IXYS

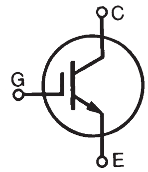
Preliminary Technical Information

GenX3™ 1200V IGBTs

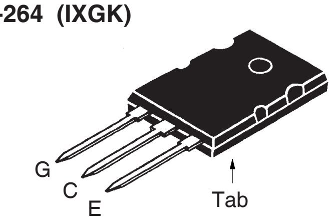
IXGK82N120A3
IXGX82N120A3

V_{CES} = 1200V
I_{C110} = 82A
$V_{CE(sat)}$ ≤ 2.05V

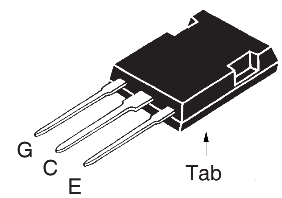
Ultra-Low-Vsat PT IGBTs for up to 3kHz Switching



TO-264 (IXGK)



PLUS247™ (IXGX)



G = Gate E = Emitter
C = Collector 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)	260	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	580	A
SSOA (RBSOA)	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 2Ω Clamped Inductive Load	I_{CM} = 164 @ 0.8 • 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..27	N/lb.
Weight	TO-264	10	g
	PLUS247	6	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			50	µA
	Note 1, T_J = 125°C			2.5	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = I_{C110}, V_{GE} = 15V, Note 2		1.83	2.05	V
	T_J = 125°C		1.95		

Features

- Optimized for Low Conduction Losses
- International Standard Packages

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.	
g_{fs}	I_C = 60A, V_{CE} = 10V, Note 2	40	66		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1 MHz		7700		pF
C_{oes}			520		pF
C_{res}			190		pF
$Q_{g(on)}$	$I_C = I_{C110}$, V_{GE} = 15V, $V_{CE} = 0.5 \bullet V_{CES}$		340		nC
Q_{ge}			54		nC
Q_{gc}			146		nC
$t_{d(on)}$	**Inductive load, $T_J = 25°C$**		34		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		75		ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 2\Omega$		5.5		mJ
$t_{d(off)}$	Note 3		265		ns
t_{fi}			780	1300	ns
E_{off}			12.5	20.0	mJ
$t_{d(on)}$	**Inductive load, $T_J = 125°C$**		32		ns
t_{ri}	I_C = 80A, V_{GE} = 15V		77		ns
E_{on}	$V_{CE} = 0.5 \bullet V_{CES}$, $R_G = 2\Omega$		6.7		mJ
$t_{d(off)}$	Note 3		340		ns
t_{fi}			1250		ns
E_{off}			22.5		mJ
R_{thJC}				0.10	°C/W
R_{thCK}			0.15		°C/W

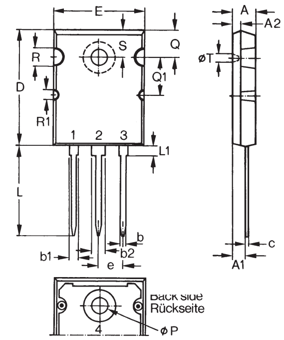
Notes:

1. Part must be heatsunk for high-temp I_{CES} 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.

PRELIMINARY TECHNICAL INFORMATION

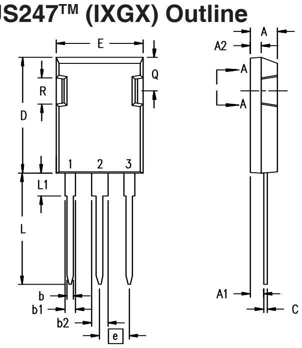
The product presented herein is under development. The Technical Specifications offered are derived from data gathered during objective characterizations of preliminary engineering lots; but also may yet contain some information supplied during a pre-production design evaluation. IXYS reserves the right to change limits, test conditions, and dimensions without notice.

TO-264 AA (IXGK) Outline



Dim.	Millimeter Min.	Max.	Inches Min.	Max.
A	4.82	5.13	.190	.202
A1	2.54	2.89	.100	.114
A2	2.00	2.10	.079	.083
b	1.12	1.42	.044	.056
b1	2.39	2.69	.094	.106
b2	2.90	3.09	.114	.122
c	0.53	0.83	.021	.033
D	25.91	26.16	1.020	1.030
E	19.81	19.96	.780	.786
e	5.46 BSC		.215 BSC	
J	0.00	0.25	.000	.010
K	0.00	0.25	.000	.010
L	20.32	20.83	.800	.820
L1	2.29	2.59	.090	.102
P	3.17	3.66	.125	.144
Q	6.07	6.27	.239	.247
Q1	8.38	8.69	.330	.342
R	3.81	4.32	.150	.170
R1	1.78	2.29	.070	.090
S	6.04	6.30	.238	.248
T	1.57	1.83	.062	.072

PLUS247™ (IXGX) Outline



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

Dim.	Millimeter Min.	Max.	Inches Min.	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

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

Fig. 1. Output Characteristics @ T_J = 25ºC

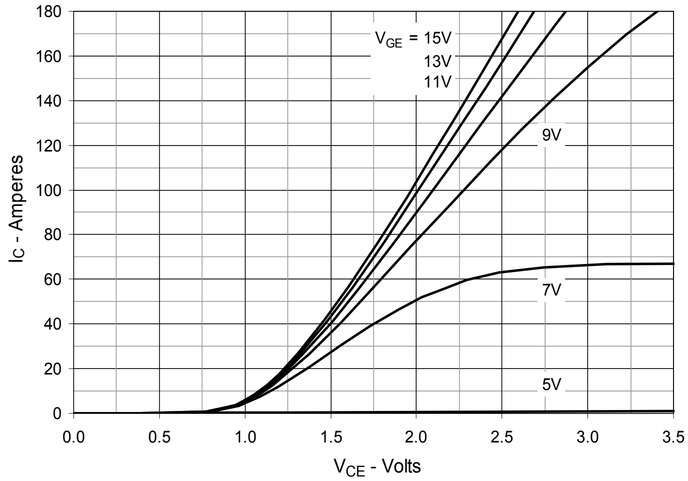


Fig. 2. Extended Output Characteristics @ T_J = 25ºC

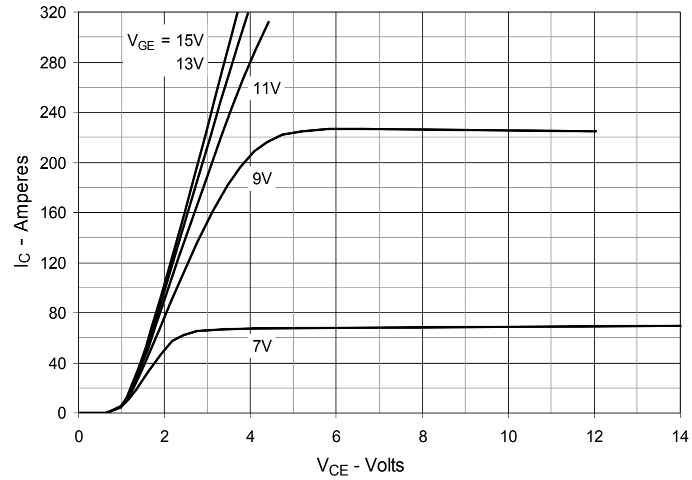


Fig. 3. Output Characteristics @ T_J = 125ºC

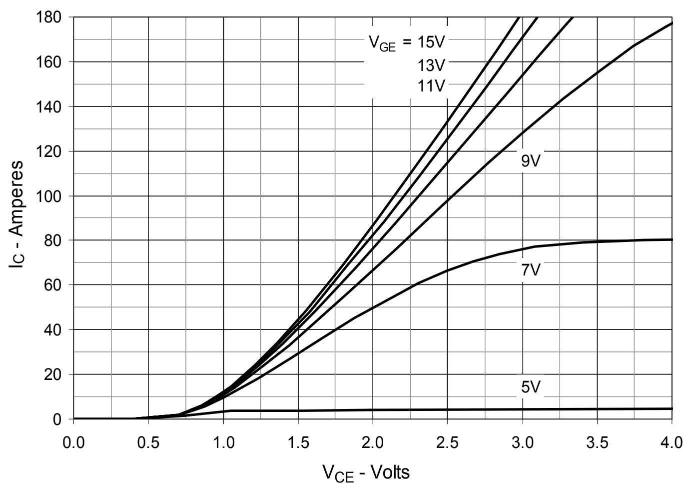


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

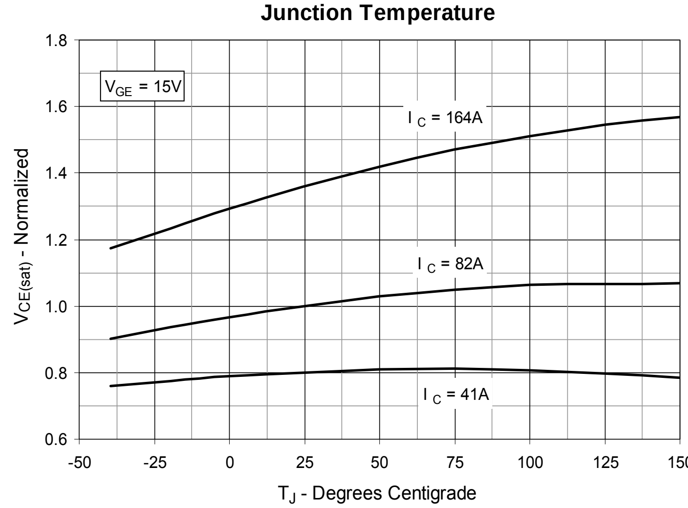


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

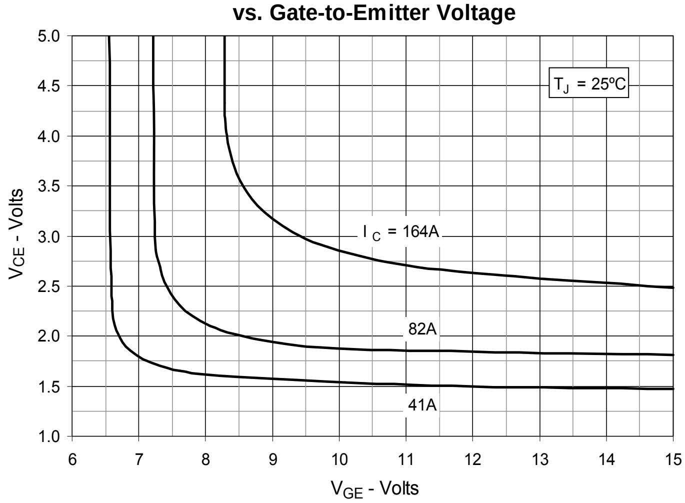


Fig. 6. Input Admittance

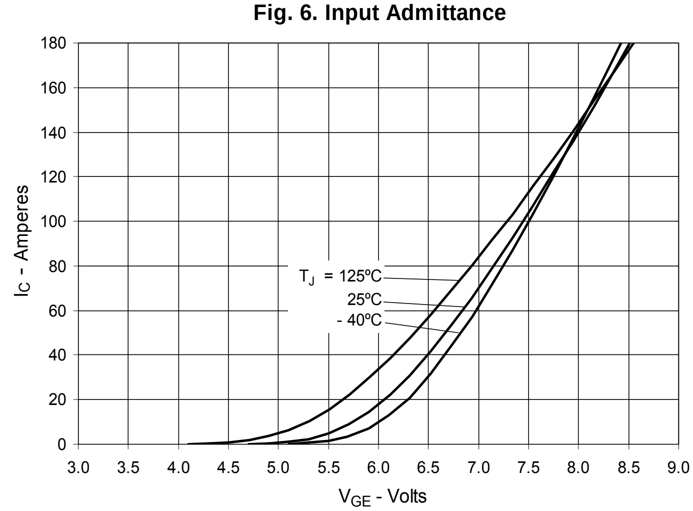


Fig. 7. Transconductance

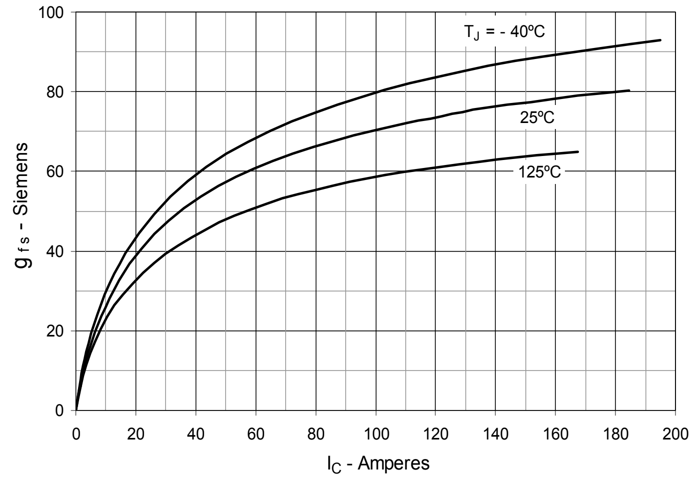


Fig. 8. Gate Charge

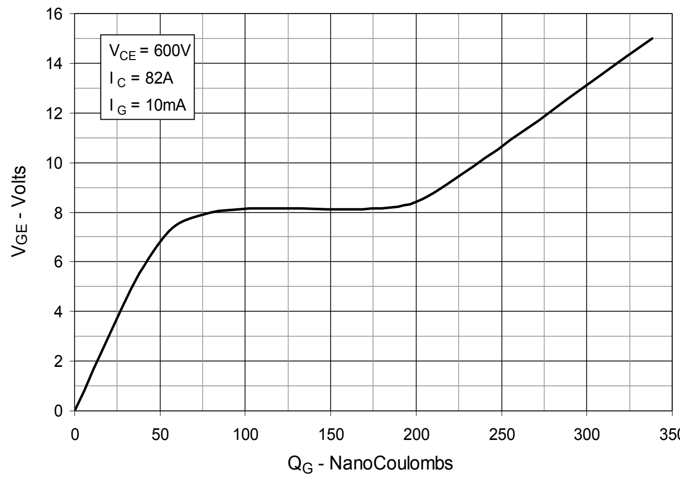


Fig. 9. Capacitance

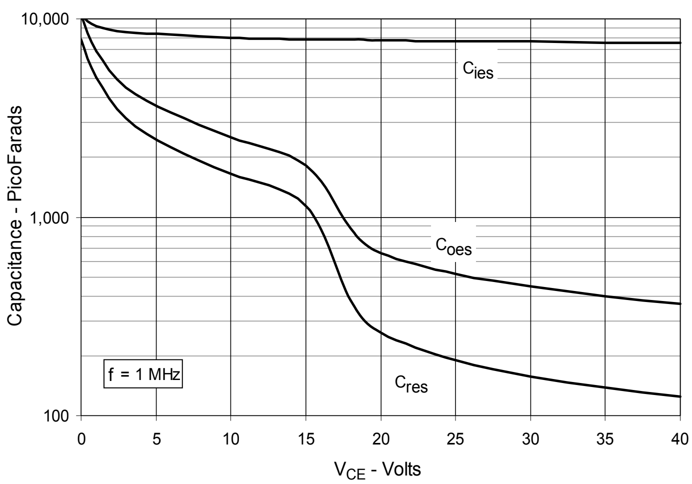


Fig. 10. Reverse-Bias Safe Operating Area

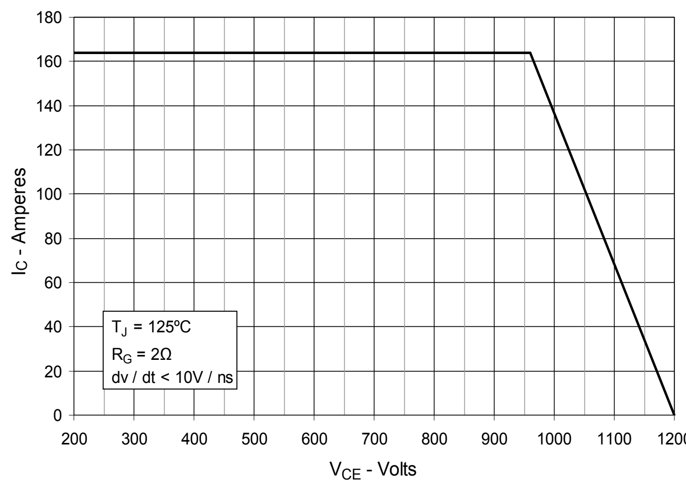


Fig. 11. Maximum Transient Thermal Impedance

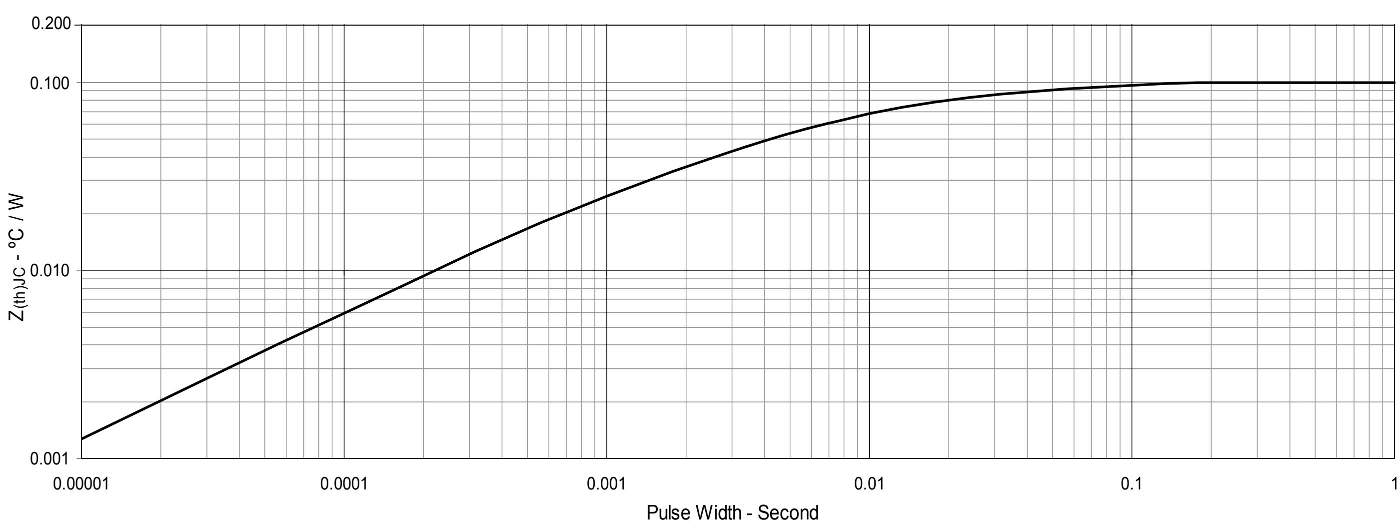


Fig. 12. Inductive Switching Energy Loss vs. Collector Current

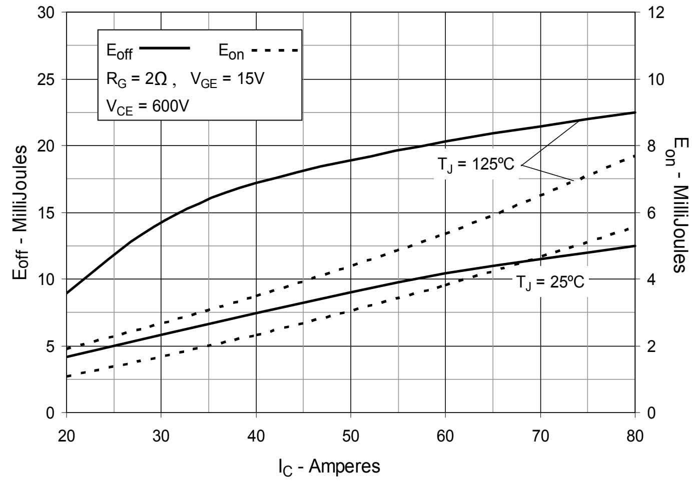


Fig. 13. Inductive Switching Energy Loss vs. Junction Temperature

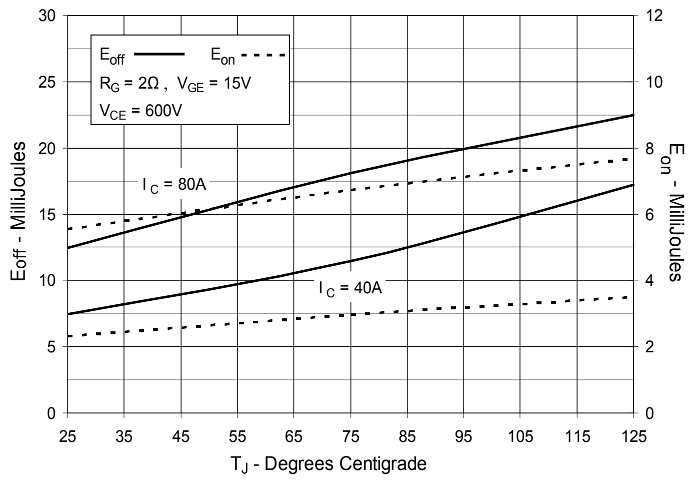


Fig. 14. Inductive Turn-off Switching Times vs. Collector Current

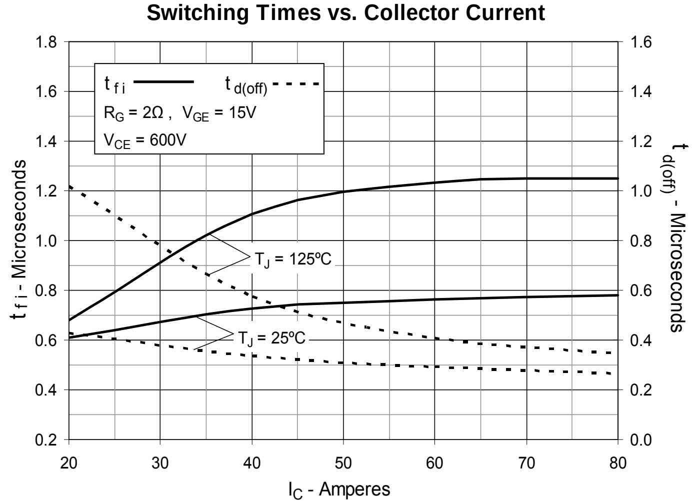


Fig. 15. Inductive Turn-off Switching Times vs. Junction Temperature

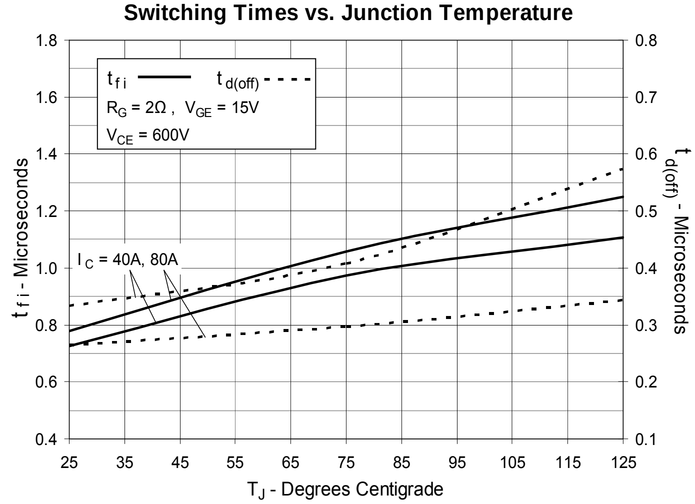


Fig. 16. Inductive Turn-on Switching Times vs. Collector Current

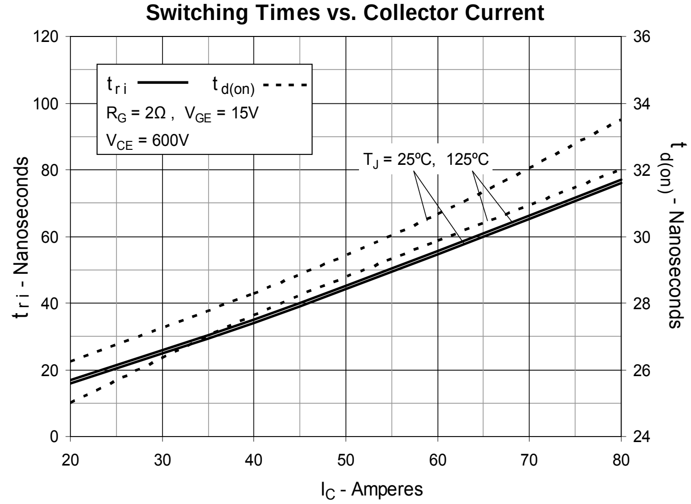


Fig. 17. Inductive Turn-on Switching Times vs. Junction Temperature