Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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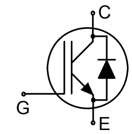
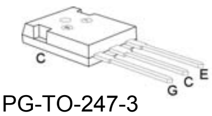
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

Reverse Conducting IGBT with monolithic body diode

Features:



- Powerful monolithic body diode with very low forward voltage
- Body diode clamps negative voltages
- TrenchStop™ and Fieldstop technology for 1200V applications offers :
  - very tight parameter distribution
  - high ruggedness, temperature stable behavior
- NPT technology offers easy parallel switching capability due to positive temperature coefficient in $V_{CE(sat)}$
- Low EMI
- 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/



PG-TO-247-3

Applications:

- Induction cooking and microwave ovens
- Soft switching applications and resonant converters

Type	V_{CE}	I_C	$V_{CE(sat),Tj=25°C}$	$T_{j,max}$	Marking	Package
IHW30N120R2	1200V	30A	1.65V	175°C	H30R1202	PG-TO-247-3

Maximum Ratings

Parameter	Symbol	Value	Unit
Collector-emitter voltage	V_{CE}	1200	V
DC collector current T_C = 25°C T_C = 100°C	I_C	 60 30	A
Pulsed collector current, t_p limited by T_{jmax}	I_{Cpuls}	90	
Turn off safe operating area ($V_{CE} \leq$ 1200V, $T_j \leq$ 175°C)	-	90	
Diode forward current T_C = 25°C T_C = 100°C	I_F	 60 30	
Diode pulsed current, t_p limited by T_{jmax}	I_{Fpuls}	90	
Diode surge non repetitive current, t_p limited by T_{jmax} T_C = 25°C, t_p = 10ms, sine halfwave T_C = 25°C, $t_p \leq$ 2.5µs, sine halfwave T_C = 100°C, $t_p \leq$ 2.5µs, sine halfwave	I_{FSM}	 50 130 120	
Gate-emitter voltage Transient Gate-emitter voltage (t_p < 5 ms)	V_{GE}	±20 ±25	V
Power dissipation T_C = 25°C	P_{tot}	390	W
Operating junction temperature	T_j	-40...+175	°C
Storage temperature	T_{stg}	-55...+175	
Soldering temperature, 1.6mm (0.063 in.) from case for 10s	-	260	

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

Thermal Resistance

Parameter	Symbol	Conditions	Max. Value	Unit
Characteristic				
IGBT thermal resistance, junction – case	R_{thJC}		0.38	K/W
Diode thermal resistance, junction – case	R_{thJCD}		0.37	
Thermal resistance, junction – ambient	R_{thJA}		40	

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

Parameter	Symbol	Conditions	Value			Unit
			min.	Typ.	max.	
Static Characteristic						
Collector-emitter breakdown voltage	$V_{(BR)CES}$	V_{GE}=0V, I_C=1mA	1200	-	-	V
Collector-emitter saturation voltage	$V_{CE(sat)}$	V_{GE} = 15V, I_C=30A				
		T_j=25°C	-	1.65	1.8	
		T_j=125°C	-	1.85	-	
		T_j=175°C	-	2.0	-	
Diode forward voltage	V_F	V_{GE}=0V, I_F=30A				
		T_j=25°C	-	1.55	1.8	
		T_j=125°C	-	1.7	-	
		T_j=175°C	-	1.75	-	
Gate-emitter threshold voltage	$V_{GE(th)}$	I_C=0.7mA, V_{CE}=V_{GE}	5.1	5.8	6.4	
Zero gate voltage collector current	I_{CES}	V_{CE}=1200V, V_{GE}=0V				μA
		T_j=25°C	-	-	5	
		T_j=175°C	-	-	2500	
Gate-emitter leakage current	I_{GES}	V_{CE}=0V, V_{GE}=20V	-	-	100	nA
Transconductance	g_{fs}	V_{CE}=20V, I_C=30A	-	19.7	-	S
Integrated gate resistor	R_{Gint}			none		Ω

Dynamic Characteristic

Input capacitance	C_{iss}	V_{CE}=25V, V_{GE}=0V, f=1MHz	-	2589	-	pF
Output capacitance	C_{oss}		-	77	-	
Reverse transfer capacitance	C_{rss}		-	62	-	
Gate charge	Q_{Gate}	V_{CC}=960V, I_C=30A V_{GE}=15V	-	198	-	nC
Internal emitter inductance measured 5mm (0.197 in.) from case	L_E		-	13	-	nH

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

Parameter	Symbol	Conditions	Value			Unit
			min.	typ.	Max.	
IGBT Characteristic						
Turn-off delay time	$t_{d(off)}$	T_j=25°C, V_{CC}=600V, I_C=30A V_{GE}=0 /15V, R_G=28Ω, L_σ[2)]=180nH, C_σ[2)]=39pF	-	792	-	ns
Fall time	t_f		-	33	-	
Turn-on energy	E_{on}		-	-	-	mJ
Turn-off energy	E_{off}		-	2.4	-	
Total switching energy	E_{ts}		-	2.4	-	

Switching Characteristic, Inductive Load, at T_j=175 °C

Parameter	Symbol	Conditions	Value			Unit
			min.	Typ.	Max.	
IGBT Characteristic						
Turn-off delay time	$t_{d(off)}$	T_j=175°C V_{CC}=600V, I_C=30A, V_{GE}= 0 /15V, R_G= 28Ω, L_σ=180nH[2)], C_σ=39pF[2)]	-	860	-	ns
Fall time	t_f		-	40	-	
Turn-on energy	E_{on}		-	-	-	mJ
Turn-off energy	E_{off}		-	3.1	-	
Total switching energy	E_{ts}		-	3.1	-	

[2)] Leakage inductance L_σ and Stray capacity C_σ due to dynamic test circuit in Figure E.

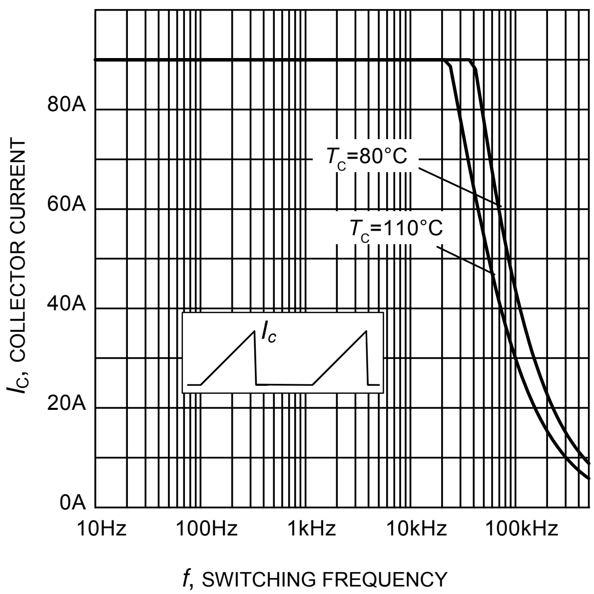


Figure 1. Collector current as a function of switching frequency for hard switching (turn-off)
($T_j \leq 175°C$, $D = 0.5$, $V_{CE} = 600V$, $V_{GE} = 0/+15V$, $R_G = 28\Omega$)

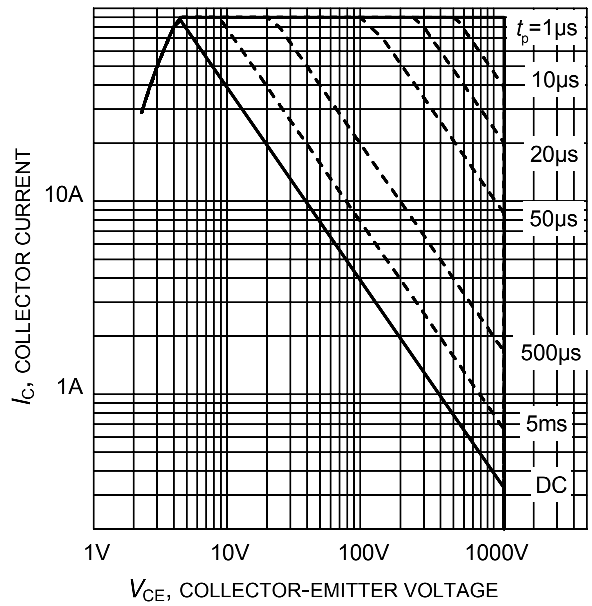


Figure 2. IGBT Safe operating area
($D = 0$, $T_C = 25°C$, $T_j \leq 175°C$; $V_{GE}=15V$)

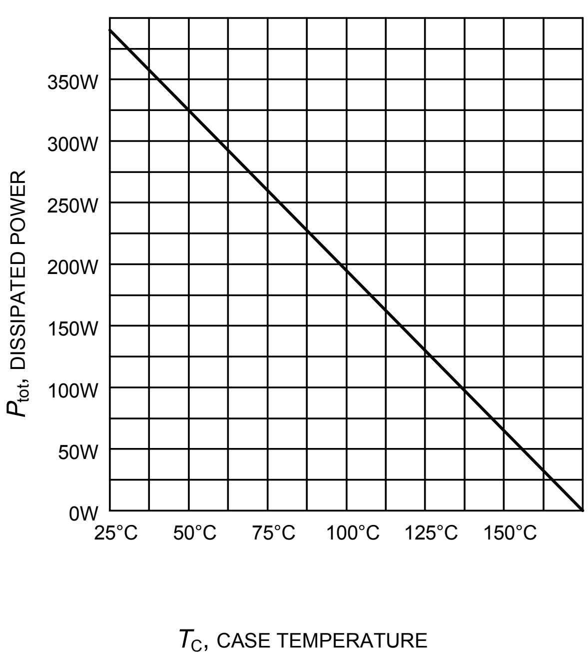


Figure 3. Power dissipation as a function of case temperature
($T_j \leq 175°C$)

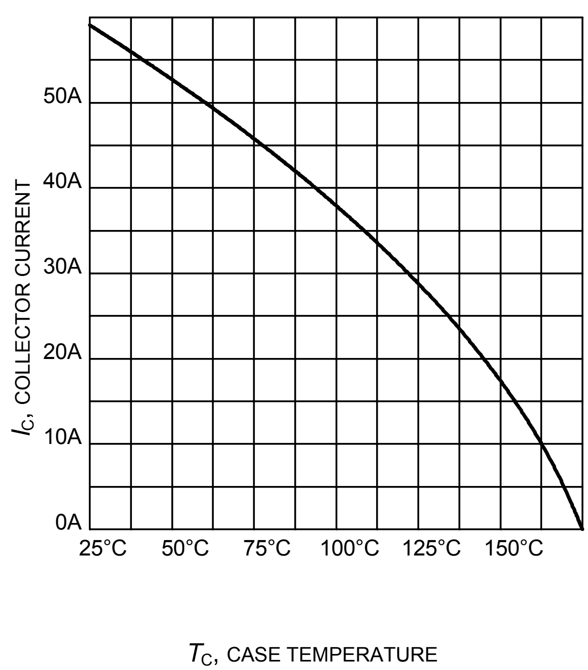


Figure 4. DC Collector current as a function of case temperature
($V_{GE} \geq 15V$, $T_j \leq 175°C$)

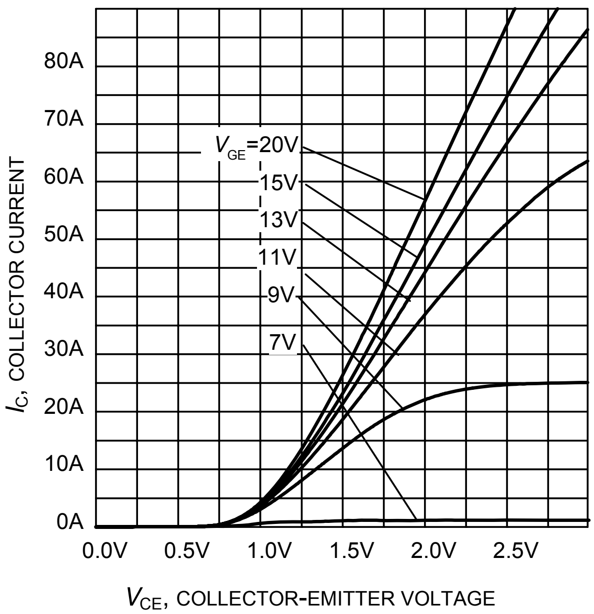


Figure 5. Typical output characteristic
(T_j = 25°C)

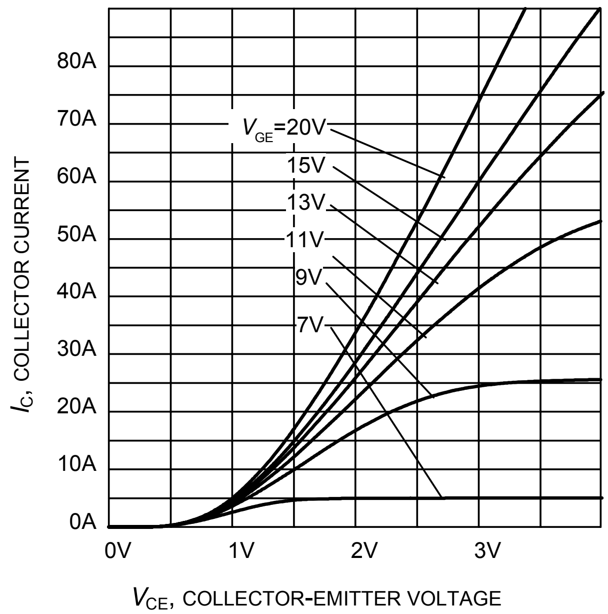


Figure 6. Typical output characteristic
(T_j = 175°C)

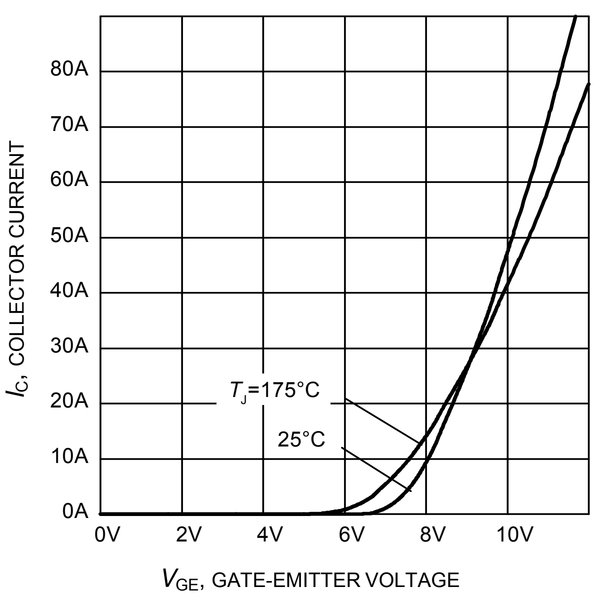


Figure 7. Typical transfer characteristic
(V_{CE}=20V)

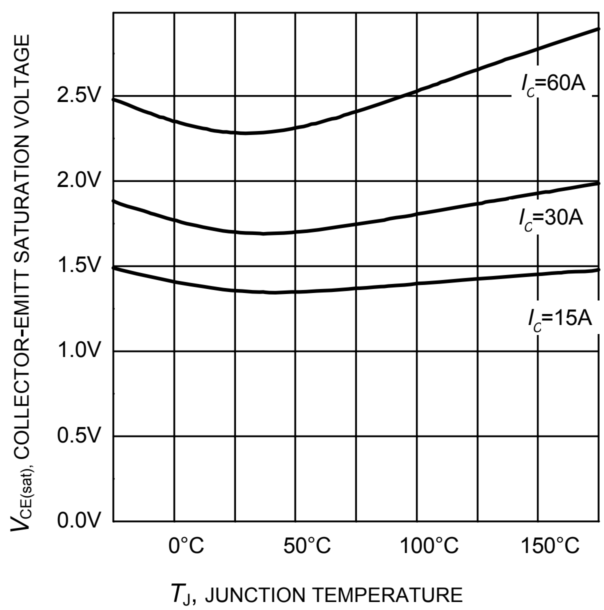


Figure 8. Typical collector-emitter saturation voltage as a function of junction temperature
(V_{GE} =15V)

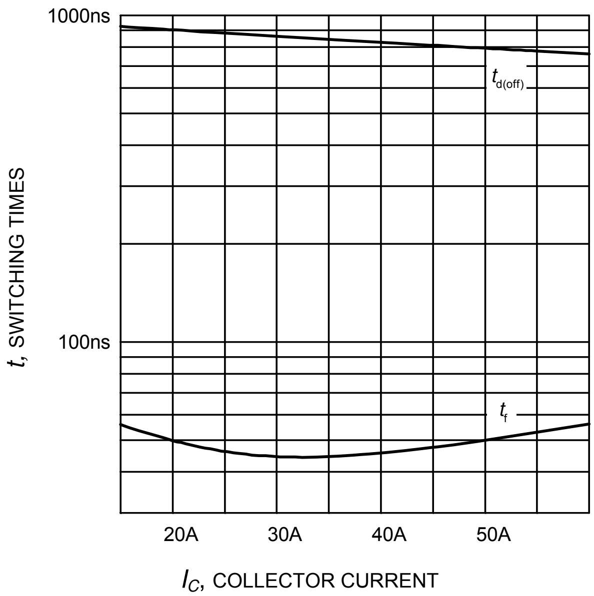


Figure 9. Typical switching times as a function of collector current
(inductive load, T_J=175°C, V_{CE}=600V, V_{GE}=0/15V, R_G=28Ω, Dynamic test circuit in Figure E)

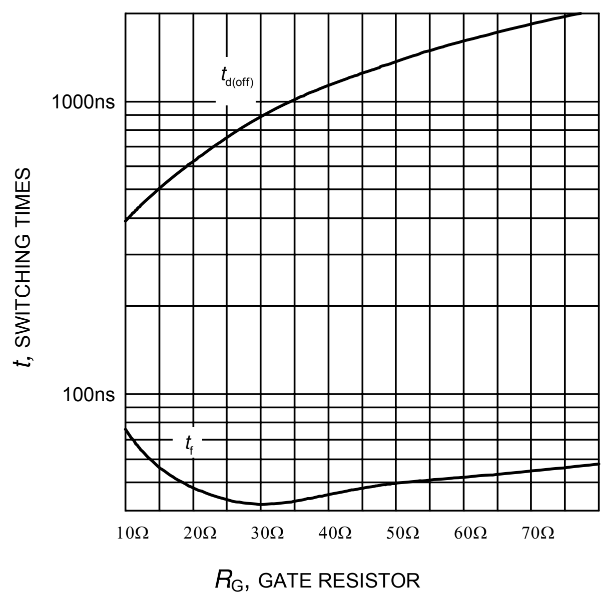


Figure 10. Typical switching times as a function of gate resistor
(inductive load, T_J=175°C, V_{CE}=600V, V_{GE}=0/15V, I_C=30A, Dynamic test circuit in Figure E)

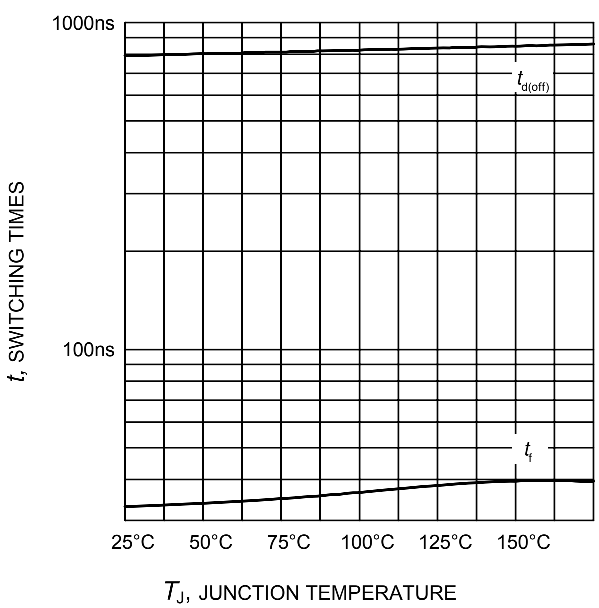


Figure 11. Typical switching times as a function of junction temperature
(inductive load, V_{CE}=600V, V_{GE}=0/15V, I_C=30A, R_G=28Ω, Dynamic test circuit in Figure E)

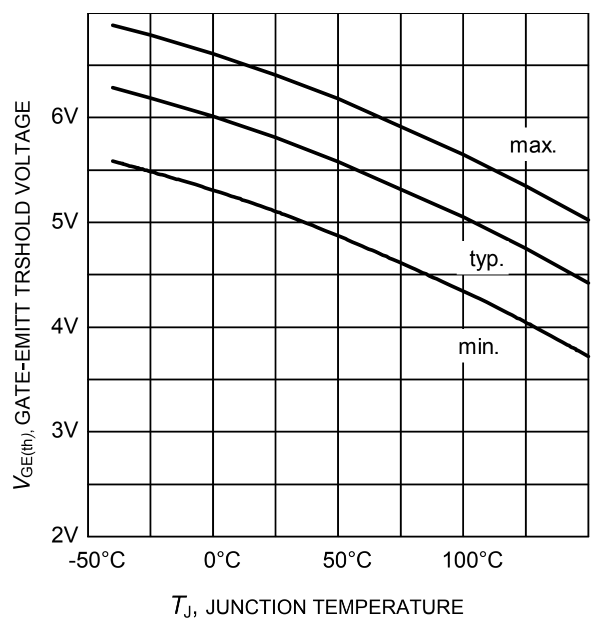


Figure 12. Gate-emitter threshold voltage as a function of junction temperature
(I_C = 0.7mA)

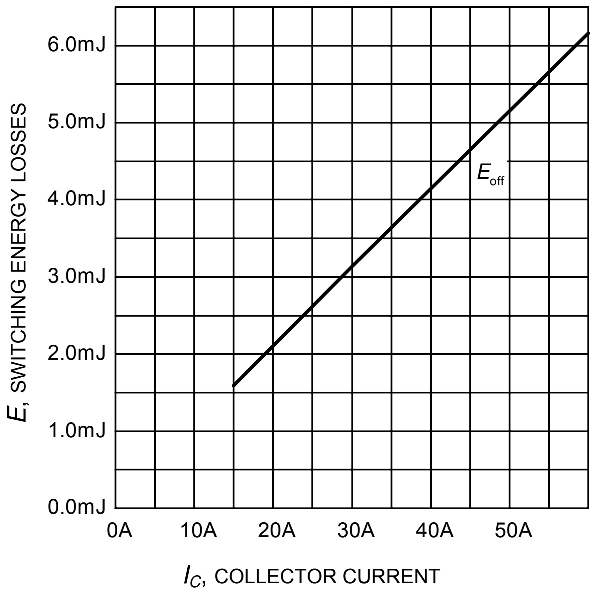


Figure 13. Typical turn-off energy as a function of collector current
(inductive load, T_J=175°C, V_{CE}=600V, V_{GE}=0/15V, R_G=28Ω, Dynamic test circuit in Figure E)

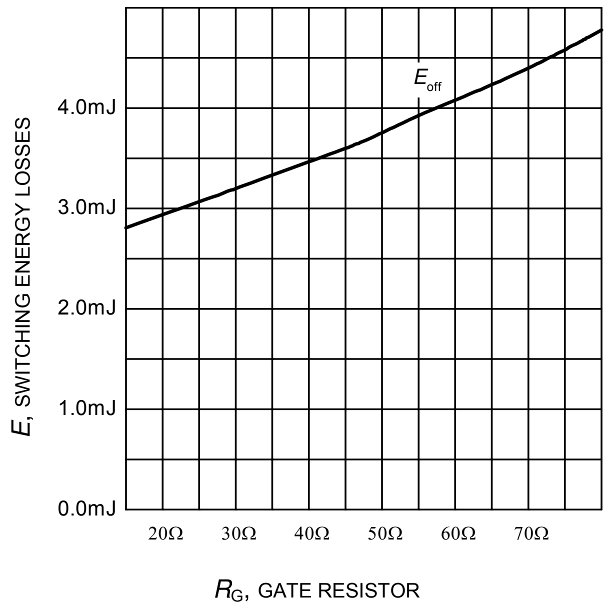


Figure 14. Typical turn-off energy as a function of gate resistor
(inductive load, T_J=175°C, V_{CE}=600V, V_{GE}=0/15V, I_C=30A, Dynamic test circuit in Figure E)

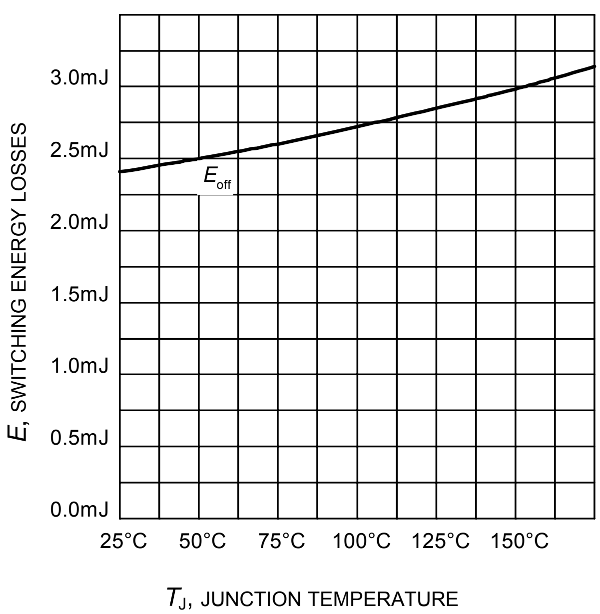


Figure 15. Typical turn-off energy as a function of junction temperature
(inductive load, V_{CE}=600V, V_{GE}=0/15V, I_C=30A, R_G=28Ω, Dynamic test circuit in Figure E)

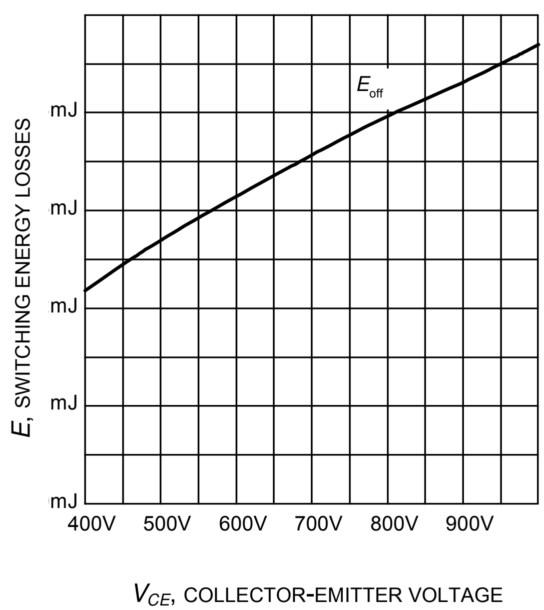


Figure 16. Typical turn-off energy as a function of collector emitter voltage
(inductive load, T_J=175°C, V_{GE}=0/15V, I_C=30A, R_G=28Ω, Dynamic test circuit in Figure E)

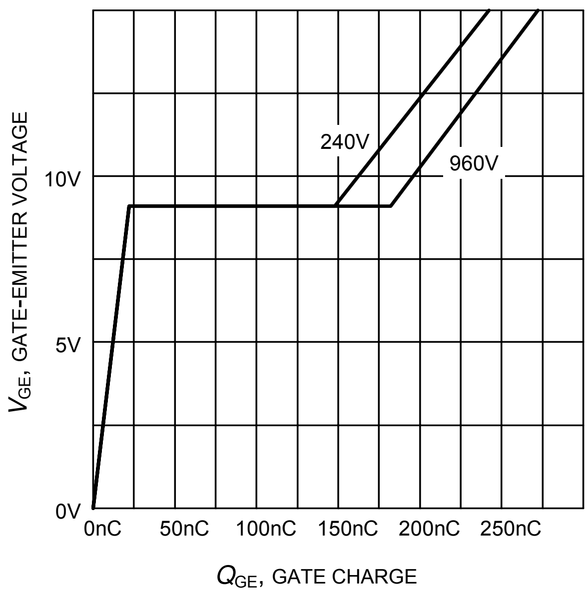


Figure 17. Typical gate charge
(I_C=30 A)

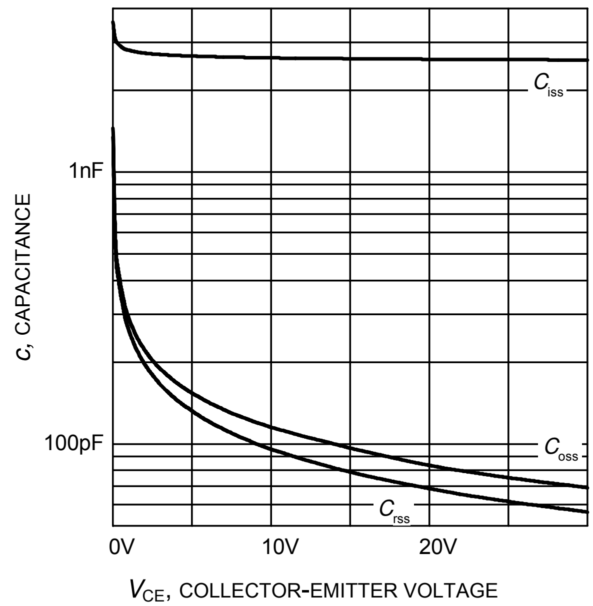


Figure 18. Typical capacitance as a function of collector-emitter voltage
(V_{GE}=0V, f = 1 MHz)

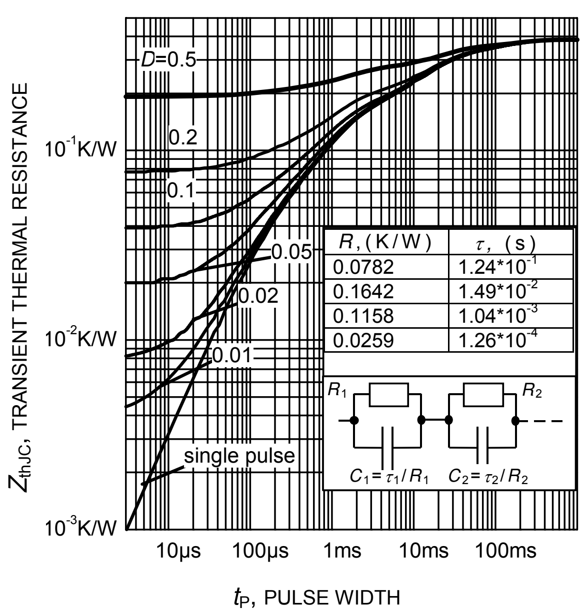


Figure 19. IGBT transient thermal resistance
($D = t_p / T$)

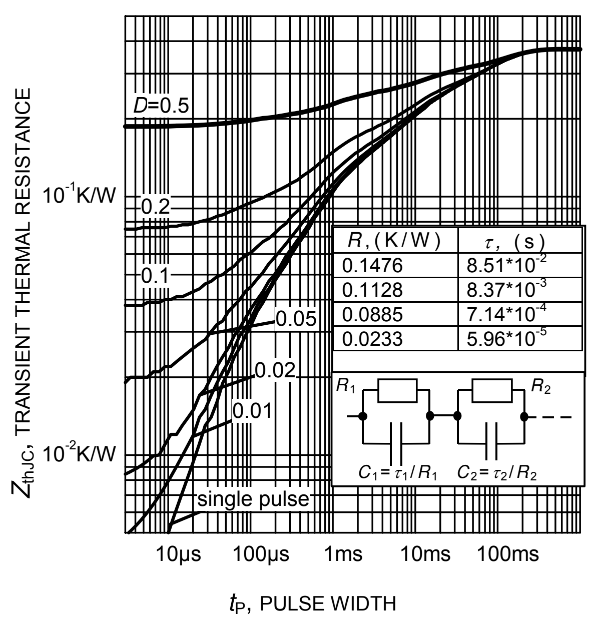


Figure 20. Diode transient thermal impedance as a function of pulse width
($D=t_P/T$)

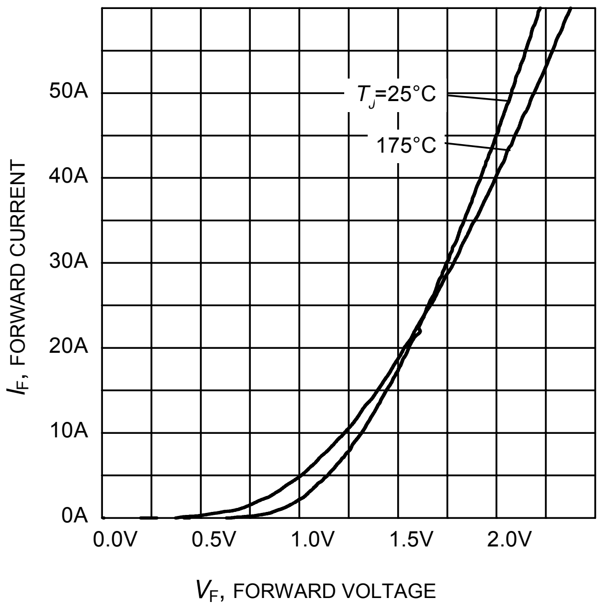


Figure 21. Typical diode forward current as a function of forward voltage

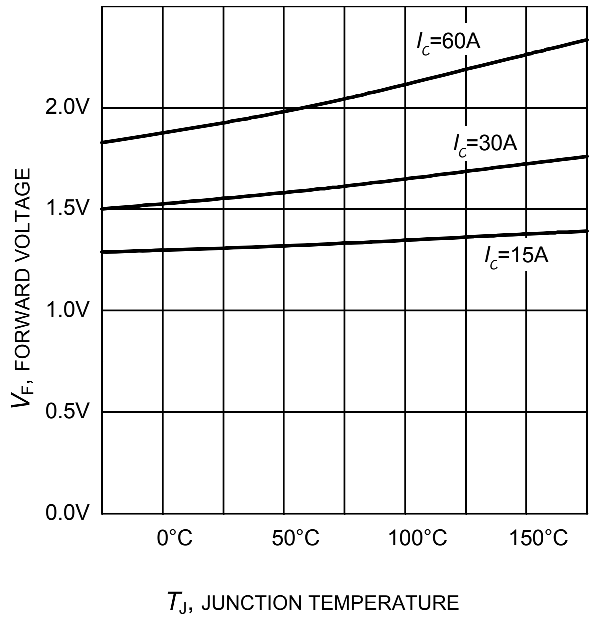


Figure 22. Typical diode forward voltage as a function of junction temperature

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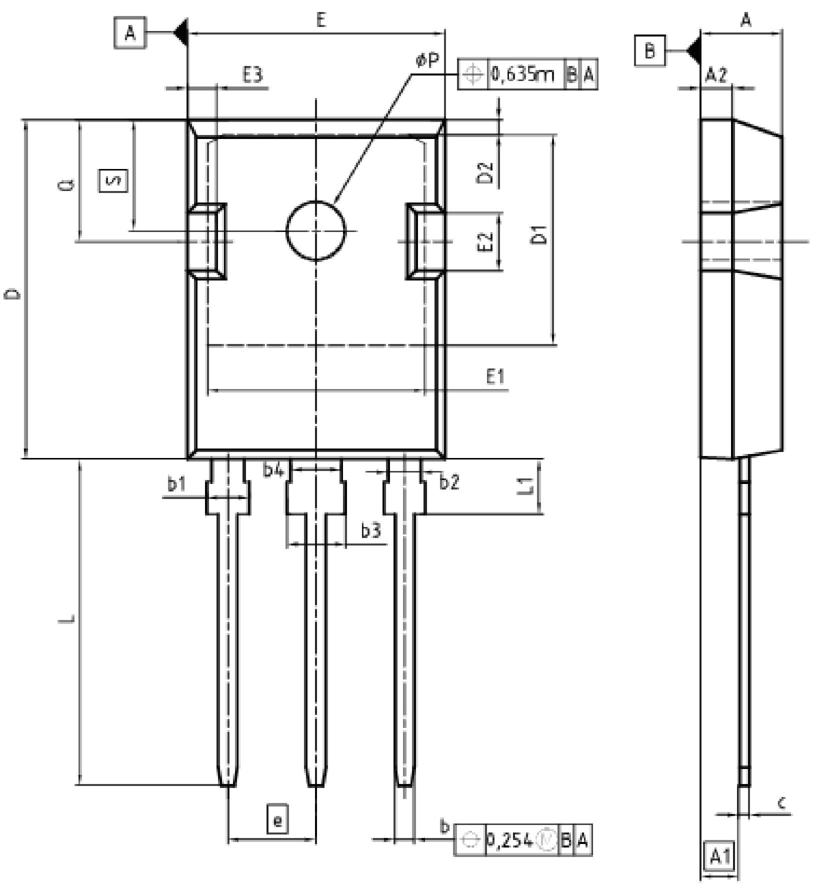

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.83	5.21	0.190	0.205
A1	2.27	2.54	0.089	0.100
A2	1.85	2.16	0.073	0.085
b	1.07	1.33	0.042	0.052
b1	1.90	2.41	0.075	0.095
b2	1.90	2.16	0.075	0.085
b3	2.87	3.38	0.113	0.133
b4	2.87	3.13	0.113	0.123
c	0.55	0.68	0.022	0.027
D	20.80	21.10	0.819	0.831
D1	16.25	17.65	0.640	0.695
D2	0.95	1.35	0.037	0.053
E	15.70	16.13	0.618	0.635
E1	13.10	14.15	0.516	0.557
E2	3.68	5.10	0.145	0.201
E3	1.00	2.60	0.039	0.102
e	5.44		0.214	
N	3		3	
L	19.80	20.32	0.780	0.800
L1	4.10	4.47	0.161	0.176
øP	3.50	3.70	0.138	0.146
Q	5.49	6.00	0.216	0.236
S	6.04	6.30	0.238	0.248

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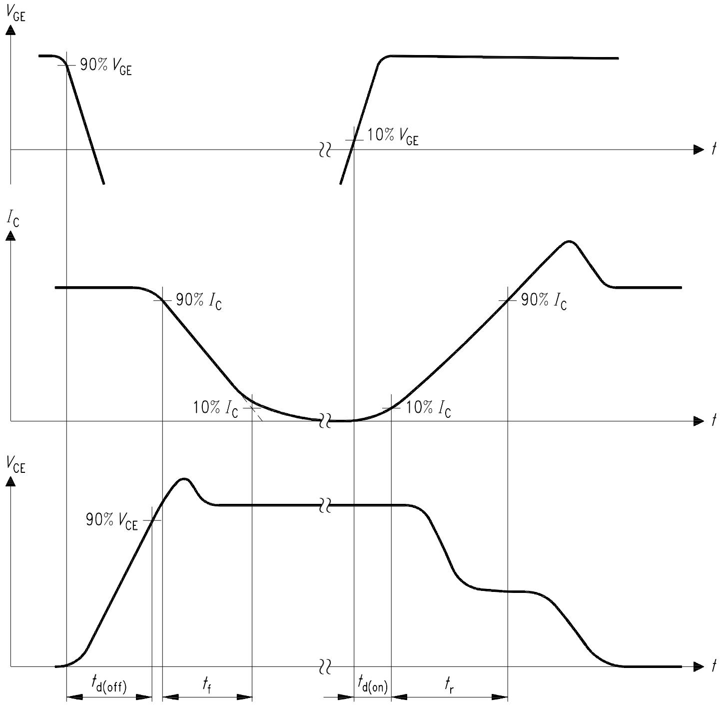

Figure A. Definition of switching times

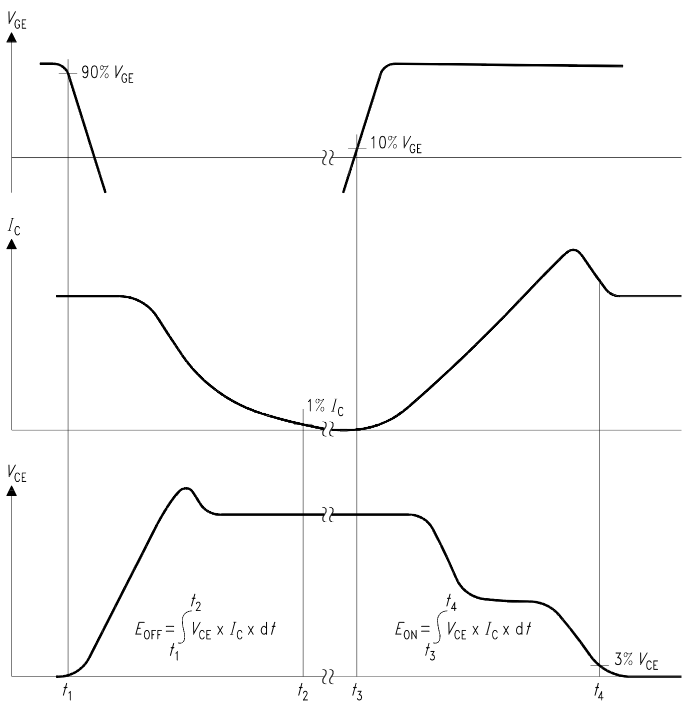

Figure B. Definition of switching losses

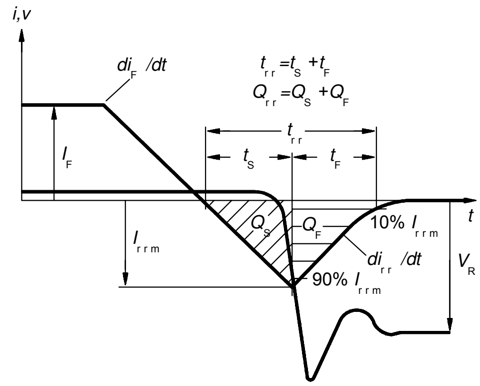

Figure C. Definition of diodes switching characteristics

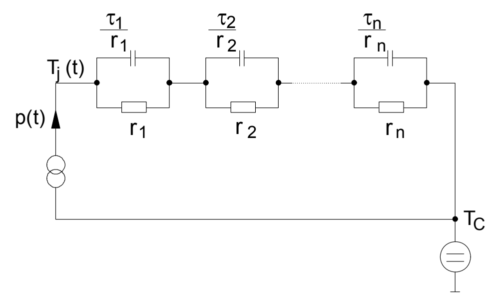

Figure D. Thermal equivalent circuit

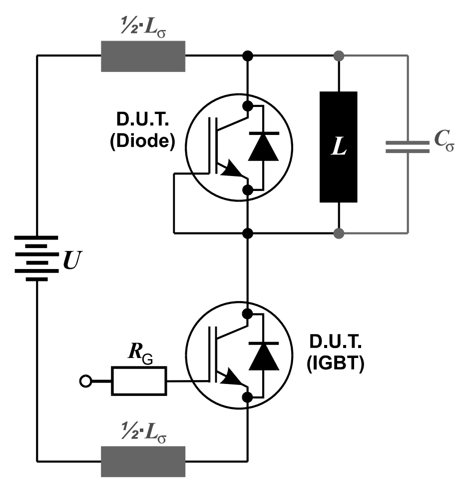

Figure E. Dynamic test circuit
Leakage inductance L_σ and Stray capacity C_σ

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