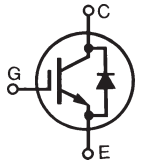
IXYS

Preliminary Technical Information

GenX3™ 1200V IGBT IXGH24N120C3H1

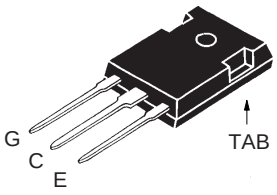
V_{CES} = 1200V
I_{C25} = 48A
$V_{CE(sat)}$ ≤ 4.2V
$t_{fi(typ)}$ = 110ns

High speed PT IGBTs for 10-50kHz Switching



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1200	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1200	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	48	A
I_{C100}	T_C = 100°C	24	A
I_{CM}	T_C = 25°C, 1ms	96	A
I_A	T_C = 25°C	20	A
E_{AS}	T_C = 25°C	250	mJ
SSOA (RBSOA)	V_{GE} = 15V, T_J = 125°C, R_G = 5Ω Clamped inductive load @ V_{CE} ≤ 1200V	I_{CM} = 48	A
P_C	T_C = 25°C	250	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting torque	1.13/10	Nm/lb.in.
T_L	Maximum lead temperature for soldering	300	°C
T_{SOLD}	1.6mm (0.062 in.) from case for 10s	260	°C
Weight		6	g

TO-247AD



G = Gate C = Collector
E = Emitter TAB = Collector

Features

- International standard packages: JEDEC TO-247AD
- IGBT and anti-parallel FRD in one package
- MOS Gate turn-on
  - drive simplicity
- Sonic-FRD diode
  - soft recovery with low I_{RM}
- Avalanche rated

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}	2.5		5.0	V
I_{CES}	V_{CE} = V_{CES}			100	μA
	V_{GE} = 0V T_J = 125°C			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 20A, V_{GE} = 15V, Note 2		3.6	4.2	V
	T_J = 125°C		3.1		V

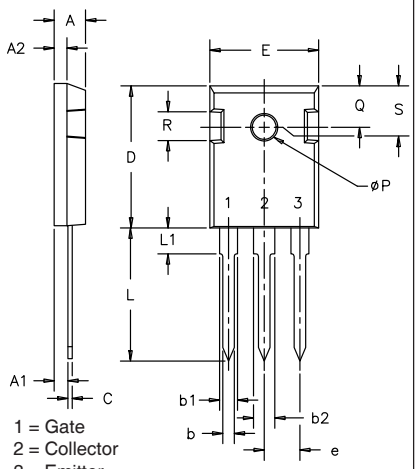
Applications

- AC motor speed control
- DC servo and robot drives
- DC choppers
- Uninterruptible power supplies (UPS)
- Switch-mode and resonant-mode power supplies

© 2008 IXYS CORPORATION, All rights reserved

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 24A, V_{CE} = 10V, Note 2	10	17		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1900		pF
C_{oes}			125		pF
C_{res}			52		pF
Q_g	I_C = 24A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		79		nC
Q_{ge}			12		nC
Q_{gc}			36		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		16		ns
t_{ri}	I_C = 20A, V_{GE} = 15V		27		ns
E_{on}	V_{CE} = 600V, R_G = 5Ω		1.16		mJ
$t_{d(off)}$	Note 1		93		ns
t_{fi}			110		ns
E_{off}			0.47	0.85	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		16		ns
t_{ri}	I_C = 20A, V_{GE} = 15V		35		ns
E_{on}	V_{CE} = 600V, R_G = 5Ω		2.18		mJ
$t_{d(off)}$	Note 1		125		ns
t_{fi}			305		ns
E_{off}			1.18	2.00	mJ
R_{thJC}				0.50	°C/W
R_{thCK}			0.25		°C/W

TO-247 (IXGH) AD Outline



1 = Gate
2 = Collector
3 = Emitter
Tab = Collector

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.7	5.3
A_1	.087	.102	2.2	2.54
A_2	.059	.098	2.2	2.6
b	.040	.055	1.0	1.4
b_1	.065	.084	1.65	2.13
b_2	.113	.123	2.87	3.12
C	.016	.031	.4	.8
D	.819	.845	20.80	21.46
E	.610	.640	15.75	16.26
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1		.177		4.50
øP	.140	.144	3.55	3.65
Q	.212	.244	5.4	6.2
R	.170	.216	4.32	5.49
S	.242 BSC		6.15 BSC	

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 20A, V_{GE} = 0V			3.0	V
	T_J = 125°C			2.8	V
I_{RM}	I_F = 20A, -di$_F$/dt = 750A/µs, V_R = 800V		19		A
t_{rr}	V_{GE} = 0V		70		ns
R_{thJC}				0.9	°C/W

Notes: 1. Switching times may increase for V_{CE} (Clamp) > 0.8 • V_{CES}, higher T_J or increased R_G.
2. Pulse test, t ≤ 300µs; duty cycle, d ≤ 2%.

PRELIMINARY TECHNICAL INFORMATION

The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. 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 4,850,072 4,881,106 4,931,844 5,017,508 5,034,796 5,049,961 5,063,307 5,187,117 5,237,481 5,381,025 5,486,715 6,162,665 6,259,123 B1 6,306,728 B1 6,404,065 B1 6,534,343 6,583,505 6,683,344 6,710,405 B2 6,710,463 6,727,585 6,759,692 6,771,478 B2 7,005,734 B2 7,063,975 B2 7,071,537 7,157,338B2

Fig. 1. Output Characteristics @ 25ºC

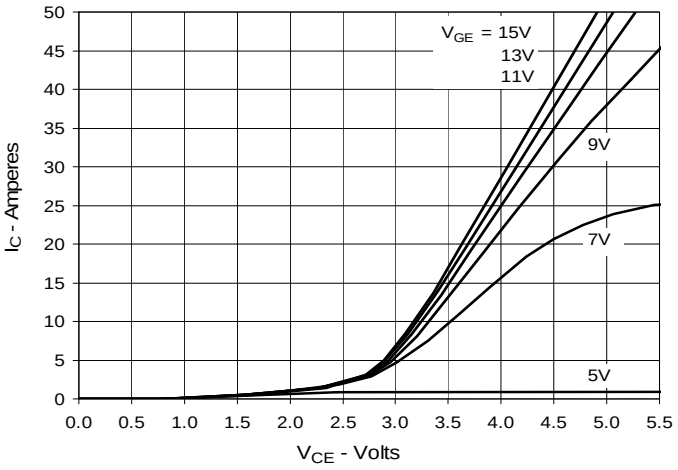


Fig. 2. Extended Output Characteristics @ 25ºC

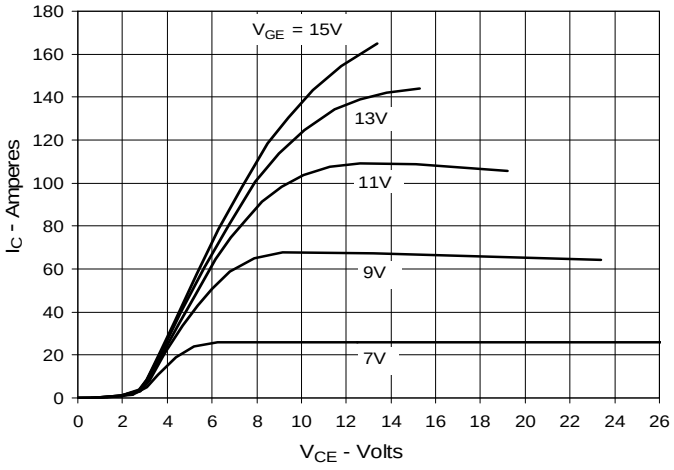


Fig. 3. Output Characteristics @ 125ºC

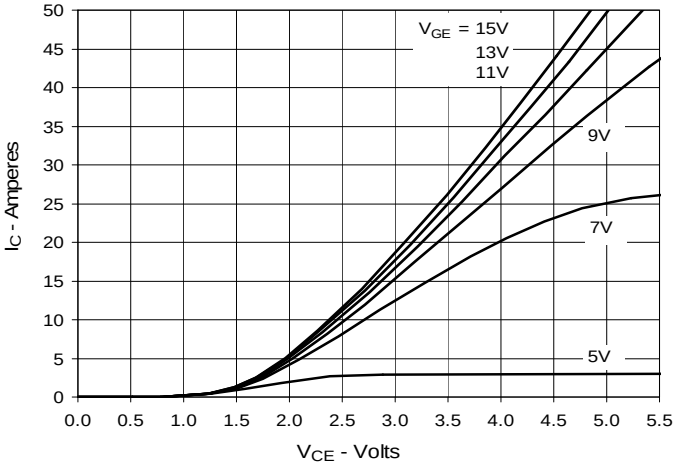


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

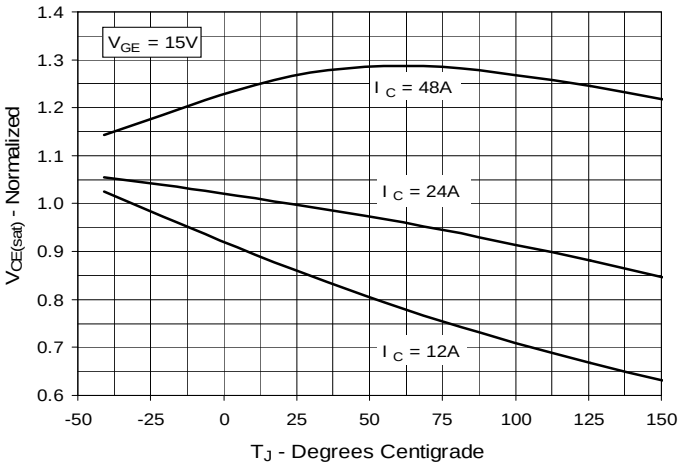


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

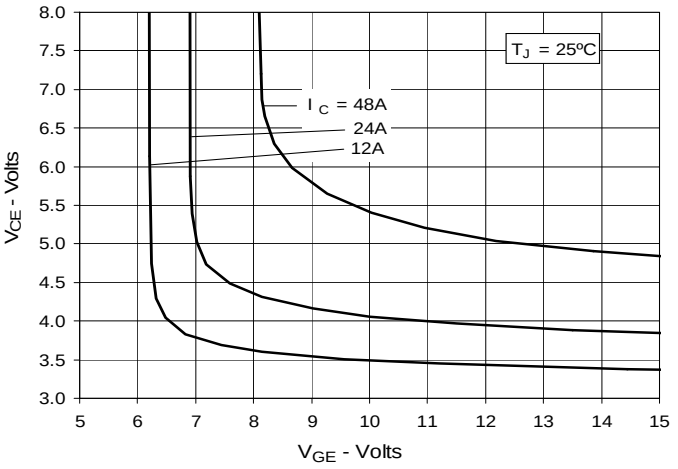
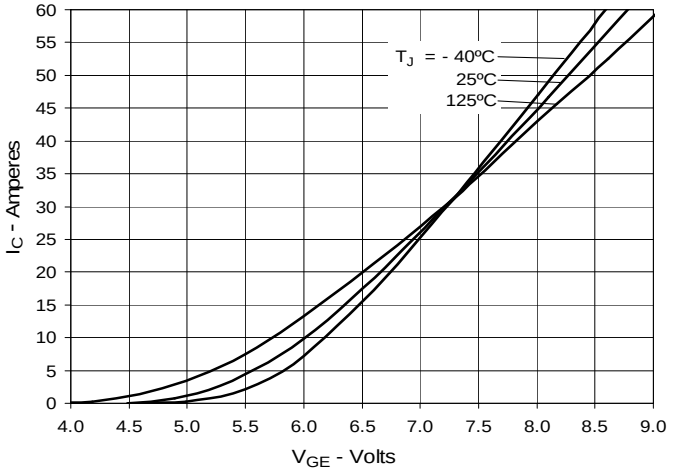


Fig. 6. Input Admittance



© 2008 IXYS CORPORATION, All rights reserved

Fig. 7. Transconductance

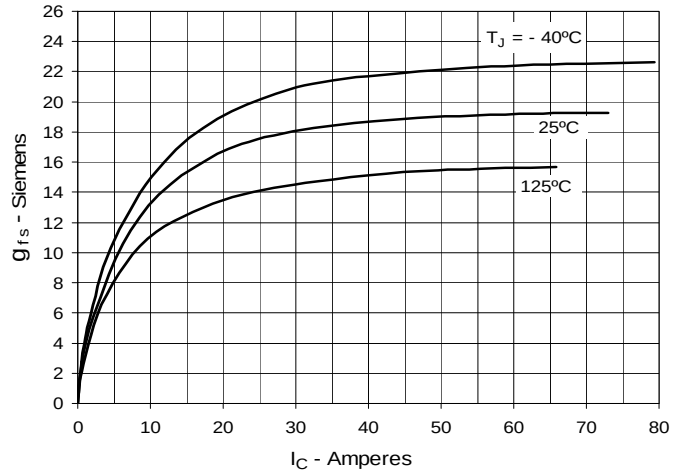


Fig. 8. Gate Charge

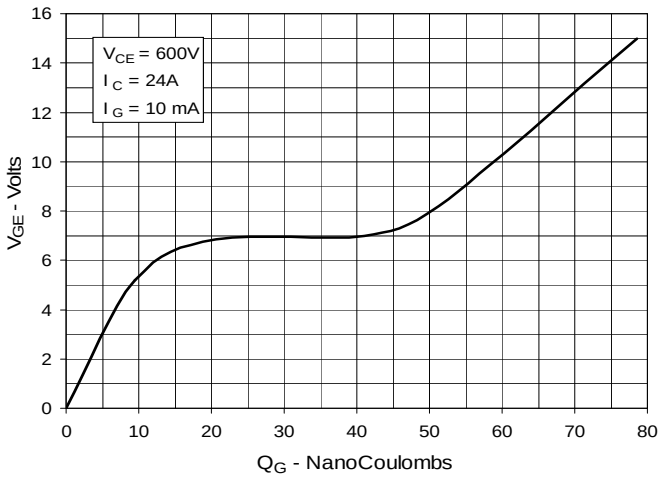


Fig. 9. Capacitance

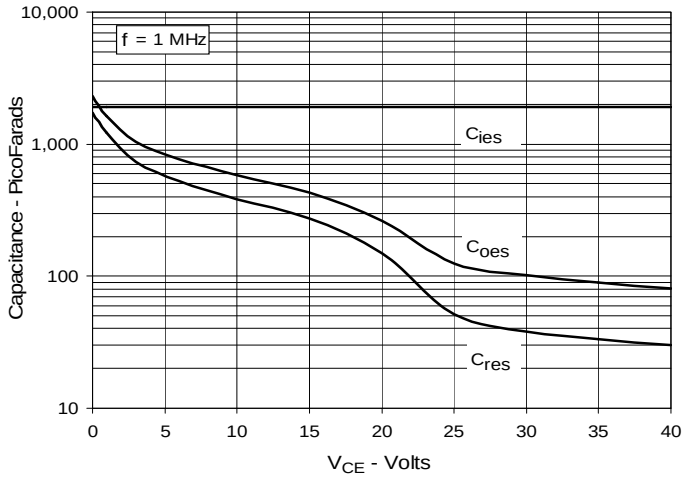


Fig. 10. Reverse-Bias Safe Operating Area

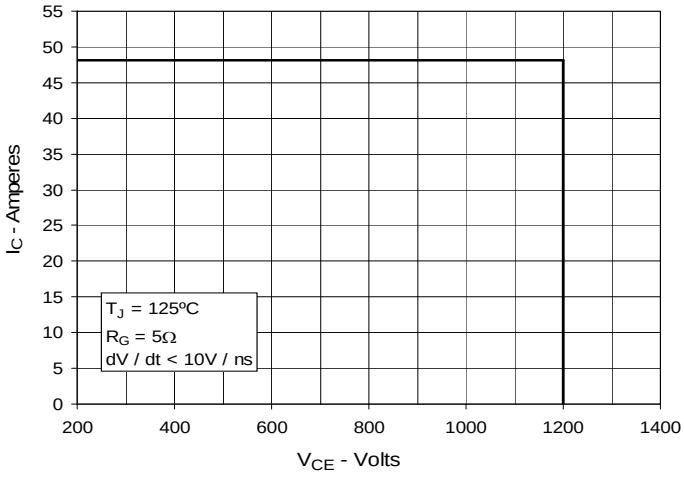
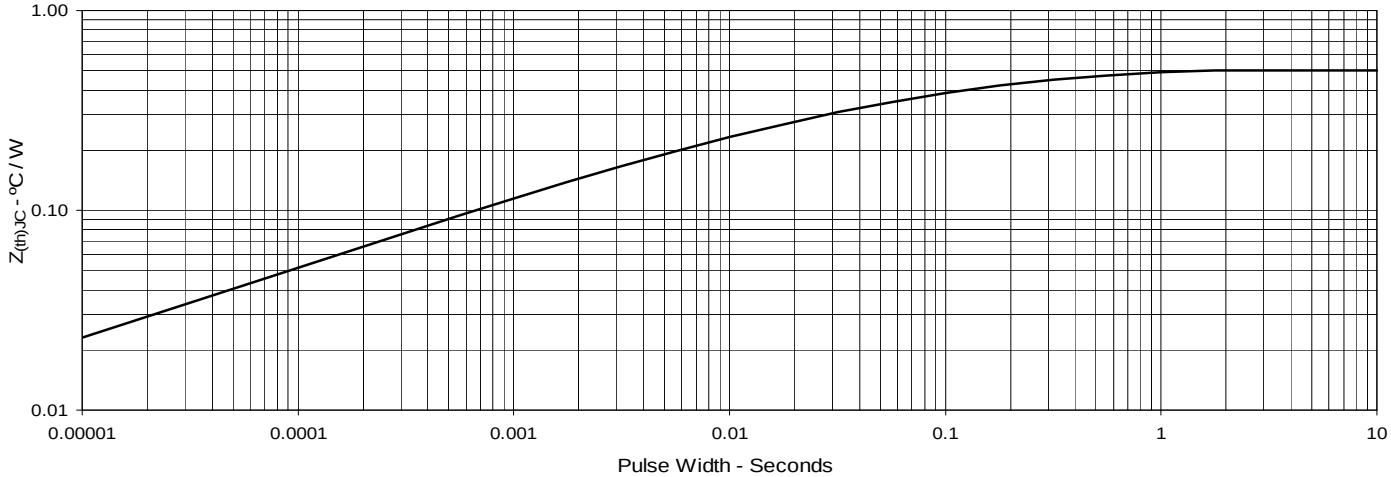


Fig. 11. Maximum Transient Thermal Impedance



IXYS reserves the right to change limits, test conditions, and dimensions.

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

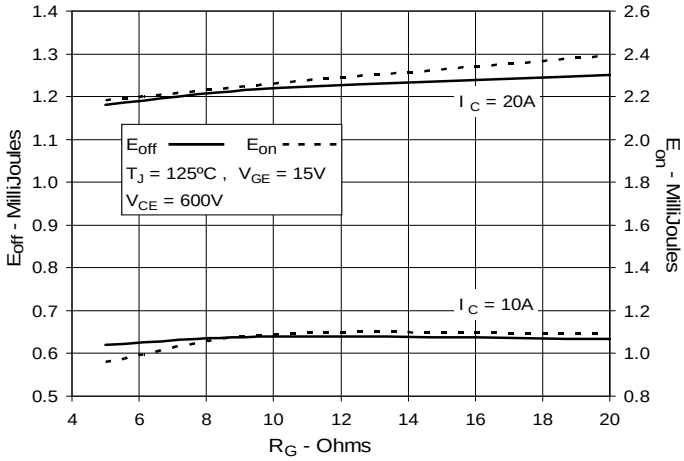


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

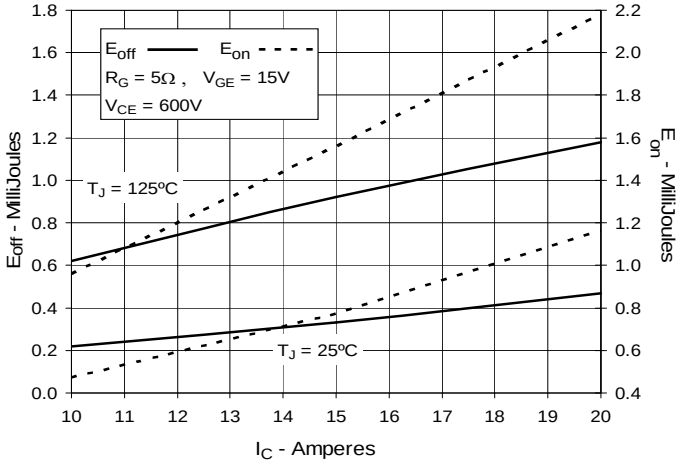


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

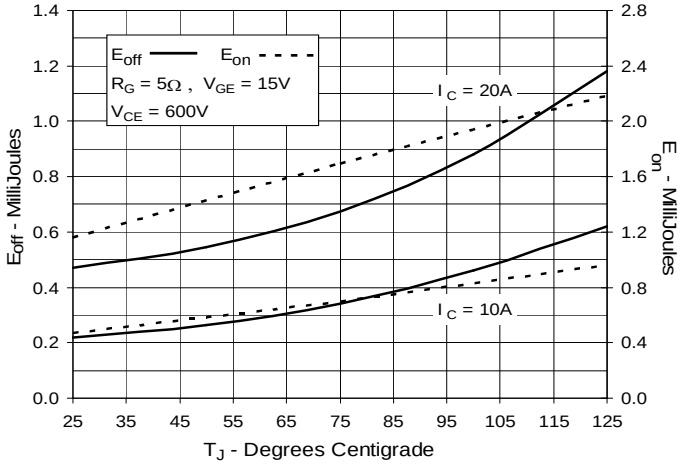


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

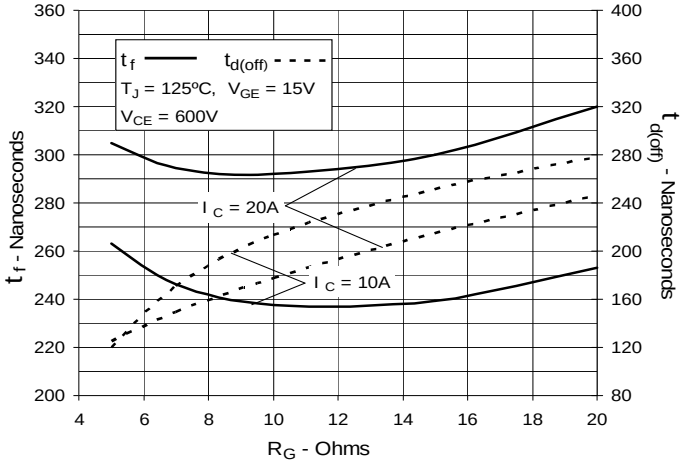


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

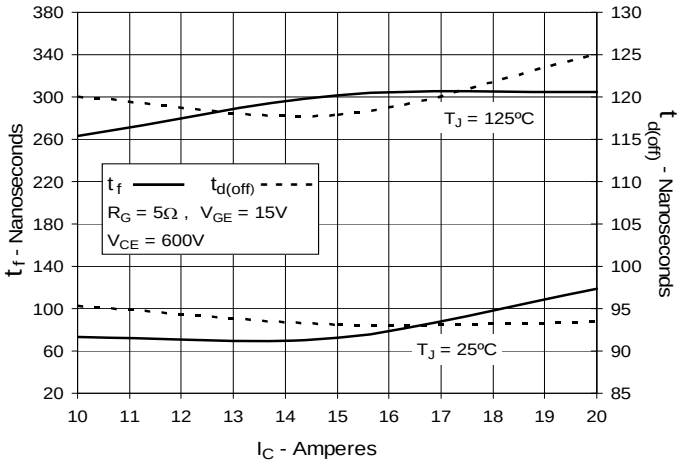
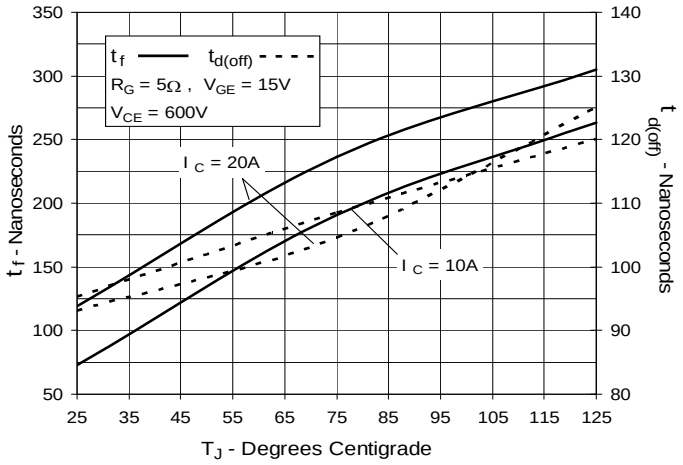


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature



© 2008 IXYS CORPORATION, All rights reserved

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

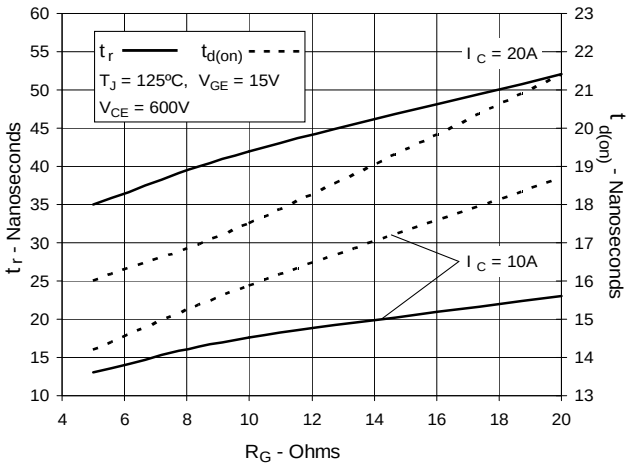


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

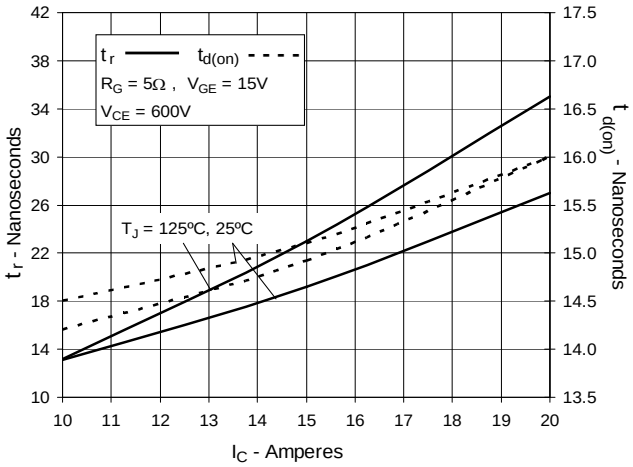
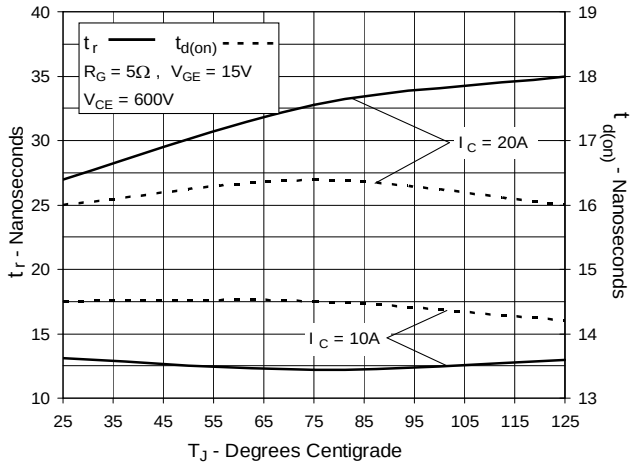


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



IXYS reserves the right to change limits, test conditions, and dimensions.



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at www.littelfuse.com/disclaimer-electronics.