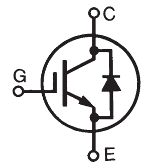
IXYS

GenX3™ 1200V IGBT

IXGH30N120B3D1
IXGT30N120B3D1

V_{CES}	=	1200V
I_{C110}	=	30A
$V_{CE(sat)}$	≤	3.5V
$t_{fi(typ)}$	=	204ns

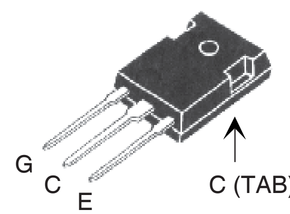
High speed Low Vsat PT
IGBTs 3-20 kHz switching



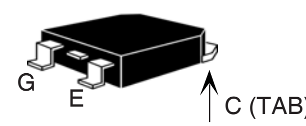
Symbol	Test Conditions	Maximum Ratings	
V_{CES}	T_J = 25°C to 150°C	1200	V
V_{CGR}	T_J = 25°C to 150°C, R_{GE} = 1MΩ	1200	V
V_{GES}	Continuous	±20	V
V_{GEM}	Transient	±30	V
I_{C110}	T_C = 110°C	30	A
I_{F110}	T_C = 110°C	28	A
I_{CM}	T_C = 25°C, 1ms	150	A
SSOA (RBSOA)	V_{GE} = 15V, T_{VJ} = 125°C, R_G = 5Ω Clamped inductive load	I_{CM} = 60 @ 0.8 • V_{CE}	A
P_C	T_C = 25°C	300	W
T_J		-55 ... +150	°C
T_{JM}		150	°C
T_{stg}		-55 ... +150	°C
M_d	Mounting torque (TO-247)	1.13 / 10	Nm/lb.in.
T_L	Maximum lead temperature for soldering	300	°C
T_{SOLD}	1.6mm (0.062 in.) from case for 10s	260	°C
Weight	TO-247 TO-268	6 4	g 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 T_J = 125°C			300 1.5	μA mA
I_{GES}	V_{CE} = 0V, V_{GE} = ±20V			±100	nA
$V_{CE(sat)}$	I_C = 30A, V_{GE} = 15V, Note 1 T_J = 125°C		2.96 2.95	3.5	V V

TO-247 AD (IXGH)



TO-268 (IXGT)



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

Features

- Optimized for low conduction and switching losses
- Square RBSOA
- Anti-parallel ultra fast diode
- International standard packages

Advantages

- High power density
- Low gate drive requirement

Applications

- Power Inverters
- UPS
- Motor Drives
- SMPS
- PFC Circuits
- Welding Machines

Symbol	Test Conditions ($T_J = 25°C$, unless otherwise specified)	Min.	Typ.	Max.	
g_{fs}	I_C = 30A, V_{CE} = 10V, Note 1	11	19		S
C_{ies}	V_{CE} = 25V, V_{GE} = 0V, f = 1MHz		1750		pF
C_{oes}			120		pF
C_{res}			46		pF
Q_g	I_C = 30A, V_{GE} = 15V, V_{CE} = 0.5 • V_{CES}		87		nC
Q_{ge}			15		nC
Q_{gc}			39		nC
$t_{d(on)}$	**Inductive load, T_J = 25°C**		16		ns
t_{ri}	I_C = 30A, V_{GE} = 15V, Notes 2		37		ns
E_{on}	V_{CE} = 0.8 • V_{CES}, R_G = 5Ω		3.47		mJ
$t_{d(off)}$			127	200	ns
t_{fi}			204	380	ns
E_{off}			2.16	4.0	mJ
$t_{d(on)}$	**Inductive load, T_J = 125°C**		18		ns
t_{ri}	I_C = 30A,V_{GE} = 15V, Notes 2		38		ns
E_{on}	V_{CE} = 0.8 • V_{CES},R_G = 5Ω		6.70		mJ
$t_{d(off)}$			216		ns
t_{fi}			255		ns
E_{off}			5.10		mJ
R_{thJC}				0.42	°C/W
R_{thCS}			0.21		°C/W

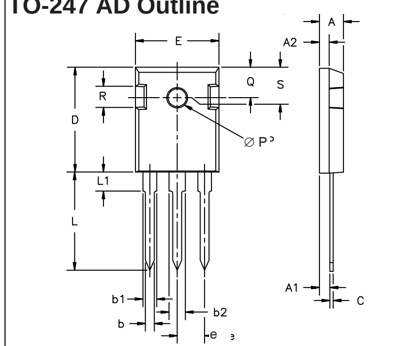
Reverse Diode (FRED)

Characteristic Values (T_J = 25°C, unless otherwise specified)

Symbol	Test Conditions	Min.	Typ.	Max.	
V_F	I_F = 30A,V_{GE} = 0V, Note 1			2.8	V
	T_J = 150°C		1.6		V
I_{RM}	I_F = 30A,V_{GE} = 0V, -di_F/dt = 100A/μs, T_J = 100°C			4	A
t_{rr}	V_R = 300V, T_J = 100°C		100		ns
R_{thJC}				0.9	°C/W

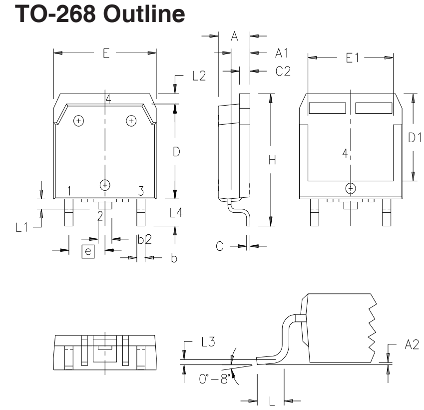
Note 1: Pulse test, t ≤ 300μs, duty cycle, d ≤ 2%.
2. Switching times may increase for V_{CE} (Clamp) > 0.8 V_{CES}, higher T_J or increased R_G.

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

TO-268 Outline



SYM	INCHES MIN	INCHES MAX	MILLIMETERS MIN	MILLIMETERS MAX
A	.193	.201	4.90	5.10
A1	.106	.114	2.70	2.90
A2	.001	.010	0.02	0.25
b	.045	.057	1.15	1.45
b2	.075	.083	1.90	2.10
C	.016	.026	0.40	0.65
C2	.057	.063	1.45	1.60
D	.543	.551	13.80	14.00
D1	.488	.500	12.40	12.70
E	.624	.632	15.85	16.05
E1	.524	.535	13.30	13.60
e	.215 BSC		5.45 BSC	
H	.736	.752	18.70	19.10
L	.094	.106	2.40	2.70
L1	.047	.055	1.20	1.40
L2	.039	.045	1.00	1.15
L3	.010 BSC		0.25 BSC	
L4	.150	.161	3.80	4.10

Fig. 1. Output Characteristics @ 25ºC

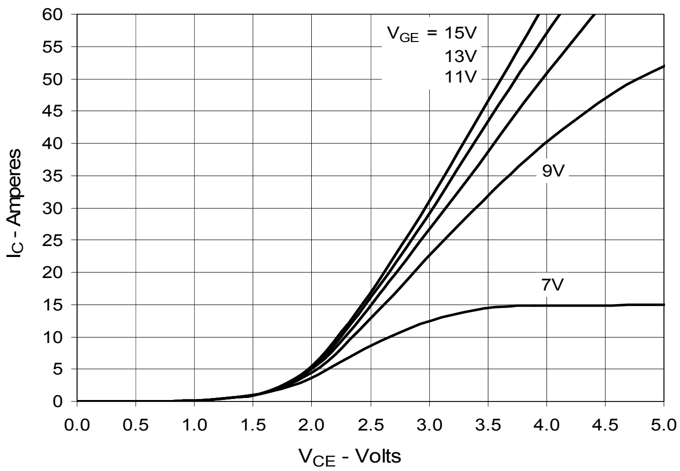


Fig. 2. Extended Output Characteristics @ 25ºC

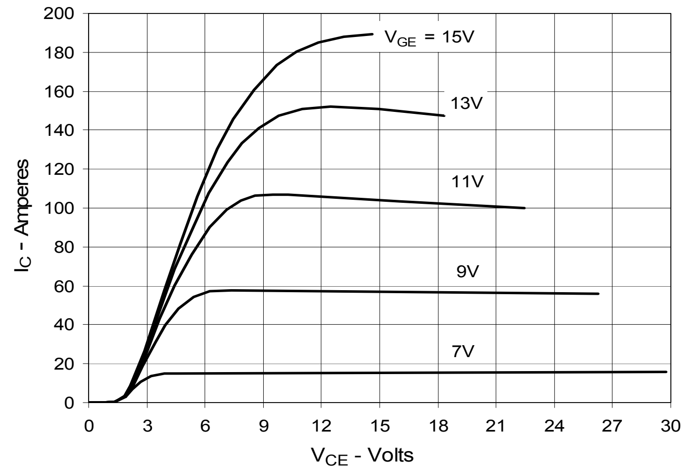


Fig. 3. Output Characteristics @ 125ºC

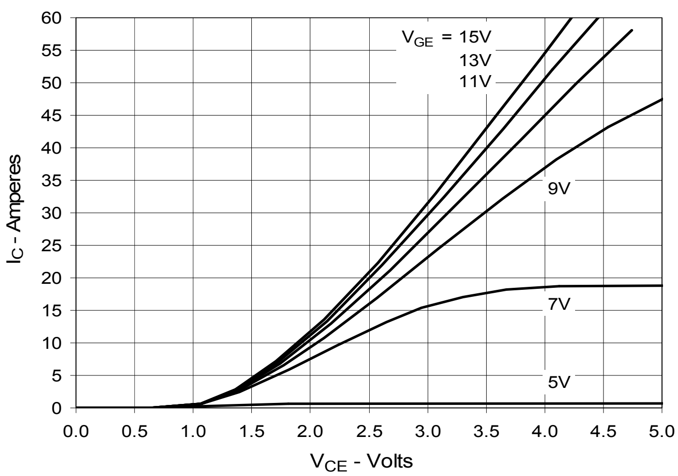


Fig. 4. Dependence of $V_{CE(sat)}$ on Junction Temperature

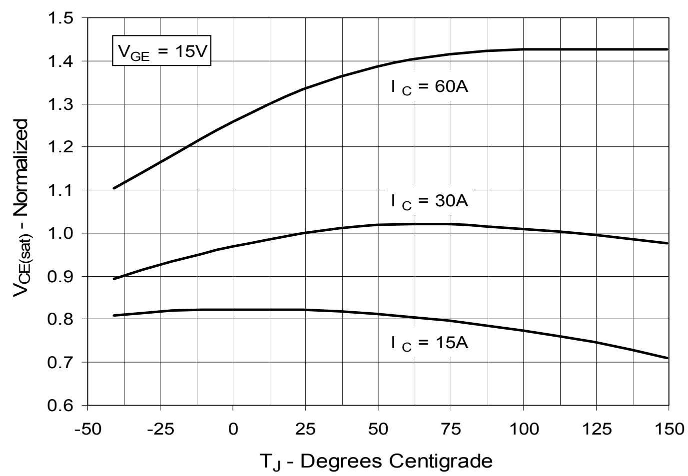


Fig. 5. Collector-to-Emitter Voltage vs. Gate-to-Emitter Voltage

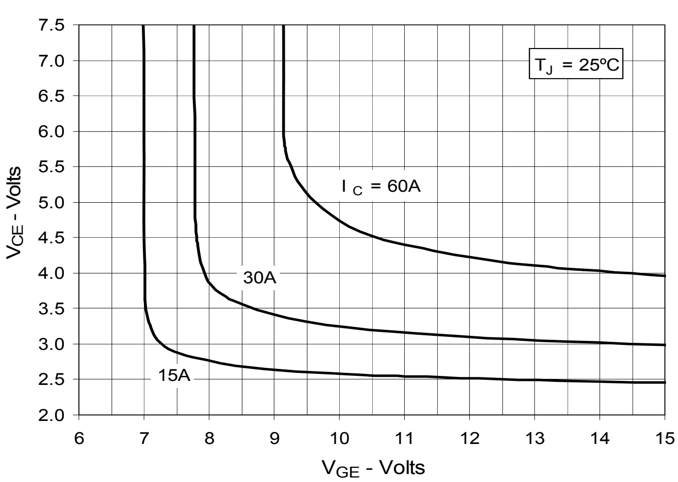


Fig. 6. Input Admittance

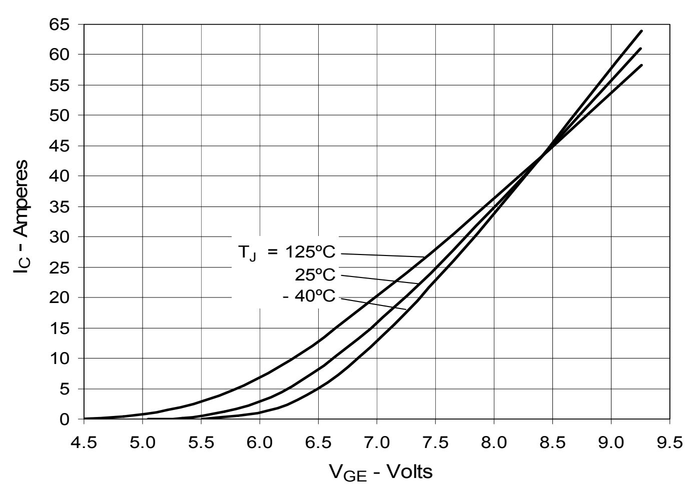


Fig. 7. Transconductance

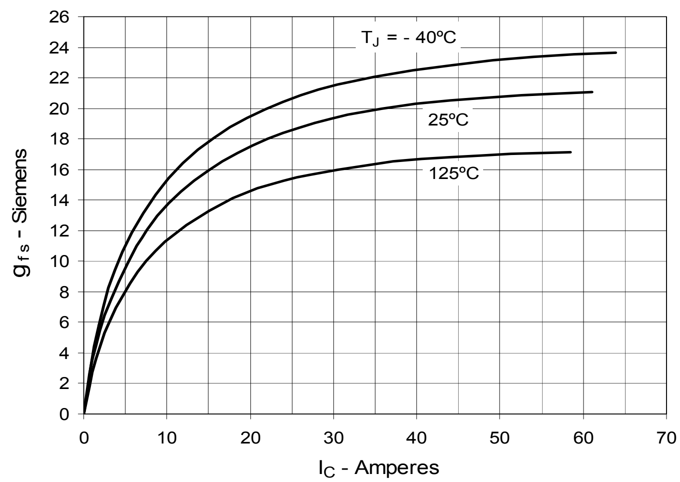


Fig. 8. Gate Charge

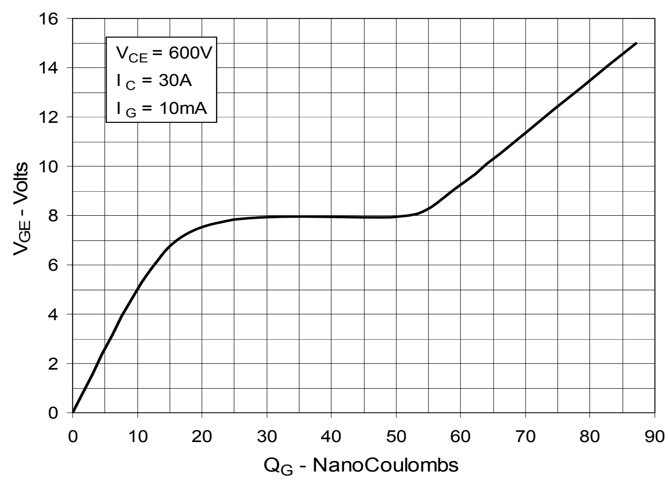


Fig. 9. Capacitance

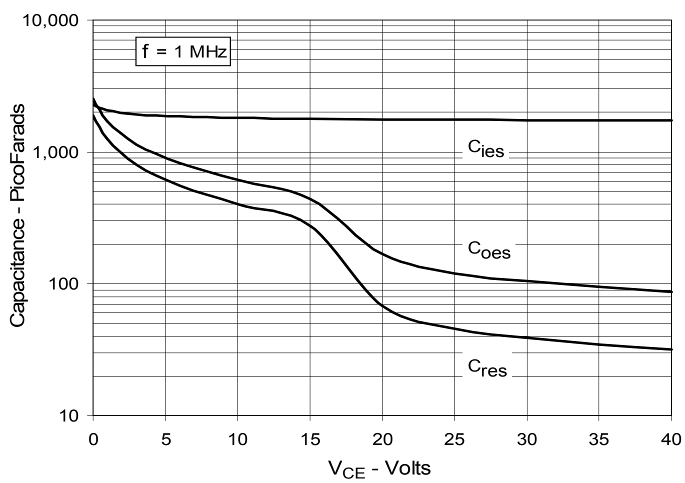


Fig. 10. Reverse-Bias Safe Operating Area

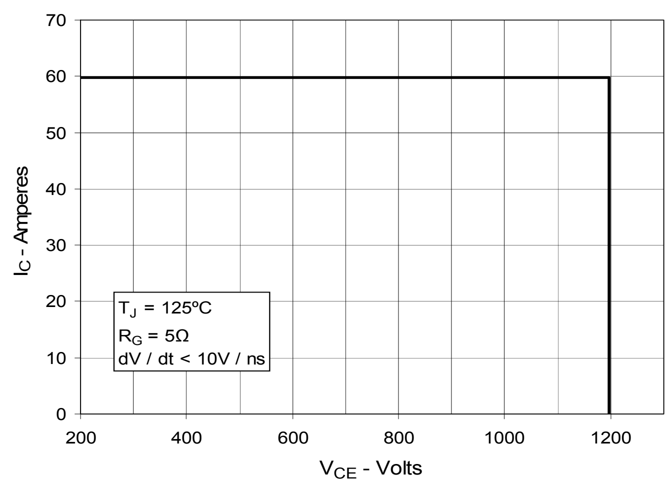


Fig. 11. Maximum Transient Thermal Impedance

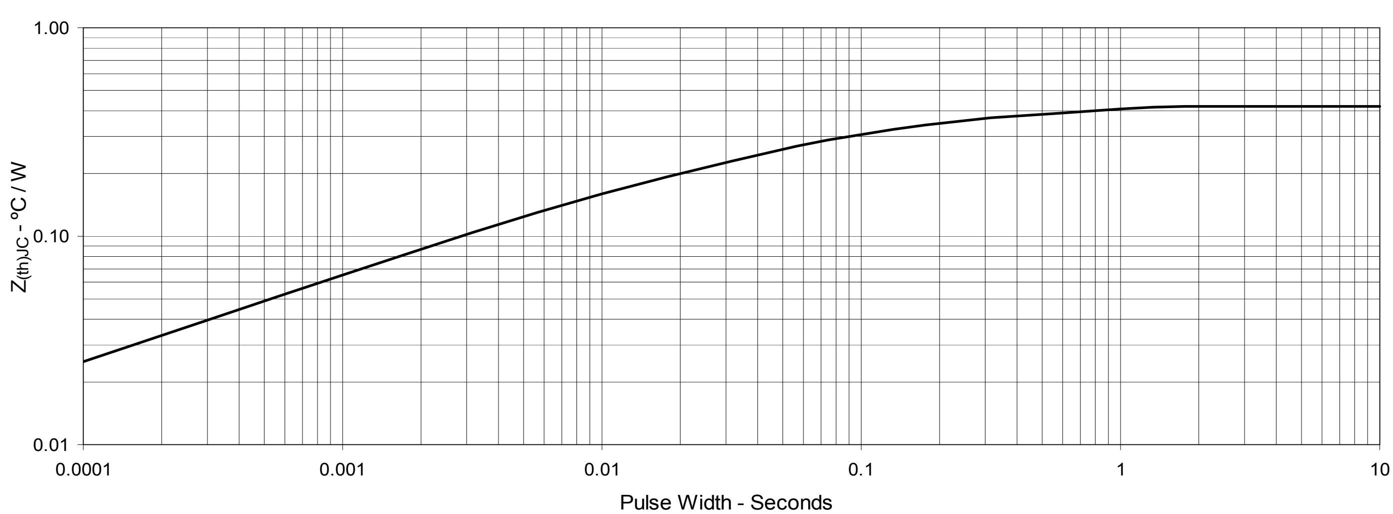


Fig. 12. Inductive Switching Energy Loss vs. Gate Resistance

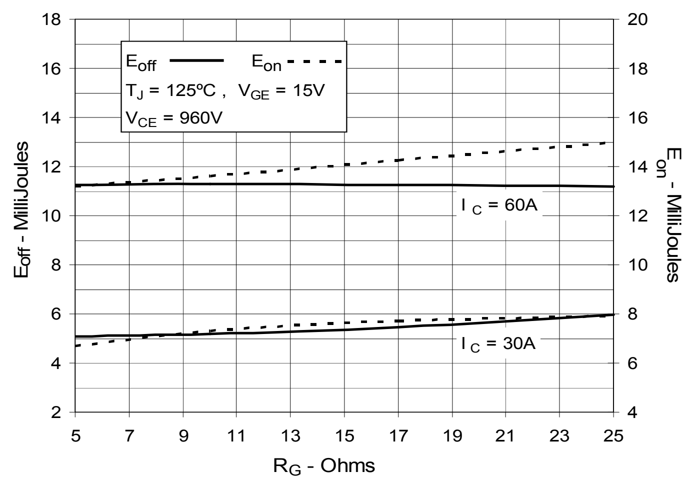


Fig. 13. Inductive Switching Energy Loss vs. Collector Current

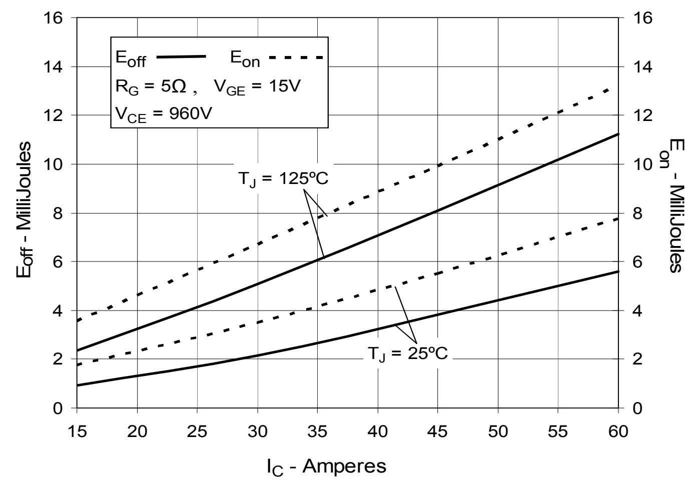


Fig. 14. Inductive Switching Energy Loss vs. Junction Temperature

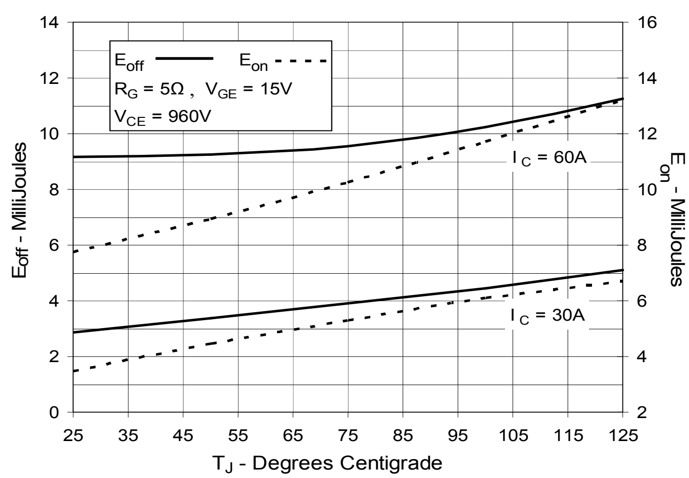


Fig. 15. Inductive Turn-off Switching Times vs. Gate Resistance

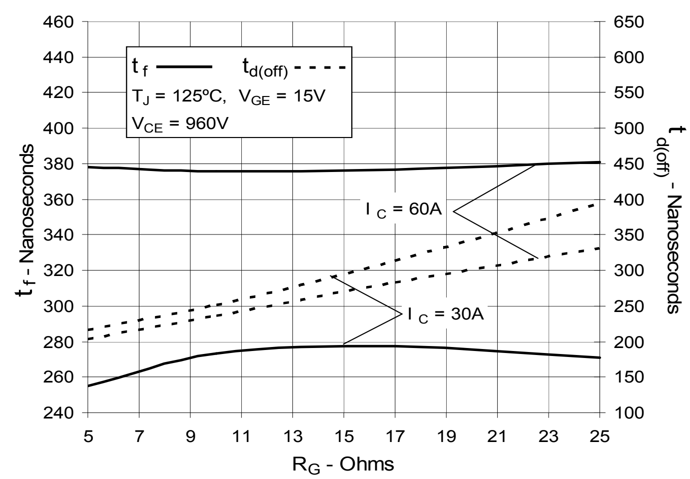


Fig. 16. Inductive Turn-off Switching Times vs. Collector Current

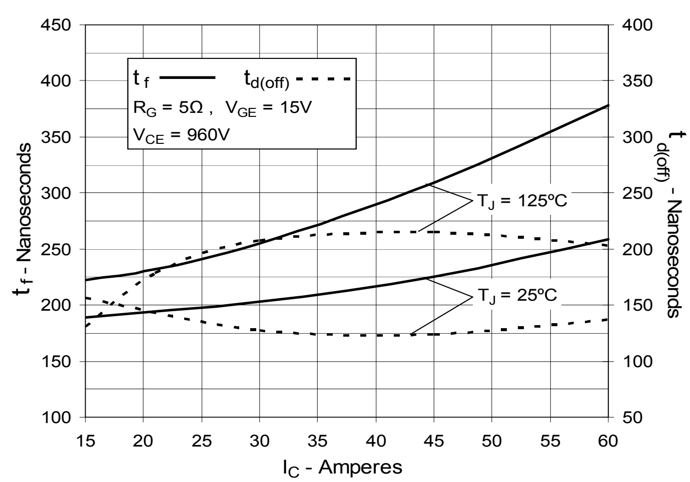


Fig. 17. Inductive Turn-off Switching Times vs. Junction Temperature

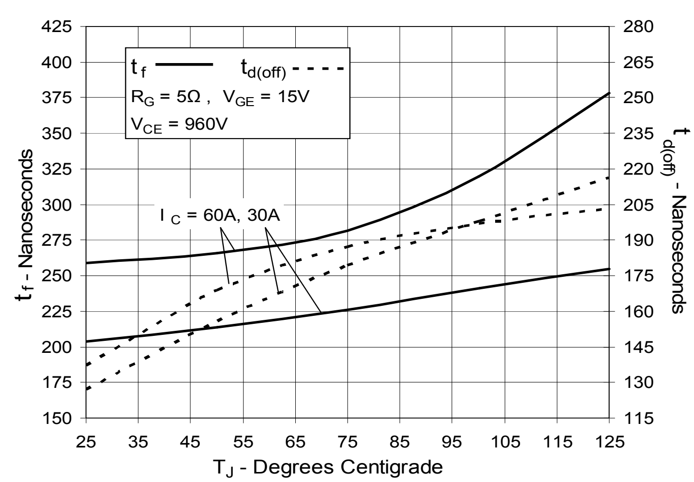


Fig. 18. Inductive Turn-on Switching Times vs. Gate Resistance

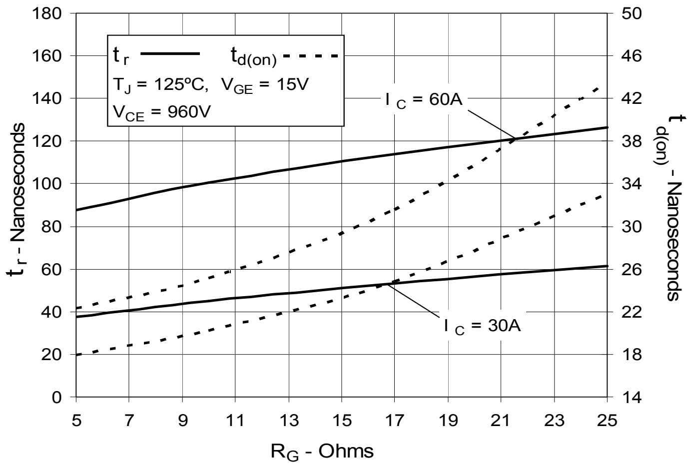


Fig. 19. Inductive Turn-on Switching Times vs. Collector Current

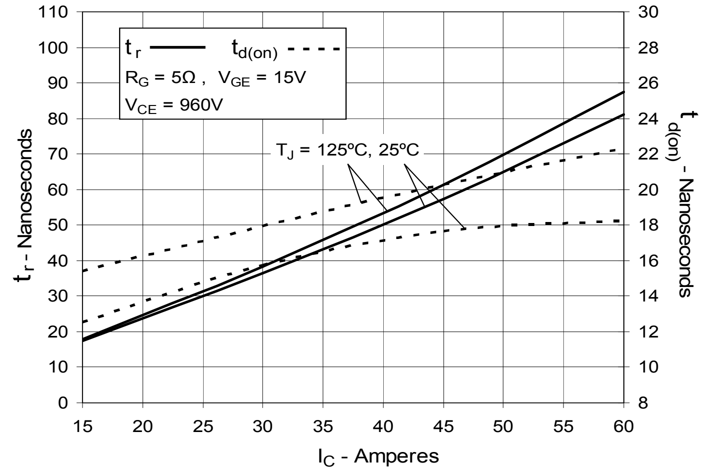
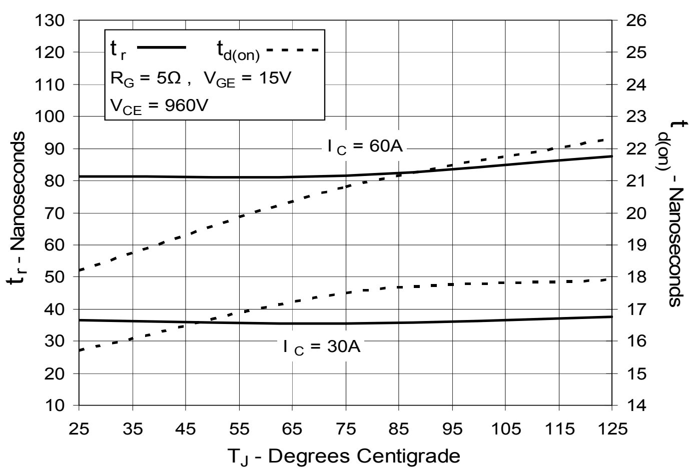


Fig. 20. Inductive Turn-on Switching Times vs. Junction Temperature



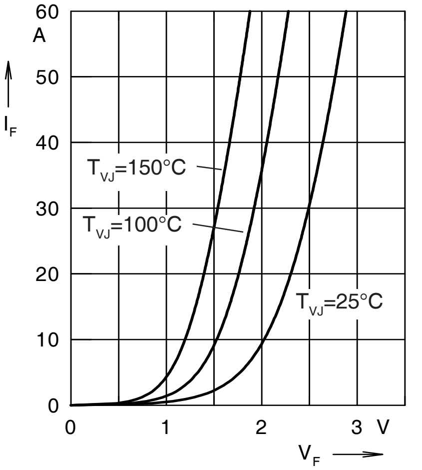


Fig. 21. Forward current I_F versus V_F

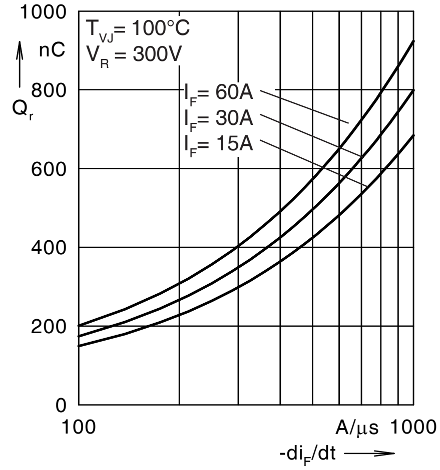


Fig. 22. Reverse recovery charge Q_r versus $-di_F/dt$

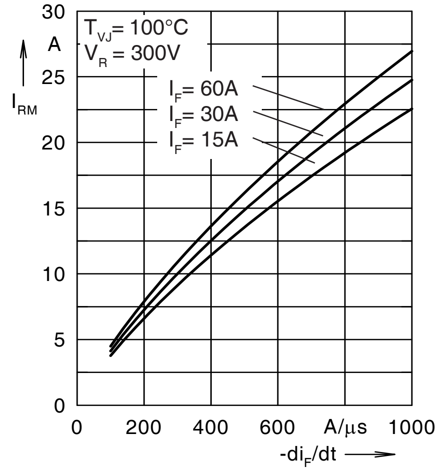


Fig. 23. Peak reverse current I_{RM} versus $-di_F/dt$

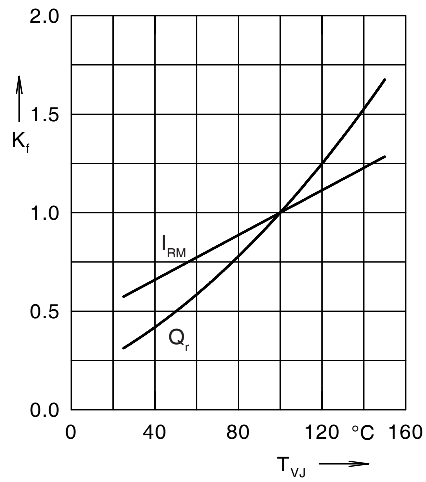


Fig. 24. Dynamic parameters Q_r, I_{RM} versus T_{VJ}

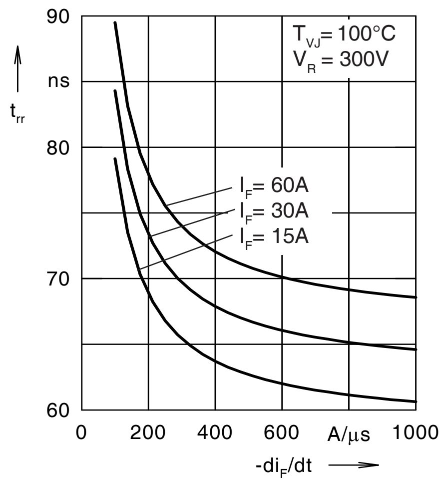


Fig. 25. Recovery time t_{rr} versus $-di_F/dt$

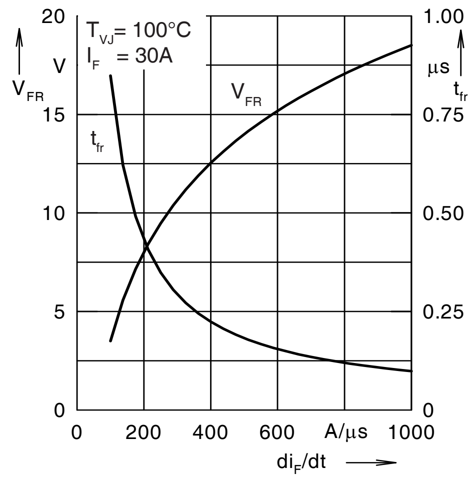


Fig. 26. Peak forward voltage V_{FR} and t_{fr} versus di_F/dt

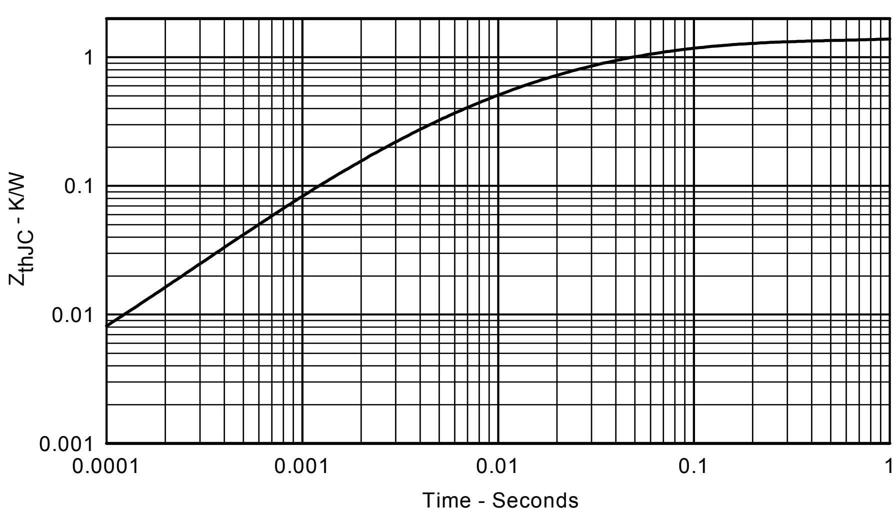


Fig. 27. Transient thermal resistance junction to case