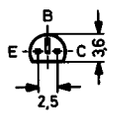
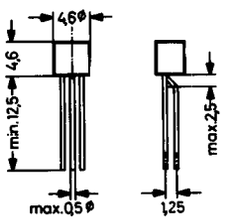
BC415, BC416

PNP Silicon Epitaxial Planar Transistors
for use in high-quality, low-noise AF and DC amplifiers. Complementary types are the NPN transistors BC413 and BC414.

These types are subdivided into three groups A, B and C, according to their DC current gain.





Plastic package ≈ JEDEC TO-92
TO-18 compatible
The case is impervious to light

Weight approximately 0.18 g
Dimensions in mm

Absolute Maximum Ratings

		Symbol	Value	Unit
Collector Base Voltage	**BC415**	$-V_{CBO}$	45	V
	BC416	$-V_{CBO}$	50	V
Collector Emitter Voltage	**BC415**	$-V_{CEO}$	30	V
	BC416	$-V_{CEO}$	45	V
Emitter Base Voltage		$-V_{EBO}$	5	V
Collector Current		$-I_C$	100	mA
Base Current		$-I_B$	20	mA
Power Dissipation at T_{amb} = 25 °C		P_{tot}	300[1)]	mW
Junction Temperature		T_j	150	°C
Storage Temperature Range		T_S	−65 . . . +150	°C

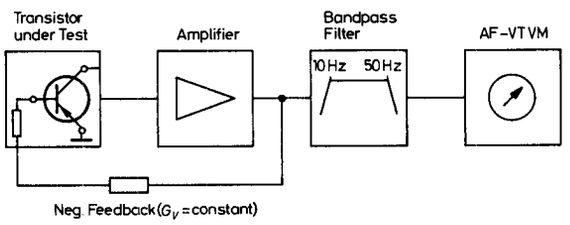
[1)] Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case

Characteristics at T_{amb} = 25 °C

		Symbol	Min.	Typ.	Max.	Unit
h-Parameters at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA, f = 1 kHz						
Small Signal Current Gain	**Current Gain Group A**	h_{fe}	125	220	260	–
	B	h_{fe}	240	330	500	–
	C	h_{fe}	450	600	900	–
Input Impedance	**Current Gain Group A**	h_{ie}	1.6	2.7	4.5	kΩ
	B	h_{ie}	3.2	4.5	8.5	kΩ
	C	h_{ie}	6	8.7	15	kΩ
Output Admittance	**Current Gain Group A**	h_{oe}	–	18	30	μS
	B	h_{oe}	–	30	60	μS
	C	h_{oe}	–	60	110	μS
Reverse Voltage Transfer Ratio	**Current Gain Group A**	h_{re}	–	$1.5 \cdot 10^{-4}$	–	–
	B	h_{re}	–	$2 \cdot 10^{-4}$	–	–
	C	h_{re}	–	$3 \cdot 10^{-4}$	–	–
DC Current Gain						
at $-V_{CE}$ = 5 V, $-I_C$ = 0.01 mA	**Current Gain Group A**	h_{FE}	40	90	–	–
	B	h_{FE}	100	150	–	–
	C	h_{FE}	100	270	–	–
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA	**Current Gain Group A**	h_{FE}	120	170	220	–
	B	h_{FE}	180	290	460	–
	C	h_{FE}	380	500	800	–
Thermal Resistance Junction to Ambient		R_{thA}	–	–	420[1)]	K/W
Collector Saturation Voltage						
at $-I_C$ = 10 mA, $-I_B$ = 0.5 mA		$-V_{CEsat}$	–	0.075	0.25	V
at $-I_C$ = 100 mA, $-I_B$ = 5 mA		$-V_{CEsat}$	–	0.25	0.6	V
Base Saturation Voltage at $-I_C$ = 100 mA, $-I_B$ = 5 mA		$-V_{BEsat}$	–	0.9	–	V
Base Emitter Voltage						
at $-V_{CE}$ = 5 V, $-I_C$ = 0.01 mA		$-V_{BE}$	–	0.52	–	V
at $-V_{CE}$ = 5 V, $-I_C$ = 0.1 mA		$-V_{BE}$	–	0.55	–	V
at $-V_{CE}$ = 5 V, $-I_C$ = 2 mA		$-V_{BE}$	0.55	0.65	0.75	V
Collector Cutoff Current						
at $-V_{CB}$ = 30 V		$-I_{CBO}$	–	–	15	nA
at $-V_{CB}$ = 30 V, T_A = 150 °C		$-I_{CBO}$	–	–	5	μA
Emitter Cutoff Current at $-V_{EB}$ = 4 V		$-I_{EBO}$	–	–	15	nA
Collector Emitter Breakdown Voltage						
at $-I_C$ = 10 mA	**BC415**	$-V_{(BR)CEO}$	30	–	–	V
	BC416	$-V_{(BR)CEO}$	45	–	–	V
Collector Base Breakdown Voltage						
at $-I_C$ = 10 μA	**BC415**	$-V_{(BR)CBO}$	45	–	–	V
	BC416	$-V_{(BR)CBO}$	50	–	–	V
Emitter Base Breakdown Voltage at $-I_{EB}$ = 10 μA		$-V_{(BR)EBO}$	5	–	–	V
Gain Bandwidth Product at $-V_{CE}$ = 5 V, $-I_C$ = 10 mA, f = 100 MHz		f_T	–	200	–	MHz
Collector Base Capacitance at $-V_{CBO}$ = 10 V, f = 1 MHz		C_{CBO}	–	4.5	–	pF

Characteristics, continuation

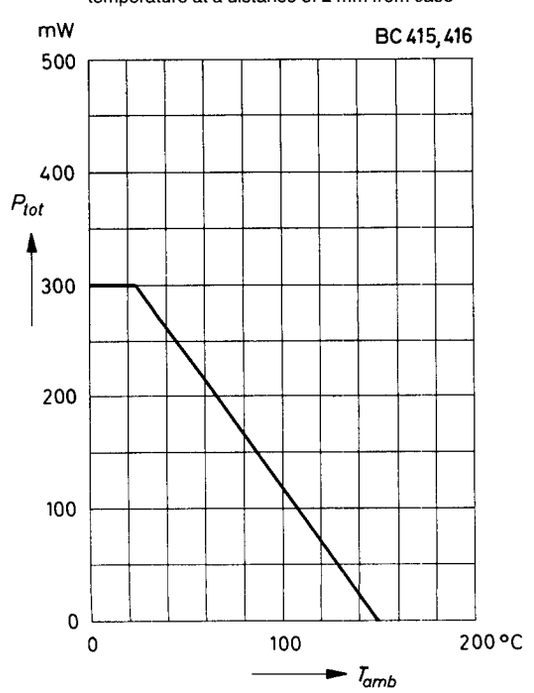
	Symbol	Min.	Typ.	Max.	Unit
Noise Figure at $-V_{CE}$ = 5 V, $-I_C$ = 0.2 mA, R_G = 2 kΩ, f = 30 Hz . . . 15 kHz	F	–	–	2	dB
Equivalent Noise EMF referred to base at $-V_{CE}$ = 5 V, $-I_C$ = 0.2 mA, R_G = 2 kΩ, f = 10 . . . 50 Hz	v_r	–	–	0.11	μV
[1] Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case					



Test circuit for equivalent noise EMF

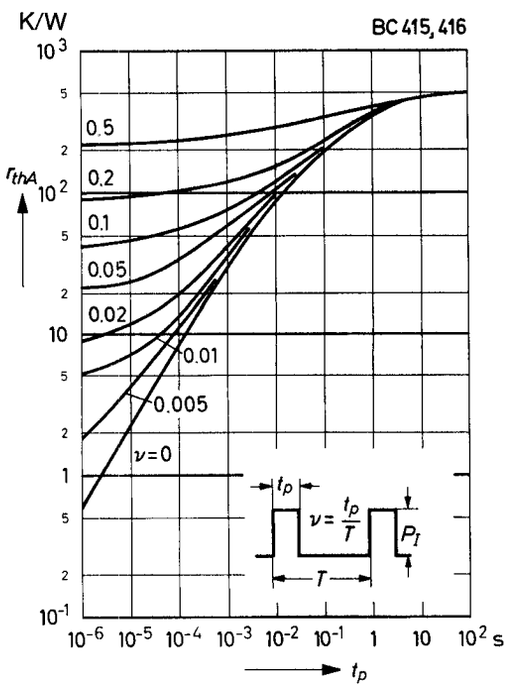
Admissible power dissipation versus ambient temperature

Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case

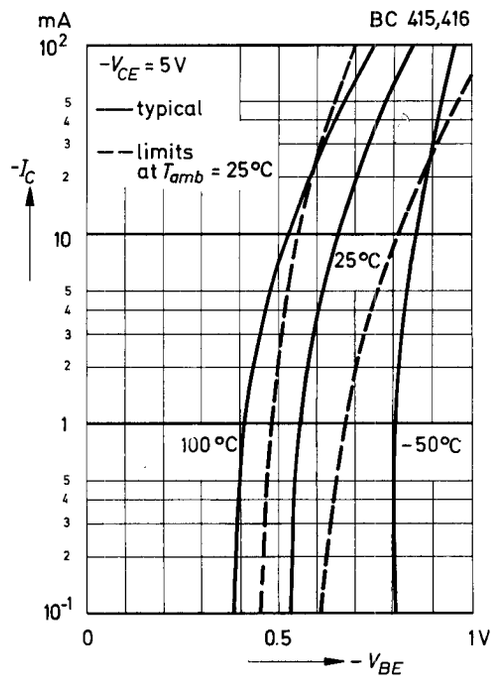


Pulse thermal resistance versus pulse duration

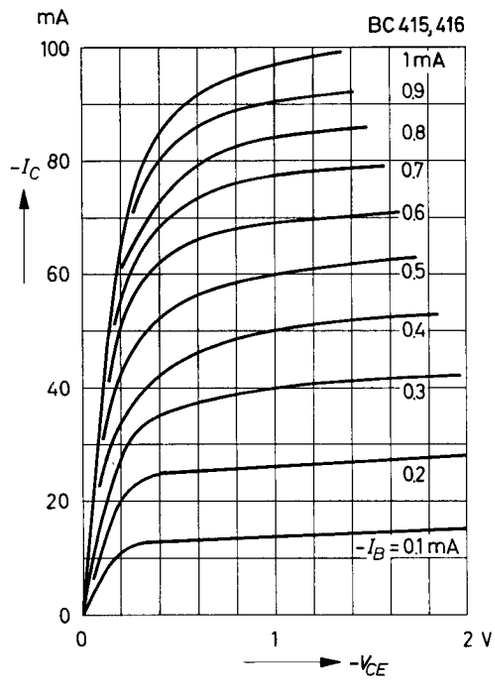
Valid provided that leads are kept at ambient temperature at a distance of 2 mm from case



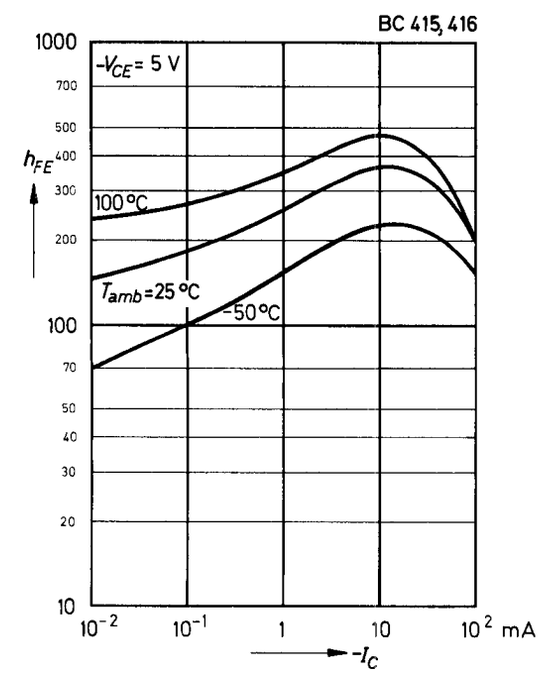
Collector current versus base emitter voltage



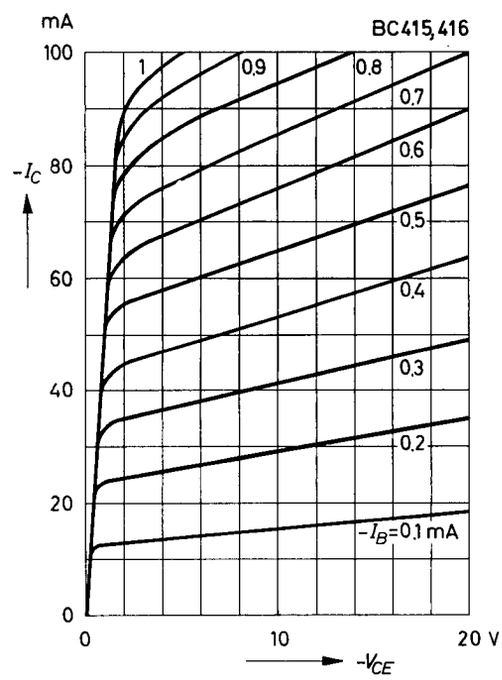
Common emitter collector characteristics



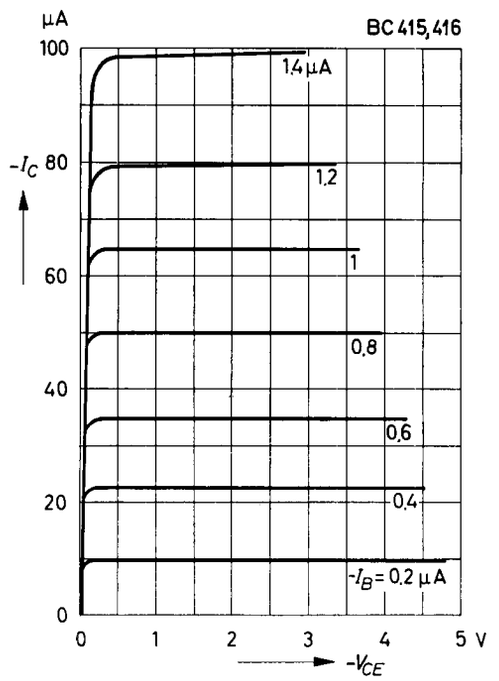
DC current gain versus collector current



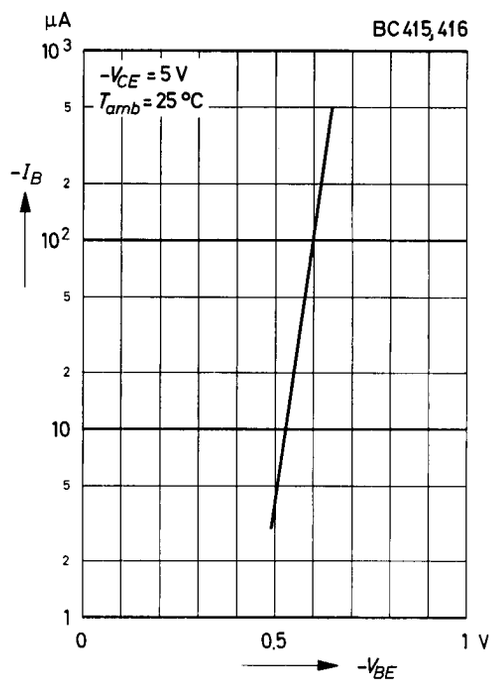
Common emitter collector characteristics



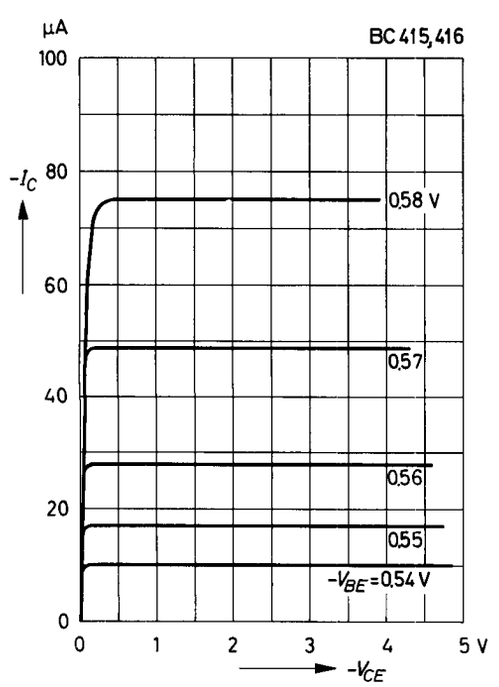
Common emitter collector characteristics



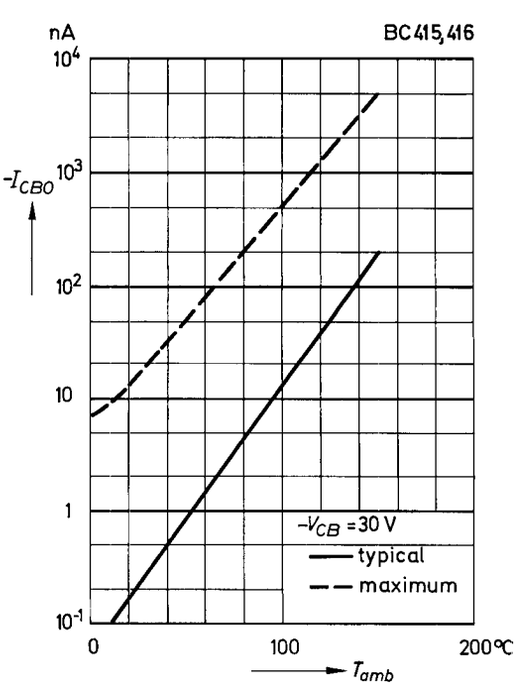
Common emitter input characteristic



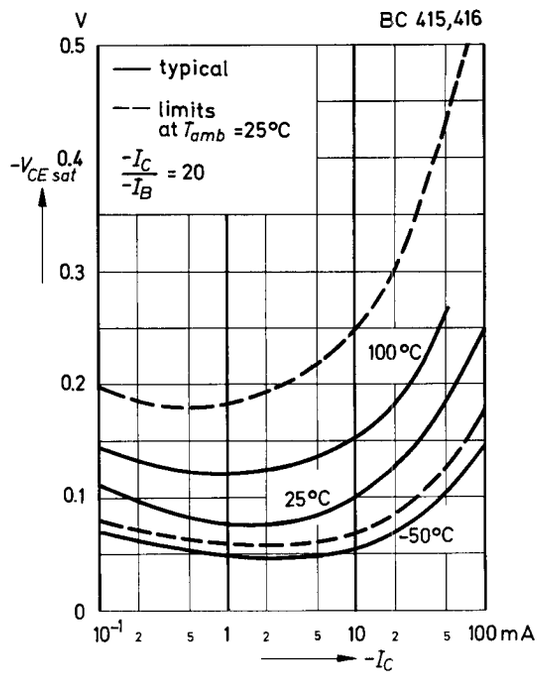
Common emitter collector characteristics



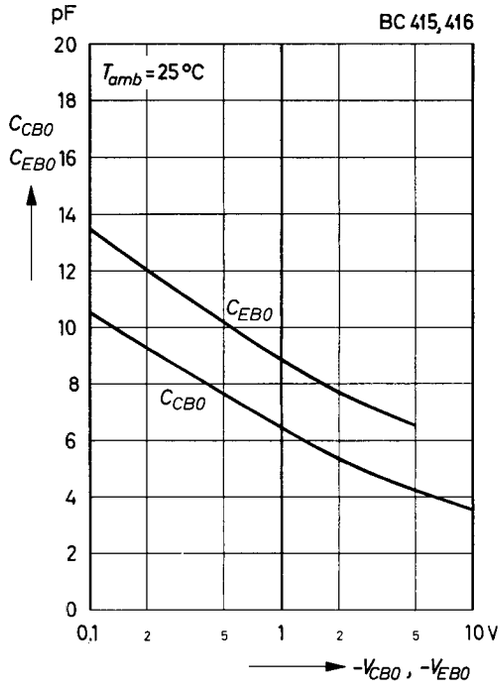
Collector cutoff current versus ambient temperature



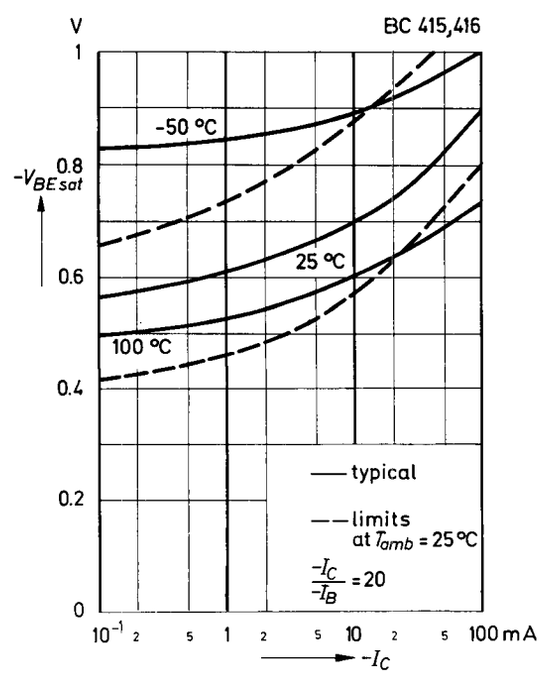
Collector saturation voltage versus collector current



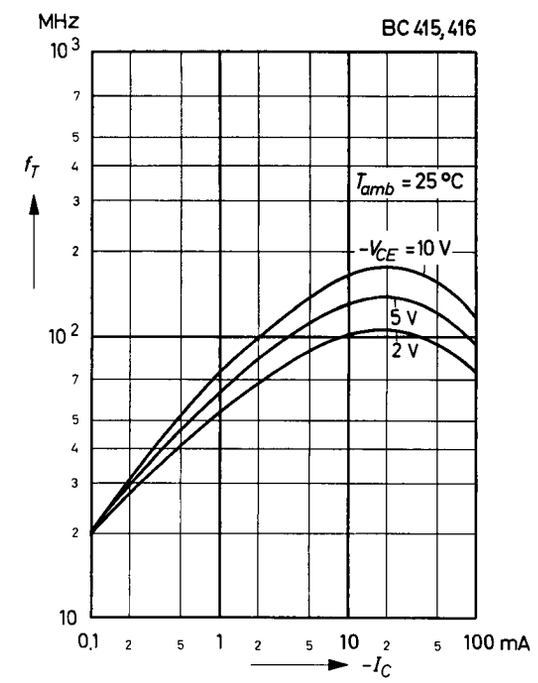
Collector base capacitance, Emitter base capacitance versus reverse bias voltage



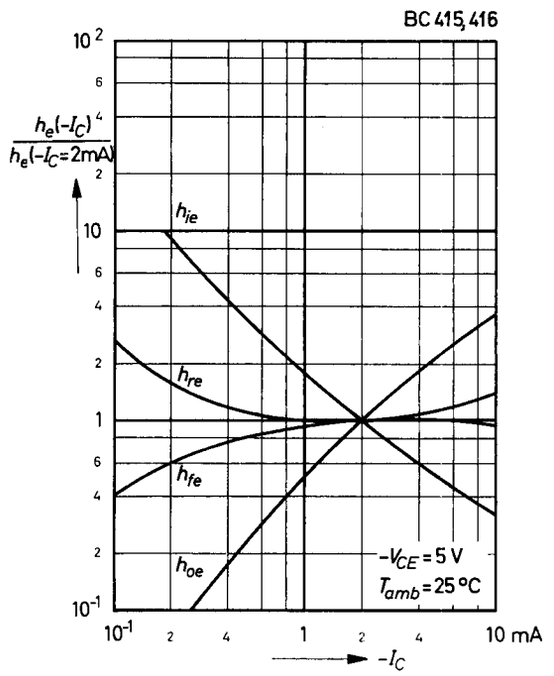
Base saturation voltage versus collector current



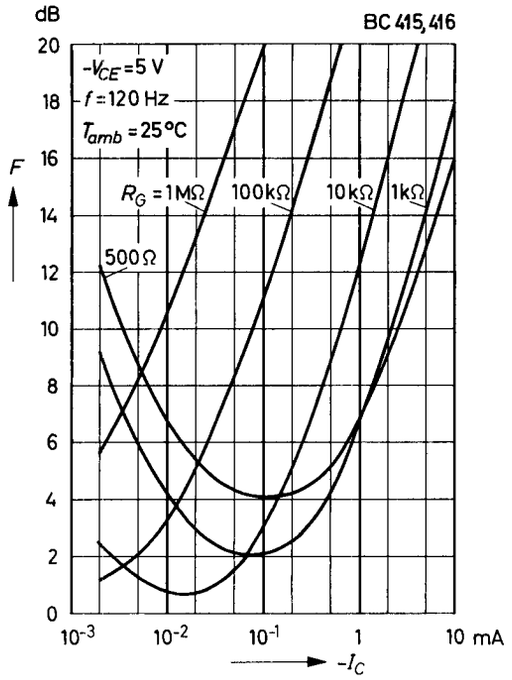
Gain bandwidth product versus collector current



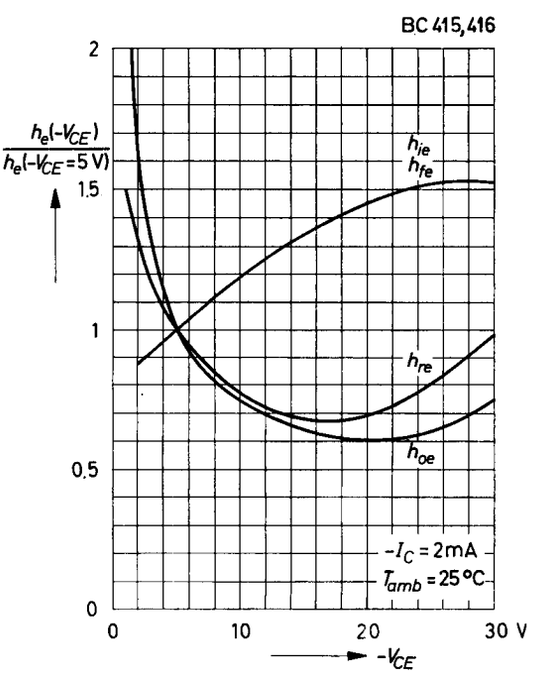
Relative h-parameters versus collector current



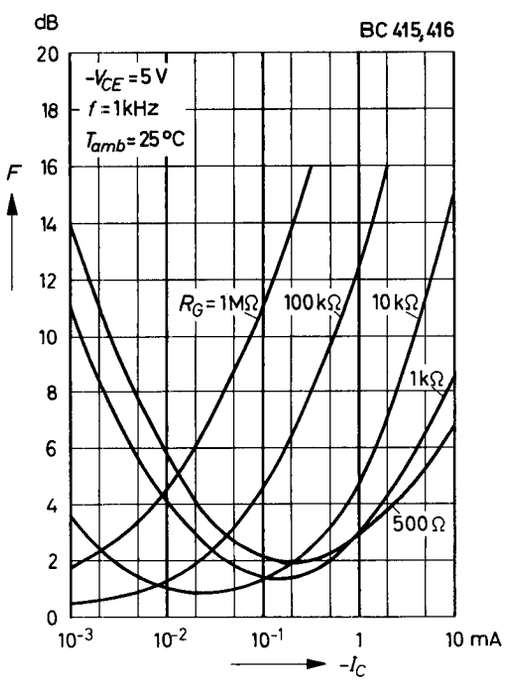
Noise figure versus collector current



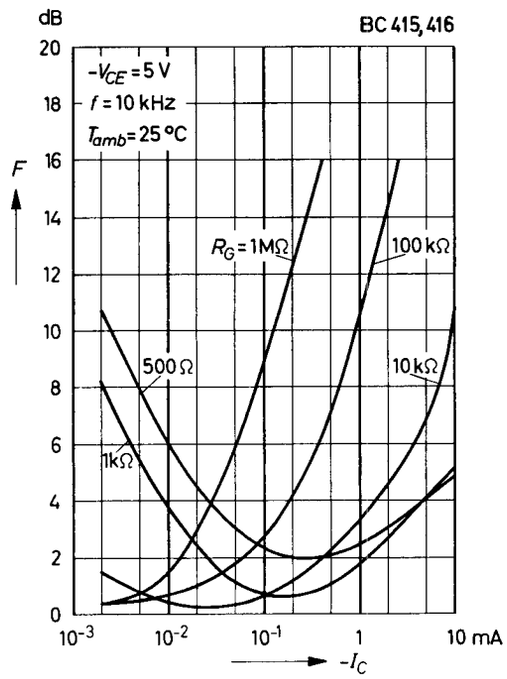
Relative h-parameters versus collector emitter voltage



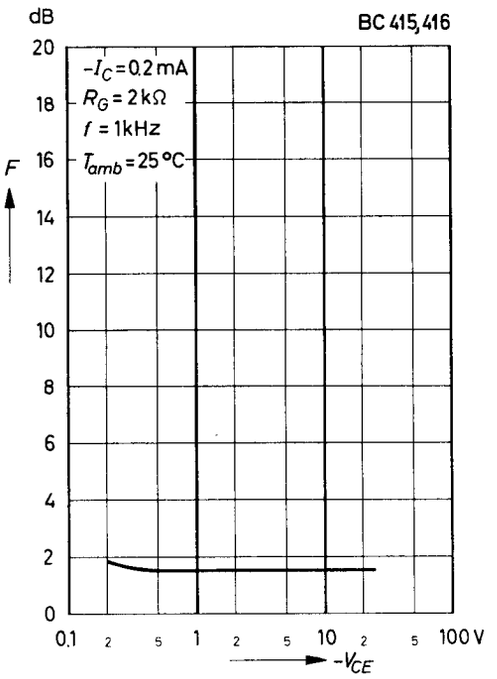
Relative h-parameters versus collector emitter voltage



Noise figure versus collector current



Noise figure versus collector emitter voltage



Noise figure versus frequency