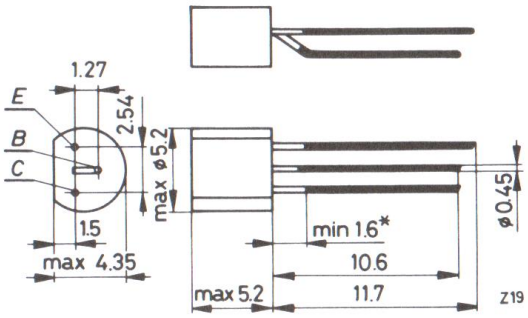
BC 212, BC 213, BC 214

PNP Silicon Planar Epitaxial Transistors

intended for use in AF pre-amplifier, and driver stages as well as in DC voltage amplifiers. The BC 214 is primarily used for low-noise pre-amplifiers. BC 212, BC 213 and BC 214 are complementary pairs with BC 182, BC 183 and BC 184 together, respectively.

Dimensions in mm



* not tinned

Case: TO-92Z

Mass: approx. 0.25 g

Absolute maximum ratings		**BC 212**	**BC 213**	**BC 214**	
Collector-emitter voltage	$-V_{CEO}$	50	30	30	V
Collector-base voltage	$-V_{CBO}$	60	45	45	V
Emitter-base voltage	$-V_{EBO}$		5		V
Collector current	$-I_C$		200		mA
Junction temperature	T_j		150		°C
Storage temperature	T_s		–65 . . . + 150		°C
Total power dissipation T_{amb} = 25°C	P_{tot}		300		mW
Thermal resistance					
junction to ambient	R_{thja}		= 420		K/W
Static characteristics[1]					
T_{amb} = 25°C					
Collector-base cut-off current $-V_{CB}$ = 30 V	$-I_{CBO}$	≤15	≤15	≤15	nA
Emitter-base cut-off current $-V_{EB}$ = 4 V	$-I_{EBO}$	≤15	≤15	≤15	nA
Collector-base breakdown voltage $-I_C$ = 10 µA	$-V_{(BR)CBO}$	≥60	≥45	≥45	V
Collector-emitter breakdown voltage $-I_C$ = 2 mA	$-V_{(BR)CEO}$	≥50	≥30	≥30	V
Emitter-base breakdown voltage $-I_E$ = 10 µA	$-V_{(BR)EBO}$	≥5	≥5	≥5	V

[1] measured under pulsed conditions

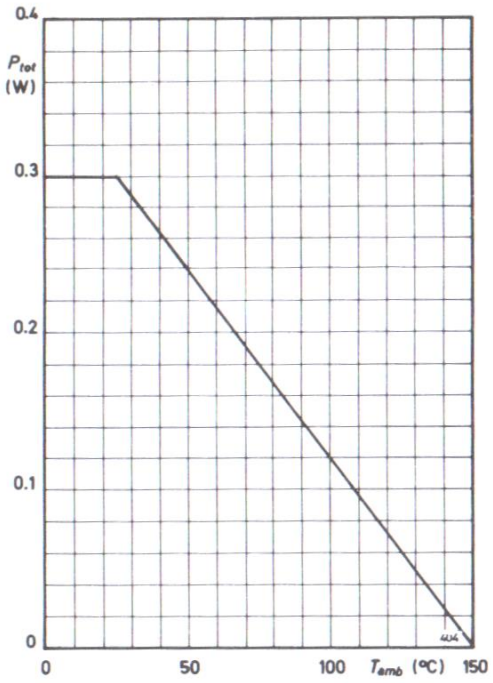
		BC 212	BC 213	BC 214	
DC forward current transfer ratio[1]					
$-V_{CE}$ = 5 V, $-I_C$ = 0.01 mA	h_{21E}	90	90	–	in group A
	h_{21E}	150	150	150	in group B
	h_{21E}	–	270	270	in group C
$-V_{CE}$ = 5 V, $-I_C$ = 2 mA	h_{21E}	170 (120 . . . 220)	170 (120 . . . 220)	–	in group A
	h_{21E}	290 (180 . . . 460)	290 (180 . . . 460)	290 (180 . . . 460)	in group B
	h_{21E}	–	500 (380 . . . 800)	500 (380 . . . 800)	in group C
$-V_{CE}$ = 5 V, $-I_C$ = 100 mA	h_{21E}	120	120	–	in group A
	h_{21E}	200	200	–	in group B
	h_{21E}	–	400	–	in group C
Collector-emitter saturation voltage					
$-I_C$ = 10 mA, $-I_B$ = 0.5 mA	$-V_{CEsat}$		≤0.25		V
$-I_C$ = 100 mA, $-I_B$ = 5 mA	$-V_{CEsat}$		≤0.6		V
Base-emitter saturation voltage					
$-I_C$ = 100 mA, $-I_B$ = 5 mA	$-V_{BEsat}$		≤1.1		V
Base-emitter voltage					
$-V_{CE}$ = 5 V, $-I_C$ = 10 µA	$-V_{BE}$		0.57		V
$-V_{CE}$ = 5 V, $-I_C$ = 2 mA	$-V_{BE}$		0.55 . . . 0.7		V
Dynamic characteristics					
T_{amb} = 25 °C					
Transition frequency $-V_{CE}$ = 5 V, $-I_C$ = 10 mA, f = 100 MHz	f_T		200		MHz
Collector-base capacitance $-V_{CB}$ = 10 V, f = 1 MHz	C_{CBO}		4 (≤6)		pF
Emitter-base capacitance $-V_{EB}$ = 0.5 V	C_{EBO}		8		pF
Noise figure $-V_{CE}$ = 5 V, $-I_C$ = 200 µA, R_G = 2 kΩ, f = 1 kHz, B = 1 Hz	F	2.5 (≤10)	2.5 (≤10)	–	dB
$-V_{CE}$ = 5 V, $-I_C$ = 200 µA, R_G = 2 kΩ, f = 10 Hz . . . 10 kHz	F	–	–	≤4	dB

[1] as requested, the devices are available, at extra charge, selected in group A, B or C according to their DC forward current transfer ratios h_{21E}

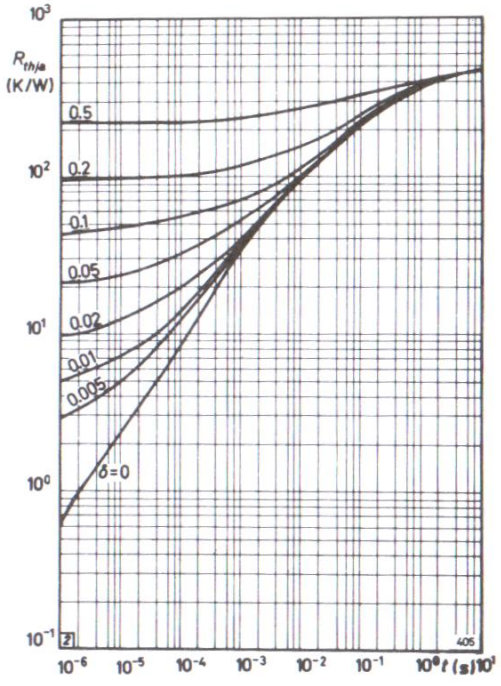
Low frequency small signal hybrid parameters
$-V_{CE} = 5\ V, -I_C = 2\ mA, f = 1\ kHz$

Type	BC 212	BC 213	BC 214	
h_{11e}	3.6 (1.5 . . . 8.5)	4.5 (1.6 . . . 15)	6.6 (3.2 . . . 15)	kΩ
h_{12e}	1.7	2	2.5	10^{-4}
h_{21e}	222 (125 . . . 260) 330 (240 . . . 500) –	222 (125 . . . 260) 330 (240 . . . 500) 600 (450 . . . 900)	– 330 (240 . . . 500) 600 (450 . . . 900)	in group A in group B in group C
h_{22e}	25 (≤60)	30 (≤110)	45 (≤110)	µS

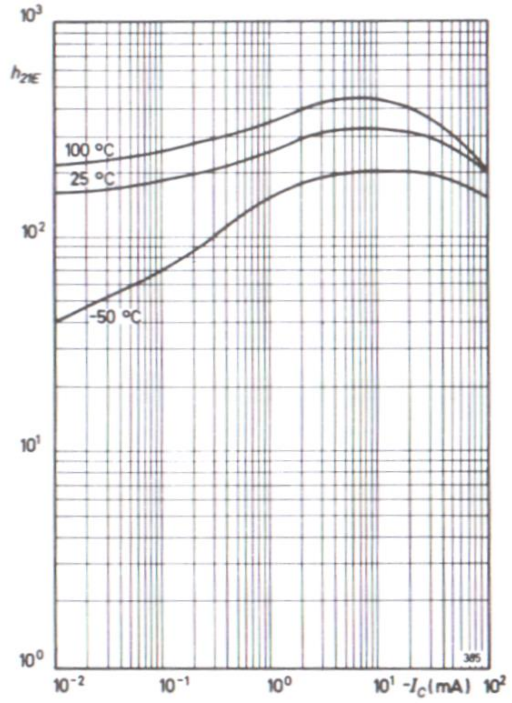
Permissible total power dissipation versus ambient temperature
$P_{tot} = f(T_{amb})$



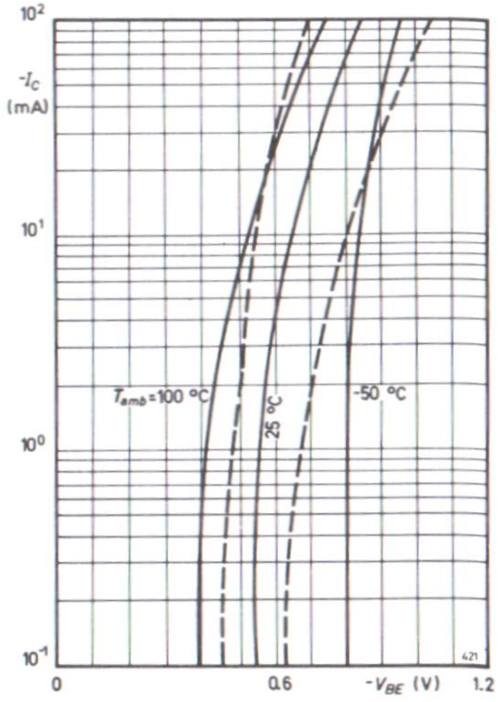
Pulse thermal resistance versus pulse duration
$R_{thja} = f(t), \delta$ = parameter



DC forward current transfer ratio versus collector current
$h_{21E} = f(I_C)$
$-V_{CE} = 5$ V, T_{amb} = parameter

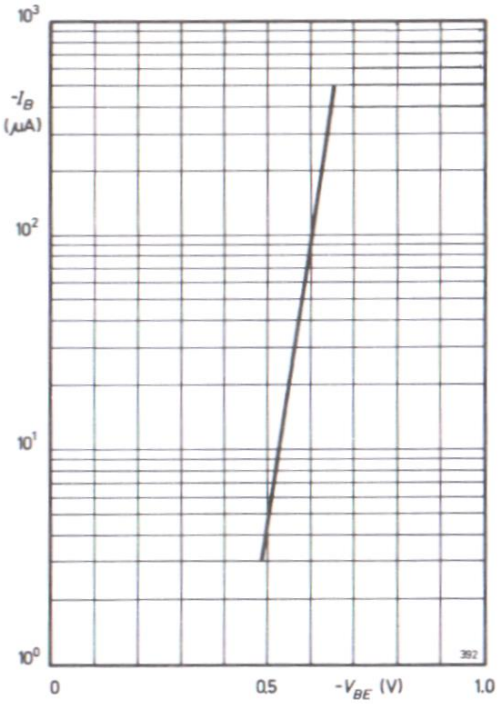


Collector current versus base-emitter voltage
$I_C = f(V_{BE})$, $-V_{CE} = 5$ V
T_{amb} = parameter

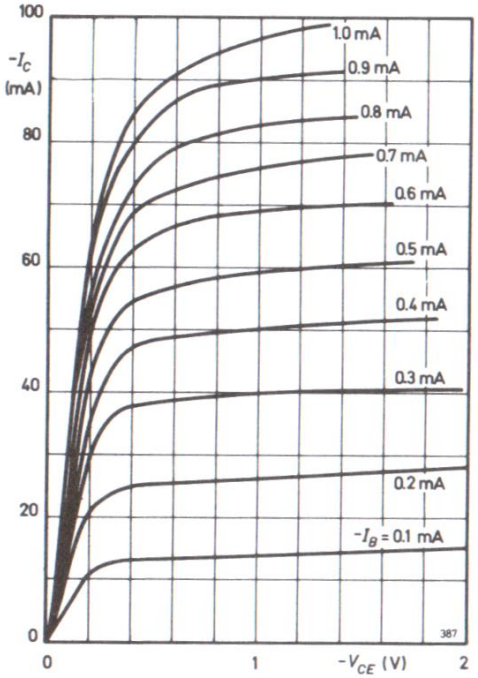


——— Typical
------ Scattering limit at $T_{amb} = 25°C$

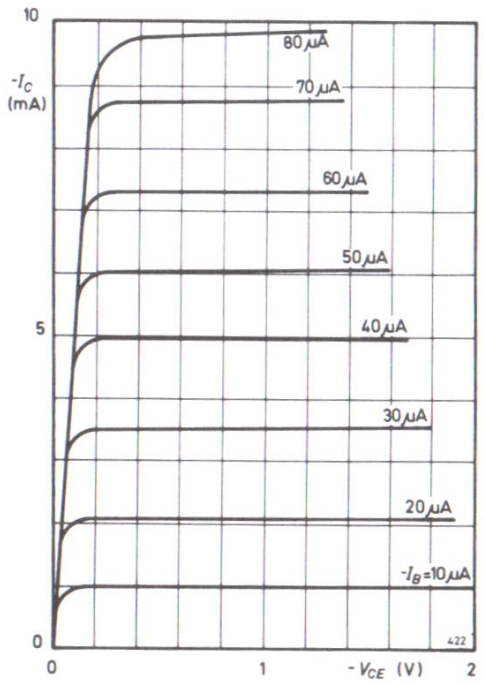
Base current versus base-emitter voltage
$I_B = f(V_{BE})$, $-V_{CE} = 5$ V



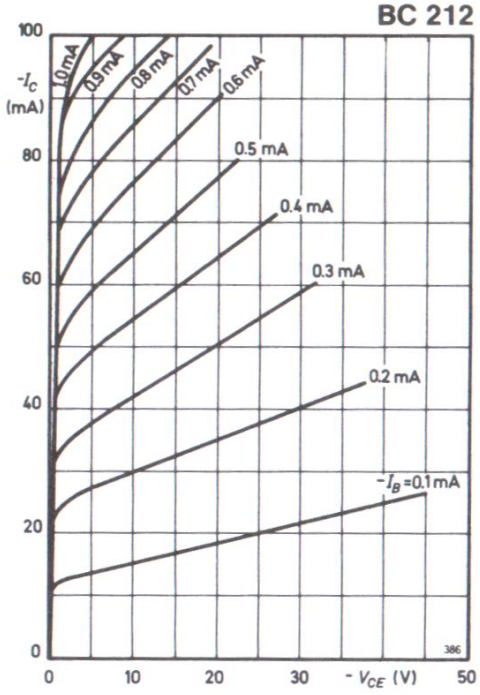
Collector current versus collector-emitter voltage
$I_C = f(V_{CE})$, $-I_B$ = parameter



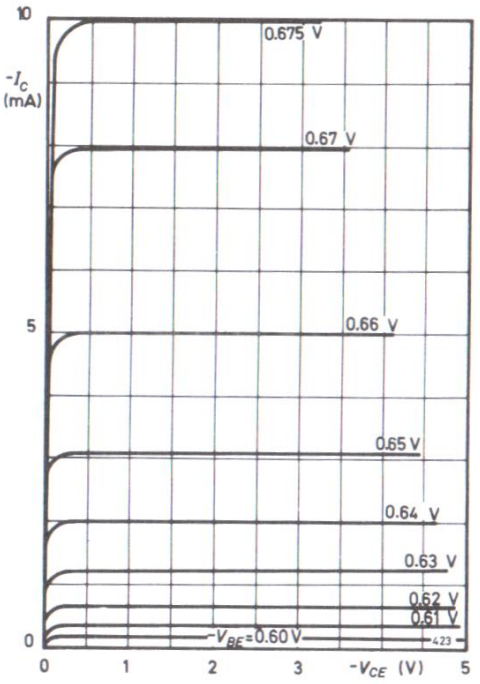
Collector current versus collector-emitter voltage
$I_C = f(V_{CE})$, $-I_B$ = parameter



Collector current versus collector-emitter voltage
$I_C = f(V_{CE})$, $-I_B$ = parameter

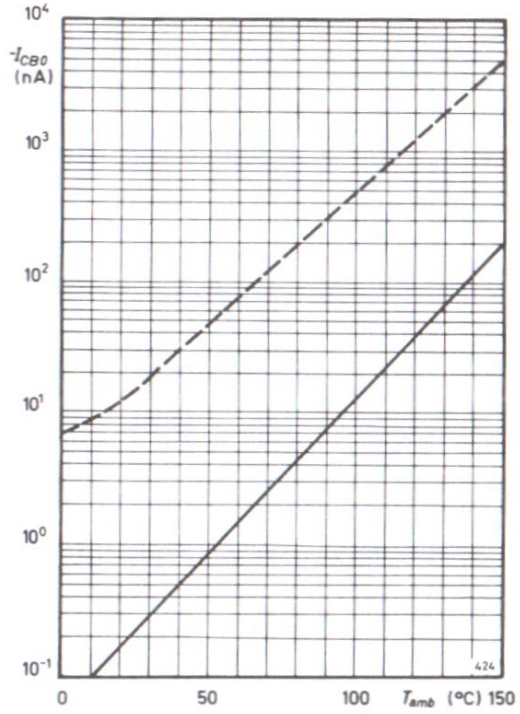


Collector current versus collector-emitter voltage
$I_C = f(V_{CE})$, $-V_{BE}$ = parameter



Collector-base cut-off current versus ambient temperature

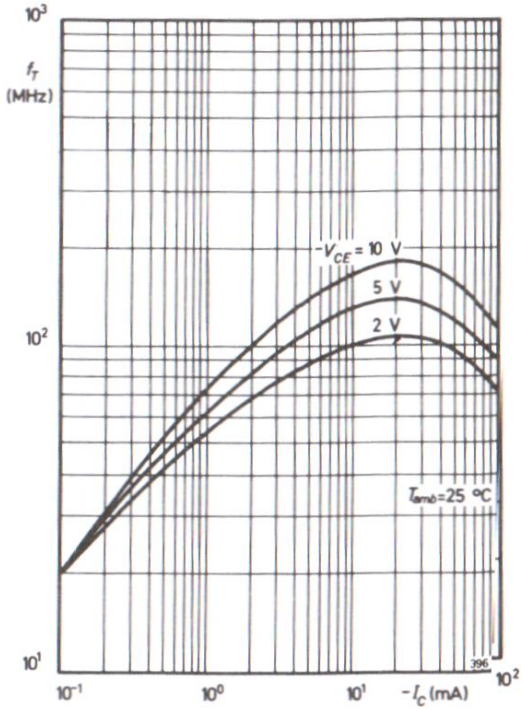
$I_{CBO} = f(T_{amb})$
at the permissible reverse voltage



——— Typical
------ Scattering limit

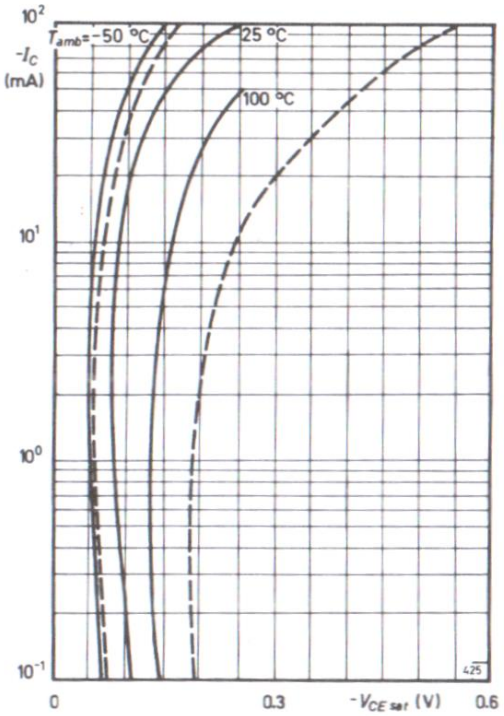
Transition frequency versus collector current

$f_T = f(I_C)$, $-V_{CE}$ = parameter



Collector current versus collector-emitter saturation voltage

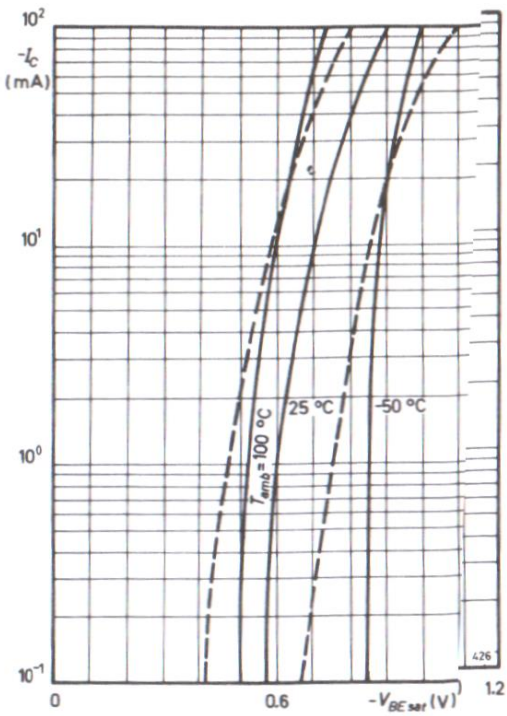
$I_C = f(V_{CEsat})$
$h_{21E} = 20$, T_{amb} = parameter



——— Typical
------ Scattering limit at $T_{amb} = 25°C$

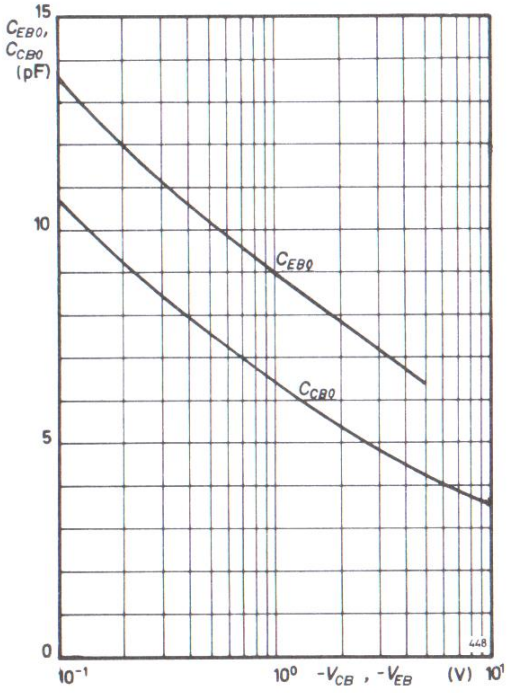
Collector current versus base-emitter saturation voltage

$I_C = f(V_{BEsat})$
$h_{21E} = 20$, T_{amb} = parameter



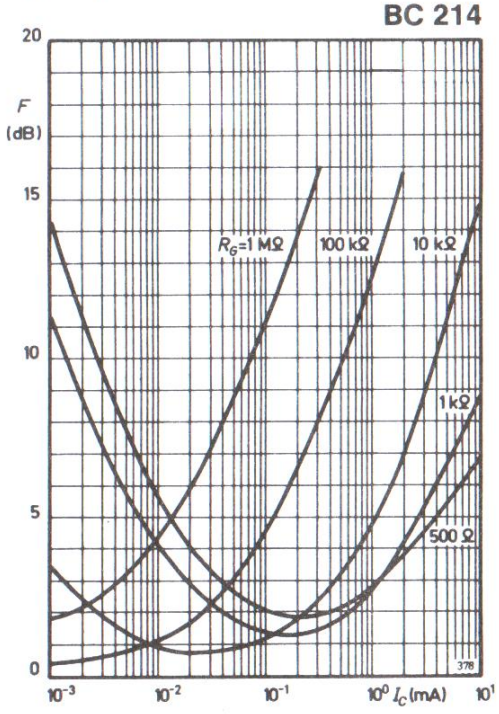
——— Typical
------ Scattering limit at $T_{amb} = 25°C$

Collector-base and emitter-base capacitance versus collector-base and emitter-base voltage, respectively
$C_{CBO} = f(V_{CB})$, $C_{EBO} = f(V_{EB})$,
$f = 1$ MHz



Noise figure versus collector current $F = f(I_C)$
$-V_{CE} = 5$ V, $f = 1$ kHz
R_G = parameter

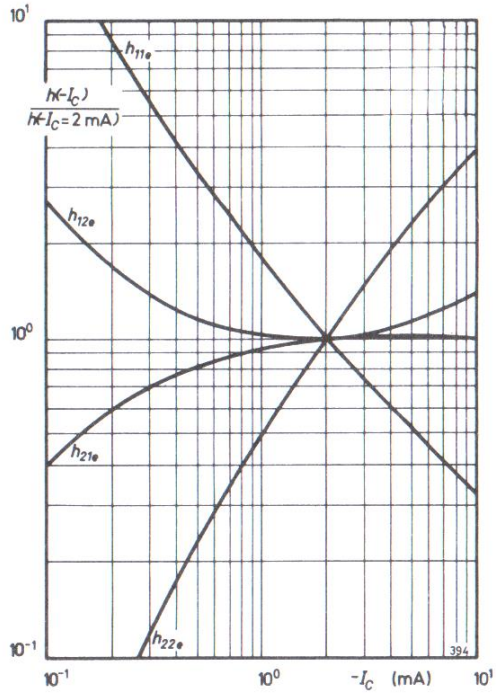
BC 214



h-parameters versus collector current

$$\frac{h_e(I_C)}{h_e(I_C = 2\text{ mA})} = f(I_C)$$

$-V_{CE} = 5$ V



h-parameters versus collector-emitter voltage

$$\frac{h_e(V_{CE})}{h_e(V_{CE} = 5\text{ V})} = f(V_{CE})$$

$-I_C = 2$ mA