# SIEMENS

NPN Silicon AF Transistors

BCP 54
... BCP 56

● For AF driver and output stages
● High collector current
● Low collector-emitter saturation voltage
● Complementary types: BCP 51 … BCP 53 (PNP)
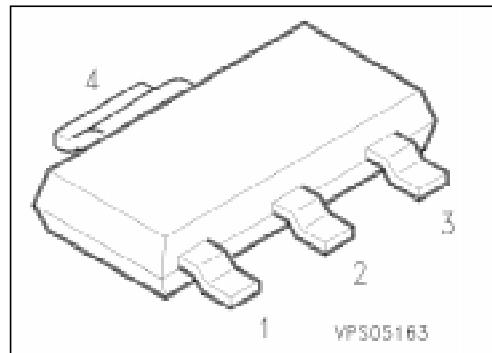
Type	Marking	Ordering Code (tape and reel)	Pin Configuration				Package[1]
			1	2	3	4	
BCP 54	BCP 54	Q62702-C2117	B	C	E	C	SOT-223
BCP 54-10	BCP 54-10	Q62702-C2119					
BCP 54-16	BCP 54-16	Q62702-C2120					
BCP 55	BCP 55	Q62702-C2148					
BCP 55-10	BCP 55-10	Q62702-C2122					
BCP 55-16	BCP 55-16	Q62702-C2123					
BCP 56	BCP 56	Q62702-C2149					
BCP 56-10	BCP 56-10	Q62702-C2125					
BCP 56-16	BCP 56-16	Q62702-C2106					

[1] For detailed information see chapter Package Outlines.

Maximum Ratings

Parameter	Symbol	Values			Unit
		BCP 54	BCP 55	BCP 56	
Collector-emitter voltage	V_{CE0}	45	60	80	V
$R_{BE} \leq 1\ k\Omega$	V_{CER}	45	60	100	
Collector-base voltage	V_{CB0}	45	60	100	
Emitter-base voltage	V_{EB0}	5			
Collector current	I_C	1			A
Peak collector current	I_{CM}	1.5			
Base current	I_B	100			mA
Peak base current	I_{BM}	200			
Total power dissipation, $T_S = 124\ °C$[1]	P_{tot}	1.5			W
Junction temperature	T_j	150			°C
Storage temperature range	T_{stg}	− 65 … + 150			

Thermal Resistance

Parameter	Symbol	Value	Unit
Junction - ambient[1]	$R_{th\ JA}$	≤ 72	K/W
Junction - soldering point	$R_{th\ JS}$	≤ 17	

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[1] Package mounted on epoxy pcb 40 mm $\times$ 40 mm $\times$ 1.5 mm/6 cm^2 Cu.

Electrical Characteristics

at T_A = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

Parameter	Symbol	min.	typ.	max.	Unit
Collector-emitter breakdown voltage I_C = 10 mA, I_B = 0 BCP 54 BCP 55 BCP 56	$V_{(BR)CE0}$	45 60 80	– – –	– – –	V
Collector-base breakdown voltage[1)] I_C = 100 µA, I_B = 0 BCP 54 BCP 55 BCP 56	$V_{(BR)CB0}$	45 60 100	– – –	– – –	
Emitter-base breakdown voltage I_E = 10 µA, I_C = 0	$V_{(BR)EB0}$	5	–	–	
Collector-base cutoff current V_{CB} = 30 V, I_E = 0 V_{CB} = 30 V, I_E = 0, T_A = 150 °C	I_{CB0}	– –	– –	100 20	nA µA
Emitter-base cutoff current V_{EB} = 5 V	I_{EB0}	–	–	10	µA

DC current gain
I_C = 5 mA, V_{CE} = 2 V
I_C = 150 mA, V_{CE} = 2 V
     BCP 54/BCP 55/BCP 56
     BCP 54/BCP 55/BCP 56-10
     BCP 54/BCP 55/BCP 56-16
I_C = 500 mA, V_{CE} = 2 V
	h_{FE}	25
		
		40
		63
		100
		25
			–
			
			–
			100
			160
			–
				–
				
				250
				160
				250
				–
					–

Collector-emitter saturation voltage[1)] I_C = 500 mA, I_B = 50 mA	V_{CEsat}	–	–	0.5	V
Base-emitter voltage[1)] I_C = 500 mA, V_{CE} = 2 V	V_{BE}	–	–	1	

AC characteristics

Parameter	Symbol	min.	typ.	max.	Unit
Transition frequency I_C = 50 mA, V_{CE} = 10 V, f = 100 MHz	f_T	–	100	–	MHz

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

**Total power dissipation** $P_{tot} = f(T_A*; T_S)$
* Package mounted on epoxy

BCP 54...56   EHP00266

P_{tot} axis (W): 1.6, 1.4, 1.2, 1.0, 0.8, 0.6, 0.4, 0.2, 0

T_A

T_S

T_S ; T_A axis (°C): 0, 50, 100, 150
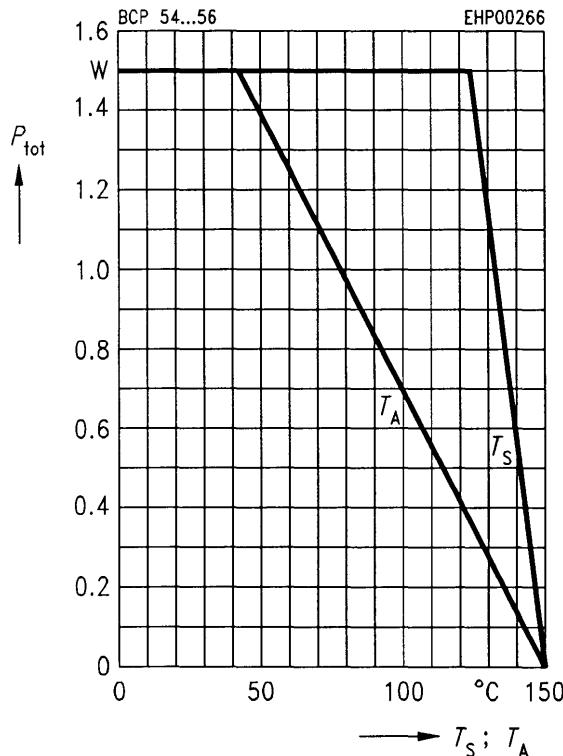
Transition frequency $f_T = f(I_C)$
$V_{CE} = 10$ V

BCP 54...56   EHP00267

f_T (MHz) axis: 10^3, 10^2, 5, 10^1

I_C axis: 10^0, 10^1, 10^2 mA, 10^3
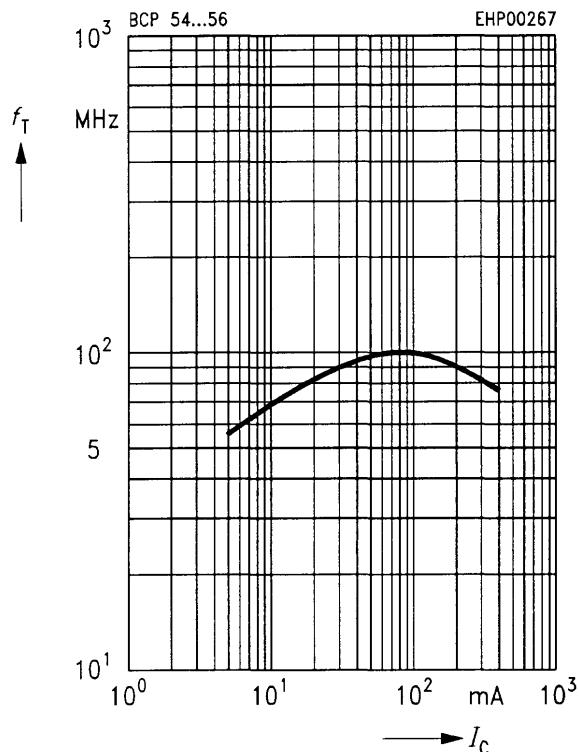
DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 2$ V

BCP 54...56   EHP00268

h_{FE} axis: 10^3, 5, 10^2, 5, 10^1, 5, 10^0

100°C
25°C
−50°C

I_C axis: 10^0, 10^1, 10^2, 10^3 mA 10^4
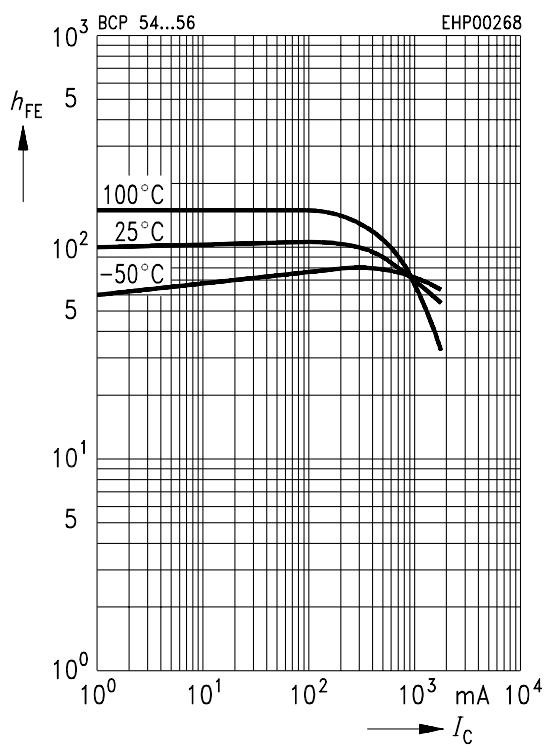
Collector cutoff current $I_{CBO} = f(T_A)$
$V_{CB} = 30$ V

BCP 54...56   EHP00269

I_{CBO} (nA) axis: 10^4, 10^3, 10^2, 10^1, 10^0, 10^{-1}

max

typ

T_A axis (°C): 0, 50, 100, 150
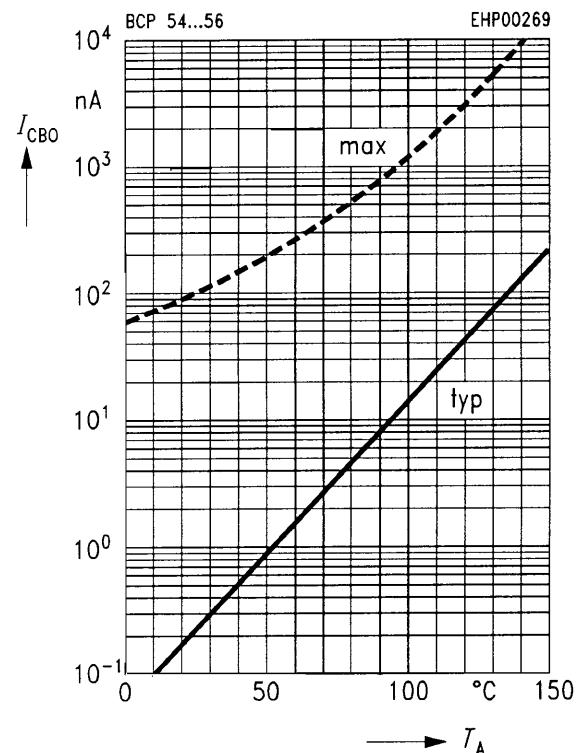
Base-emitter saturation voltage

$I_C = f(V_{BEsat})$

$h_{FE} = 10$

BCP 54...56   EHP00270

I_C mA

100°C
25°C
−50°C

V_{BEsat}
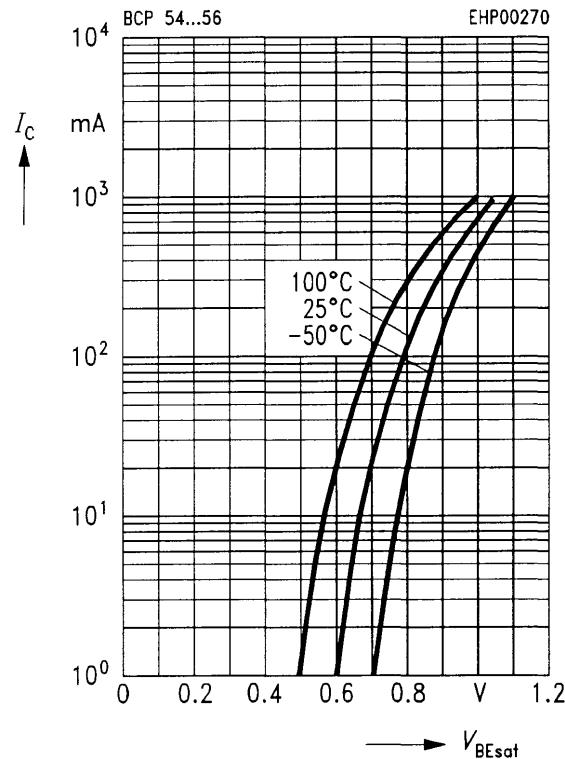
Collector-emitter saturation voltage

$I_C = f(V_{CEsat})$

$h_{FE} = 10$

BCP 54...56   EHP00271

I_C mA

100°C
25°C
−50°C

V_{CEsat}
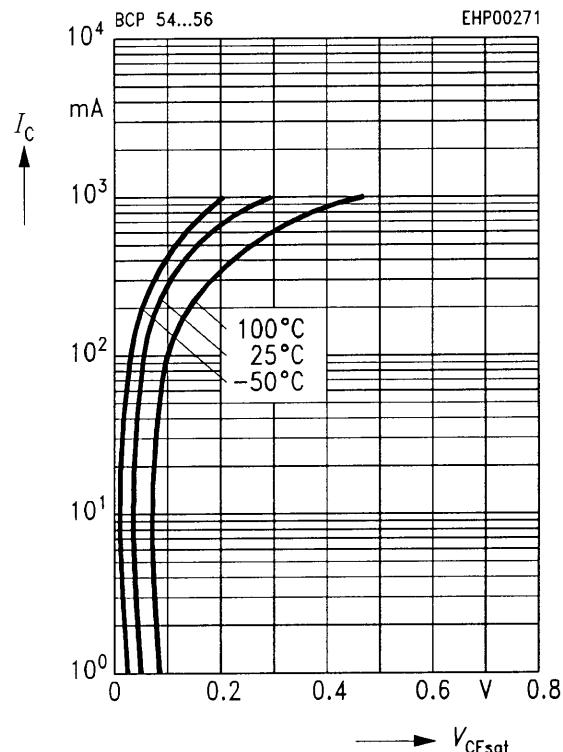
Permissible pulse load $P_{tot\ max}/P_{tot\ DC} = f(t_p)$

BCP 54...56   EHP00272

$\dfrac{P_{tot\ max}}{P_{tot\ DC}}$

$D = \dfrac{t_P}{T}$

$D =$
0
0.005
0.01
0.02
0.05
0.1
0.2
0.5

t_p