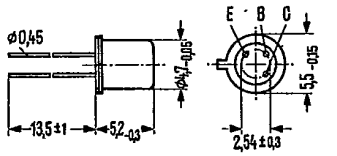
NPN Silicon Planar Transistor **BCY 66**

T-29-23

SIEMENS AKTIENGESELLSCHAF 312 D

BCY 66 is an epitaxial NPN silicon planar transistor in TO 18 case (18 A 3 DIN 41876). The collector is electrically connected to the case. The transistor is particularly provided for low-noise AF input stages. The complementary transistor is BCY 67.

Type	Ordering code
BCY 66	Q60203-Y66



Approx. weight 0.3 g Dimensions in mm

Maximum ratings

Collector-emitter voltage	V_{CES}	45	V
Collector-emitter voltage	V_{CEO}	45	V
Emitter-base voltage	V_{EBO}	7	V
Collector current	I_C	50	mA
Base current	I_B	5	mA
Junction temperature	T_j	200	°C
Storage temperature range	T_{stg}	−65 to +200	°C
Total power dissipation ($T_{case} \leq 45$ °C)	P_{tot}	1	W

Thermal resistance

Junction to ambient air	R_{thJA}	≤450	K/W
Junction to case	R_{thJC}	≤150	K/W

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

V_{CE} V	I_C mA	h_{FE} I_C/I_B	V_{BE} V
5	0.01	>40	0.5
5	2	350 (180 to 630)	0.62 (0.55 to 0.7)*
1	10	120 to 1000[1]	0.7

Collector-emitter saturation voltage (I_C = 10 mA; I_B = 0.25 mA)	V_{CEsat}	0.12 (<0.35)	V
Base-emitter saturation voltage (I_C = 10 mA; I_B = 0.25 mA)	V_{BEsat}	0.7 (<0.85)	V

1) The upper limit applies to at least 90% of the transistors.
*) AQL = 0.65%

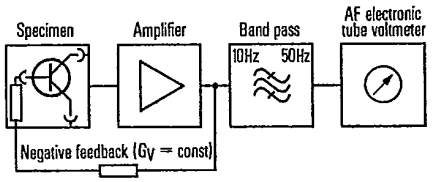
Static characteristics (T_{amb} = 25 °C)

Collector cutoff current (V_{CES} = 45 V)	I_{CES}	0.2 (<10)	nA
Collector cutoff current (V_{CES} = 45 V; T_{amb} = 150 °C)	I_{CES}	0.2 (<10)	µA
Emitter cutoff current (V_{EBO} = 5 V)	I_{EBO}	<10*	nA
Collector-emitter breakdown voltage (I_{CEO} = 2 mA)	$V_{(BR)CEO}$	>45*	V
Emitter-base breakdown voltage (I_{EBO} = 1 µA)	$V_{(BR)EBO}$	>7*	V

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

Transition frequency (I_C = 10 mA; V_{CE} = 5 V; f = 100 MHz)	f_T	250 (>125)	MHz
Collector-base capacitance (V_{CBO} = 10 V; f = 1 MHz)	C_{CBO}	3.5 (<6)	pF
Emitter-base capacitance (V_{EBO} = 0.5 V; f = 1 MHz)	C_{EBO}	8 (<15)	pF
Noise figure (I_C = 0.2 mA; V_{CE} = 5 V; R_g = 2 kΩ; f = 1 kHz; Δf = 200 Hz)	NF	1.2 (<2)	dB
I_C = 20 µA; V_{CE} = 5 V; f = 100 Hz; R_g = 10 kΩ	NF	<4	dB
I_C = 20 µA; V_{CE} = 5 V; f = 1 kHz; R_g = 10 kΩ	NF	<2	dB
I_C = 20 µA; V_{CE} = 5 V; f = 10 kHz; R_g = 10 kΩ	NF	<2	dB
I_C = 200 µA; V_{CE} = 5 V; Δf = 15.7 kHz; R_g = 2 kΩ	NF	<3	dB
Equivalent, base referred noise voltage ($-I_C$ = 0.2 mA; $-V_{CE}$ = 5 V; R_g = 2 kΩ; f = 10 to 50 Hz)	E_n	<0.11	µV

Test circuit for noise voltage measurement



Four-pole characteristics (I_C = 2 mA; V_{CE} = 5 V; f = 1 kHz)

h_{11e}	4.5 (2.5 to 12)	kΩ
h_{12e}	2	10^{-4}
h_{21e}	330	–
h_{22e}	30 (<100)	µS

* AQL = 0.65%

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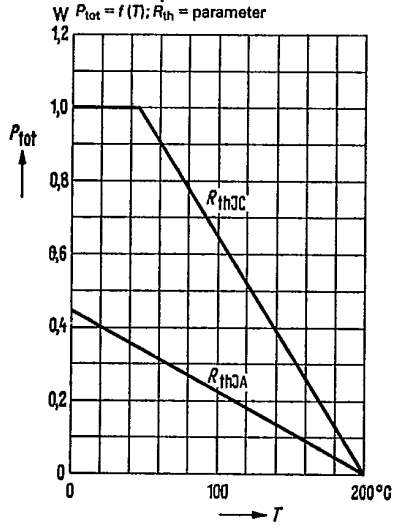
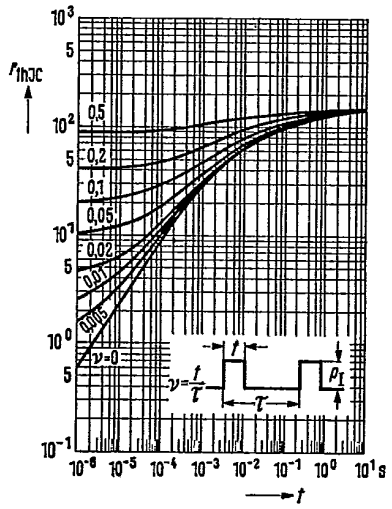
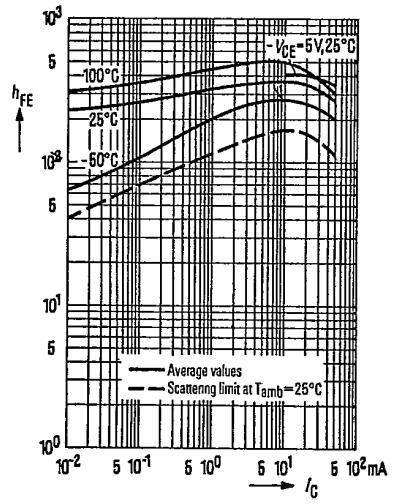
Total perm. power dissipation versus temperature
W $P_{tot} = f(T)$; R_{th} = parameter



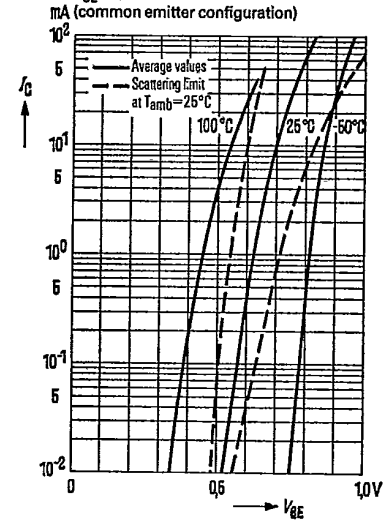
Permissible pulse load
$\frac{K}{W}$ $r_{thJC} = f(t)$; v = parameter



DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 1$ V; T_{amb} = parameter



Collector current $I_C = f(V_{BE})$
$V_{CE} = 1$ V
mA (common emitter configuration)



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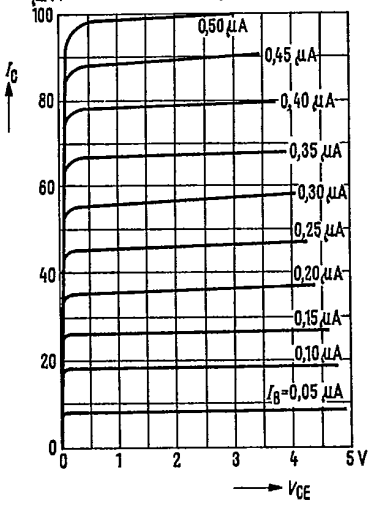
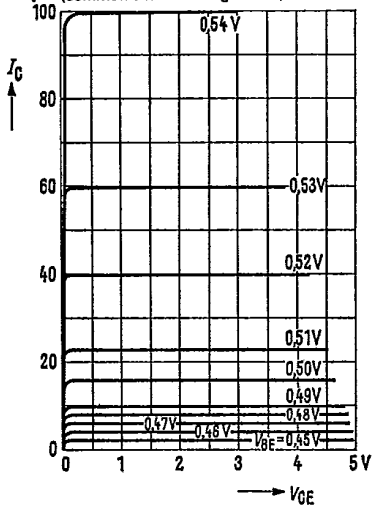
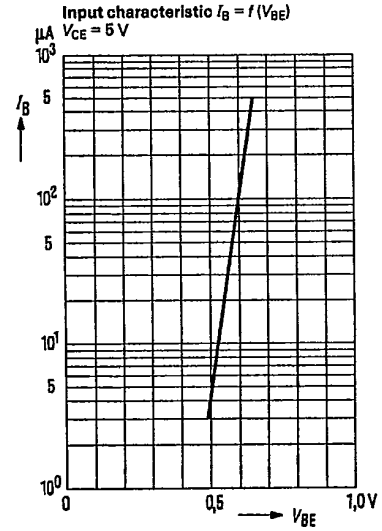
Output characteristics $I_C = f(V_{CE})$
I_B = parameter
µA (common emitter configuration)



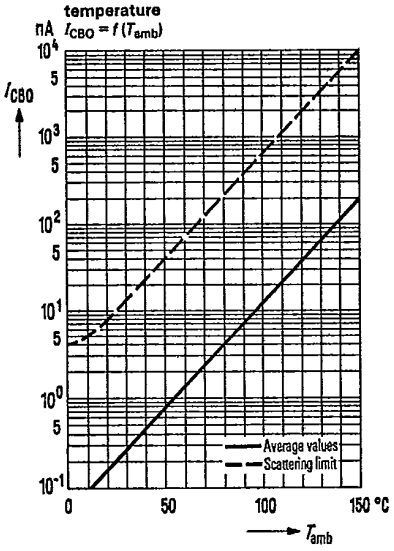
Output characteristics $I_C = f(V_{CE})$
V_{BE} = parameter
µA (common emitter configuration)



Input characteristic $I_B = f(V_{BE})$
V_{CE} = 5 V



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



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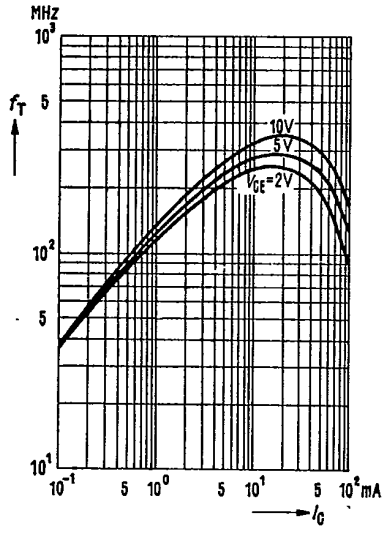
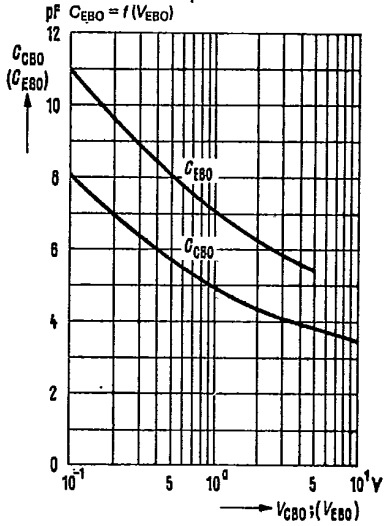
Transition frequency $f_T = f(I_C)$
V_{CE} = parameter

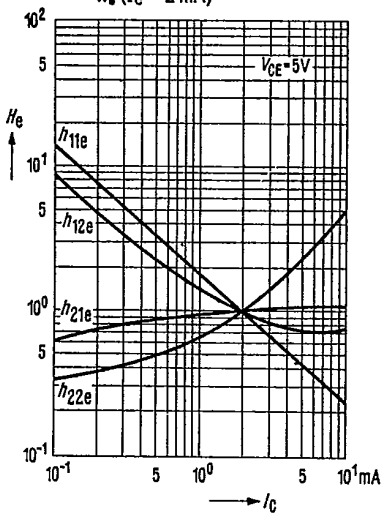


Collector-base capacitance
$C_{CBO} = f(V_{CBO})$
Emitter-base capacitance
$C_{EBO} = f(V_{EBO})$



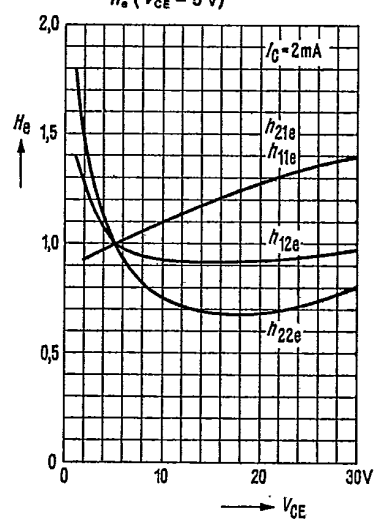
h-parameter versus collector current

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



h-parameter versus collector-emitter voltage

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



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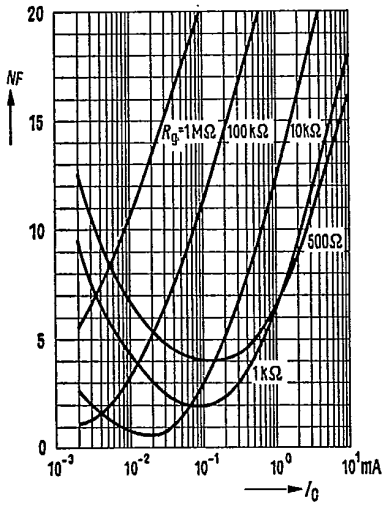
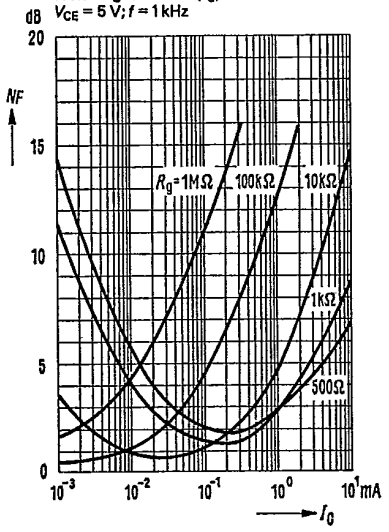
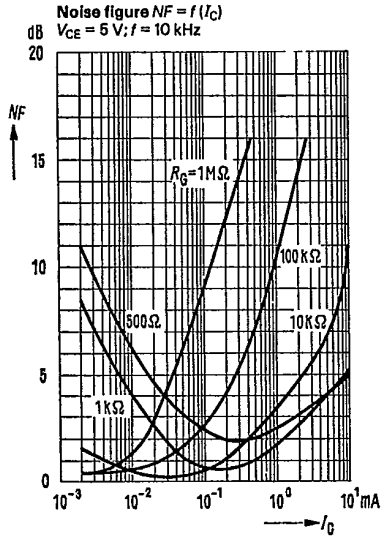
Noise figure $NF = f(I_C)$
$V_{CE} = 5$ V; $f = 120$ Hz



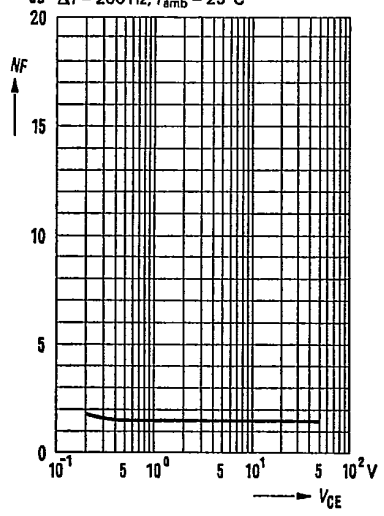
Noise figure $NF = f(I_C)$
$V_{CE} = 5$ V; $f = 1$ kHz



Noise figure $NF = f(I_C)$
$V_{CE} = 5$ V; $f = 10$ kHz



Noise figure $NF = f(V_{CE})$
$I_C = 0.2$ mA; $R_g = 2$ kΩ; $f = 1$ kHz
$\Delta f = 200$ Hz; $T_{amb} = 25$ °C



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