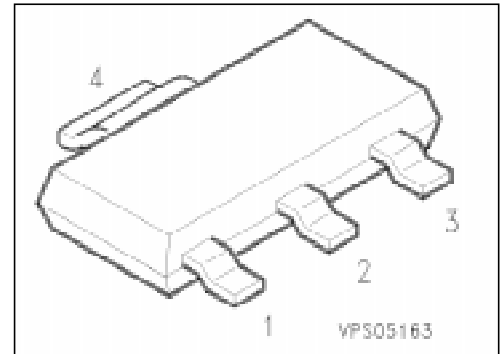


NPN Silicon Darlington Transistors

BSP 50
... BSP 52

- High collector current
- Low collector-emitter saturation voltage
- Complementary types: BSP 60 ... BSP 62 (PNP)



Type	Marking	Ordering Code (tape and reel)	Pin Configuration				Package ¹⁾
			1	2	3	4	
BSP 50	BSP 50	Q62702-P1163	B	C	E	C	SOT-223
BSP 51	BSP 51	Q62702-P1164					
BSP 52	BSP 52	Q62702-P1165					

Maximum Ratings

Parameter	Symbol	Values			Unit
		BSP 50	BSP 51	BSP 52	
Collector-emitter voltage	V_{CEr}	45	60	80	V
Collector-base voltage	V_{CB0}	60	80	100	
Emitter-base voltage	V_{EB0}	5			
Collector current	I_C	1			A
Peak collector current	I_{CM}	2			
Base current	I_B	0.1			
Total power dissipation, $T_s = 124\text{ °C}$	P_{tot}	1.5			W
Junction temperature	T_j	150			°C
Storage temperature range	T_{stg}	- 65 ... + 150			

Thermal Resistance

Junction - ambient ²⁾	$R_{th JA}$	≤ 72	K/W
Junction - soldering point	$R_{th JS}$	≤ 17	

1) For detailed information see chapter Package Outlines.

2) Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm² Cu.

Electrical Characteristics

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

Collector-emitter breakdown voltage ¹⁾ $I_C = 10\text{ mA}$	$V_{(BR)CER}$	45	–	–	V
BSP 50		60	–	–	
BSP 51		80	–	–	
Collector-base breakdown voltage $I_C = 100\text{ }\mu\text{A}, I_B = 0$	$V_{(BR)CB0}$	60	–	–	
BSP 50		80	–	–	
BSP 51		100	–	–	
Emitter-base breakdown voltage $I_E = 100\text{ }\mu\text{A}, I_B = 0$	$V_{(BR)EB0}$	5	–	–	
Collector-emitter cutoff current $V_{CE} = V_{CERmax}, V_{BE} = 0$	I_{CES}	–	–	10	μA
Emitter-base cutoff current $V_{EB} = 4\text{ V}, I_C = 0$	I_{EB0}	–	–	10	
DC current gain ²⁾ $I_C = 150\text{ mA}, V_{CE} = 10\text{ V}$ $I_C = 500\text{ mA}, V_{CE} = 10\text{ V}$	h_{FE}	1000	–	–	–
		2000	–	–	
Collector-emitter saturation voltage ²⁾ $I_C = 500\text{ mA}, I_B = 0.5\text{ mA}$ $I_C = 1\text{ A}, I_B = 1\text{ mA}$	V_{CEsat}	–	–	1.3	V
		–	–	1.8	
Base-emitter saturation voltage ²⁾ $I_C = 500\text{ mA}, I_B = 0.5\text{ mA}$ $I_C = 1\text{ A}, I_B = 1\text{ mA}$	V_{BEsat}	–	–	1.9	
		–	–	2.2	

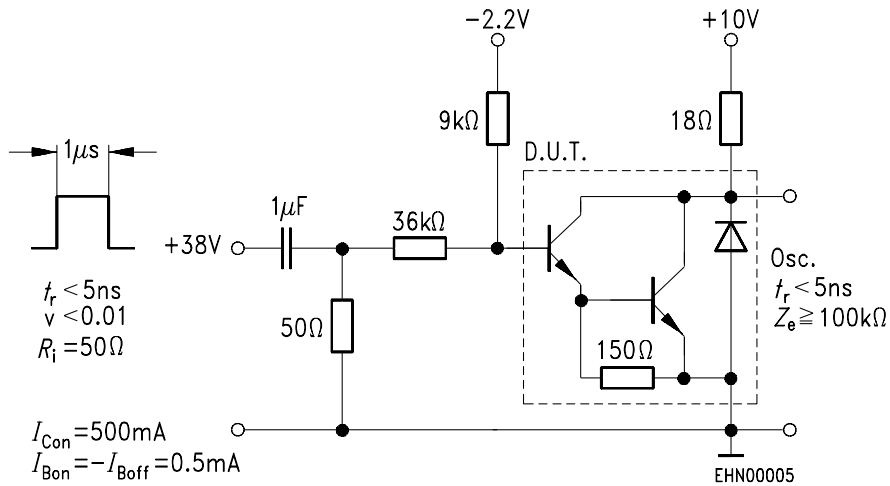
AC characteristics

Transition frequency $I_C = 100\text{ mA}, V_{CE} = 5\text{ V}, f = 100\text{ MHz}$	f_T	–	200	–	MHz
Switching times $I_C = 500\text{ mA}, I_{B1} = I_{B2} = 0.5\text{ mA}$ (see diagrams)	t_{on}	–	400	–	ns
	t_{off}	–	1500	–	ns

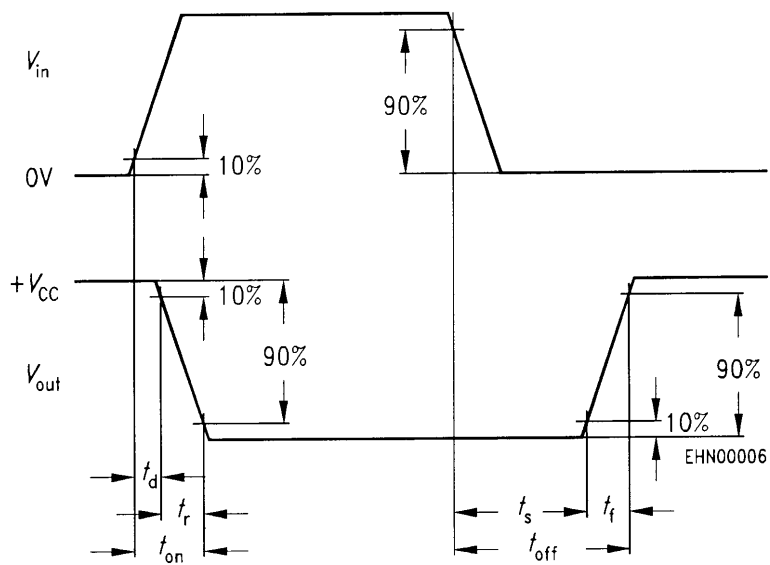
1) Compare R_{BE} for thermal stability.

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

Switching time test circuit

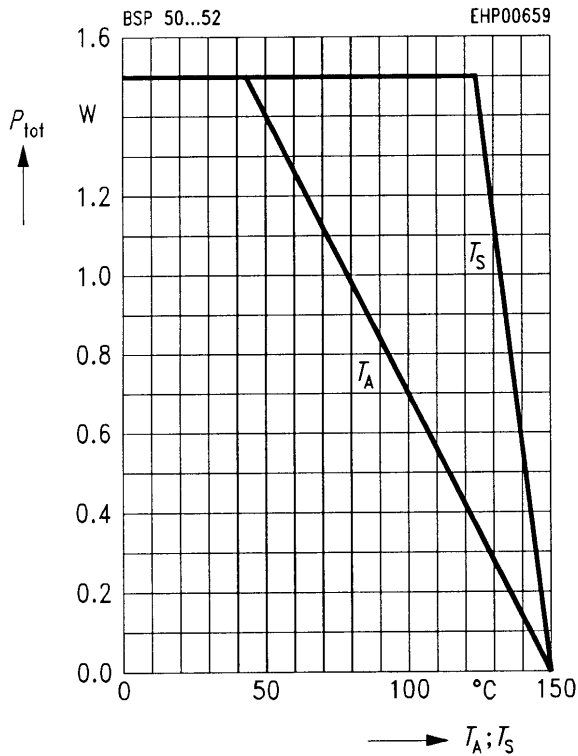


Switching time waveform



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

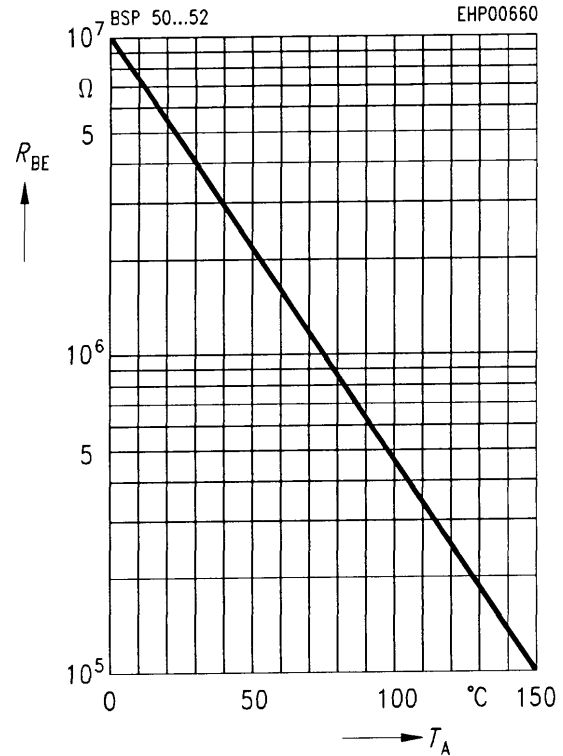
* Package mounted on epoxy



External resistance $R_{BE} = f(T_A)^{**}$

$V_{CB} = V_{CE\ max}$

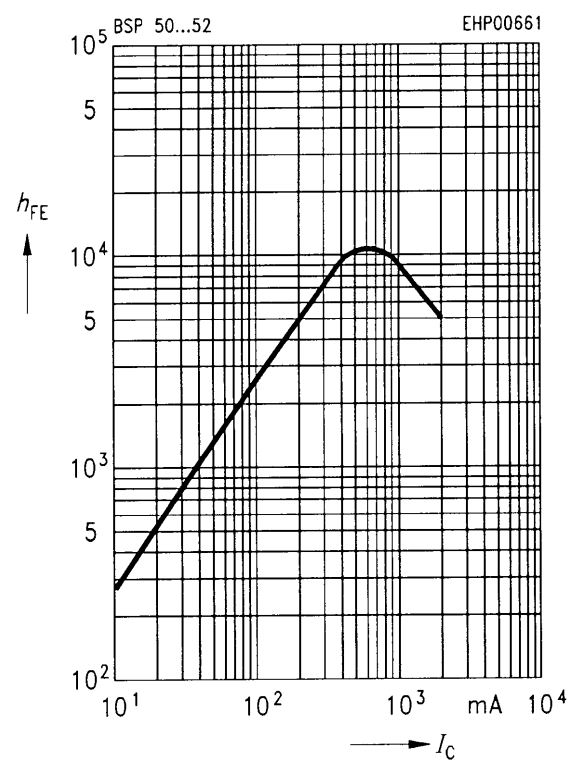
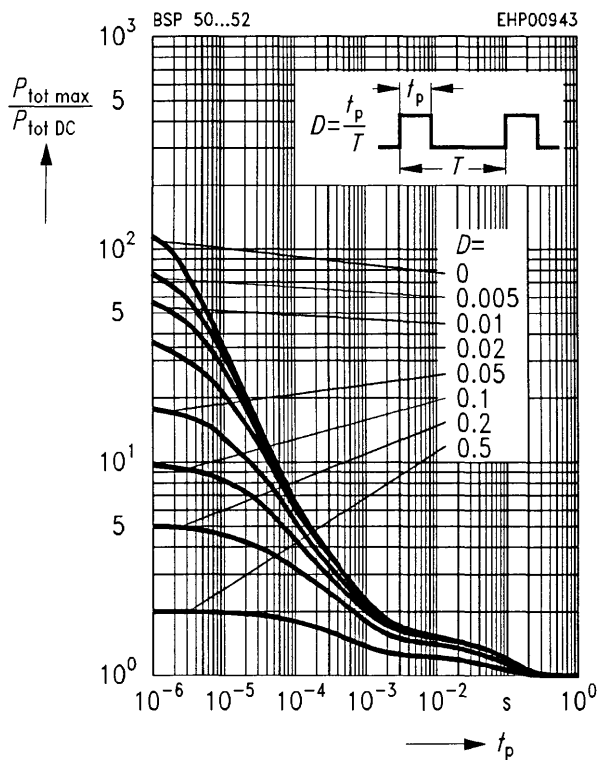
** $R_{BE\ max}$ for thermal stability



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

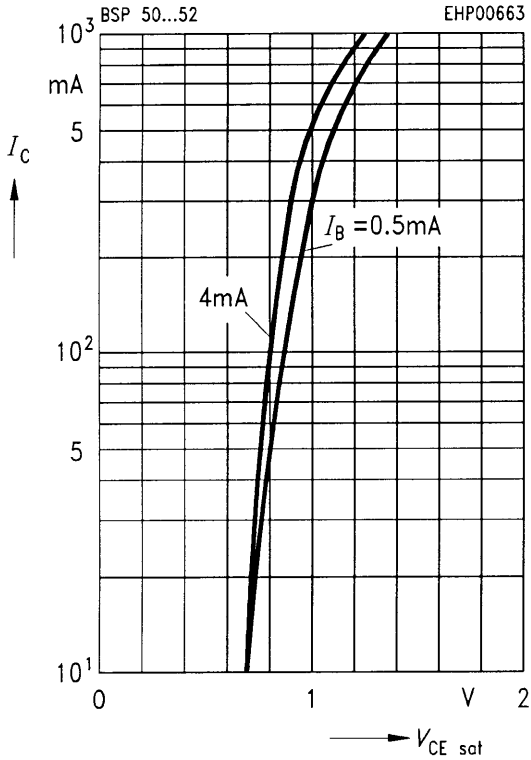
DC current gain $h_{FE} = f(I_C)$

$V_{CE} = 10\ V$



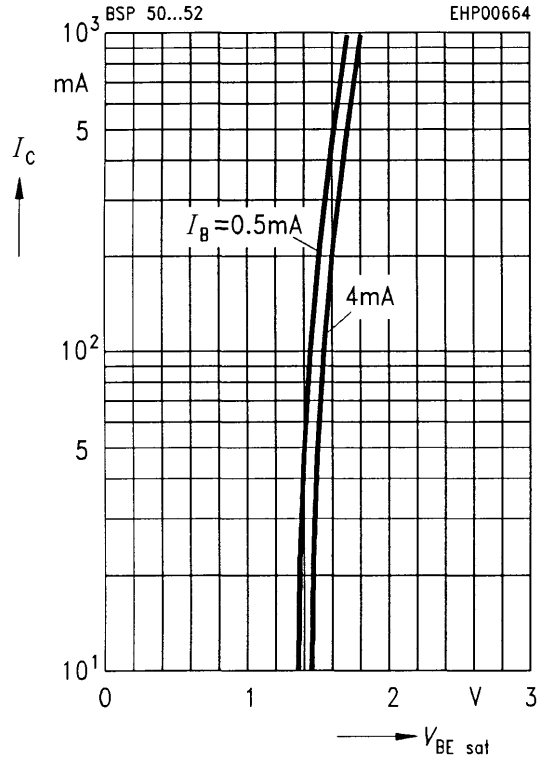
Collector-emitter saturation voltage

$I_C = f(V_{CE\ sat}), I_B\text{-parameter}$



Base-emitter saturation voltage

$I_C = f(V_{BE\ sat}), I_B\text{-parameter}$



Transition frequency $f_T = f(I_C)$

$V_{CE} = 5\text{ V}, f = 100\text{ MHz}$

