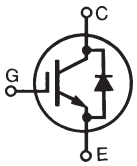
IXYS

Preliminary Technical Information

High Voltage, High Gain BIMOSFET™ Monolithic Bipolar MOS Transistor

IXBR42N170

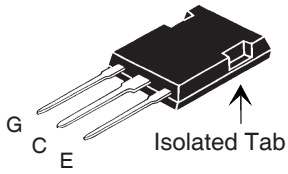
V_{CES} = 1700V
I_{C90} = 32A
$V_{CE(sat)} \leq$ 2.9V



Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_C = 25°C to 150°C	1700	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1700	V
V_{GES}	Continuous	± 20	V
V_{GEM}	Transient	± 30	V
I_{C25}	T_C = 25°C	57	A
I_{C90}	T_C = 90°C	32	A
I_{CM}	T_C = 25°C, 1ms	300	A
SSOA	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 10Ω	I_{CM} = 100	A
(RBSOA)	Clamped inductive load	$V_{CES} \leq$ 1350	V
P_C	T_C = 25°C	200	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	1.6mm (0.062 in.) from case for 10s	300	°C
T_{SOLD}	Plastic body for 10 seconds	260	°C
F_C	Mounting force	20..120 / 4.5..27	Nm/lb.in.
V_{ISOL}	50/60 Hz, RMS t = 1min	2500	V~
	$I_{ISOL} \leq$ 1mA t = 1s	3000	V~
Weight		5	g

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	1700			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	2.5		5.5	V
I_{CES}	V_{CE} = 0.8 • V_{CES}			50	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 = 42A, V_{GE} = 15V, Note 1			2.9	V
	T_J = 125°C		2.7		V

ISOPLUS247™
E153432



G = Gate E = Emitter
C = Collector

Features

- Silicon chip on Direct-Copper Bond (DCB) substrate
- Isolated mounting surface
- 2500V electrical isolation

Advantages

- Low gate drive requirement
- High power density

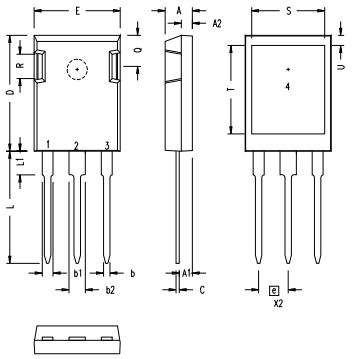
Applications:

- Switched-mode and resonant-mode power supplies
- Uninterruptible power supplies (UPS)
- Laser generator
- Capacitor discharge circuit
- AC switches

© 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 = 42A, V_{CE} = 10V, Note 1	24	32		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		3990		pF
C_{oes}			225		pF
C_{res}			70		pF
Q_g	I_C = 42A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		188		nC
Q_{ge}			29		nC
Q_{gc}			76		nC
$t_{d(on)}$	**Resistive Switching times, T_J = 25°C** I_C = 42A, V_{GE} = 15V V_{CE} = 850V, R_G = 10Ω		37		ns
t_r			139		ns
$t_{d(off)}$			340		ns
t_f			665		ns
$t_{d(on)}$	**Resistive Switching times, T_J = 125°C** I_C = 42A, V_{GE} = 15V V_{CE} = 850V, R_G = 10Ω		36		ns
t_r			188		ns
$t_{d(off)}$			330		ns
t_f			740		ns
R_{thJC}				0.62	°C/W
R_{thCS}			0.15		°C/W

ISOPLUS247 (IXBR) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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
b1	.075	.084	1.91	2.13
b2	.115	.123	2.92	3.12
C	.024	.031	0.61	0.80
D	.819	.840	20.80	21.34
E	.620	.635	15.75	16.13
e	.215 BSC		5.45 BSC	
L	.780	.800	19.81	20.32
L1	.150	.170	3.81	4.32
Q	.220	.244	5.59	6.20
R	.170	.190	4.32	4.83
S	.520	.540	13.21	13.72
T	.620	.640	15.75	16.26
U	.065	.080	1.65	2.03

1 – GATE
2 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)
4 – NO CONNECTION

NOTE: This drawing will meet all dimensions requirement of JEDEC outline TO-247AD except screw hole.

Reverse Diode

Symbol	Test Conditions (T_J = 25°C unless otherwise specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 42A, V_{GE} = 0V			2.8	V
t_{rr}	I_F = 21A, V_{GE} = 0V, -di_F/dt = 100A/μs V_R = 100V		1.32		μs
I_{RM}			36		A

Note 1: 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

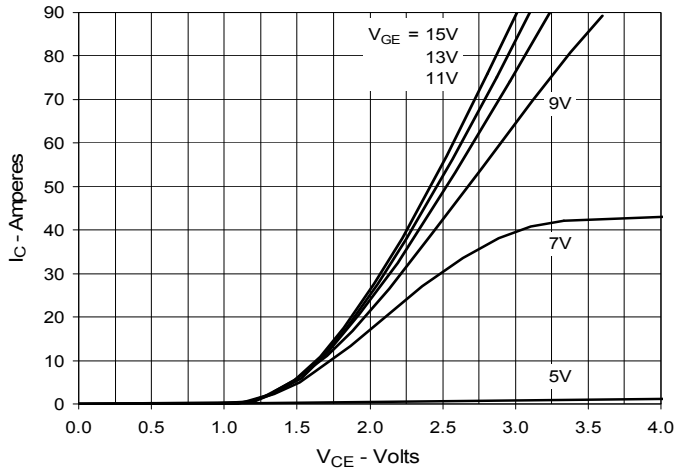


Fig. 2. Extended Output Characteristics @ 25ºC

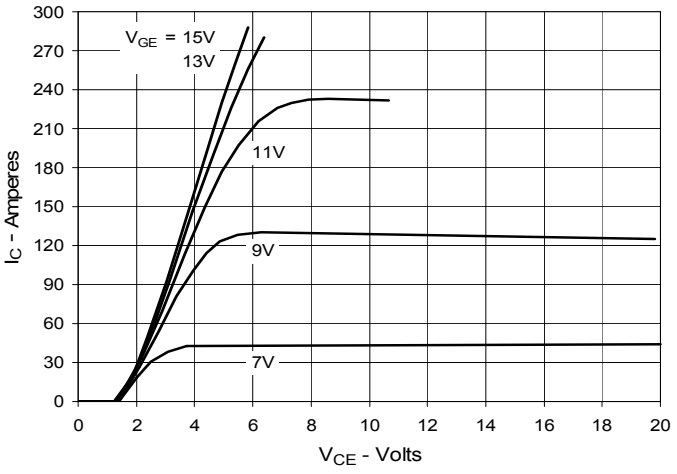


Fig. 3. Output Characteristics @ 125ºC

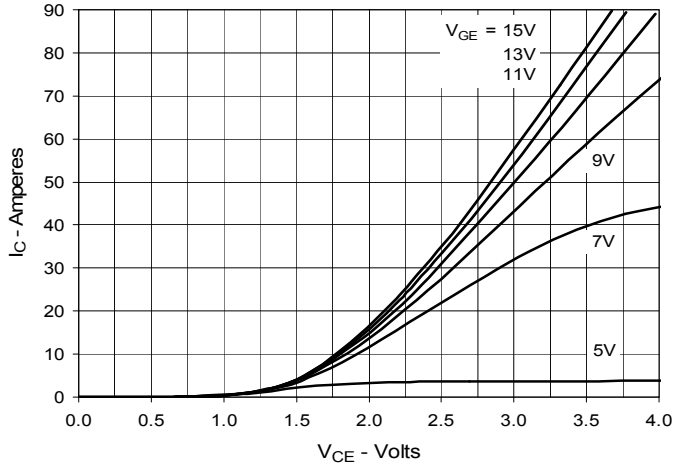


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

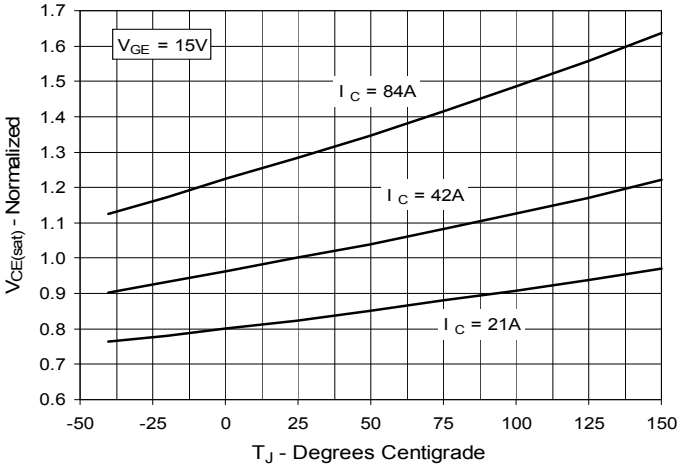


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

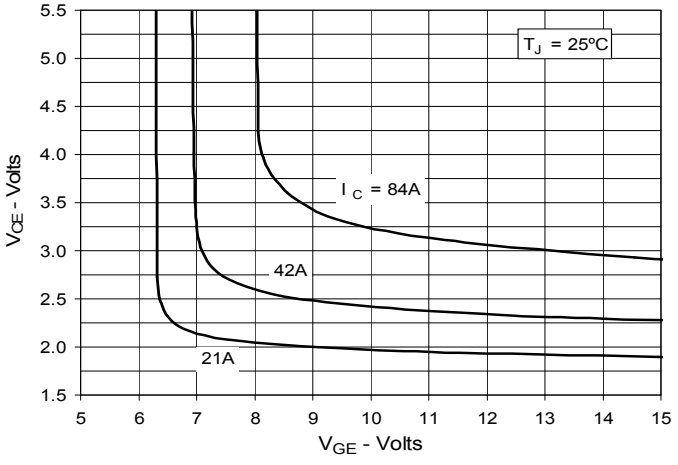
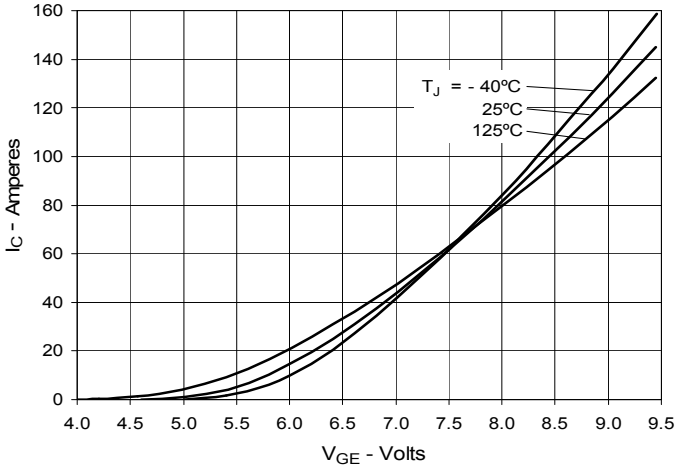


Fig. 6. Input Admittance



© 2008 IXYS CORPORATION, All rights reserved

Fig. 7. Transconductance

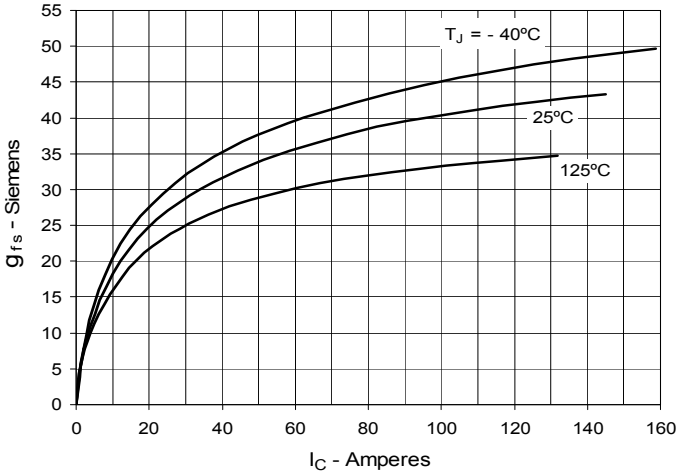


Fig. 8. Forward Voltage Drop of Intrinsic Diode

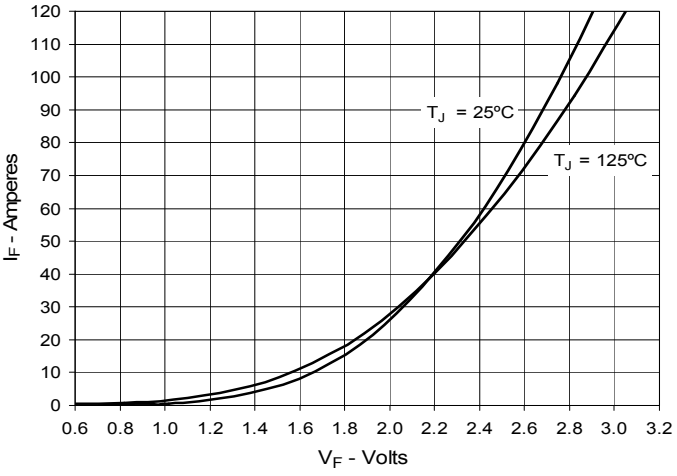


Fig. 9. Gate Charge

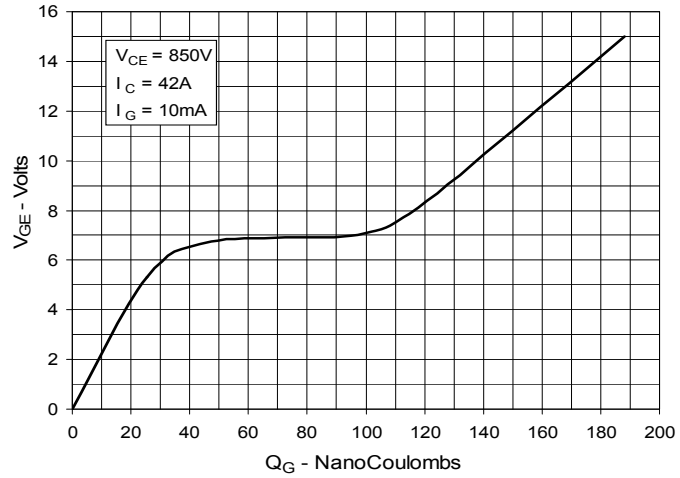


Fig. 10. Capacitance

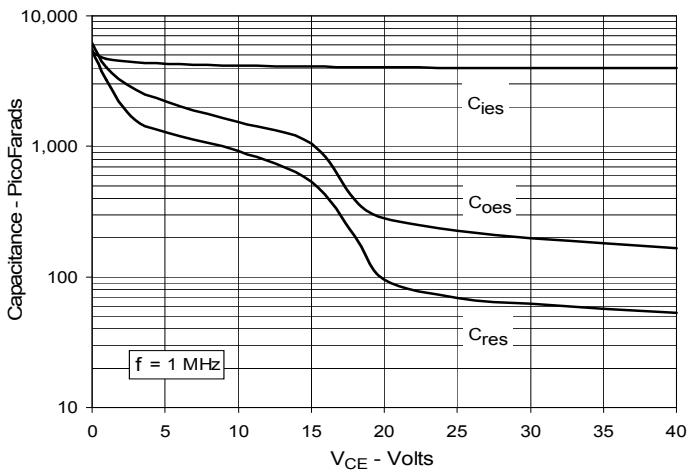


Fig. 11. Reverse-Bias Safe Operating Area

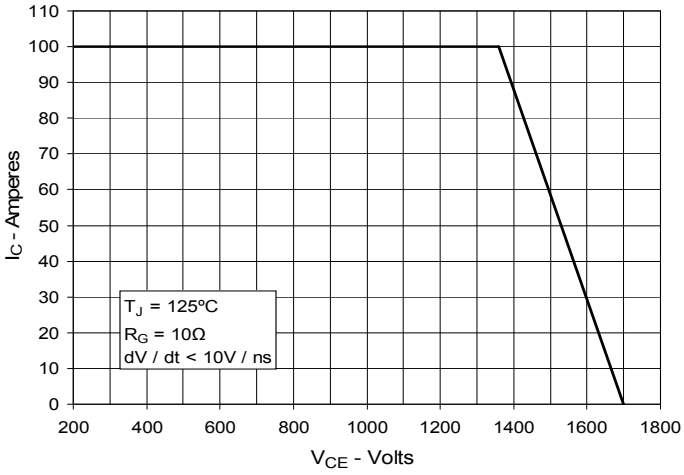
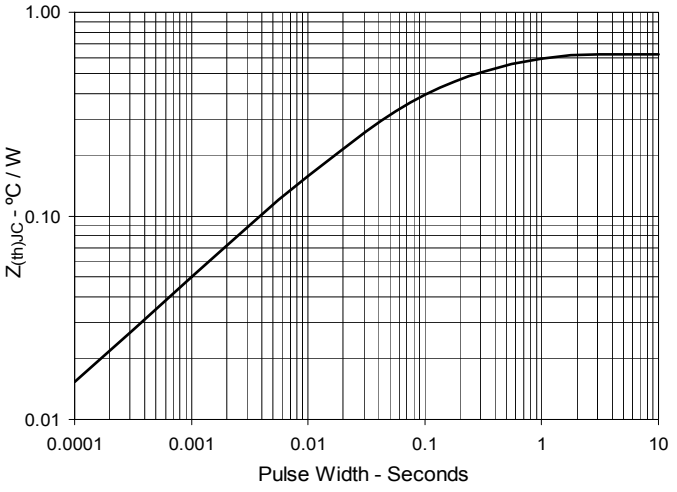


Fig. 12. Maximum Transient Thermal Impedance



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

Fig. 13. Resistive Turn-on Rise Time vs. Junction Temperature

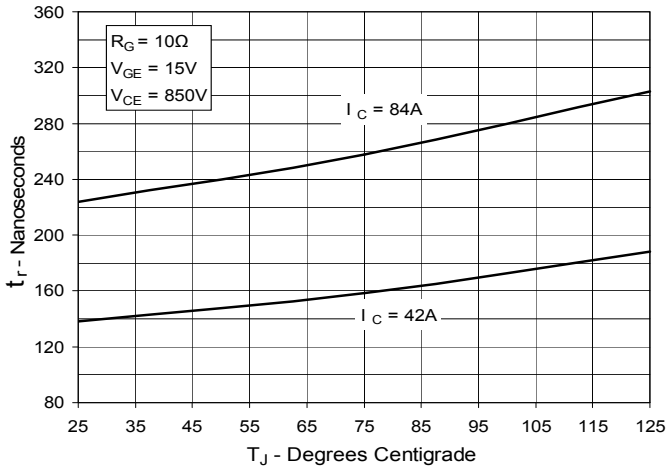


Fig. 14. Resistive Turn-on Rise Time vs. Drain Current

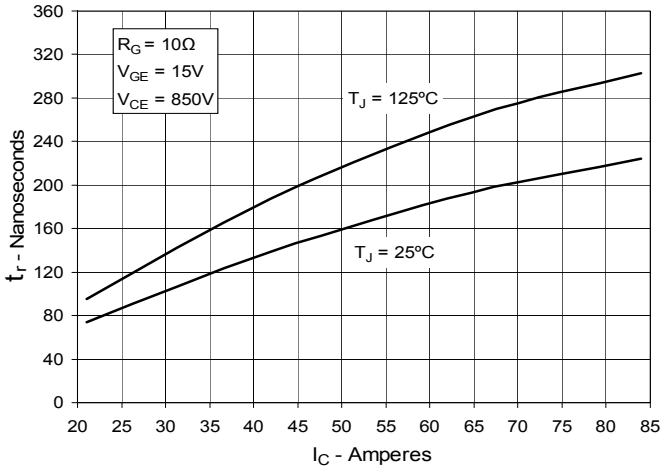


Fig. 15. Resistive Turn-on Switching Times vs. Gate Resistance

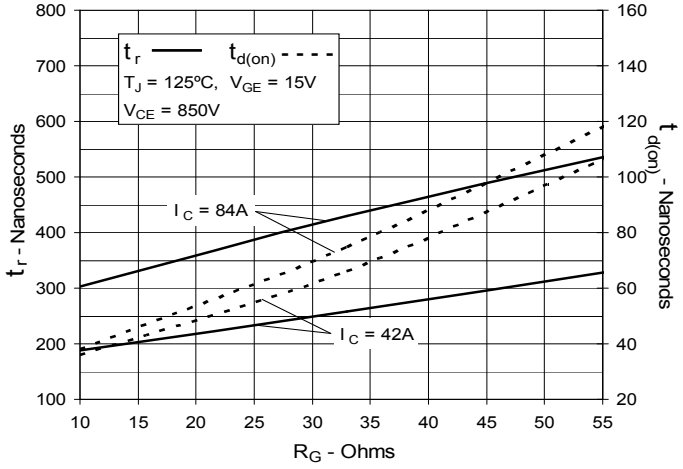


Fig. 16. Resistive Turn-off Switching Times vs. Junction Temperature

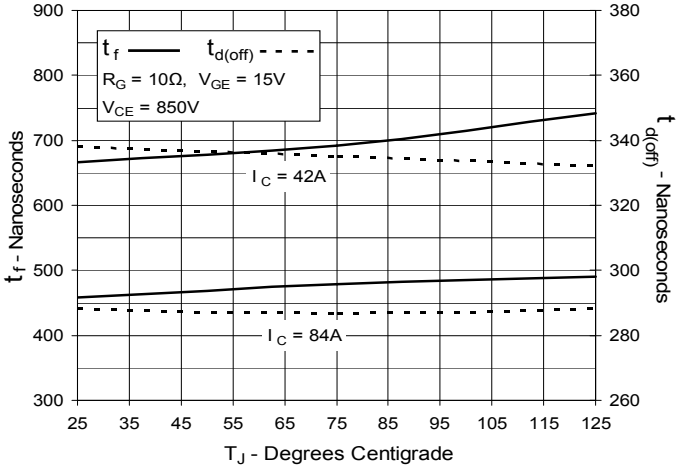


Fig. 17. Resistive Turn-off Switching Times vs. Drain Current

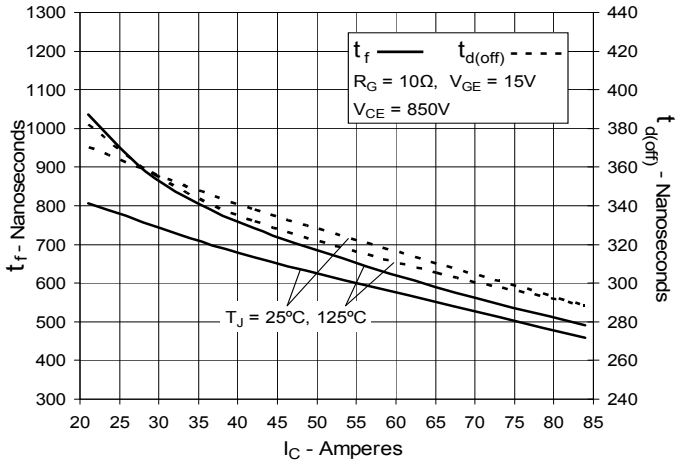
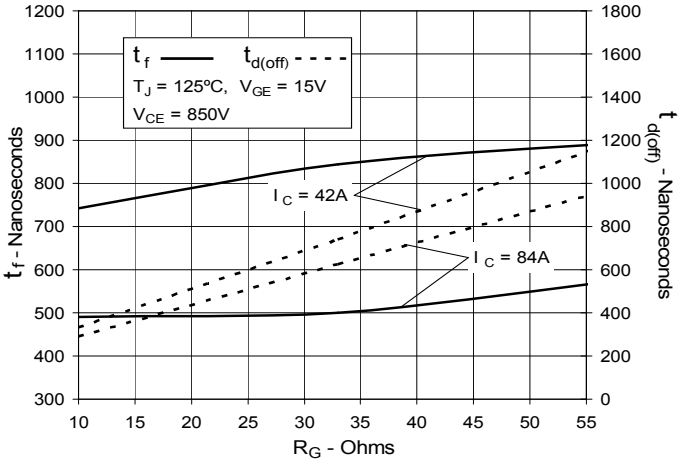


Fig. 18. Resistive Turn-off Switching Times vs. Gate Resistance



© 2008 IXYS CORPORATION, All rights reserved



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.