# SIEMENS

PNP Silicon Darlington Transistors

**BSP 60
… BSP 62**

● High collector current
● Low collector-emitter saturation voltage
● Complementary types: BSP 50 … BSP 52 (NPN)
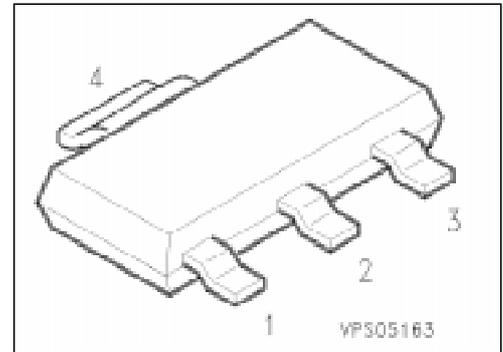
Type	Marking	Ordering Code (tape and reel)	Pin Configuration				Package[1]
			1	2	3	4	
BSP 60	BSP 60	Q62702-P1166	B	C	E	C	SOT-223
BSP 61	BSP 61	Q62702-P1167					
BSP 62	BSP 62	Q62702-P1168					

Maximum Ratings

Parameter	Symbol	Values			Unit
		BSP 60	BSP 61	BSP 62	
Collector-emitter voltage	V_{CER}	45	60	80	V
Collector-base voltage	V_{CB0}	60	80	90	
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, $T_S = 124\ °C$	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	

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[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 ˚C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

Parameter	Symbol	min.	typ.	max.	Unit
Collector-emitter breakdown voltage[1]	$V_{(BR)CER}$				V
I_C = 10 mA, R_{BE} = 150 Ω BSP 60		45	–	–	
BSP 61		60	–	–	
BSP 62		80	–	–	
Collector-base breakdown voltage	$V_{(BR)CB0}$				
I_C = 100 μA, I_B = 0 BSP 60		60	–	–	
BSP 61		80	–	–	
BSP 62		90	–	–	
Emitter-base breakdown voltage	$V_{(BR)EB0}$	5	–	–	
I_E = 100 μA, I_B = 0					
Collector-emitter cutoff current	I_{CES}	–	–	10	μA
V_{CE} = V_{CERmax}, V_{BE} = 0					
Emitter-base cutoff current	I_{EB0}	–	–	10	
V_{EB} = 4 V, I_C = 0					
DC current gain[2]	h_{FE}				–
I_C = 150 mA, V_{CE} = 10 V		1000	–	–	
I_C = 500 mA, V_{CE} = 10 V		2000	–	–	
Collector-emitter saturation voltage[2]	V_{CEsat}				V
I_C = 500 mA, I_B = 0.5 mA		–	–	1.3	
I_C = 1 A, I_B = 1 mA		–	–	1.8	
Base-emitter saturation voltage[2]	V_{BEsat}				
I_C = 500 mA, I_B = 0.5 mA		–	–	1.9	
I_C = 1 A, I_B = 1 mA		–	–	2.2	

AC characteristics

Parameter	Symbol	min.	typ.	max.	Unit
Transition frequency	f_T	–	200	–	MHz
I_C = 100 mA, V_{CE} = 5 V, f = 100 MHz					
Switching times					
I_C = 500 mA, I_{B1} = I_{B2} = 0.5 mA	t_{on}	–	400	–	ns
(see diagrams)	t_{off}	–	1500	–	ns

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[1] Compare R_{BE} for thermal stability.

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

## Switching time test circuit

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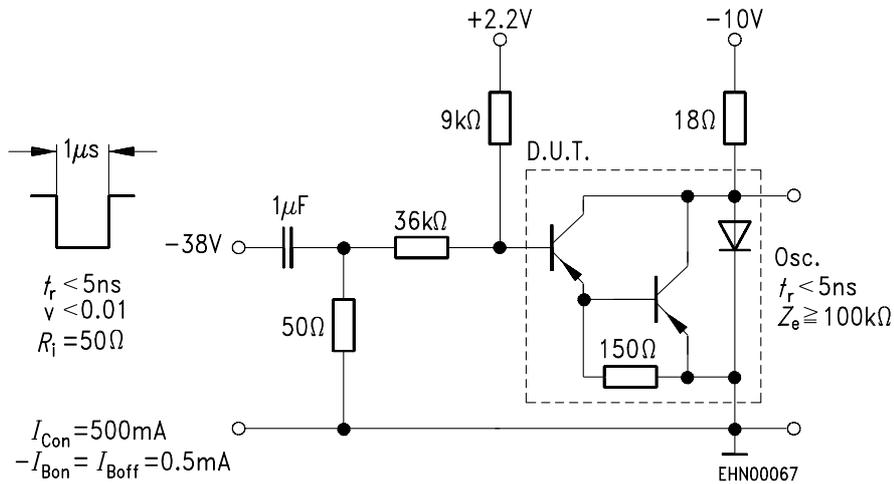
Switching time waveform

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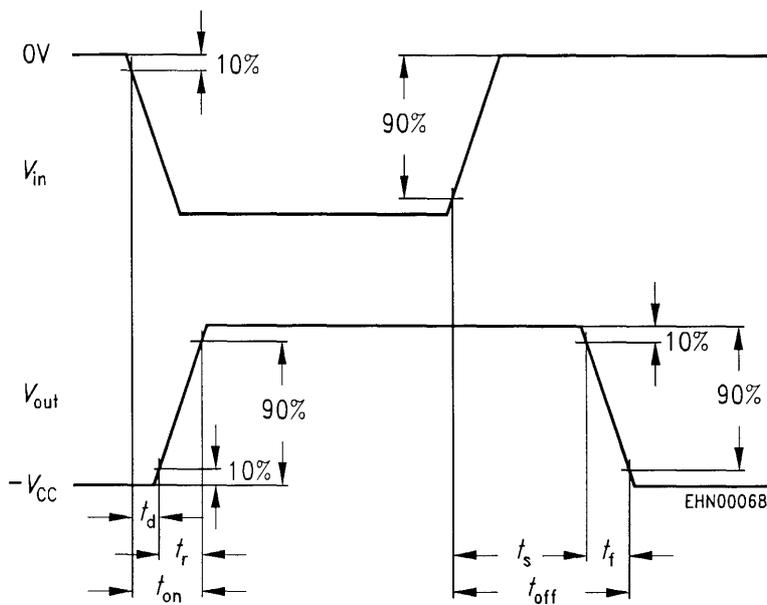
**Total power dissipation** $P_{tot} = f(T_A*; T_S)$
* Package mounted on epoxy
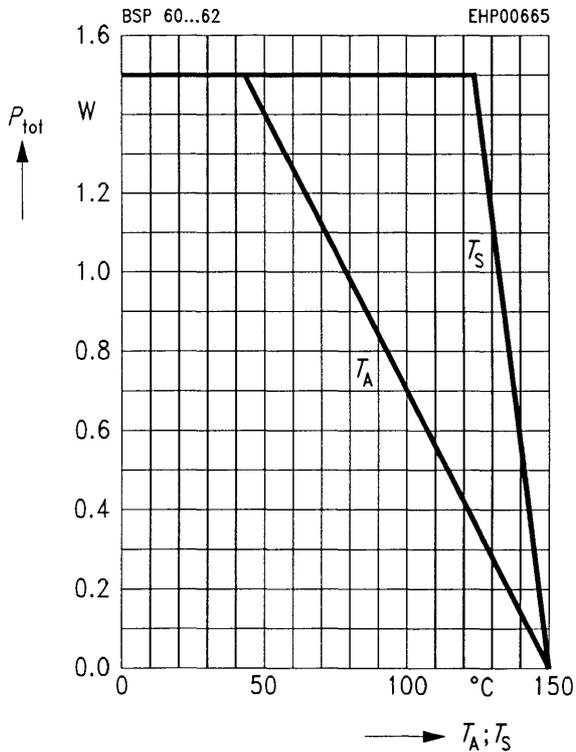
**External resistance** $R_{BE} = f(T_A)**$
$V_{CB} = V_{CE\,max}$
** $R_{BE\,max}$ for thermal stability
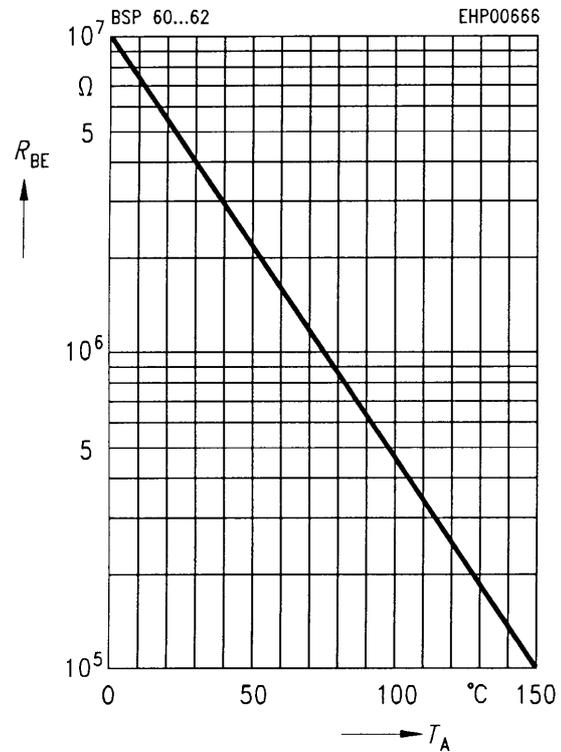
**Permissible pulse load** $P_{tot\,max} / P_{tot\,DC} = f(t_p)$

**DC current gain** $h_{FE} = f(I_C)$
$V_{CE} = 10$ V
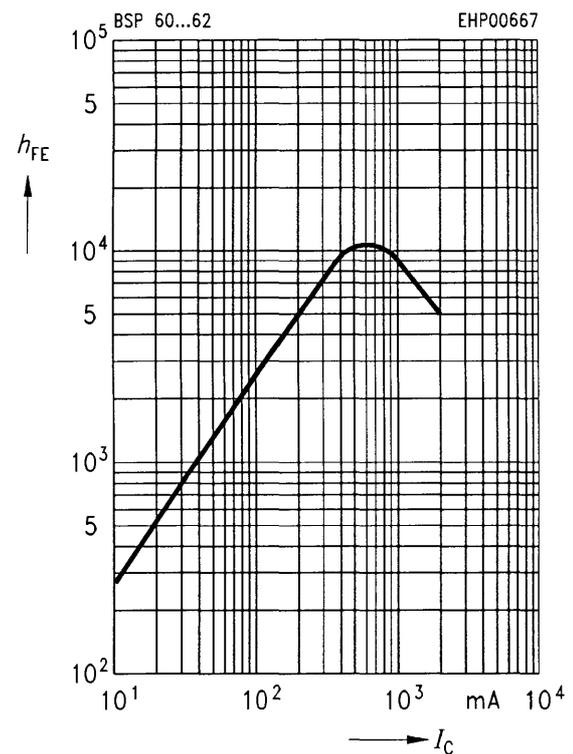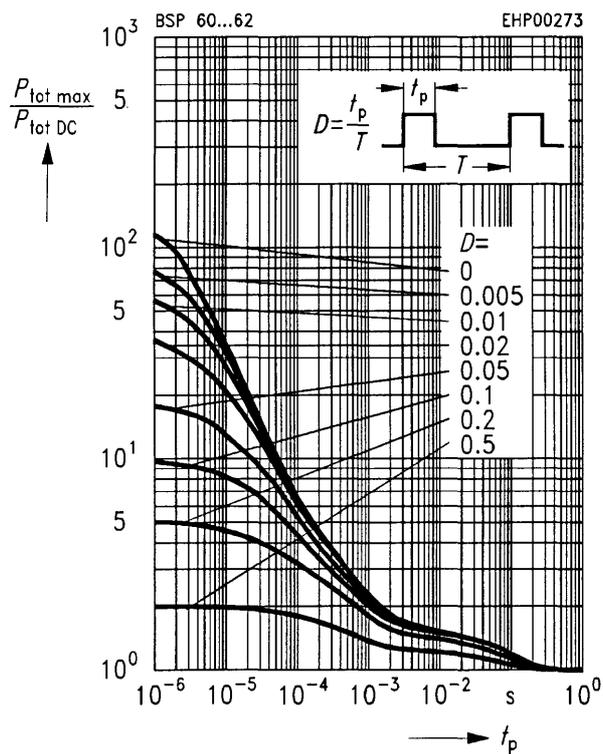
Collector-emitter saturation voltage
$I_C = f(V_{CE\ sat})$, I_B-parameter

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$I_B = 0.5\,mA$

$4\,mA$

$V_{CE\ sat}$
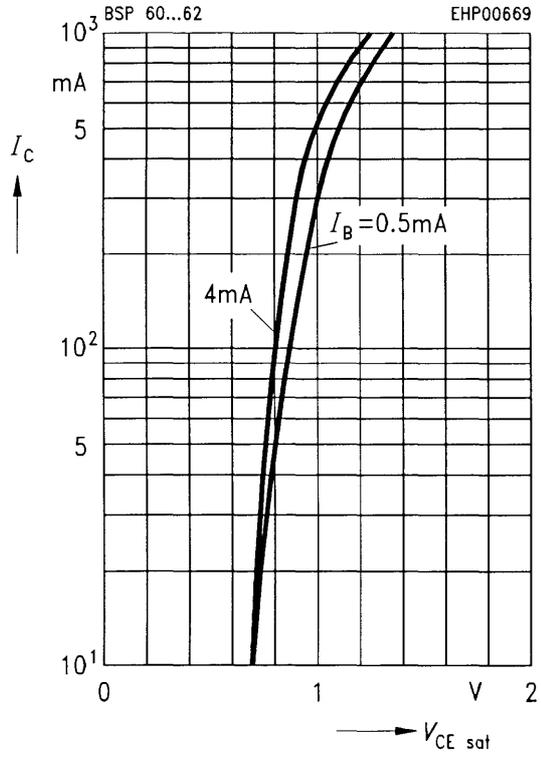
Base-emitter saturation voltage
$I_C = f(V_{BE\ sat})$, I_B-parameter

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$I_B = 0.5\,mA$

$4\,mA$

$V_{BE\ sat}$
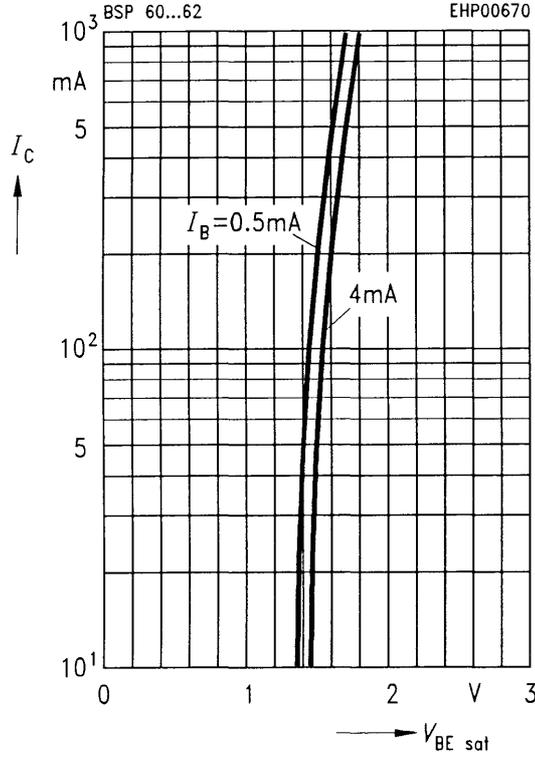
Transition frequency $f_T = f(I_C)$
$V_{CE} = 10\ V$, $f = 100\ MHz$

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I_C