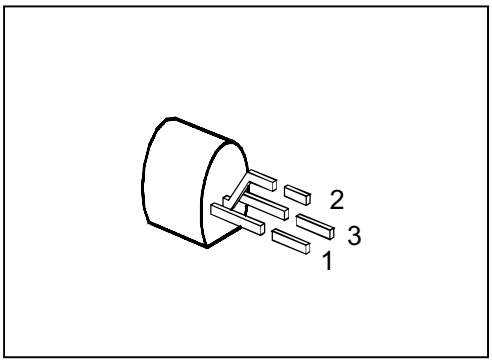
SIEMENS

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 1	2	3	Package[1]
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 BCX 58	BCX 59	Unit
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 °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[2]	$R_{th\ JC}$	≤ 160	

1) For detailed information see chapter Package Outlines.
2) Mounted on Al heat sink 15 mm × 25 mm × 0.5 mm.

Electrical Characteristics
at T_A = 25 ˚C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter breakdown voltage	$V_{(BR)CE0}$				V
I_C = 2 mA BCX 58		32	–	–	
BCX 59		45	–	–	
Collector-base breakdown voltage	$V_{(BR)CB0}$				
I_C = 10 µA BCX 58		32	–	–	
BCX 59		45	–	–	
Emitter-base breakdown voltage	$V_{(BR)EB0}$	7	–	–	
I_E = 1 µA					
Collector cutoff current	I_{CB0}				
V_{CB} = 32 V BCX 58		–	–	20	nA
V_{CB} = 45 V BCX 59		–	–	20	nA
V_{CB} = 32 V, T_A = 150 ˚C BCX 58		–	–	10	µA
V_{CB} = 45 V, T_A = 150 ˚C BCX 59		–	–	10	µA
Collector cutoff current	I_{CEX}				µA
V_{CE} = 32 V, V_{BE} = 0.2 V, T_A = 100 ˚C		–	–	20	
V_{CE} = 45 V, V_{BE} = 0.2 V, T_A = 100 ˚C		–	–	20	
Emitter cutoff current	I_{EB0}	–	–	20	nA
V_{EB} = 4 V					
DC current gain	h_{FE}				–
I_C = 10 µA, V_{CE} = 5 V					
BCX 58 VII, BCX 59 VII		20	78	–	
BCX 58 VIII, BCX 59 VIII		20	145	–	
BCX 58 IX, BCX 59 IX		40	220	–	
BCX 58 X, BCX 59 X		100	300	–	
I_C = 2 mA, V_{CE} = 5 V					
BCX 58 VII, BCX 59 VII		120	170	220	
BCX 58 VIII, BCX 59 VIII		180	250	310	
BCX 58 IX, BCX 59 IX		250	350	460	
BCX 58 X, BCX 59 X		380	500	630	
I_C = 100 mA, V_{CE} = 1 V[1)]					
BCX 58 VII, BCX 59 VII		40	–	–	
BCX 58 VIII, BCX 59 VIII		45	–	–	
BCX 58 IX, BCX 59 IX		60	–	–	
BCX 58 X, BCX 59 X		60	–	–	

1) Pulse test: $t \leq 300$ µs, $D \leq 2$ %.

Electrical Characteristics
at T_A = 25 ˚C, unless otherwise specified.

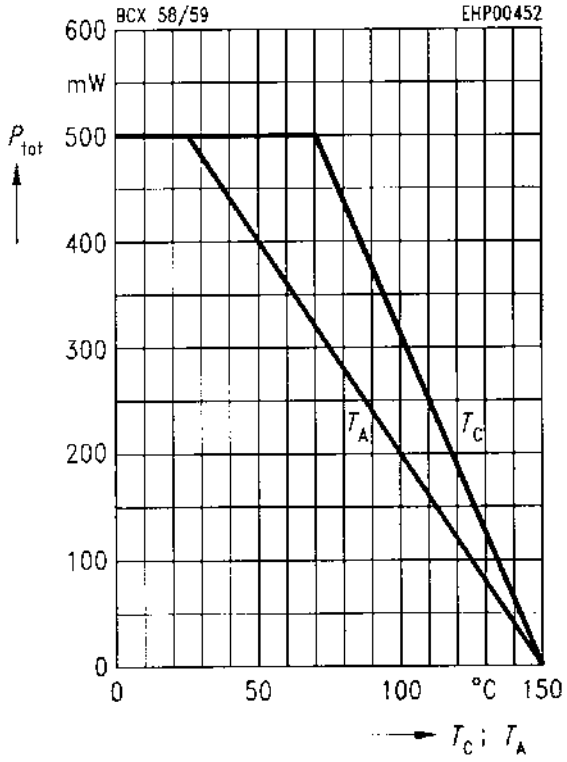
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter saturation voltage[1)] I_C = 100 mA, I_B = 2.5 mA	V_{CEsat}	–	–	0.5	V
Base-emitter saturation voltage[1)] I_C = 100 mA, I_B = 2.5 mA	V_{BEsat}	–	–	1.0	
Base-emitter voltage I_C = 10 µA, V_{CE} = 5 V I_C = 2 mA, V_{CE} = 5 V I_C = 100 mA, V_{CE} = 1 V [1)]	$V_{BE(on)}$	 – 0.55 –	 0.52 0.65 0.83	 – 0.75 –	

[1)] Pulse test: $t \leq 300$ µs, $D \leq 2$ %.

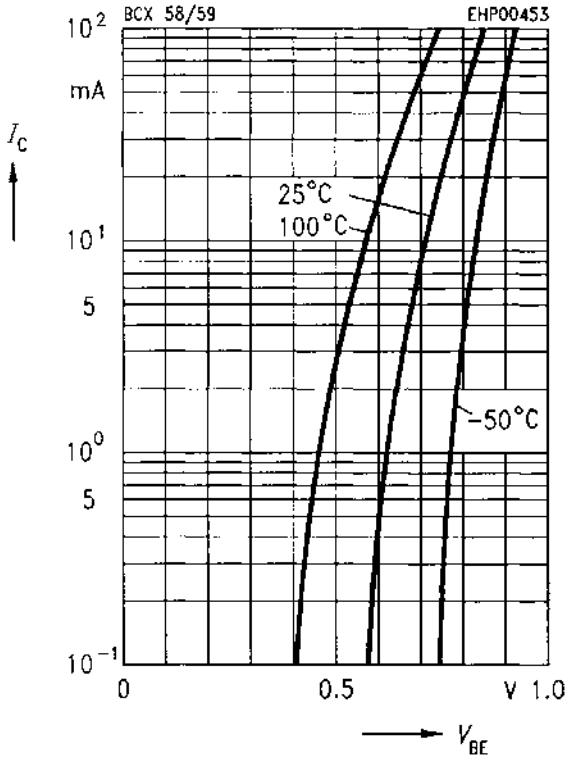
Electrical Characteristics
at T_A = 25 ˚C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC characteristics					
Transition frequency I_C = 20 mA, V_{CE} = 5 V, f = 100 MHz	f_t	–	200	–	MHz
Output capacitance V_{CB} = 10 V, f = 1 MHz	C_{obo}	–	3	–	pF
Input capacitance V_{CB} = 0.5 V, f = 1 MHz	C_{ibo}	–	8	–	
Short-circuit input impedance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{11e}				kΩ
BCX 58 VII, BCX 59 VII		–	2.7	–	
BCX 58 VIII, BCX 59 VIII		–	3.6	–	
BCX 58 IX, BCX 59 IX		–	4.5	–	
BCX 58 X, BCX 59 X		–	7.5	–	
Open-circuit reverse voltage transfer ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{12e}				10^{-4}
BCX 58 VII, BCX 59 VII		–	1.5	–	
BCX 58 VIII, BCX 59 VIII		–	2.0	–	
BCX 58 IX, BCX 59 IX		–	2.0	–	
BCX 58 X, BCX 59 X		–	3.0	–	
Short-circuit forward current transfer ratio I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{21e}				–
BCX 58 VII, BCX 59 VII		–	200	–	
BCX 58 VIII, BCX 59 VIII		–	260	–	
BCX 58 IX, BCX 59 IX		–	330	–	
BCX 58 X, BCX 59 X		–	520	–	
Open-circuit output admittance I_C = 2 mA, V_{CE} = 5 V, f = 1 kHz	h_{22e}				µS
BCX 58 VII, BCX 59 VII		–	18	–	
BCX 58 VIII, BCX 59 VIII		–	24	–	
BCX 58 IX, BCX 59 IX		–	30	–	
BCX 58 X, BCX 59 X		–	50	–	
Noise figure I_C = 0.2 mA, V_{CE} = 5 V, R_S = 2 kΩ f = 1 kHz, Δf = 200 Hz	F	–	2	–	dB

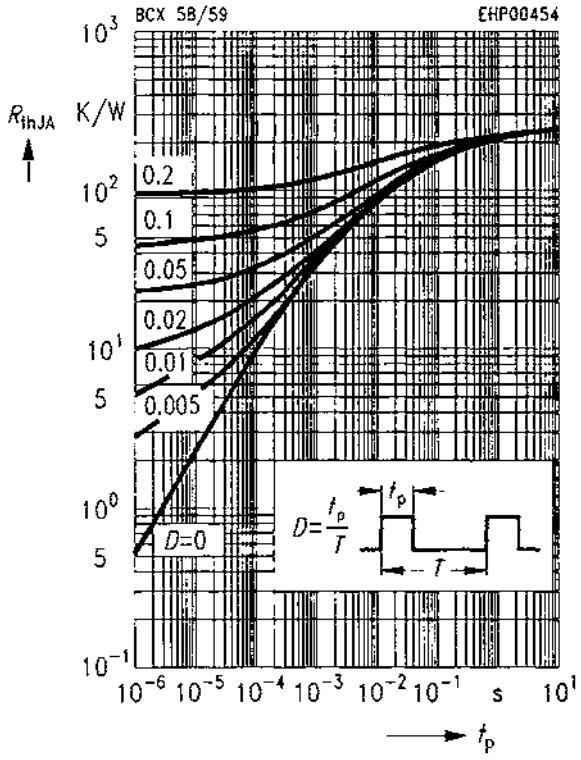
Total power dissipation $P_{tot} = f(T_A; T_C)$



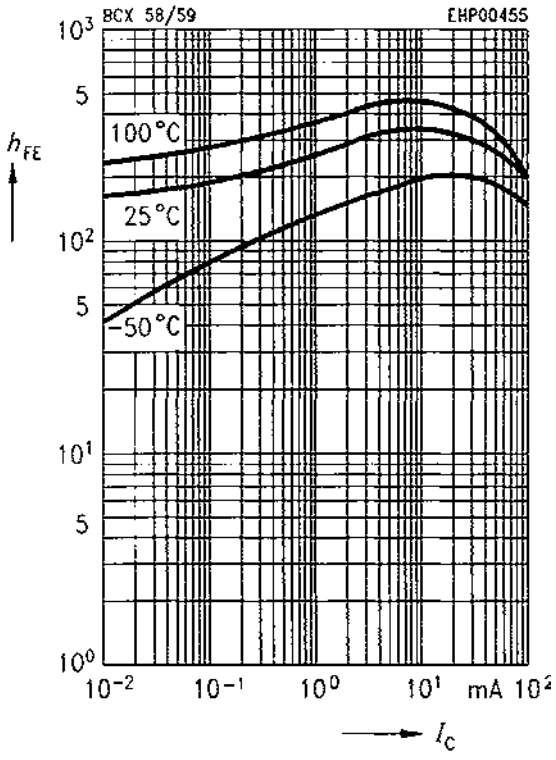
Collector current $I_C = f(V_{BE})$
V_{CE} = 5 V (common emitter configuration)



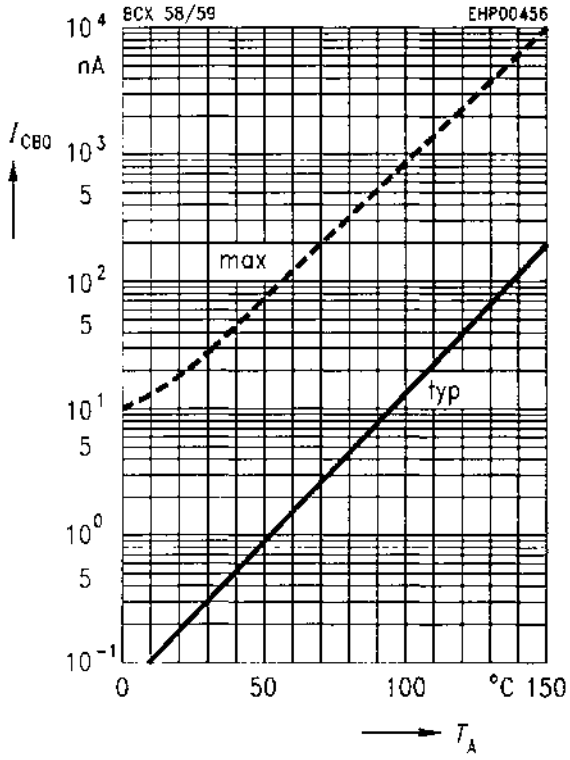
Permissible pulse load $R_{thJA} = f(t_p)$



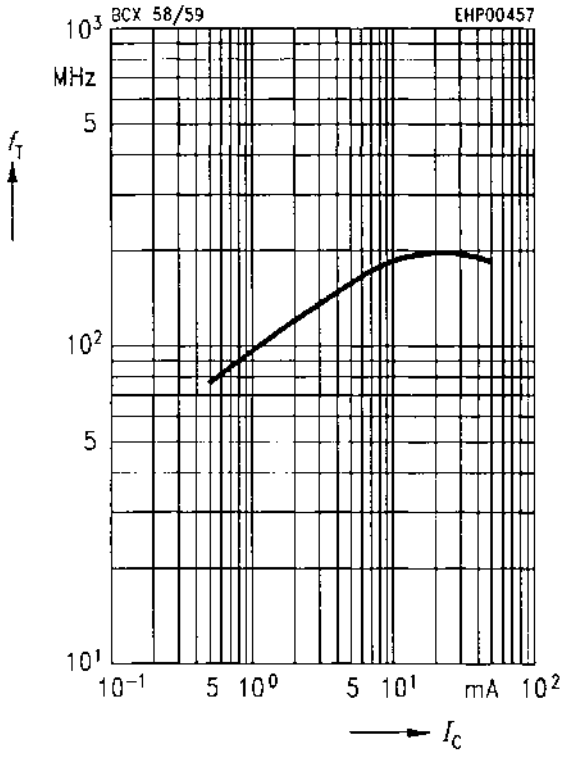
DC current gain $h_{FE} = f(I_C)$
V_{CE} = 5 V (common emitter configuration)



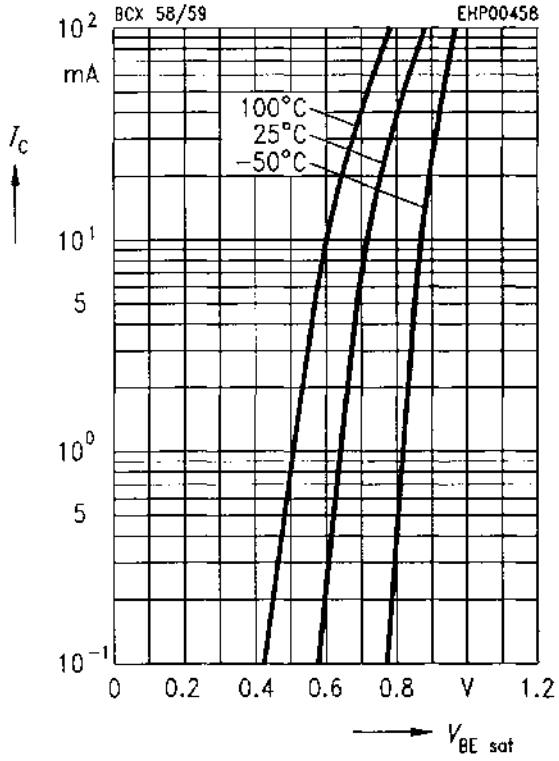
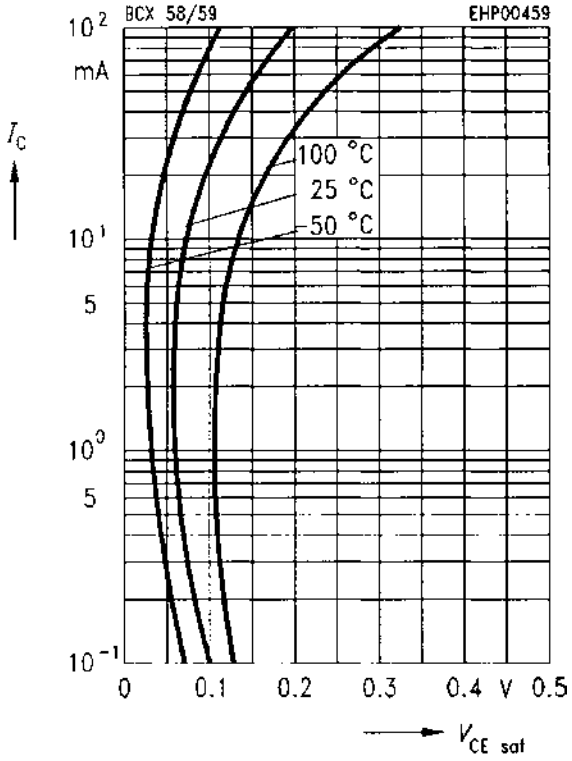
Collector cutoff current $I_{CB0} = f(T_A)$
V_{CB} = 45 V



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