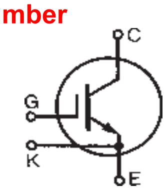
IXYS

GenX3™ A3-Class IGBTS

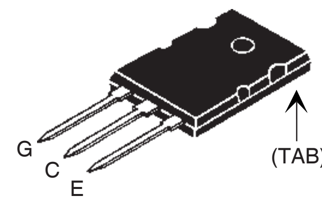
Ultra-Low Vsat PT IGBTs for up to 5kHz Switching

IXGK120N60A3*
IXGX120N60A3
*Obsolete Part Number

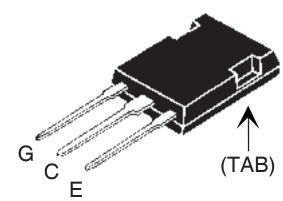


V_{CES} = 600V
I_{C110} = 120A
$V_{CE(sat)}$ ≤ 1.35V

TO-264 (IXGK)



PLUS 247™ (IXGX)



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

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	200	A
I_{C110}	T_C = 110°C	120	A
I_{LRMS}	Terminal Current Limit	75	A
I_{CM}	T_C = 25°C, 1ms	600	A
SSOA	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 1.5Ω	I_{CM} = 200	A
(RBSOA)	Clamped Inductive Load	@ ≤ 600	V
P_C	T_C = 25°C	780	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	Characteristic Values			
(T_J = 25°C, Unless Otherwise Specified)		Min.	Typ.	Max.	
$V_{GE(th)}$	I_C = 500μA, V_{CE} = V_{GE}	3.0		5.0	V
I_{CES}	V_{CE} = V_{CES}, V_{GE} = 0V			50	μA
	T_J = 125°C			1.25	mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±400	nA
$V_{CE(sat)}$	I_C = 100A, V_{GE} = 15V, Note 1		1.20	1.35	V

Features

- Optimized for Low Conduction Losses
- Square RBSOA
- High Current Handling Capability
- International Standard Packages

Advantages

- High Power Density
- Low Gate Drive Requirement

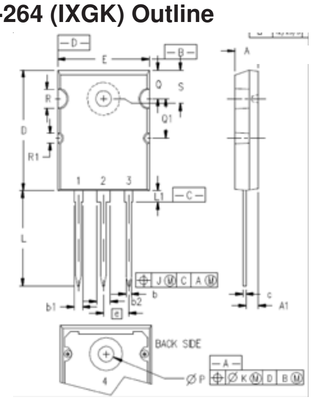
Applications

- 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} = 10 V, Note 1	65	108		S
C_{ies}	V_{CE} = 25 V, V_{GE} = 0 V, f = 1 MHz		14.8		nF
C_{oes}			800		pF
C_{res}			140		pF
$Q_{g(on)}$	$I_C = I_{C110}$, V_{GE} = 15 V, $V_{CE} = 0.5 \bullet V_{CES}$		450		nC
Q_{ge}			67		nC
Q_{gc}			130		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		39		ns
t_{ri}	I_C = 100A, V_{GE} = 15V		82		ns
E_{on}	V_{CE} = 480V, R_G = 1.5Ω		2.7		mJ
$t_{d(off)}$			295		ns
t_{fi}			260		ns
E_{off}			6.6		mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		40		ns
t_{ri}	I_C = 100A, V_{GE} = 15V		83		ns
E_{on}	V_{CE} = 480V, R_G = 1.5Ω		3.5		mJ
$t_{d(off)}$			420		ns
t_{fi}			410		ns
E_{off}			10.4		mJ
R_{thJC}				0.16	°C/W
R_{thCK}			0.15		°C/W

Note: 1. Pulse Test, t ≤ 300μs; Duty Cycle, d ≤ 2%.

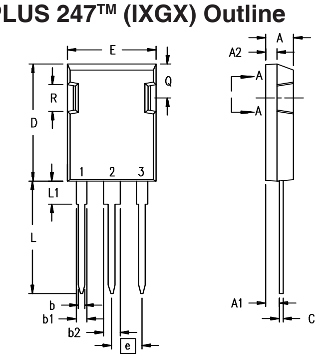
TO-264 (IXGK) Outline



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

PLUS 247™ (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

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

Fig. 1. Output Characteristics @ 25ºC

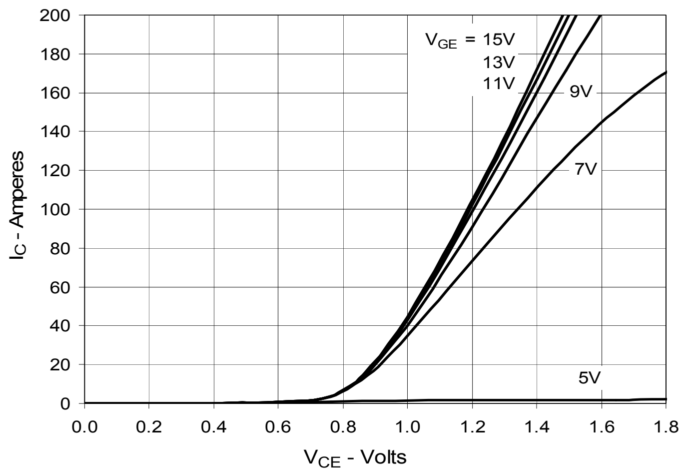


Fig. 2. Extended Output Characteristics @ 25ºC

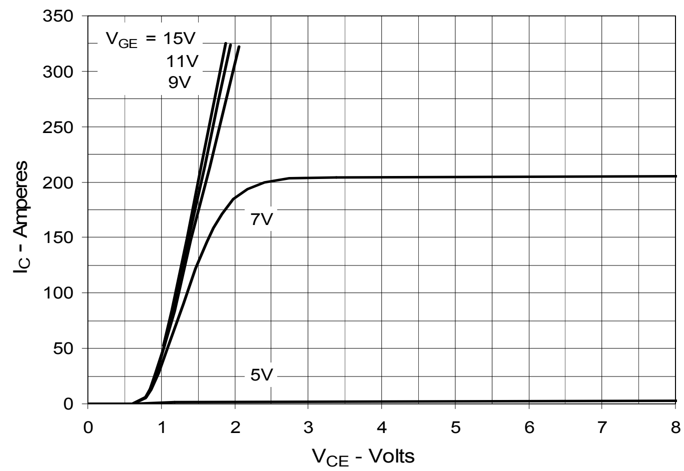


Fig. 3. Output Characteristics @ 125ºC

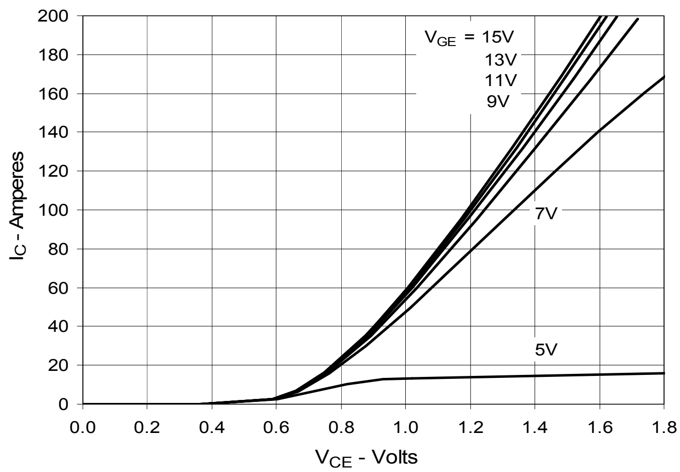


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

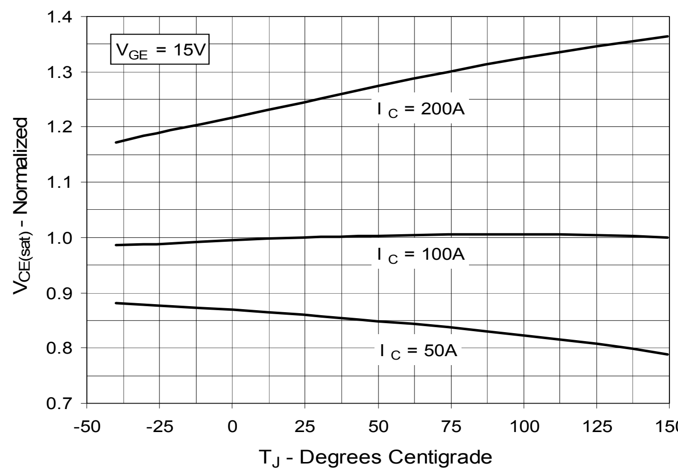


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

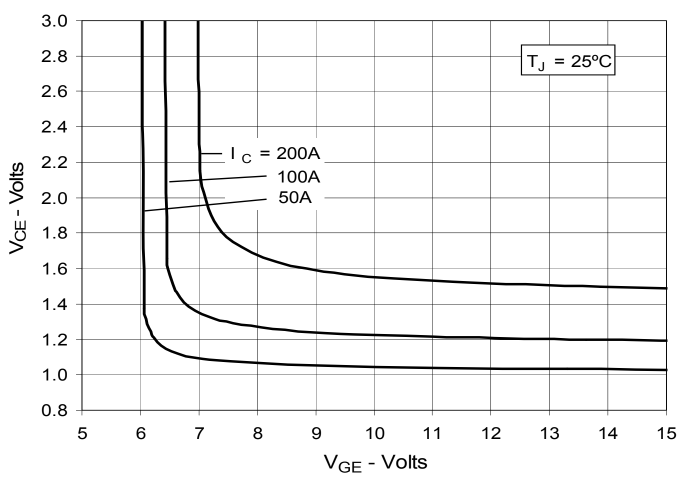


Fig. 6. Input Admittance

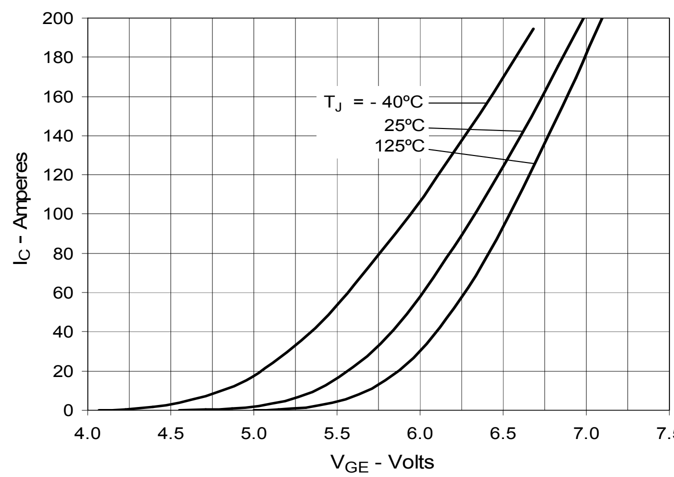


Fig. 7. Transconductance

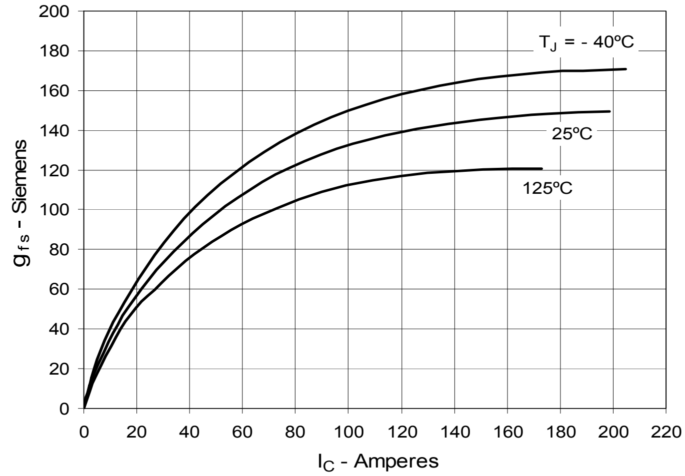


Fig. 8. Gate Charge

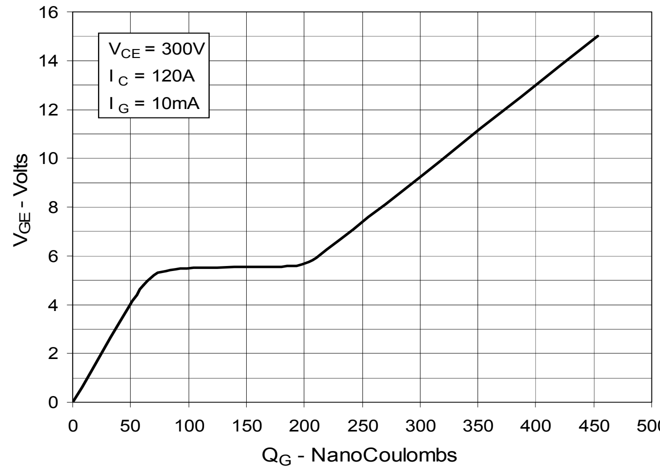


Fig. 9. Capacitance

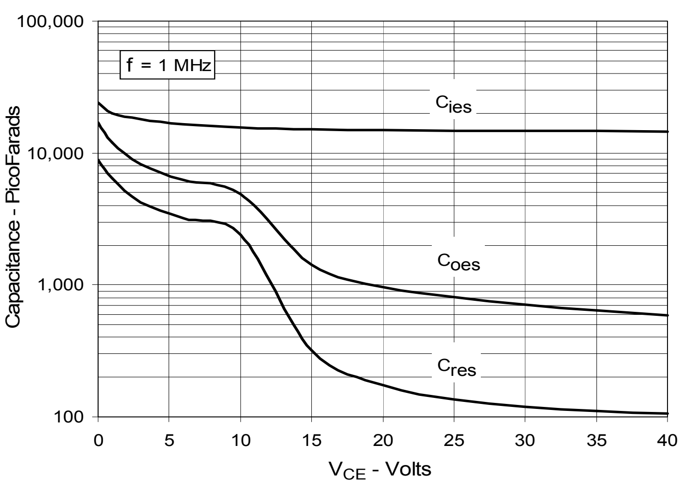


Fig. 10. Reverse-Bias Safe Operating Area

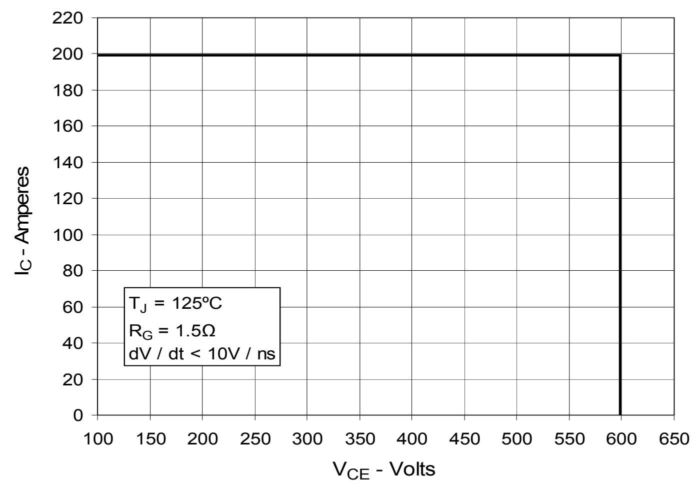


Fig. 11. Maximum Transient Thermal Impedance

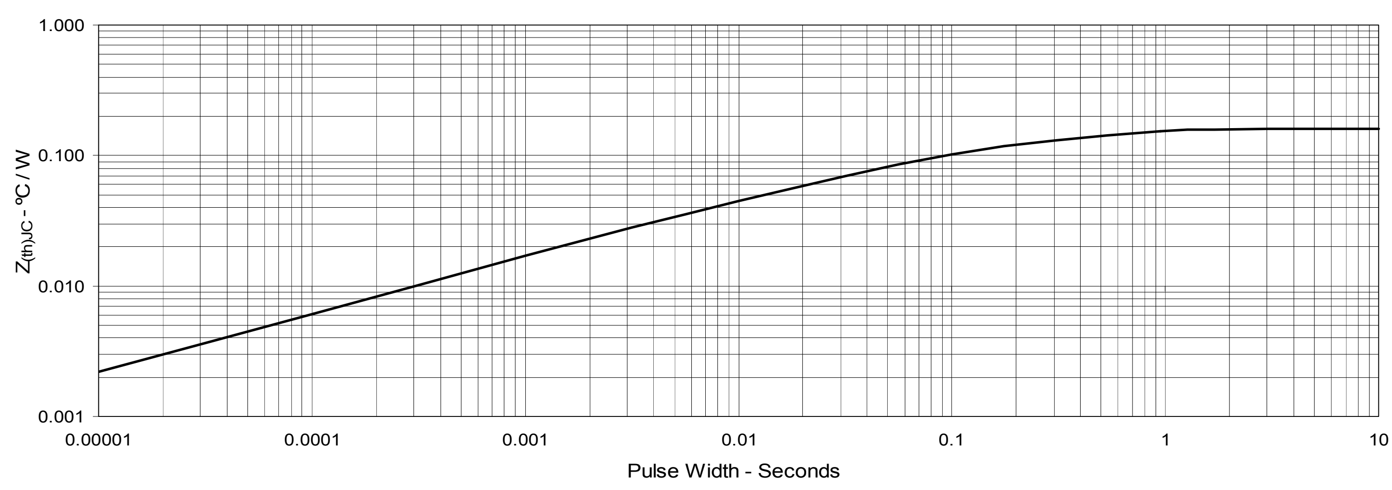


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

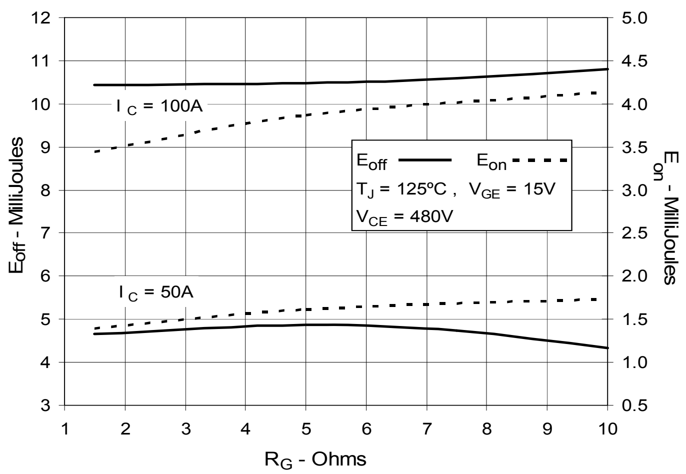


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

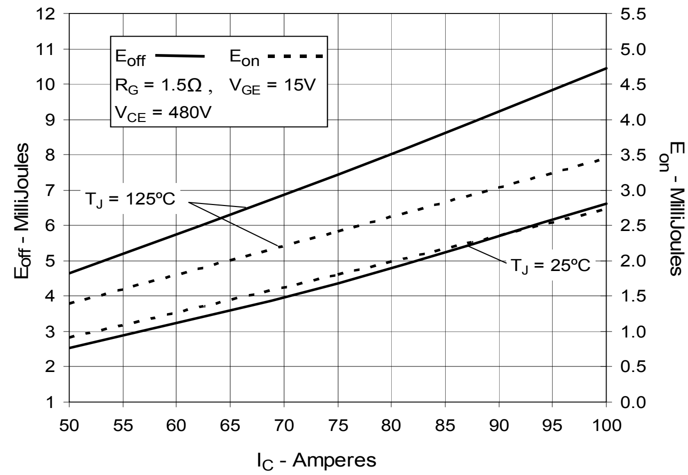


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

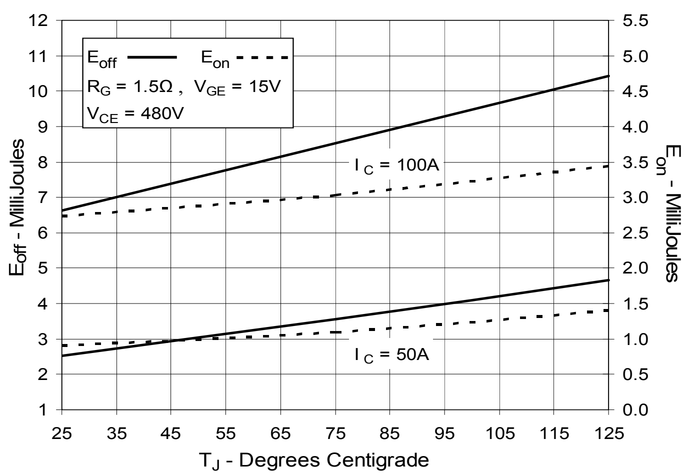


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

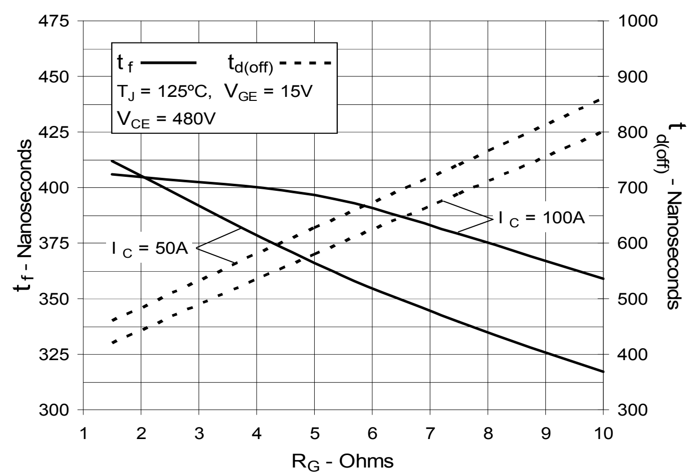


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

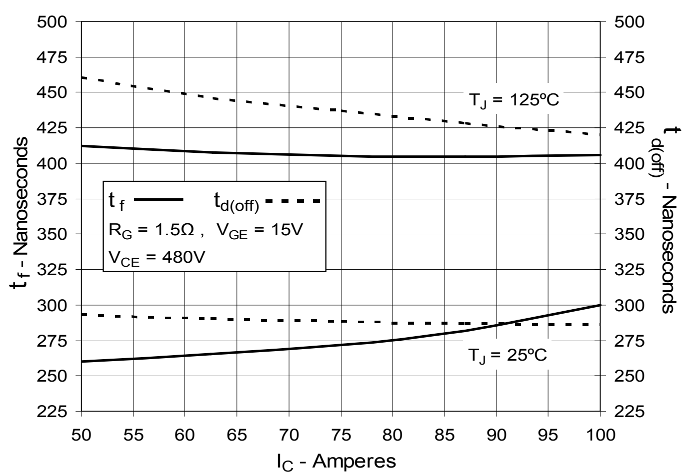


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

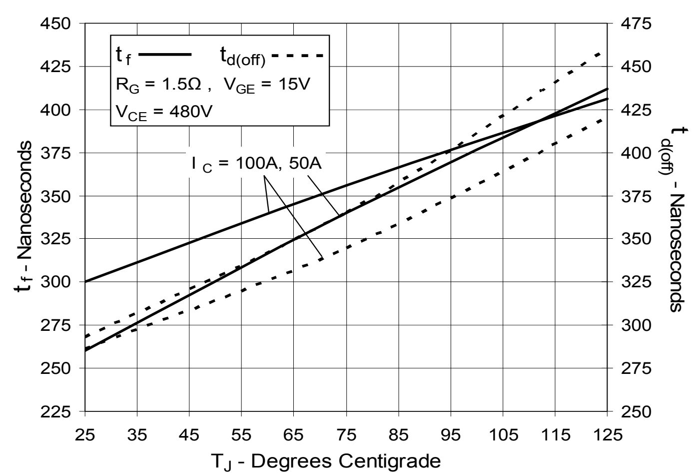


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

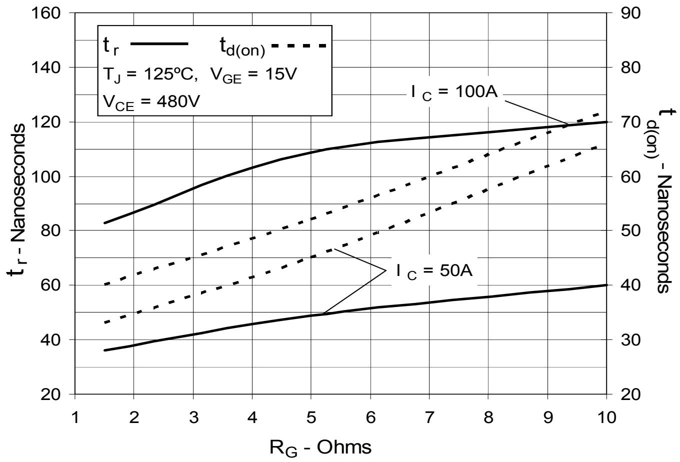


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

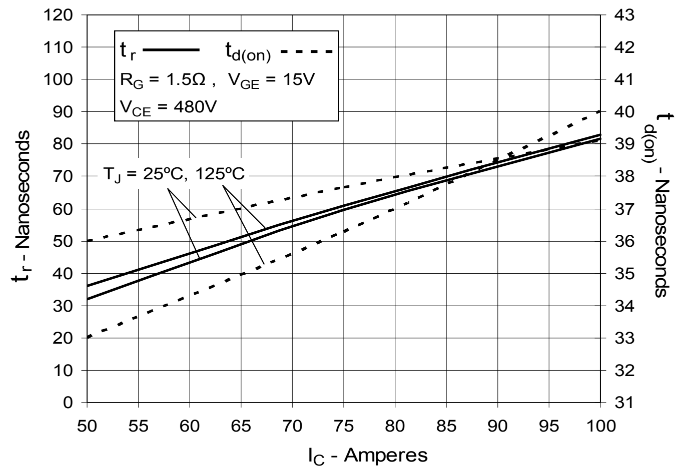


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature