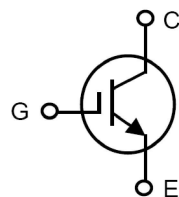


1200V XPT™ GenX4™ IGBT

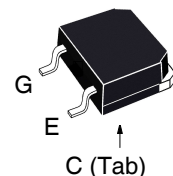
IXYT40N120A4HV

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



$$\begin{aligned} V_{CES} &= 1200V \\ I_{C110} &= 40A \\ V_{CE(sat)} &\leq 1.80V \\ t_{fi(typ)} &= 220ns \end{aligned}$$

TO-268HV
(IXYT..HV)



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}	$T_C = 25^\circ\text{C}$	140	A
I_{C110}	$T_C = 110^\circ\text{C}$	40	A
I_{CM}	$T_C = 25^\circ\text{C}, 1\text{ms}$	275	A
SSOA (RBSOA)	$V_{GE} = 15V, T_{VJ} = 150^\circ\text{C}, R_G = 5\Omega$ Clamped Inductive Load	$I_{CM} = 80$ $V_{CE} \leq 0.8 \cdot V_{CES}$	A
P_C	$T_C = 25^\circ\text{C}$	600	W
T_J		-55 ... +175	$^\circ\text{C}$
T_{JM}		175	$^\circ\text{C}$
T_{stg}		-55 ... +175	$^\circ\text{C}$
T_{SOLD}	Plastic Body for 10s	260	$^\circ\text{C}$
Weight		4	g

Features

- Optimized for Low Conduction
- 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 Protection Circuits

Symbol	Test Conditions ($T_J = 25^\circ\text{C}$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu\text{A}, V_{GE} = 0V$	1200		V
$V_{GE(th)}$	$I_C = 250\mu\text{A}, V_{CE} = V_{GE}$	4.0		6.5 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$ $T_J = 150^\circ\text{C}$			10 μA 1 mA
I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 32A, V_{GE} = 15V, \text{Note 1}$ $T_J = 150^\circ\text{C}$	1.56 1.80		V V

Symbol Test Conditions ($T_J = 25^\circ\text{C}$ Unless Otherwise Specified)		Characteristic Values		
		Min.	Typ.	Max.
g_{fs}	$I_C = 32\text{A}, V_{CE} = 10\text{V}, \text{Note 1}$	12	22	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		1650	pF
C_{oes}			105	pF
C_{res}			60	pF
$Q_{g(on)}$	$I_C = 32\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		90	nC
Q_{ge}			15	nC
Q_{gc}			40	nC
$t_{d(on)}$	Inductive load, $T_J = 25^\circ\text{C}$ $I_C = 32\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}, R_G = 5\Omega$ Note 2		22	ns
t_{ri}			50	ns
E_{on}			2.30	mJ
$t_{d(off)}$			204	ns
t_{fi}			346	ns
E_{off}			3.75	mJ
$t_{d(on)}$	Inductive load, $T_J = 150^\circ\text{C}$ $I_C = 32\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 600\text{V}, R_G = 5\Omega$ Note 2		17	ns
t_{ri}			50	ns
E_{on}			3.55	mJ
$t_{d(off)}$			280	ns
t_{fi}			760	ns
E_{off}			6.46	mJ
R_{thJC}				0.25 $^\circ\text{C/W}$

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 .

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	

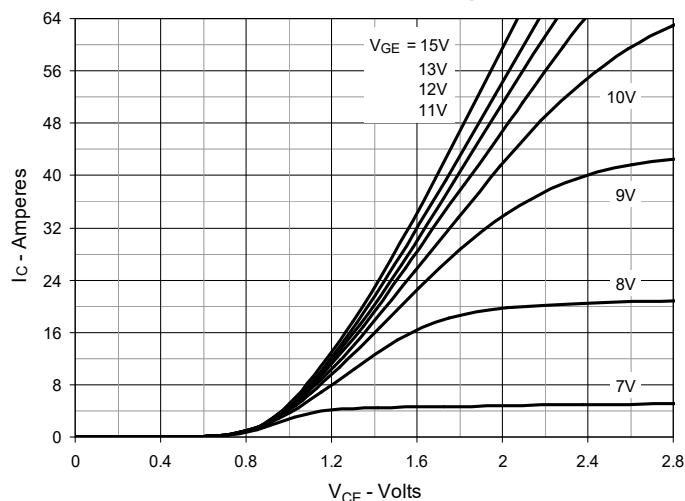
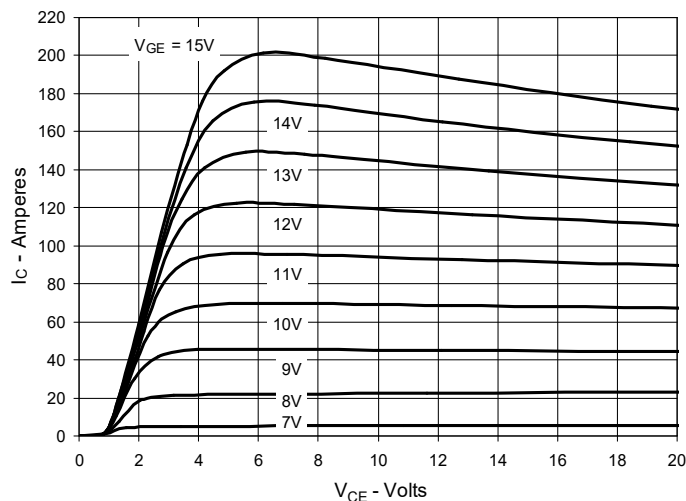
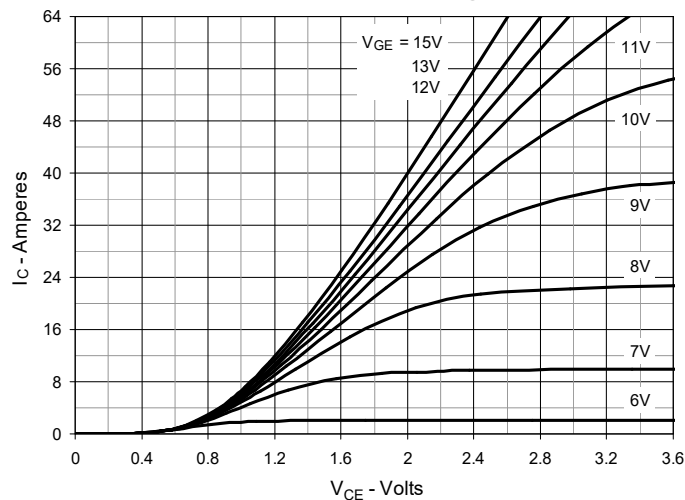
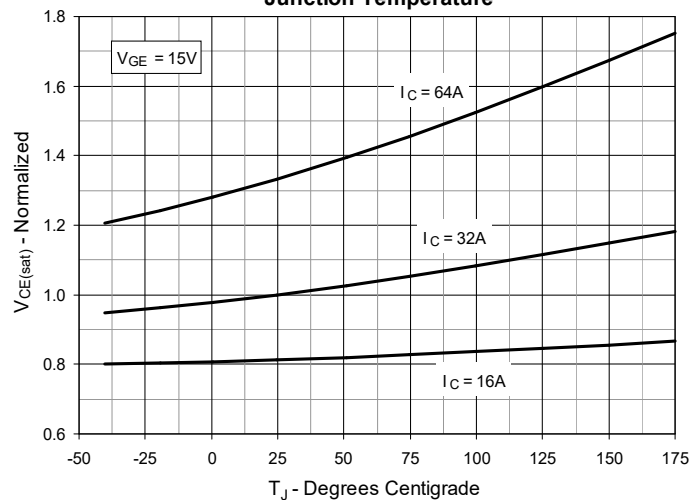
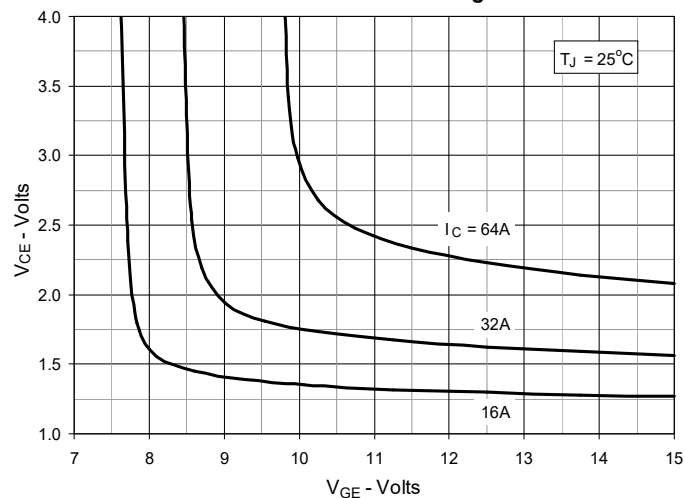
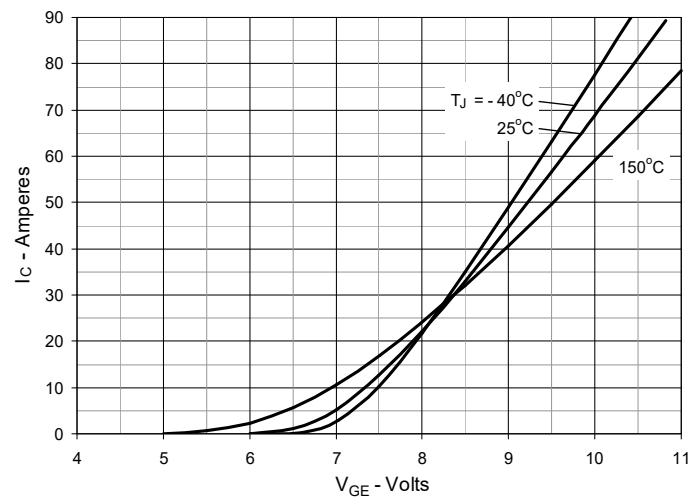
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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

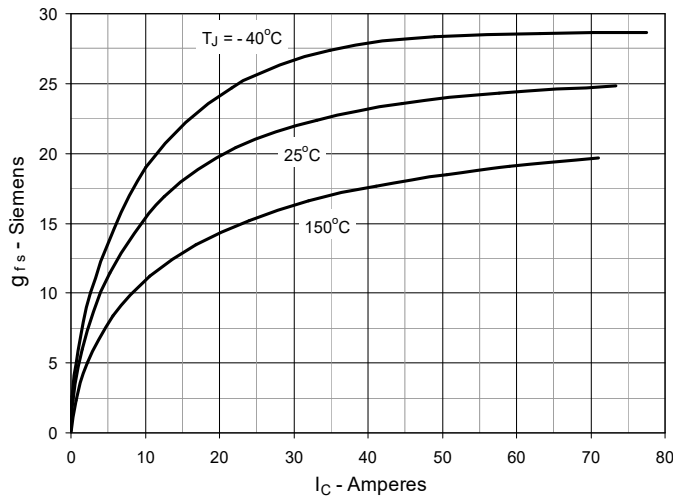


Fig. 8. Gate Charge

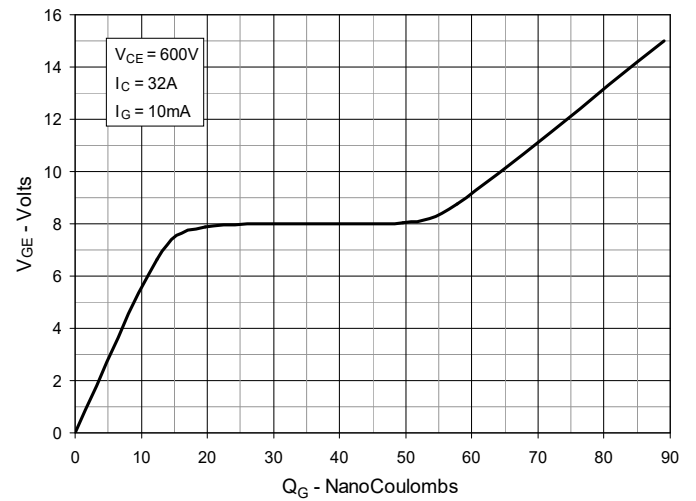


Fig. 9. Capacitance

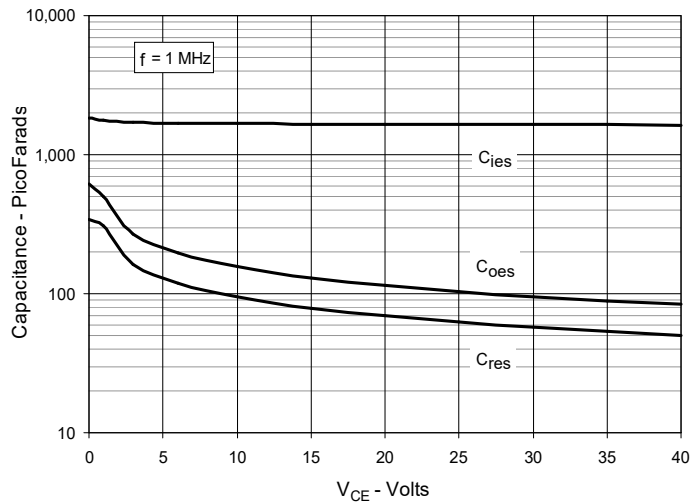


Fig. 10. Reverse-Bias Safe Operating Area

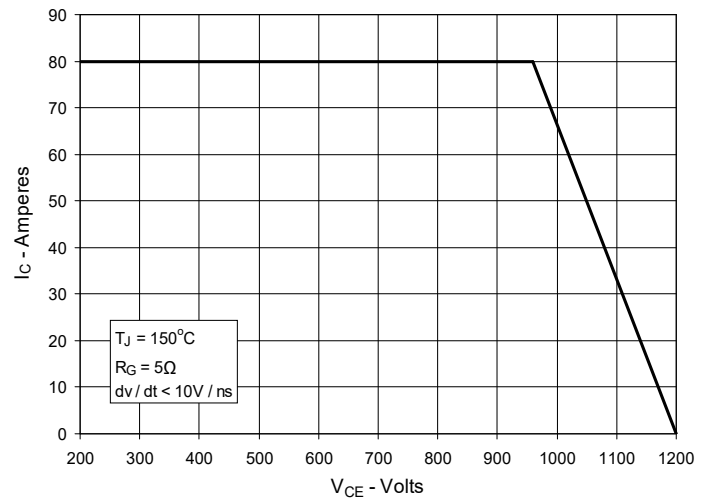


Fig. 11. Maximum Transient Thermal Impedance

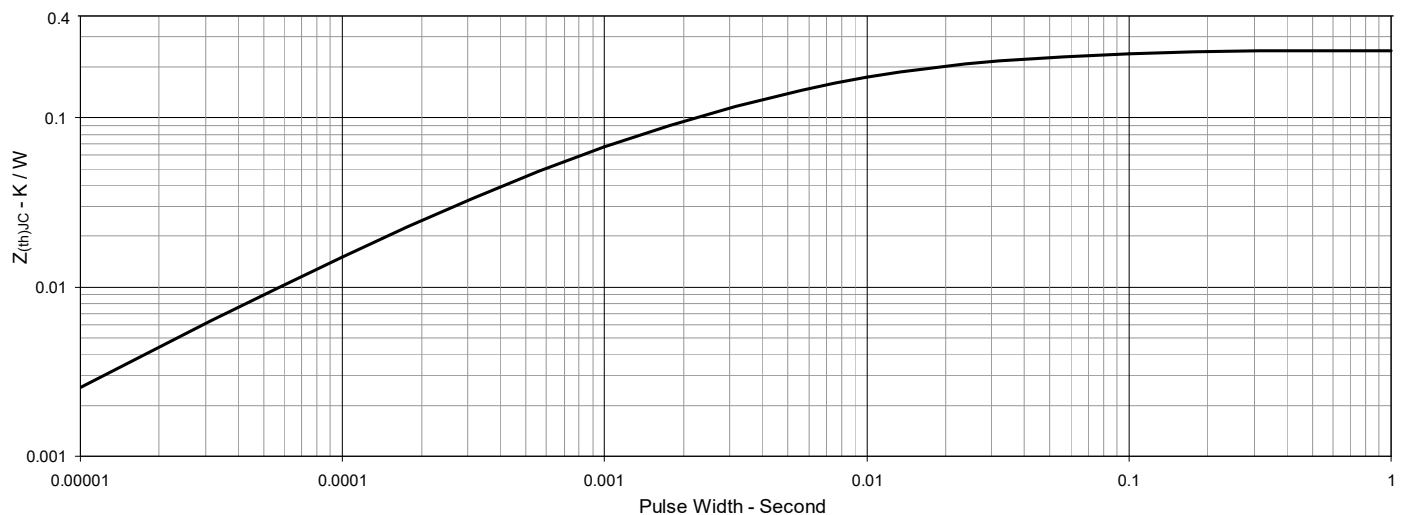


Fig. 12. Inductive Switching Energy Loss vs. Collector Current

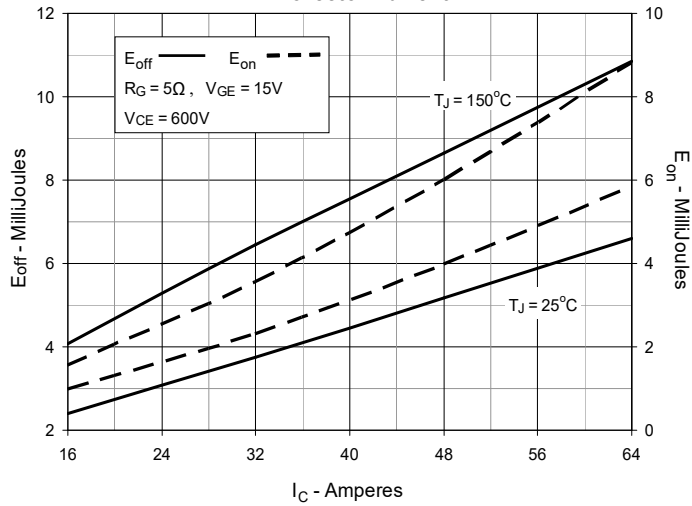


Fig. 13. Inductive Switching Energy Loss vs. Collector-Emitter Voltage

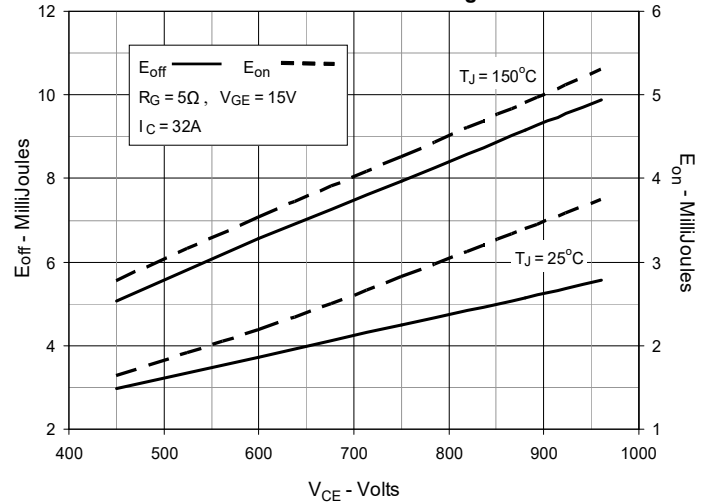


Fig. 14. Inductive Switching Energy Loss vs. Gate Resistance

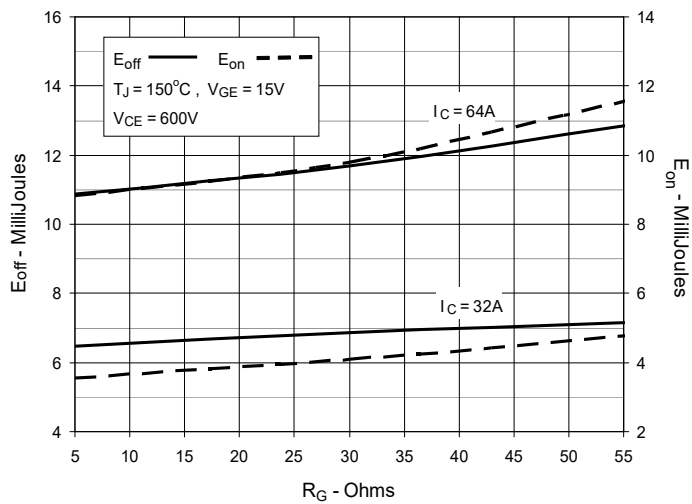


Fig. 15. Inductive Switching Energy Loss vs. Junction Temperature

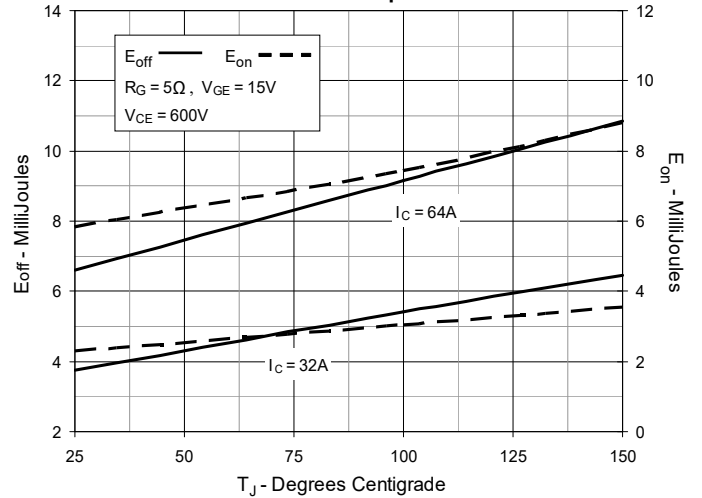


Fig. 16. Inductive Turn-off Switching Times vs. Gate Resistance

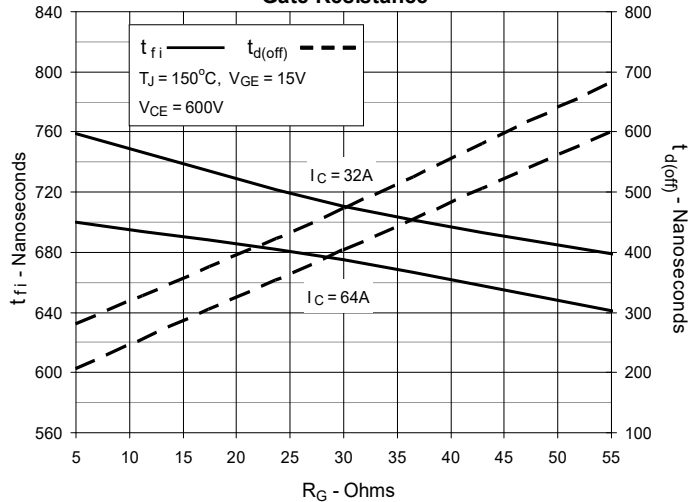


Fig. 17. Inductive Turn-off Switching Times vs. Collector Current

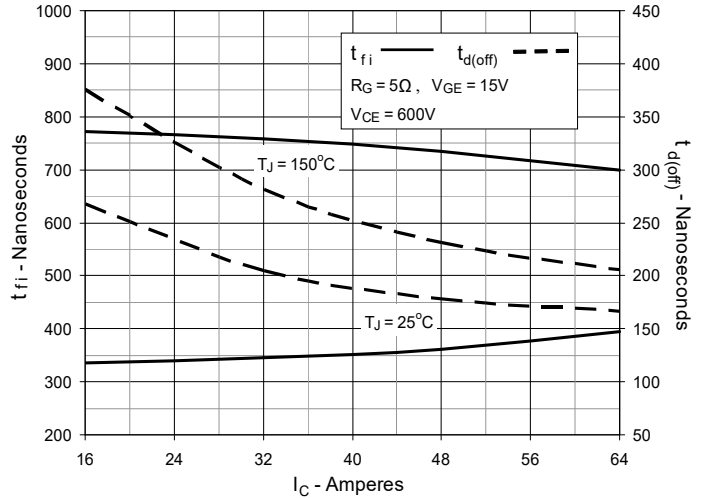


Fig. 18. Inductive Turn-off Switching Times vs. Junction Temperature

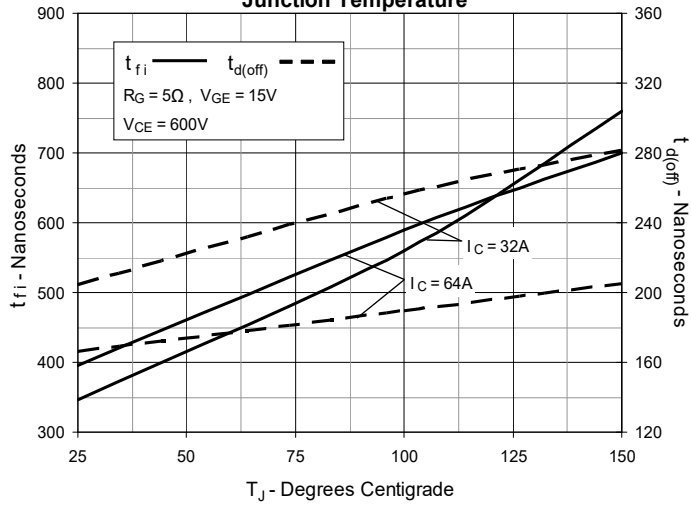


Fig. 19. Inductive Turn-on Switching Times vs. Gate Resistance

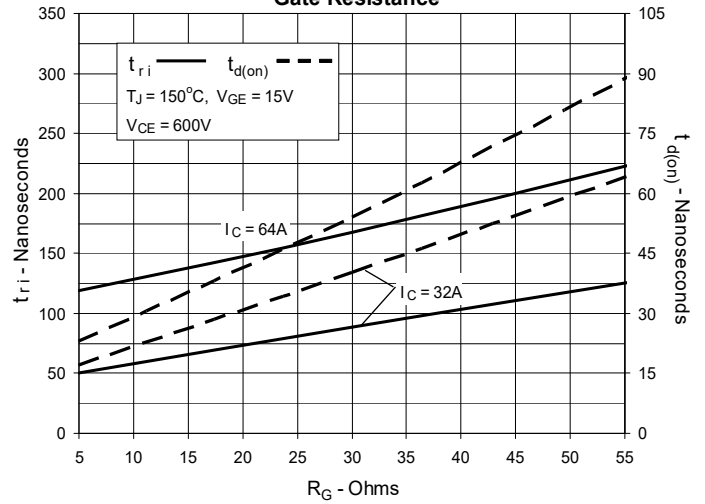


Fig. 20. Inductive Turn-on Switching Times vs. Collector Current

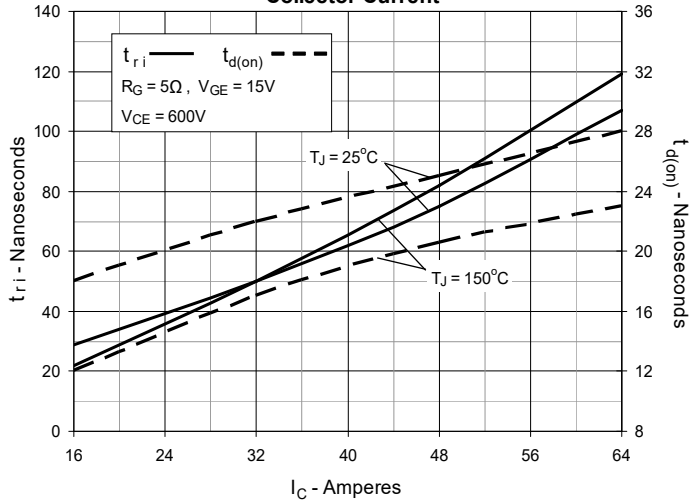
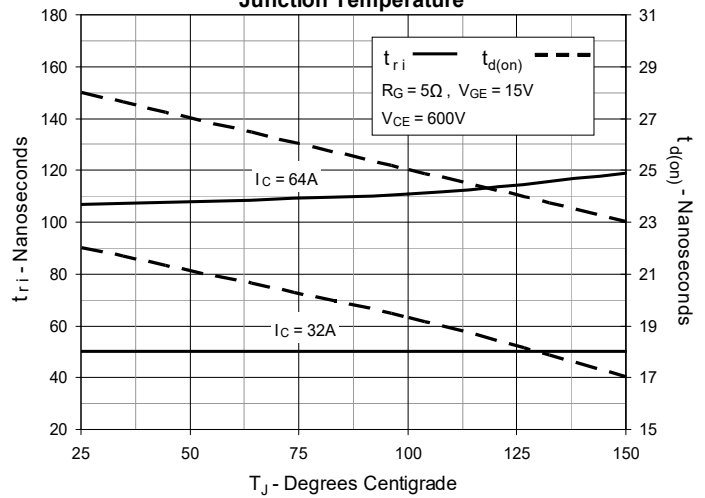
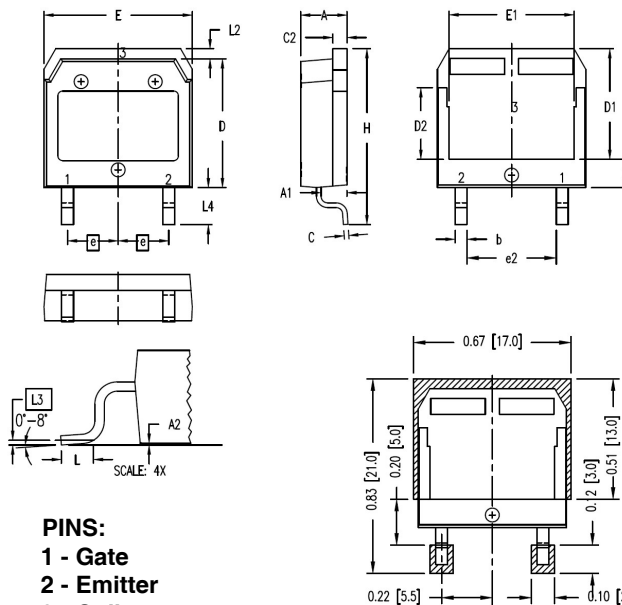


Fig. 21. Inductive Turn-on Switching Times vs. Junction Temperature



TO-268HV Outline


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

