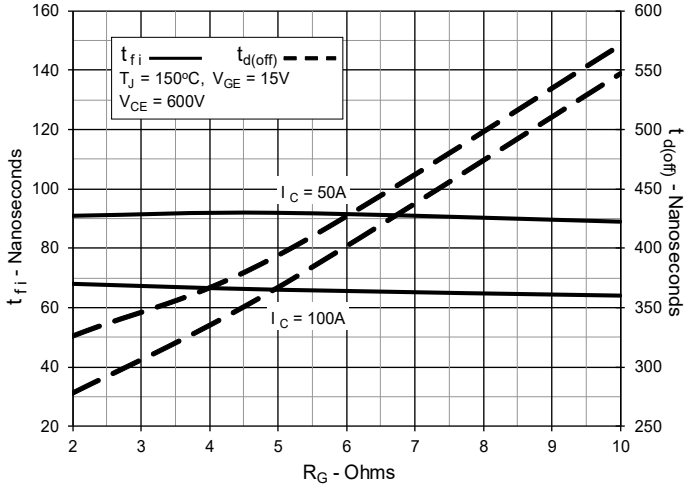


Fig. 17. Inductive Turn-off Switching Times vs. Collector Current

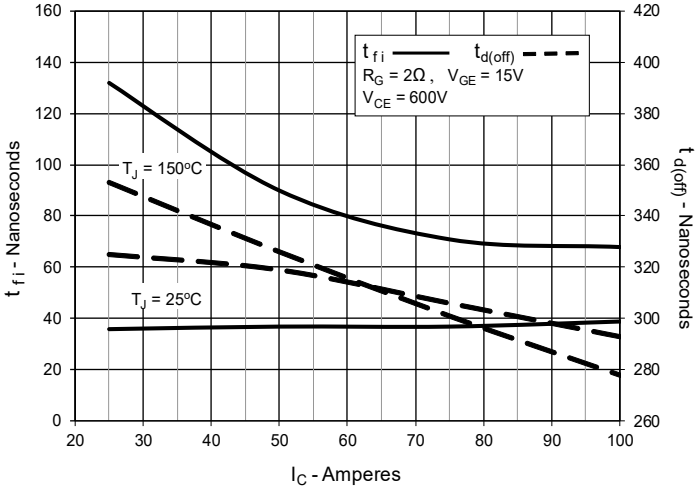


Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature

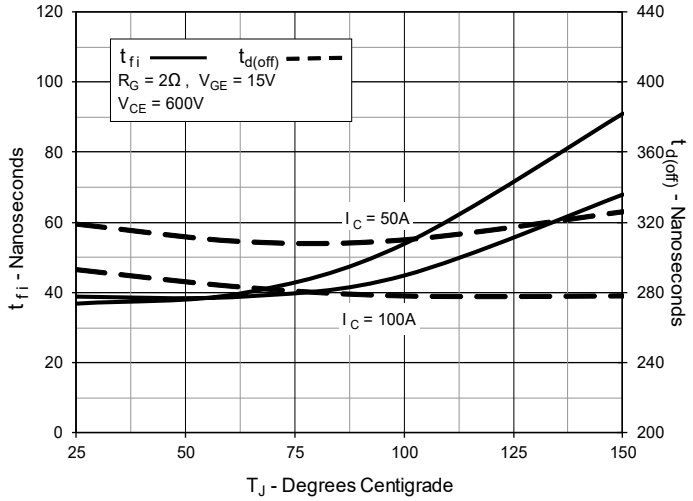


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

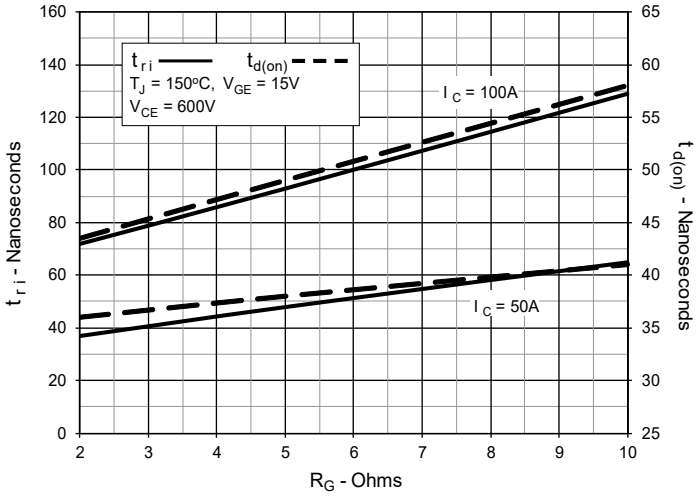


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

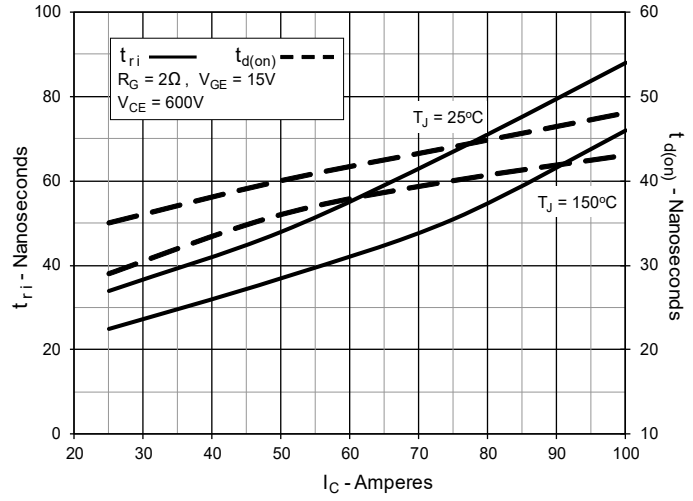
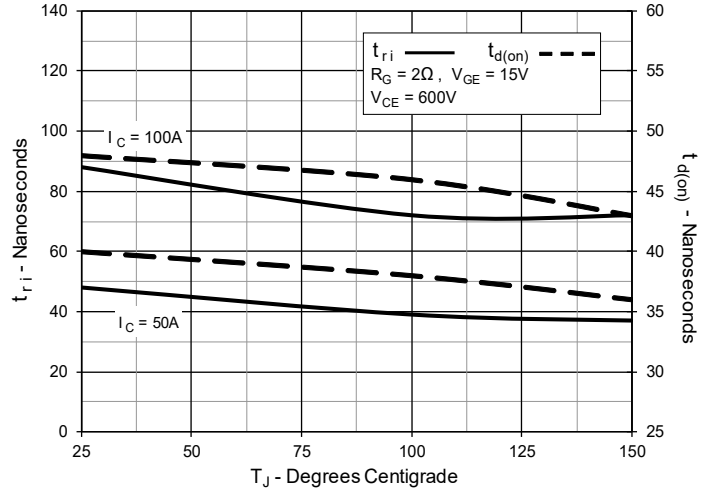
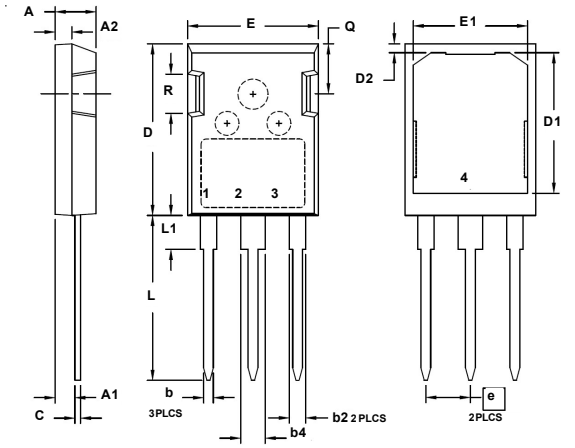


Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature



PLUS247™ Outline



1 - Gate
2,4 - Collector
3 - Emitter

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	.520	.560	13.08	14.22
e	.215 BSC		5.45 BSC	
L	.780	.810	19.81	20.57
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83

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A Littelfuse Technology