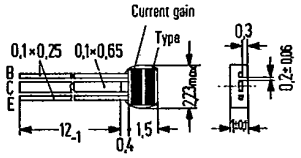
PNP Silicon Transistors

SIEMENS AKTIENGESELLSCHAF

BC 201
BC 202
BC 203

BC 201, BC 202, and BC 203 are epitaxial PNP silicon planar transistors of miniature design in U 32 plastic package. The types are marked by a green (BC 201), blue (BC 202), and grey (BC 203) color line on the case. The transistors are particularly intended for use in low noise AF amplifiers and as complementary transistors to BC 121, BC 122, and BC 123.

Type	Ordering code
BC 201[1]	Q62702-C149
BC 201 white	Q62702-C167
BC 201 yellow	Q62702-C168
BC 201 green	Q62702-C310
BC 201 blue	Q62702-C170
BC 202[1]	Q62702-C150
BC 202 white	Q62702-C172
BC 202 yellow	Q62702-C173
BC 202 green	Q62702-C361-X1
BC 202 blue	Q62702-C175
BC 203[1]	Q62702-C151
BC 203 white	Q62702-C177
BC 203 yellow	Q62702-C178
BC 203 green	Q62702-C362



Approx. weight 20 g

Dimensions in mm

Maximum ratings		BC 201	BC 202	BC 203	
Collector-emitter voltage	$-V_{CEO}$	5	20	30	V
Collector-base voltage	$-V_{CBO}$	5	30	45	V
Emitter-base voltage	$-V_{EBO}$	5	5	5	V
Collector current	$-I_C$	75	75	75	mA
Emitter current	I_E	85	85	85	mA
Base current	$-I_B$	10	10	10	mA
Junction temperature	T_j	150	150	150	°C
Storage temperature range	T_{stg}		−55 to +125		°C
Total power dissipation [lead length "L" = 2 mm; see diagram $R_{th} = f(L)$]	P_{tot}	250	250	250	mW
Thermal resistance					
see diagram[2] $R_{th} = f(L)$	R_{thJA}	<1000	<1000	<1000	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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Static characteristics (T_{amb} = 25 °C)

The transistors are grouped according to their small-signal current gain h_{fe}, and are marked with a color line. At a collector-emitter voltage of V_{CE} = 2 V and the collector currents stated below the following static characteristics apply.

h_{fe} group	white	yellow	green	blue	
Type	**BC 201** **BC 202** **BC 203**	**BC 201** **BC 202** **BC 203**	**BC 201** **BC 202** **BC 203**	**BC 201** **BC 202** **BC 203**	**BC 201** **BC 202** **BC 203**
$-I_C$ mA	h_{fe} I_C/I_B	h_{fe} I_C/I_B	h_{fe} I_C/I_B	h_{fe} I_C/I_B	$-V_{BE}$ V
0.25	100	175	290	520	0.58 (0.52 to 0.68)

Static characteristics (T_{amb} = 25 °C)

Saturation voltages	$-V_{CEsat}$	$-V_{BEsat}$	
($-I_C$ = 10 mA; $-I_B$ = 0.5 mA)	0.1 (<0.2)	0.7 (<0.8)	V
($-I_C$ = 50 mA; $-I_B$ = 2.5 mA)	0.18 (<0.35)	0.8 (<0.92)	V

		BC 201	**BC 202**	**BC 203**	
Collector cutoff current ($-V_{CB}$ = 2 V)	$-I_{CBO}$	2 (<100)	–	–	nA
Collector cutoff current ($-V_{CB}$ = 15 V)	$-I_{CBO}$	–	2 (<100)	–	nA
Collector cutoff current ($-V_{CB}$ = 25 V)	$-I_{CBO}$	–	–	2 (<100)	nA
Collector-emitter breakdown voltage ($-I_{CE}$ = 100 µA)	$-V_{(BR)CEO}$	5	20	30	V
Collector-base breakdown voltage ($-I_{CB}$ = 100 µA)	$-V_{(BR)CBO}$	5	30	45	V
Emitter-base breakdown voltage ($-I_{EB}$ = 100 µA)	$-V_{(BR)EBO}$	5	5	5	V

Dynamic characteristics (T_{amb} = 25 °C)		BC 201	BC 202	BC 203	
Transition frequency ($-I_C$ = 10 mA; $-V_{CE}$ = 0.5 V)	f_T	80	80	80	MHz
Collector-base capacitance ($-V_{CBO}$ = 2 V; f = 1 MHz)	C_{CBO}	5.4 (<11)	–	–	pF
Collector-base capacitance ($-V_{CBO}$ = 10 V; f = 1 MHz)	C_{CBO}	–	3.5 (<7)	3.5 (<7)	pF
Noise figure ($-I_C$ = 200 µA; $-V_{CE}$ = 0.5 V; f = 1 kHz; Δf = 200 Hz; R_g = 2 kΩ)	NF	2.5 (<10)	2.5 (<10)	2.5 (<10)	dB

Current-gain groups

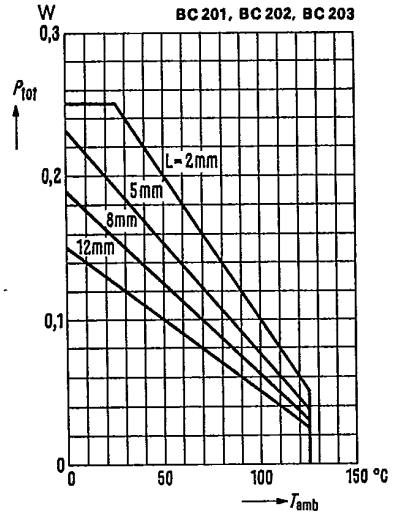
Transistors BC 201, BC 202, BC 203 are grouped according to their small signal current gain h_{fe}, and are marked with a color line on the case.

Operating point: $-V_{CE}$ = 0.5 V; $-I_C$ = 250 µA

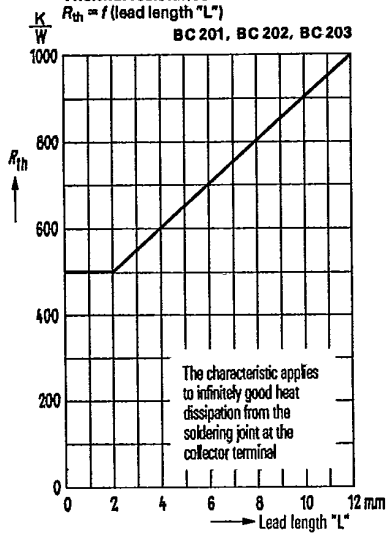
Color	white	yellow	green	blue
Type	**BC 201** **BC 202** **BC 203**	**BC 201** **BC 202** **BC 203**	**BC 201** **BC 202** **BC 203**	**BC 201** **BC 202** –
h_{fe} group	75 to 150	125 to 260	240 to 500	450 to 900

1604 C-03

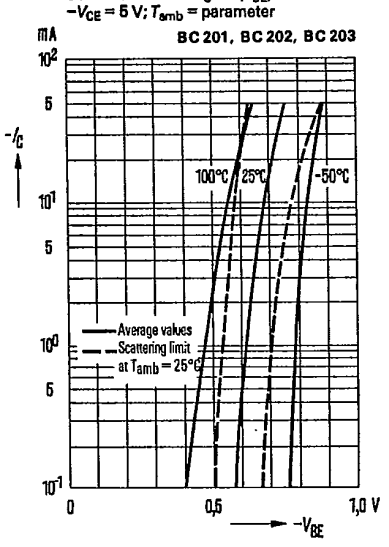
Total perm. power dissipation versus temperature $P_{tot} = f(T_{amb})$; parameter = lead length "L"



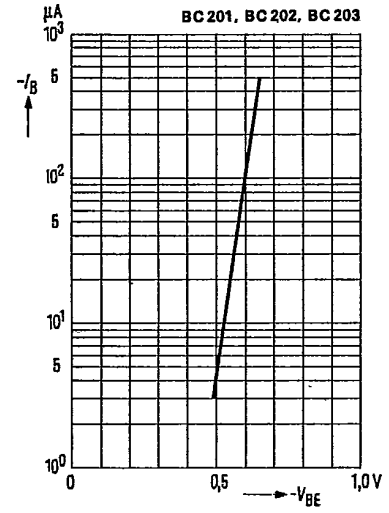
Thermal resistance $R_{th} = f$ (lead length "L")



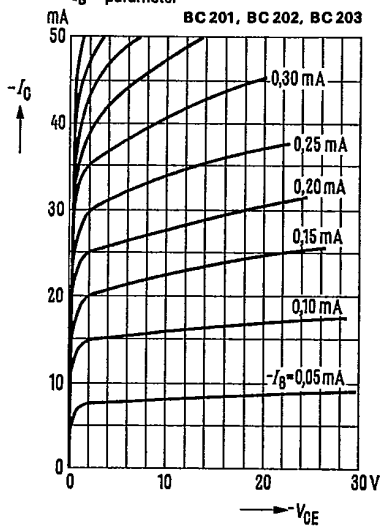
Collector current $I_C = f(V_{BE})$
$-V_{CE} = 5$ V; T_{amb} = parameter



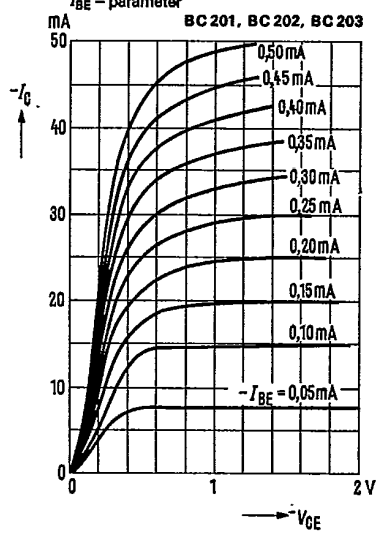
Input characteristic $I_B = f(V_{BE})$
$-V_{CE} = 5$ V; $T_{amb} = 25$°C)



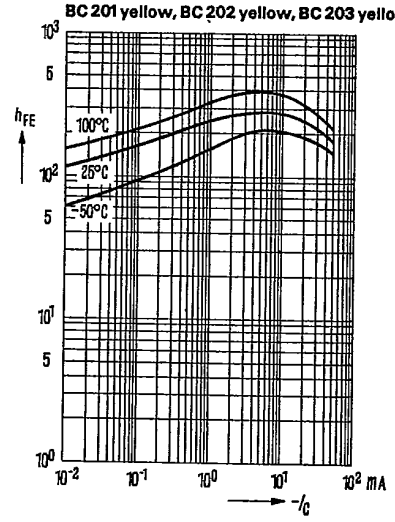
Output characteristics $I_C = f(V_{CE})$
I_B = parameter



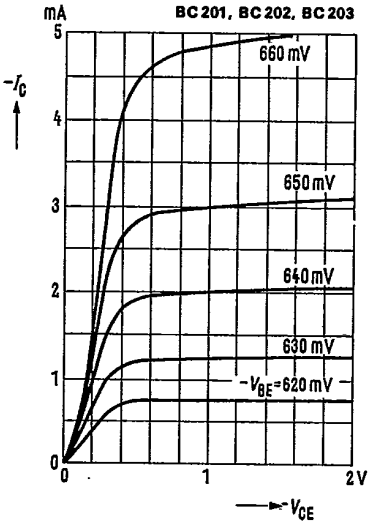
Output characteristics $I_C = f(V_{CE})$
I_{BE} = parameter



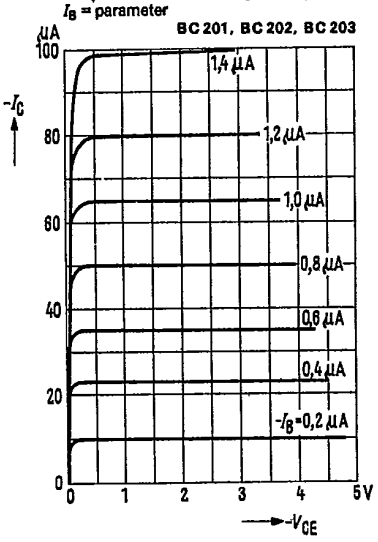
DC current gain $h_{FE} = f(I_C)$
$-V_{CE}$ = 2 V (characteristics based on average values)
BC 201 yellow, BC 202 yellow, BC 203 yellow



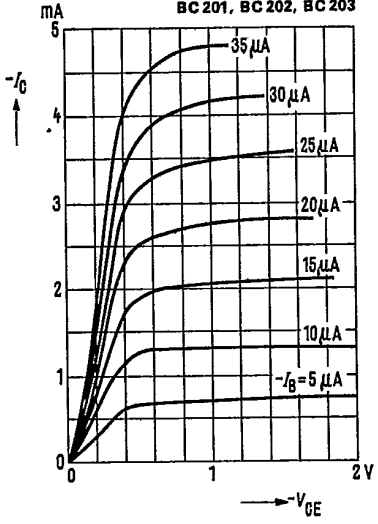
Output characteristics $I_C = f(V_{CE})$
V_{BE} = parameter



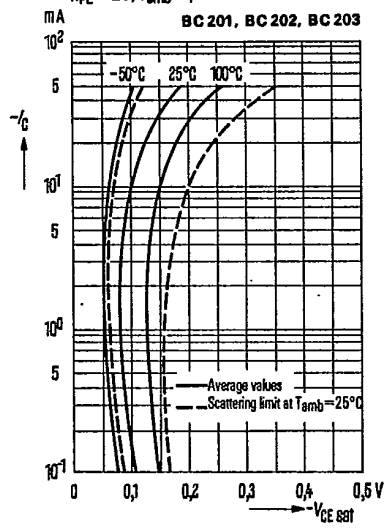
Output characteristics $I_C = f(V_{CE})$
I_B = parameter
BC 201, BC 202, BC 203



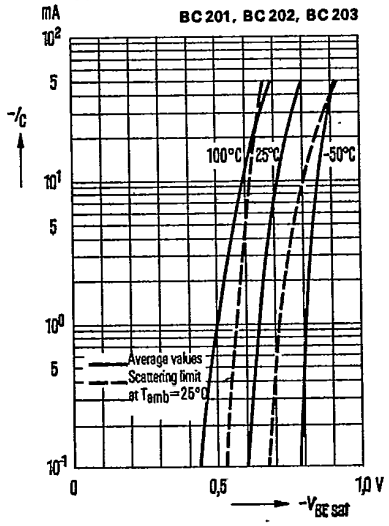
Output characteristics $I_C = f(V_{CE})$
I_B = parameter
BC 201, BC 202, BC 203



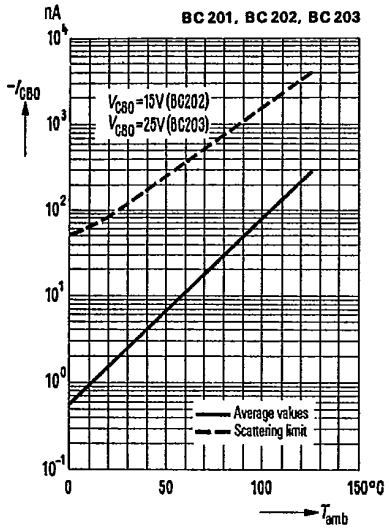
Collector-emitter saturation voltage
$V_{CEsat} = f(I_C)$
$h_{FE} = 20$; T_{amb} = parameter
BC 201, BC 202, BC 203



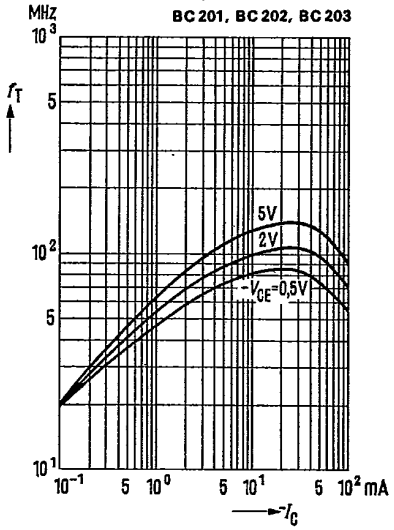
Base-emitter saturation voltage
$V_{BEsat} = f(I_C)$
$h_{FE} = 20$; T_{amb} = parameter
BC 201, BC 202, BC 203



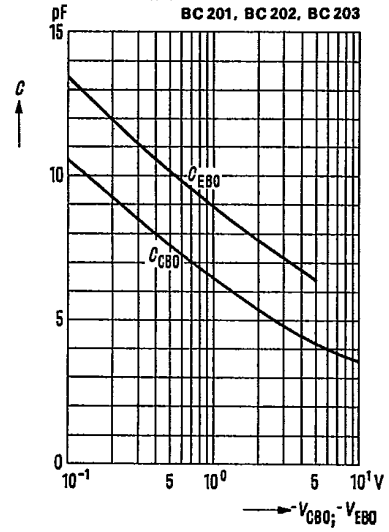
Collector cutoff current versus temperature
$I_{CBO} = f(T_{amb})$



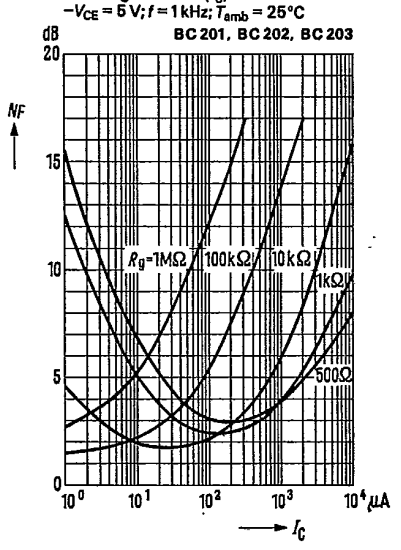
Transition frequency $f_T = f(I_C)$;
T_{amb} = 25°C; V_{CE} = parameter



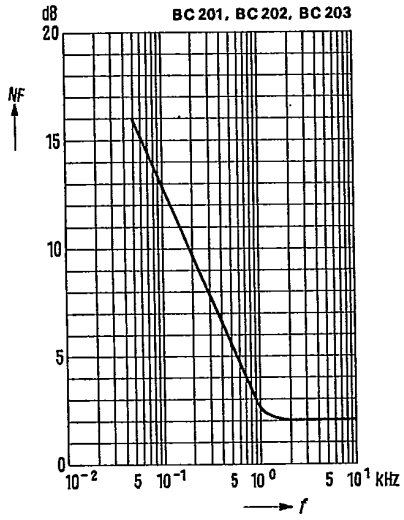
Collector-base capacitance
$C_{CBO} = f(V_{CBO})$
Emitter-base capacitance $C_{EBO} = f(V_{EBO})$
f = 1MHz; T_{amb} = 25°C



Noise figure $NF = f(I_C)$
$-V_{CE}$ = 5 V; f = 1 kHz; T_{amb} = 25°C



Noise figure $NF = f(f)$
$R_g = 2\,k\Omega$; $-V_{CE} = 5\,V$; $-I_C = 0.2\,mA$;
$T_{amb} = 25°C$



Noise figure $NF = f(V_{CE})$
$-I_C = 0.2\,mA$; $R_g = 2\,k\Omega$; $f = 1\,kHz$;
$T_{amb} = 25°C$