IXYS

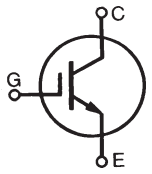
Advance Technical Information

900V XPT™ IGBTs GenX3™

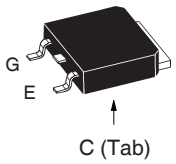
IXYY8N90C3
IXYP8N90C3

V_{CES} = 900V
I_{C110} = 8A
$V_{CE(sat)}$ ≤ 2.5V
$t_{fi(typ)}$ = 130ns

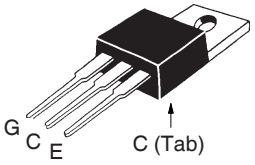
High-Speed IGBT
for 20-50 kHz Switching



TO-252 (IXYY)



TO-220 (IXYP)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 175°C	900	V
V_{CGR}	T_J = 25°C to 175°C, R_{GE} = 1MΩ	900	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C25}	T_C = 25°C	20	A
I_{C110}	T_C = 110°C	8	A
I_{CM}	T_C = 25°C, 1ms	48	A
I_A	T_C = 25°C	4	A
E_{AS}	T_C = 25°C	15	mJ
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 150°C, R_G = 30Ω Clamped Inductive Load	I_{CM} = 16 @$V_{CE} \leq V_{CES}$	A
P_C	T_C = 25°C	120	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
M_d	Mounting Torque (TO-220)	1.13/10	Nm/lb.in.
Weight	TO-252	0.35	g
	TO-220	3.00	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250μA, V_{GE} = 0V	950			V
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.5		6.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			60	μA
	T_J = 150°C			400	μA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 8A, V_{GE} = 15V, Note 1		2.15	2.50	V
	T_J = 150°C		2.75		V

Features

- Optimized for Low Switching Losses
- Square RBSOA
- Positive Thermal Coefficient of Vce(sat)
- Avalanche Rated
- International Standard Package

Advantages

- High Power Density
- Low Gate Drive Requirement

Applications

- High Frequency Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

Symbol	Test Conditions (T_J = 25°C Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 8A, V_{CE} = 10V, Note 1	2.9	4.8		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		400		pF
C_{oes}			24		pF
C_{res}			7.8		pF
$Q_{g(on)}$	I_C = 8A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		13.3		nC
Q_{ge}			3.4		nC
Q_{gc}			5.8		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		16		ns
t_{ri}	I_C = 8A, V_{GE} = 15V		20		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 30Ω		0.46		mJ
$t_{d(off)}$	Note 2		40		ns
t_{fi}			130		ns
E_{off}			0.18	0.50	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		17		ns
t_{ri}	I_C = 8A, V_{GE} = 15V		22		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 30Ω		1.00		mJ
$t_{d(off)}$	Note 2		75		ns
t_{fi}			163		ns
E_{off}			0.22		mJ
R_{thJC}				1.20	°C/W
R_{thCS}	TO-252		0.35		°C/W
	TO-220		0.50		°C/W

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)		Characteristic Value Min.	Typ.	Max.	
V_F	I_F = 10A, V_{GE} = 0V, Note 1	T_J = 150°C			3.0	V
					2.0	V
I_{RM}	I_F = 10A, V_{GE} = 0V, -di_F/dt = 200A/μs, V_R = 600V	T_J = 100°C		7.5		A
t_{rr}		T_J = 100°C		114		ns
R_{thJC}					2.5	°C/W

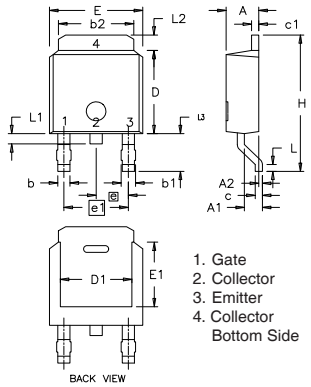
Notes:

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

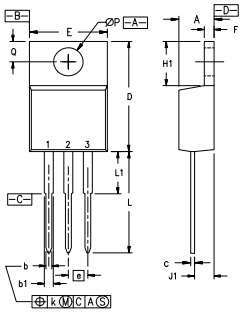
TO-252 AA Outline



1. Gate
2. Collector
3. Emitter
4. Collector Bottom Side

Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	2.19	2.38	0.086	0.094
A1	0.89	1.14	0.035	0.045
A2	0	0.13	0	0.005
b	0.64	0.89	0.025	0.035
b1	0.76	1.14	0.030	0.045
b2	5.21	5.46	0.205	0.215
c	0.46	0.58	0.018	0.023
c1	0.46	0.58	0.018	0.023
D	5.97	6.22	0.235	0.245
D1	4.32	5.21	0.170	0.205
E	6.35	6.73	0.250	0.265
E1	4.32	5.21	0.170	0.205
e	2.28 BSC		0.090 BSC	
e1	4.57 BSC		0.180 BSC	
H	9.40	10.42	0.370	0.410
L	0.51	1.02	0.020	0.040
L1	0.64	1.02	0.025	0.040
L2	0.89	1.27	0.035	0.050
L3	2.54	2.92	0.100	0.115

TO-220 Outline



Pins: 1 - Gate 2 - Collector
3 - Emitter

SYM	INCHES MIN	MAX	MILLIMETERS MIN	MAX
A	.170	.190	4.32	4.83
b	.025	.040	0.64	1.02
b1	.045	.065	1.15	1.65
c	.014	.022	0.35	0.56
D	.580	.630	14.73	16.00
E	.390	.420	9.91	10.66
e	.100 BSC		2.54 BSC	
F	.045	.055	1.14	1.40
H1	.230	.270	5.85	6.85
J1	.090	.110	2.29	2.79
k	0	.015	0	0.38
L	.500	.550	12.70	13.97
L1	.110	.230	2.79	5.84
ØP	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

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 @ T_J = 25ºC

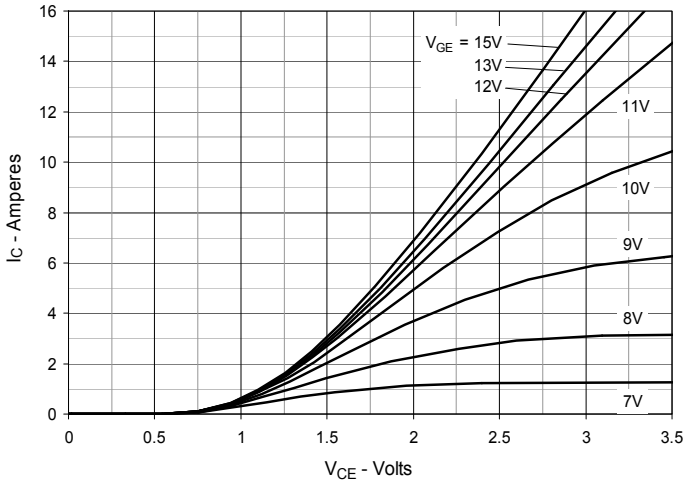


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

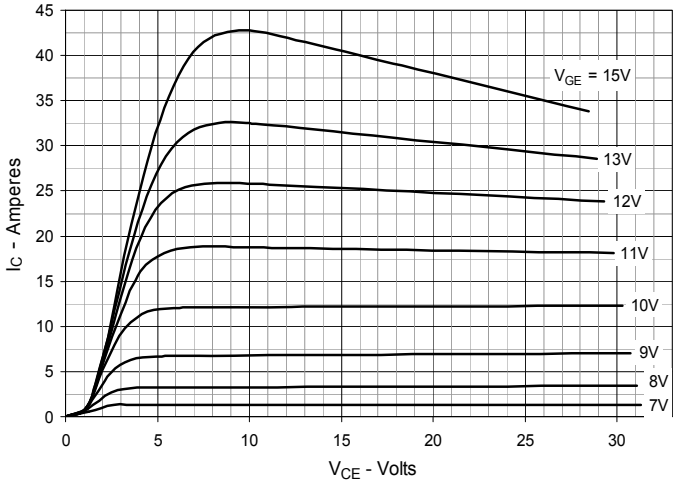


Fig. 3. Output Characteristics @ T_J = 150ºC

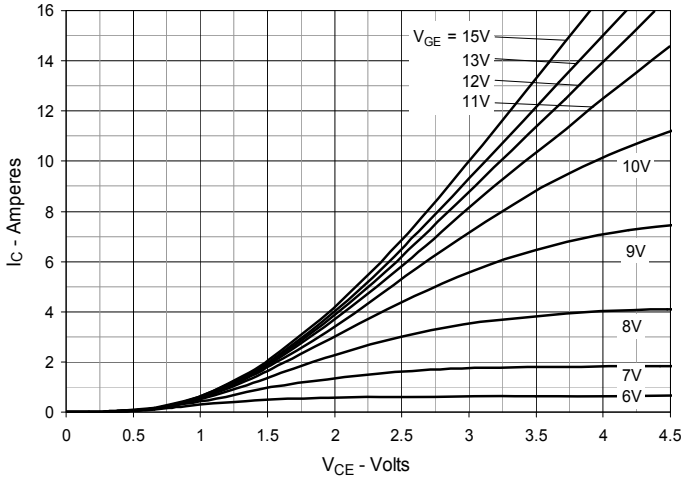


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

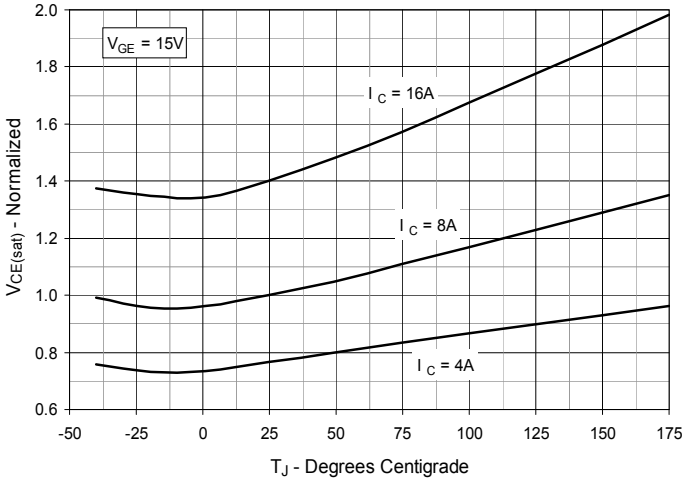


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

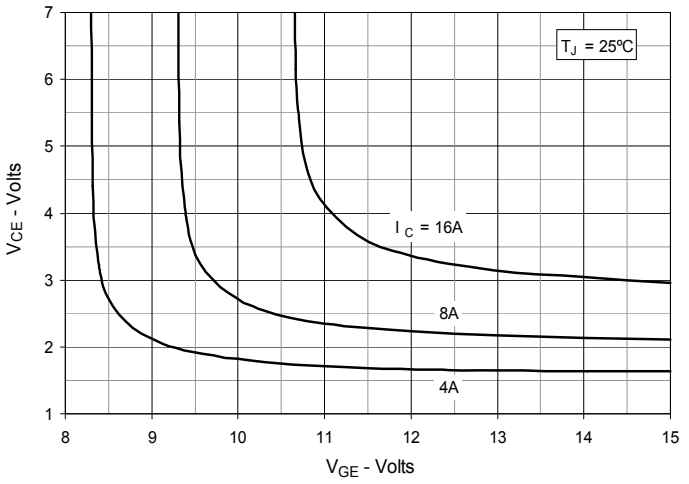


Fig. 6. Input Admittance

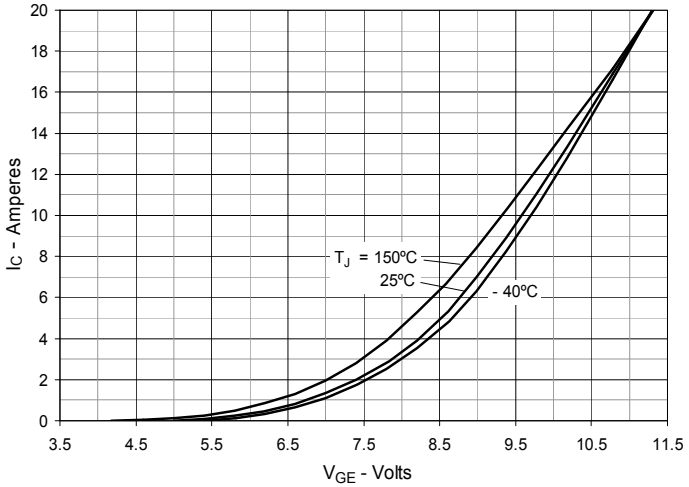


Fig. 7. Transconductance

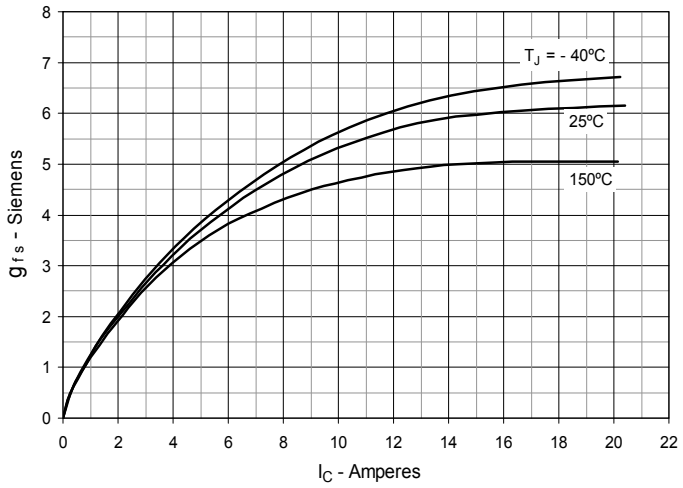


Fig. 8. Gate Charge

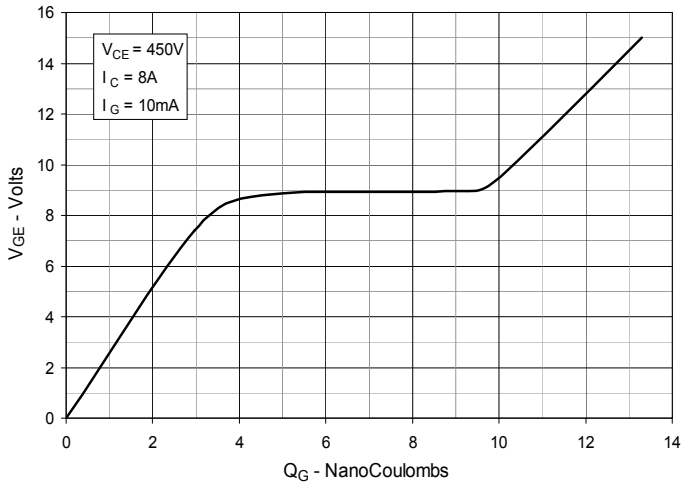


Fig. 9. Capacitance

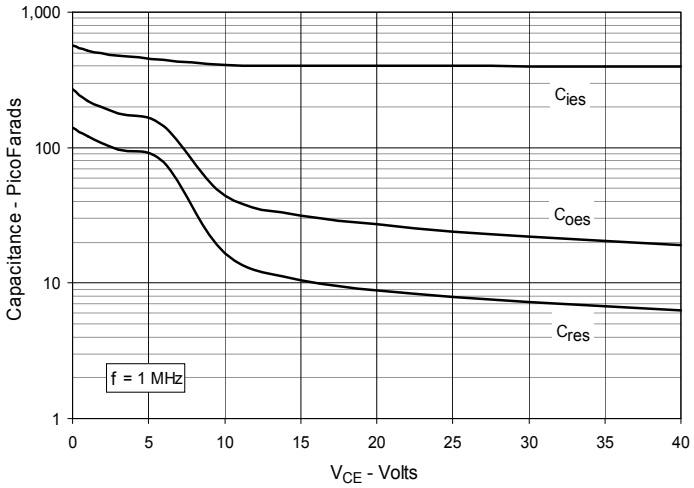


Fig. 10. Reverse-Bias Safe Operating Area

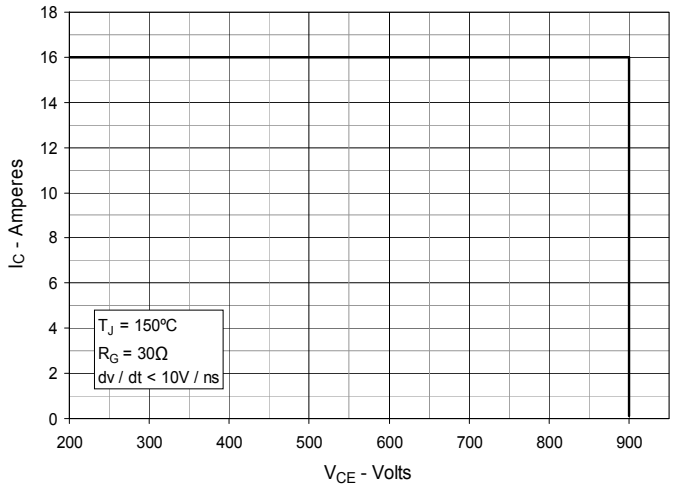


Fig. 11. Maximum Transient Thermal Impedance

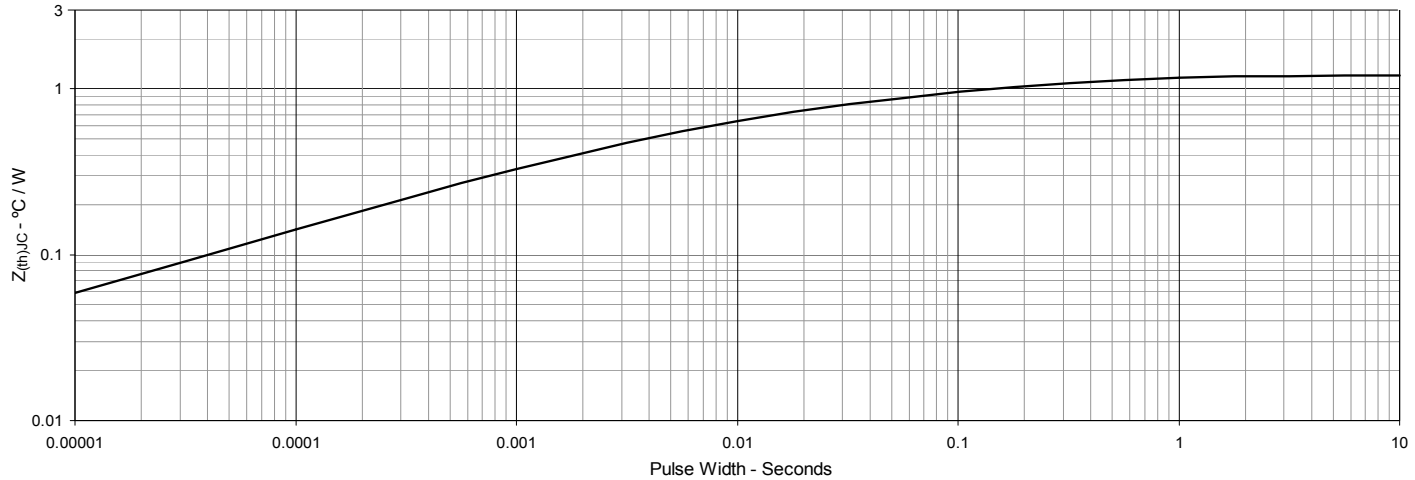


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

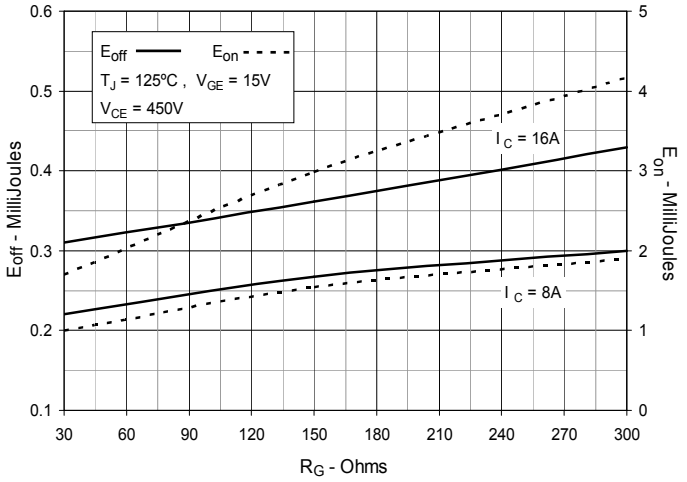


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

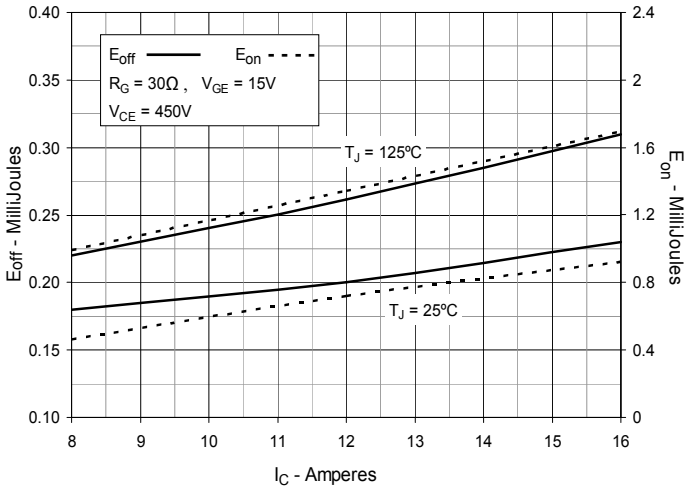


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

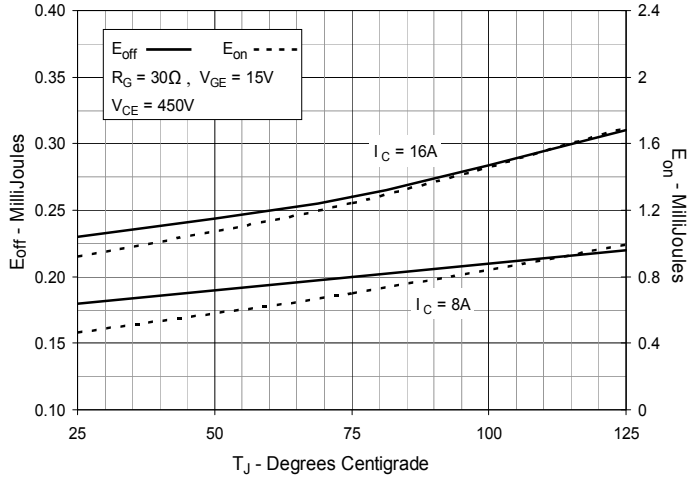


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

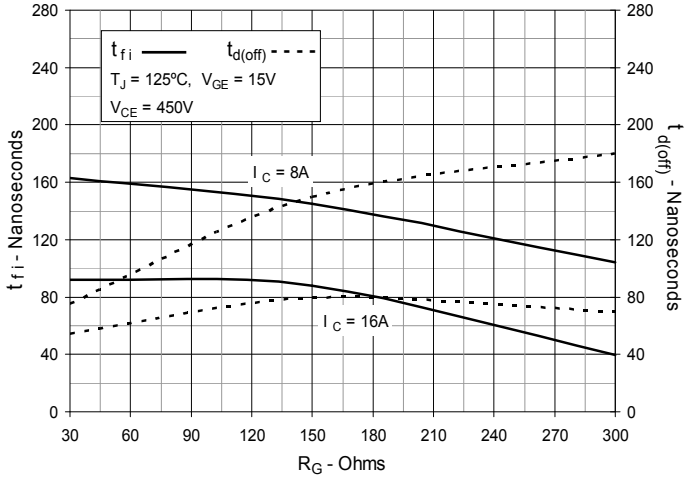


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

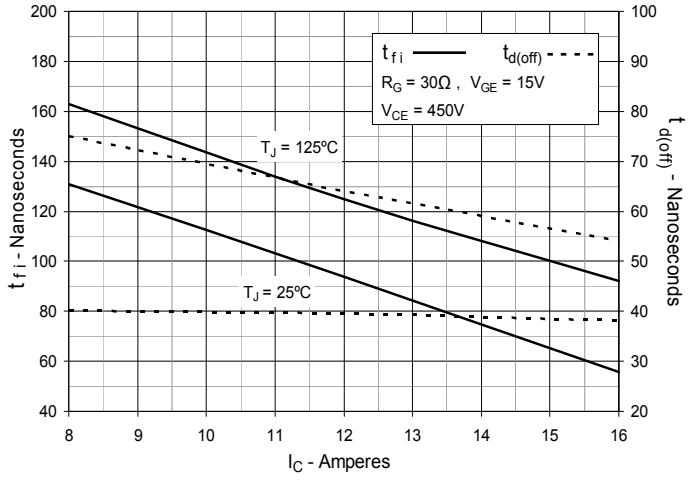


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

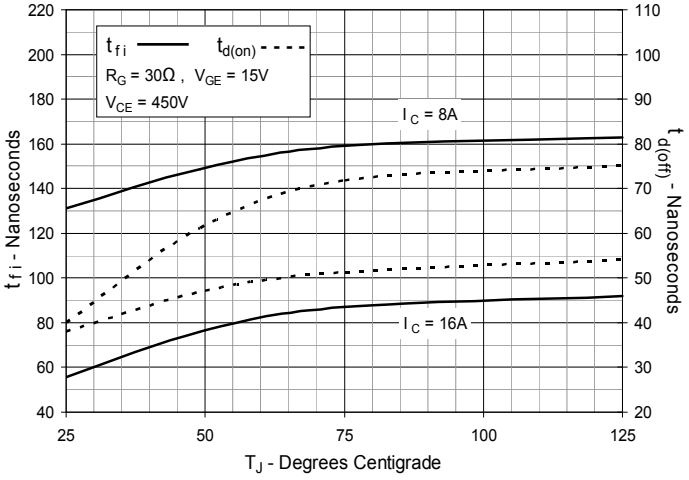


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

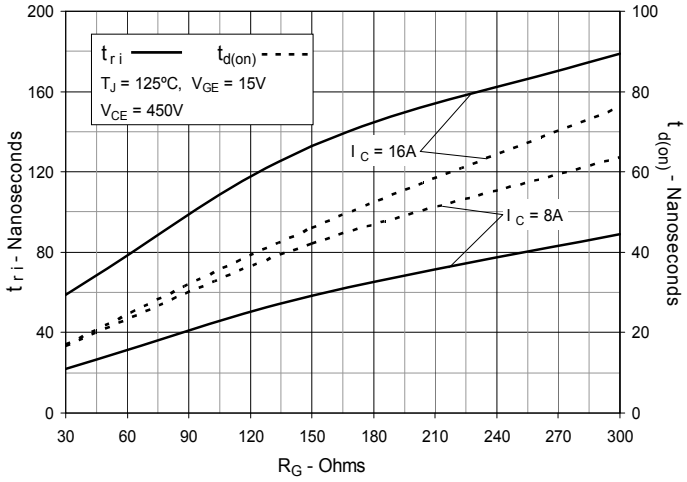


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

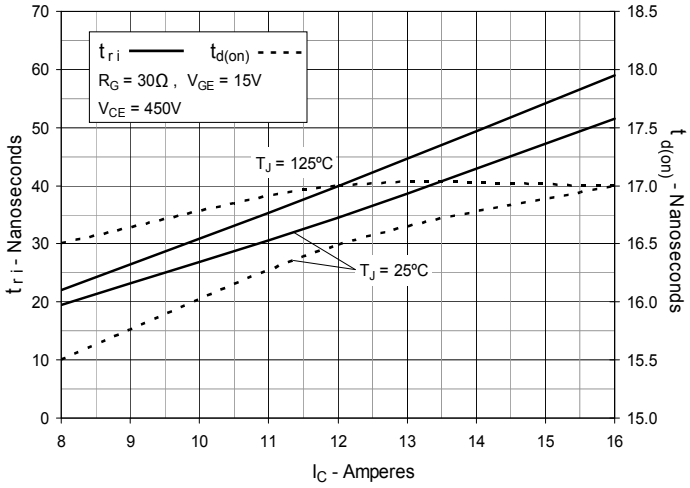


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature