

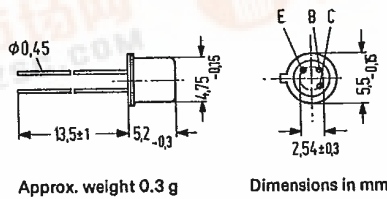
25C D ■ 8235605 0004089 T ■ SIEG T-29-17

**NPN Silicon Transistors SIEMENS AKTIENGESELLSCHAFT BC 107
BC 108
BC 109**

BC 107, BC 108, and BC 109 are epitaxial NPN silicon planar transistors in TO 18 metal case (18 A 3 DIN 41876). The collector is electrically connected to the case.

The transistors are particularly suitable for use in AF input and driver stages.

Type	Ordering code
BC 107 ¹⁾	Q62702-C680
BC 107 A	Q60203-X107-A
BC 107 B	Q60203-X107-B
BC 108 ¹⁾	Q60203-X108
BC 108 A	Q60203-X108-A
BC 108 B	Q60203-X108-B
BC 108 C	Q60203-X108-C
BC 109 ¹⁾	Q60203-X109
BC 109 B	Q60203-X109-B
BC 109 C	Q60203-X109-C



Maximum ratings		BC 107	BC 108	BC 109	
Collector-emitter voltage	V_{CES}	50	30	30	V
Collector-emitter voltage	V_{CEO}	45	20	20	V
Emitter-base voltage	V_{EBO}	6	5	5	V
Collector current	I_C	100	100	50	mA
Collector peak current	I_{CM}	200	200	—	mA
Base current	I_B	50	50	5	mA
Junction temperature	T_j	175	175	175	°C
Storage temperature range	T_{stg}	-55 to +175			°C
Total power dissipation	P_{tot}	300	300	300	mW
Thermal resistance					
Junction to ambient air	R_{thJA}	≤ 500	≤ 500	≤ 500	K/W
Junction to case	R_{thJC}	≤ 200	≤ 200	≤ 200	K/W

1) If the order does not include any exact indication of the current amplification group desired, a transistor of a current amplification group just available from stock will be delivered.

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SIEMENS AKTIENGESELLSCHAFT

BC 107

BC 108

BC 109

Static characteristics ($T_{amb} = 25^\circ\text{C}$). The transistors are grouped according to the DC current gain h_{FE} and marked by A, B, C. At $V_{CE} = 5\text{ V}$ and the collector currents indicated below the following static characteristics apply:

h_{FE} group	A	B	C
Type	BC 107 BC 108 —	BC 107 BC 108 BC 109	— BC 108 BC 109
I_C mA	h_{FE} I_C/I_B	h_{FE} I_C/I_B	h_{FE} I_C/I_B
0.01	90	150	270
2	170 (120 to 220)	290 (180 to 460)	500 (380 to 800)
100 ²⁾	120	200 ²⁾	400 ²⁾

	BC 107 BC 108 BC 109				
I_C mA	V_{BE} V	I_C mA	I_B mA	$V_{CEsat}^{1)}$ V	$V_{BEsat}^{1)}$ V
0.1	0.55	10	0.5	0.07 (<0.2)	0.73 (<0.83)
2	0.62 (0.55 to 0.7)				
100 ²⁾	0.83 ²⁾	100 ²⁾	5	0.2 (<0.6) ²⁾	0.87 (<1.05) ²⁾

Static characteristics ($T_{amb} = 25^\circ\text{C}$)	BC 107	BC 108	BC 109	
Collector cutoff current ($V_{CES} = 50\text{ V}$)	I_{CES}	0.2 (<15)	—	nA
Collector cutoff current ($V_{CES} = 30\text{ V}$)	I_{CES}	—	0.2 (<15)	nA
Collector cutoff current ($V_{CES} = 50\text{ V}$; $T_{amb} = 125^\circ\text{C}$)	I_{CES}	0.2 (<4)	—	μA
Collector cutoff current ($V_{CES} = 30\text{ V}$; $T_{amb} = 125^\circ\text{C}$)	I_{CES}	—	0.2 (<4)	μA
Emitter-base breakdown voltage ($I_{EBO} = 1\text{ }\mu\text{A}$)	$V_{(BR)EBO}$	>6	>5	V
Collector-emitter break- down voltage ($I_{CEO} = 2\text{ mA}$)	$V_{(BR)CEO}$	>45	>20	V

1) The transistor is overloaded to such an extent that the DC current gain decreases to $h_{FE} = 20$

2) These values do not apply to BC 109.

Dynamic characteristics ($T_{amb} = 25^{\circ}\text{C}$)		BC 107	BC 108	BC 109	
Transition frequency ($I_C = 0.5 \text{ mA}$; $V_{CE} = 3 \text{ V}$)	f_T	85	85	85	MHz
Transition frequency ($I_C = 10 \text{ mA}$; $V_{CE} = 5 \text{ V}$; $f = 100 \text{ MHz}$)	f_T	250 (>150)	250 (>150)	300 (<150)	MHz
Collector-base capacitance ($V_{CBO} = 10 \text{ V}$; $f = 1 \text{ MHz}$)	C_{CBO}	3.5 (<6)	3.5 (<6)	3.5 (<6)	pF
Emitter-base capacitance ($V_{EBO} = 0.5 \text{ V}$; $f = 1 \text{ MHz}$)	C_{EBO}	8	8	8	pF
Noise figure ($I_C = 0.2 \text{ mA}$; $V_{CE} = 5 \text{ V}$; $R_g = 2 \text{ k}\Omega$; $\Delta f = 30 \text{ Hz}$ to 15 kHz)	NF	—	—	<4	dB
Noise figure ($I_C = 0.2 \text{ mA}$; $V_{CE} = 5 \text{ V}$; $R_g = 2 \text{ k}\Omega$; $f = 1 \text{ kHz}$; $\Delta f = 200 \text{ Hz}$)	NF	2 (<10)	2 (<10)	<4	dB

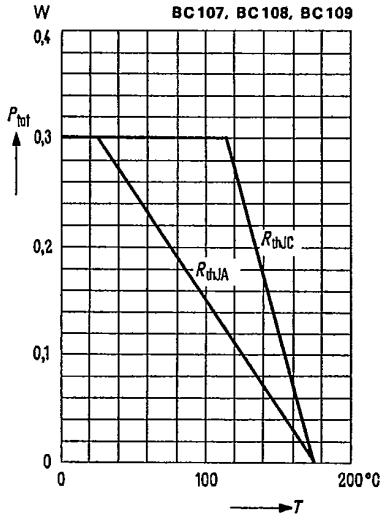
Dynamic characteristics ($T_{amb} = 25^{\circ}\text{C}$) $I_C = 2 \text{ mA}$; $V_{CE} = 5 \text{ V}$; $f = 1 \text{ kHz}$

h_{FE} group	A	B	C	
Type	BC 107 BC 108 —	BC 107 BC 108 BC 109	— BC 108 BC 109	
h_{11e}	2.7 (1.6 to 4.5)	4.5 (3.2 to 8.5)	8.7 (6 to 16)	k Ω
h_{12e}	1.5	2	3	10^{-4}
h_{21e}	220	330	600	—
h_{22e}	18 (<30)	30 (<60)	60 (<110)	μS

Total perm. power dissipation
versus temperature

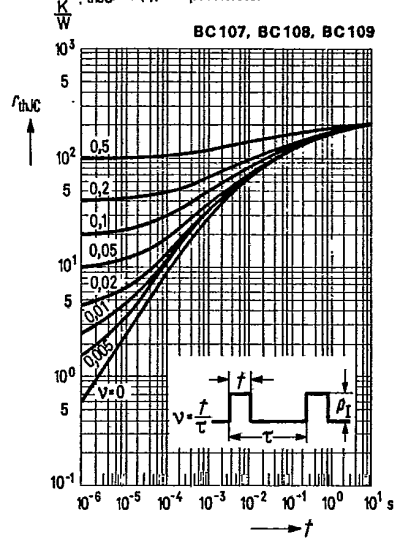
$P_{tot} = f(T); R_{th} = \text{parameter}$

BC 107, BC 108, BC 109



Permissible pulse load
 $r_{thJC} = f(t); v = \text{parameter}$

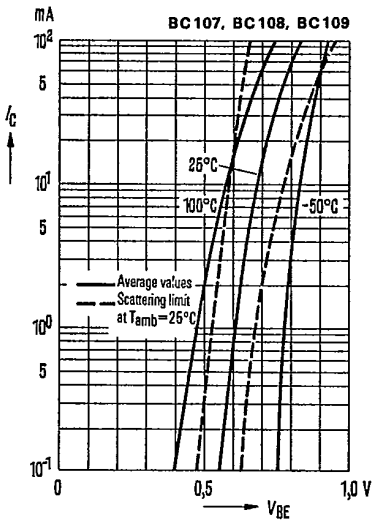
BC 107, BC 108, BC 109



Collector current $I_C = f(V_{BE})$

$V_{CE} = 5 \text{ V}$ (common emitter configuration)

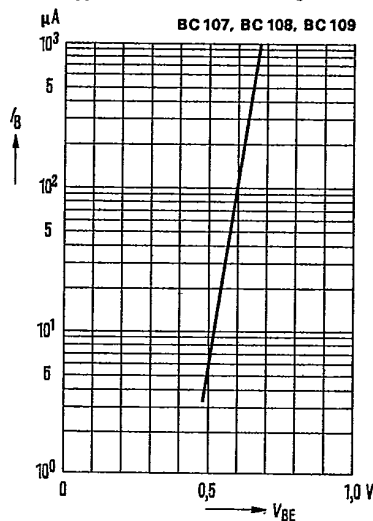
BC 107, BC 108, BC 109



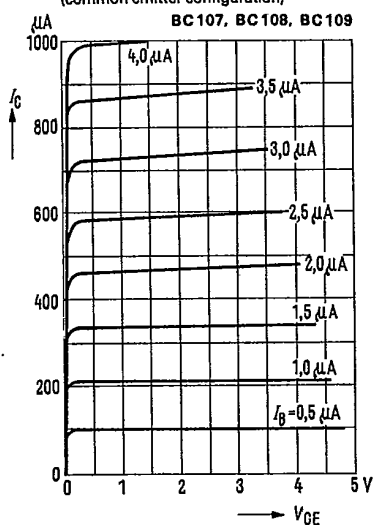
Input characteristic $I_B = f(V_{BE})$

$V_{CE} = 5 \text{ V}$ (common emitter configuration)

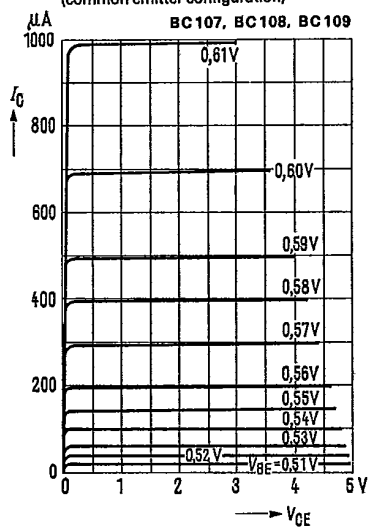
BC 107, BC 108, BC 109



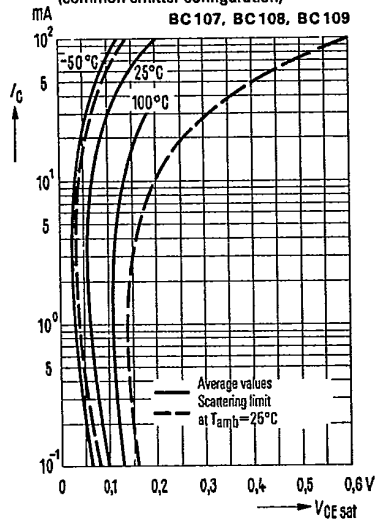
Output characteristics
 $I_C = f(V_{CE})$; $I_B = \text{parameter}$
 (common emitter configuration)



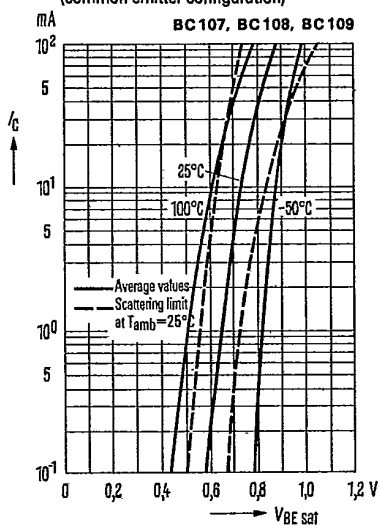
Output characteristics
 $I_C = f(V_{CE})$; $V_{BE} = \text{parameter}$
 (common emitter configuration)



Collector-emitter saturation voltage
 $V_{CEsat} = f(I_C)$; $h_{FE} = 20$; $T_{amb} = \text{parameter}$
 (common emitter configuration)



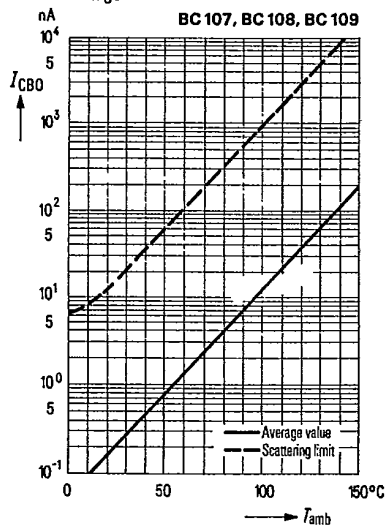
Base-emitter saturation voltage
 $V_{BEsat} = f(I_C)$; $h_{FE} = 20$; $T_{amb} = \text{parameter}$
 (common emitter configuration)



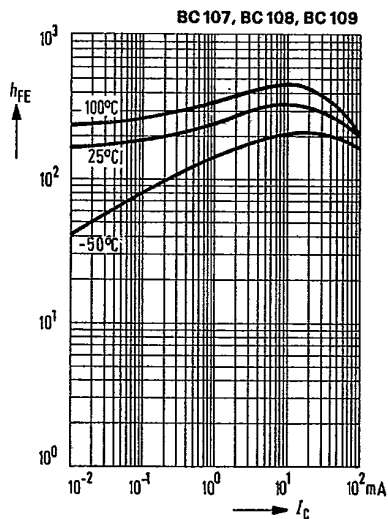
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BC 107
BC 108
BC 109

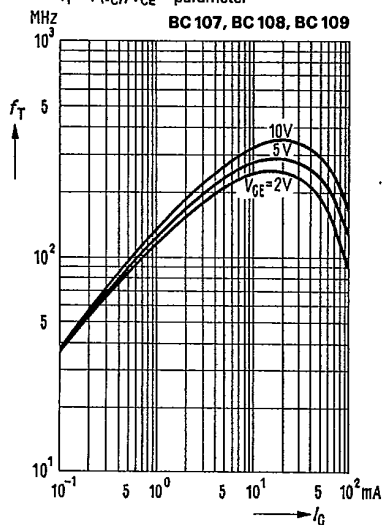
Collector cutoff current versus
temperature $I_{CBO} = f(T_{amb})$
for maximum permissible breakdown
voltage



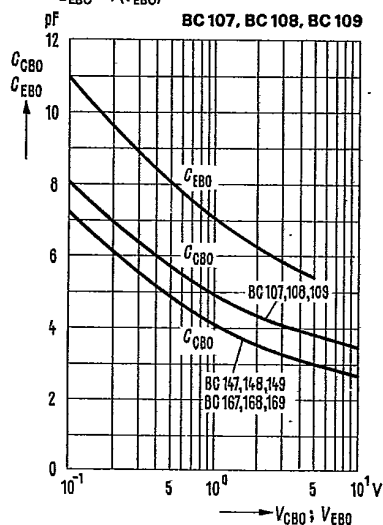
DC current gain $h_{FE} = f(I_C)$;
 $V_{CE} = 5$ V; T_{amb} = parameter
(common emitter configuration)



Transition frequency
 $f_T = f(I_C)$; V_{CE} = parameter



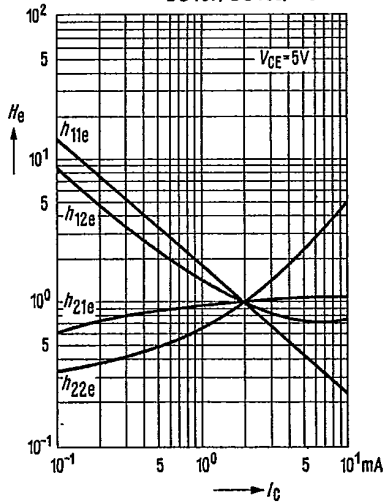
Collector-base capacitance
 $C_{CBO} = f(V_{CBO})$
Emitter-base capacitance
 $C_{EBO} = f(V_{EBO})$



h-parameter versus collector current

$$H_e = \frac{h_o(I_C)}{h_o(I_C = 2 \text{ mA})} = f(I_C); V_{CE} = 5 \text{ V}$$

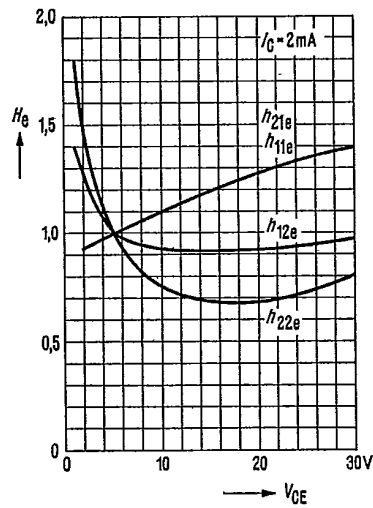
BC 107, BC 108, BC 109



h-parameter versus collector-emitter voltage

$$H_e = \frac{h_o(V_{CE})}{h_o(V_{CE} = 5 \text{ V})} = f(V_{CE}); I_C = 2 \text{ mA}$$

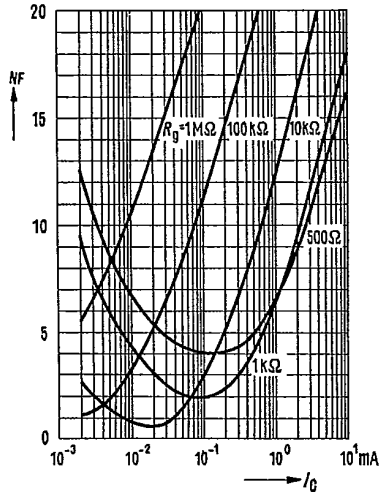
BC 107, BC 108, BC 109



Noise figure $NF = f(I_C)$

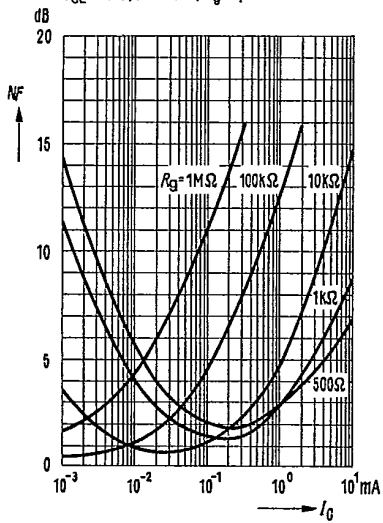
$$V_{CE} = 5 \text{ V}; f = 120 \text{ Hz}; R_g = \text{parameter}$$

BC 109

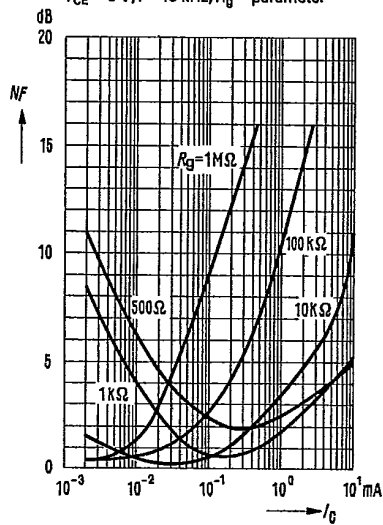


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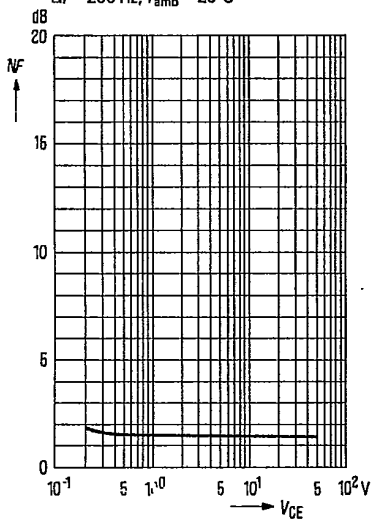
Noise figure $NF = f(I_G)$
 $V_{CE} = 5 \text{ V}; f = 1 \text{ kHz}; R_G = \text{parameter}$



Noise figure $NF = f(I_G)$
 $V_{CE} = 5 \text{ V}; f = 10 \text{ kHz}; R_G = \text{parameter}$



Noise figure $NF = f(V_{CE})$
 $I_G = 0.2 \text{ mA}; R_G = 2 \text{ k}\Omega; f = 1 \text{ kHz}$
 $\Delta f = 200 \text{ Hz}; T_{amb} = 25^\circ\text{C}$



Noise figure $NF = f(f)$
 $V_{CE} = 5 \text{ V}; I_G = 0.2 \text{ mA}$
 $R_G = 2 \text{ k}\Omega; T_{amb} = 25^\circ\text{C}$

