

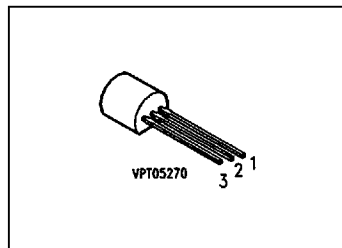
SIEMENS

SIEMENS AKTIENGESELLSCHAFT

T-29-21

PNP Silicon AF Transistors**BC 257
... BC 259**

- High current gain
- Low collector-emitter saturation voltage
- Complementary types: BC 167, BC 168,
BC 169 (NPN)



Type	Marking	Ordering Code	Pin Configuration			Package ¹⁾
			1	2	3	
BC 257	—	Q62702-C700	E	C	B	TO-92
BC 257 A		Q62702-C184				
BC 257 B		Q62702-C206				
BC 258		Q62702-C701				
BC 258 A		Q62702-C187				
BC 258 B		Q62702-C188				
BC 258 C		Q62702-C438				
BC 259		Q62702-C702				
BC 259 B		Q62702-C192				
BC 259 C		Q62702-C439				

¹⁾ For detailed information see chapter Package Outlines.

Maximum Ratings

Parameter	Symbol	Values			Unit
		BC 257	BC 258	BC 259	
Collector-emitter voltage	V_{CE0}	45	25	20	V
Collector-base voltage	V_{CB0}	50	30	25	
Emitter-base voltage	V_{EB0}	5			
Collector current	I_C	100			mA
Peak collector current	I_{CM}	200			
Peak base current	I_{BM}	200			
Peak emitter current	I_{EM}	200			
Total power dissipation, $T_C = 70\text{ }^{\circ}\text{C}$	P_{tot}	500			mW
Junction temperature	T_j	150			$^{\circ}\text{C}$
Storage temperature range	T_{stg}	− 65 ... + 150			

Thermal Resistance

Junction - ambient	R_{thJA}	≤ 250	K/W
Junction - case ¹⁾	R_{thJC}	≤ 160	

¹⁾ Mounted on Al-heat sink 15 mm × 25 mm × 0.5 mm.

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Electrical Characteristicsat $T_A = 25^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter breakdown voltage $I_C = 2\text{ mA}$	$V_{(BR)CEO}$				V
BC 257		45	—	—	
BC 258		25	—	—	
BC 259		20	—	—	
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CBO}$				
BC 257		50	—	—	
BC 258		30	—	—	
BC 259		25	—	—	
Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$	$V_{(BR)EBO}$	5	—	—	
Collector cutoff current $V_{CB} = 30\text{ V}$ $V_{CB} = 30\text{ V}$, $T_A = 150\text{ }^\circ\text{C}$	I_{CBO}	— —	— —	15 4	nA μA
DC current gain $I_C = 10\text{ }\mu\text{A}$; $V_{CE} = 5\text{ V}$ BC 257 A, BC 258 A BC 257 B, BC 258 B, BC 259 B BC 258 C, BC 259 C $I_C = 2\text{ mA}$; $V_{CE} = 5\text{ V}$ BC 257 A, BC 258 A BC 257 B, BC 258 B, BC 259 B BC 258 C, BC 259 C	h_{FE}	— — — 125 220 420	90 150 270 180 290 520	— — — 250 475 800	—
Collector-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$; $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$; $I_B = 5\text{ mA}$	V_{CEsat}	— —	75 250	300 650	mV
Base-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$; $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$; $I_B = 5\text{ mA}$	V_{BEsat}	— —	700 930	— —	
Base-emitter voltage $I_C = 2\text{ mA}$; $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$; $V_{CE} = 5\text{ V}$	$V_{BE(on)}$	600 —	650 —	750 820	

¹⁾ Pulse test: $t \leq 300\text{ }\mu\text{s}$, $D \leq 2\%$.

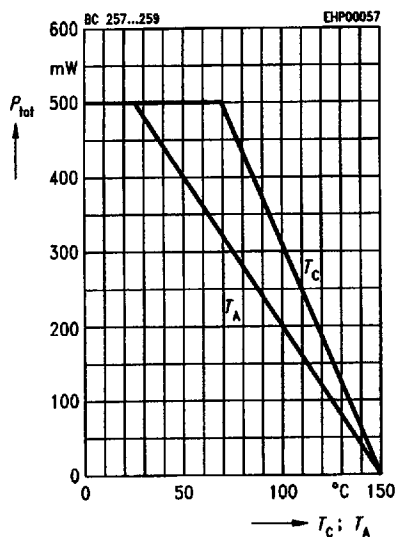
Electrical Characteristicsat $T_A = 25^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

AC characteristics

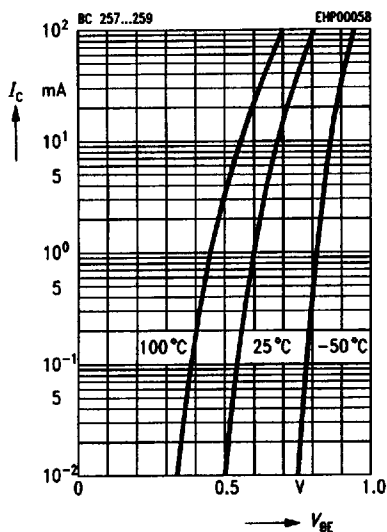
Transition frequency $I_C = 20\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 100\text{ MHz}$	f_T	—	250	—	MHz
Output capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{obo}	—	4	—	pF
Input capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{ibo}	—	10	—	
Short-circuit input impedance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BC 257 A, BC 258 A BC 257 B, BC 258 B, BC 259 B BC 258 C, BC 259 C	h_{11e}	— — —	2.7 4.5 8.7	— — —	k Ω
Open-circuit reverse voltage transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BC 257 A, BC 258 A BC 257 B, BC 258 B, BC 259 B BC 258 C, BC 259 C	h_{12e}	— — —	1.5 2 3	— — —	10^{-4}
Short-circuit forward current transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BC 257 A, BC 258 A BC 257 B, BC 258 B, BC 259 B BC 258 C, BC 259 C	h_{21e}	— — —	200 330 600	— — —	—
Open-circuit output admittance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BC 257 A, BC 258 A BC 257 B, BC 258 B, BC 259 B BC 258 C, BC 259 C	h_{22e}	— — —	18 30 60	— — —	μS
Noise figure $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_s = 2\text{ k}\Omega$ $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$ BC 257, BC 258 BC 259	F	— —	2 1	— 4	dB

Total power dissipation $P_{\text{tot}} = f(T_A; T_C)$

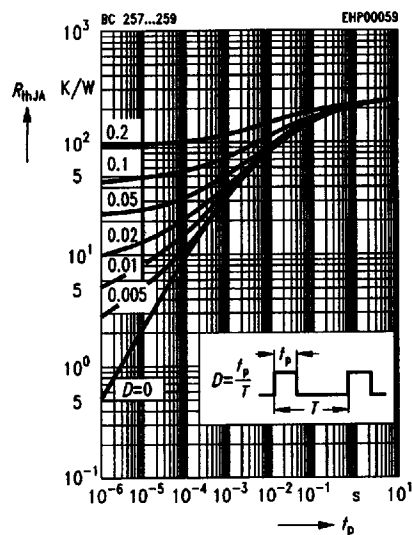


Collector current $I_C = f(V_{BE})$

$V_{CE} = 5 \text{ V}$

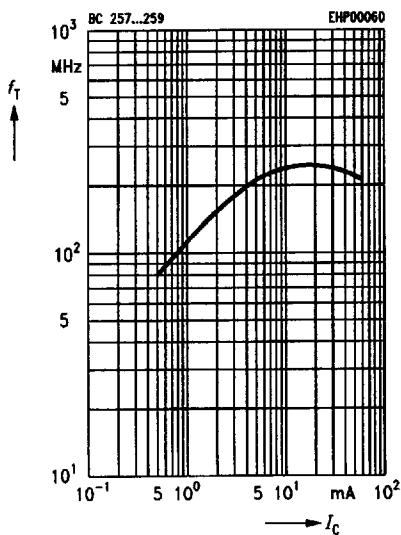


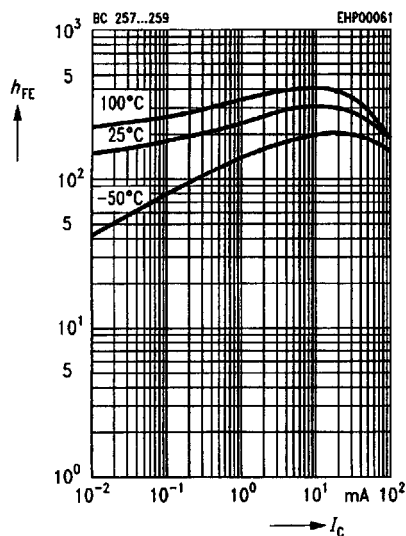
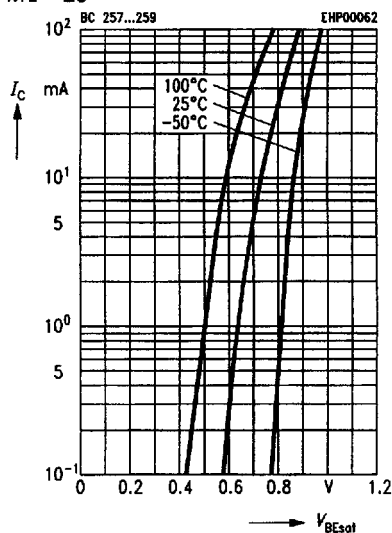
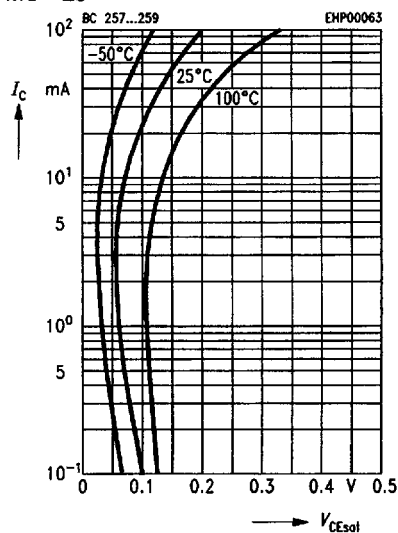
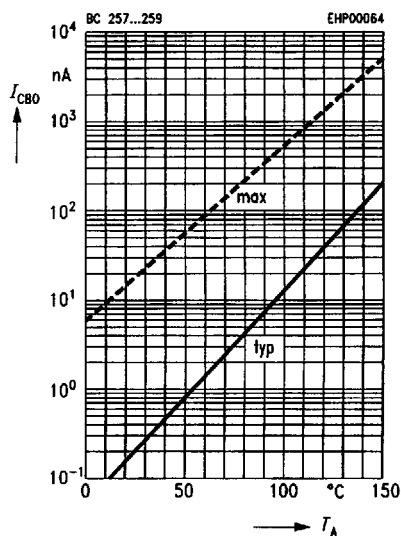
Permissible pulse load $R_{\text{thJA}} = f(t_p)$

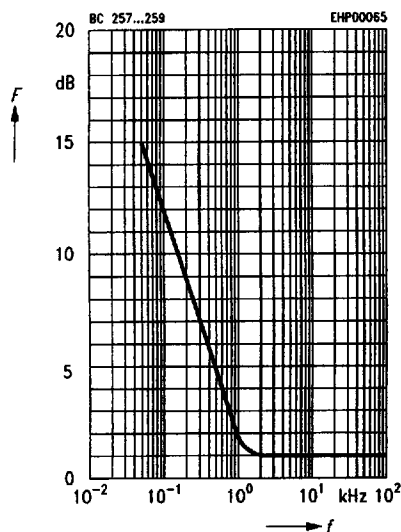
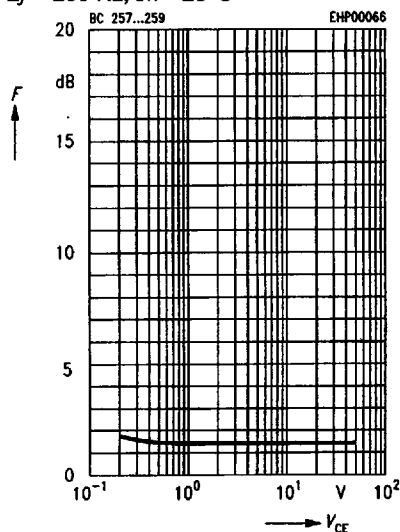
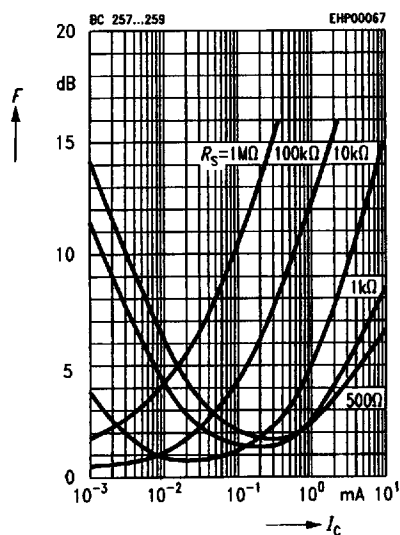
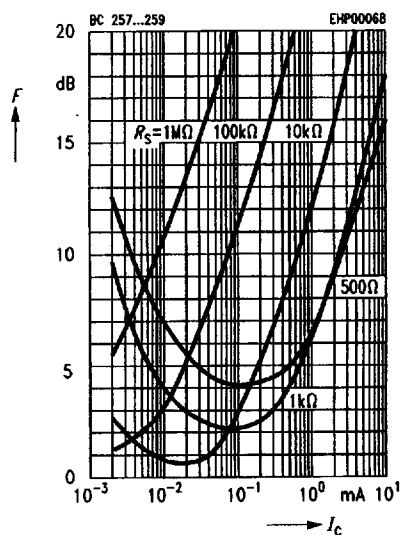


Transition frequency $f_T = f(I_C)$

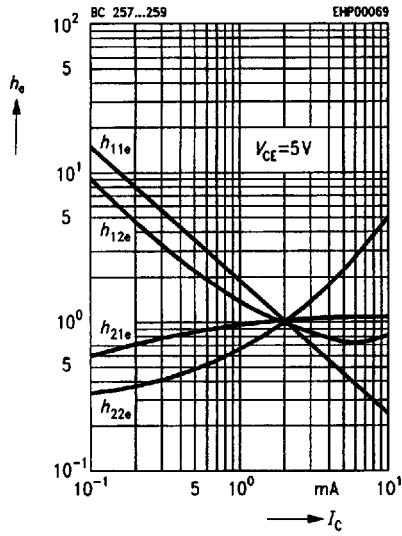
$V_{CE} = 5 \text{ V}, f = 100 \text{ MHz}$



DC current gain $h_{FE} = f(I_C)$
 $V_{CE} = 5 \text{ V}$ (common emitter configuration)

Base-emitter saturation voltage
 $V_{BEsat} = f(I_C)$
 $h_{FE} = 20$

Collector-emitter saturation voltage
 $V_{CEsat} = f(I_C)$
 $h_{FE} = 20$

Collector cutoff current $I_{CB0} = f(T_A)$
 $V_{CB} = 30 \text{ V}$


Noise figure $F = f(f)$
 $I_C = 0.2 \text{ mA}$, $f = 12 \text{ kHz}$, $R_S = 2 \text{ k}\Omega$

Noise figure $F = f(V_{CE})$
 $I_C = 0.2 \text{ mA}$, $R_S = 2 \text{ k}\Omega$, $f = 1 \text{ kHz}$
 $\Delta f = 200 \text{ Hz}$, $T_A = 25^\circ \text{C}$

Noise figure $F = f(I_C)$
 $V_{CE} = 5 \text{ V}$, $f = 120 \text{ kHz}$

Noise figure $F = f(I_C)$
 $V_{CE} = 5 \text{ V}$, $f = 1 \text{ Hz}$


h parameter $h_e = f(I_C)$



Capacitance $C = f(V_{CB}, V_{EB})$

