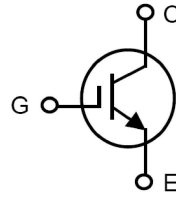


1200V XPT™ GenX4™ IGBT

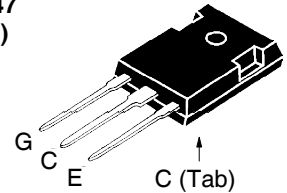
IXYH85N120A4

Ultra Low-V_{sat} PT IGBT for
up to 5kHz Switching



$$\begin{aligned} V_{CES} &= 1200V \\ I_{C110} &= 85A \\ V_{CE(sat)} &\leq 1.8V \\ t_{fi(typ)} &= 280ns \end{aligned}$$

TO-247
(IXYH)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}$	1200	V
V_{CGR}	$T_J = 25^\circ\text{C to } 175^\circ\text{C}, R_{GE} = 1M\Omega$	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ\text{C}$ (Chip Capability)	300	A
I_{LRMS}	Terminal Current Limit	160	A
I_{C110}	$T_C = 110^\circ\text{C}$	85	A
I_{CM}	$T_C = 25^\circ\text{C}, 1\text{ms}$	520	A
SSOA (RBSOA)	$V_{GE} = 15\text{V}, T_{VJ} = 125^\circ\text{C}, R_G = 5\Omega$ Clamped Inductive Load	$I_{CM} = 170$ $V_{CE} \leq 0.8 \cdot V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	1150	W
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
T_L	Maximum Lead Temperature for Soldering 1.6 mm (0.062 in.) from Case for 10s	300	$^\circ\text{C}$
M_d	Mounting Torque	1.13 / 10	Nm/lb.in
Weight		6	g

Features

- Optimized for Low Conduction Losses
- Positive Thermal Coefficient of $V_{ce(sat)}$
- 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
- Inrush Current Protector Circuits

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}, V_{GE} = 0\text{V}$	1200		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}, V_{CE} = V_{GE}$	4.0		6.5 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0\text{V}$ $T_J = 150^\circ\text{C}$			10 μA 5 mA
I_{GES}	$V_{CE} = 0\text{V}, V_{GE} = \pm 20\text{V}$			± 100 nA
$V_{CE(sat)}$	$I_C = 85\text{A}, V_{GE} = 15\text{V}, \text{Note 1}$ $T_J = 150^\circ\text{C}$		1.5 1.7	1.8 V V

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	46	60	S
C_{ies}	V _{CE} = 25V, V _{GE} = 0V, f = 1MHz		3700	pF
C_{oes}			210	pF
C_{res}			140	pF
Q_{g(on)}	I _C = 85A, V _{GE} = 15V, V _{CE} = 0.5 • V _{CES}		200	nC
Q_{ge}			30	nC
Q_{gc}			80	nC
t_{d(on)}	Inductive load, T_J = 25°C I _C = 60A, V _{GE} = 15V V _{CE} = 0.5 • V _{CES} , R _G = 5Ω Note 2		40	ns
t_{ri}			40	ns
E_{on}			4.9	mJ
t_{d(off)}			400	ns
t_{fi}			280	ns
E_{off}			8.3	mJ
t_{d(on)}	Inductive load, T_J = 150°C I _C = 60A, V _{GE} = 15V V _{CE} = 0.5 • V _{CES} , R _G = 5Ω Note 2		30	ns
t_{ri}			43	ns
E_{on}			8.3	mJ
t_{d(off)}			460	ns
t_{fi}			530	ns
E_{off}			13.7	mJ
R_{thJC}				0.13 °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	4,931,844	5,049,961	5,237,481	6,162,665	6,404,065 B1	6,683,344	6,727,585	7,005,734 B2	7,157,338B2
4,860,072	5,017,508	5,063,307	5,381,025	6,259,123 B1	6,534,343	6,710,405 B2	6,759,692	7,063,975 B2	
4,881,106	5,034,796	5,187,117	5,486,715	6,306,728 B1	6,583,505	6,710,463	6,771,478 B2	7,071,537	

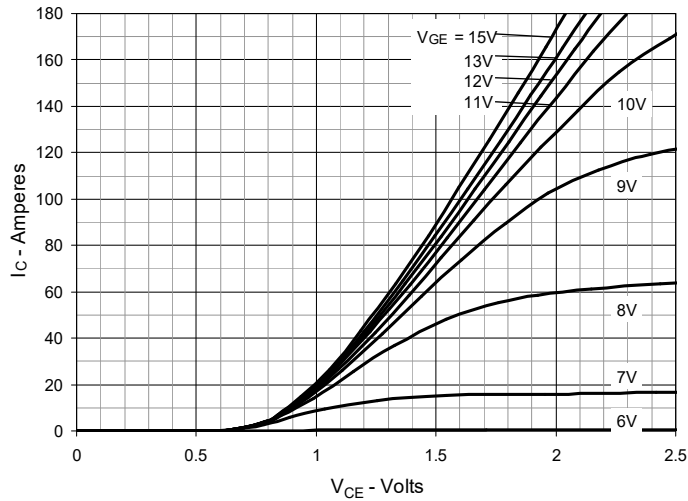
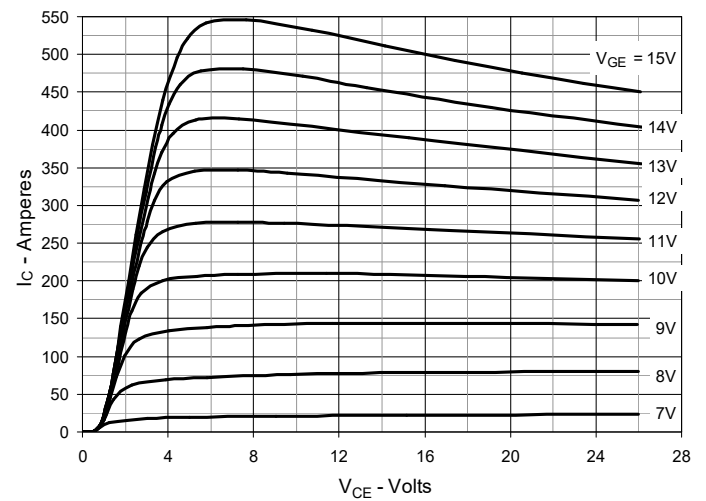
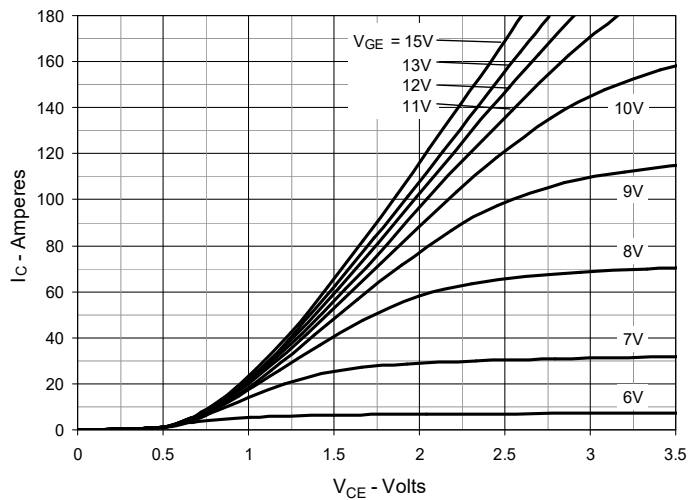
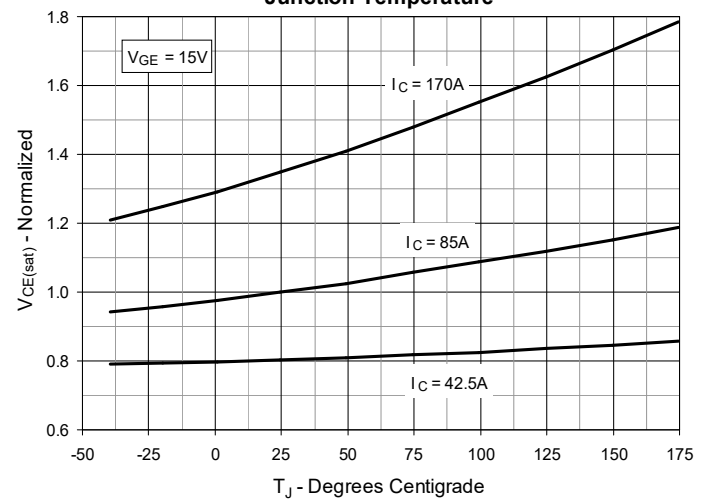
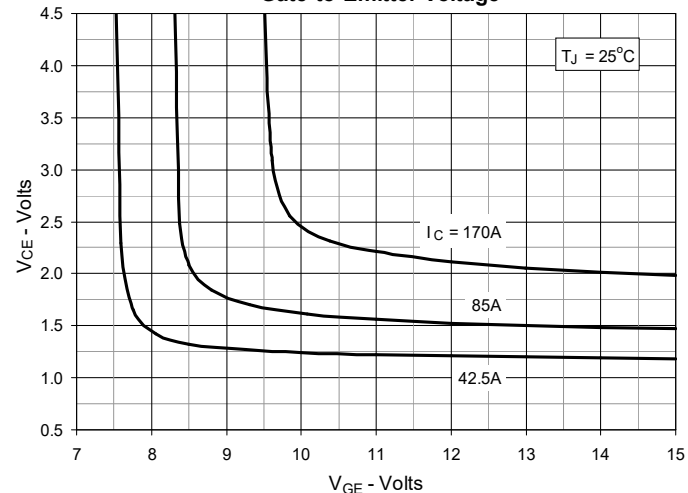
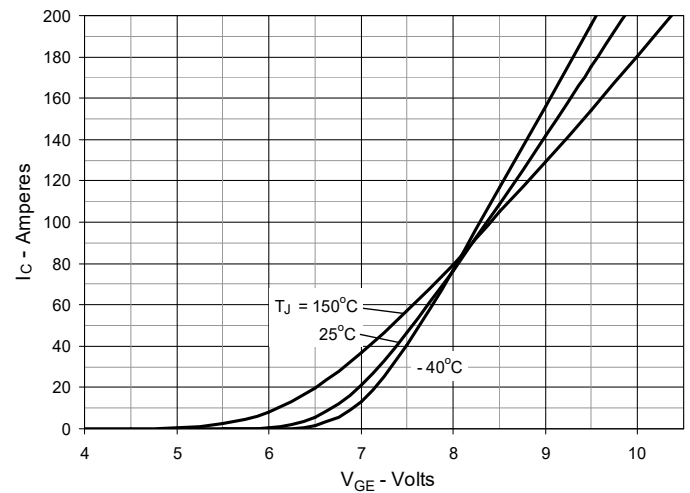
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 2. Extended Output Characteristics @ $T_J = 25^\circ\text{C}$

Fig. 3. Output Characteristics @ $T_J = 150^\circ\text{C}$

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

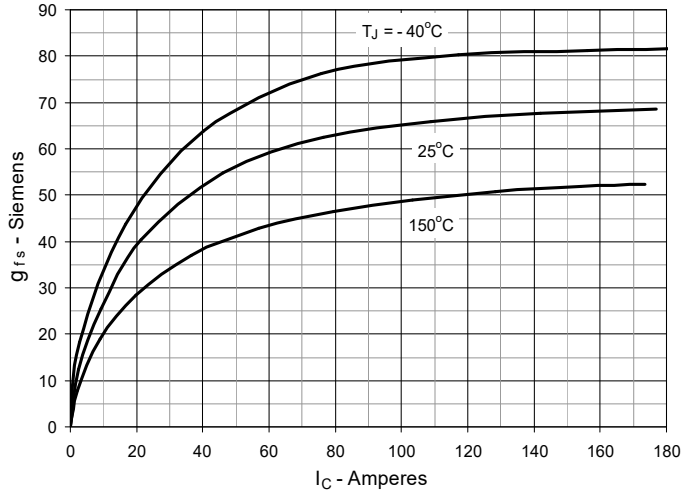


Fig. 8. Gate Charge

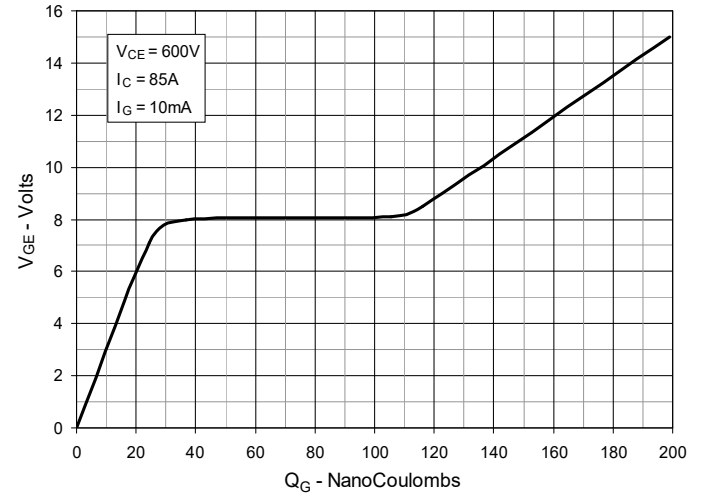


Fig. 9. Capacitance

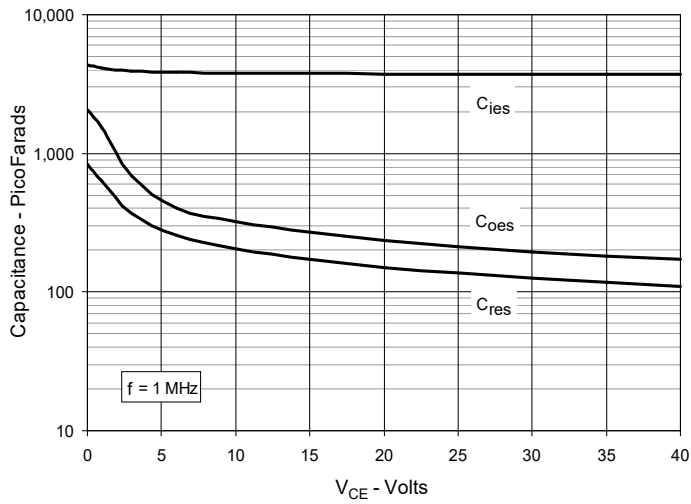


Fig. 10. Reverse-Bias Safe Operating Area

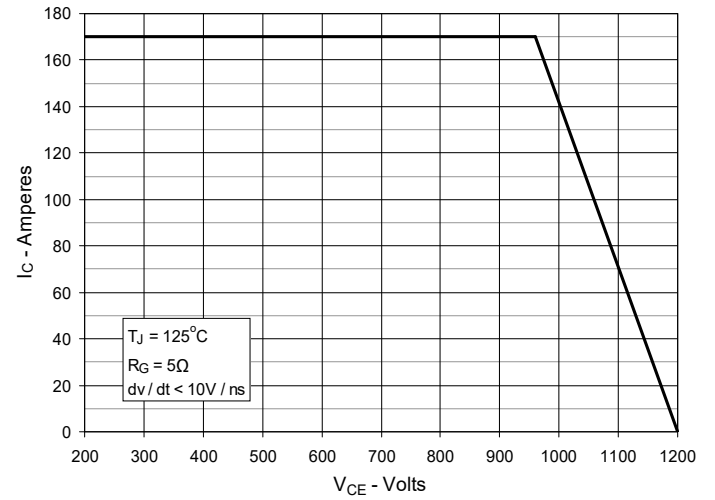


Fig. 11. Maximum Transient Thermal Impedance

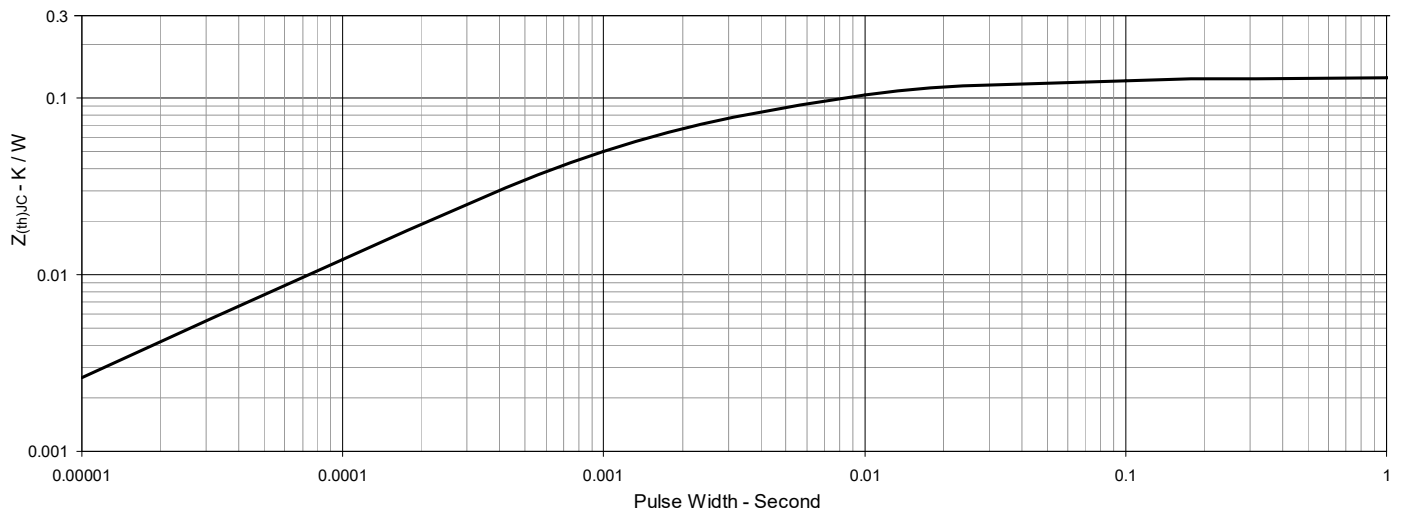


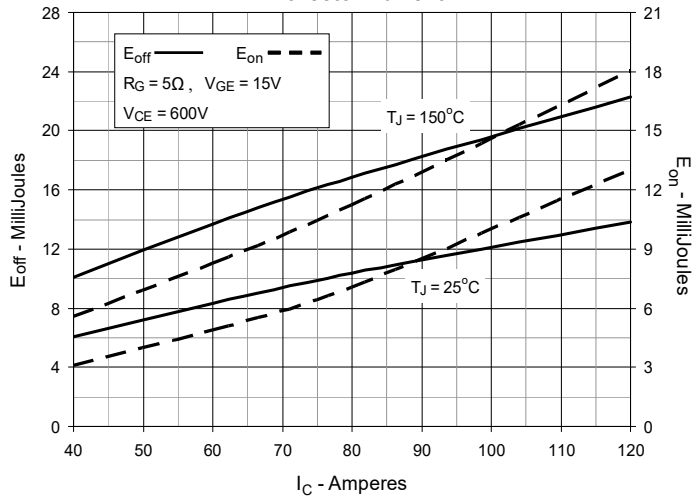
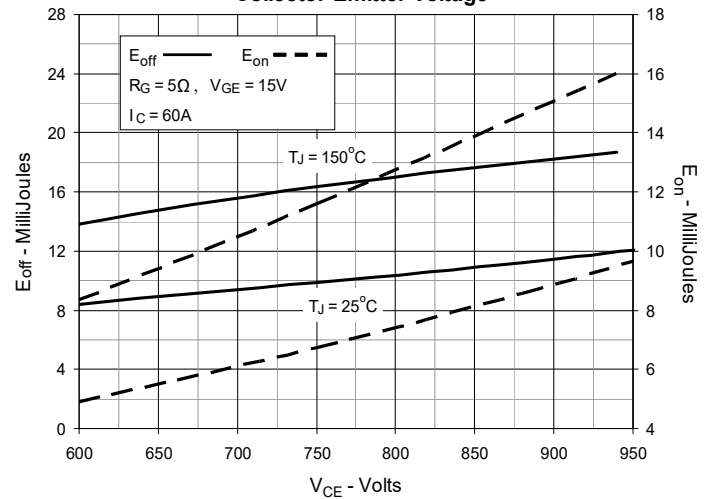
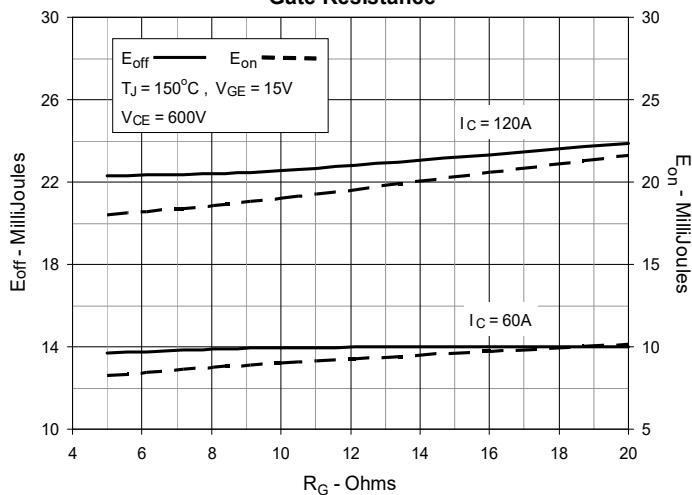
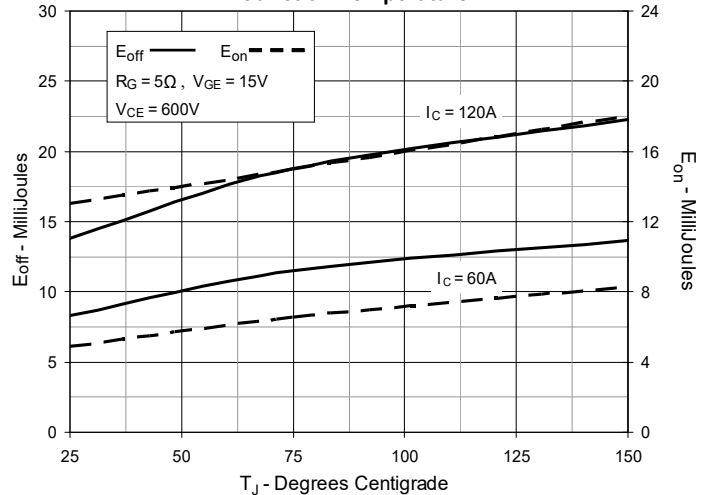
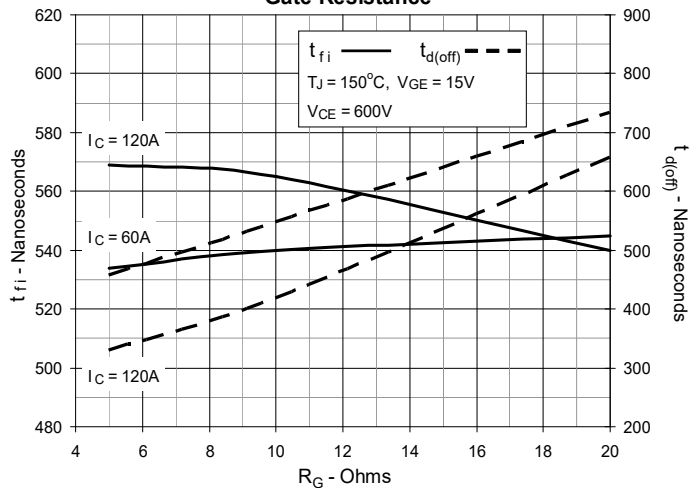
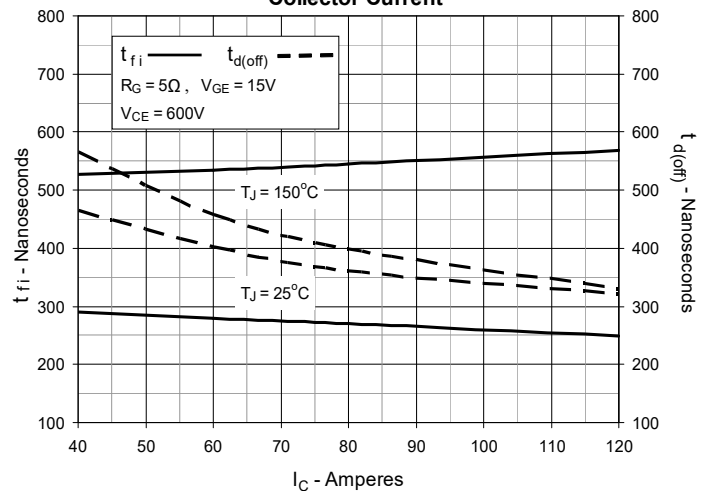
Fig. 12. Inductive Switching Energy Loss vs. Collector Current

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

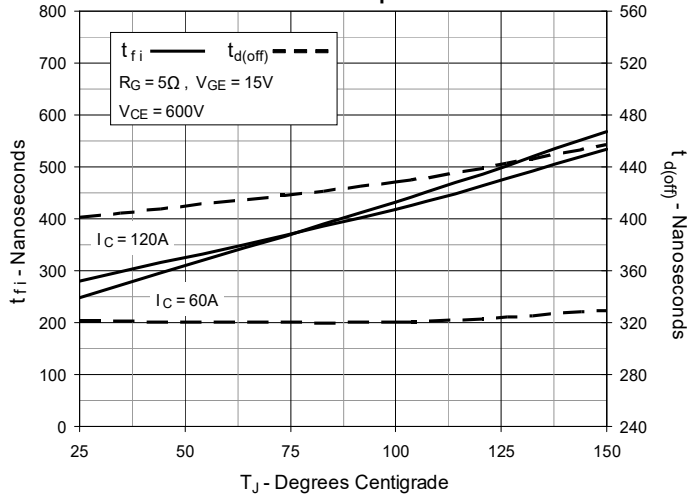


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

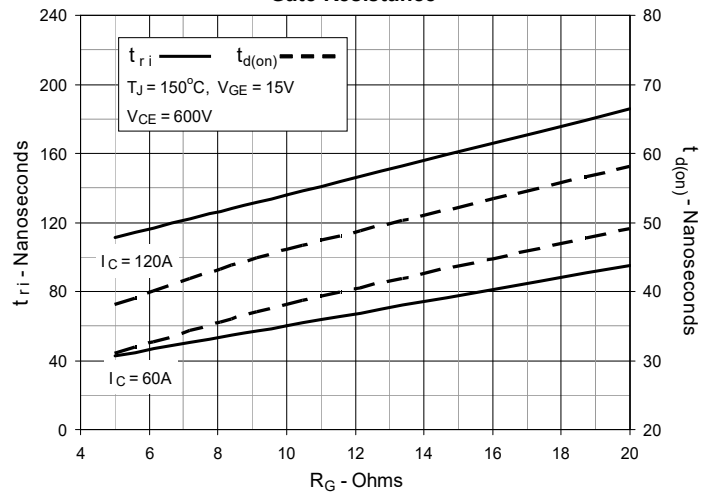


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

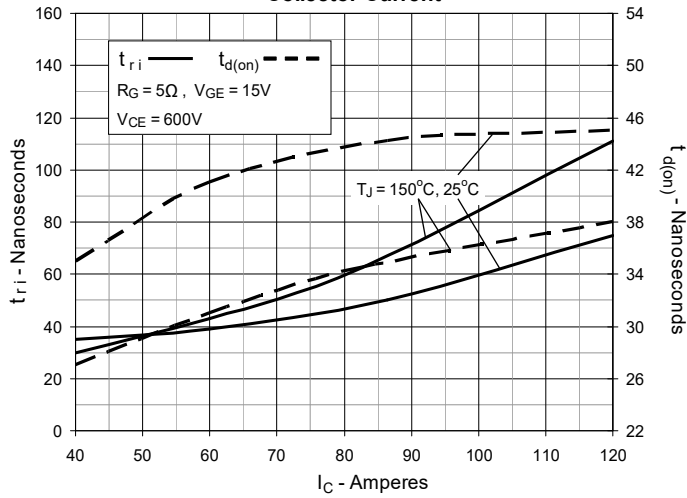
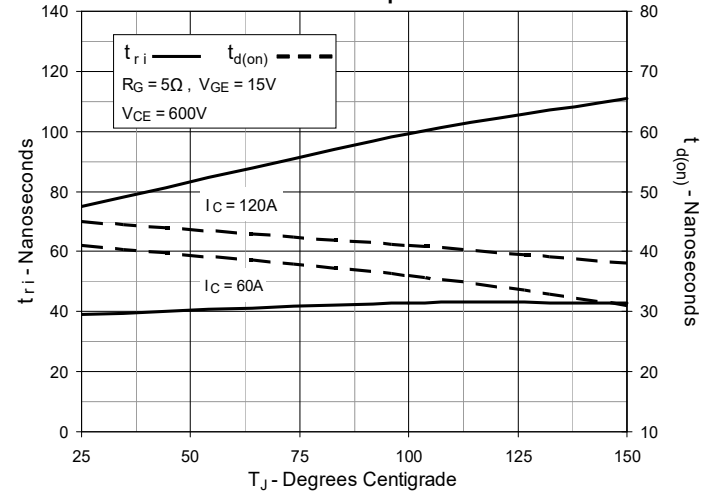
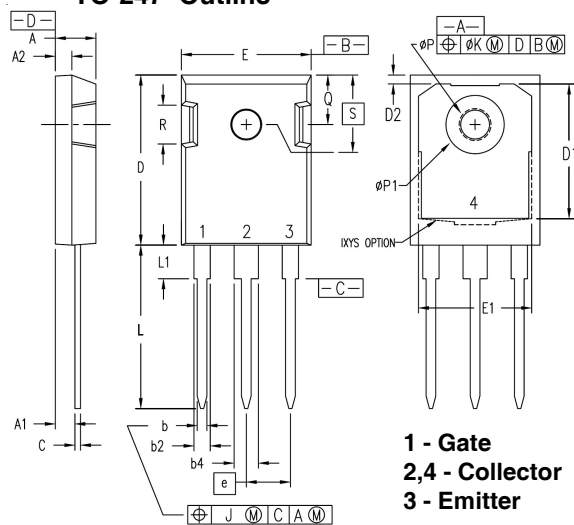


Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature



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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