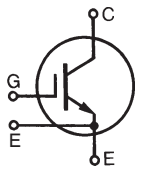
IXYS

GenX3™ 600V IGBT

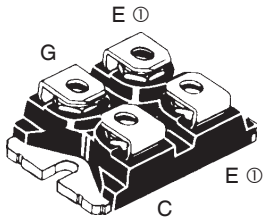
IXGN320N60A3

V_{CES} = 600V
I_{C110} = 170A
$V_{CE(sat)} \leq$ 1.30V

Ultra-Low-Vsat PT IGBT for
up to 5kHz Switching



SOT-227B, miniBLOC
E153432



G = Gate, C = Collector, E = Emitter

① Either Emitter Terminal Can Be Used as Main or Kelvin Emitter

Symbol	Test Conditions		Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C		600	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ		600	V
V_{GES}	Continuous		±20	V
V_{GEM}	Transient		±30	V
I_{C25}	T_C = 25°C (Chip Capability)		320	A
I_{C110}	T_C = 110°C		170	A
I_{LRMS}	Terminal Current Limit		200	A
I_{CM}	T_C = 25°C, 1ms		1200	A
SSOA	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 1Ω		I_{CM} = 320	A
(RBSOA)	Clamped Inductive Load		@0.8 • V_{CES}	
P_C	T_C = 25°C		735	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
V_{ISOL}	50/60Hz	t = 1min	2500	V~
	$I_{ISOL} \leq$ 1mA	t = 1s	3000	V~
M_d	Mounting Torque		1.5/13	Nm/lb.in
	Terminal Connection Torque (M4)		1.3/11.5	Nm/lb.in
Weight			30	g

Features

- Optimized for Low Conduction Losses
- High Avalanche Capability
- Isolation Voltage 3000 V~
- International Standard Package

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

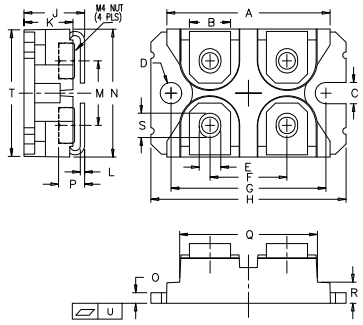
- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts
- Inrush Current Protection Circuits

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 1mA, V_{GE} = 0V	600			V
$V_{GE(th)}$	I_C = 4mA, V_{CE} = V_{GE}	3.0		5.5	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			150	µA
	T_J = 125°C			1.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±400	nA
$V_{CE(sat)}$	I_C = 100A, V_{GE} = 15V, Note 1		1.05	1.30	V
	I_C = 320A		1.46		V

© 2015 IXYS CORPORATION, All Rights Reserved

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 1	70	125		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		18		nF
C_{oes}			985		pF
C_{res}			150		pF
$Q_{g(on)}$	I_C = 80V, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		560		nC
Q_{ge}			94		nC
Q_{gc}			195		nC
$t_{d(on)}$	**Resistive Load, T_J = 25°C**		63		ns
t_r	I_C = 80A, V_{GE} = 15V		68		ns
$t_{d(off)}$	V_{CE} = 400V, R_G = 1Ω		290		ns
t_f			740		ns
$t_{d(on)}$	**Resistive Load, T_J = 125°C**		62		ns
t_r	I_C = 80A, V_{GE} = 15V		77		ns
$t_{d(off)}$	V_{CE} = 400V, R_G = 1Ω		330		ns
t_f			1540		ns
R_{thJC}				0.17	°C/W
R_{thCK}			0.05		°C/W

SOT-227B miniBLOC (IXGN)



M4 screws (4x) supplied

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	1.240	1.255	31.50	31.88
B	.307	.323	7.80	8.20
C	.161	.169	4.09	4.29
D	.161	.169	4.09	4.29
E	.161	.169	4.09	4.29
F	.587	.595	14.91	15.11
G	1.186	1.193	30.12	30.30
H	1.496	1.505	38.00	38.23
J	.460	.481	11.68	12.22
K	.351	.378	8.92	9.60
L	.030	.033	0.76	0.84
M	.496	.506	12.60	12.85
N	.990	1.001	25.15	25.42
O	.078	.084	1.98	2.13
P	.195	.235	4.95	5.97
Q	1.045	1.059	26.54	26.90
R	.155	.174	3.94	4.42
S	.186	.191	4.72	4.85
T	.968	.987	24.59	25.07
U	-.002	.004	-0.05	0.1

Note 1. Pulse test, t ≤ 300µs, duty cycle, d ≤ 2%.

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 4,860,072 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. Extended Output Characteristics @ T_J = 25ºC

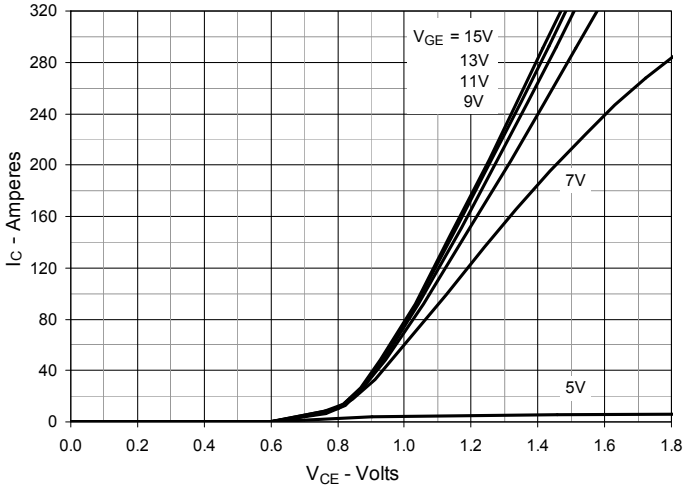


Fig. 2. Output Characteristics @ T_J = 125ºC

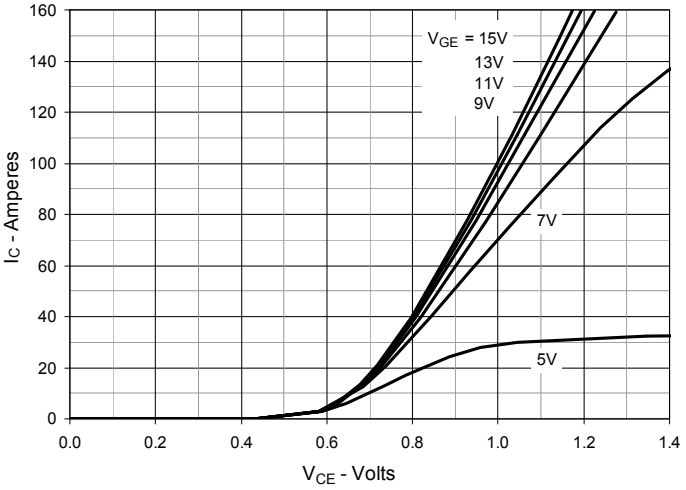


Fig. 3. Dependence of $V_{CE(sat)}$ on Junction Temperature

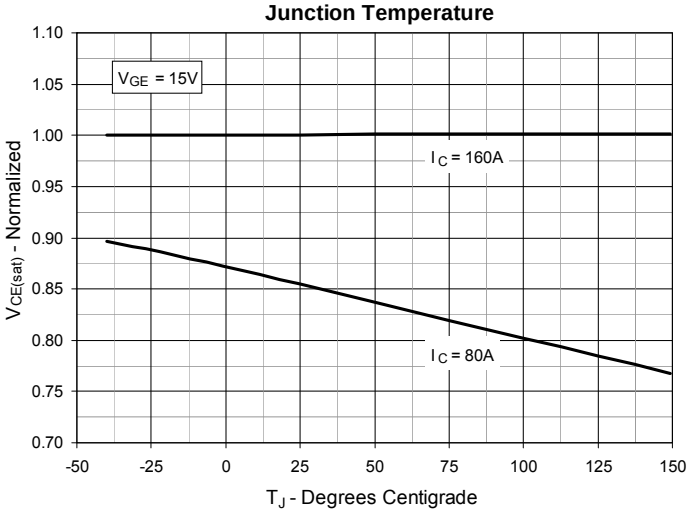


Fig. 4. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

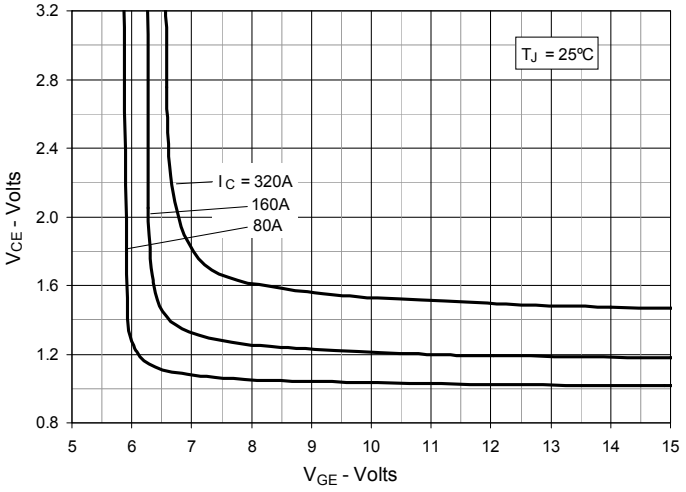


Fig. 5. Input Admittance

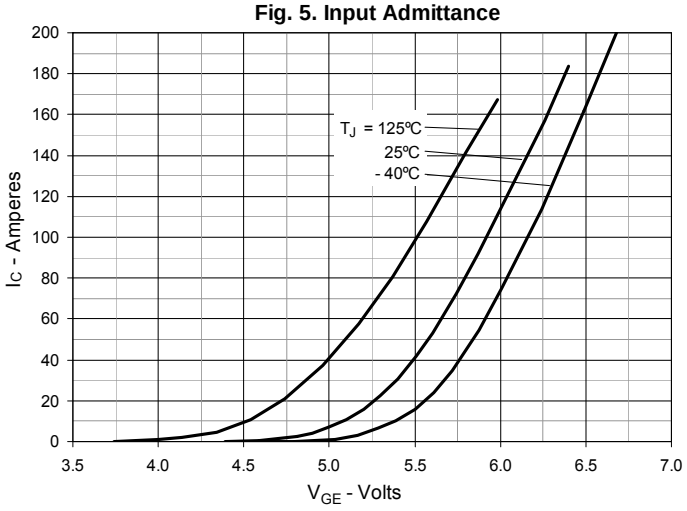
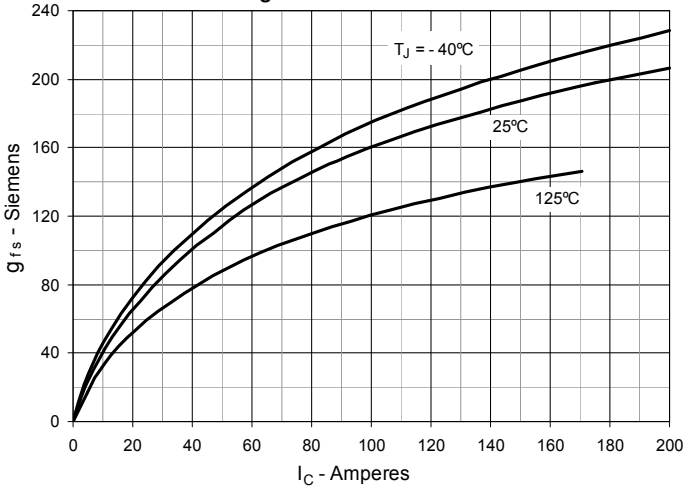


Fig. 6. Transconductance



© 2015 IXYS CORPORATION, All Rights Reserved

Fig. 7. Gate Charge

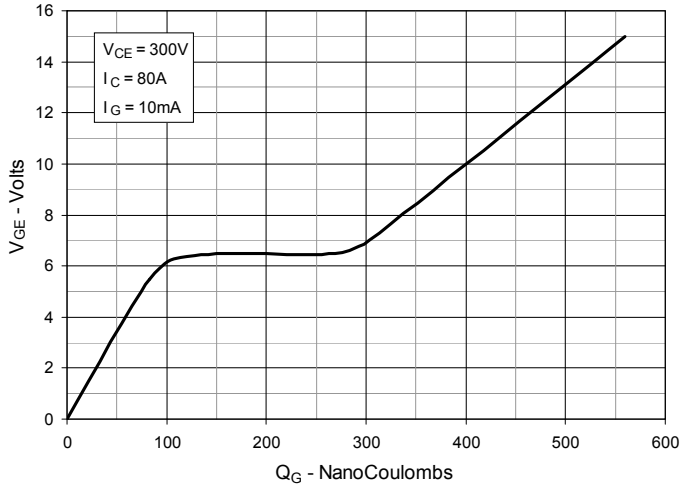


Fig. 8. Capacitance

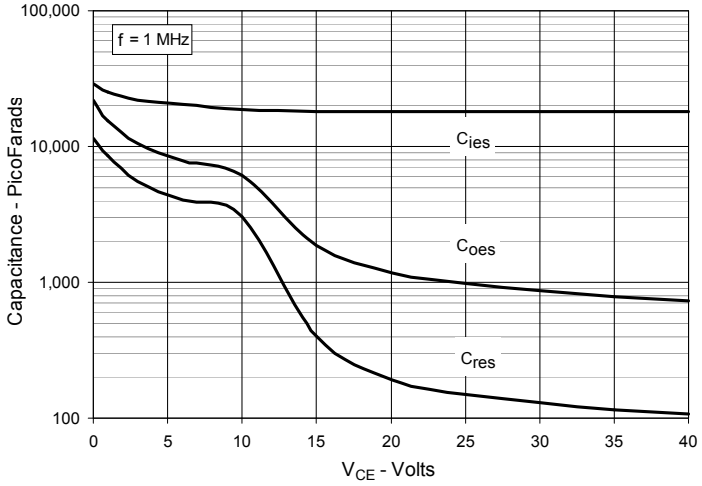


Fig. 9. Reverse-Bias Safe Operating Area

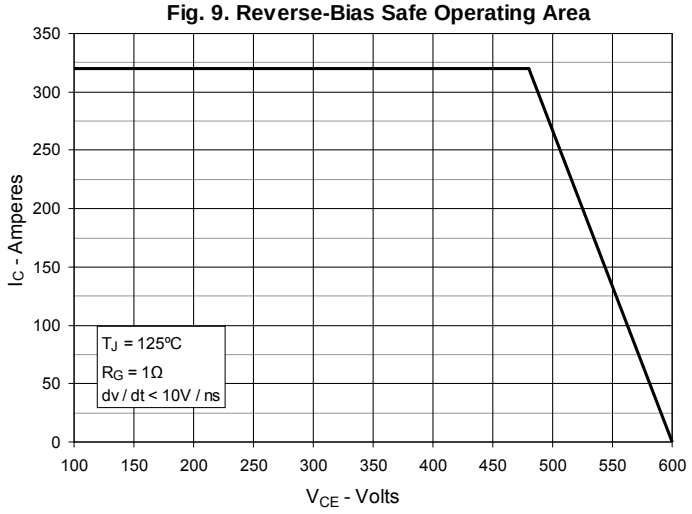


Fig. 10. Maximum Transient Thermal Impedance

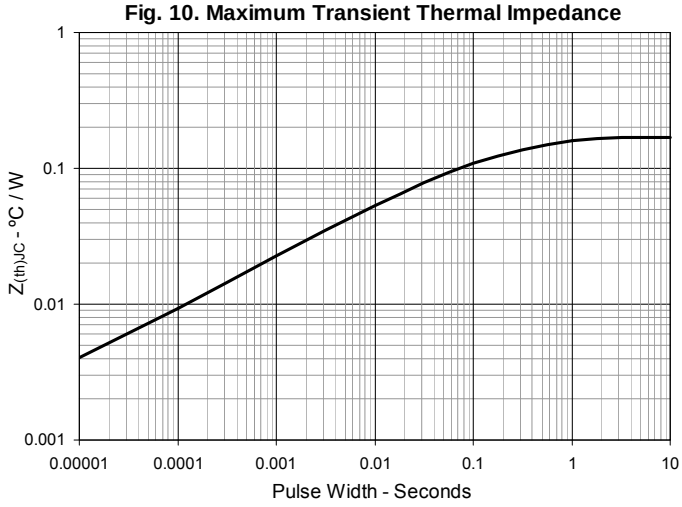


Fig.11. Resistive Turn-on Rise Time vs. Junction Temperature

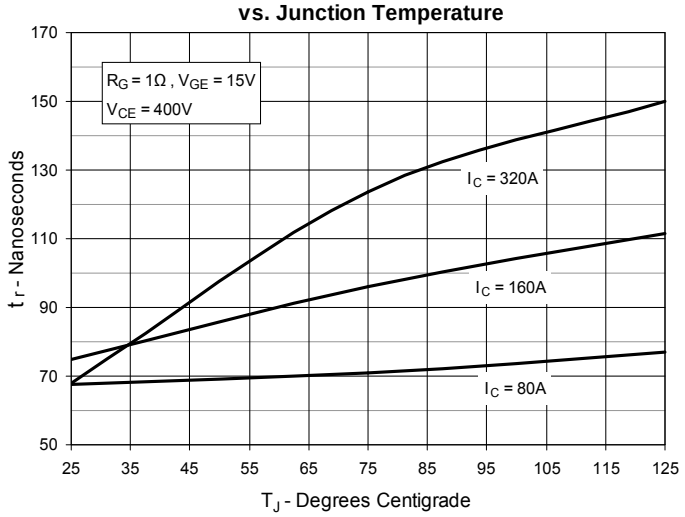


Fig. 12. Resistive Turn-on Rise Time vs. Collector Current

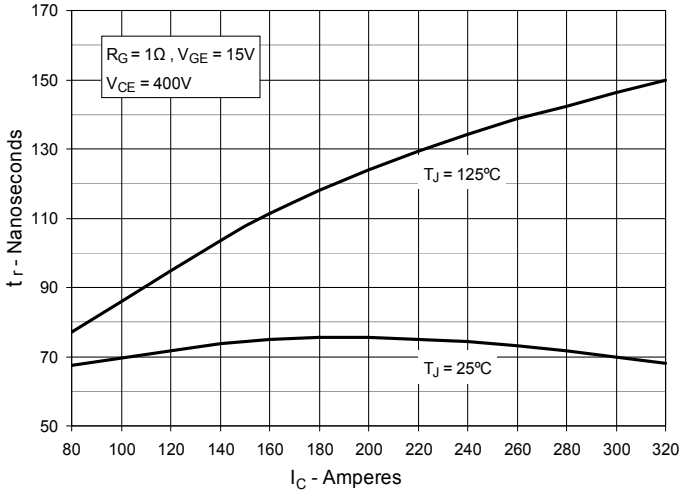


Fig. 13. Resistive Turn-on Switching Times vs. Gate Resistance

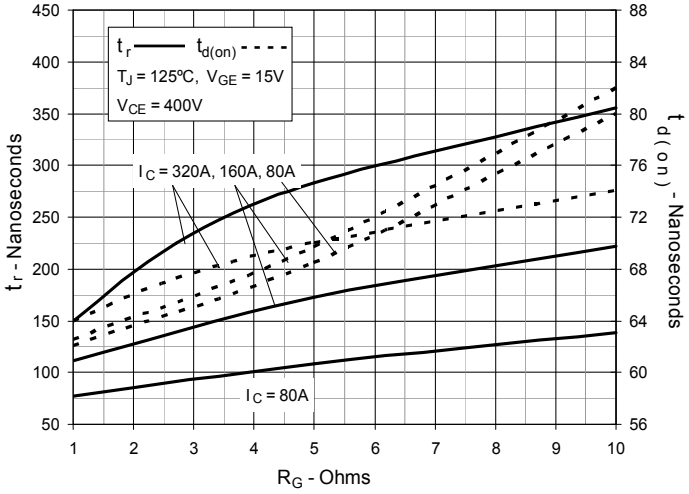


Fig. 14. Resistive Turn-off Switching Times vs. Junction Temperature

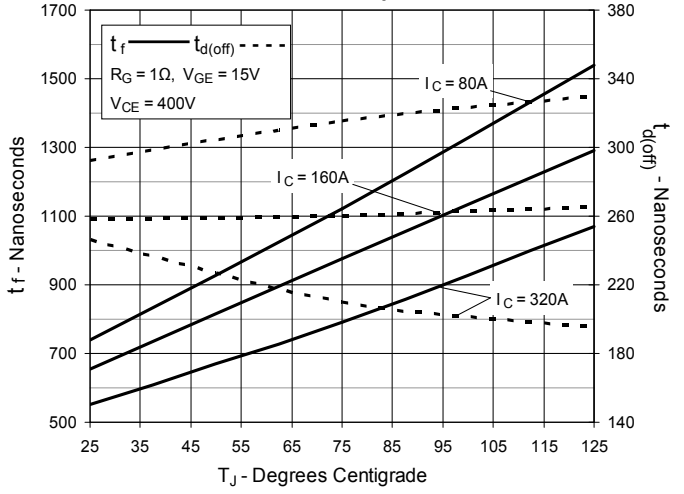


Fig. 15. Resistive Turn-off Switching Times vs. Collector Current

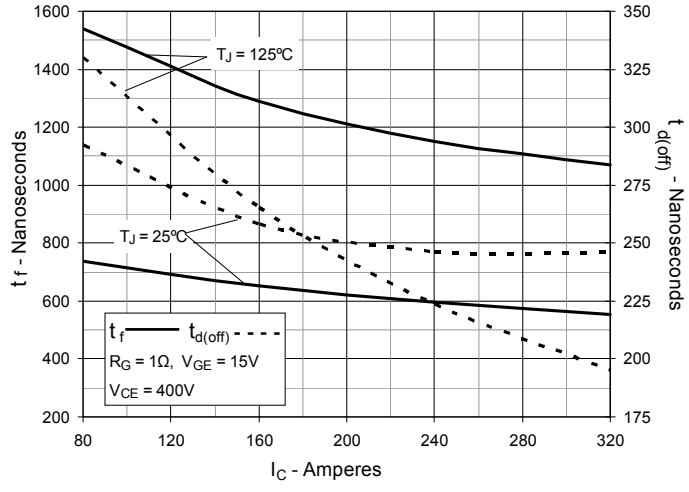
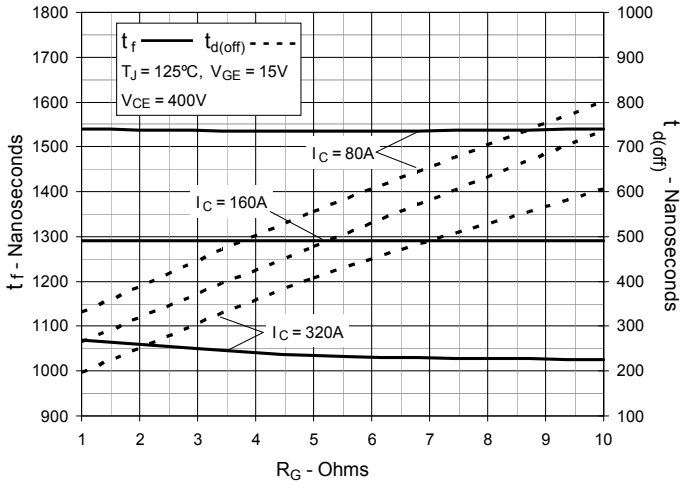


Fig. 16. Resistive Turn-off Switching Times vs. Gate Resistance



© 2015 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.