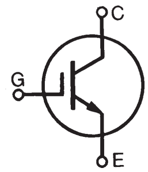
IXYS — Advance Technical Information

GenX3™ 1200V IGBTs

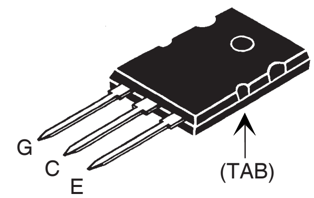
IXGK82N120B3
IXGX82N120B3

V_{CES} = 1200V
I_{C110} = 82A
$V_{CE(sat)} \leq$ 3.20V

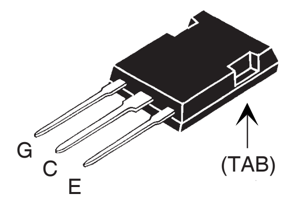
High-Speed Low-Vsat PT IGBTs
for 3 - 20 kHz Switching



TO-264 (IXGK)



PLUS247™ (IXGX)



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

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 (Chip Capability)	230	A
I_{C110}	T_C = 110°C	82	A
I_{LRMS}	T_C = 25°C (Lead RMS Limit)	120	A
I_{CM}	T_C = 25°C, 1ms	500	A
I_A	T_C = 25°C	41	A
E_{AS}	T_C = 25°C	750	mJ
SSOA (RBSOA)	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 2Ω Clamped Inductive Load	I_{CM} = 164 $V_{CE} \leq V_{CES}$	A
P_C	T_C = 25°C	1250	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
T_L	Maximum Lead Temperature for Soldering	300	°C
T_{SOLD}	1.6 mm (0.062 in.) from Case for 10	260	°C
M_d	Mounting Torque (IXGK)	1.13/10	Nm/lb.in.
F_C	Mounting Force (IXGX)	20..120/4.5..14.6	N/lb.
Weight	TO-264 PLUS247	10 6	g g

Symbol	Test Conditions (T_J = 25°C, Unless Otherwise Specified)	Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{CE} = 0V	1200			V
$V_{GE(th)}$	I_C = 1mA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V T_J = 125°C, Note 1			50 5	µA mA
I_{GES}	V_{CE} = 0V, V_{GE} = ± 20V			±100	nA
$V_{CE(sat)}$	I_C = I_{C110}, V_{GE} = 15V, Note 2 T_J = 125°C		2.70 2.64	3.20	V V

Features

- Optimized for Low Conduction and Switching Losses
- Square RBSOA
- High Avalanche Capability
- International Standard Packages

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 = 60A, V_{CE} = 10V, Note 2	35	60		S
C_{ies}			7900		pF
C_{oes}	V_{CE} = 25V, V_{GE} = 0V, f = 1 MHz		640		pF
C_{res}			170		pF
$Q_{g(on)}$			350		nC
Q_{ge}	$I_C = I_{C110}$, V_{GE} = 15V, $V_{CE} = 0.5 \bullet V_{CES}$		50		nC
Q_{gc}			150		nC
$t_{d(on)}$			30		ns
t_{ri}	**Inductive load, $T_J = 25°C$**		77		ns
E_{on}	I_C = 80A, V_{GE} = 15V		5.0		mJ
$t_{d(off)}$	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 2\Omega$		210		ns
t_{fi}	Note 3		100	180	ns
E_{off}			3.3	6.2	mJ
$t_{d(on)}$			32		ns
t_{ri}	**Inductive load, $T_J = 125°C$**		80		ns
E_{on}	I_C = 80A, V_{GE} = 15V		6.8		mJ
$t_{d(off)}$	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 2\Omega$		240		ns
t_{fi}	Note 3		520		ns
E_{off}			7.1		mJ
R_{thJC}				0.10	°C/W
R_{thCK}			0.15		°C/W

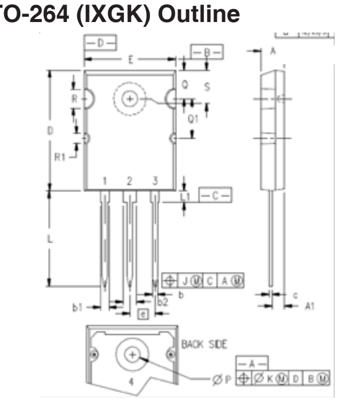
Notes:

1. Part must be heatsunk for high-temp Ices measurement.
2. Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.
3. 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.

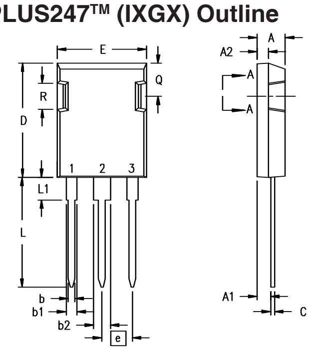
TO-264 (IXGK) Outline



1 – GATE
2, 4 – DRAIN (COLLECTOR)
3 – SOURCE (EMITTER)

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.185	.209	4.70	5.31
A1	.102	.118	2.59	3.00
b	.037	.055	0.94	1.40
b1	.087	.102	2.21	2.59
b2	.110	.126	2.79	3.20
c	.017	.029	0.43	0.74
D	1.007	1.047	25.58	26.59
E	.760	.799	19.30	20.29
e	.215BSC		5.46 BSC	
J	.000	.010	0.00	0.25
K	.000	.010	0.00	0.25
L	.779	.842	19.79	21.39
L1	.087	.102	2.21	2.59
ØP	.122	.138	3.10	3.51
Q	.240	.256	6.10	6.50
Q1	.330	.346	8.38	8.79
ØR	.155	.187	3.94	4.75
ØR1	.085	.093	2.16	2.36
S	.243	.253	6.17	6.43

PLUS247™ (IXGX) Outline



Terminals: 1 - Gate
2 - Drain (Collector)
3 - Source (Emitter)

Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.83	5.21	.190	.205
A_1	2.29	2.54	.090	.100
A_2	1.91	2.16	.075	.085
b	1.14	1.40	.045	.055
b_1	1.91	2.13	.075	.084
b_2	2.92	3.12	.115	.123
C	0.61	0.80	.024	.031
D	20.80	21.34	.819	.840
E	15.75	16.13	.620	.635
e	5.45 BSC		.215 BSC	
L	19.81	20.32	.780	.800
L1	3.81	4.32	.150	.170
Q	5.59	6.20	.220	0.244
R	4.32	4.83	.170	.190

Fig. 1. Output Characteristics @ 25ºC

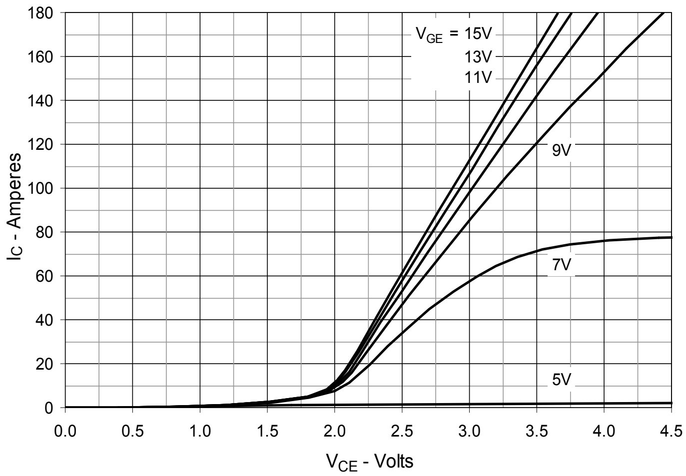


Fig. 2. Extended Output Characteristics @ 25ºC

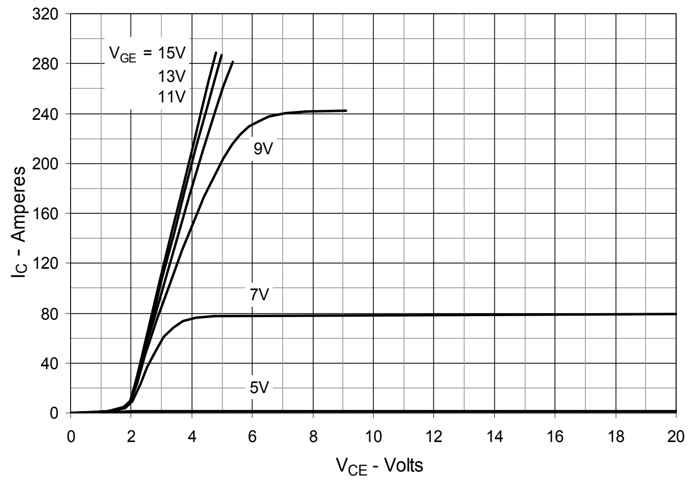


Fig. 3. Output Characteristics @ 125ºC

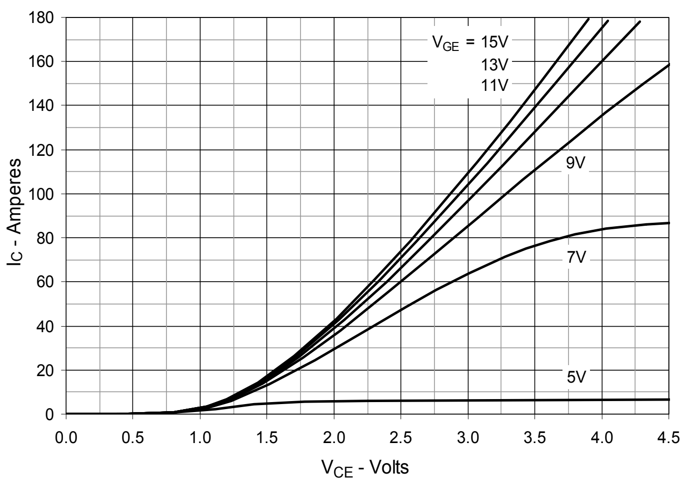


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

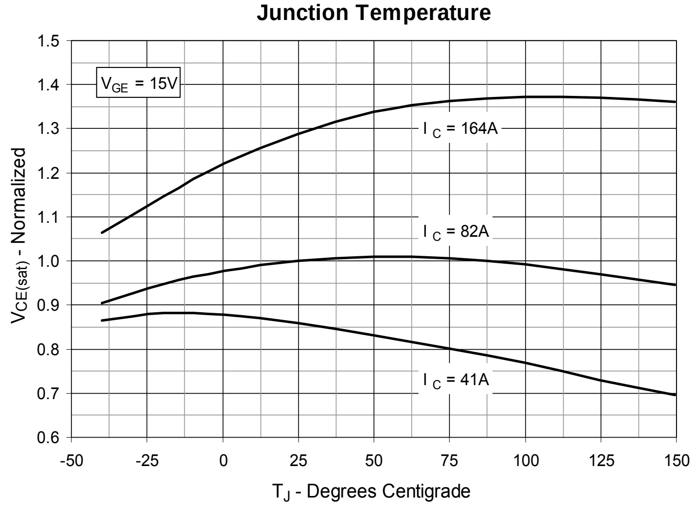


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

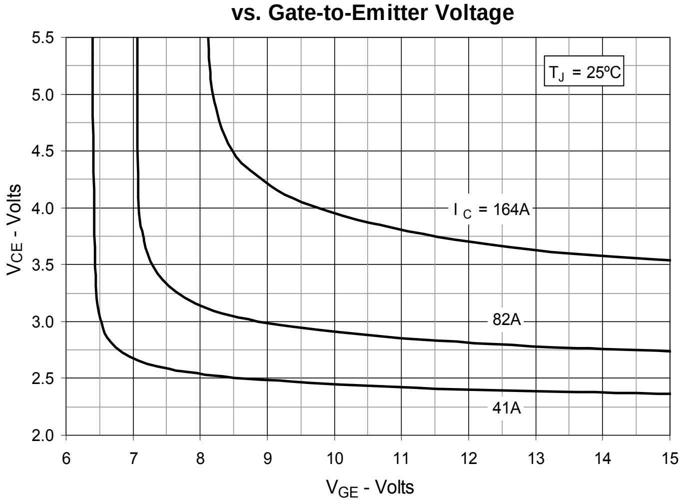


Fig. 6. Input Admittance

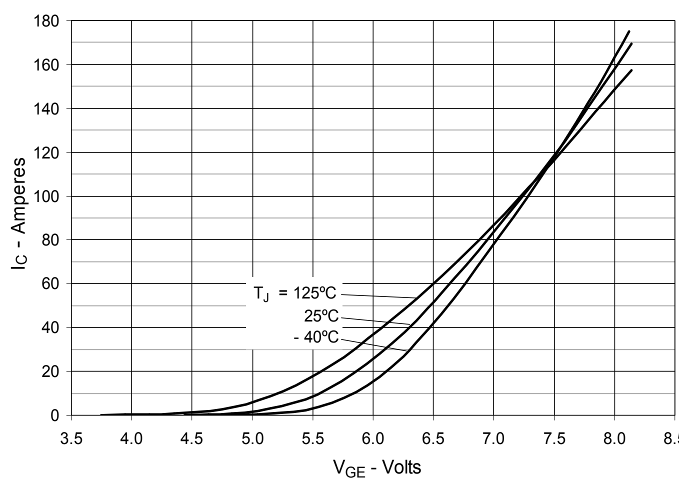


Fig. 7. Transconductance

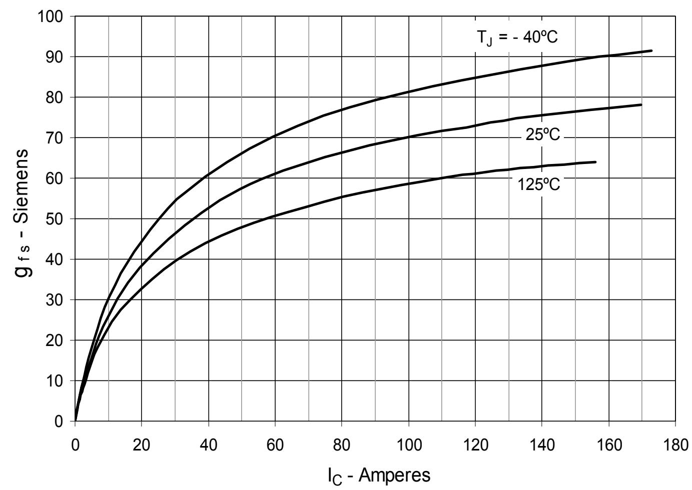


Fig. 8. Gate Charge

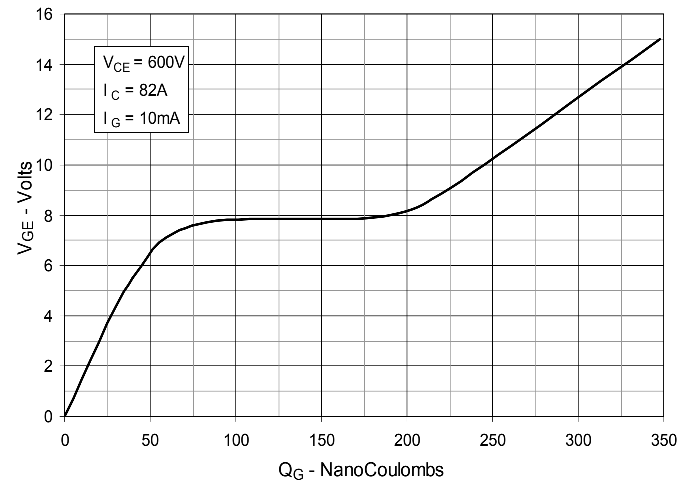


Fig. 9. Capacitance

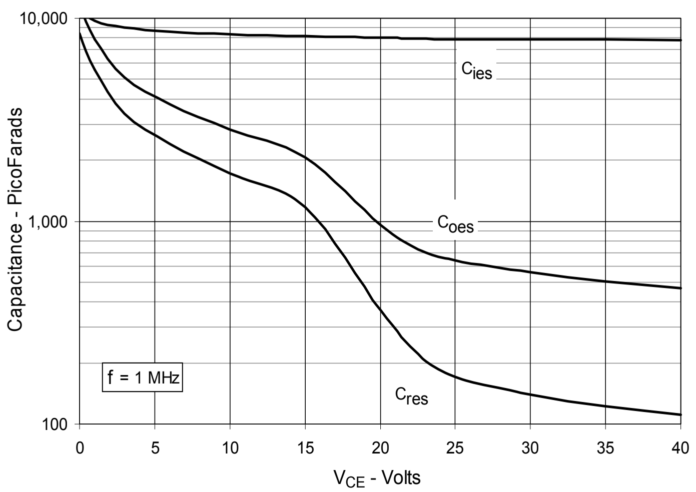


Fig. 10. Reverse-Bias Safe Operating Area

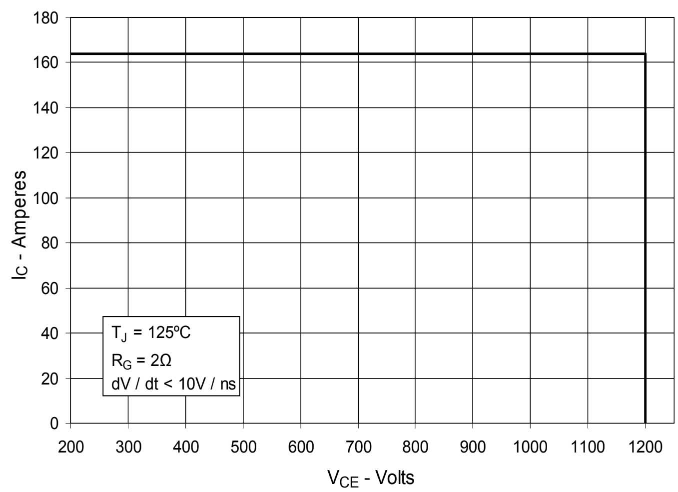
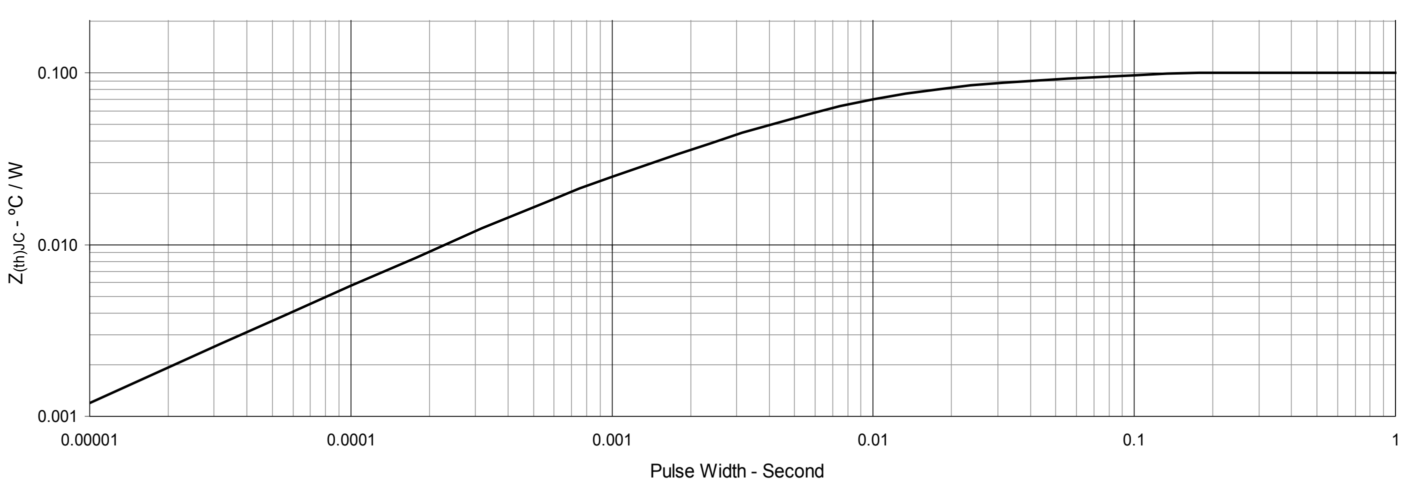


Fig. 11. Maximum Transient Thermal Impedance



IXYS Reserves the Right to Change Limits, Test Conditions, and Dimensions.

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

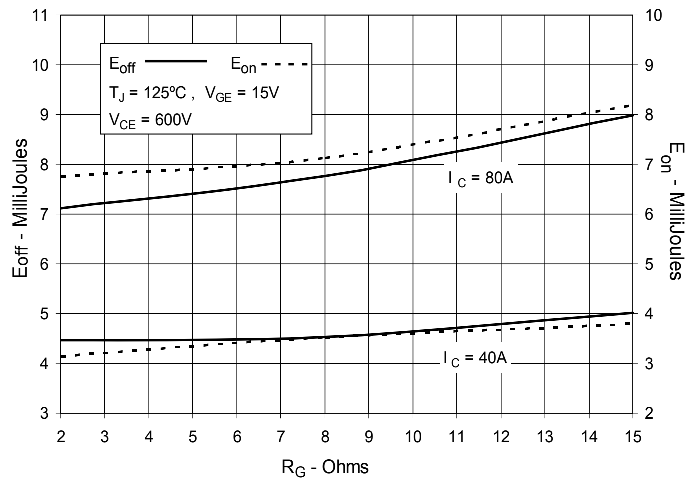


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

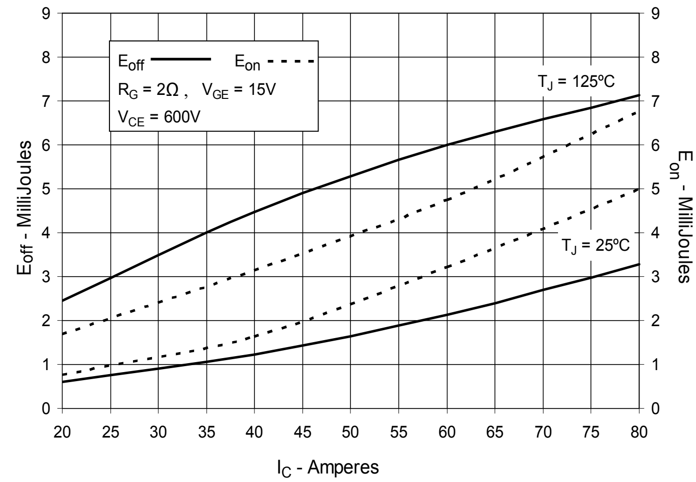


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

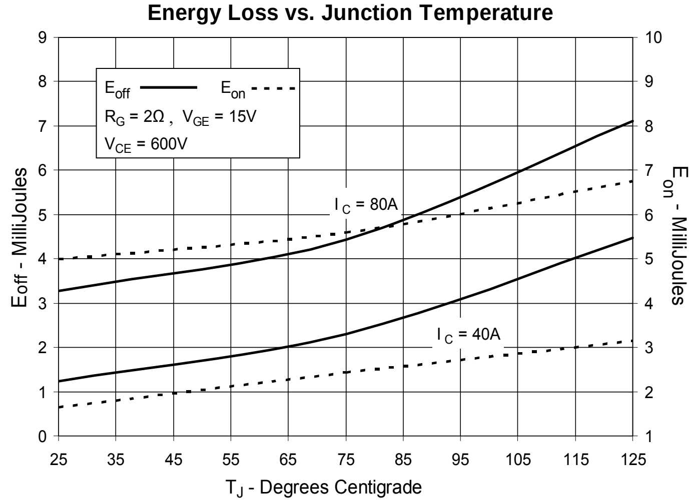


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

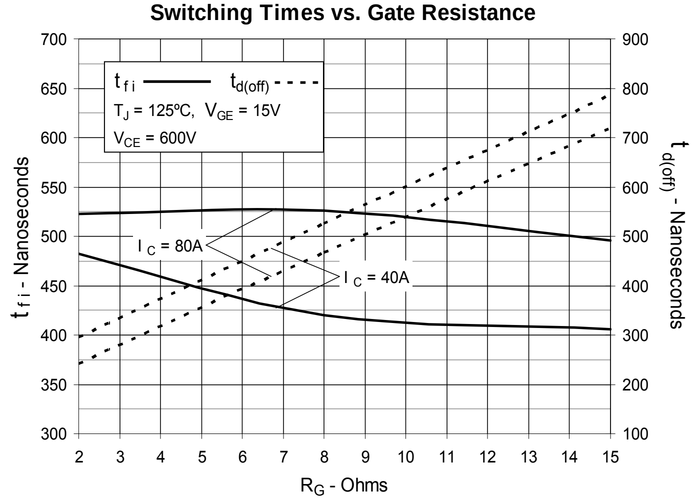


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

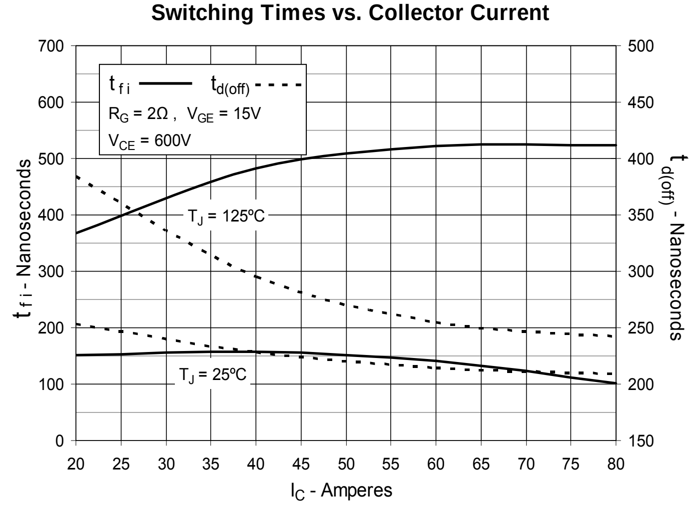


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

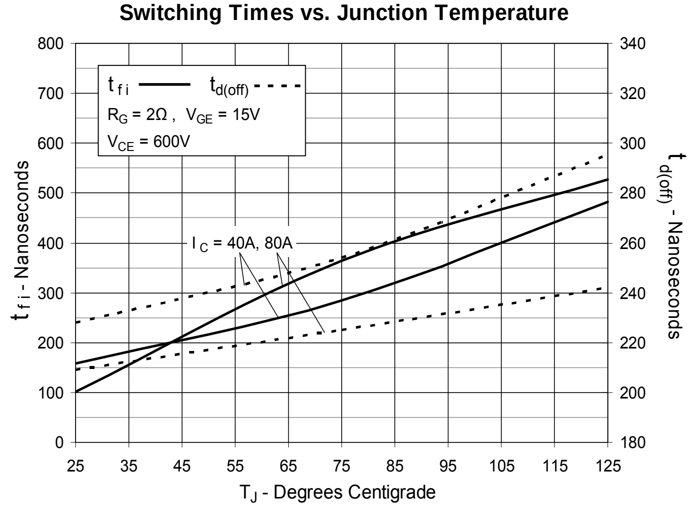


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

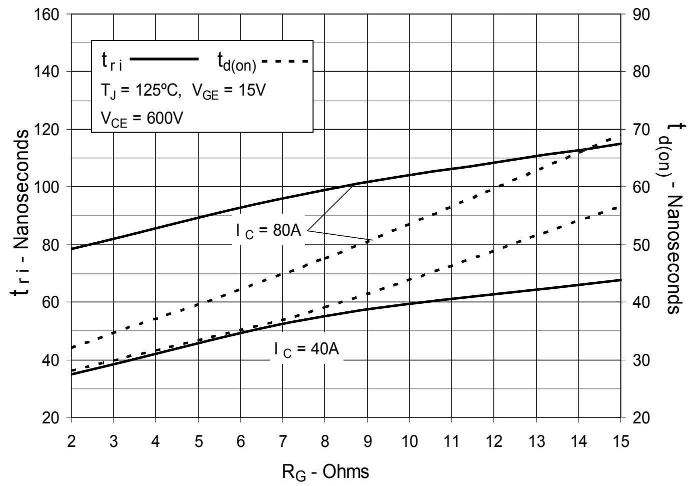


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

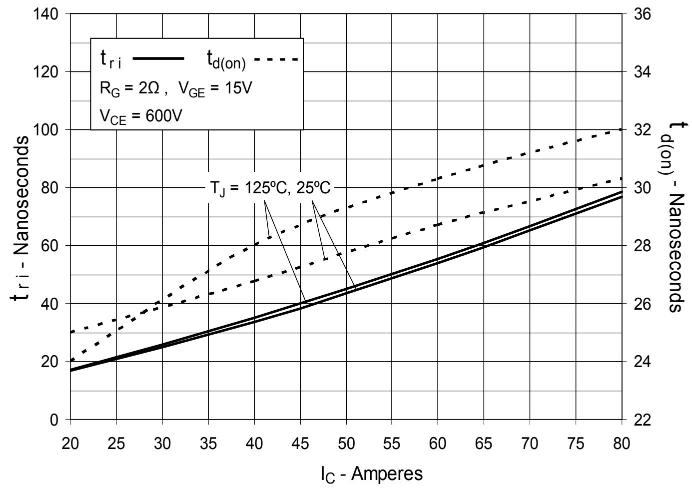


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature