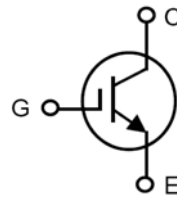


1200V XPT™ GenX4™ IGBT

IXYH30N120C4

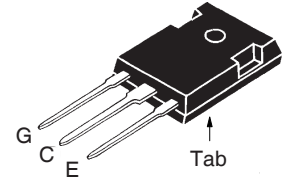
High-Speed Low-V_{sat} PT IGBT
for up to 20-50kHz Switching



$$\begin{aligned} V_{CES} &= 1200V \\ I_{C110} &= 30A \\ V_{CE(sat)} &\leq 2.4V \\ t_{fi(typ)} &= 53ns \end{aligned}$$

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	$T_J = 25^\circ C \text{ to } 175^\circ C$	1200	V
V_{CGR}	$T_J = 25^\circ C \text{ to } 175^\circ C, R_{GE} = 1M\Omega$	1200	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	$T_C = 25^\circ C$	94	A
I_{C110}	$T_C = 110^\circ C$	30	A
I_{CM}	$T_C = 25^\circ C, 1ms$	166	A
SSOA (RBSOA)	$V_{GE} = 15V, T_{VJ} = 150^\circ C, R_G = 5\Omega$ Clamped Inductive Load	$I_{CM} = 60$ $V_{CE} \leq 0.8 \cdot V_{CES}$	A
P_C	$T_C = 25^\circ C$	500	W
T_J		-55 ... +175	$^\circ C$
T_{JM}		175	$^\circ C$
T_{stg}		-55 ... +175	$^\circ C$
T_L	Maximum Lead Temperature for Soldering	300	$^\circ C$
T_{SOLD}	1.6 mm (0.062in.) from Case for 10s	260	$^\circ C$
M_d	Mounting Torque	1.13/10	Nm/lb.in.
Weight		6	g

TO-247



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

Features

- Optimized for Low Switching 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

Symbol	Test Conditions ($T_J = 25^\circ C$, Unless Otherwise Specified)	Characteristic Values		
		Min.	Typ.	Max.
BV_{CES}	$I_C = 250\mu A, V_{GE} = 0V$	1200		V
$V_{GE(th)}$	$I_C = 250\mu A, V_{CE} = V_{GE}$	4.0		6.5 V
I_{CES}	$V_{CE} = V_{CES}, V_{GE} = 0V$ $T_J = 150^\circ C$			10 μA 500 μA
I_{GES}	$V_{CE} = 0V, V_{GE} = \pm 20V$			± 100 nA
$V_{CE(sat)}$	$I_C = 25A, V_{GE} = 15V, \text{Note 1}$ $T_J = 150^\circ C$		2.0 2.4	2.4 V V

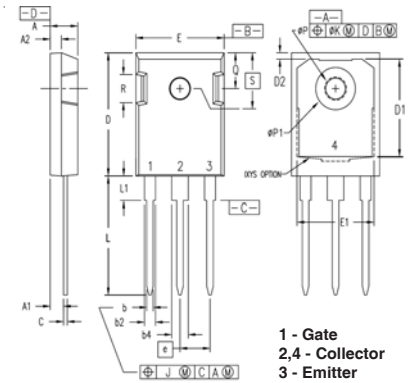
Symbol Test Conditions

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

Characteristic Values

		Min.	Typ.	Max.
g_{fs}	$I_C = 25\text{A}, V_{CE} = 10\text{V}$, Note 1	9.0	15.5	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}			10	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		18	ns
t_{ri}			58	ns
E_{on}			4.8	mJ
$t_{d(off)}$			205	ns
t_{fi}			53	ns
E_{off}			1.5	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		16	ns
t_{ri}			40	ns
E_{on}			5.6	mJ
$t_{d(off)}$			260	ns
t_{fi}			100	ns
E_{off}			2.7	mJ
R_{thJC}				0.30 $^\circ\text{C/W}$
R_{thCS}		0.21		$^\circ\text{C/W}$

TO-247 (IXYH) 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	

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 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	

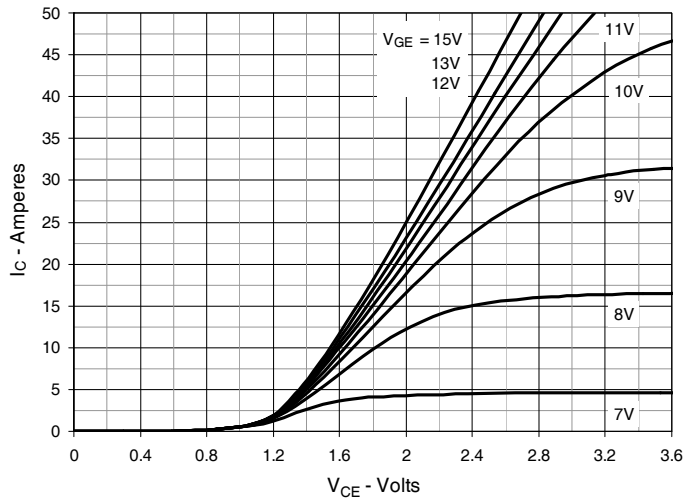
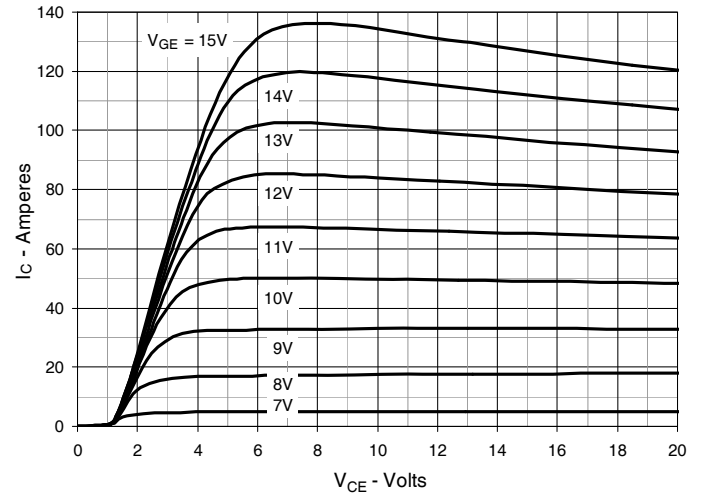
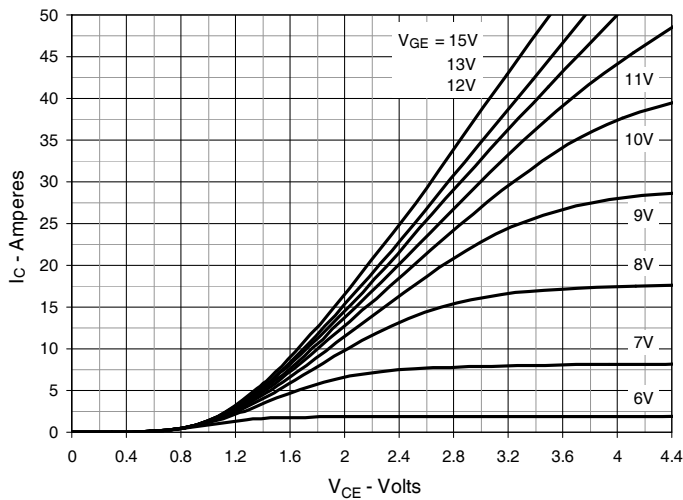
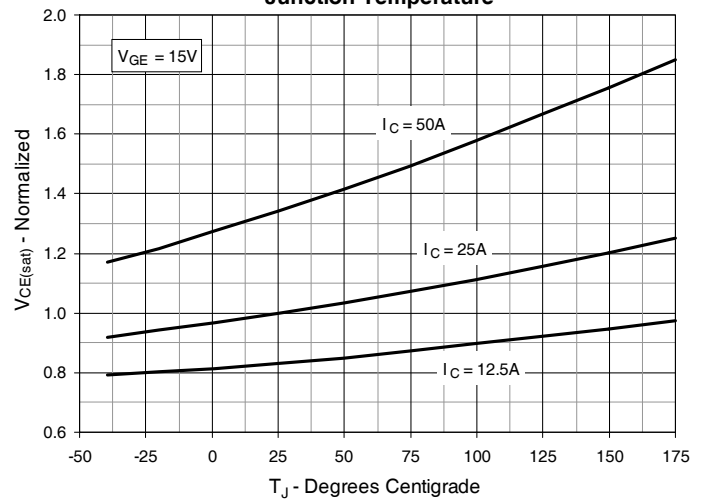
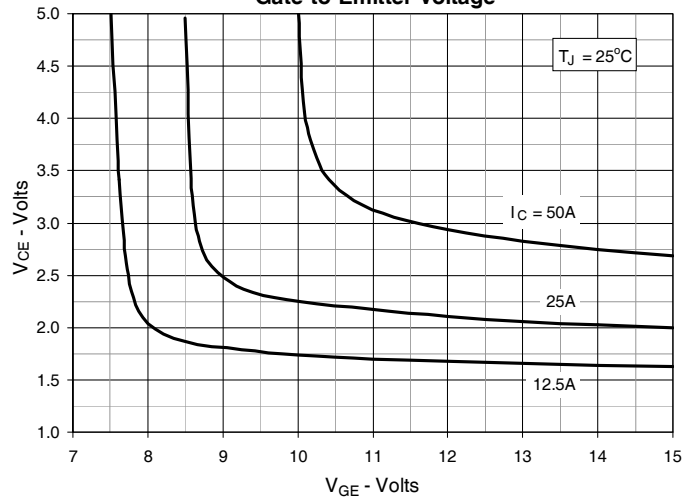
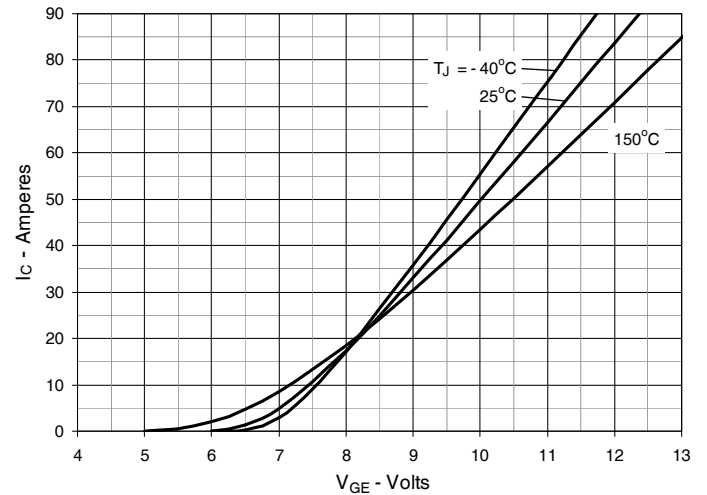
Fig. 1. Output Characteristics @ $T_J = 25^\circ\text{C}$

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


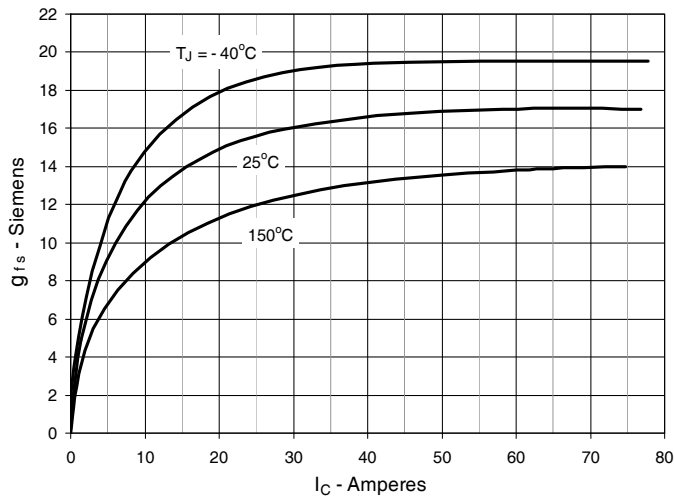
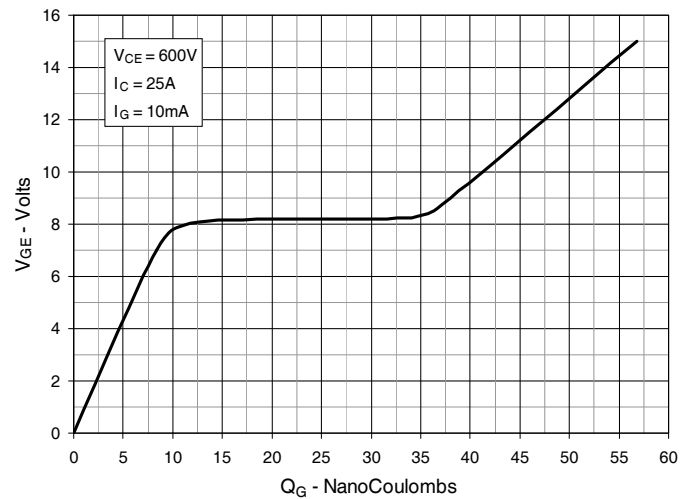
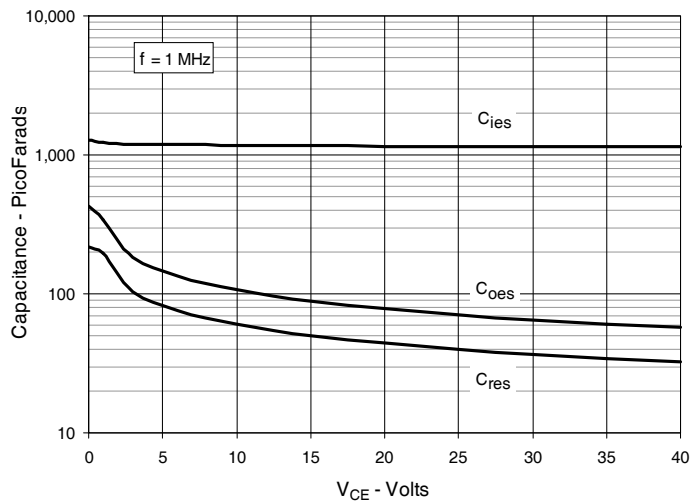
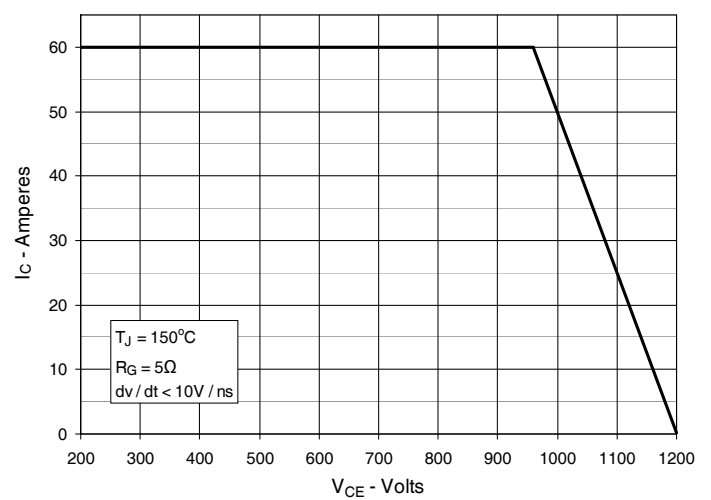
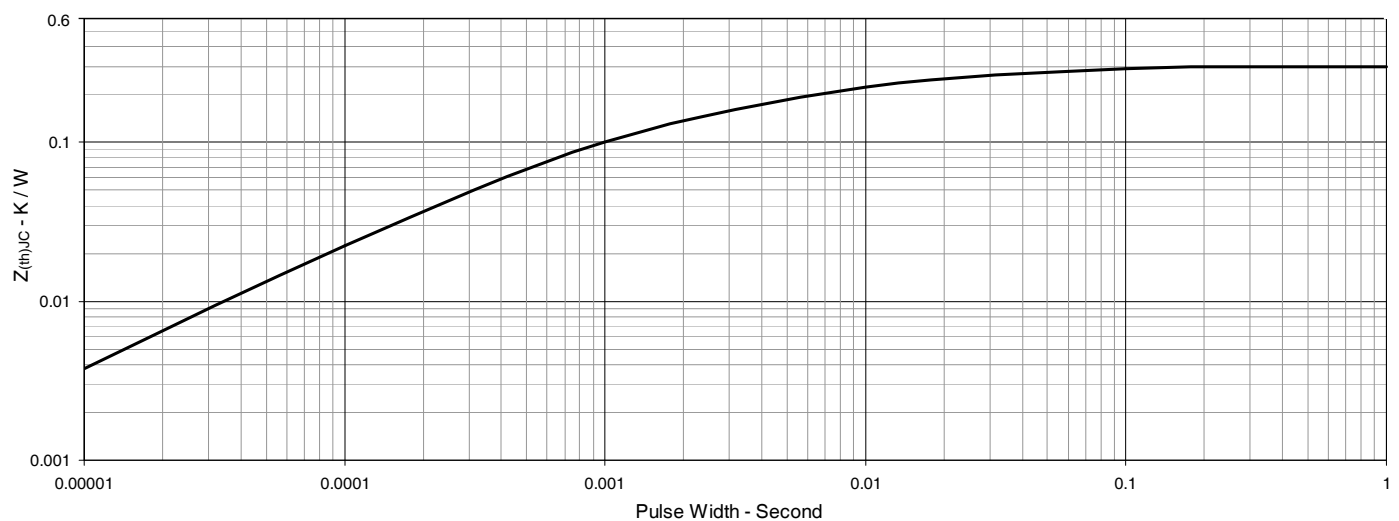
Fig. 7. Transconductance

Fig. 8. Gate Charge

Fig. 9. Capacitance

Fig. 10. Reverse-Bias Safe Operating Area

Fig. 11. Maximum Transient Thermal Impedance


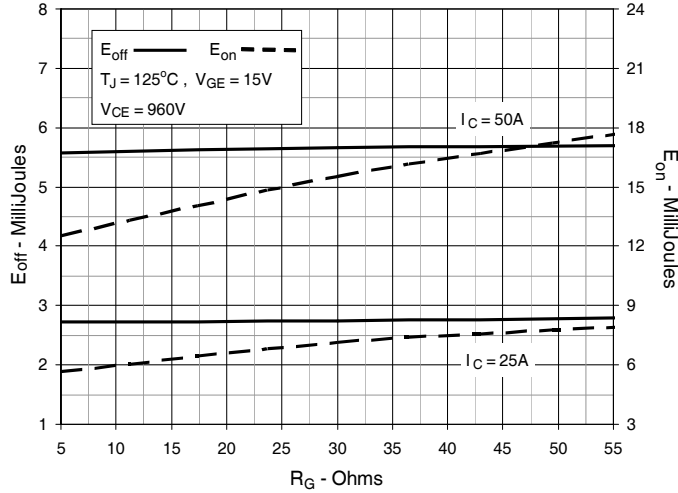
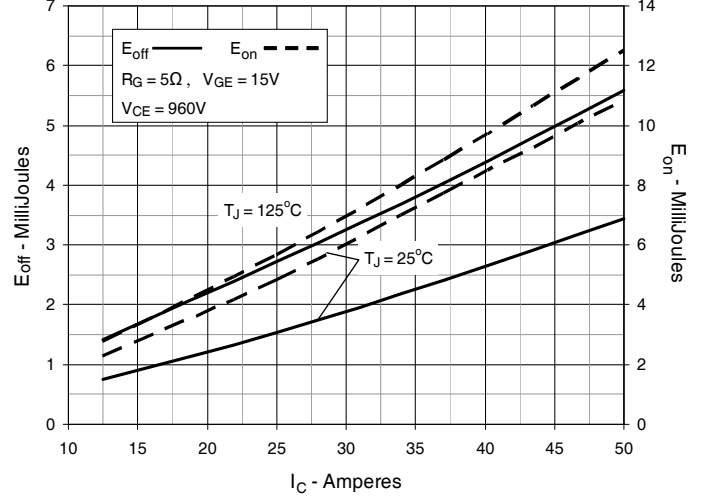
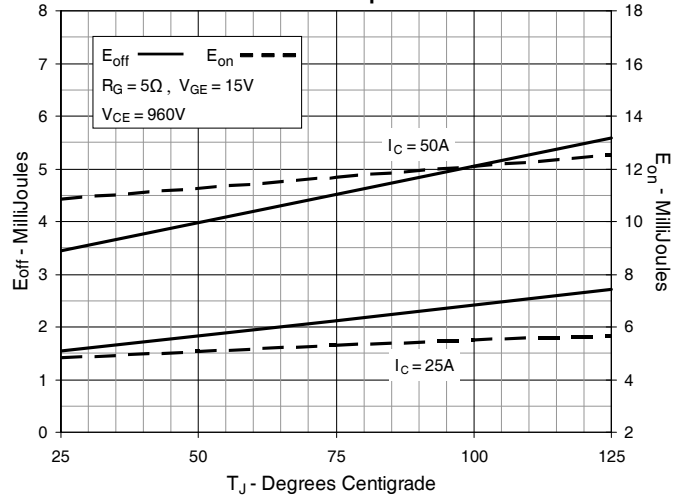
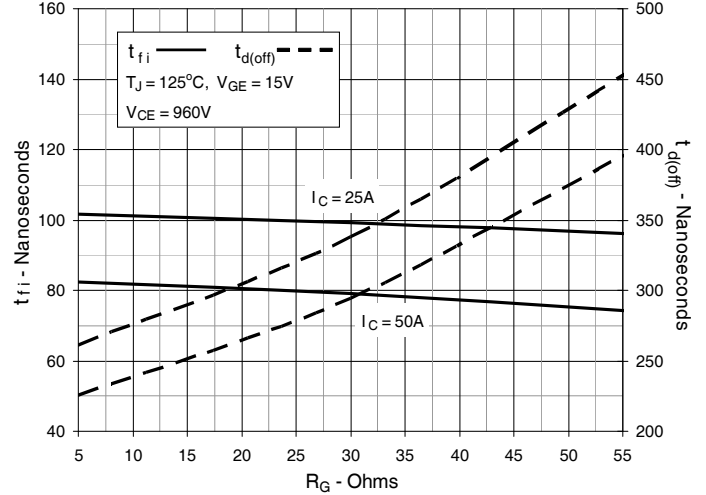
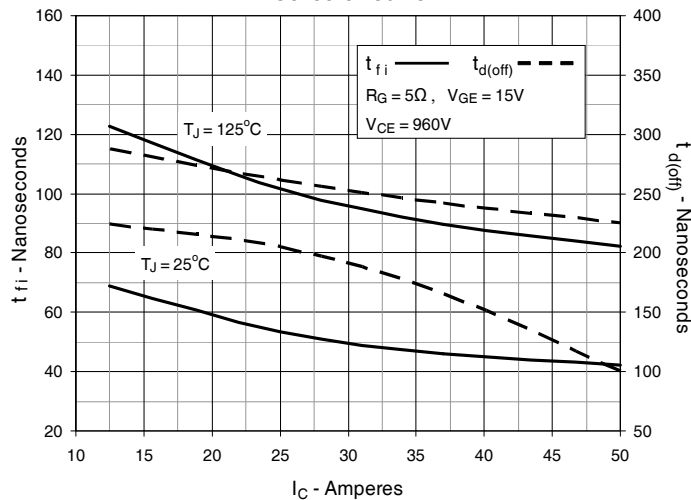
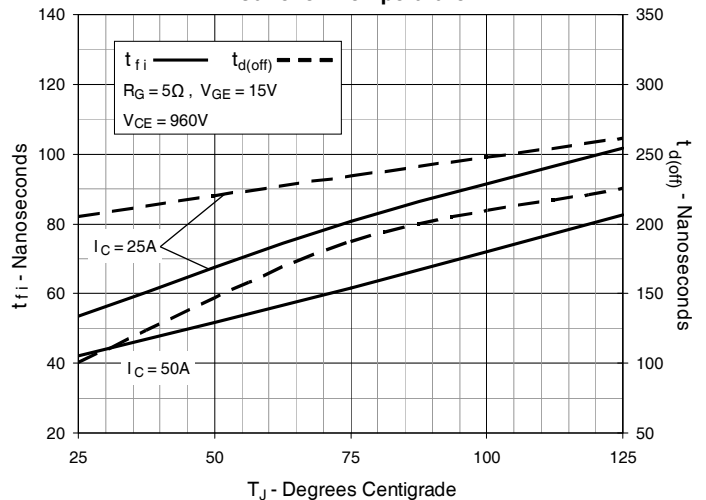
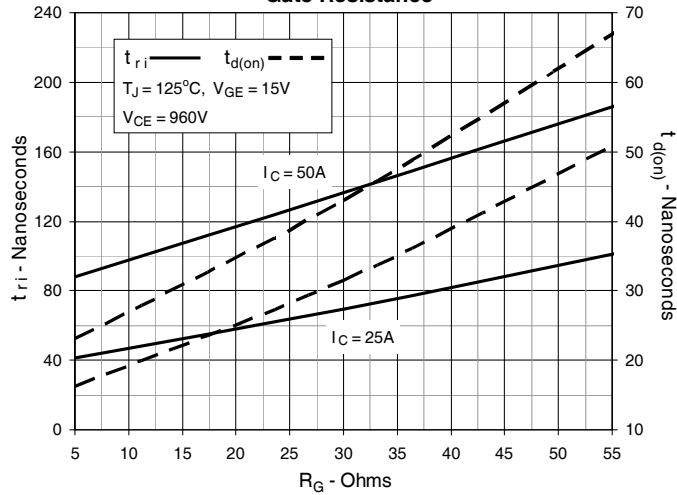
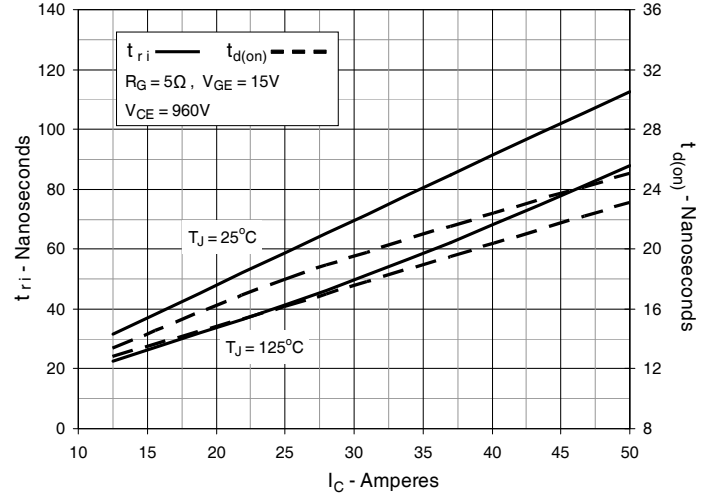
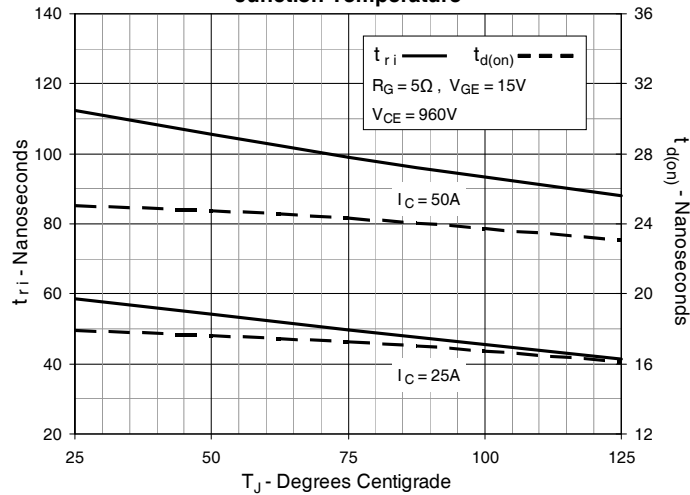
Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

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




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