

Silicon NPN Transistor

BC239

30V / 100mA

DATASHEET

OEM – Telefunken

Source: Telefunken Databook 1972/73

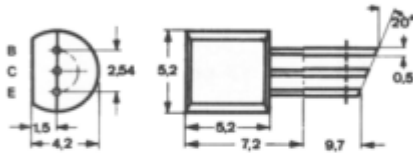
BC 167 · BC 168 · BC 169 · BC 237 · BC 238 · BC 239

Silizium-NPN-Epitaxial-Planar-Transistoren für NF-Vor- und Treiberstufen. BC 169 und BC 239 für rauscharme Vorstufen. Die Transistoren BC 237, BC 238, BC 239 sind komplementär zu BC 307, BC 308, BC 309.

Silicon NPN epitaxial planar transistors for AF input stages and driver stages, BC 169 and BC 239 for low noise input stages. The transistors BC 237, BC 238, BC 239 are complementary to BC 307, BC 308, BC 309.

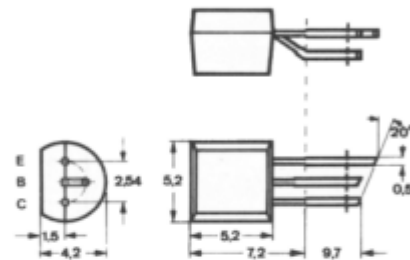
Abmessungen · Dimensions

Maße in mm
M 2:1



BC 167, BC 168, BC 169

Kunststoffgehäuse
JEDEC TO 92
Gewicht · Weight
max. 0,2 g

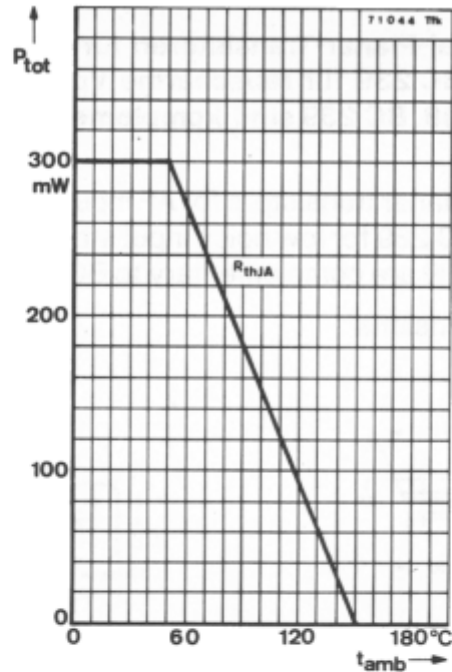


BC 237, BC 238, BC 239

Kunststoffgehäuse
≈ JEDEC TO 92
Gewicht · Weight
max. 0,2 g

Absolute Grenzdaten · Absolute maximum ratings

		BC 167	BC 168	BC 169	
		BC 237	BC 238	BC 239	
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 $t_{amb} \leq 50^\circ C$	P_{tot}	300	300	300	mW
Sperrschichttemperatur	t_j	150	150	150	$^\circ C$
Lagerungstemperatur	t_{stg}	-55...+150			$^\circ C$

BC 167 · BC 168 · BC 169 BC 237 · BC 238 · BC 239

Min. Typ. Max.

Wärmewiderstand · Thermal resistance

Sperrschicht-Umgebung

 R_{thJA}

330 °C/W

Statische Kenngrößen · DC characteristicsUmgebungstemperatur $t_{amb} = 25^\circ\text{C}$, falls nicht anders angegeben

Kollektorruhestrom

 $U_{CB} = 20\text{ V}$, $t_{amb} = 125^\circ\text{C}$ I_{CBO} 5 μA

Kollektor-Emitter-Durchbruchspannung

 $I_C = 2\text{ mA}$ **BC 167, BC 237** $U_{(BR)CEO}^{1)}$

45

V

BC 168, BC 169, BC 238, BC 239 $U_{(BR)CEO}^{1)}$

20

V

Emitter-Basis-Durchbruchspannung

 $I_E = 1\ \mu\text{A}$ **BC 167, BC 237** $U_{(BR)EBO}$

6

V

BC 168, BC 169, BC 238, BC 239 $U_{(BR)EBO}$

5

V

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

BC 167 · BC 168 · BC 169 · BC 237 · BC 238 · BC 239

		Min.	Typ.	Max.
Kollektor-Sättigungsspannung				
$I_C = 10 \text{ mA}, I_B = 0,5 \text{ mA}$	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
Basis-Sättigungsspannung				
$I_C = 10 \text{ mA}, I_B = 0,5 \text{ mA}$	U_{BEsat}		700	mV
$I_C = 100 \text{ mA}, I_B = 5 \text{ mA}$	$U_{BEsat}^{1)}$		900	mV
Basis-Emitterspannung				
$U_{CE} = 5 \text{ V}, I_C = 0,1 \text{ mA}$	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
Kollektor-Basis-Gleichstromverhältnis				
$U_{CE} = 5 \text{ V}, I_C = 10 \mu\text{A}$				
Gruppe A:	BC 167, BC 168			
	BC 237, BC 238	h_{FE}	90	
Gruppe B:	BC 167, BC 168, BC 169			
	BC 237, BC 238, BC 239	h_{FE}	40	150
Gruppe C:	BC 168, BC 169			
	BC 238, BC 239	h_{FE}	100	270
$U_{CE} = 5 \text{ V}, I_C = 2 \text{ mA}$				
Gruppe A:	BC 167, BC 168			
	BC 237, BC 238	h_{FE}	180	
Gruppe B:	BC 167, BC 168, BC 169			
	BC 237, BC 238, BC 239	h_{FE}	290	
Gruppe C:	BC 168, BC 169			
	BC 238, BC 239	h_{FE}	520	

Dynamische Kenngrößen · AC characteristicsUmgebungstemperatur $t_{amb} = 25^\circ \text{C}$

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) $t_p = 0,01, t_p = 0,3 \text{ ms}$ 2) siehe Seite A 67
see page

BC 167 · BC 168 · BC 169 · BC 237 · BC 238 · BC 239

		Min.	Typ.	Max.	
Rauschmaß					
$U_{CE} = 5\text{ V}, I_C = 200\ \mu\text{A}, R_G = 2\ \text{k}\Omega,$					
$f = 1\ \text{kHz}, \Delta f = 200\ \text{Hz}$					
BC 167, BC 168, BC 237, BC 238	F		3	10	dB
BC 169, BC 239	F			4	dB
$U_{CE} = 5\text{ V}, I_C = 200\ \mu\text{A}, R_G = 2\ \text{k}\Omega,$					
$f = 30\ \text{Hz} \dots 15\ \text{kHz}$					
BC 169, BC 239	F			4	dB
Kurzschluß-Stromverstärkung					
$U_{CE} = 5\text{ V}, I_C = 2\ \text{mA}, f = 1\ \text{kHz}$					
Gruppe A:					
BC 167, BC 168					
BC 237, BC 238	h_{fe}	125	220	260	
Gruppe B:					
BC 167, BC 168, BC 169					
BC 237, BC 238, BC 239	h_{fe}	240	330	500	
Gruppe C:					
BC 168, BC 169					
BC 238, BC 239	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

Gruppe A	h_{ie}	1,6	2,7	4,5	k Ω
Gruppe B	h_{ie}	3,2	4,5	8,5	k Ω
Gruppe C	h_{ie}	6	8,7	15	k Ω

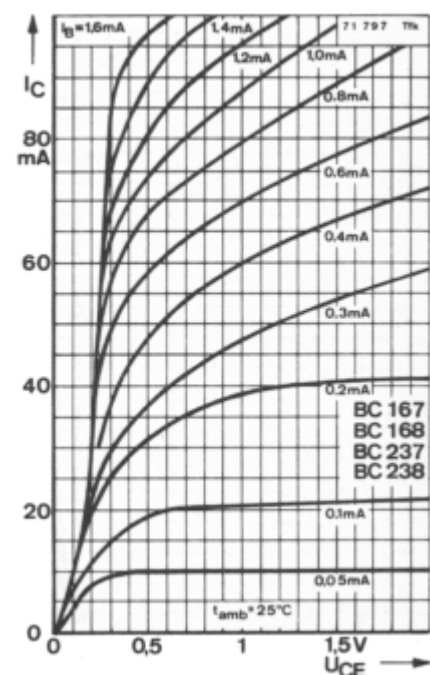
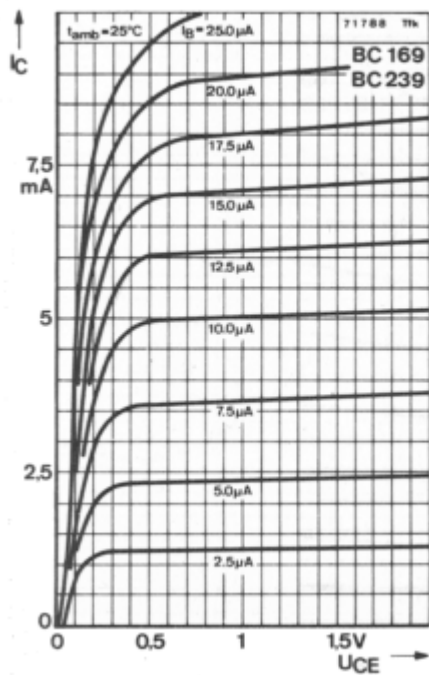
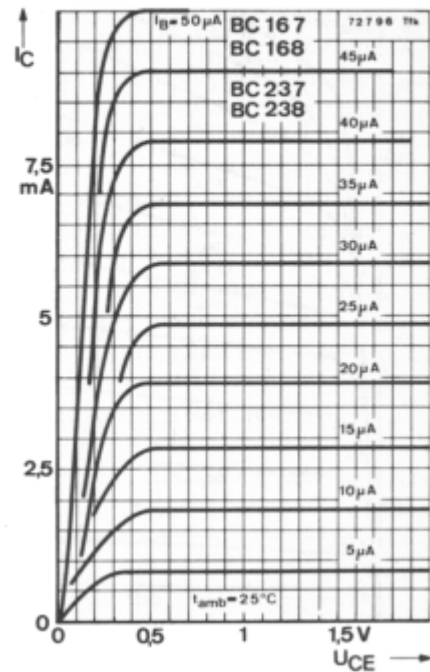
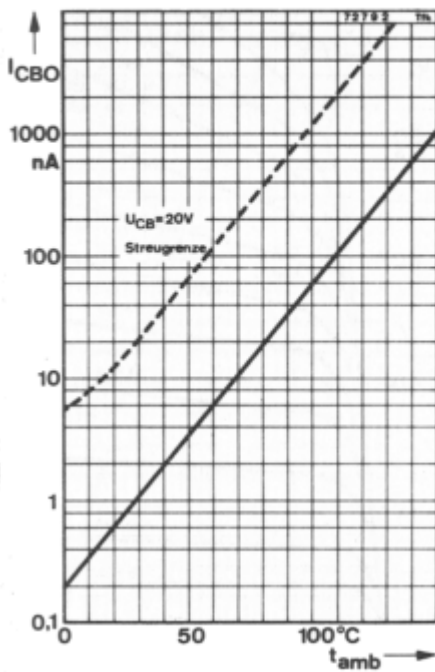
Leerlauf-Spannungsrückwirkung

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

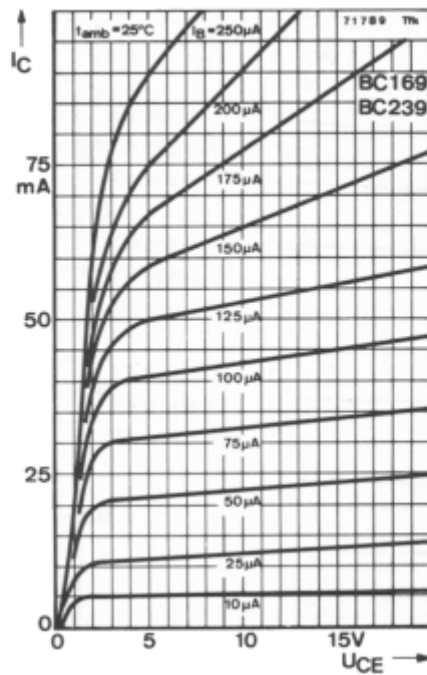
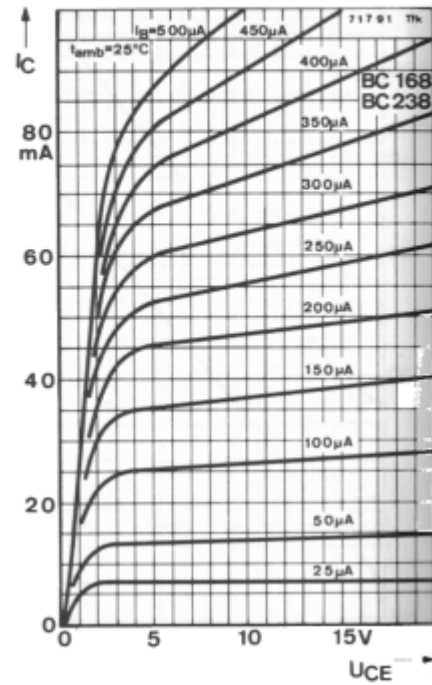
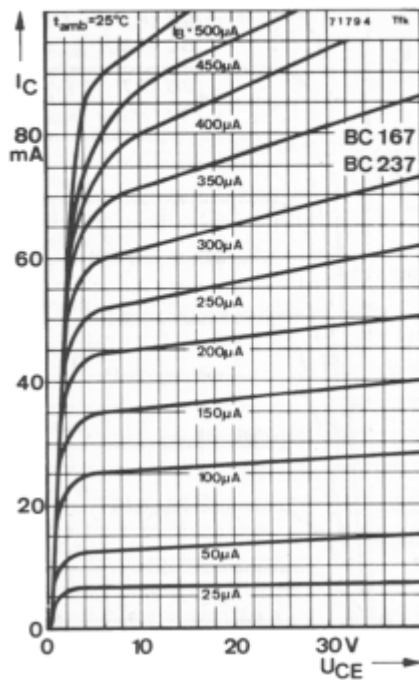
Leerlauf-Ausgangsleitwert

Gruppe A	h_{oe}		18		μS
Gruppe B	h_{oe}		30		μS
Gruppe C	h_{oe}		60		μS

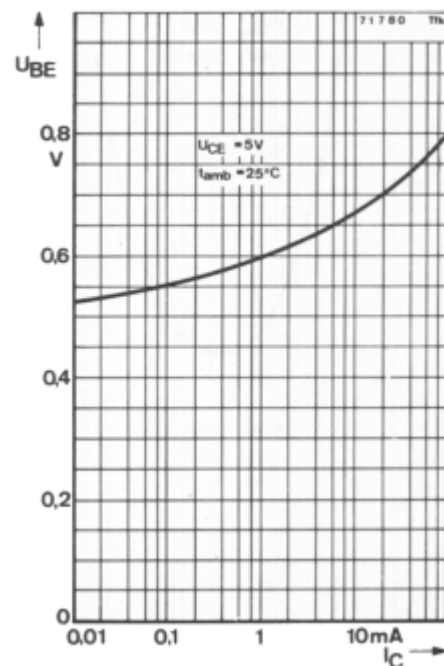
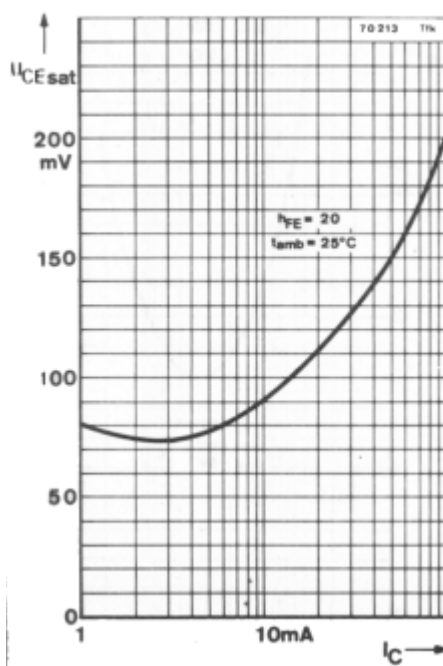
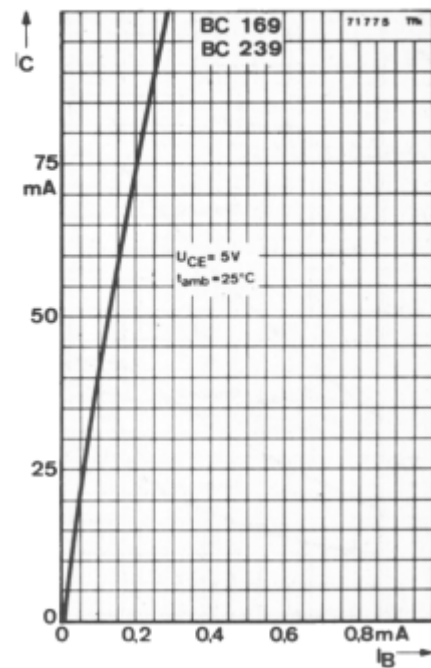
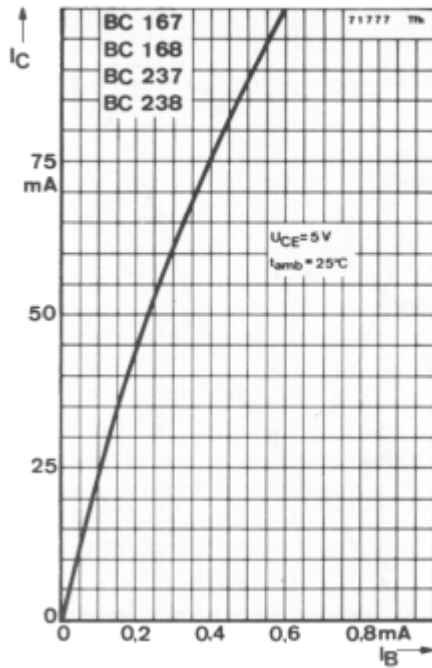
BC 167 · BC 168 · BC 169 · BC 237 · BC 238 · BC 239



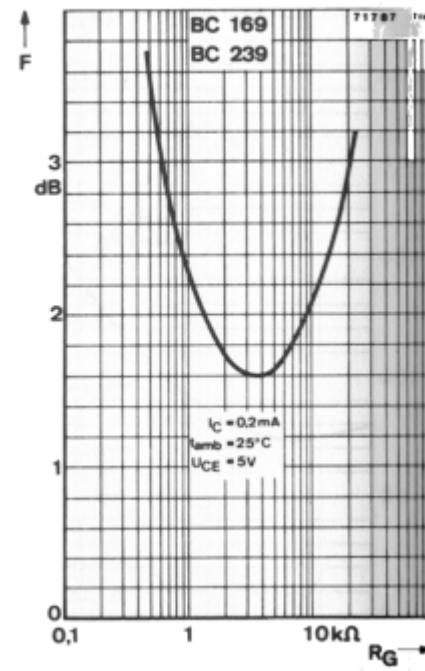
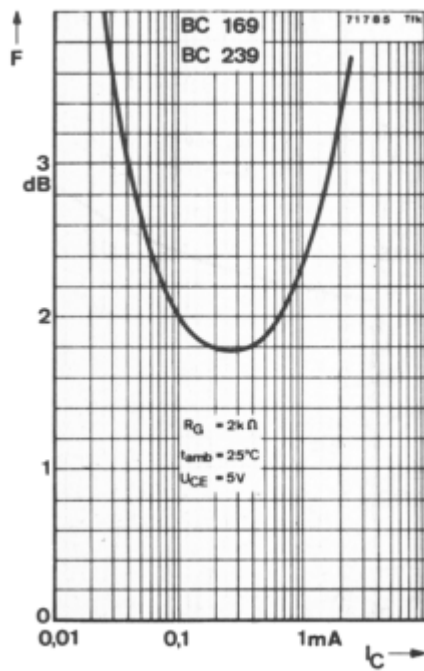
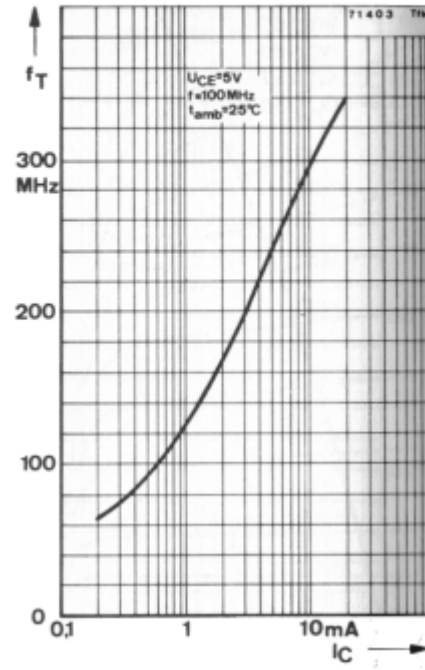
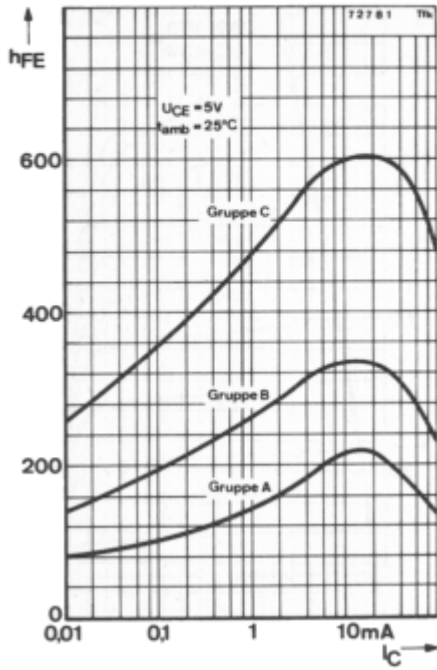
BC 167 · BC 168 · BC 169 · BC 237 · BC 238 · BC 239



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