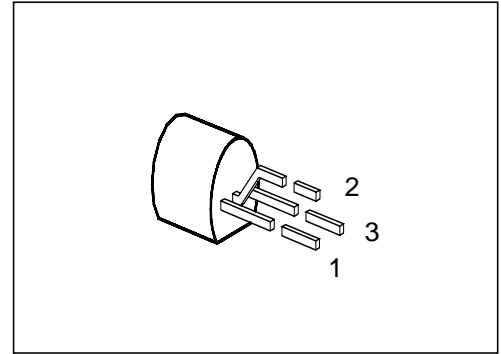


## PNP Silicon AF Transistors

**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 <sup>1)</sup>
			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				

<sup>1)</sup> 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 <sup>1)</sup>	$R_{th JC}$	≤ 160	

<sup>1)</sup> Mounted on Al heat sink 15 mm × 25 mm × 0.5 mm.

**Electrical Characteristics**

at  $T_A = 25\text{ °C}$ , 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 $V_{CB} = 32\text{ V}$ $V_{CB} = 45\text{ V}$ $V_{CB} = 32\text{ V}, T_A = 150\text{ °C}$ $V_{CB} = 45\text{ V}, T_A = 150\text{ °C}$	$I_{CB0}$	– – – –	– – – –	20 20 10 10	nA nA $\mu\text{A}$ $\mu\text{A}$
Collector cutoff current $V_{CB} = 32\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ °C}$ $V_{CB} = 45\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ °C}$	$I_{CE0}$	– –	– –	20 20	$\mu\text{A}$
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	– – – –	– – – –	

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

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

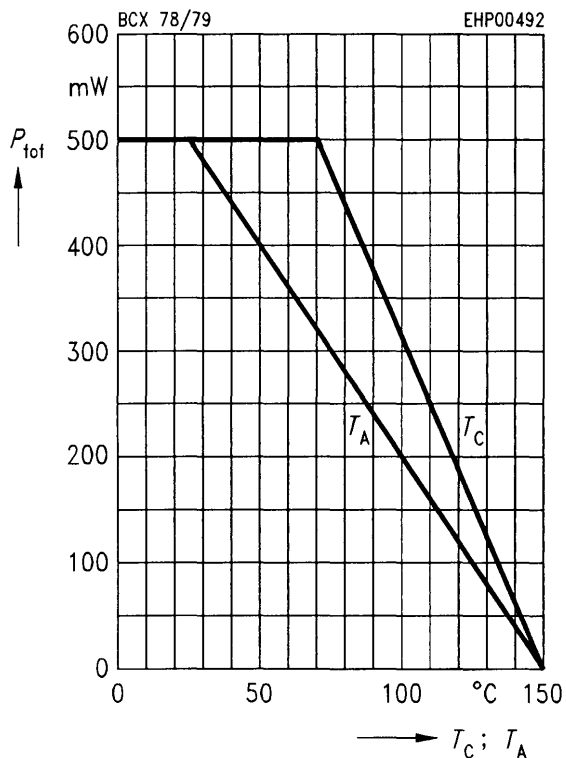
<sup>1)</sup> Pulse test:  $t \leq 300\text{ }\mu\text{s}, D \leq 2\text{ }\%$ .

**Electrical Characteristics**

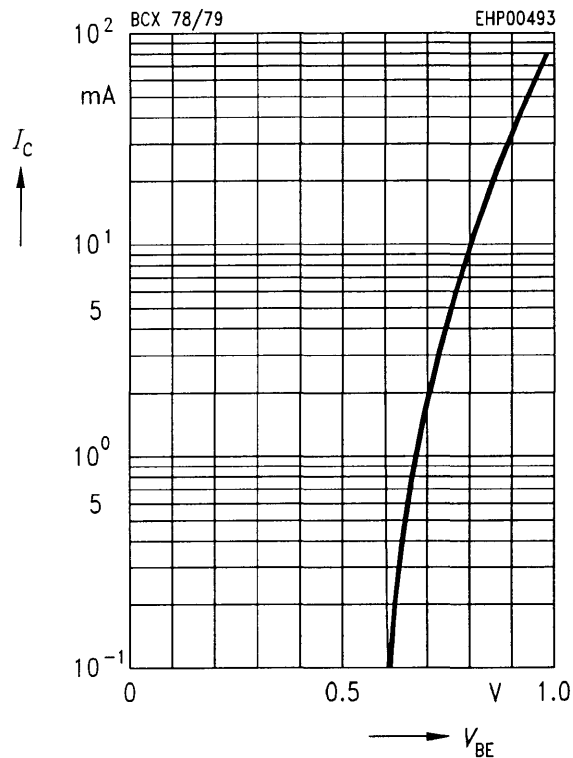
at  $T_A = 25\text{ }^\circ\text{C}$ , unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>AC characteristics</b>					
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 $\Omega$
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	– – – –	$\mu\text{S}$
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

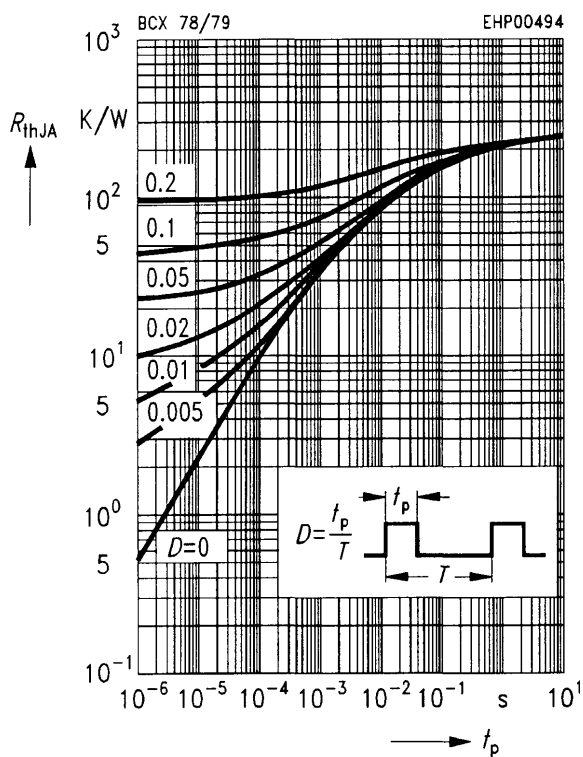
**Total power dissipation  $P_{tot} = f(T_A; T_C)$**



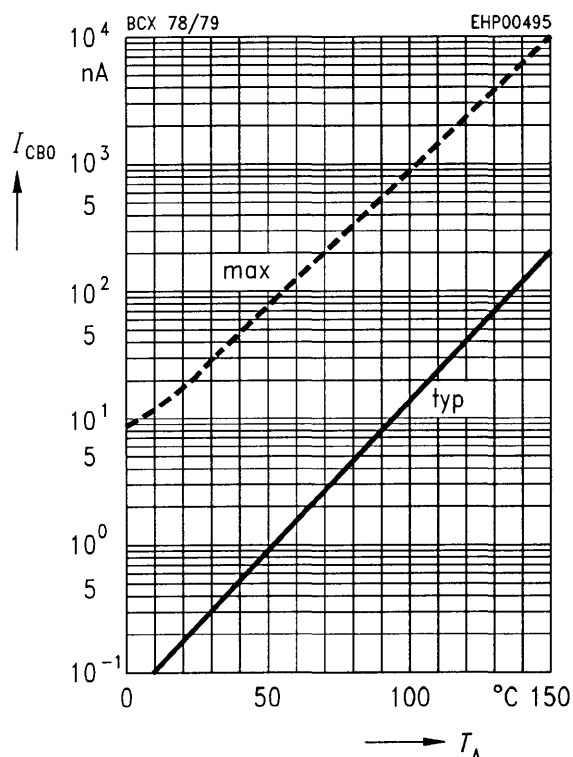
**Collector current  $I_C = f(V_{BE})$**   
 $V_{CE} = 5 V$



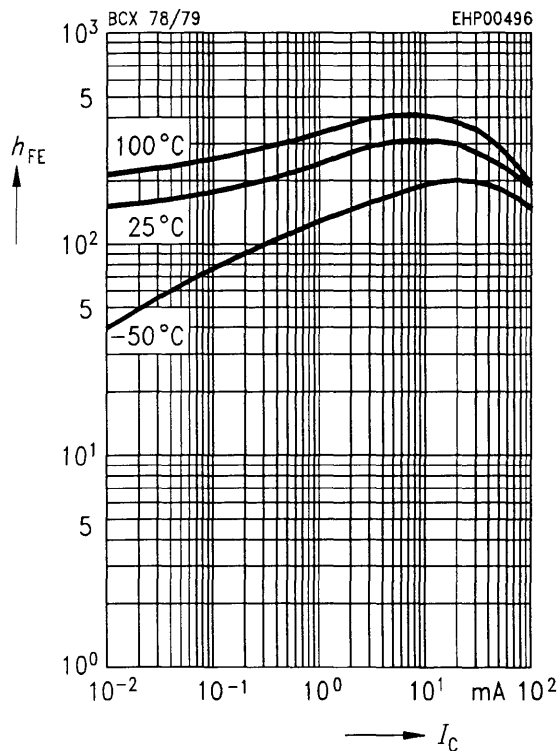
**Permissible pulse load  $R_{thJA} = f(t_p)$**



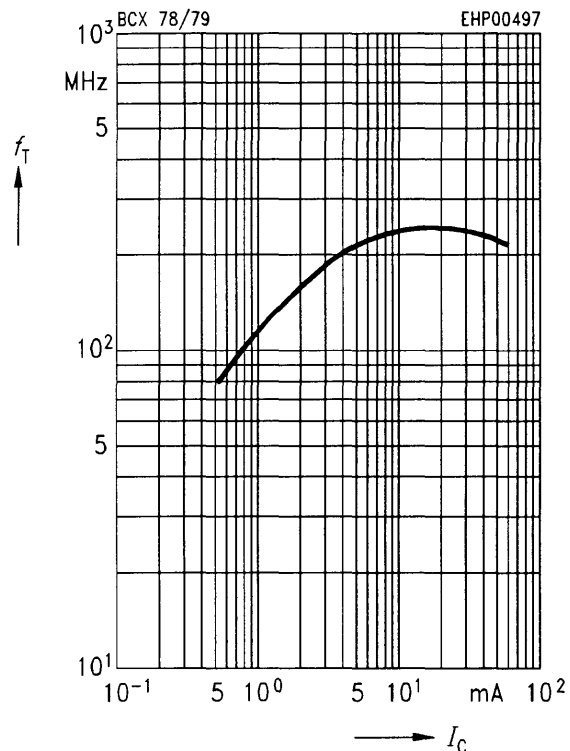
**Collector cutoff current  $I_{CB0} = f(T_A)$**   
for max. permissible reverse voltage



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

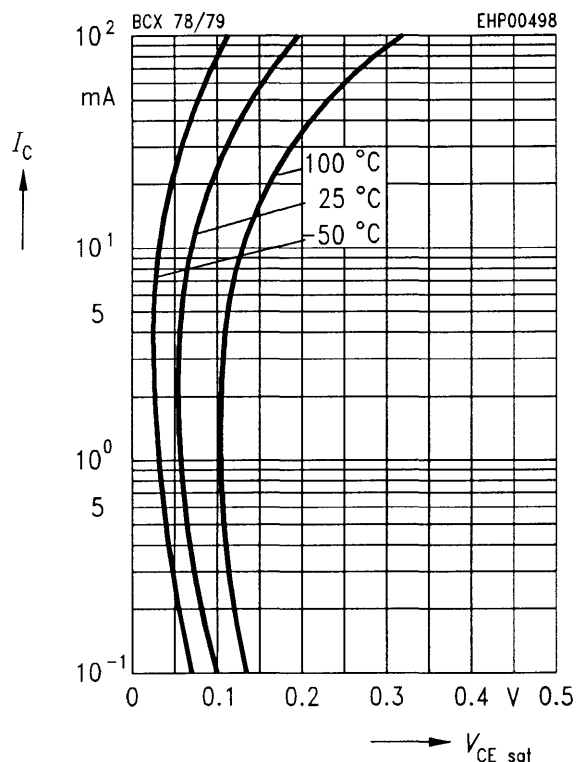


**Transition frequency  $f_T = f(I_C)$**   
 $V_{CE} = 5\text{ V}$



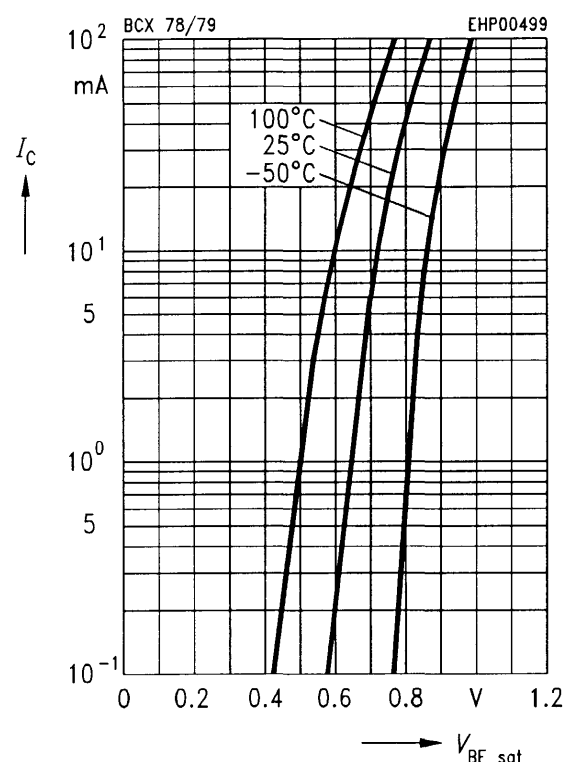
**Collector-emitter saturation voltage**

$I_C = f(V_{CEsat})$   
 $h_{FE} = 20$



**Base-emitter saturation voltage**

$I_C = f(V_{BEsat})$   
 $h_{FE} = 20$





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