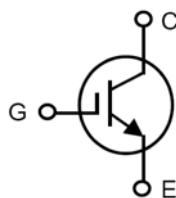


1200V XPT™ GenX4™ IGBT

IXYA30N120A4HV
IXYP30N120A4
IXYH30N120A4

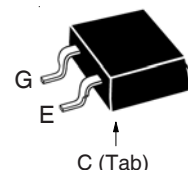
Ultra Low-V_{sat} PT IGBT for
up to 5kHz Switching



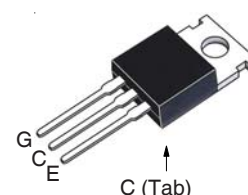
V_{CES} = 1200V
I_{C110} = 30A
V_{CE(sat)} ≤ 1.9V
t_{fi(typ)} = 147ns

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	106	A
I _{C110}	T _C = 110°C	30	A
I _{CM}	T _C = 25°C, 1ms	184	A
SSOA (RBSOA)	V _{GE} = 15V, T _{VJ} = 150°C, R _G = 5Ω Clamped Inductive Load	I _{CM} = 60 V _{CE} ≤ 0.8 • V _{CES}	A
P _C	T _C = 25°C	500	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 (0.062in.) from Case for 10s	260	°C
F _C M _d	Mounting Force (TO-263HV) Mounting Torque (TO-220 & TO-247)	10..65 / 2.2..14.6 1.13 / 10	N/lb Nm/lb.in
Weight	TO-263HV TO-220 TO-247	2.5 3.0 6.0	g g g

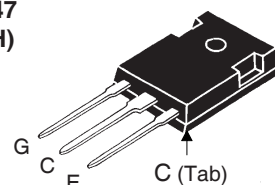
TO-263HV
(IXYA..HV)



TO-220
(IXYP)



TO-247
(IXYH)



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

Features

- Optimized for Low Conduction
- Positive Thermal Coefficient of V_{ce(sat)}
- International Standard Packages

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°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 T _J = 150°C			10 μA 500 μA
I _{GES}	V _{CE} = 0V, V _{GE} = ±20V			±100 nA
V _{CE(sat)}	I _C = 25A, V _{GE} = 15V, Note 1 T _J = 150°C		1.6 1.9	V V

Symbol Test Conditions
 $(T_J = 25^{\circ}\text{C}$ Unless Otherwise Specified)

Characteristic Values
Min. **Typ.** **Max.**

g_{fs}	$I_C = 25\text{A}, V_{CE} = 10\text{V}$, Note 1	10	16	S
C_{ies}	$V_{CE} = 25\text{V}, V_{GE} = 0\text{V}, f = 1\text{MHz}$		1150	pF
C_{oes}			70	pF
C_{res}			40	pF
$Q_{g(on)}$	$I_C = 25\text{A}, V_{GE} = 15\text{V}, V_{CE} = 0.5 \cdot V_{CES}$		57	nC
Q_{ge}			8	nC
Q_{gc}			26	nC
$t_{d(on)}$	Inductive load, $T_J = 25^{\circ}\text{C}$ $I_C = 25\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = 5\Omega$ Note 2		15	ns
t_{ri}			42	ns
E_{on}			4.0	mJ
$t_{d(off)}$			235	ns
t_{fi}			147	ns
E_{off}			3.4	mJ
$t_{d(on)}$	Inductive load, $T_J = 125^{\circ}\text{C}$ $I_C = 25\text{A}, V_{GE} = 15\text{V}$ $V_{CE} = 0.8 \cdot V_{CES}, R_G = 5\Omega$ Note 2		13	ns
t_{ri}			33	ns
E_{on}			4.8	mJ
$t_{d(off)}$			316	ns
t_{fi}			270	ns
E_{off}			5.6	mJ
R_{thJC}	TO-220 TO-247		0.50	0.30 $^{\circ}\text{C/W}$
R_{thCS}				$^{\circ}\text{C/W}$ $^{\circ}\text{C/W}$

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} (clamp), T_J or R_G .

ADVANCE TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from a subjective evaluation of the design, based upon prior knowledge and experience, and constitute a "considered reflection" of the anticipated result. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

IXYS MOSFETs and IGBTs are covered	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
by one or more of the following U.S. patents:	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	

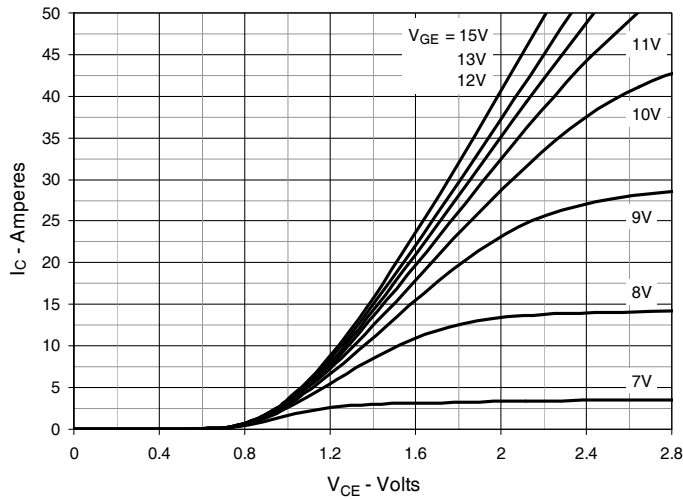
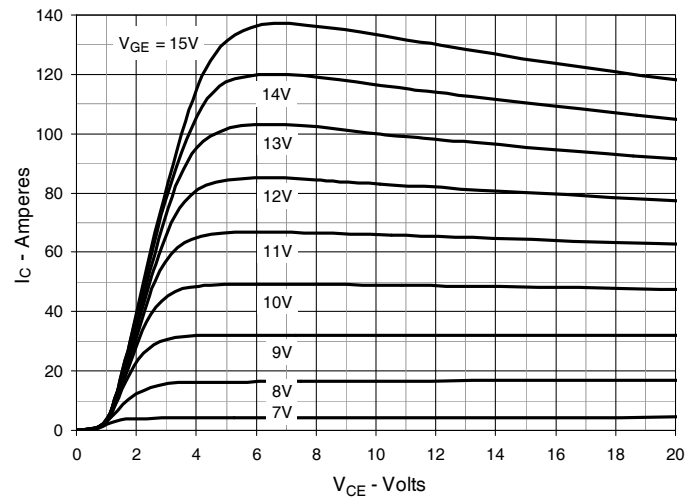
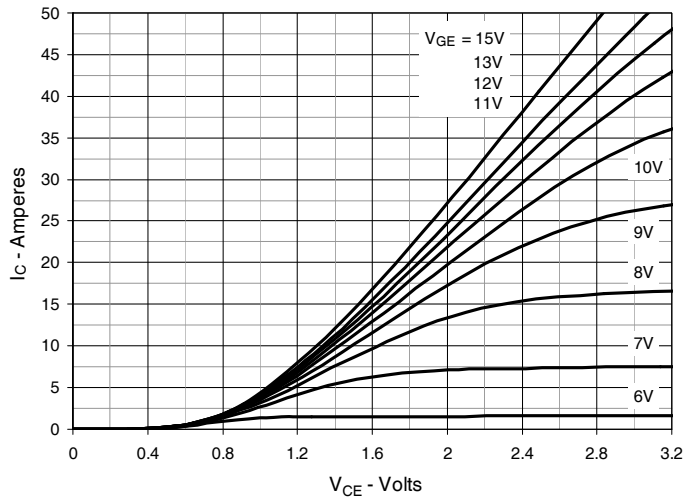
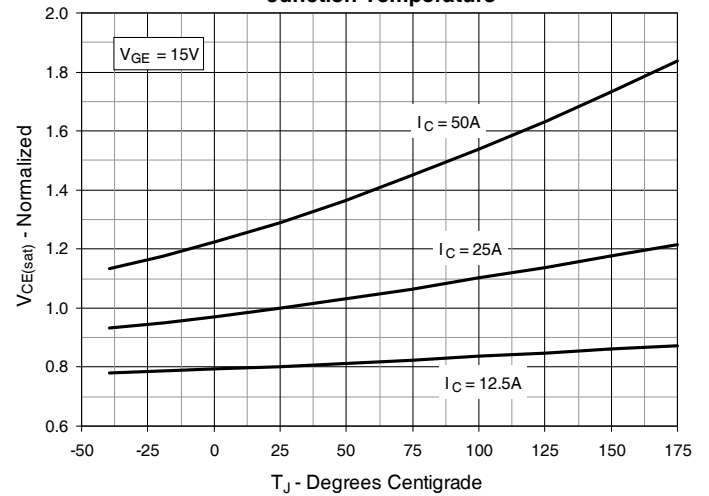
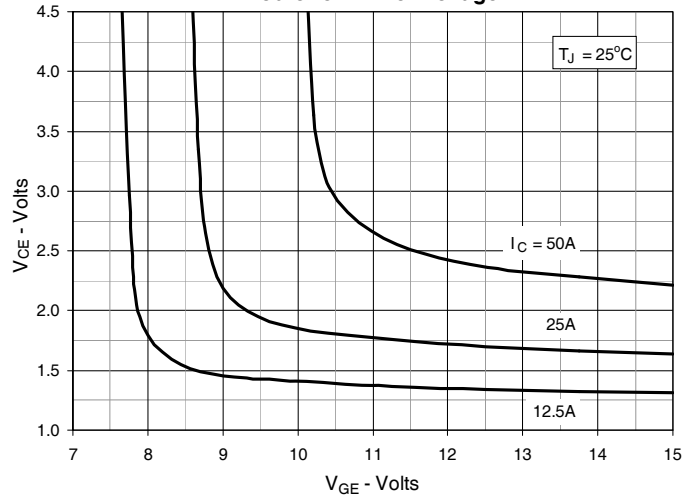
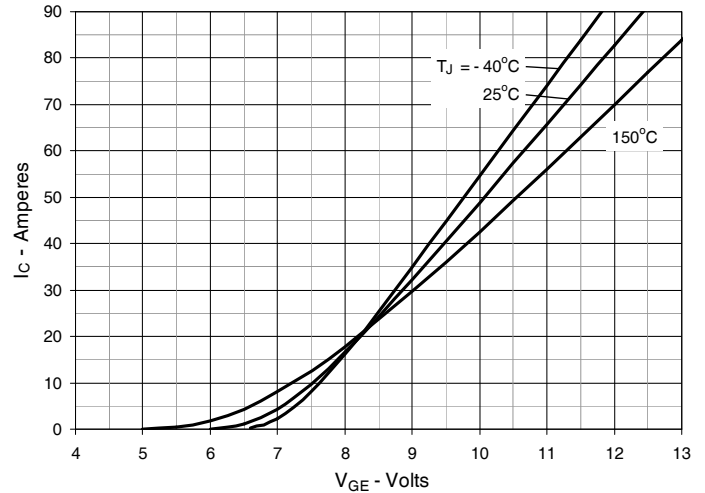
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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 VCE(sat) on Junction Temperature

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

Fig. 6. Input Admittance


Fig. 7. Transconductance

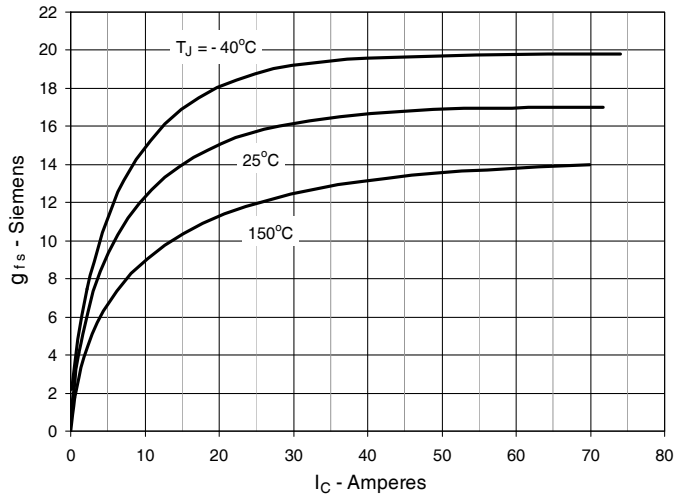


Fig. 8. Gate Charge

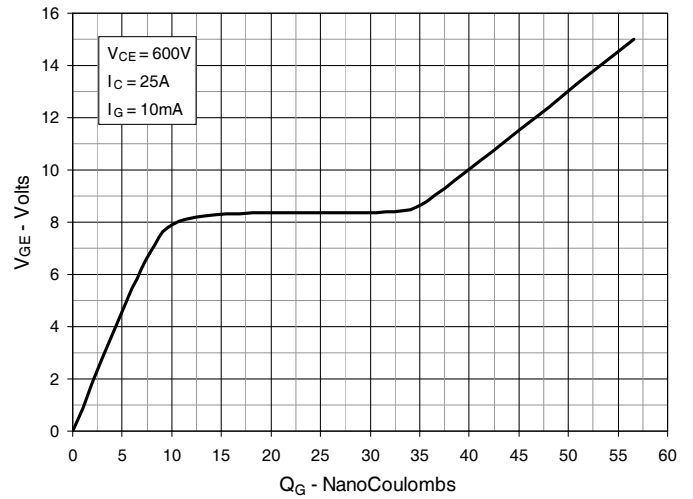


Fig. 9. Capacitance

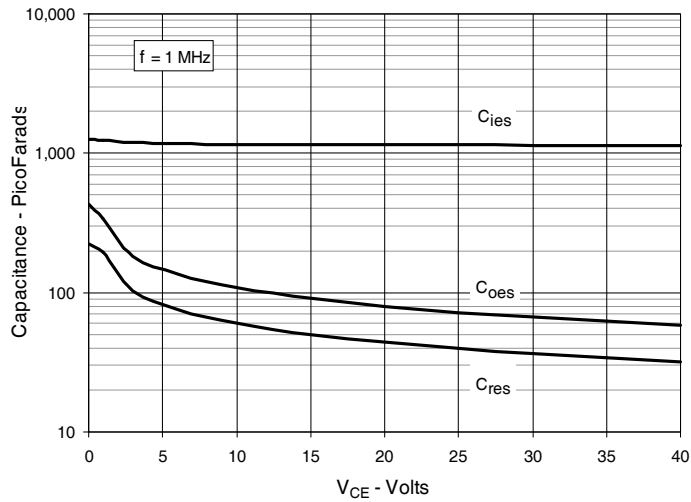


Fig. 10. Reverse-Bias Safe Operating Area

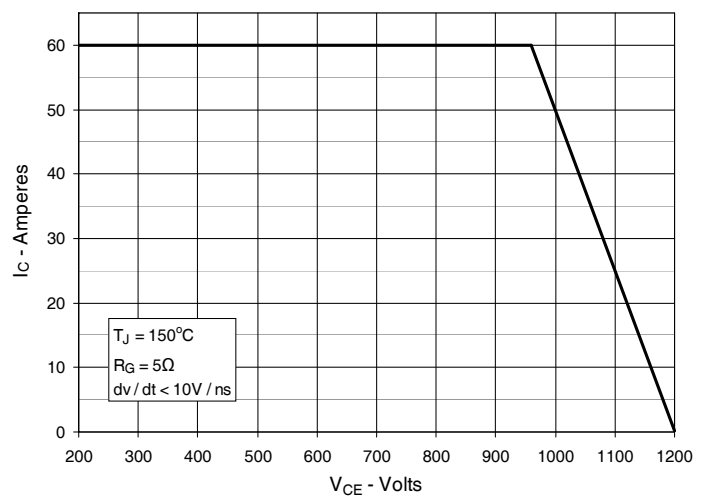


Fig. 11. Maximum Transient Thermal Impedance

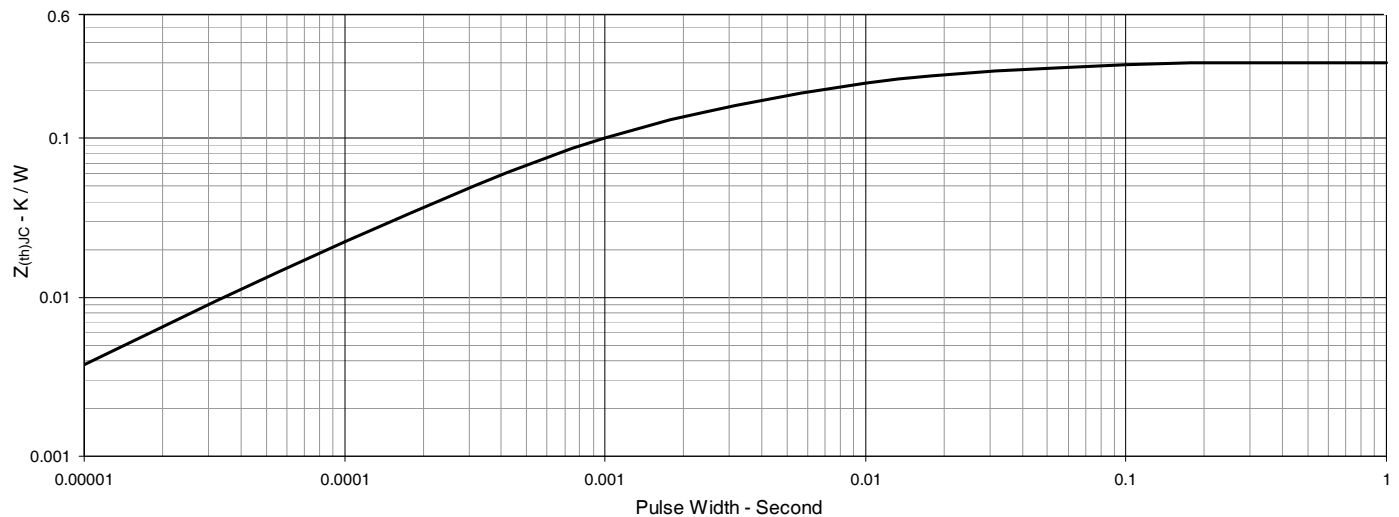


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

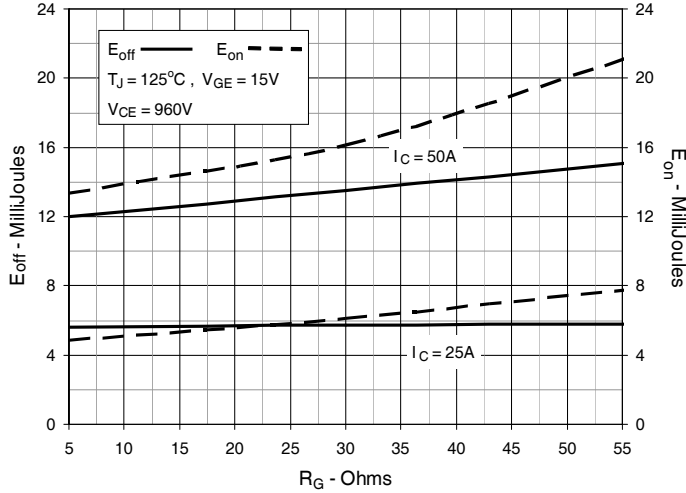


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

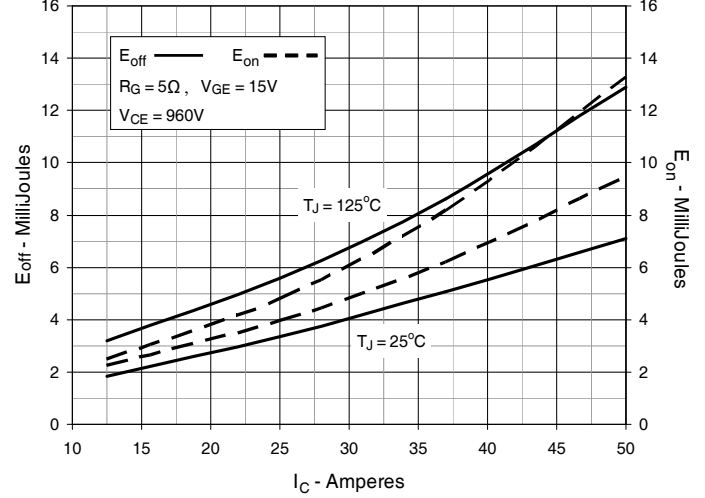


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

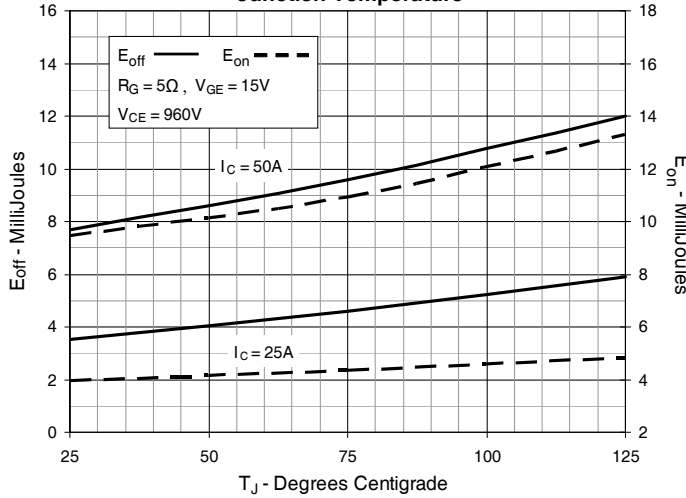


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

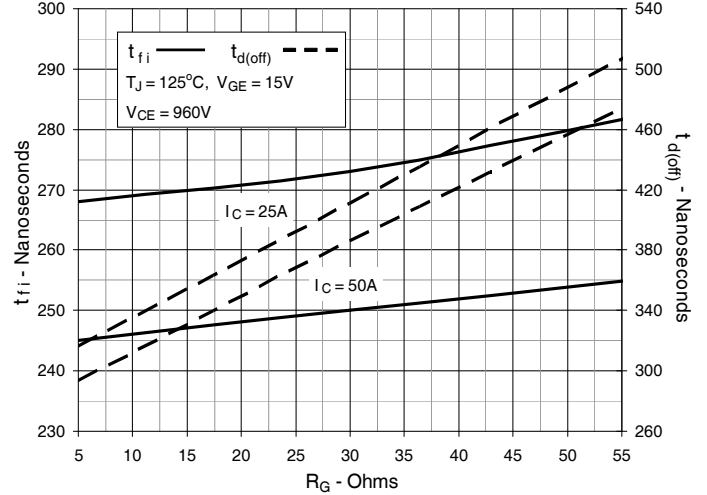


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

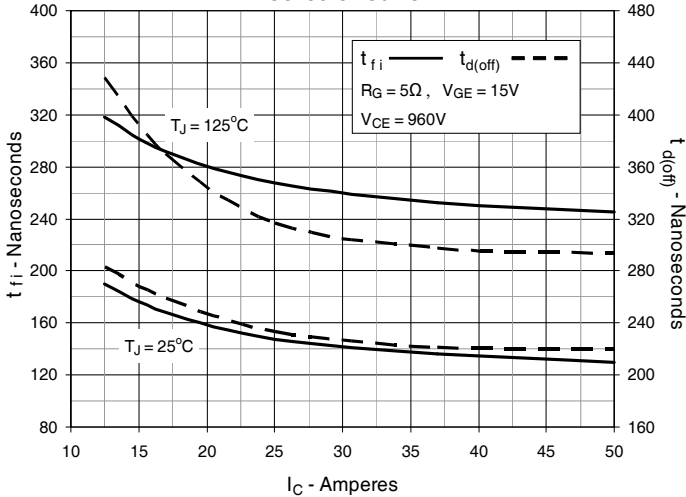


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

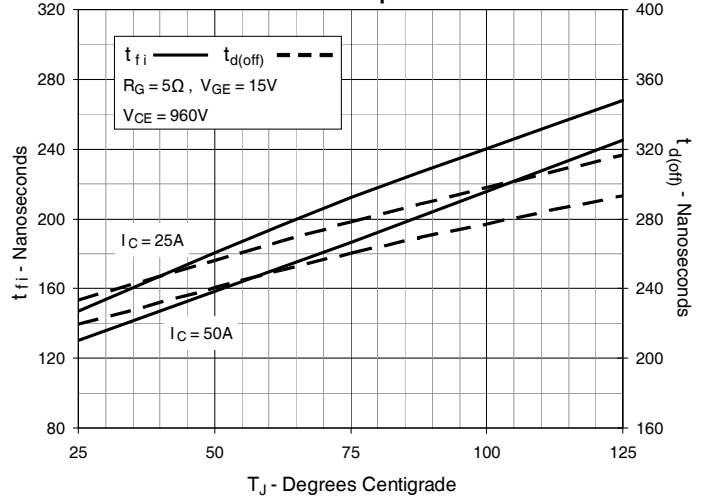


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

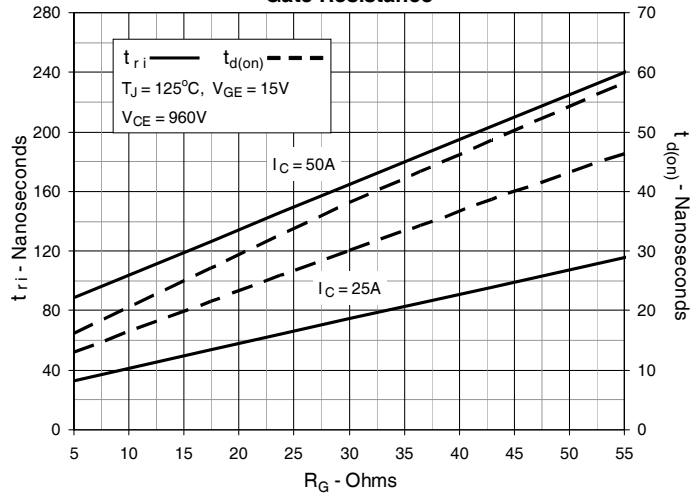


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

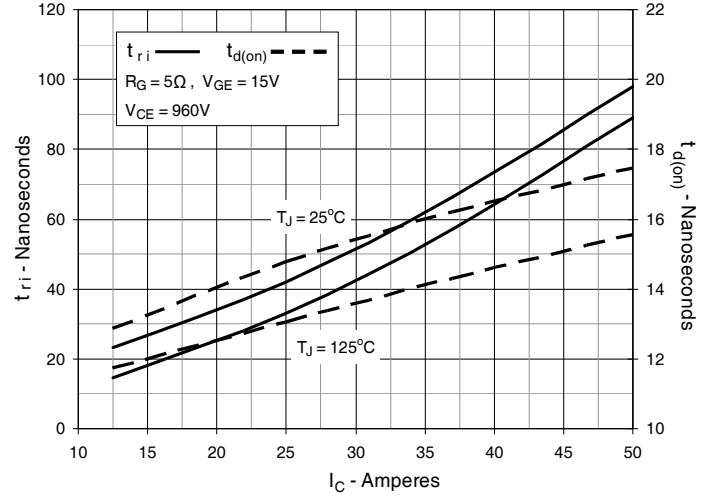
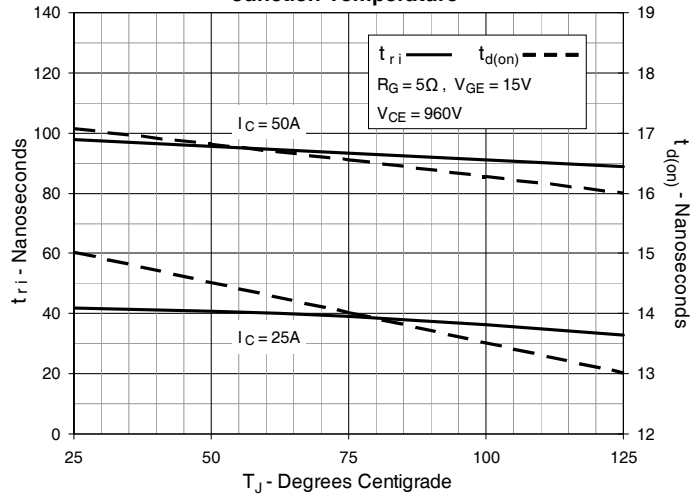
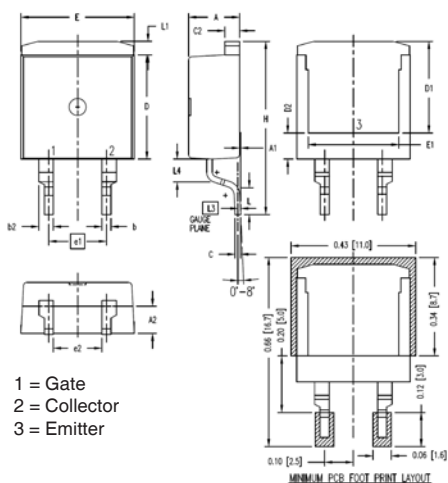


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

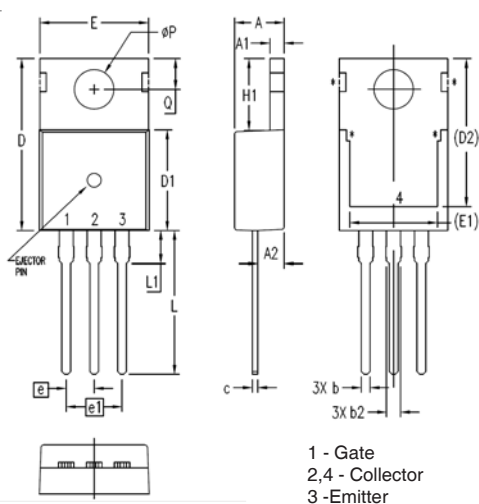


TO-263HV Outline



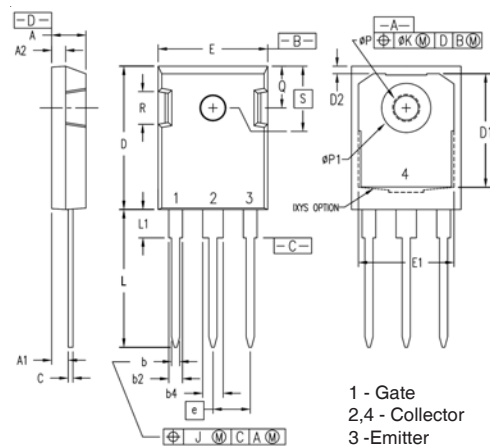
SYM	INCHES		MILLIMETER	
	MIN	MAX	MIN	MAX
A	.170	.185	4.30	4.70
A1	.000	.008	0.00	0.20
A2	.091	.098	2.30	2.50
b	.028	.035	0.70	0.90
b2	.046	.054	1.18	1.38
C	.018	.024	0.45	0.60
C2	.049	.055	1.25	1.40
D	.354	.370	9.00	9.40
D1	.311	.327	7.90	8.30
D2	.083	.098	2.10	2.50
E	.386	.402	9.80	10.20
E1	.307	.323	7.80	8.20
e1	.200	BSC	5.08	BSC
(e2)	.163	.174	4.13	4.43
H	.591	.614	15.00	15.60
L	.079	.102	2.00	2.60
L1	.039	.055	1.00	1.40
L3	.010	BSC	0.254	BSC
(L4)	.071	.087	1.80	2.20

TO-220 Outline



SYM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	.169	.185	4.30	4.70
A1	.047	.055	1.20	1.40
A2	.079	.106	2.00	2.70
b	.024	.039	0.60	1.00
b2	.045	.057	1.15	1.45
c	.014	.026	0.35	0.65
D	.587	.626	14.90	15.90
D1	.335	.370	8.50	9.40
(D2)	.500	.531	12.70	13.50
E	.382	.406	9.70	10.30
(E1)	.283	.323	7.20	8.20
e	.100	BSC	2.54	BSC
e1	.200	BSC	5.08	BSC
H1	.244	.268	6.20	6.80
L	.492	.547	12.50	13.90
L1	.110	.154	2.80	3.90
ØP	.134	.150	3.40	3.80
Q	.106	.126	2.70	3.20

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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