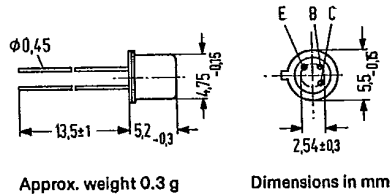


25C D ■ 8235605 0004089 T ■ SIEG T-29-17  
**NPN Silicon Transistors SIEMENS AKTIENGESELLSCHAFT BC 107**  
**BC 108**  
**BC 109**

BC 107, BC 108, and BC 109 are epitaxial NPN silicon planar transistors in TO 18 metal case (18 A 3 DIN 41 876). 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 <sup>1)</sup>	Q62702-C680
BC 107 A	Q60203-X107-A
BC 107 B	Q60203-X107-B
BC 108 <sup>1)</sup>	Q60203-X108
BC 108 A	Q60203-X108-A
BC 108 B	Q60203-X108-B
BC 108 C	Q60203-X108-C
BC 109 <sup>1)</sup>	Q60203-X109
BC 109 B	Q60203-X109-B
BC 109 C	Q60203-X109-C



Approx. weight 0.3 g

Dimensions in mm

**Maximum ratings**

	BC 107	BC 108	BC 109	
Collector-emitter voltage	50	30	30	V
Collector-emitter voltage	45	20	20	V
Emitter-base voltage	6	5	5	V
Collector current	100	100	50	mA
Collector peak current	200	200	—	mA
Base current	50	50	5	mA
Junction temperature	175	175	175	°C
Storage temperature range	-55 to +175			°C
Total power dissipation	300	300	300	mW

**Thermal resistance**

	BC 107	BC 108	BC 109	
Junction to ambient air	$R_{thJA} \leq 500$	$\leq 500$	$\leq 500$	K/W
Junction to case	$R_{thJC} \leq 200$	$\leq 200$	$\leq 200$	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.

**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 <sup>2)</sup>	120	200 <sup>2)</sup>	400 <sup>2)</sup>

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 <sup>2)</sup>	0.83 <sup>2)</sup>	100 <sup>2)</sup>	5	0.2 (<0.6) <sup>2)</sup>	0.87 (<1.05) <sup>2)</sup>

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

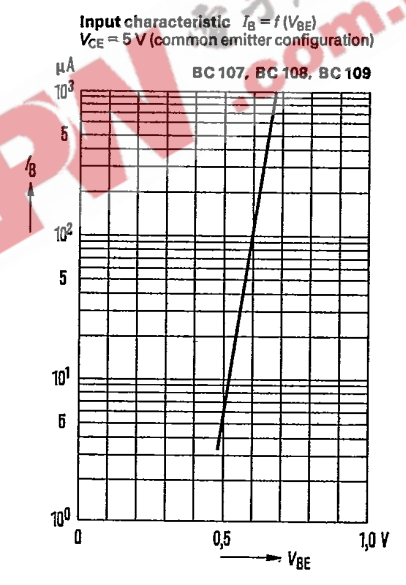
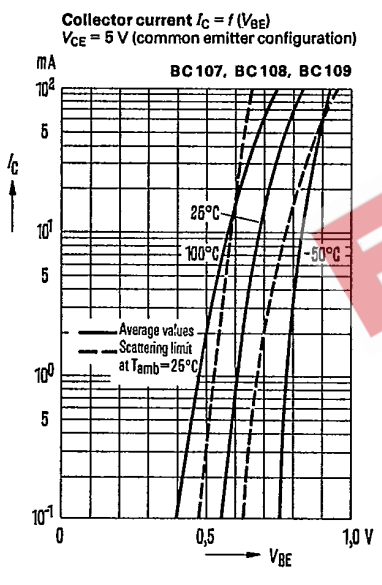
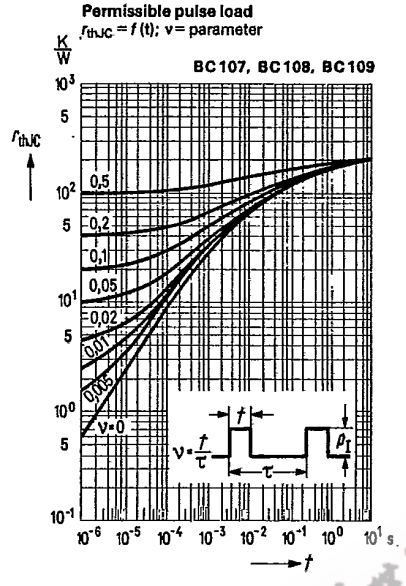
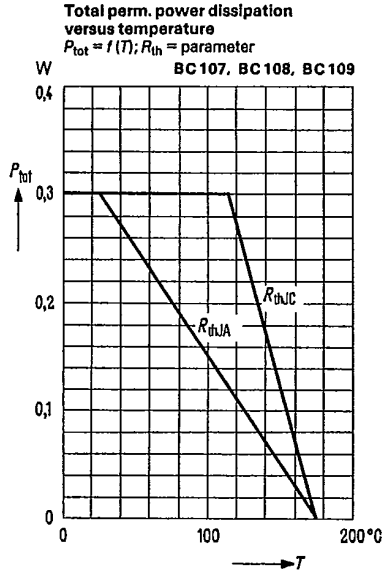
1) The transistor is overloaded to such an extent that the DC current gain decreases to  $h_{FE} = 20$   
2) These values do not apply to BC 109.

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 ( $I_C = 0.2 \text{ mA}; V_{CE} = 5 \text{ V}; R_g = 2 \text{ k}\Omega; \Delta f = 30 \text{ Hz to } 15 \text{ kHz}$ )	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 ( $T_{amb} = 25^{\circ}\text{C}$ )

$I_C = 2 \text{ mA}; V_{CE} = 5 \text{ V}; f = 1 \text{ kHz}$

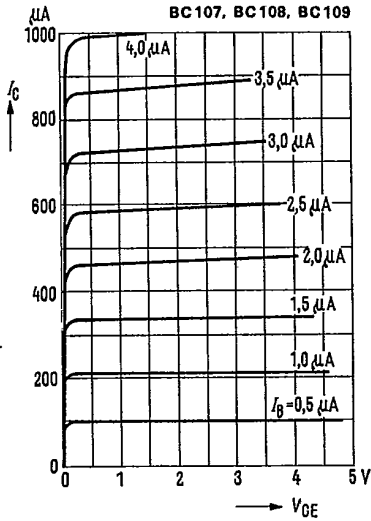
$h_{FE}$ group	A	B	C	
Type	BC 107 BC 108 -	BC 107 BC 108 BC 109	- BC 108 BC 109	
$h_{11e}$	2.7 (1.6 to 4.5)	4.5 (3.2 to 8.5)	8.7 (6 to 16)	k $\Omega$
$h_{12e}$	1.5	2	3	$10^{-4}$
$h_{21e}$	220	330	600	-
$h_{22e}$	18 (<30)	30 (<60)	60 (<110)	$\mu\text{S}$



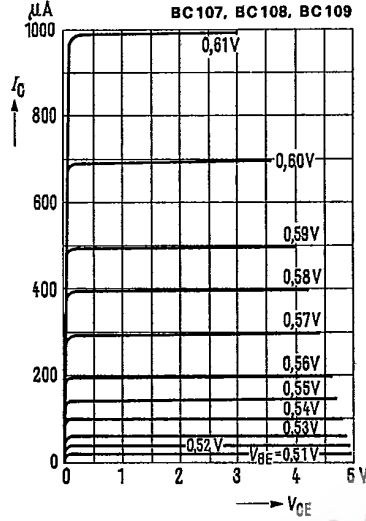
T-29-17

BC 107  
BC 108  
BC 109

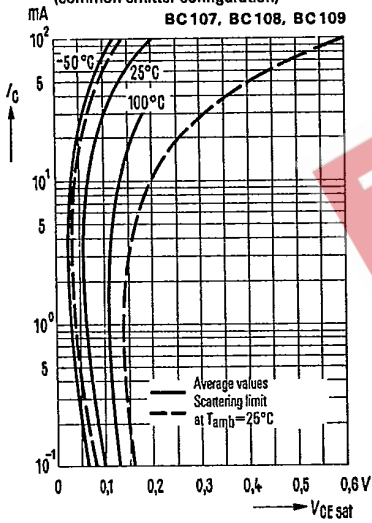
**Output characteristics**  
 $I_C = f(V_{CE}); I_B = \text{parameter}$   
(common emitter configuration)



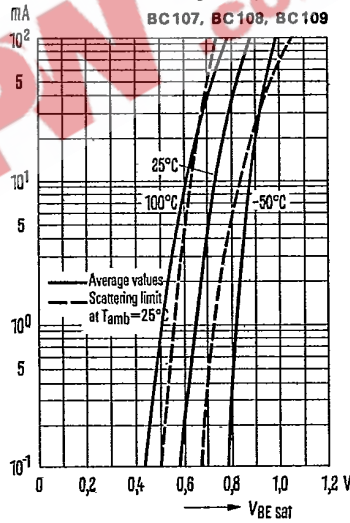
**Output characteristics**  
 $I_C = f(V_{CE}); V_{BE} = \text{parameter}$   
(common emitter configuration)



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



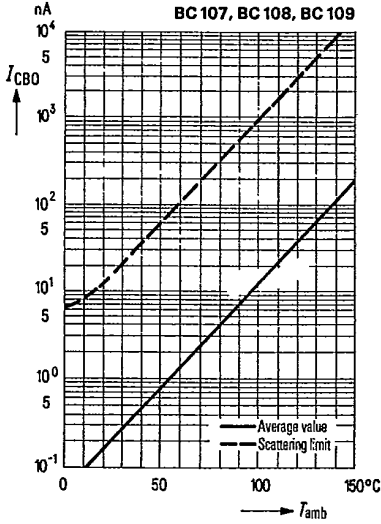
**Base-emitter saturation voltage**  
 $V_{BEsat} = f(I_C); h_{FE} = 20; T_{amb} = \text{parameter}$   
(common emitter configuration)



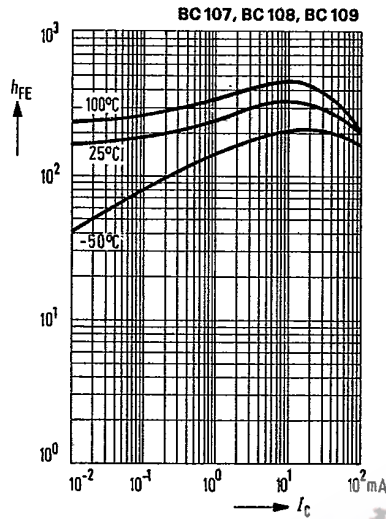
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BC 107  
 BC 108  
 BC 109

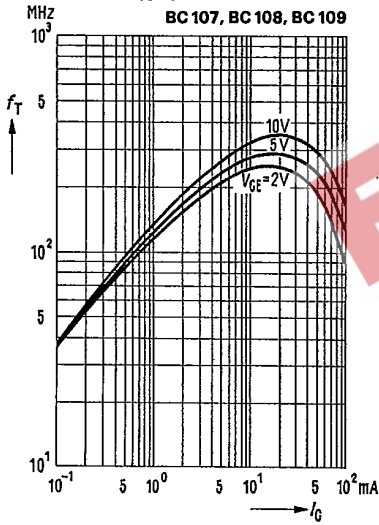
Collector cutoff current versus temperature  $I_{CBO} = f(T_{amb})$  for maximum permissible breakdown voltage



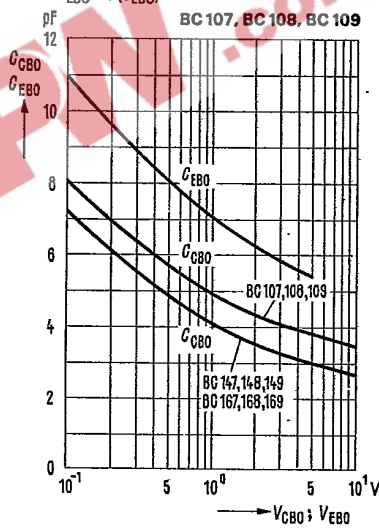
DC current gain  $h_{FE} = f(I_C)$ ;  $V_{CE} = 5V$ ;  $T_{amb} = \text{parameter}$  (common emitter configuration)



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



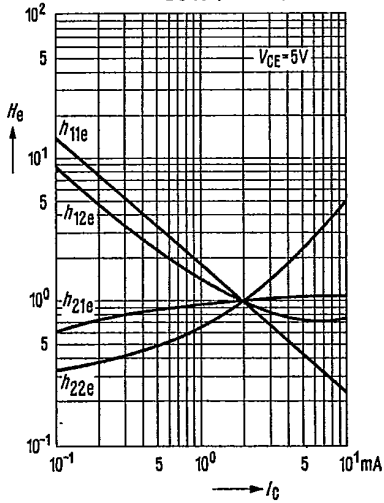
Collector-base capacitance  $C_{CBO} = f(V_{CBO})$   
 Emitter-base capacitance  $C_{EBO} = f(V_{EBO})$



h-parameter versus collector current

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

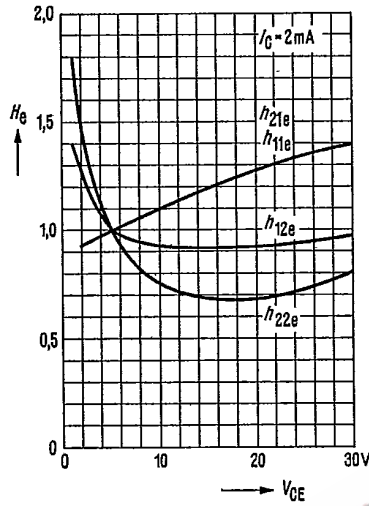
BC107, BC108, BC109



h-parameter versus collector-emitter voltage

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

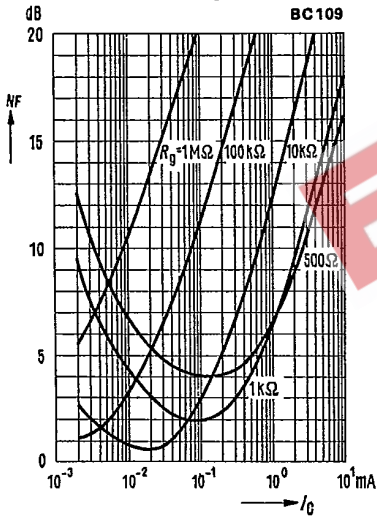
BC 107, BC 108, BC 109



Noise figure  $NF = f(I_c)$

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

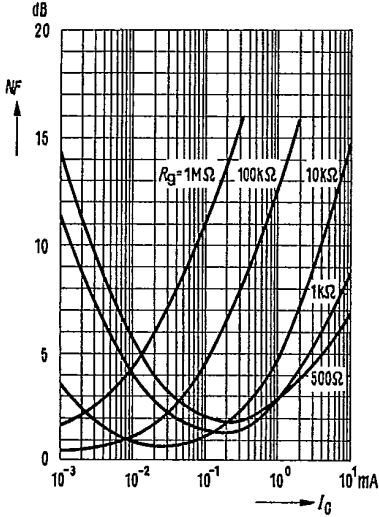
BC109



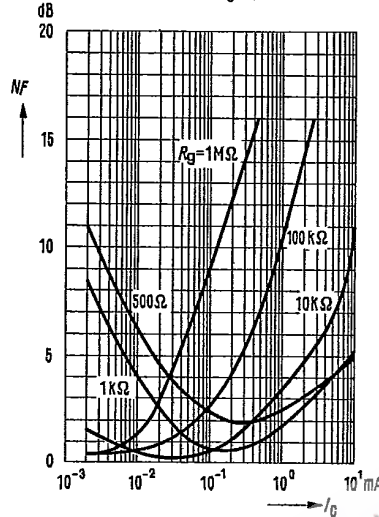
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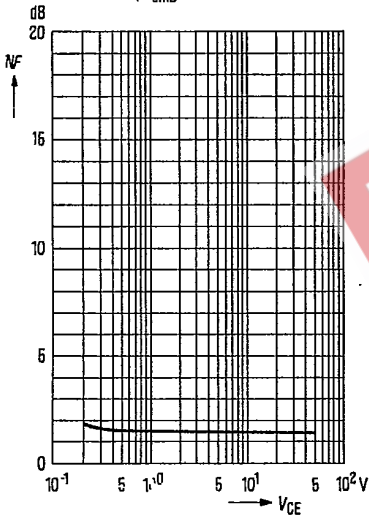
Noise figure  $NF = f(I_C)$   
 $V_{CE} = 5 \text{ V}; f = 1 \text{ kHz}; R_G = \text{parameter}$



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



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



Noise figure  $NF = f(f)$   
 $V_{CE} = 5 \text{ V}; I_C = 0.2 \text{ mA}$   
 $R_G = 2 \text{ k}\Omega; T_{amb} = 26^\circ\text{C}$

