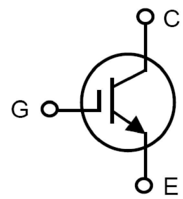
IXYS

1200V XPT™ GenX4™ IGBT

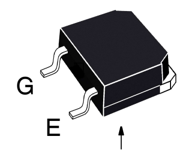
IXYT55N120A4HV

V_{CES} = 1200V
I_{C110} = 55A
$V_{CE(sat)}$ ≤ 1.8V
$t_{fi(typ)}$ = 270ns

Ultra Low-Vsat PT IGBT for up to 5kHz Switching



TO-268HV (IXYT..HV)



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	175	A
I_{C110}	T_C = 110°C	55	A
I_{CM}	T_C = 25°C, 1ms	350	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 5Ω Clamped Inductive Load	I_{CM} = 110 $V_{CE} \leq$ 0.8 • V_{CES}	A
P_C	T_C = 25°C	650	W
T_J		-55 ... +175	°C
T_{JM}		175	°C
T_{stg}		-55 ... +175	°C
T_{SOLD}	Plastic Body for 10s	260	°C
Weight		4	g

Features

- Optimized for Low Conduction 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
- Inrush Current Protector Circuits

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			5	µA
	T_J = 150°C			2.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 55A, V_{GE} = 15V, Note 1		1.5	1.8	V
	T_J = 150°C		1.8		V

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 55A, V_{CE} = 10V, Note 1	22	36		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		2150		pF
C_{oes}			125		pF
C_{res}			80		pF
$Q_{g(on)}$	I_C = 55A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		110		nC
Q_{ge}			17		nC
Q_{gc}			56		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C** I_C = 40A, V_{GE} = 15V V_{CE} = 0.5 • V_{CES}, R_G = 5Ω Note 2		23		ns
t_{ri}			35		ns
E_{on}			2.3		mJ
$t_{d(off)}$			300		ns
t_{fi}			270		ns
E_{off}			5.3		mJ
$t_{d(on)}$	**Inductive load, T_J = 150°C** I_C = 40A, V_{GE} = 15V V_{CE} = 0.5 • V_{CES}, R_G = 5Ω Note 2		21		ns
t_{ri}			33		ns
E_{on}			3.8		mJ
$t_{d(off)}$			380		ns
t_{fi}			530		ns
E_{off}			8.8		mJ
R_{thJC}				0.23	°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 = 25°C

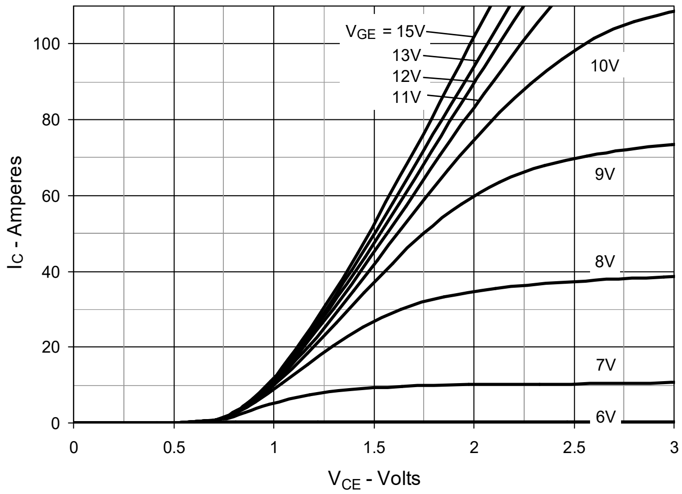


Fig. 2. Extended Output Characteristics @ T_J = 25°C

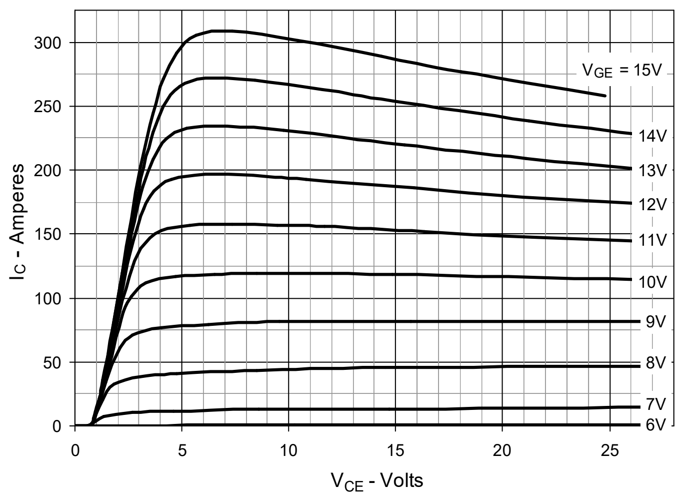


Fig. 3. Output Characteristics @ T_J = 150°C

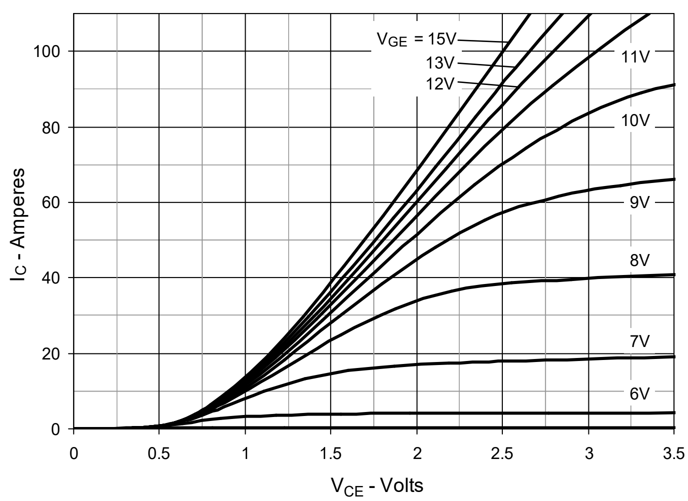


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

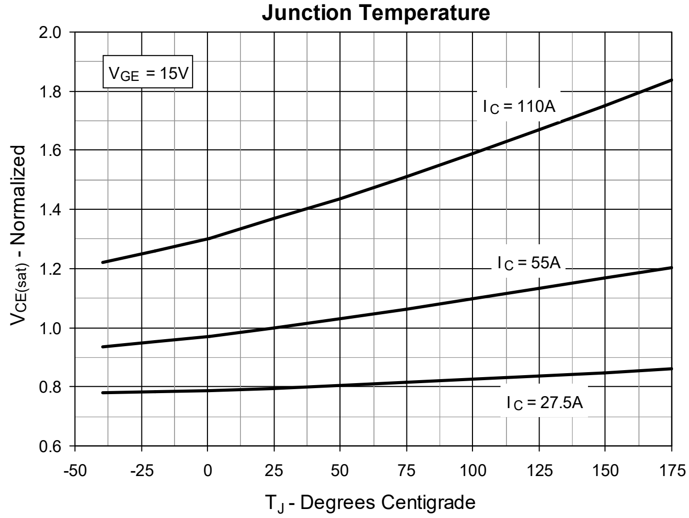


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

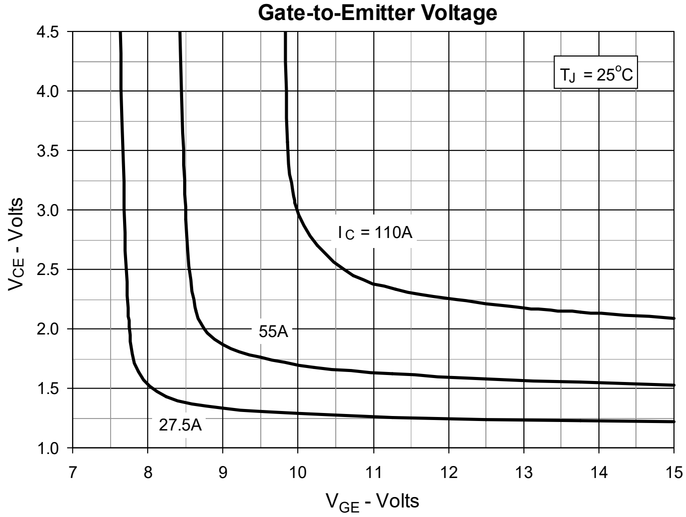


Fig. 6. Input Admittance

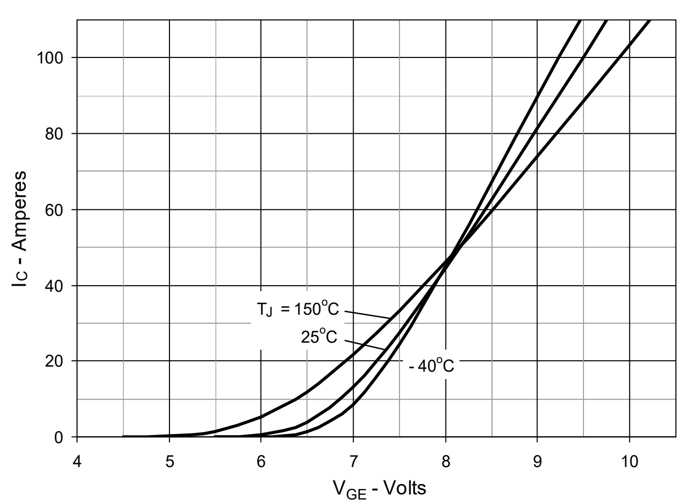


Fig. 7. Transconductance

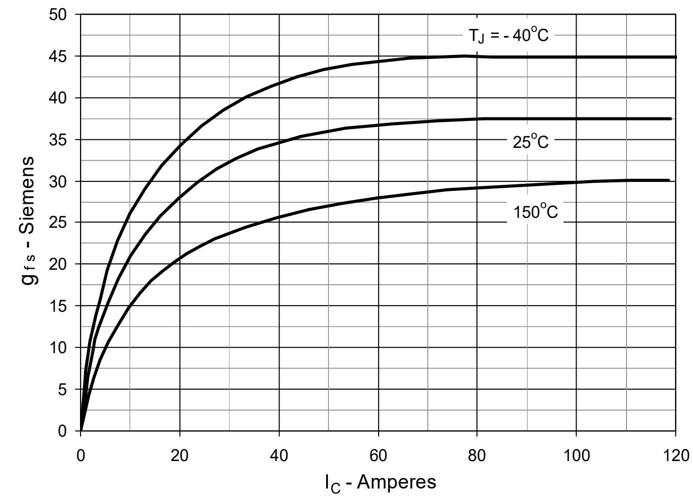


Fig. 8. Gate Charge

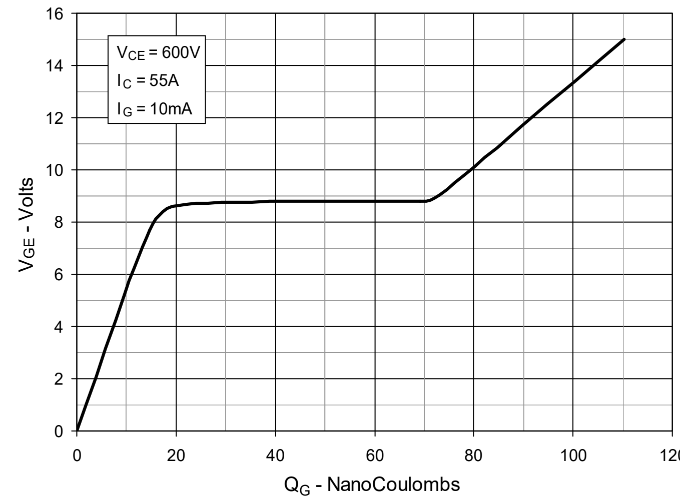


Fig. 9. Capacitance

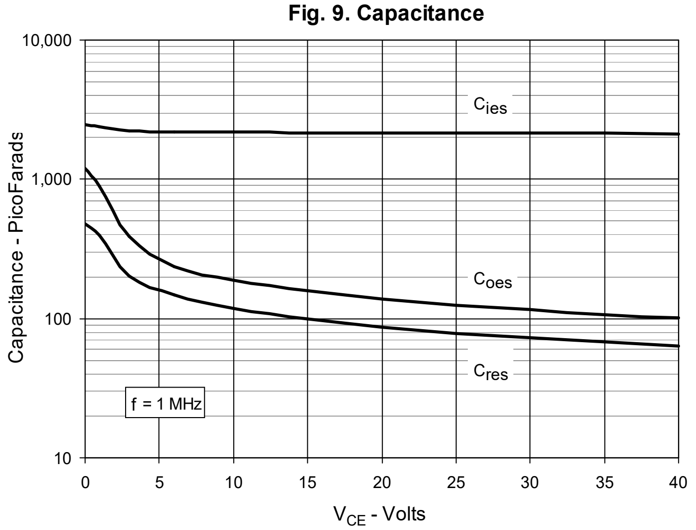


Fig. 10. Reverse-Bias Safe Operating Area

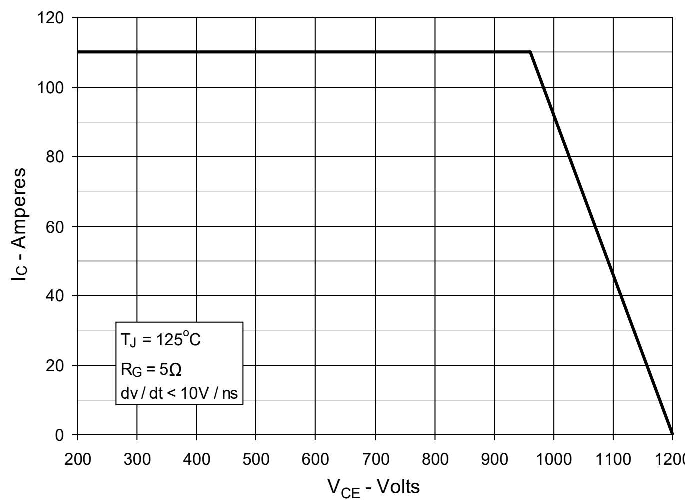


Fig. 11. Maximum Transient Thermal Impedance

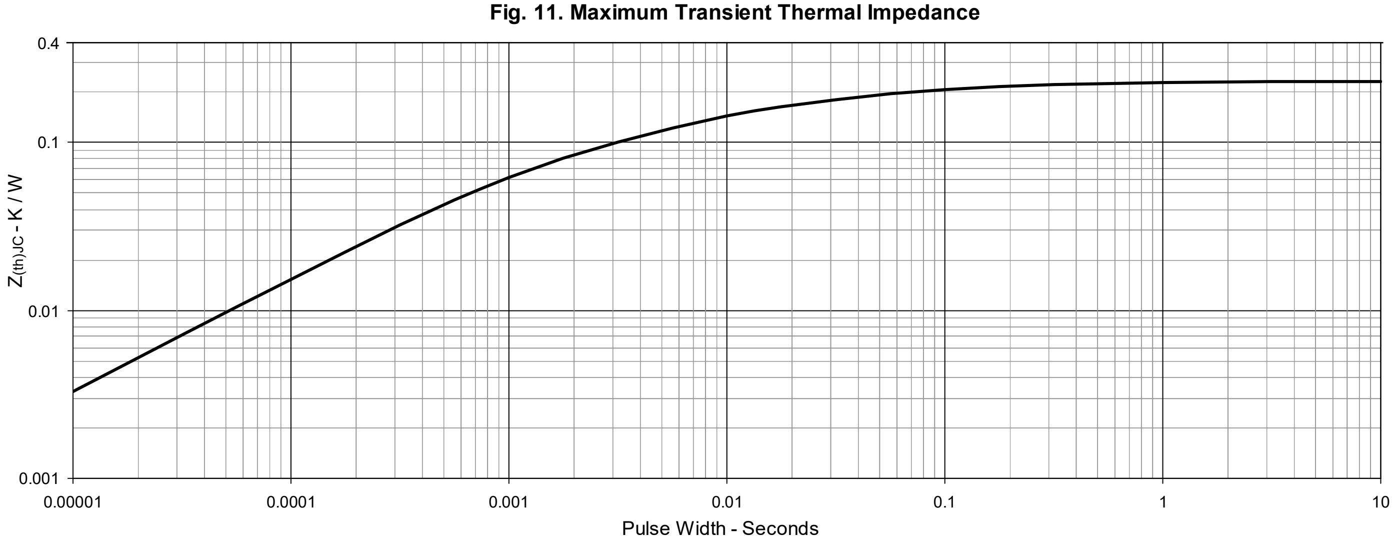


Fig. 12. Inductive Switching Energy Loss vs. Collector Current

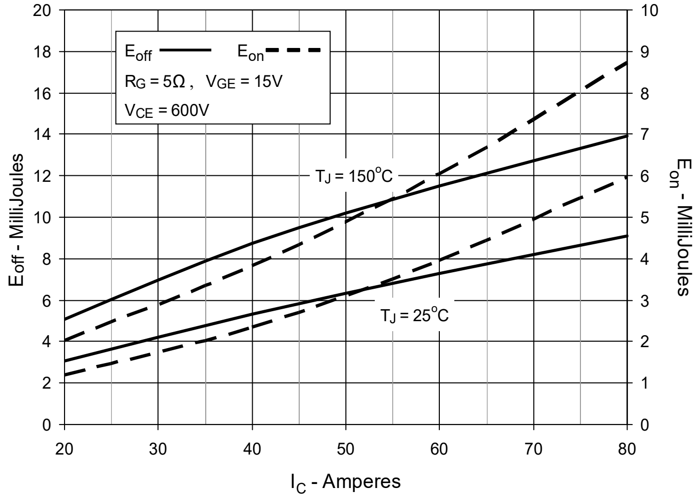


Fig. 13. Inductive Switching Energy Loss vs. Collector-Emitter Voltage

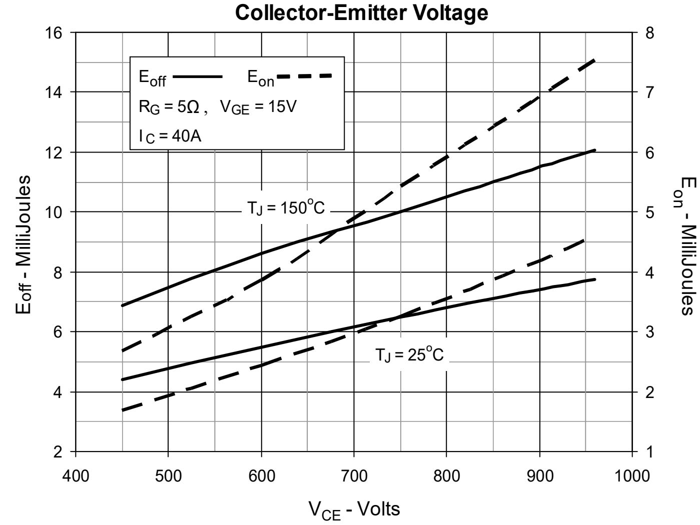


Fig. 14. Inductive Switching Energy Loss vs. Gate Resistance

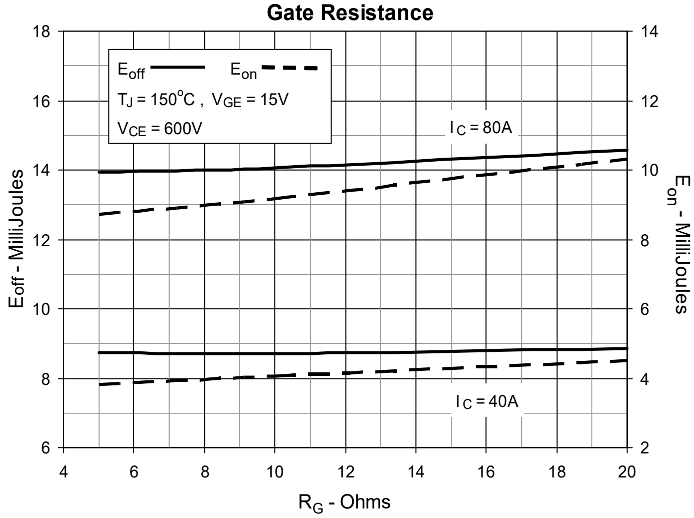


Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

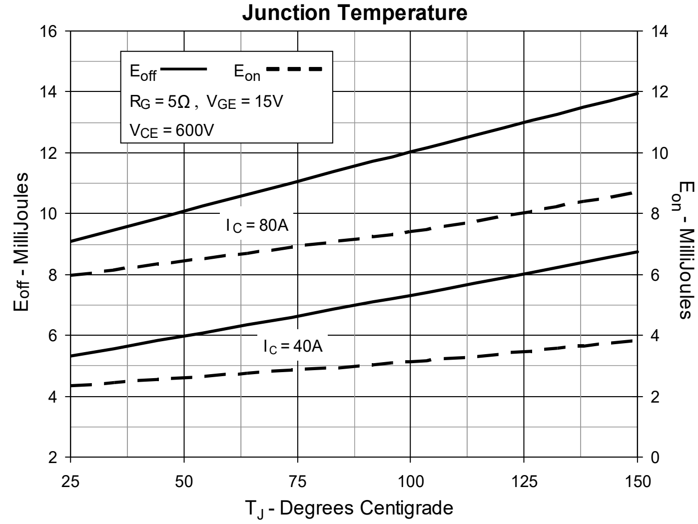


Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

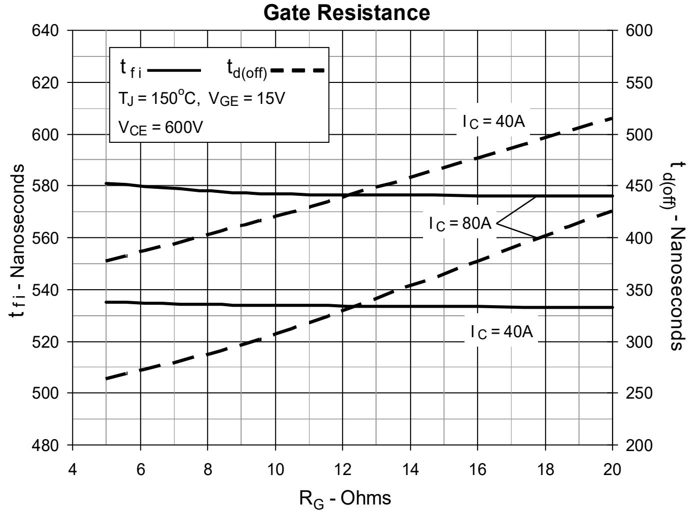


Fig. 17. Inductive Turn-off Switching Times vs. Collector Current

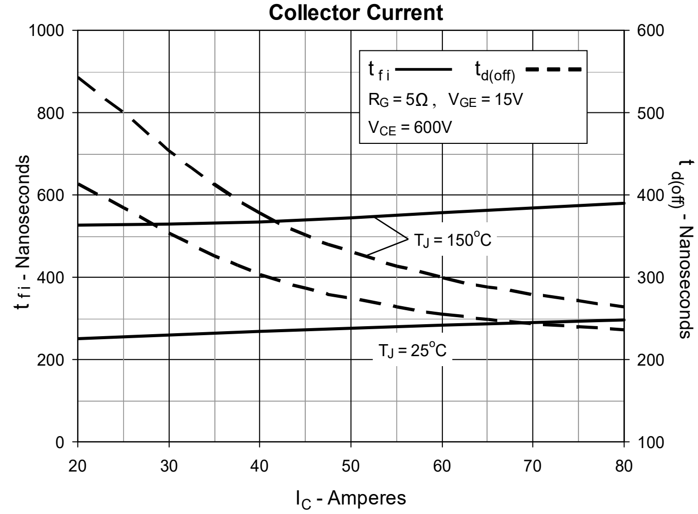


Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature

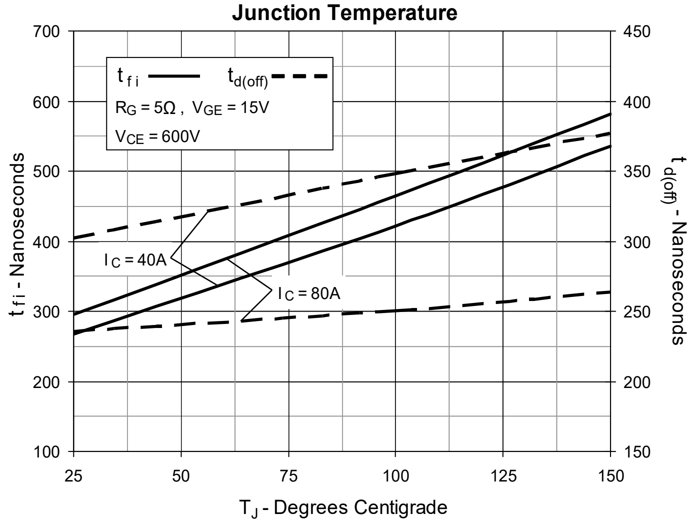


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

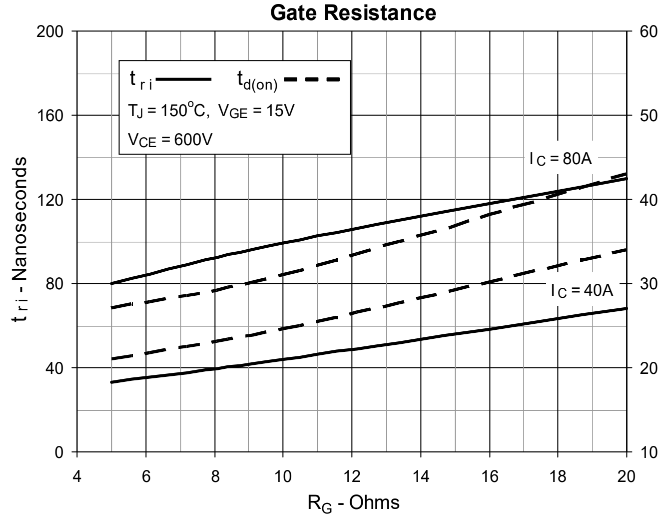


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

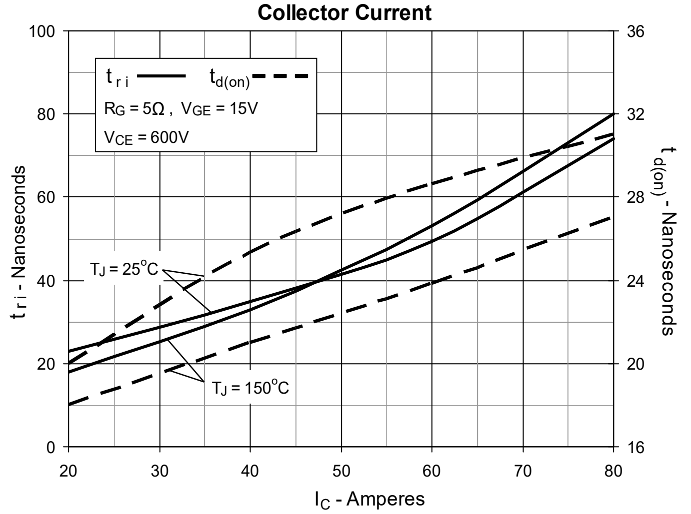
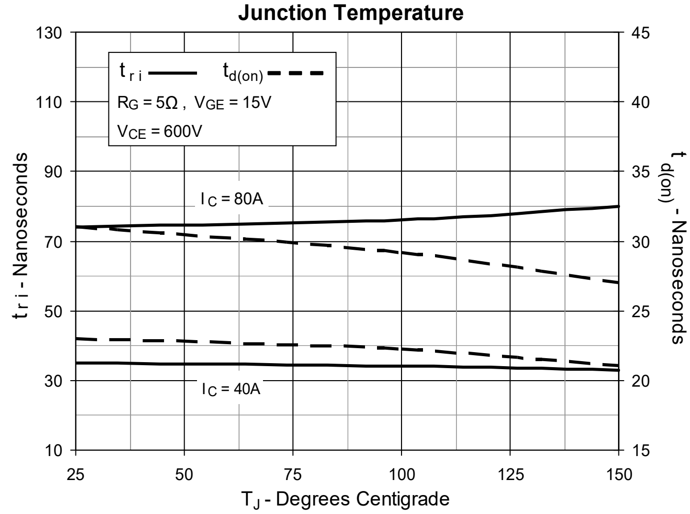
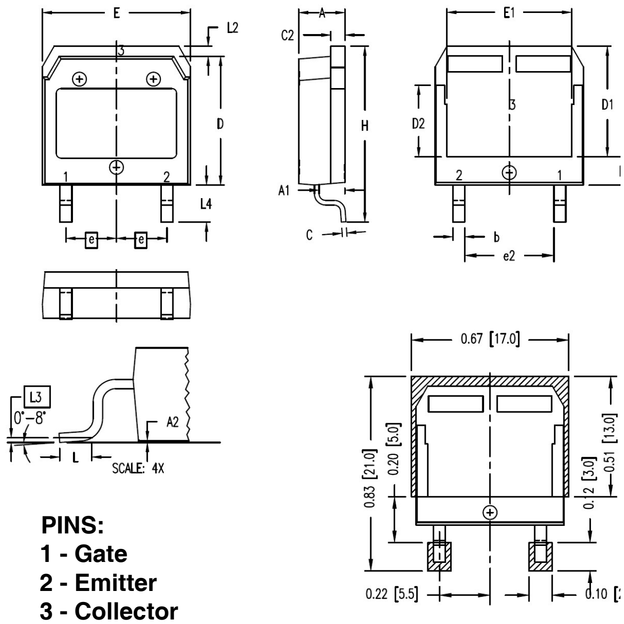


Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature



TO-268HV Outline



PINS:
1 - Gate
2 - Emitter
3 - Collector

SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.465	.476	11.80	12.10
D2	.295	.307	7.50	7.80
D3	.114	.126	2.90	3.20
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
(e2)	.374	.386	9.50	9.80
H	.736	.752	18.70	19.10
L	.067	.079	1.70	2.00
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10