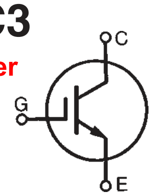
IXYS

GenX3™ 300V IGBT

High Speed PT IGBTs for 50-150kHz switching

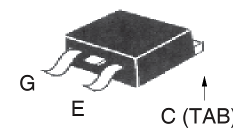
IXGA42N30C3
IXGH42N30C3*
IXGP42N30C3

*Obsolete Part Number

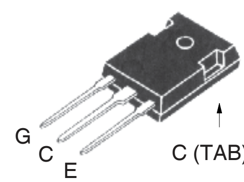


V_{CES}	=	300V
I_{C110}	=	42A
$V_{CE(sat)}$	≤	1.85V
t_{fi} typ	=	65ns

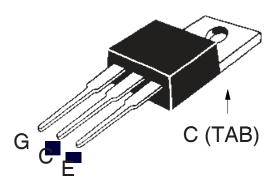
TO-263 (IXGA)



TO-247 (IXGH)



TO-220 (IXGP)



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

Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	300	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	300	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C110}	T_C = 110°C (chip capability)	42	A
I_{CM}	T_C = 25°C, 1ms	250	A
I_A	T_C = 25°C	42	A
E_{AS}	T_C = 25°C	250	mJ
SSOA (RBSOA)	V_{GE}= 15V, T_{VJ} = 125°C, R_G = 10Ω Clamped inductive load @ ≤ 300V	I_{CM} = 84	A
P_C	T_C = 25°C	223	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}	1.6mm (0.062 in.) from case for 10s	260	°C
M_d	Mounting torque (TO-247)(TO-220)	1.13/10	Nm/lb.in.
Weight	TO-263 TO-247 TO-220	2.5 6.0 3.0	g g g

Features

- Optimized for low switching losses
- Square RBSOA
- High current handling capability
- International standard packages

Advantages

- High power density
- Low gate drive requirement

Applications

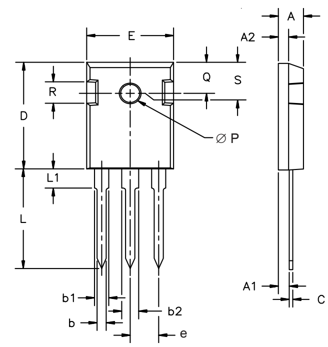
- High Frequency Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Battery Chargers
- Welding Machines
- Lamp Ballasts

Symbol	Test Conditions (T_J = 25°C, unless otherwise specified)		Characteristic Values Min.	Typ.	Max.	
BV_{CES}	I_C = 250µA, V_{GE} = 0V		300			V
$V_{GE(th)}$	I_C = 250µA, V_{CE} = V_{GE}		2.5		5.0	V
I_{CES}	V_{CE} = V_{CES}				25	µA
	V_{GE} = 0V	T_J = 125°C			500	µA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V				±100	nA
$V_{CE(sat)}$	I_C = 42A, V_{GE} = 15V, Note1			1.54	1.85	V
		T_J = 125°C		1.54		V

Symbol	Test Conditions ($T_J = 25°C$, unless otherwise specified)	Min.	Typ.	Max.	Unit
g_{fs}	$I_C = 0.5 \bullet I_{C110}$, $V_{CE} = 10V$, Note 1	20	33		S
C_{ies}	$V_{CE} = 25V$, $V_{GE} = 0V$, f = 1MHz		2140		pF
C_{oes}			218		pF
C_{res}			60		pF
Q_g	$I_C = I_{C110}$, $V_{GE} = 15V$, $V_{CE} = 0.5 \bullet V_{CES}$		76		nC
Q_{ge}			15		nC
Q_{gc}			26		nC
$t_{d(on)}$	**Inductive Load, $T_J = 25°C$**		21		ns
t_{ri}	$I_C = 0.5 \bullet I_{C110}$, $V_{GE} = 15V$		23		ns
E_{on}	$V_{CE} = 200V$, $R_G = 10\Omega$		0.12		mJ
$t_{d(off)}$			113	170	ns
t_{fi}			65	120	ns
E_{off}			0.15	0.28	mJ
$t_{d(on)}$	**Inductive Load, $T_J = 125°C$**		21		ns
t_{ri}	$I_C = 0.5 \bullet I_{C110}$, $V_{GE} = 15V$		22		ns
E_{on}	$V_{CE} = 200V$, $R_G = 10\Omega$		0.21		mJ
$t_{d(off)}$			127		ns
t_{fi}			102		ns
E_{off}			0.20		mJ
R_{thJC}				0.56	°C/W
R_{thCK}	TO-220		0.50		°C/W
	TO-247		0.25		°C/W

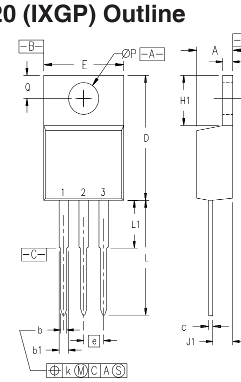
Note1. Pulse test, t ≤ 300μs; duty cycle, d ≤ 2%.

TO-247 AD Outline



Dim.	Millimeter Min.	Millimeter Max.	Inches Min.	Inches Max.
A	4.7	5.3	.185	.209
A_1	2.2	2.54	.087	.102
A_2	2.2	2.6	.059	.098
b	1.0	1.4	.040	.055
b_1	1.65	2.13	.065	.084
b_2	2.87	3.12	.113	.123
C	.4	.8	.016	.031
D	20.80	21.46	.819	.845
E	15.75	16.26	.610	.640
e	5.20	5.72	0.205	0.225
L	19.81	20.32	.780	.800
L1		4.50		.177
∅P	3.55	3.65	.140	.144
Q	5.89	6.40	0.232	0.252
R	4.32	5.49	.170	.216
S	6.15 BSC		242 BSC	

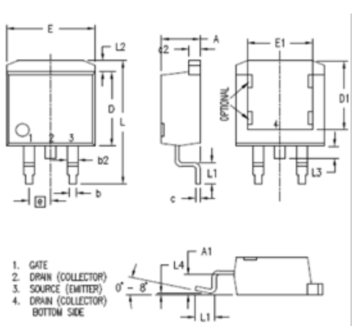
TO-220 (IXGP) Outline



Pins: 1 - Gate 2 - Drain

SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS 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
∅P	.139	.161	3.53	4.08
Q	.100	.125	2.54	3.18

TO-263 (IXGA) Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.160	.190	4.06	4.83
A1	.080	.110	2.03	2.79
b	.020	.039	0.51	0.99
b2	.045	.055	1.14	1.40
c	.016	.029	0.40	0.74
c2	.045	.055	1.14	1.40
D	.340	.380	8.64	9.65
D1	.315	.350	8.00	8.89
E	.380	.410	9.65	10.41
E1	.245	.320	6.22	8.13
e	.100 BSC		2.54 BSC	
L	.575	.625	14.61	15.88
L1	.090	.110	2.29	2.79
L2	.040	.055	1.02	1.40
L3	.050	.070	1.27	1.78
L4	0	.005	0	0.13

Fig. 1. Output Characteristics @ 25ºC

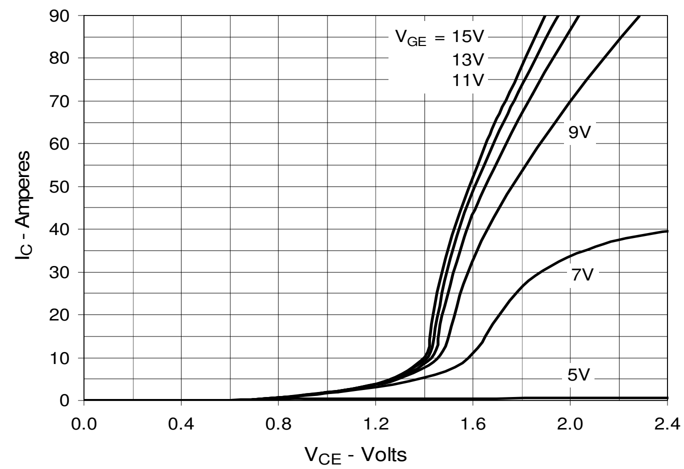


Fig. 2. Extended Output Characteristics @ 25ºC

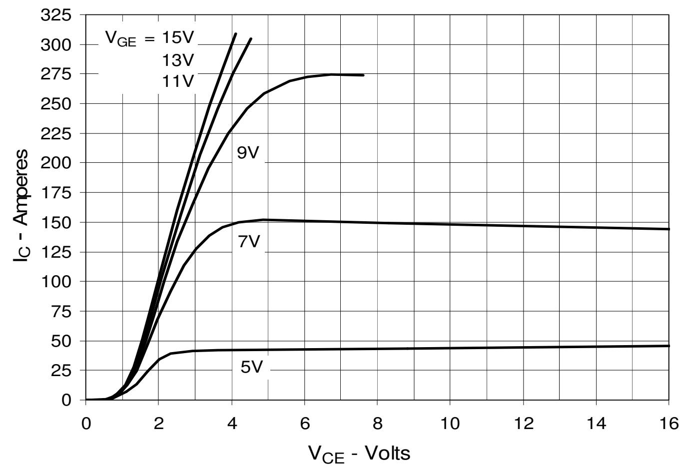


Fig. 3. Output Characteristics @ 125ºC

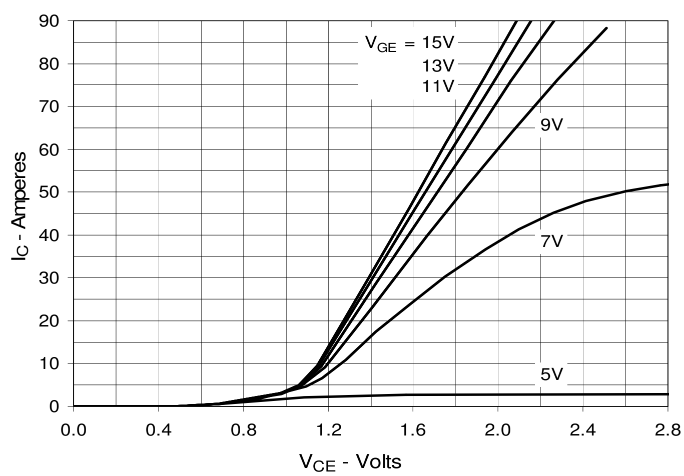


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

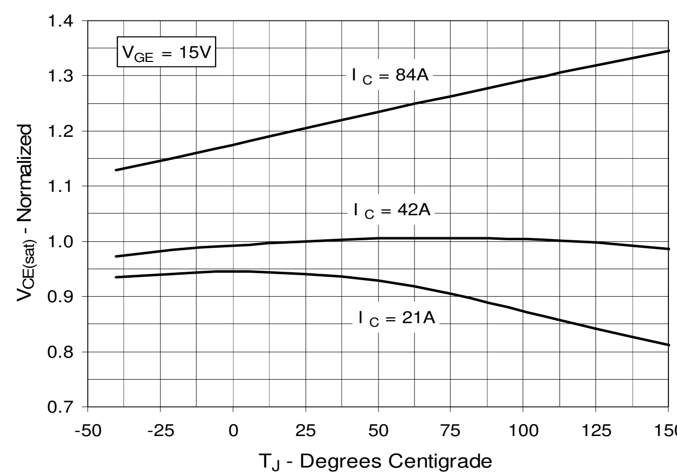


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

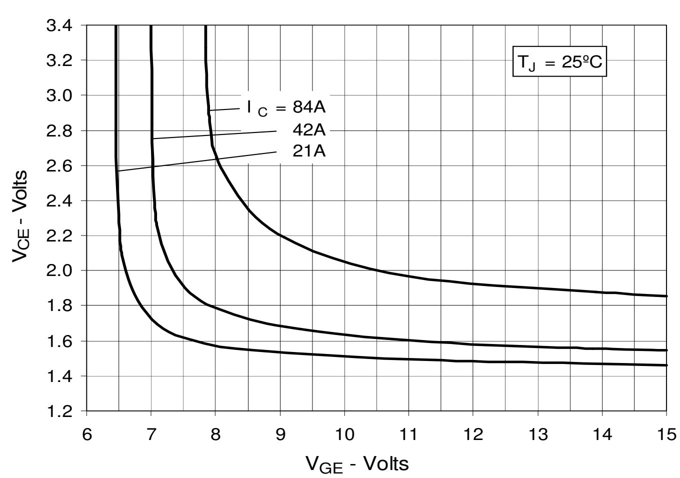


Fig. 6. Input Admittance

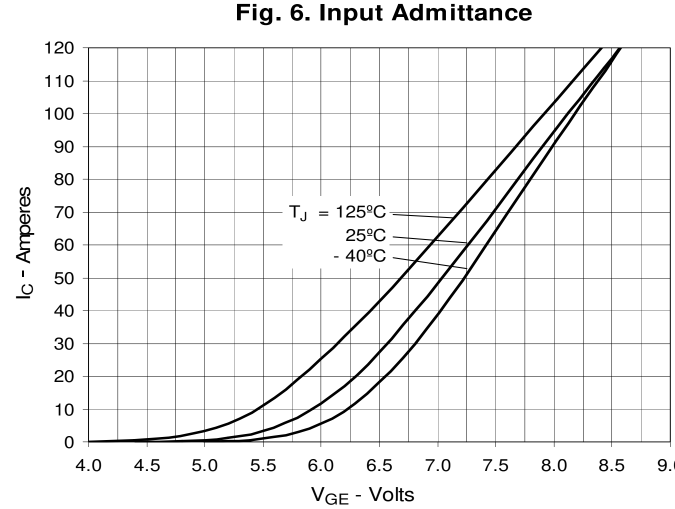


Fig. 7. Transconductance

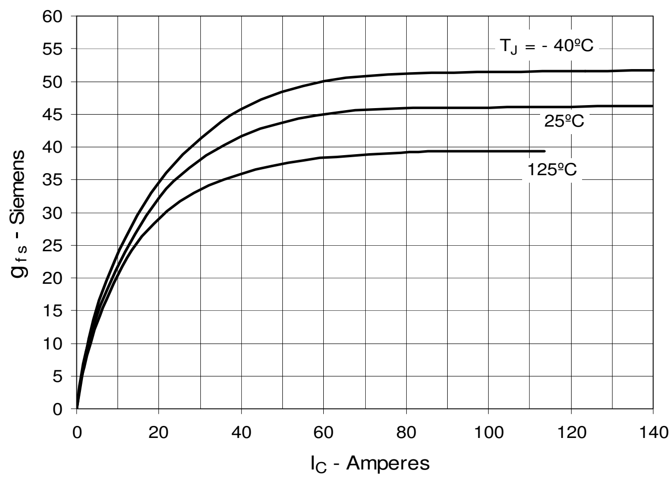


Fig. 8. Gate Charge

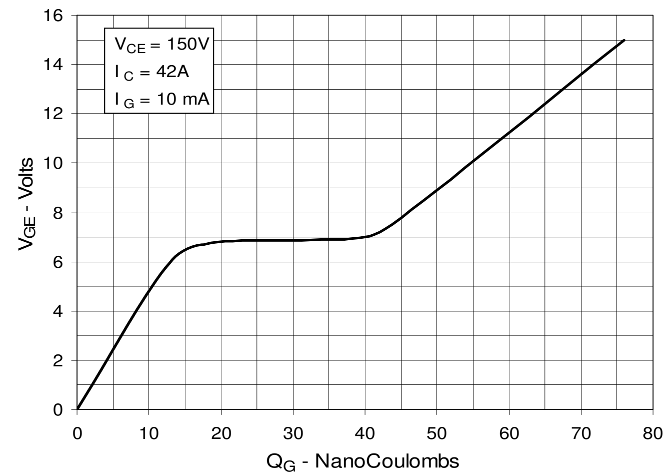


Fig. 9. Capacitance

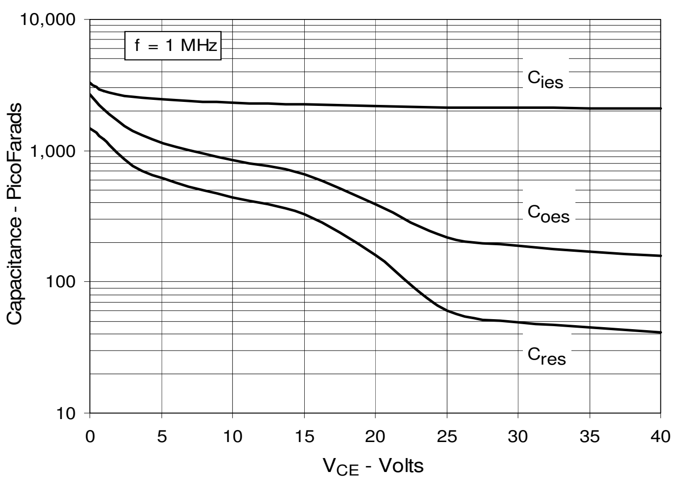


Fig. 10. Reverse-Bias Safe Operating Area

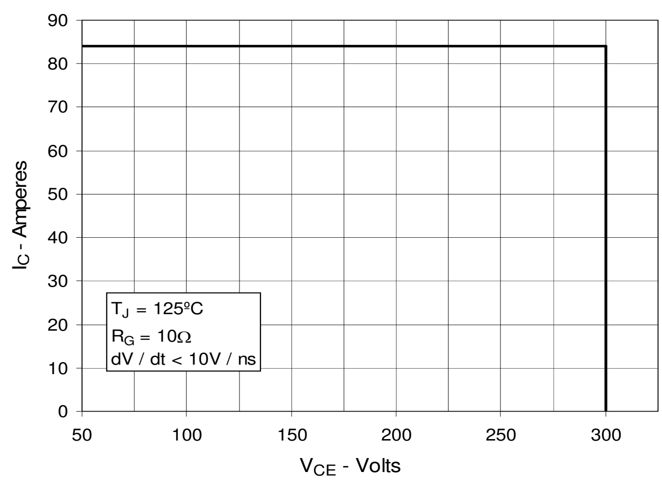


Fig. 11. Maximum Transient Thermal Impedance

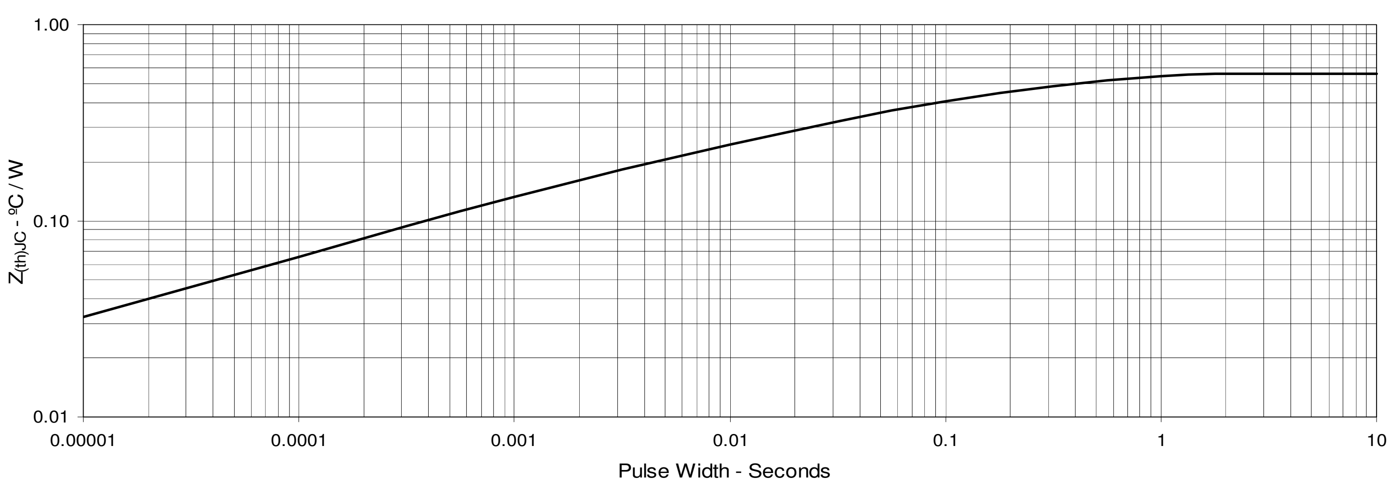


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

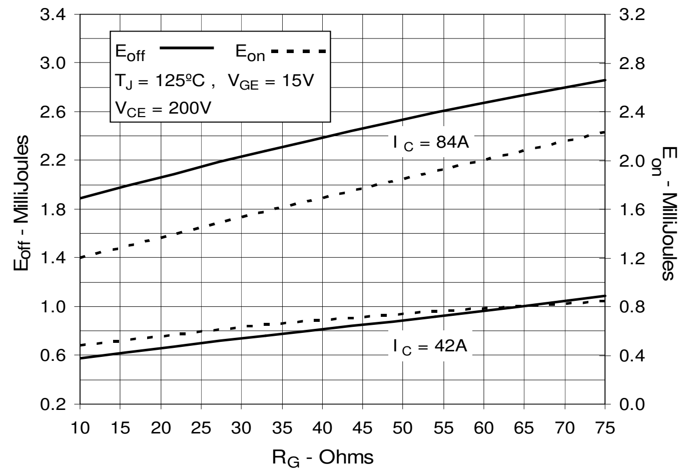


Fig. 13. Inductive Swiching Energy Loss vs. Collector Current

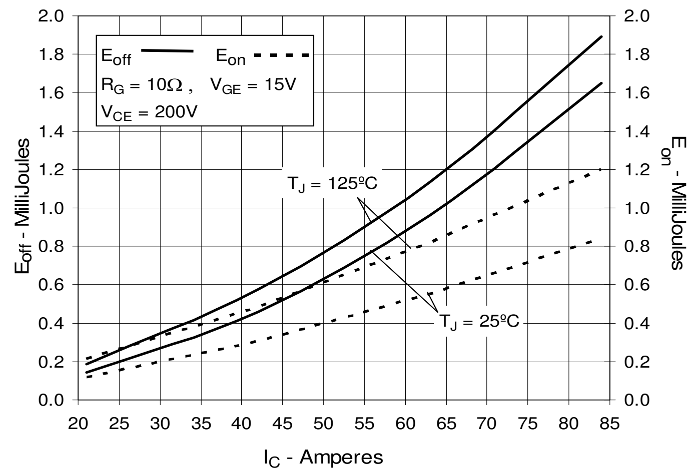


Fig. 14. Inductive Swiching Energy Loss vs. Junction Temperature

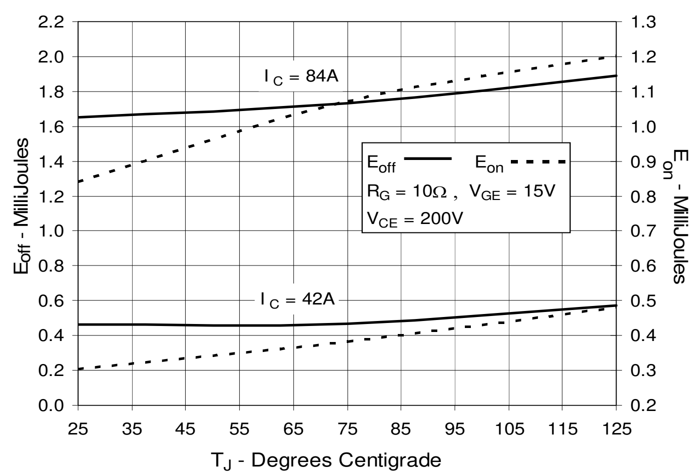


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

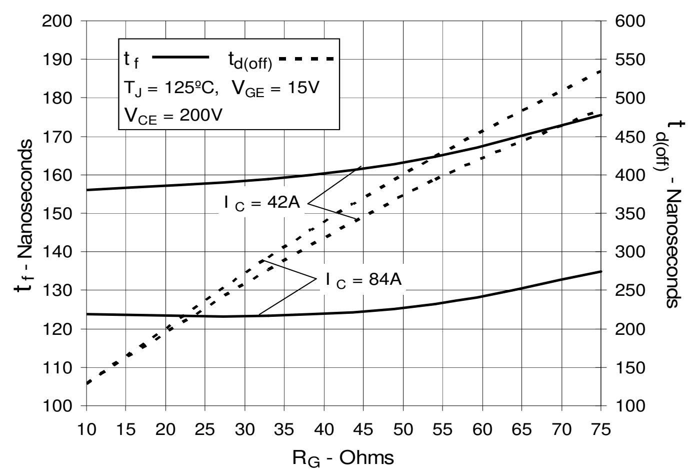


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

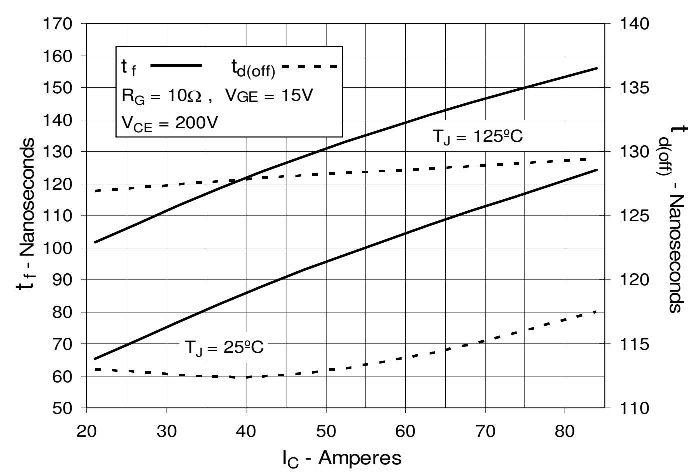


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

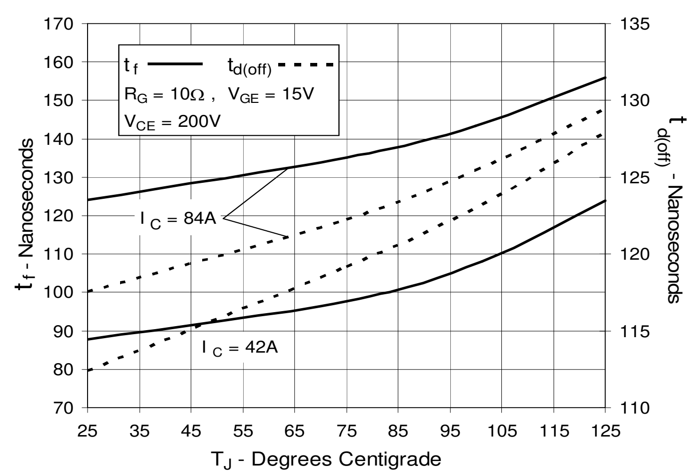


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

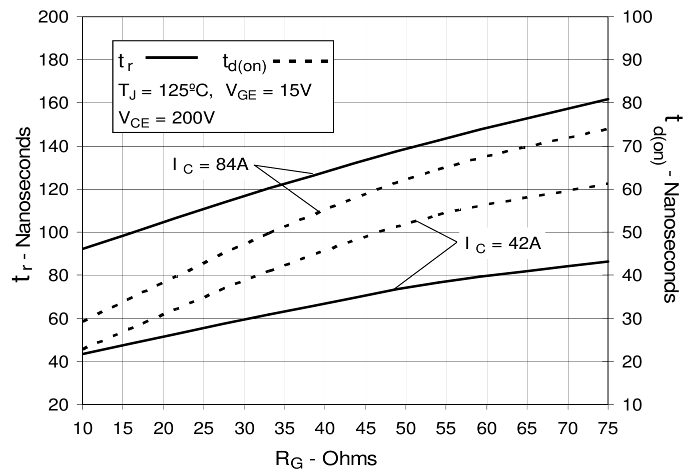


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

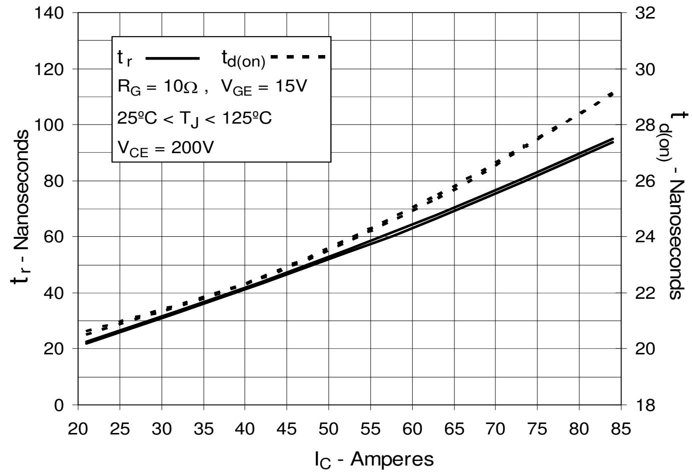


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature