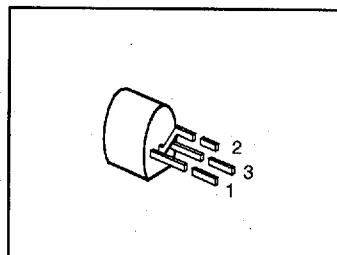


NPN Silicon AF Transistors

BCX 58
BCX 59

- High current gain
- Low collector-emitter saturation voltage
- Complementary types: BCX 78, BCX 79 (PNP)



Type	Marking	Ordering Code	Pin Configuration			Package ¹⁾
			1	2	3	
BCX 58 VIII	-	Q62702-C619	C	B	E	TO-92
BCX 58 IX		Q62702-C620				
BCX 58 X		Q62702-C621				
BCX 59 VIII		Q62702-C623				
BCX 59 IX		Q62702-C624				
BCX 59 X		Q62702-C625				

Maximum Ratings

Parameter	Symbol	Values		Unit
		BCX 58	BCX 59	
Collector-emitter voltage	V_{CE0}	32	45	V
Collector-base voltage	V_{CB0}	32	45	
Emitter-base voltage	V_{EB0}	7		
Collector current	I_C	100		mA
Peak collector current	I_{CM}	200		
Peak base current	I_{BM}	200		
Total power dissipation, $T_C = 70\text{ }^\circ\text{C}$	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 ²⁾	R_{thJC}	≤ 160	

1) For detailed information see chapter Package Outlines.

2) Mounted on Al heat sink 15 mm x 25 mm x 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 $I_C = 2\text{ mA}$	$V_{(BR)CEO}$	32 45	- -	- -	V
BCX 58					
BCX 59					
Collector-base breakdown voltage $I_C = 10\text{ }\mu\text{A}$	$V_{(BR)CBO}$	32 45	- -	- -	
BCX 58					
BCX 59					
Emitter-base breakdown voltage $I_E = 1\text{ }\mu\text{A}$	$V_{(BR)EBO}$	7	-	-	
Collector cutoff current $V_{CB} = 32\text{ V}$	I_{CBO}	-	-	20	nA
$V_{CB} = 45\text{ V}$		-	-	20	nA
$V_{CB} = 32\text{ V}, T_A = 150\text{ }^\circ\text{C}$		-	-	10	μA
$V_{CB} = 45\text{ V}, T_A = 150\text{ }^\circ\text{C}$		-	-	10	μA
Collector cutoff current $V_{CE} = 32\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ }^\circ\text{C}$	I_{CEX}	-	-	20	μA
$V_{CE} = 45\text{ V}, V_{BE} = 0.2\text{ V}, T_A = 100\text{ }^\circ\text{C}$		-	-	20	
Emitter cutoff current $V_{EB} = 4\text{ V}$	I_{EBO}	-	-	20	nA
DC current gain $I_C = 10\text{ }\mu\text{A}, V_{CE} = 5\text{ V}$	h_{FE}	20	78	-	
BCX 58 VII, BCX 59 VII		20	145	-	
BCX 58 VIII, BCX 59 VIII		40	220	-	
BCX 58 IX, BCX 59 IX		100	300	-	
BCX 58 X, BCX 59 X					
$I_C = 2\text{ mA}, V_{CE} = 5\text{ V}$	h_{FE}	120	170	220	
BCX 58 VII, BCX 59 VII		180	250	310	
BCX 58 VIII, BCX 59 VIII		250	350	460	
BCX 58 IX, BCX 59 IX		380	500	630	
BCX 58 X, BCX 59 X					
$I_C = 100\text{ mA}, V_{CE} = 1\text{ V}^{(1)}$	h_{FE}	40	-	-	
BCX 58 VII, BCX 59 VII		45	-	-	
BCX 58 VIII, BCX 59 VIII		60	-	-	
BCX 58 IX, BCX 59 IX		60	-	-	
BCX 58 X, BCX 59 X					

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

Electrical Characteristics

at $T_A = 25^\circ\text{C}$, 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}	—	—	0.5	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 0.83	— 0.75 —	

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

Electrical Characteristics

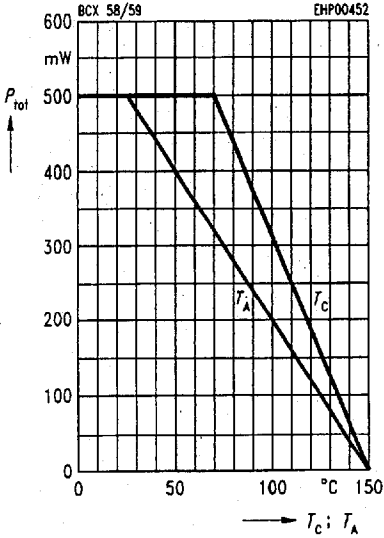
at $T_A = 25^\circ\text{C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

AC characteristics

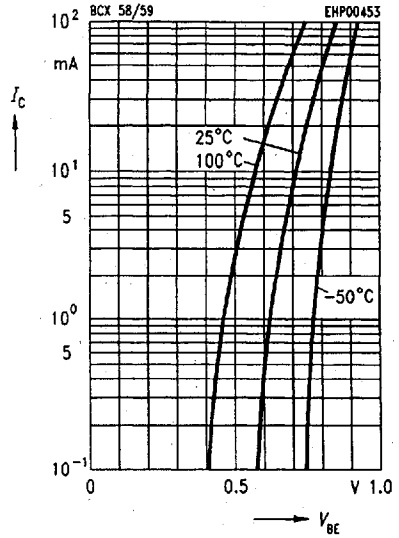
Transition frequency $I_C = 20\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 100\text{ MHz}$	f_T	—	200	—	MHz
Output capacitance $V_{CB} = 10\text{ V}$, $f = 1\text{ MHz}$	C_{ob0}	—	3	—	pF
Input capacitance $V_{CB} = 0.5\text{ V}$, $f = 1\text{ MHz}$	C_{ib0}	—	8	—	
Short-circuit input impedance $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 58 VII, BCX 59 VII BCX 58 VIII, BCX 59 VIII BCX 58 IX, BCX 59 IX BCX 58 X, BCX 59 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 58 VII, BCX 59 VII BCX 58 VIII, BCX 59 VIII BCX 58 IX, BCX 59 IX BCX 58 X, BCX 59 X	h_{12e}	—	1.5 2.0 2.0 3.0	—	10^{-4}
Short-circuit forward current transfer ratio $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ BCX 58 VII, BCX 59 VII BCX 58 VIII, BCX 59 VIII BCX 58 IX, BCX 59 IX BCX 58 X, BCX 59 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 58 VII, BCX 59 VII BCX 58 VIII, BCX 59 VIII BCX 58 IX, BCX 59 IX BCX 58 X, BCX 59 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 $P_{tot} = f(T_A; T_C)$

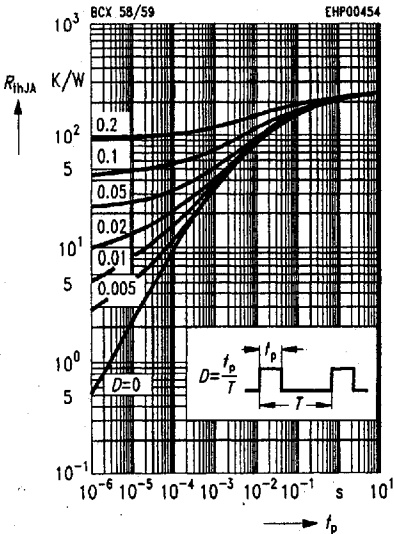


Collector current $I_C = f(V_{BE})$

$V_{CE} = 5\text{ V}$ (common emitter configuration)

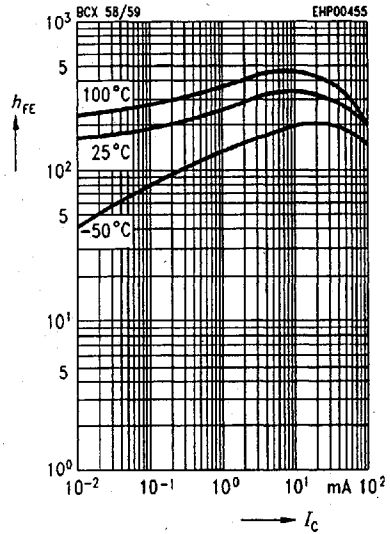


Permissible pulse load $R_{thJA} = f(t_p)$

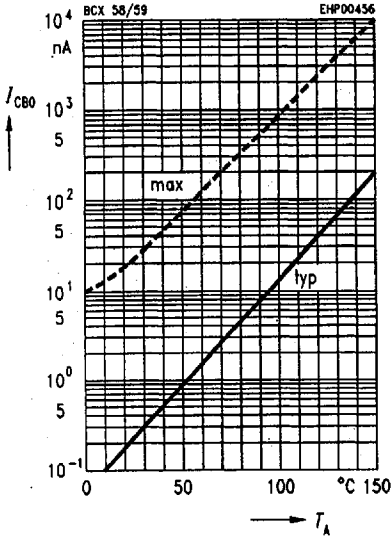


DC current gain $h_{FE} = f(I_C)$

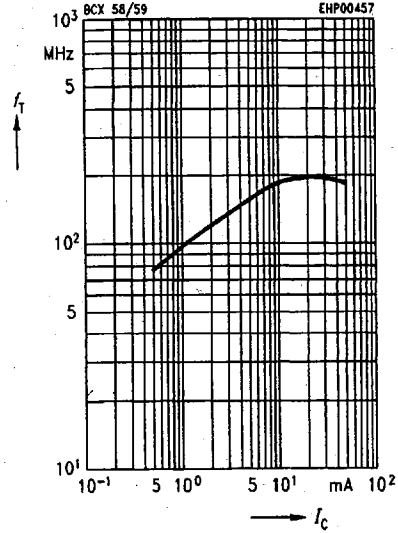
$V_{CE} = 5\text{ V}$ (common emitter configuration)



Collector cutoff current $I_{CBO} = f(T_A)$
 $V_{CB} = 45 \text{ V}$

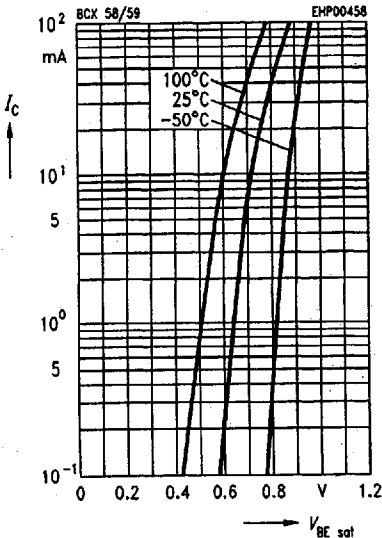


Transition frequency $f_T = f(I_C)$
 $V_{CE} = 5 \text{ V}, f = 100 \text{ MHz}$



Base-emitter saturation voltage

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



Collector-emitter saturation voltage

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

