IXYS

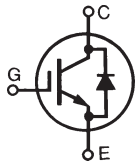
Advance Technical Information

GenX3™ 1200V IGBT w/ Diode

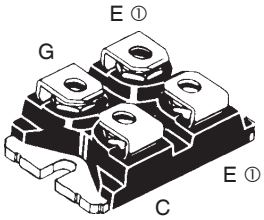
IXGN50N120C3H1

V_{CES} = 1200V
I_{C110} = 50A
$V_{CE(sat)}$ ≤ 4.2V

High-Speed PT IGBT for
20-50 kHz 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		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		95	A
I_{C110}	T_C = 110°C		50	A
I_{F110}	T_C = 110°C		58	A
I_{CM}	T_C = 25°C, 1ms		240	A
SSOA	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 2Ω		I_{CM} = 100	A
(RBSOA)	Clamped Inductive Load		$V_{CE} \le V_{CES}$	
P_C	T_C = 25°C		460	W
T_J			-55 ... +150	°C
T_{JM}			150	°C
T_{stg}			-55 ... +150	°C
V_{ISOL}	50/60Hz	t = 1min	2500	V~
	$I_{ISOL} \le$ 1mA	t = 1s	3000	V~
M_d	Mounting Torque		1.5/13	Nm/lb.in.
	Terminal Connection Torque		1.3/11.5	Nm/lb.in.
Weight			30	g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
$V_{GE(th)}$	I_C = 250μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE}= 0V			250	μA
	T_J = 125°C			14	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 40A, V_{GE} = 15V, Note 1			4.2	V
	T_J = 125°C		2.6		V

Features

- Optimized for Low Switching Losses
- Square RBSOA
- High Current Capability
- Isolation Voltage 2500V~
- Anti-Parallel Ultra Fast Diode
- International Standard Package

Advantages

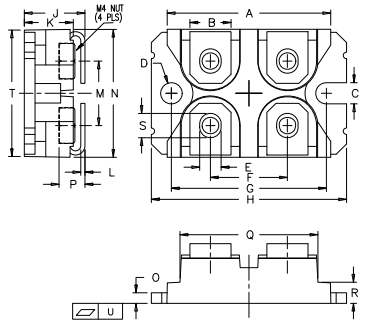
- High Power Density
- Low Gate Drive Requirement

Applications

- Power Inverters
- UPS
- SMPS
- PFC Circuits
- Welding Machines
- Lamp Ballasts

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
g_{fs}	I_C = 40A, V_{CE} = 10V, Note 1	24	40		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		4250		pF
C_{oes}			455		pF
C_{res}			120		pF
Q_g	I_C = 50A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		196		nC
Q_{ge}			24		nC
Q_{gc}			84		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		31		ns
t_{ri}	I_C = 40A, V_{GE} = 15V		36		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2Ω		2.0		mJ
$t_{d(off)}$	Note 2		123		ns
t_{fi}			64		ns
E_{off}			0.63	1.2	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		23		ns
t_{ri}	I_C = 40A, V_{GE} = 15V		37		ns
E_{on}	V_{CE} = 0.5 • V_{CES}, R_G = 2Ω		3.0		mJ
$t_{d(off)}$	Note 2		170		ns
t_{fi}			315		ns
E_{off}			2.1		mJ
R_{thJC}				0.27	°C/W
R_{thCK}			0.05		°C/W

SOT-227B miniBLOC (IXGN)



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

Reverse Diode (FRED)

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
V_F	I_F = 50A, V_{GE} = 0V, Note 1		2.1	2.4	V
	T_J = 125°C			2.3	V
I_{RM}	I_F = 50A, V_{GE} = 0V,		50		A
t_{rr}	$-di_F/dt$ = 2500A/μs, V_R = 800V		75		ns
R_{thJC}				0.30	°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.

Fig. 1. Output Characteristics @ T_J = 25ºC

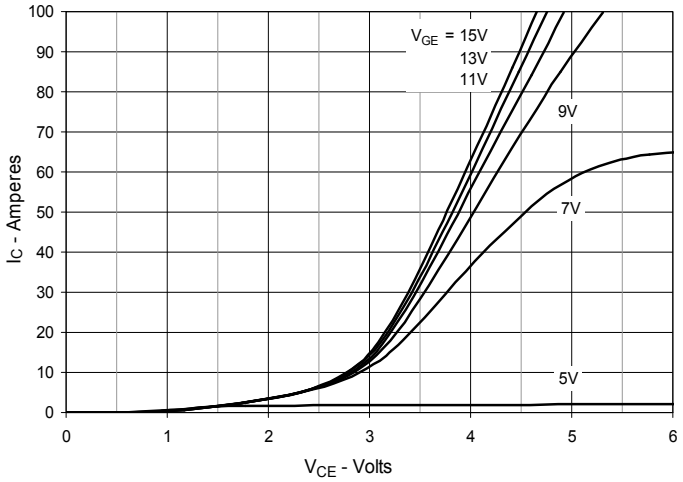


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

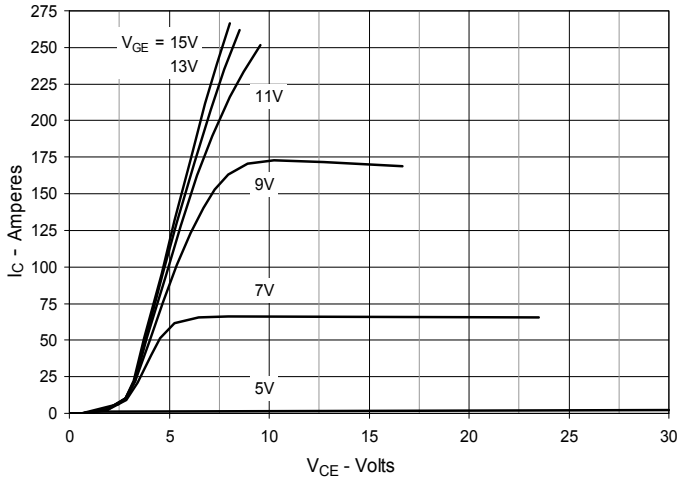


Fig. 3. Output Characteristics @ T_J = 125ºC

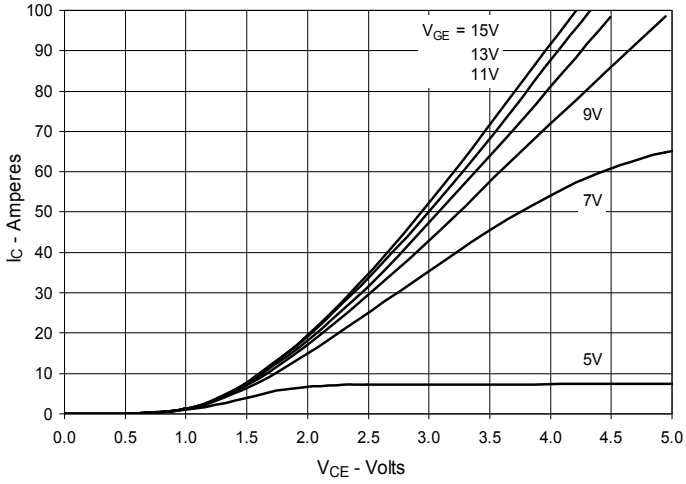


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

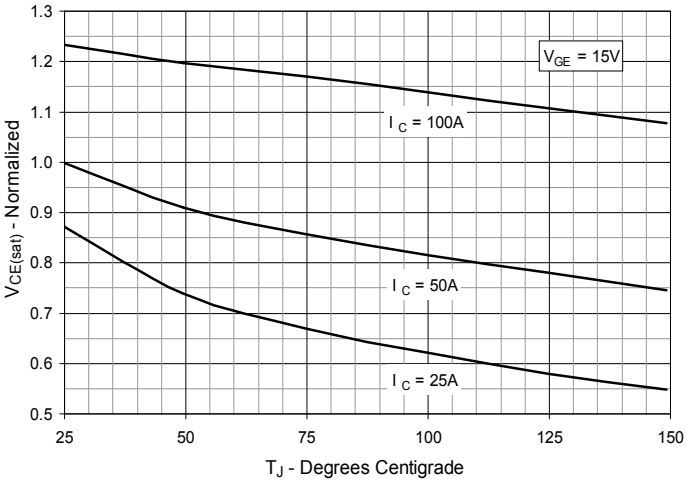


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

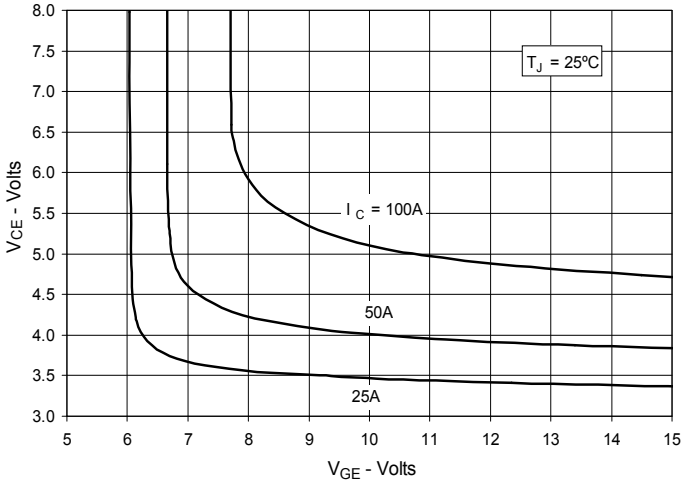


Fig. 6. Input Admittance

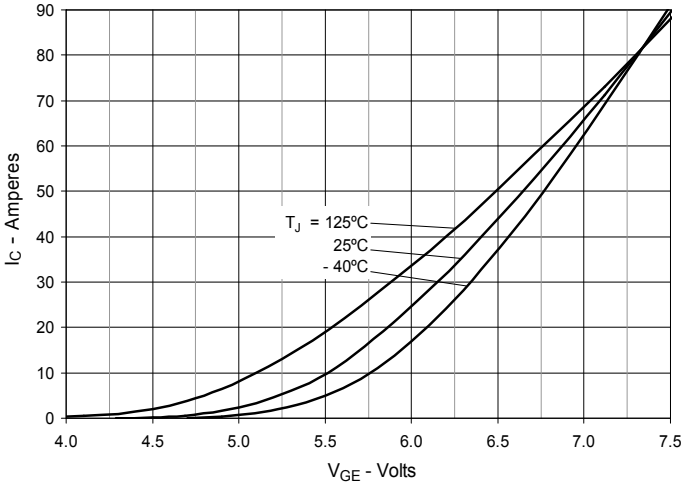


Fig. 7. Transconductance

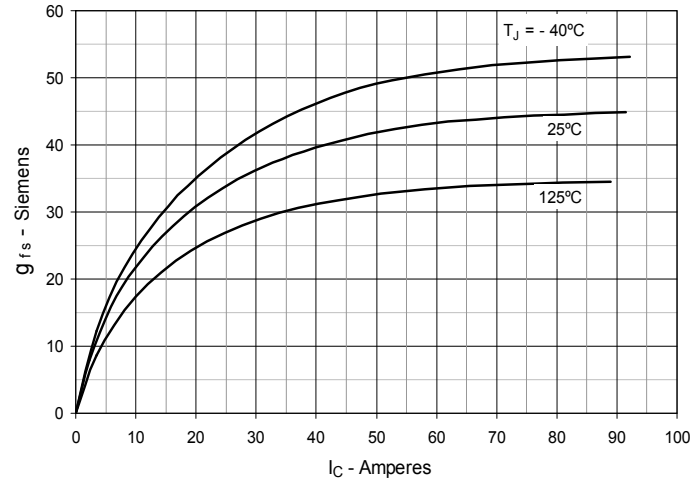


Fig. 8. Gate Charge

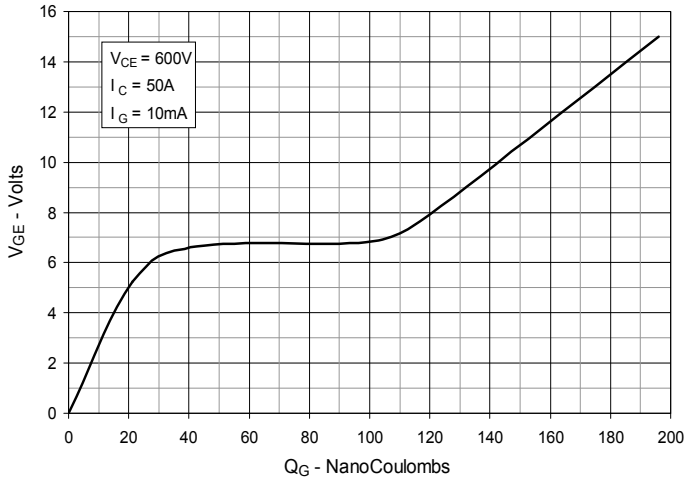


Fig. 9. Capacitance

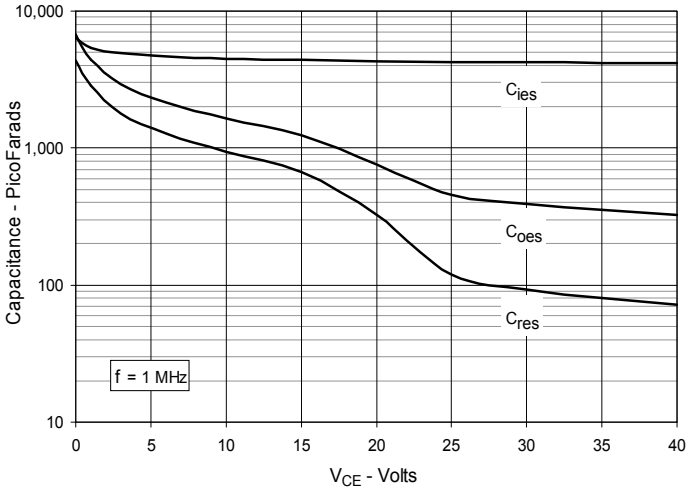


Fig. 10. Reverse-Bias Safe Operating Area

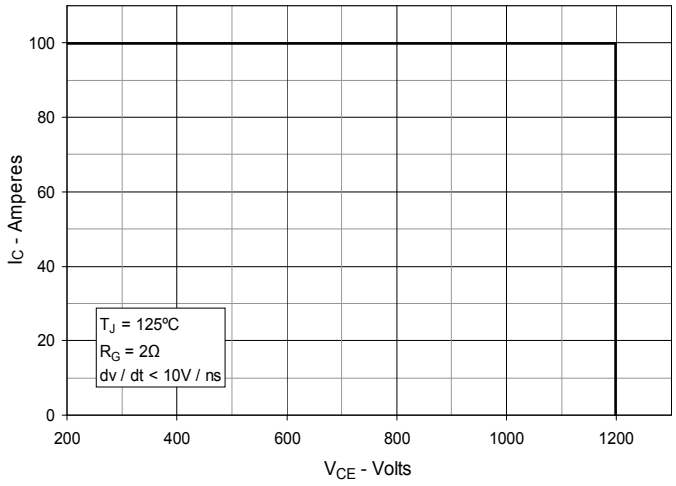


Fig. 11. Maximum Transient Thermal Impedance

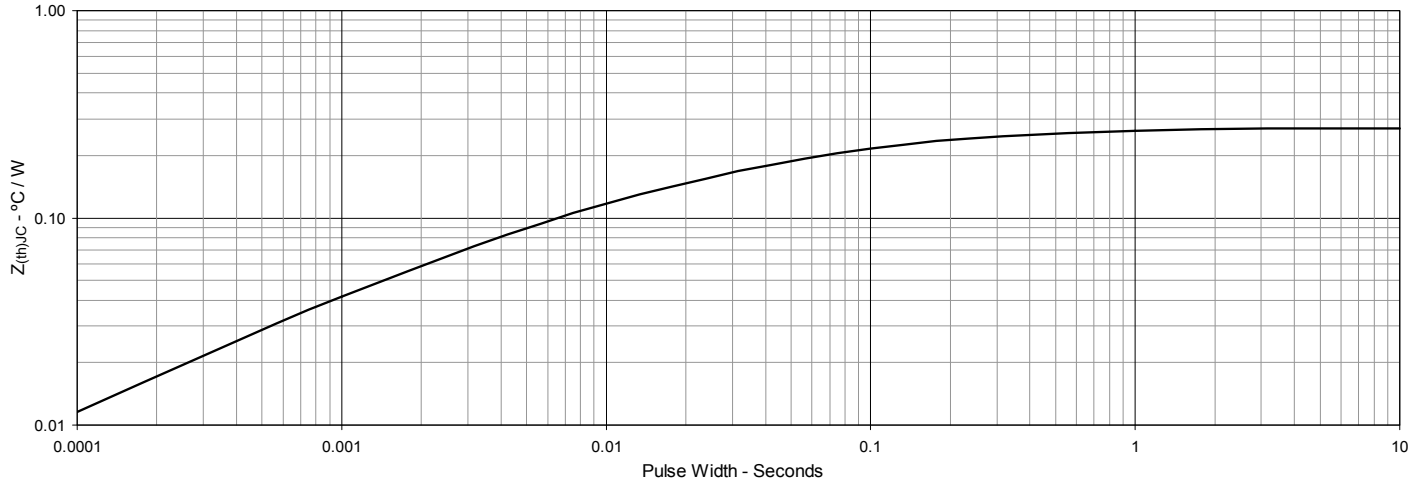


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

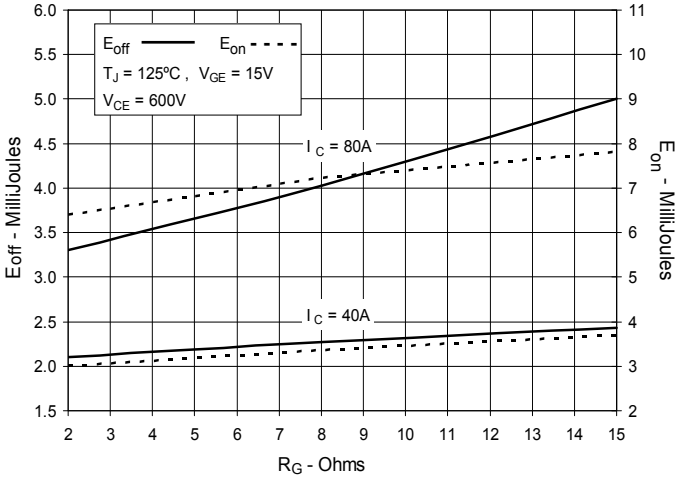


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

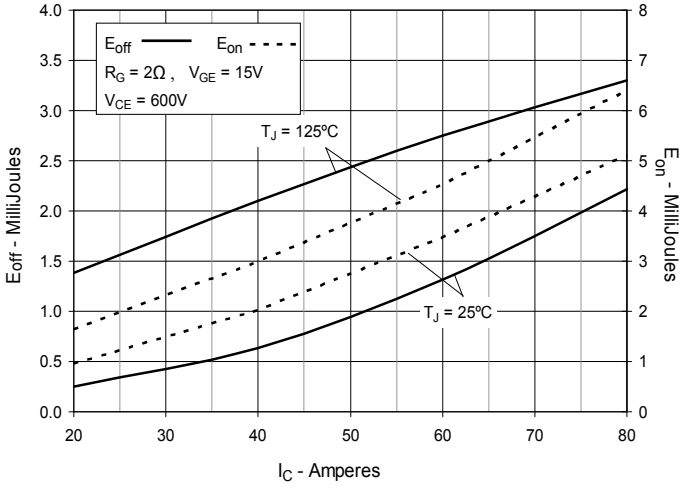


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

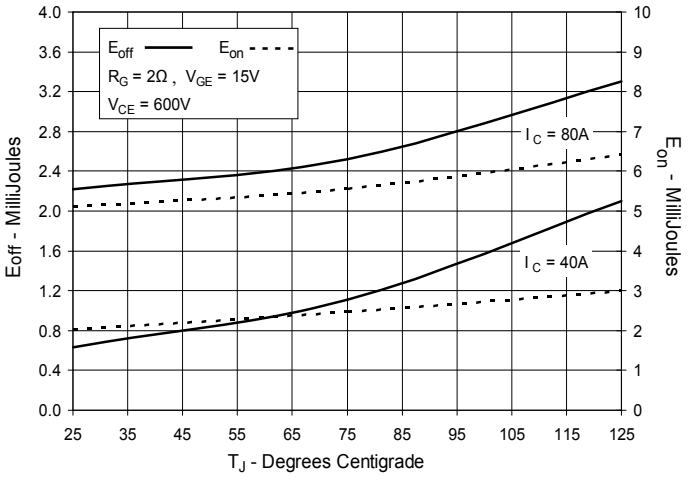


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

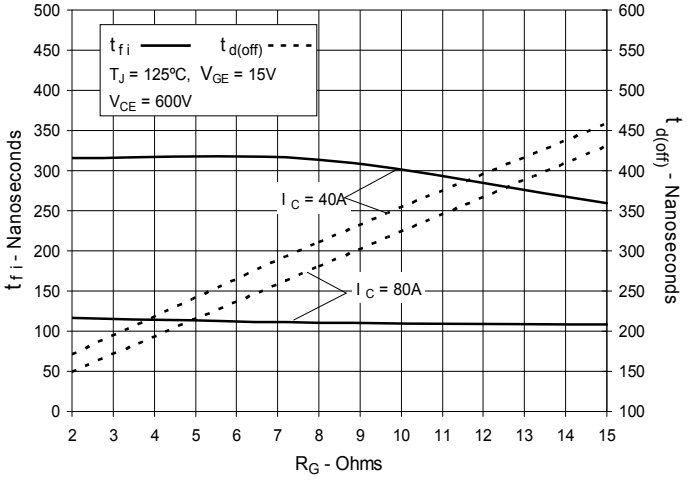


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

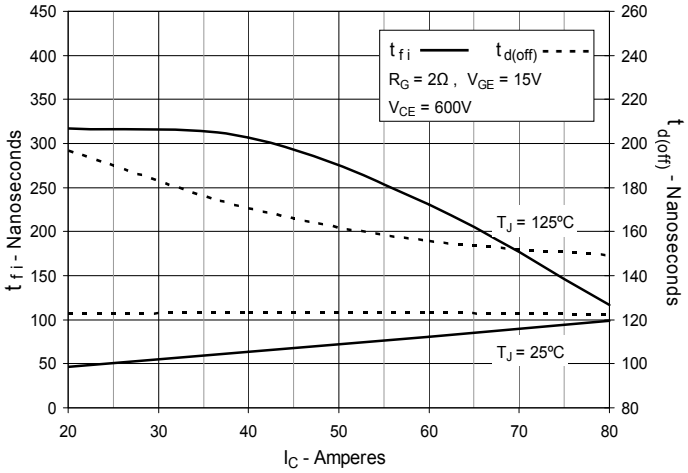


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

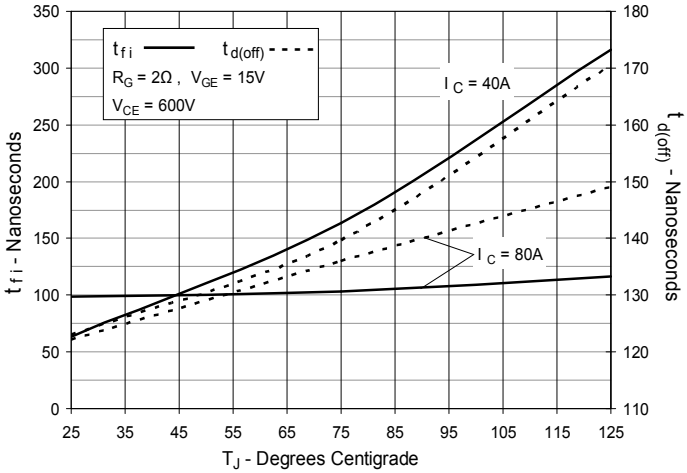


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

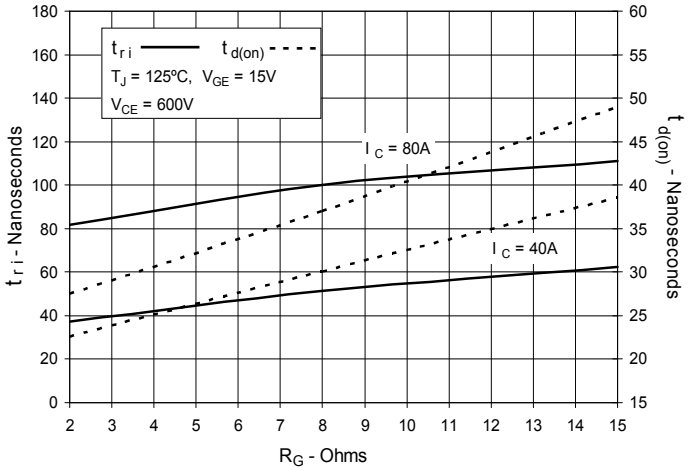


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

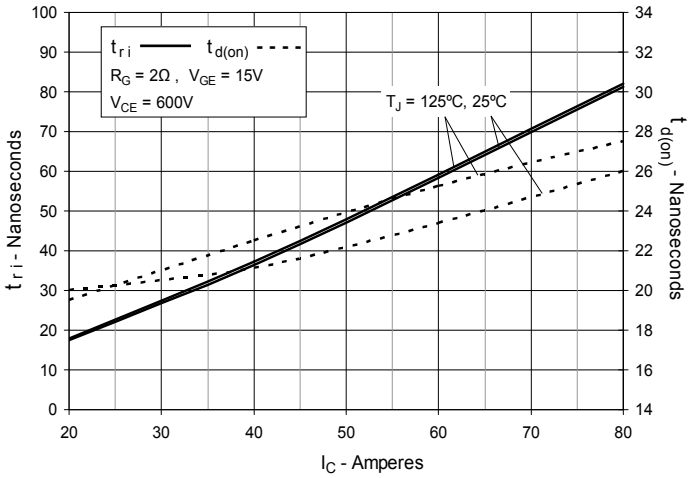


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature

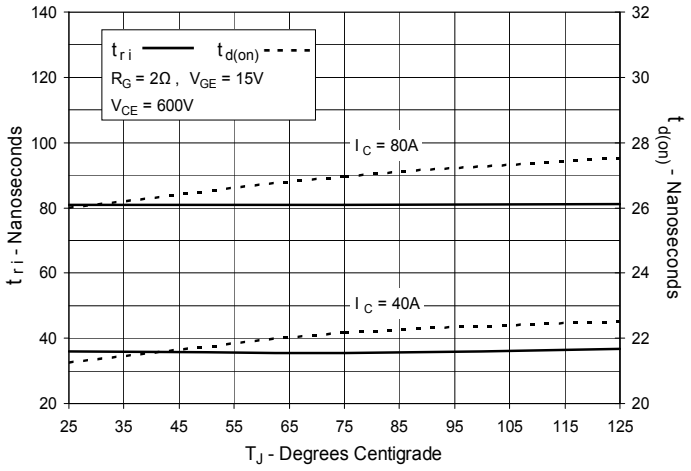


Fig. 21. Forward Current vs. Forward Voltage