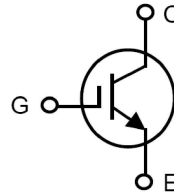


1200V XPT™ GenX4™ IGBT

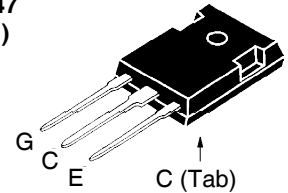
IXYH85N120A4

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
$V_{CE(sat)}$	$I_C = 85\text{A}, V_{GE} = 15\text{V}$, Note 1 $T_J = 150^\circ\text{C}$		1.5 1.7	1.8 V V

Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 60\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	46	60	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		3700	pF
C_{oes}			210	pF
C_{res}			140	pF
$Q_{g(on)}$	$I_C = 85\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		200	nC
Q_{ge}			30	nC
Q_{gc}			80	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 60\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 5\Omega$ 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, $T_J = 150^\circ\text{C}$ $I_C = 60\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.5 \cdot V_{CES}, R_G = 5\Omega$ 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 $^\circ\text{C/W}$
R_{thCS}			0.21	$^\circ\text{C/W}$

Notes:

1. Pulse test, $t \leq 300\mu\text{s}$, duty cycle, $d \leq 2\%$.
2. Switching times & energy losses may increase for higher $V_{CE}(\text{clamp})$, T_J or R_G .

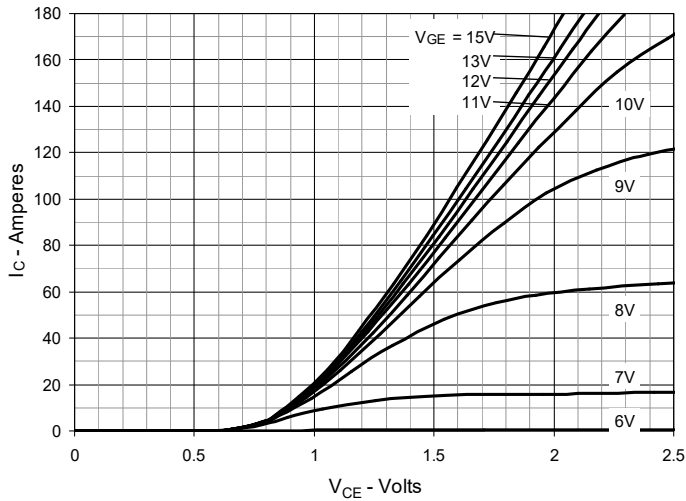
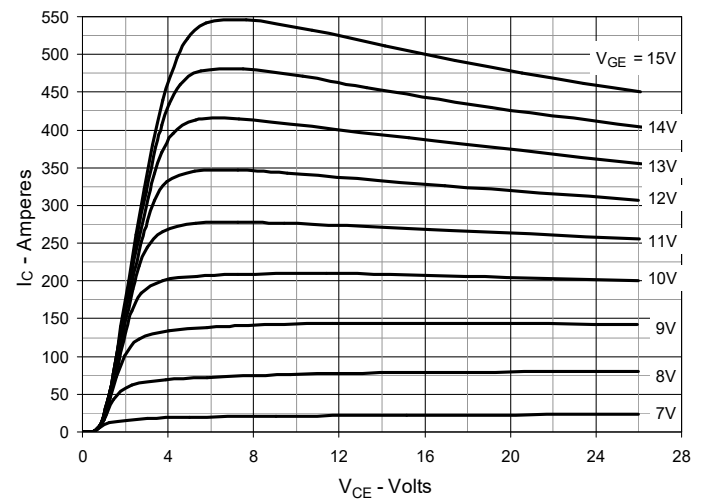
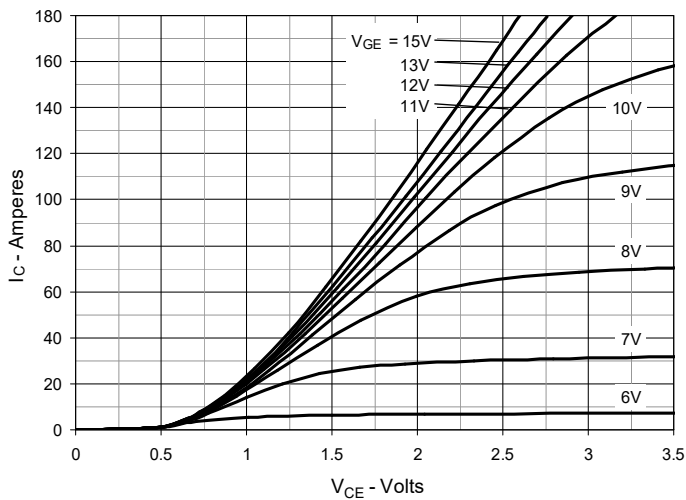
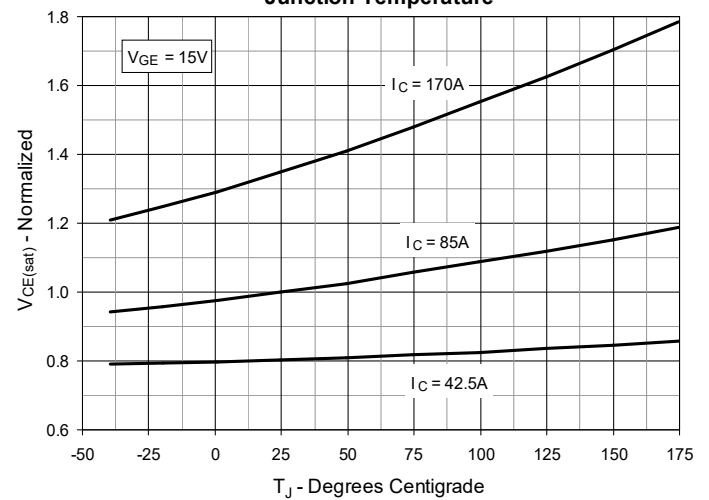
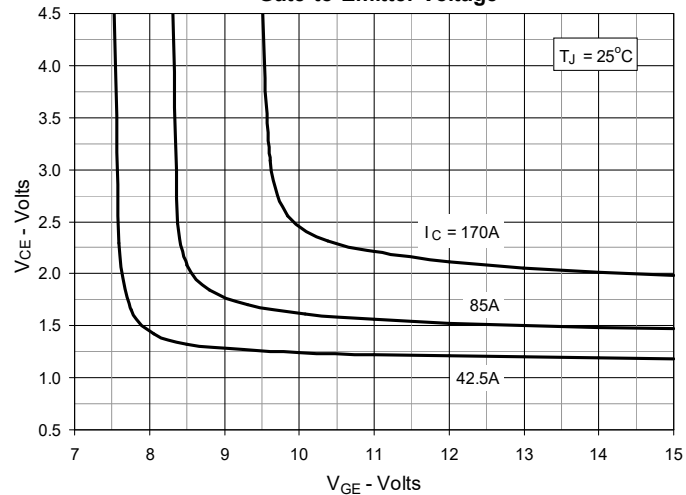
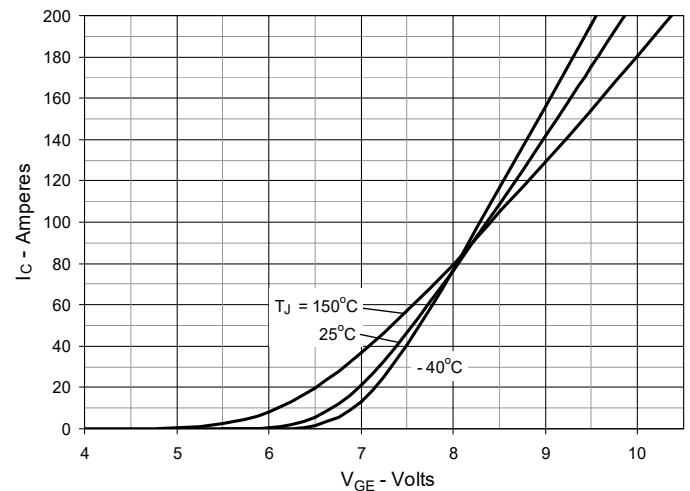
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

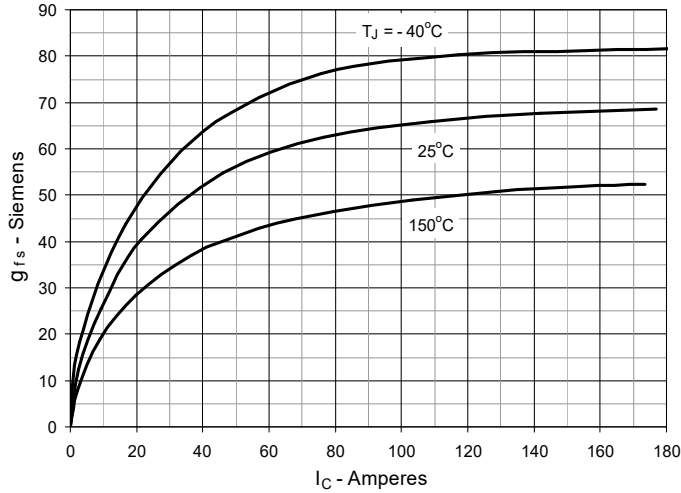


Fig. 8. Gate Charge

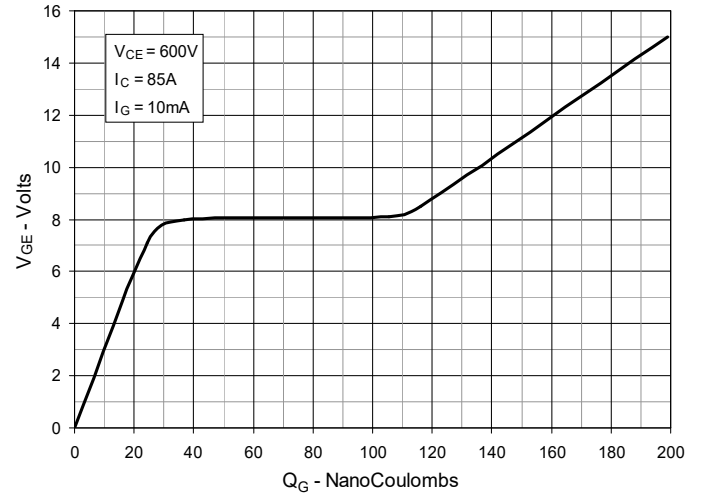


Fig. 9. Capacitance

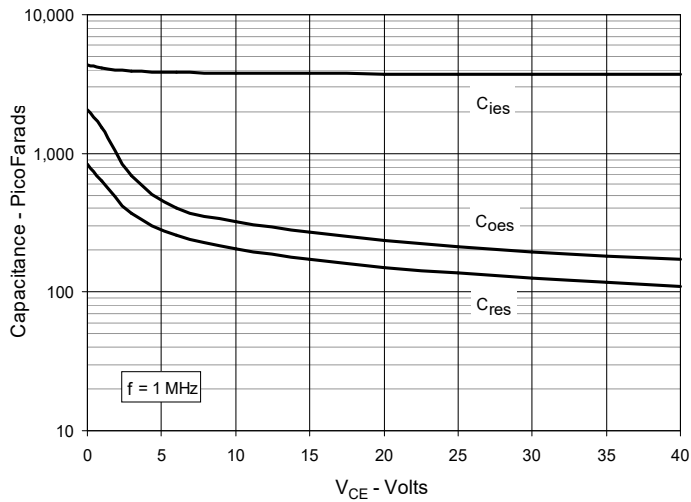


Fig. 10. Reverse-Bias Safe Operating Area

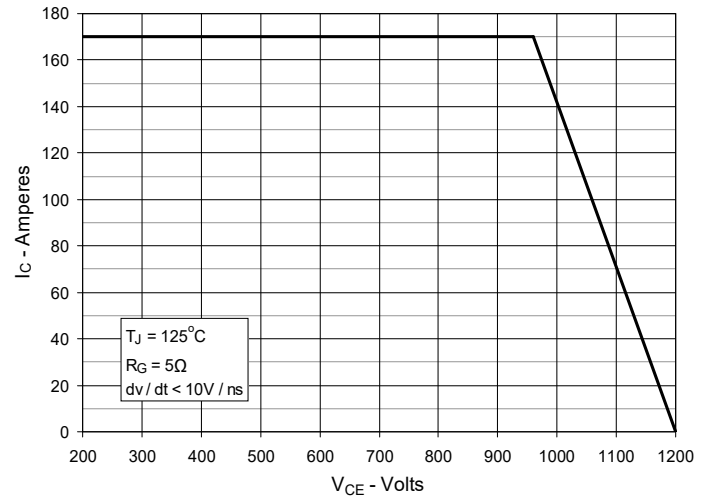


Fig. 11. Maximum Transient Thermal Impedance

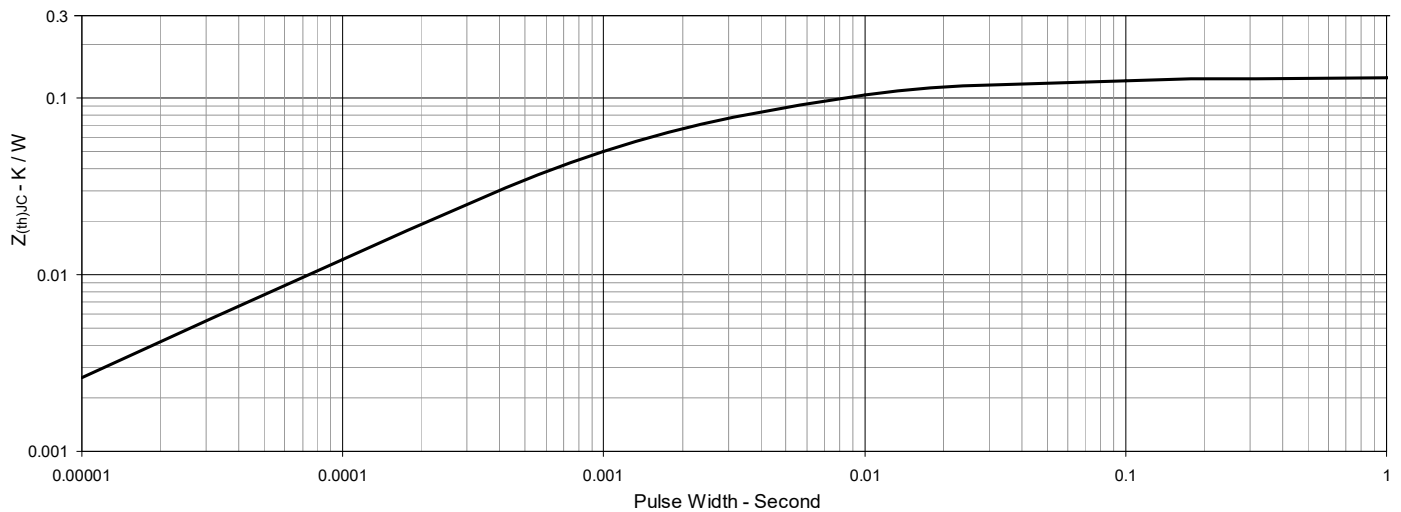


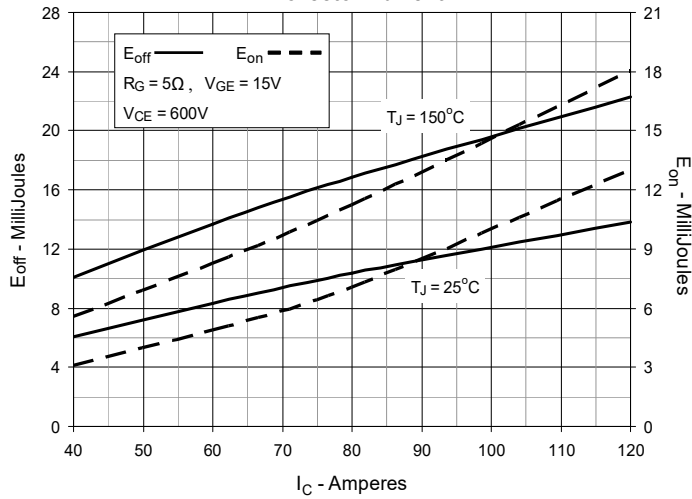
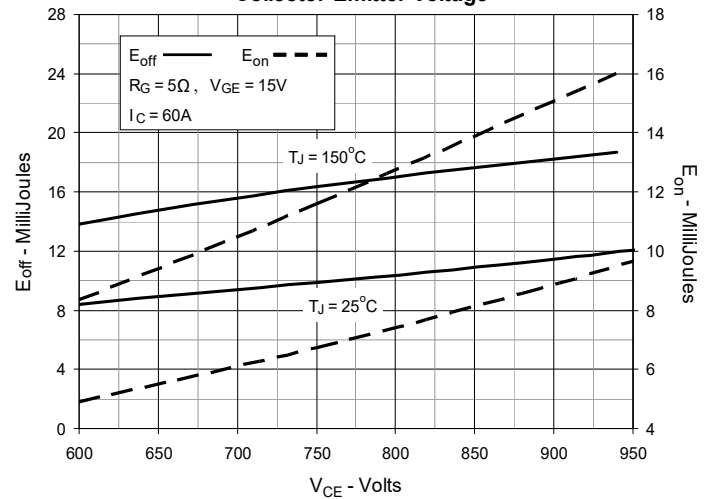
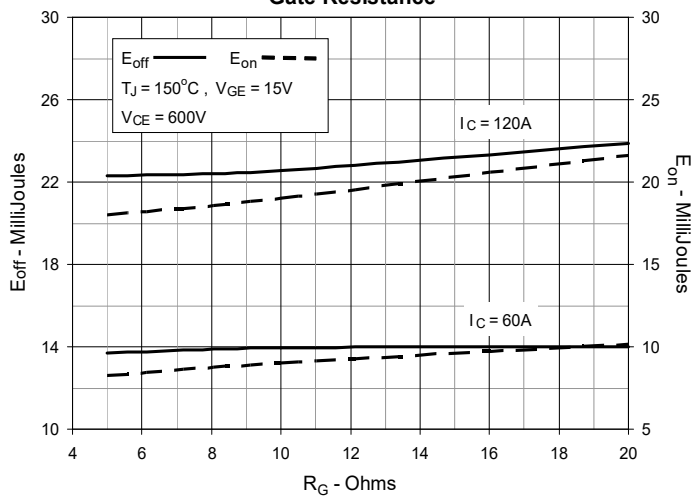
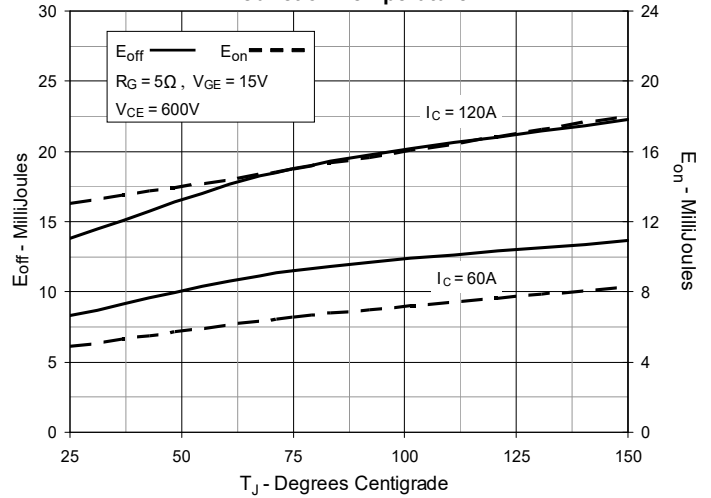
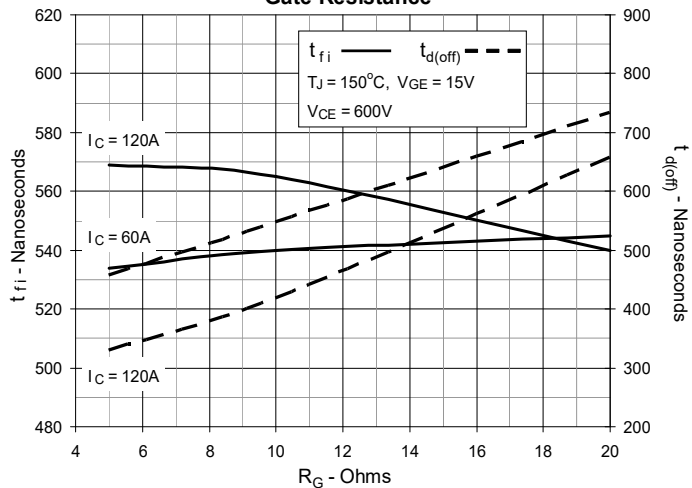
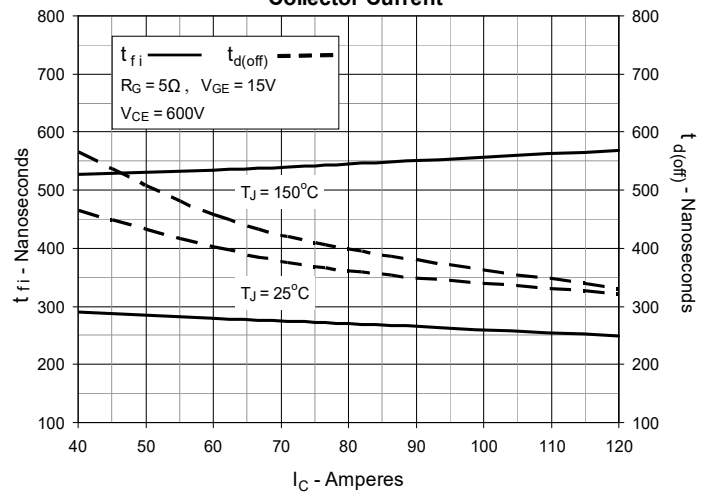
Fig. 12. Inductive Switching Energy Loss vs. Collector Current

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

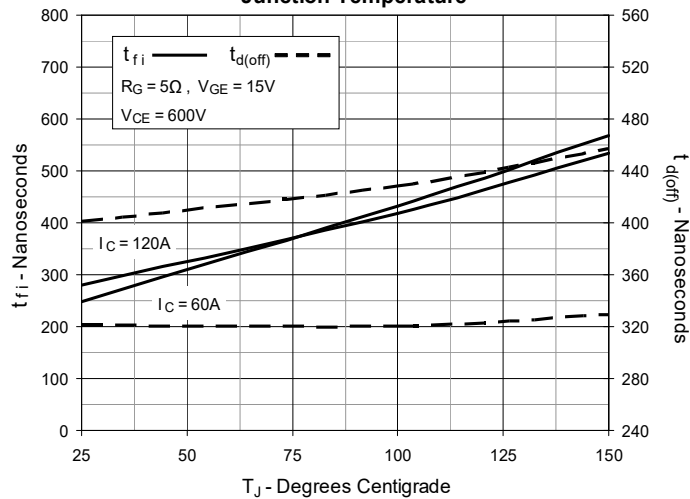


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

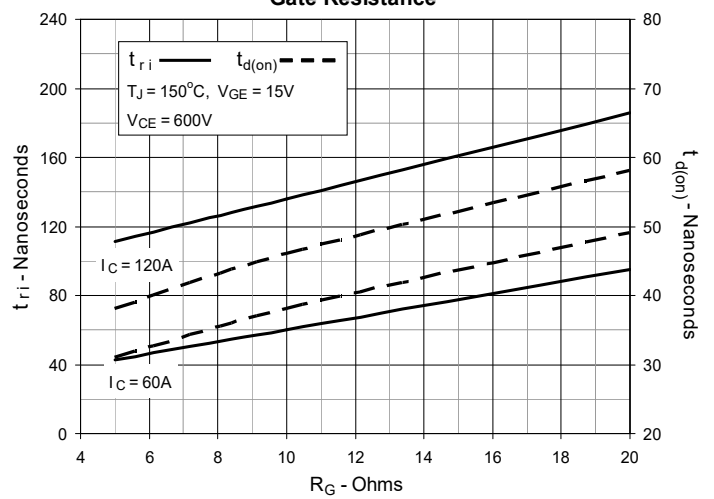


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

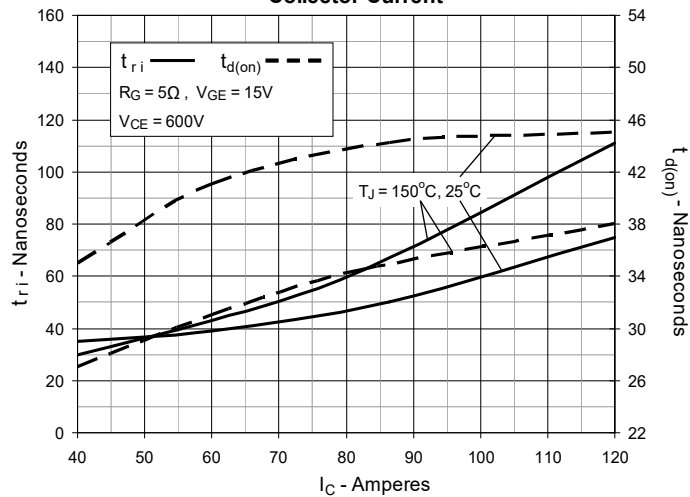
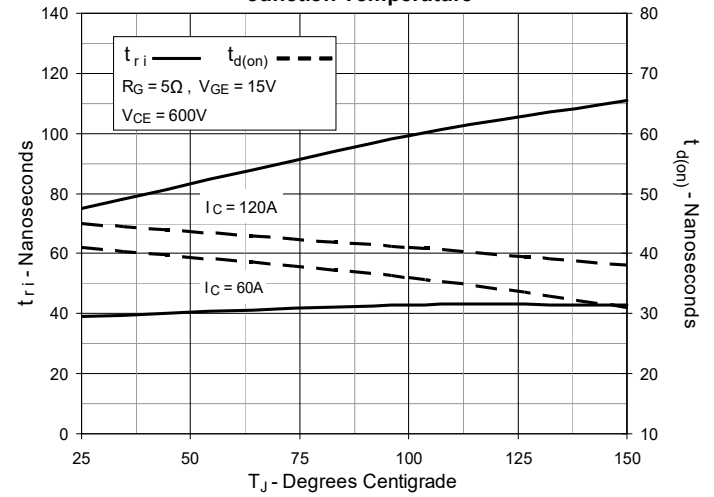
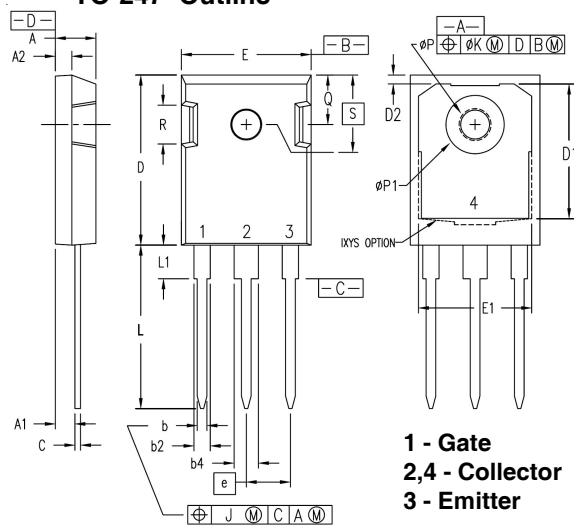


Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature



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	

