

# Silicon NPN Transistor

## **BC147**

50V / 100mA

# DATASHEET

OEM – Telefunken

Source: Telefunken Databook 1972/73

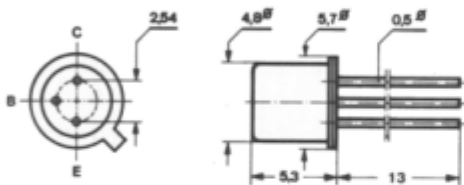
## BC 107 · BC 108 · BC 109 · BC 147 · BC 148 · BC 149

**Silizium-NPN-Epitaxial-Planar-Transistoren für NF-Vor- und Treiberstufen, BC 109 und BC 149 besonders für rauscharme Vorstufen. Die Transistoren BC 107, BC 108, BC 109 sind komplementär zu BC 177, BC 178, BC 179.**

Silicon NPN epitaxial planar transistors for AF input stages and driver stages, BC 109, and BC 149 especially for low noise input stages. The transistors BC 107, BC 108, BC 109 are complementary to BC 177, BC 178, BC 179.

### Abmessungen · Dimensions

Maße in mm · M 2:1



**BC 107, BC 108, BC 109**

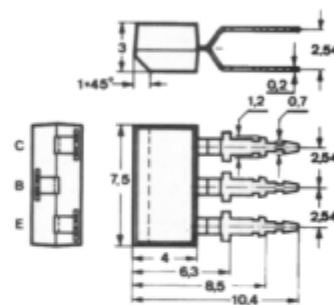
Normgehäuse

DIN 18 A 3

JEDEC TO 18

Kollektor mit Gehäuse verbunden

Collector is connected to case



**BC 147, BC 148, BC 149**

Kunststoffgehäuse

≈ SOT 25

Gewicht · Weight

max. 0.2 g

### Absolute Grenzdaten · Absolute maximum ratings

		BC 107	BC 108	BC 109	
		BC 147	BC 148	BC 149	
Kollektor-Basis-Sperrspannung	$U_{CBO}$	50	30	30	V
Kollektor-Emitter-Sperrspannung	$U_{CEO}$	45	20	20	V
Emitter-Basis-Sperrspannung	$U_{EBO}$	6	5	5	V
Kollektorstrom	$I_C$	100	100	100	mA
Kollektorspitzenstrom	$I_{CM}$	200	200	200	mA
Basisstrom	$I_B$	50	50	50	mA

### Gesamtverlustleistung

$t_{amb} \leq 25^\circ C$  **BC 107, BC 108, BC 109**  $P_{tot}$  300 mW

$t_{amb} \leq 50^\circ C$  **BC 147, BC 148, BC 149**  $P_{tot}$  300 mW

### Sperrschichttemperatur

**BC 107, BC 108, BC 109**  $t_j$  175  $^\circ C$

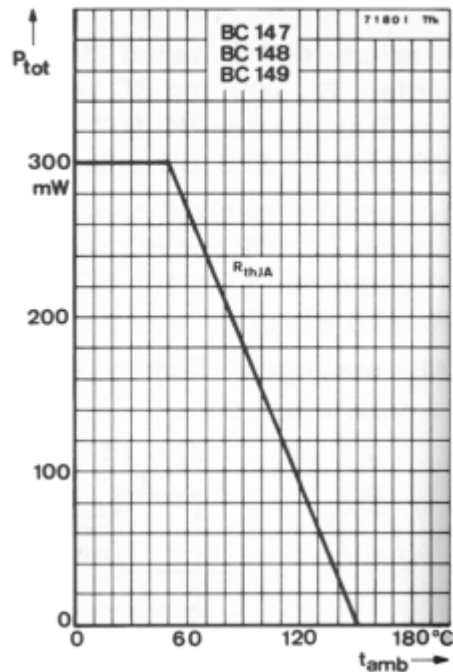
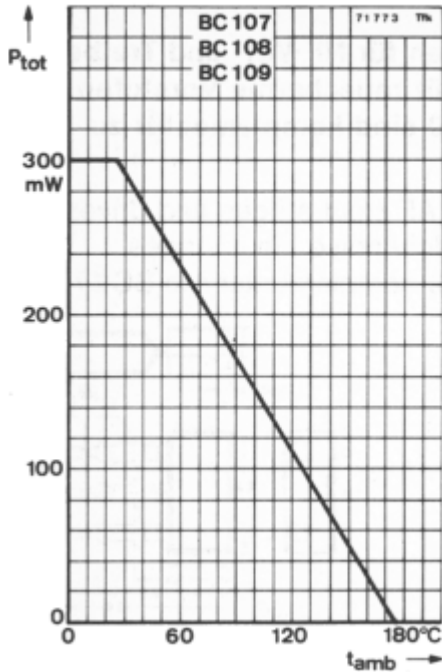
**BC 147, BC 148, BC 149**  $t_j$  150  $^\circ C$

### Lagerungstemperatur

**BC 107, BC 108, BC 109**  $t_{stg}$  -55...+175  $^\circ C$

**BC 147, BC 148, BC 149**  $t_{stg}$  -55...+150  $^\circ C$

**BC 107 · BC 108 · BC 109 · BC 147 · BC 148 · BC 149**



**Wärmewiderstände · Thermal resistances**

Sperrschicht-Umgebung

**BC 107, BC 108, BC 109**  $R_{thJA}$

500 °C/W

**BC 147, BC 148, BC 149**  $R_{thJA}$

330 °C/W

Sperrschicht-Gehäuse

**BC 107, BC 108, BC 109**  $R_{thJC}$

200 °C/W

Min. Typ. Max.

**Statische Kenngrößen · DC characteristics**

Umgebungstemperatur  $t_{amb} = 25^\circ\text{C}$ , falls nicht anders angegeben

Kollektorreststrom

$U_{CB} = 20\text{ V}, t_{amb} = 150^\circ\text{C}$

**BC 107, BC 108, BC 109**  $I_{CBO}$

15  $\mu\text{A}$

$U_{CB} = 20\text{ V}, t_{amb} = 125^\circ\text{C}$

**BC 147, BC 148, BC 149**  $I_{CBO}$

5  $\mu\text{A}$

Kollektor-Emitter-Durchbruchspannung

$I_C = 2\text{ mA}$  **BC 107, BC 147**  $U_{(BR)CEO}^{1)}$

45

V

**BC 108, BC 109, BC 148, BC 149**  $U_{(BR)CEO}^{1)}$

20

V

Emitter-Basis-Durchbruchspannung

$I_E = 1\ \mu\text{A}$  **BC 107, BC 147**  $U_{(BR)EBO}$

6

V

**BC 108, BC 109, BC 148, BC 149**  $U_{(BR)EBO}$

5

V

1)  $t_p = 0,01, t_p = 0,3\text{ ms}$

## BC 107 · BC 108 · BC 109 · BC 147 · BC 148 · BC 149

		Min.	Typ.	Max.
<b>Kollektor-Sättigungsspannung</b>				
$I_C = 10 \text{ mA}, I_B = 0,5 \text{ mA}$	$U_{CEsat}$		90	250 mV
$I_C = 10 \text{ mA}, (U_{CE} = 1 \text{ V}, I_C' = 11 \text{ mA})$	$U_{CEsat}^{2)}$		300	600 mV
$I_C = 100 \text{ mA}, I_B = 5 \text{ mA}$	$U_{CEsat}^{1)}$		200	mV
<b>Basis-Sättigungsspannung</b>				
$I_C = 10 \text{ mA}, I_B = 0,5 \text{ mA}$	$U_{BEsat}$		700	mV
$I_C = 100 \text{ mA}, I_B = 5 \text{ mA}$	$U_{BEsat}^{1)}$		900	mV
<b>Basis-Emitterspannung</b>				
$U_{CE} = 5 \text{ V}, I_C = 0,1 \text{ mA}$	$U_{BE}$		550	mV
$U_{CE} = 5 \text{ V}, I_C = 2 \text{ mA}$	$U_{BE}$		620	700 mV
$U_{CE} = 5 \text{ V}, I_C = 10 \text{ mA}$	$U_{BE}$		675	mV
<b>Kollektor-Basis-Gleichstromverhältnis</b>				
$U_{CE} = 5 \text{ V}, I_C = 10 \mu\text{A}$				
<b>Gruppe A:</b>	<b>BC 107, BC 108</b>			
	<b>BC 147, BC 148</b>	$h_{FE}$	90	
<b>Gruppe B:</b>	<b>BC 107, BC 108, BC 109</b>			
	<b>BC 147, BC 148, BC 149</b>	$h_{FE}$	40	150
<b>Gruppe C:</b>	<b>BC 108, BC 109</b>			
	<b>BC 148, BC 149</b>	$h_{FE}$	100	270
$U_{CE} = 5 \text{ V}, I_C = 2 \text{ mA}$				
<b>Gruppe A:</b>	<b>BC 107, BC 108</b>			
	<b>BC 147, BC 148</b>	$h_{FE}$	180	
<b>Gruppe B:</b>	<b>BC 107, BC 108, BC 109</b>			
	<b>BC 147, BC 148, BC 149</b>	$h_{FE}$	290	
<b>Gruppe C:</b>	<b>BC 108, BC 109</b>			
	<b>BC 148, BC 149</b>	$h_{FE}$	520	

### Dynamische Kenngrößen · AC characteristics

Umgebungstemperatur  $t_{amb} = 25^\circ \text{C}$

Transitfrequenz

$U_{CE} = 5 \text{ V}, I_C = 0,5 \text{ mA}, f = 30 \text{ MHz}$   $f_T$  85 MHz

$U_{CE} = 5 \text{ V}, I_C = 10 \text{ mA}, f = 100 \text{ MHz}$   $f_T$  300 MHz

Kollektor-Basis-Kapazität

$U_{CB} = 10 \text{ V}, f = 1 \text{ MHz}$   $C_{CBO}$  2,5 4,5 pF

1)  $\frac{t_p}{T} = 0,01, I_p = 0,3 \text{ mA}$

2) siehe Seite  
see page A 67

## BC 107 · BC 108 · BC 109 · BC 147 · BC 148 · BC 149

		Min.	Typ.	Max.	
Rauschmaß					
$U_{CE} = 5\text{ V}, I_C = 200\ \mu\text{A}, R_G = 2\text{ k}\Omega,$					
$f = 1\text{ kHz}, \Delta f = 200\text{ Hz}$					
<b>BC 107, BC 108, BC 147, BC 148</b>	F		3	10	dB
<b>BC 109, BC 149</b>	F			4	dB
$U_{CE} = 5\text{ V}, I_C = 200\ \mu\text{A}, R_G = 2\text{ k}\Omega,$					
$f = 30\text{ Hz} \dots 15\text{ kHz}$					
<b>BC 109, BC 149</b>	F			4	dB
Kurzschluß-Stromverstärkung					
$U_{CE} = 5\text{ V}, I_C = 2\text{ mA}, f = 1\text{ kHz}$					
<b>Gruppe A:</b>					
<b>BC 107, BC 108</b>					
<b>BC 147, BC 148</b>	$h_{fe}$	125	220	260	
<b>Gruppe B:</b>					
<b>BC 107, BC 108, BC 109</b>					
<b>BC 147, BC 148, BC 149</b>	$h_{fe}$	240	330	500	
<b>Gruppe C:</b>					
<b>BC 108, BC 109</b>					
<b>BC 148, BC 149</b>	$h_{fe}$	450	600	900	

### Vierpol Kenngrößen · Two port characteristics

Umgebungstemperatur  $t_{amb} = 25^\circ\text{C}$

#### Emitterschaltung

$U_{CE} = 5\text{ V}, I_C = 2\text{ mA}, f = 1\text{ kHz}$

Kurzschluß-Eingangswiderstand

<b>Gruppe A</b>	$h_{ie}$	1,6	2,7	4,5	k $\Omega$
<b>B</b>	$h_{ie}$	3,2	4,5	8,5	k $\Omega$
<b>C</b>	$h_{ie}$	6	8,7	15	k $\Omega$

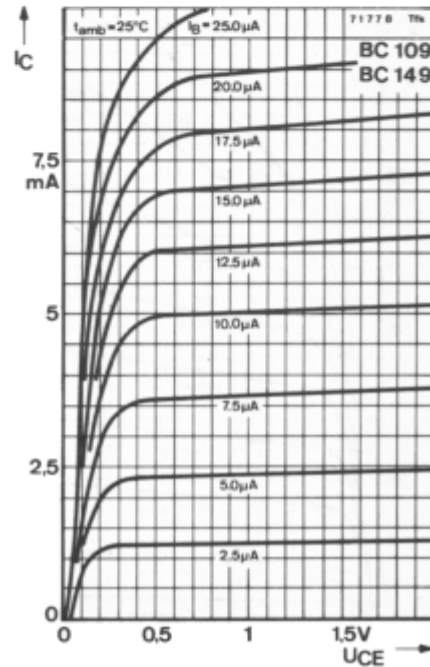
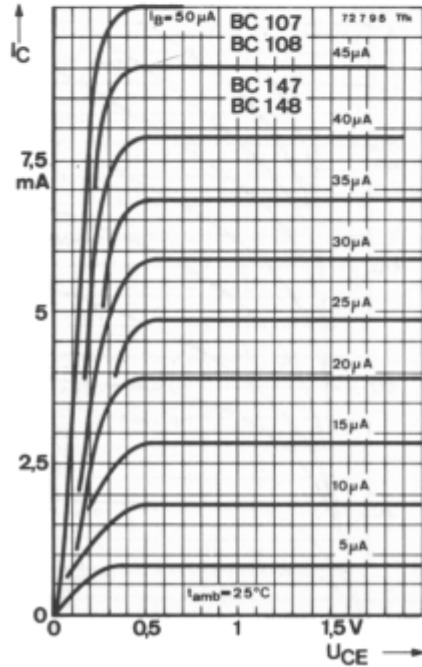
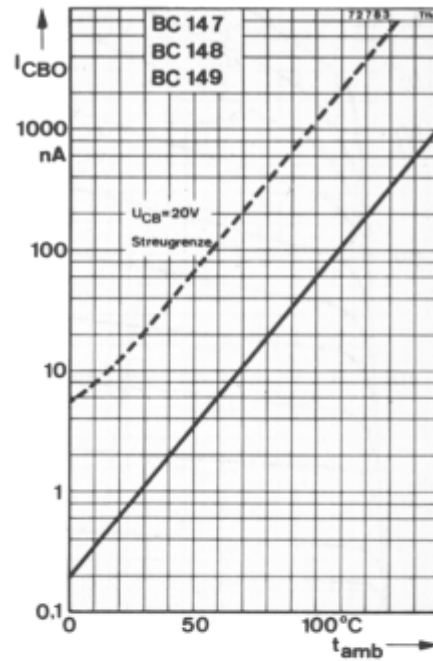
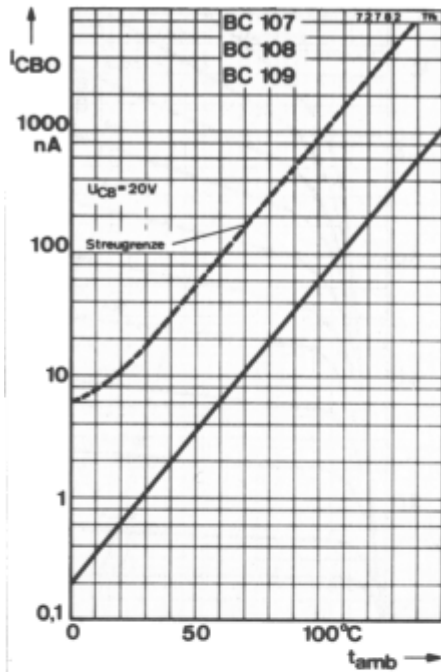
Leerlauf-Spannungsrückwirkung

<b>Gruppe A</b>	$h_{re}$	$1,5 \cdot 10^{-4}$			
<b>B</b>	$h_{re}$	$2 \cdot 10^{-4}$			
<b>C</b>	$h_{re}$	$3 \cdot 10^{-4}$			

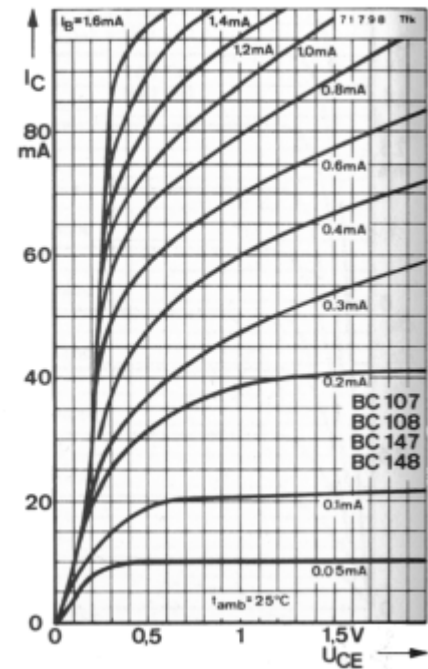
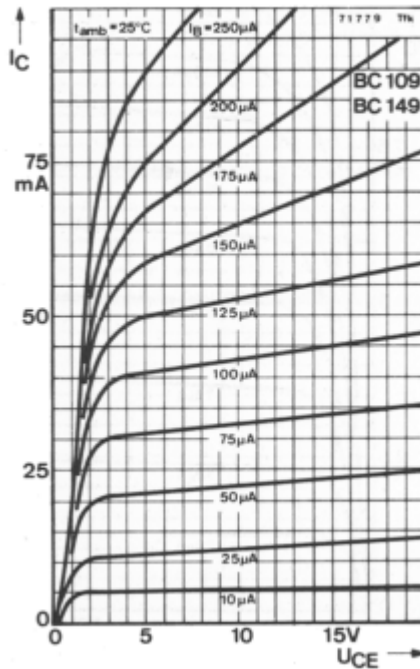
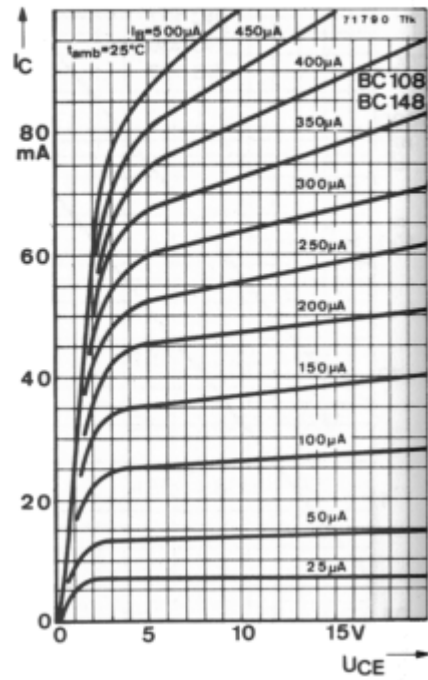
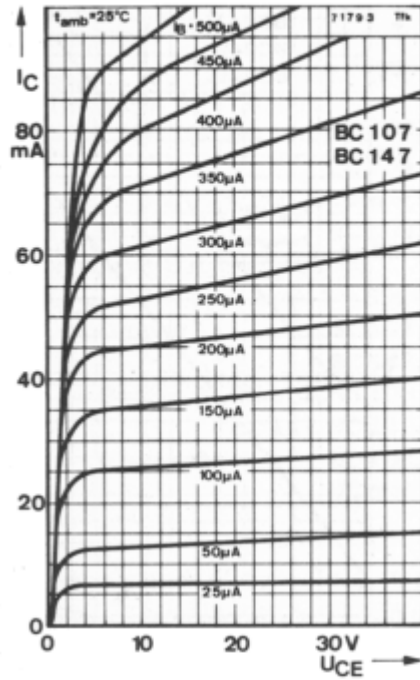
Leerlauf-Ausgangsleitwert

<b>Gruppe A</b>	$h_{oe}$	18			$\mu\text{S}$
<b>B</b>	$h_{oe}$	30			$\mu\text{S}$
<b>C</b>	$h_{oe}$	60			$\mu\text{S}$

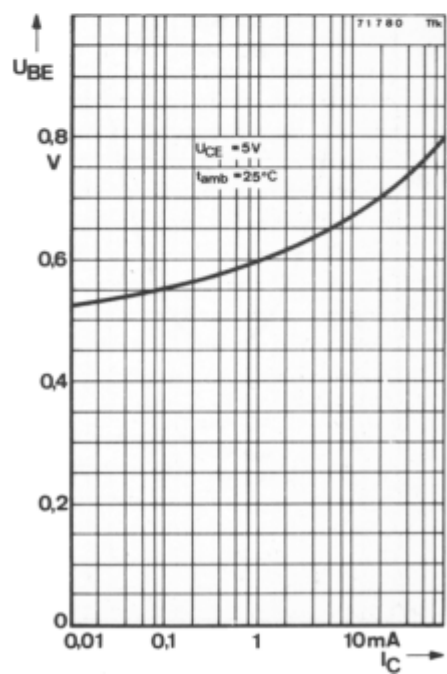
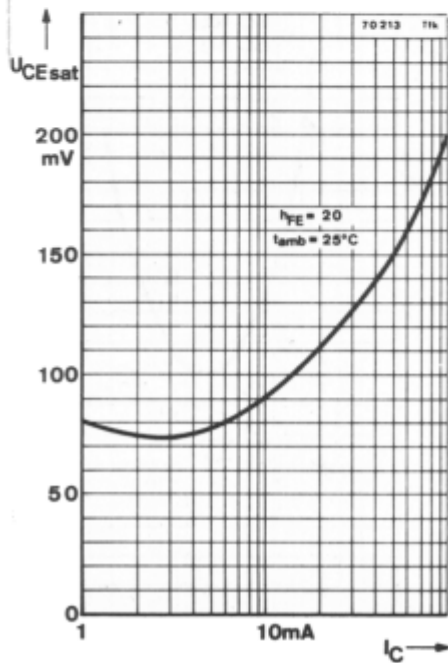
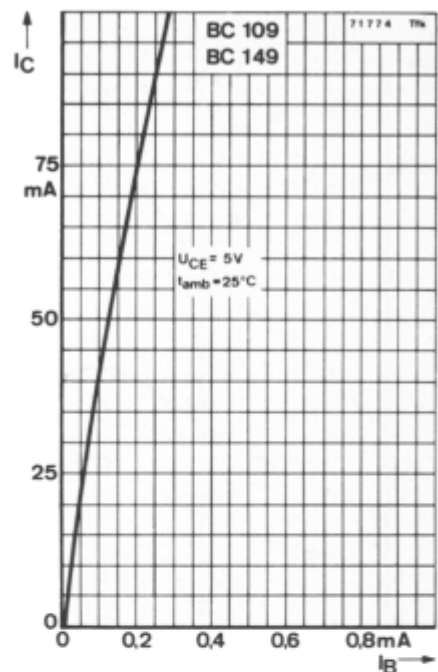
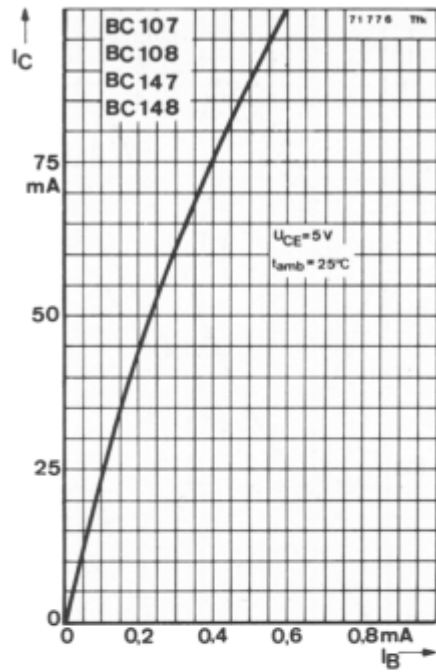
**BC 107 · BC 108 · BC 109 · BC 147 · BC 148 · BC 149**



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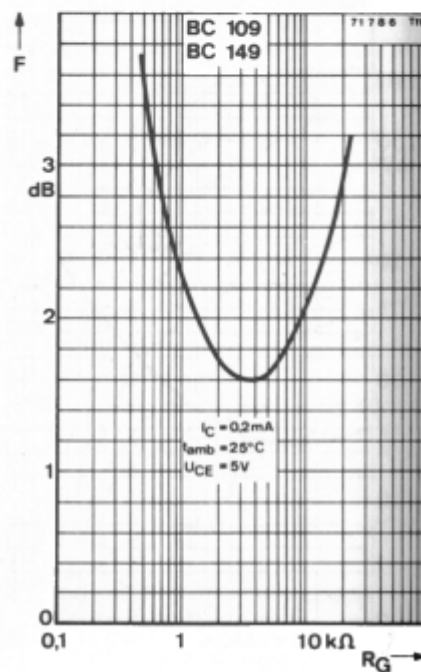
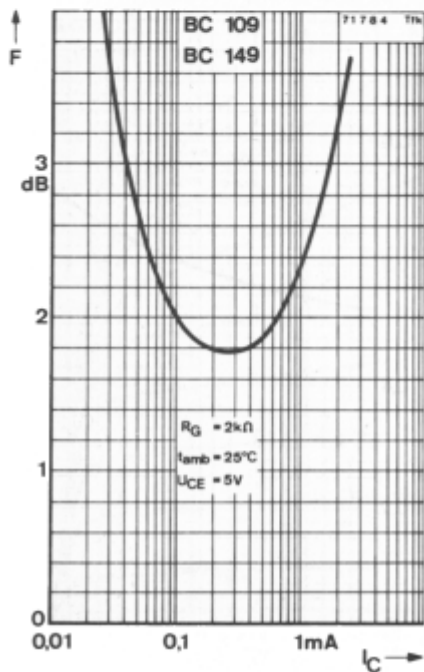
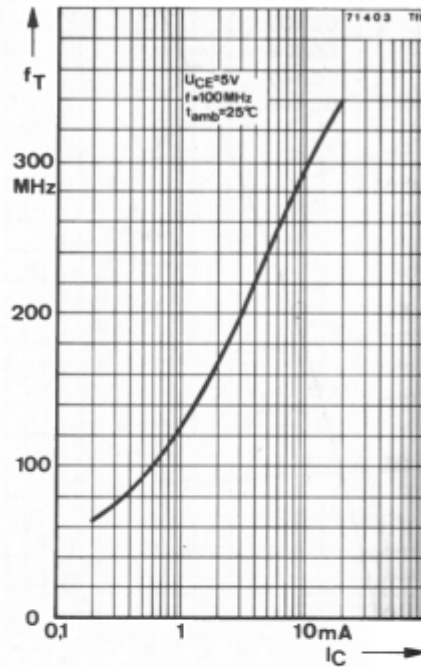
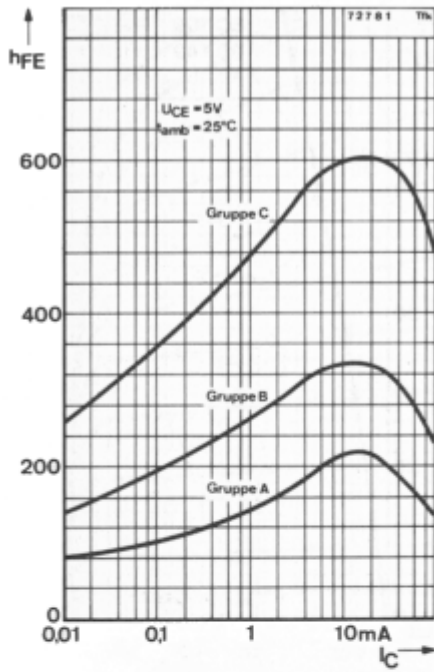


**BC 107 · BC 108 · BC 109 · BC 147 · BC 148 · BC 149**





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**BC 107 · BC 108 · BC 109 · BC 147 · BC 148 · BC 149**

