ANTREX Electronics

Electronic Components Sourcing Information

Product Reference Information

Part Number:	IGA03N120H2XKSA1
Manufacturer:	Infineon Technologies
Package:	TO-220-3 Full Pack
Availability:	Please confirm with sales

Product Page:

https://antrexco.com/product/details/infineon-technologies/iga03n120h2xksa1.html

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Supplier verification and packaging condition review

CoC / RoHS / REACH documents available on request

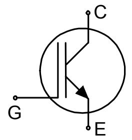
Secure sourcing support for OEM / EMS projects

Note:

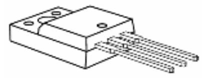
This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

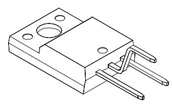
HighSpeed 2-Technology



- **Designed for:**
  - TV – Horizontal Line Deflection
- **2[nd] generation HighSpeed-Technology for 1200V applications offers:**
  - loss reduction in resonant circuits
  - temperature stable behavior
  - parallel switching capability
  - tight parameter distribution
  - E_{off} optimized for I_C =3A
  - simple Gate-Control



PG-TO220-3-31 (FullPAK)



PG-TO220-3-34 (FullPAK)

- Qualified according to JEDEC[1] for target applications
- Pb-free lead plating; RoHS compliant
- Complete product spectrum and PSpice Models : http://www.infineon.com/igbt/

Type	V_{CE}	I_C	E_{off}	$T_{j,max}$	Marking	Package
IGA03N120H2	1200V	3A	0.15mJ	150°C	G03H1202	PG-TO-220-3-31
IGA03N120H2	1200V	3A	0.15mJ	150°C	G03H1202	PG-TO-220-3-34

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CE}	1200	V
Triangular collector peak current (V_{GS} = 15V) T_C = 100°C, f = 32kHz	I_{Cpk}	8.2	A
Pulsed collector current, t_p limited by T_{jmax}	I_{Cpuls}	9	
Turn off safe operating area $V_{CE} \leq$ 1200V, $T_j \leq$ 150°C	-	9	
Gate-emitter voltage	V_{GE}	±20	V
Power dissipation T_C = 25°C	P_{tot}	29	W
Operating junction and storage temperature	T_j , T_{stg}	-40...+150	°C
Soldering temperature, 1.6mm (0.063 in.) from case for 10s	-	260	
Isolation Voltage	V_{isol}	2500	V_{rms}

[1] J-STD-020 and JESD-022

Thermal Resistance

Parameter	Symbol	Conditions	Max. Value	Unit
Characteristic				
IGBT thermal resistance, junction – case	R_{thJC}		4.3	K/W
Thermal resistance, junction – ambient	R_{thJA}		64	

Electrical Characteristic, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value min.	Value Typ.	Value max.	Unit
Static Characteristic						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	V_{GE}=0V, I_C=300µA	1200	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE} = 15V, I_C=3A				
		T_j=25°C	-	2.2	2.8	
		T_j=150°C	-	2.5	-	
		V_{GE} = 10V, I_C=3A, T_j=25°C	-	2.4	-	
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C=90µA, V_{CE}=V_{GE}	2.1	3	3.9	
Zero gate voltage collector current	I_{CES}	V_{CE}=1200V, V_{GE}=0V				µA
		T_j=25°C	-	-	20	
		T_j=150°C	-	-	80	
Gate-emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V	-	-	100	nA
Transconductance	g_{fs}	V_{CE}=20V, I_C=3A	-	2	-	S
Dynamic Characteristic						
Input capacitance	C_{iss}	V_{CE}=25V	-	205	-	pF
Output capacitance	C_{oss}	V_{GE}=0V	-	24	-	
Reverse transfer capacitance	C_{rss}	f=1MHz	-	7	-	
Gate charge	Q_{Gate}	V_{CC}=960V, I_C=3A, V_{GE}=15V	-	8.6	-	nC
Internal emitter inductance measured 5mm (0.197 in.) from case	L_E		-	7	-	nH

Switching Characteristic, Inductive Load, at T_j=25 °C

Parameter	Symbol	Conditions	Value			Unit
			min.	Typ.	max.	
IGBT Characteristic						
Turn-on delay time	$t_{d(on)}$	T_j=25°C	-	9.2	-	ns
Rise time	t_r	V_{CC}=800V, I_C=3A	-	5.2	-	
Turn-off delay time	$t_{d(off)}$	V_{GE}=0V/15V	-	281	-	
Fall time	t_f	R_G=82Ω, L_σ [2]=180nH	-	29	-	
Turn-on energy	E_{on}	C_σ [1]=40pF	-	0.14	-	mJ
Turn-off energy	E_{off}	Energy losses include	-	0.15	-	
Total switching energy	E_{ts}	"tail" and diode [2] reverse recovery.	-	0.29	-	

Switching Characteristic, Inductive Load, at T_j=150 °C

Parameter	Symbol	Conditions	Value			Unit
			min.	Typ.	max.	
IGBT Characteristic						
Turn-on delay time	$t_{d(on)}$	T_j=150°C	-	9.4	-	ns
Rise time	t_r	V_{CC}=800V, I_C=3A	-	6.7	-	
Turn-off delay time	$t_{d(off)}$	V_{GE}=0V/15V	-	340	-	
Fall time	t_f	R_G=82Ω, L_σ [1]=180nH	-	63	-	
Turn-on energy	E_{on}	C_σ [1]=40pF	-	0.22	-	mJ
Turn-off energy	E_{off}	Energy losses include	-	0.26	-	
Total switching energy	E_{ts}	"tail" and diode[3] reverse recovery.	-	0.48	-	

Switching Energy ZVT, Inductive Load

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	max.	
IGBT Characteristic						
Turn-off energy	E_{off}	V_{CC}=800V, I_C=3A, V_{GE}=0V/15V, R_G=82Ω, C_r [1]=4nF				mJ
		T_j=25°C	-	0.05	-	
		T_j=150°C	-	0.09	-	

[2] Leakage inductance L_σ and stray capacity C_σ due to dynamic test circuit in figure E
[3] Commutation diode from device IKP03N120H2

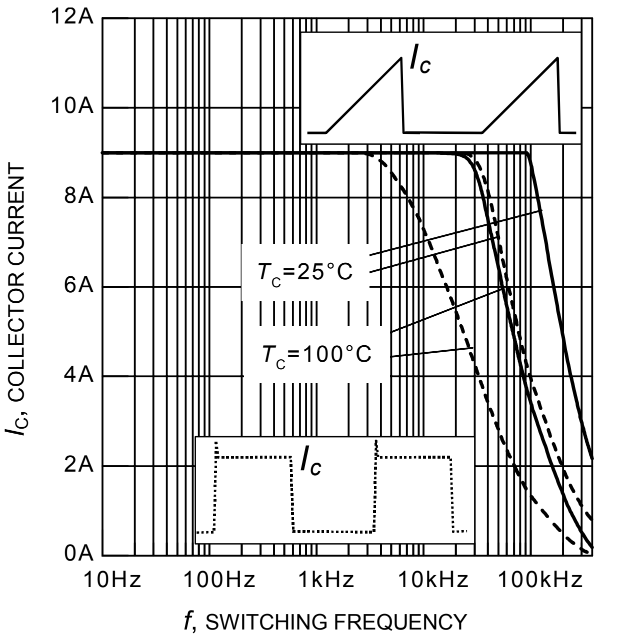


Figure 1. Collector current as a function of switching frequency
($T_j \leq 150°C$, $D = 0.5$, $V_{CE} = 800V$, $V_{GE} = +15V/0V$, $R_G = 82\Omega$)

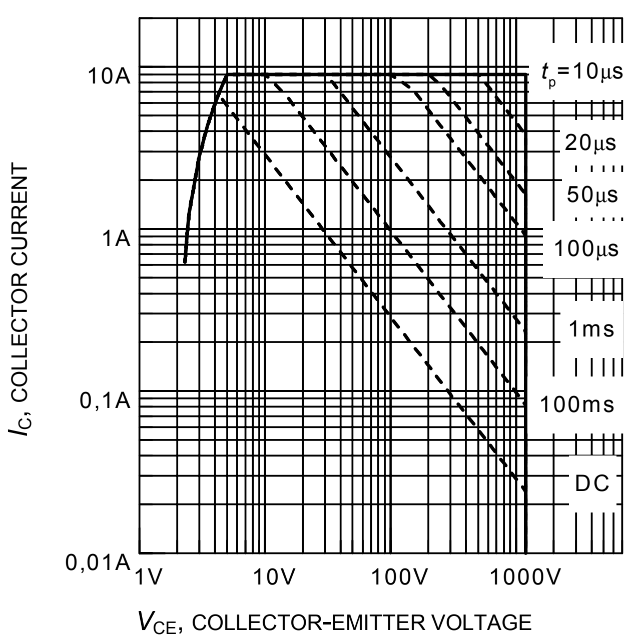


Figure 2. Safe operating area
($D = 0$, $T_C = 25°C$, $T_j \leq 150°C$)

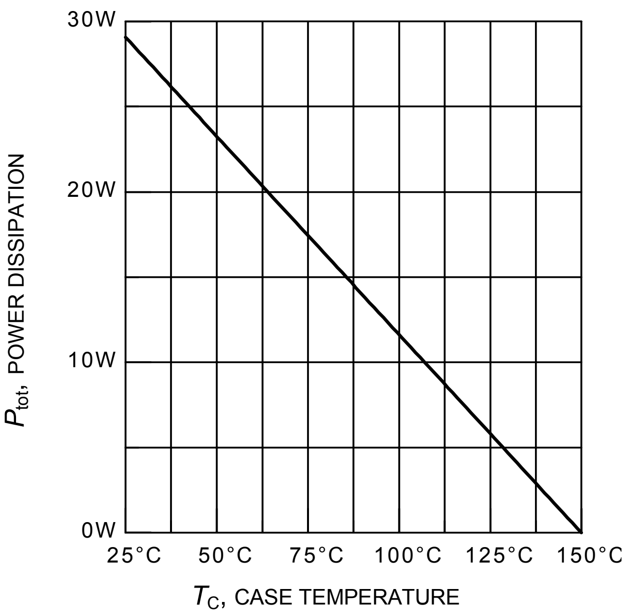


Figure 3. Power dissipation as a function of case temperature
($T_j \leq 150°C$)

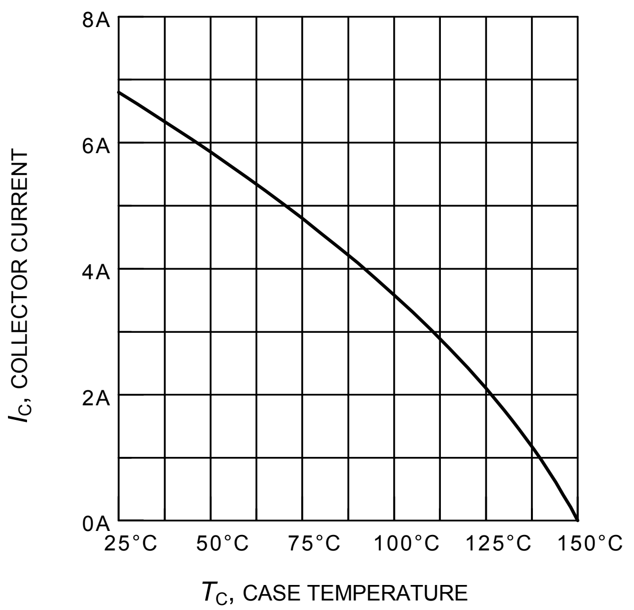


Figure 4. Collector current as a function of case temperature
($V_{GE} \leq 15V$, $T_j \leq 150°C$)

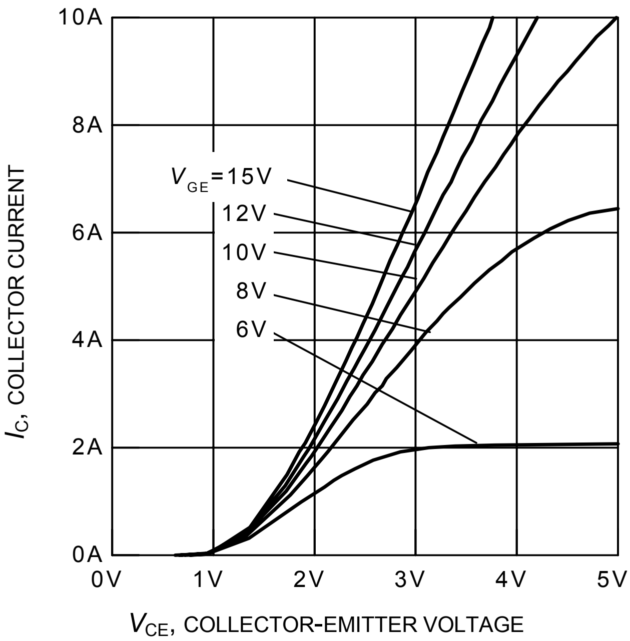


Figure 5. Typical output characteristics
(T_j = 25°C)

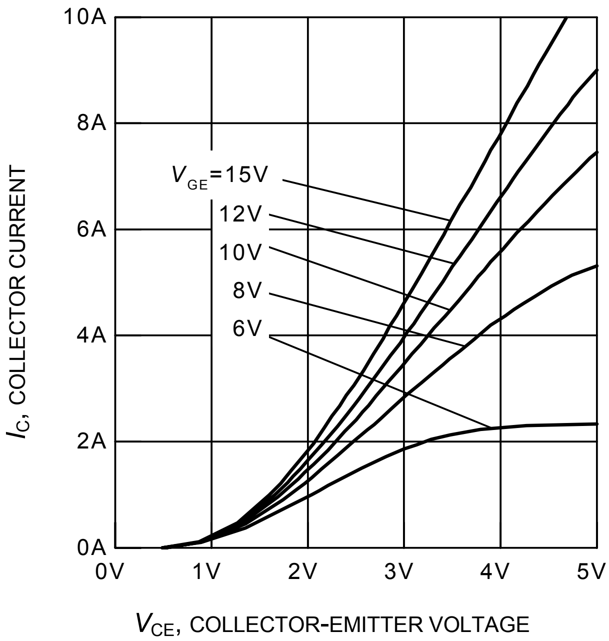


Figure 6. Typical output characteristics
(T_j = 150°C)

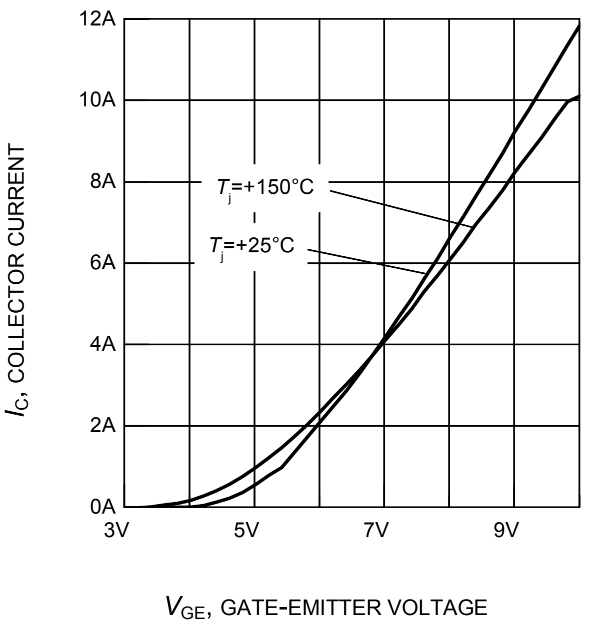


Figure 7. Typical transfer characteristics
(V_{CE} = 20V)

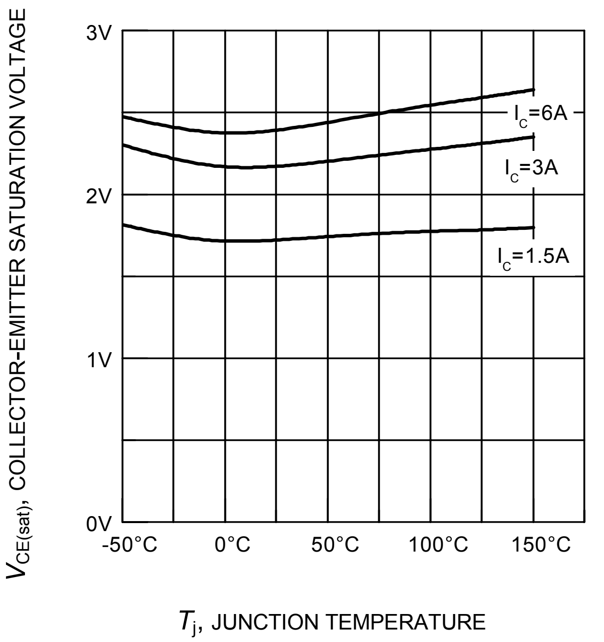


Figure 8. Typical collector-emitter saturation voltage as a function of junction temperature
(V_{GE} = 15V)

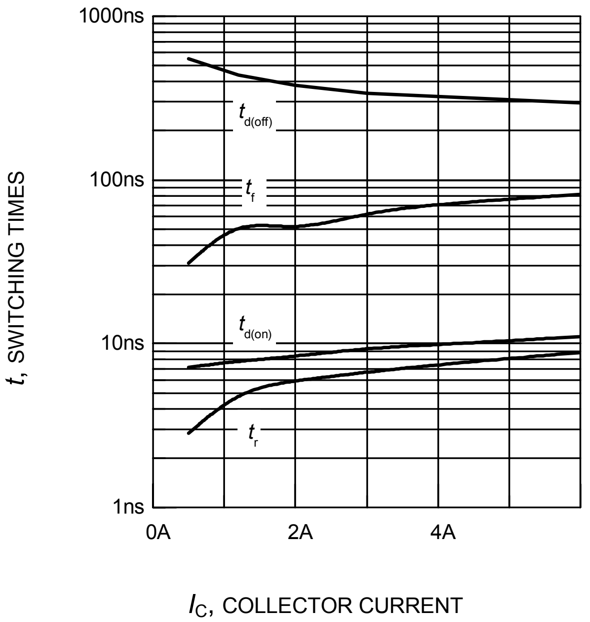


Figure 9. Typical switching times as a function of collector current
(inductive load, T_j = 150°C,
V_{CE} = 800V, V_{GE} = +15V/0V, R_G = 82Ω,
dynamic test circuit in Fig.E)

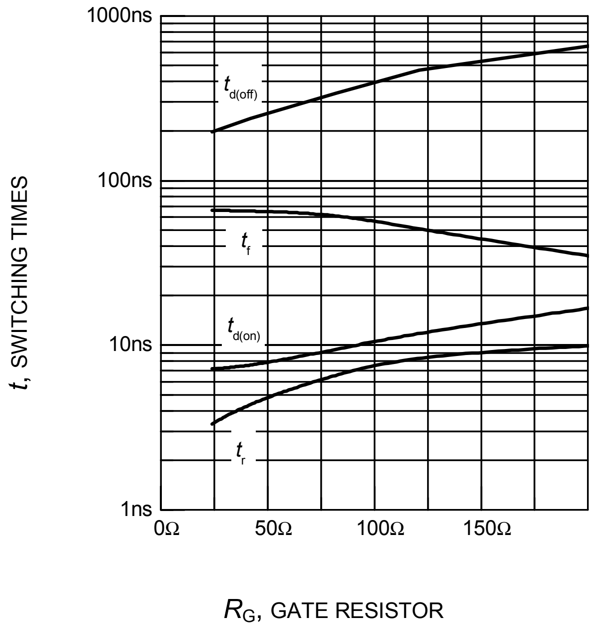


Figure 10. Typical switching times as a function of gate resistor
(inductive load, T_j = 150°C,
V_{CE} = 800V, V_{GE} = +15V/0V, I_C = 3A,
dynamic test circuit in Fig.E)

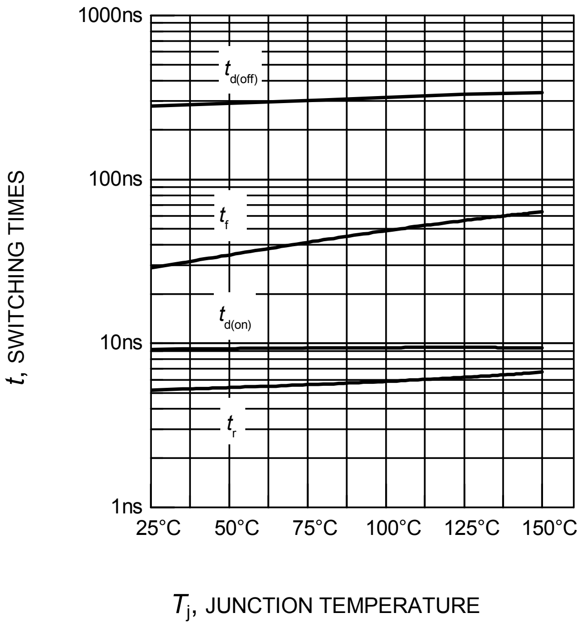


Figure 11. Typical switching times as a function of junction temperature
(inductive load, V_{CE} = 800V,
V_{GE} = +15V/0V, I_C = 3A, R_G = 82Ω,
dynamic test circuit in Fig.E)

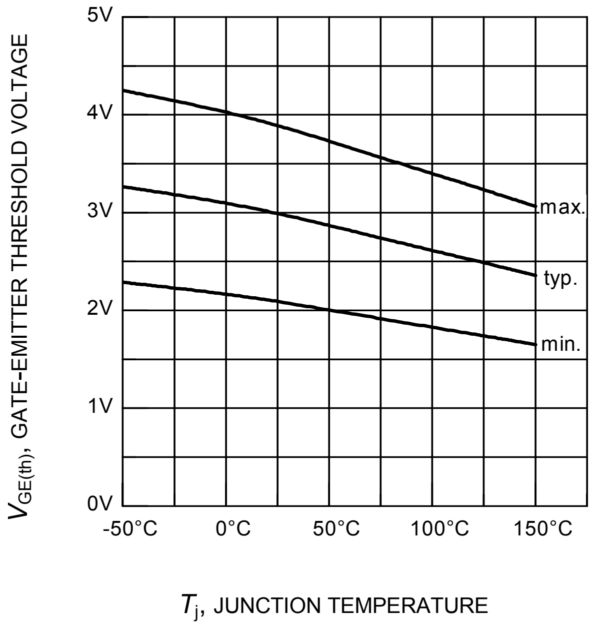


Figure 12. Gate-emitter threshold voltage as a function of junction temperature
(I_C = 0.09mA)

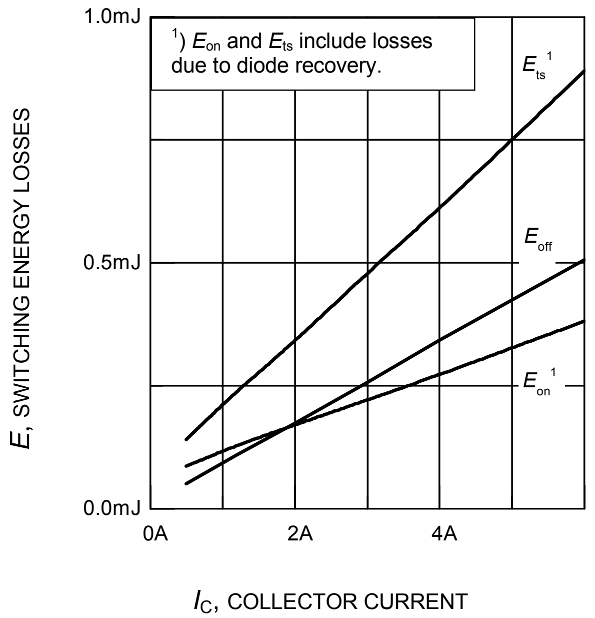


Figure 13. Typical switching energy losses as a function of collector current
(inductive load, T_j = 150°C,
V_{CE} = 800V, V_{GE} = +15V/0V, R_G = 82Ω,
dynamic test circuit in Fig.E)

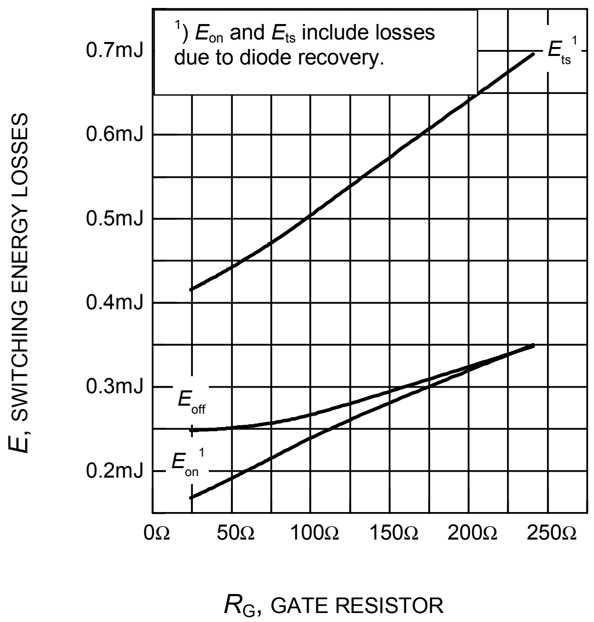


Figure 14. Typical switching energy losses as a function of gate resistor
(inductive load, T_j = 150°C,
V_{CE} = 800V, V_{GE} = +15V/0V, I_C = 3A,
dynamic test circuit in Fig.E)

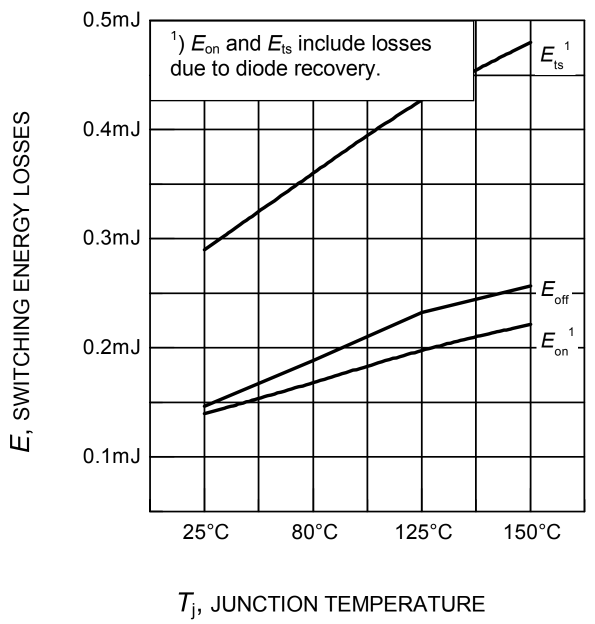


Figure 15. Typical switching energy losses as a function of junction temperature
(inductive load, V_{CE} = 800V,
V_{GE} = +15V/0V, I_C = 3A, R_G = 82Ω,
dynamic test circuit in Fig.E)

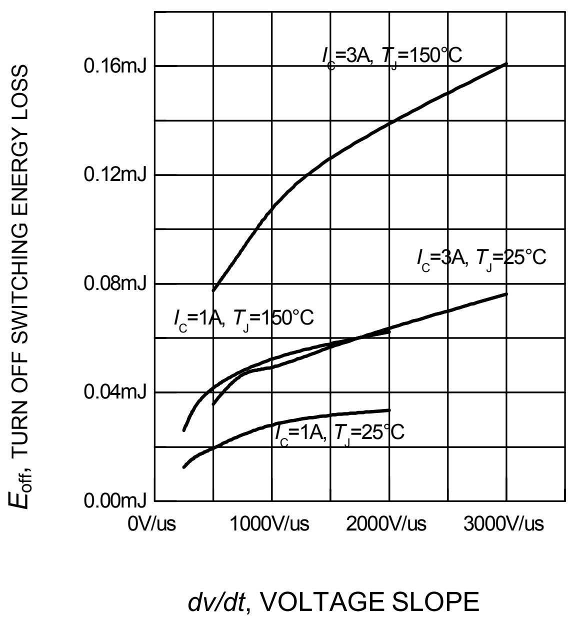


Figure 16. Typical turn off switching energy loss for soft switching
(*dynamic test circuit in Fig. E*)

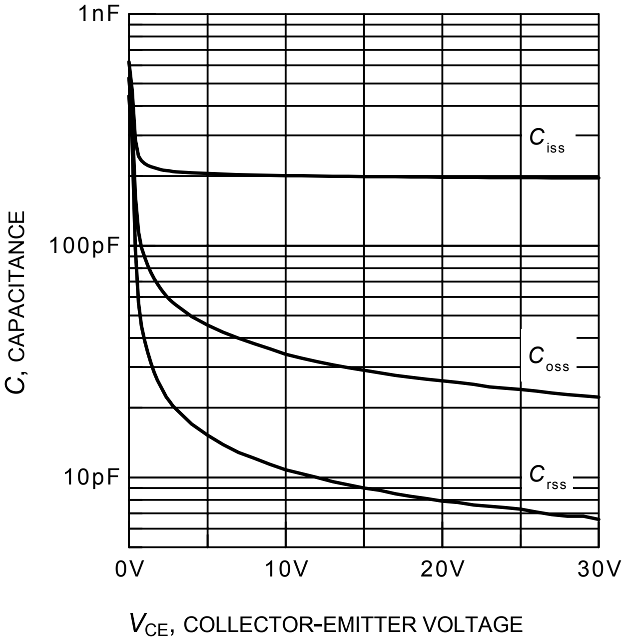


Figure 19. Typical capacitance as a function of collector-emitter voltage
(V_{GE} = 0V, f = 1MHz)

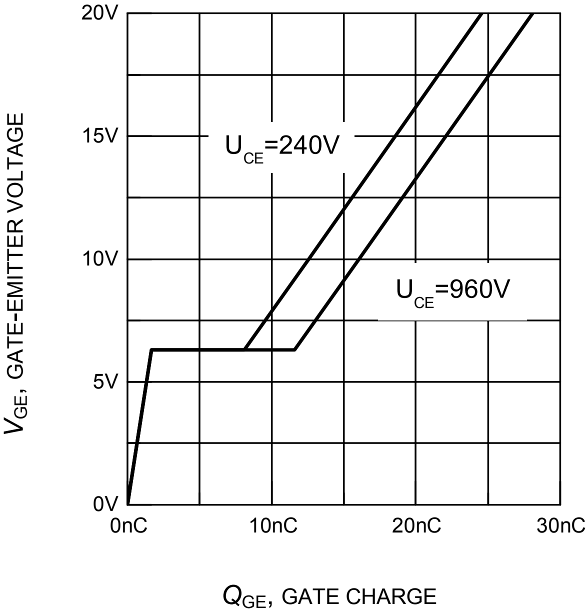


Figure 18. Typical gate charge
(I_C = 3A)

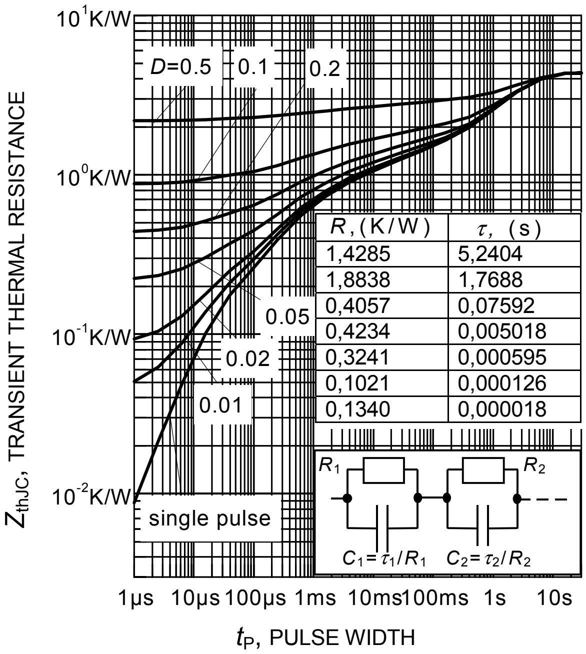
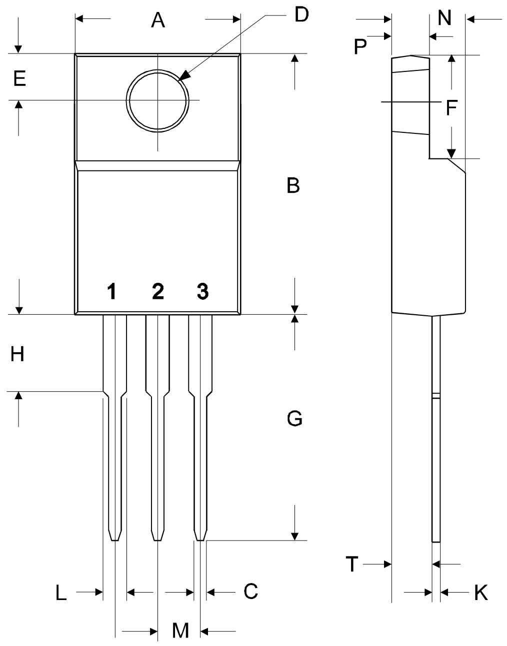


Figure 17. IGBT transient thermal impedance as a function of pulse width
(D=t_P/T)

PG-TO-220-3-31 (FullPAK)



symbol	dimensions			
	[mm]		[inch]	
	min	max	min	max
A	10.37	10.63	0.4084	0.4184
B	15.86	16.12	0.6245	0.6345
C	0.65	0.78	0.0256	0.0306
D	2.95 typ.		0.1160 typ.	
E	3.15	3.25	0.124	0.128
F	6.05	6.56	0.2384	0.2584
G	13.47	13.73	0.5304	0.5404
H	3.18	3.43	0.125	0.135
K	0.45	0.63	0.0177	0.0247
L	1.23	1.36	0.0484	0.0534
M	2.54 typ.		0.100 typ.	
N	4.57	4.83	0.1800	0.1900
P	2.57	2.83	0.1013	0.1113
T	2.51	2.62	0.0990	0.1030

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