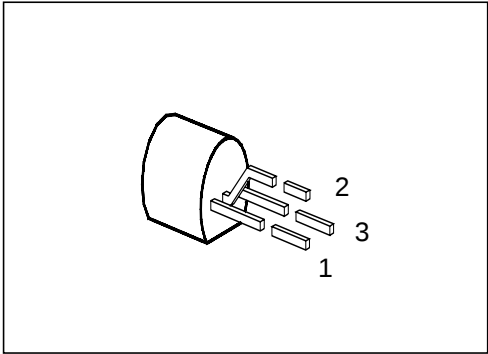


PNP Silicon AF Transistors

BCX 78
BCX 79

- High current gain
- Low collector-emitter saturation voltage
- Low noise at 1 kHz
- Low noise at low frequencies
- Complementary types: BCX 58, BCX 59 (NPN)



Type	Marking	Ordering Code	Pin Configuration			Package ¹⁾
			1	2	3	
BCX 78	—	Q62702-C717	C	B	E	TO-92
BCX 78-VII		Q62702-C626				
BCX 78-VIII		Q62702-C627				
BCX 78-IX		Q62702-C628				
BCX 78-X		Q62702-C629				
BCX 79		Q62702-C718				
BCX 79-VII		Q62702-C630				
BCX 79-VIII		Q62702-C631				
BCX 79-IX		Q62702-C632				
BCX 79-X		Q62702-C633				

¹⁾ For detailed information see chapter Package Outlines.

Maximum Ratings

Parameter	Symbol	Values		Unit
		BCX 78	BCX 79	
Collector-emitter voltage	V_{CE0}	32	45	V
Collector-base voltage	V_{CB0}	32	45	
Emitter-base voltage	V_{EB0}	5		
Collector current	I_C	100		mA
Peak collector current	I_{CM}	200		
Peak base current	I_{BM}	200		
Total power dissipation, $T_C = 70\text{ °C}$	P_{tot}	500		mW
Junction temperature	T_j	150		°C
Storage temperature range	T_{stg}	− 65 ... + 150		

Thermal Resistance

Junction - ambient	$R_{th JA}$	≤ 250	K/W
Junction - case ¹⁾	$R_{th JC}$	≤ 160	

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

Electrical Characteristics

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

Collector-emitter breakdown voltage $I_C = 2\text{ mA}$	$V_{(BR)CE0}$	32 45	— —	— —	V
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CB0}$	32 45	— —	— —	
Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$	$V_{(BR)EB0}$	5	—	—	
Collector cutoff current $V_{CB} = 32\text{ V}$ BCX 78 $V_{CB} = 45\text{ V}$ BCX 79	I_{CB0}	— —	— —	20 20	nA nA
$V_{CB} = 32\text{ V}, T_A = 150\text{ }^{\circ}\text{C}$ BCX 78 $V_{CB} = 45\text{ V}, T_A = 150\text{ }^{\circ}\text{C}$ BCX 79		— —	— —	10 10	μA μA
Collector cutoff current $V_{CB} = 32\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ }^{\circ}\text{C}$ $V_{CB} = 45\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ }^{\circ}\text{C}$	I_{CE0}	— —	— —	20 20	μA
Emitter cutoff current $V_{EB} = 4\text{ V}$	I_{EB0}	—	—	20	nA
DC current gain $I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$	h_{FE}	20 30 40 100	140 200 270 340	— — — —	—
$I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$		120 180 250 380	170 250 350 500	220 310 460 630	
$I_C = 100\text{ mA}, V_{CE} = 1\text{ V}^{1)}$		40 45 60 60	— — — —	— — — —	

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

Electrical Characteristics

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

Collector-emitter saturation voltage ¹⁾ $I_C = 100\text{ mA}$, $I_B = 2.5\text{ mA}$	V_{CEsat}	—	—	0.6	V
Base-emitter saturation voltage ¹⁾ $I_C = 100\text{ mA}$, $I_B = 2.5\text{ mA}$	V_{BEsat}	—	—	1.0	
Base-emitter voltage $I_C = 10\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 100\text{ mA}$, $V_{CE} = 1\text{ V}$ ¹⁾	$V_{BE(on)}$	— 0.55 —	0.52 0.65 0.93	— 0.75 —	

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

Electrical Characteristics

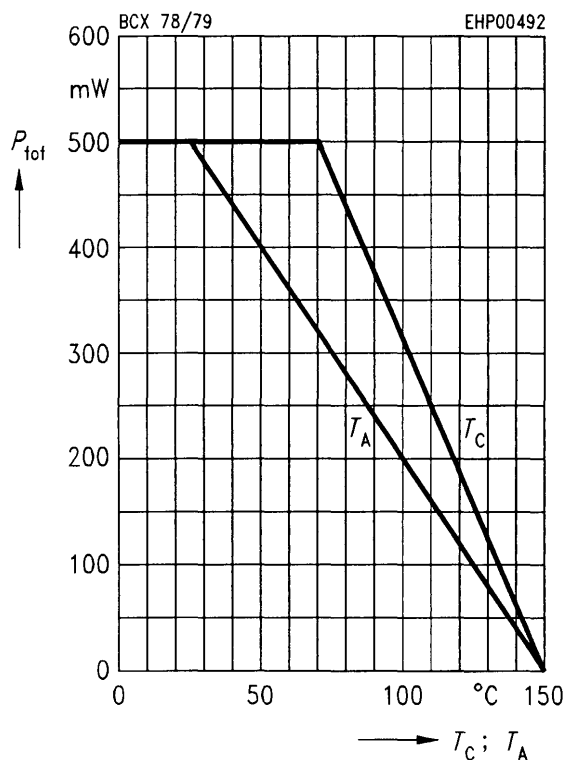
at $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

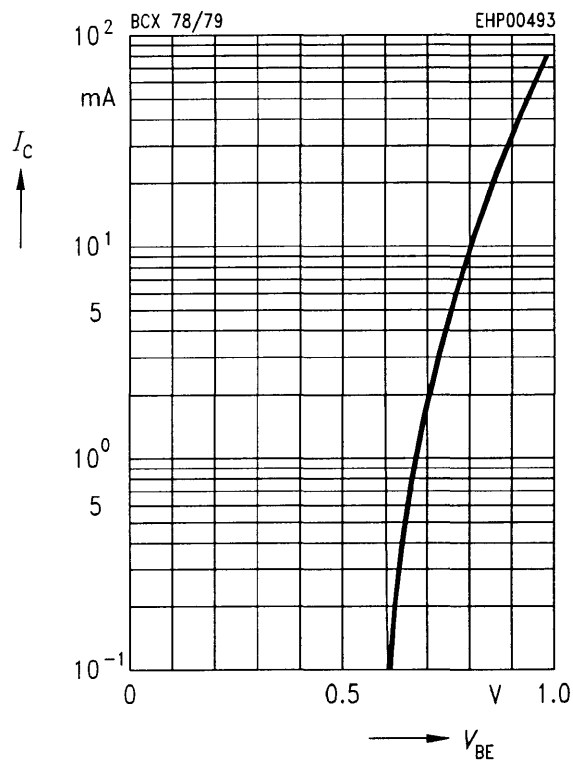
AC characteristics

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}	—	3	—	pF
Input capacitance $V_{EB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{ibo}	—	10	—	
Short-circuit input impedance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 78 VII, BCX 79 VII BCX 78 VIII, BCX 79 VIII BCX 78 IX, BCX 79 IX BCX 78 X, BCX 79 X	h_{11e}	— — — —	2.7 3.6 4.5 7.5	— — — —	k Ω
Open-circuit reverse voltage transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 78 VII, BCX 79 VII BCX 78 VIII, BCX 79 VIII BCX 78 IX, BCX 79 IX BCX 78 X, BCX 79 X	h_{12e}	— — — —	1.5 2 2 3	— — — —	10^{-4}
Short-circuit forward current transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 78 VII, BCX 79 VII BCX 78 VIII, BCX 79 VIII BCX 78 IX, BCX 79 IX BCX 78 X, BCX 79 X	h_{21e}	— — — —	200 260 330 520	— — — —	—
Open-circuit output admittance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 78 VII, BCX 79 VII BCX 78 VIII, BCX 79 VIII BCX 78 IX, BCX 79 IX BCX 78 X, BCX 79 X	h_{22e}	— — — —	18 24 30 50	— — — —	μS
Noise figure $I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ k}\Omega$ $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$	F	—	2	—	dB

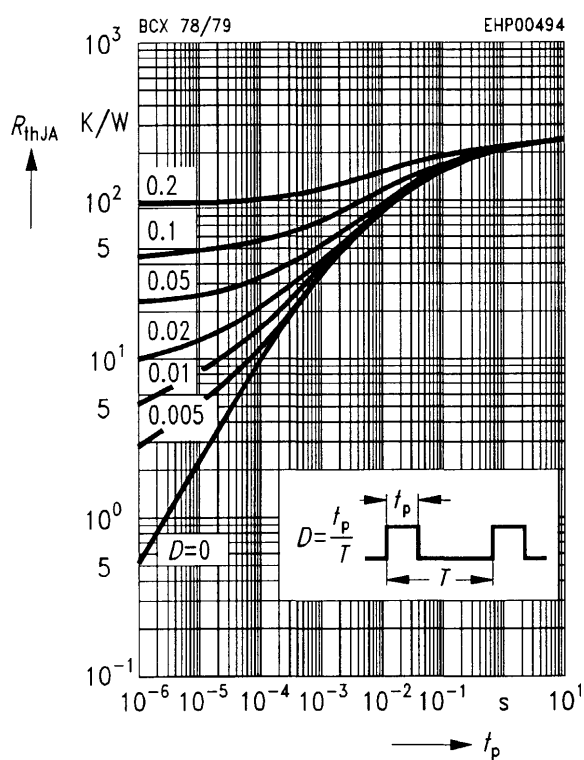
Total power dissipation $P_{\text{tot}} = f(T_A; T_C)$



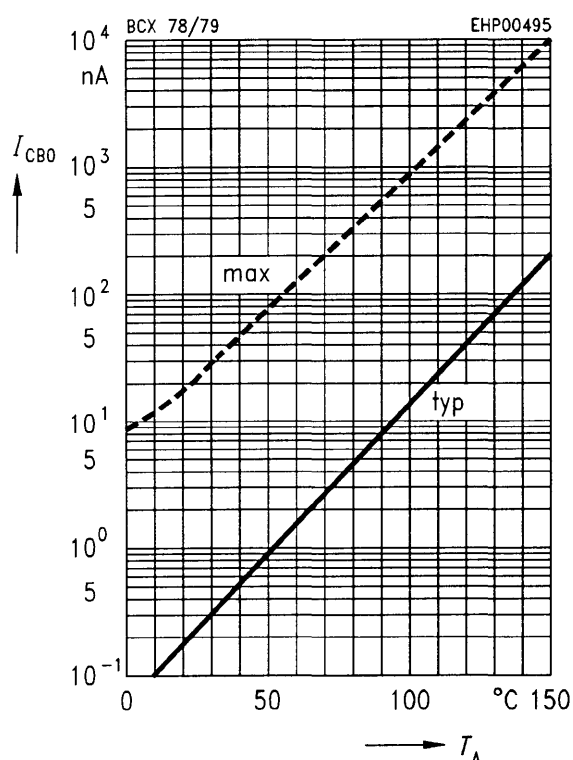
Collector current $I_C = f(V_{\text{BE}})$
 $V_{\text{CE}} = 5 \text{ V}$



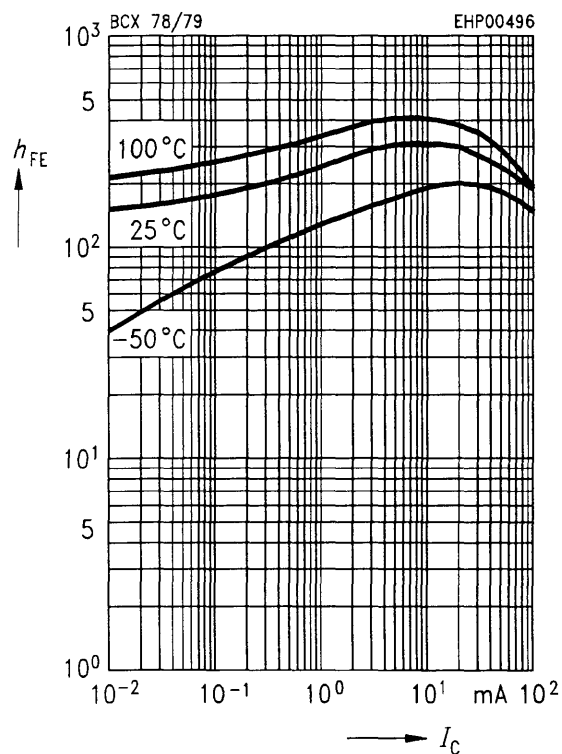
Permissible pulse load $R_{\text{thJA}} = f(t_p)$



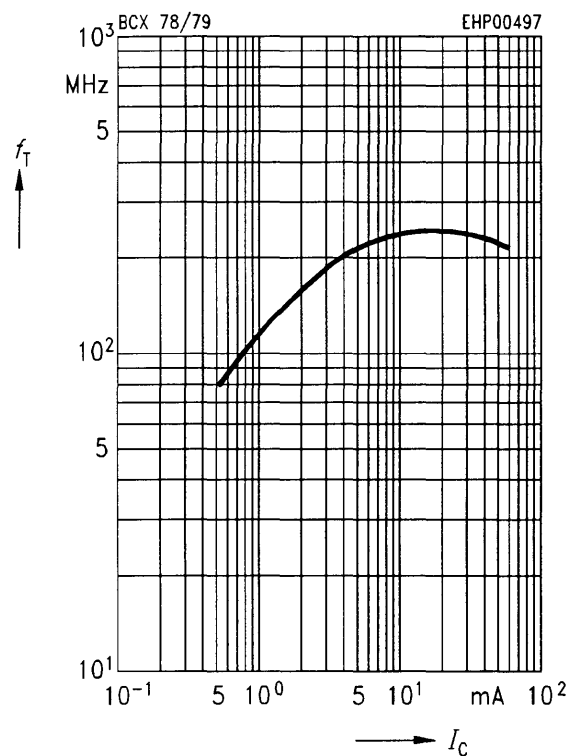
Collector cutoff current $I_{\text{CB0}} = f(T_A)$
for max. permissible reverse voltage



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



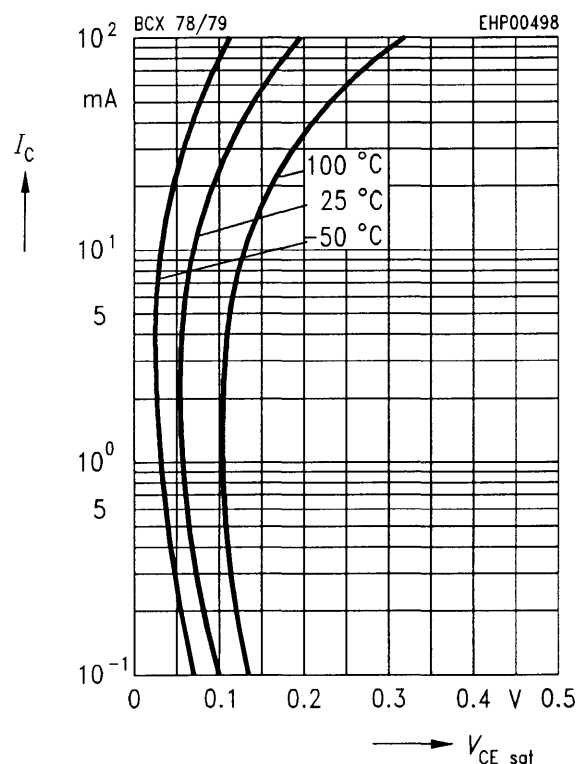
Transition frequency $f_T = f(I_C)$
 $V_{CE} = 5 \text{ V}$



Collector-emitter saturation voltage

$$I_C = f(V_{CEsat})$$

$h_{FE} = 20$



Base-emitter saturation voltage

$$I_C = f(V_{BEsat})$$

$h_{FE} = 20$

