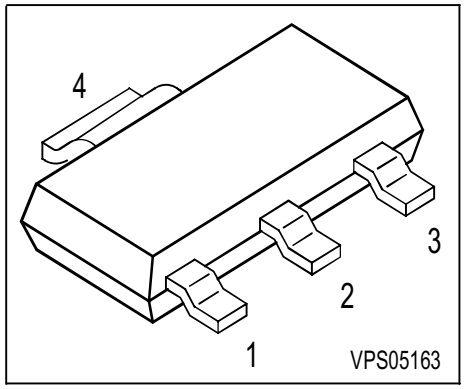
NPN Silicon Darlington Transistors



- High collector current
- Low collector-emitter saturation voltage
- Complementary types: BSP60 ... BSP62 (PNP)

Type	Marking	Pin Configuration				Package
BSP50	BSP 50	1 = B	2 = C	3 = E	4 = C	SOT223
BSP51	BSP 51	1 = B	2 = C	3 = E	4 = C	SOT223
BSP52	BSP 52	1 = B	2 = C	3 = E	4 = C	SOT223

Maximum Ratings

Parameter	Symbol	BSP50	BSP51	BSP52	Unit
Collector-emitter voltage	V_{CEO}	45	60	80	V
Collector-base voltage	V_{CBO}	60	80	90	
Emitter-base voltage	V_{EBO}	5	5	5	
DC collector current	I_C	1			A
Peak collector current	I_{CM}	2			
Base current	I_B	100			mA
Total power dissipation, T_S = 124 °C	P_{tot}	1.5			W
Junction temperature	T_j	150			°C
Storage temperature	T_{stg}	-65 ... 150			

Thermal Resistance

Junction - soldering point[1)]	R_{thJS}	≤17	K/W

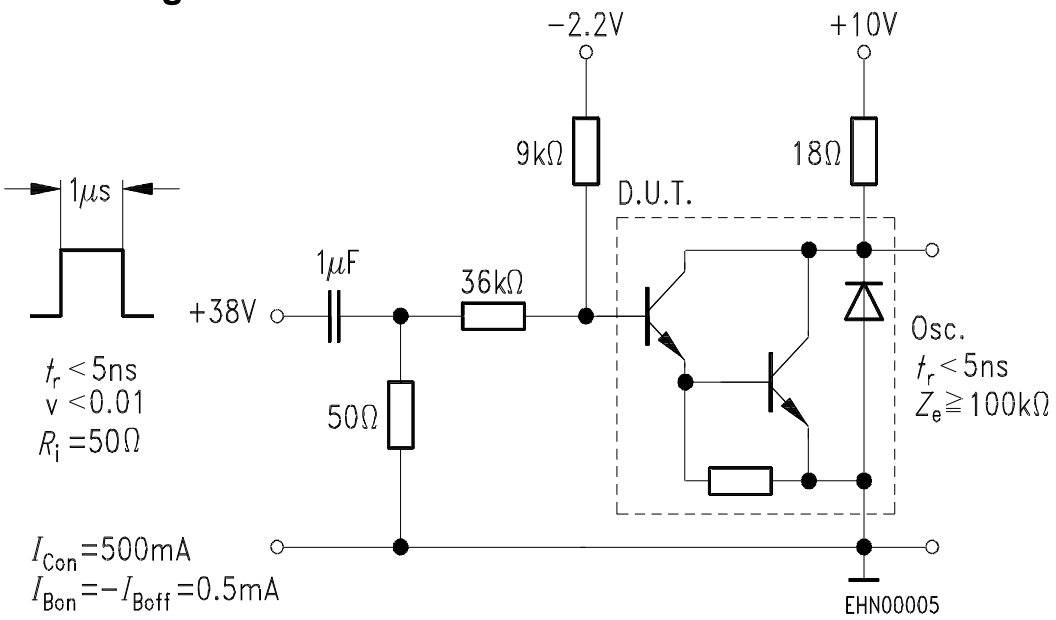
[1]For calculation of R_{thJA} please refer to Application Note Thermal Resistance

Electrical Characteristics at T_A = 25°C, unless othertwise specified

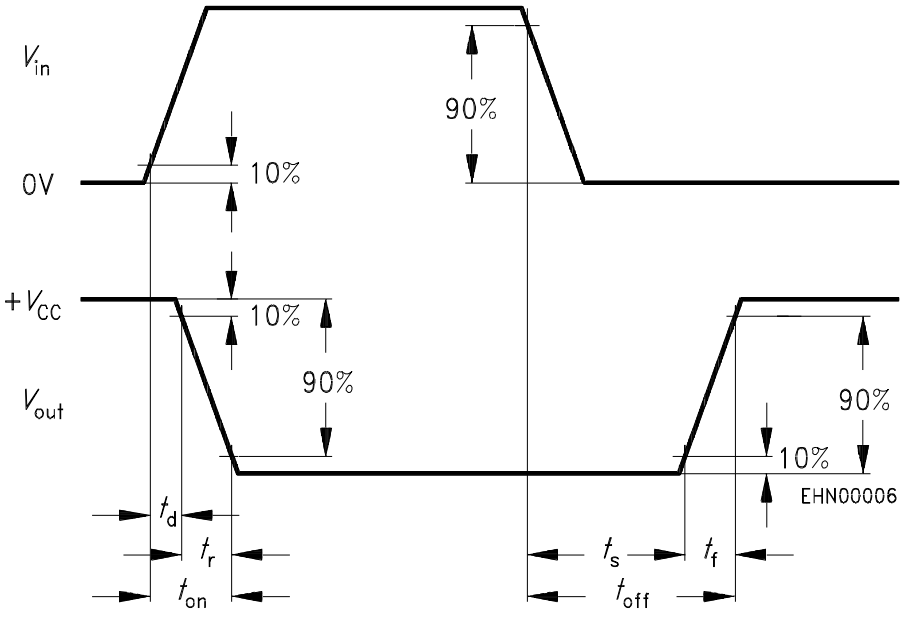
Parameter		Symbol	Values			Unit
			min.	typ.	max.	
DC Characteristics						
Collector-emitter breakdown voltage		$V_{(BR)CEO}$				V
I_C = 10 mA, I_B = 0	BSP50		45	-	-	
	BSP51		60	-	-	
	BSP52		80	-	-	
Collector-base breakdown voltage		$V_{(BR)CBO}$				
I_C = 100 µA, I_E = 0	BSP50		60	-	-	
	BSP51		80	-	-	
	BSP52		90	-	-	
Emitter-base breakdown voltage		$V_{(BR)EBO}$	5	-	-	
I_E = 100 µA, I_C = 0						
Collector-emitter cutoff current		I_{CES}	-	-	10	µA
V_{CE} = V_{CEOmax}, V_{BE} = 0						
Emitter cutoff current		I_{EBO}	-	-	10	
V_{EB} = 4 V, I_C = 0						
DC current gain 1)		h_{FE}				-
I_C = 150 mA, V_{CE} = 10 V			1000	-	-	
I_C = 500 mA, V_{CE} = 10 V			2000	-	-	
Collector-emitter saturation voltage1)		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 1)		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						
Transition frequency		f_T	-	200	-	MHz
I_C = 100 mA, V_{CE} = 5 V, f = 100 MHz						
Turn-on time		$t_{(on)}$	-	400	-	ns
I_C = 500 mA, I_{B1} = I_{B2} = 0.5mA						
Turn-off time		$t_{(off)}$	-	1500	-	
I_C = 500 mA, I_{B1} = I_{B2} = 0.5mA						

1) Pulse test: t ≤ 300µs, D = 2%

Switching time test circuit

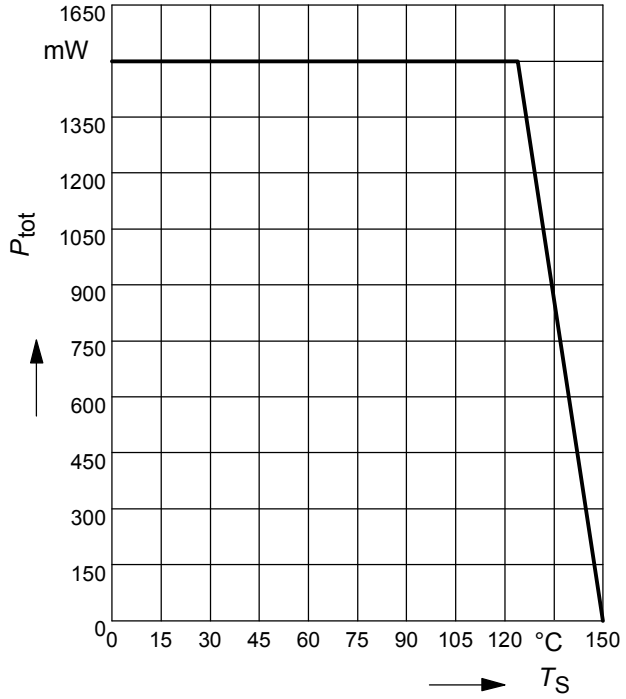


Switching time waveform



1) Pulse test: t ≤ 300µs, D = 2%

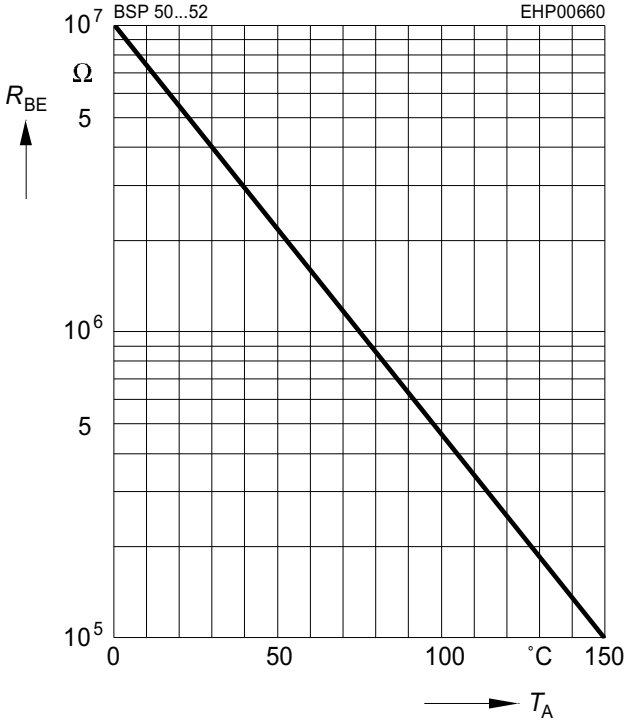
Total power dissipation $P_{tot} = f(T_S)$



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

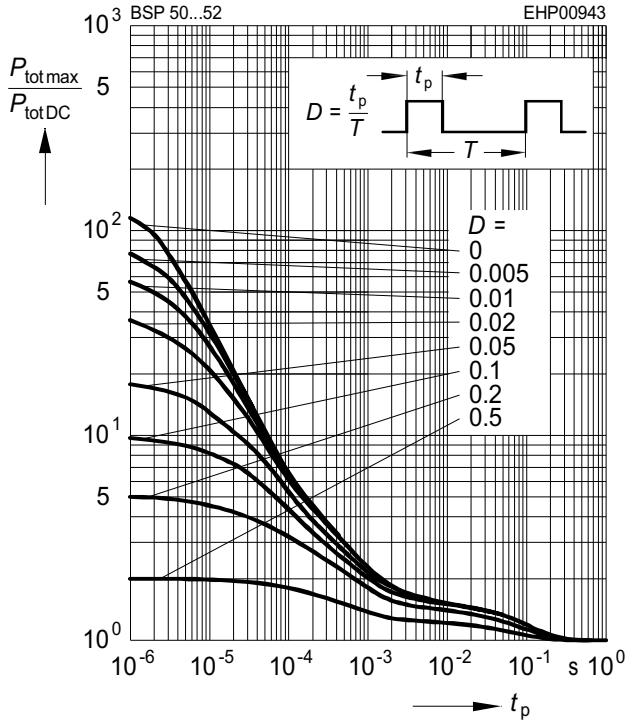
$V_{CB} = V_{CEmax}$

** R_{BEmax} for thermal stability



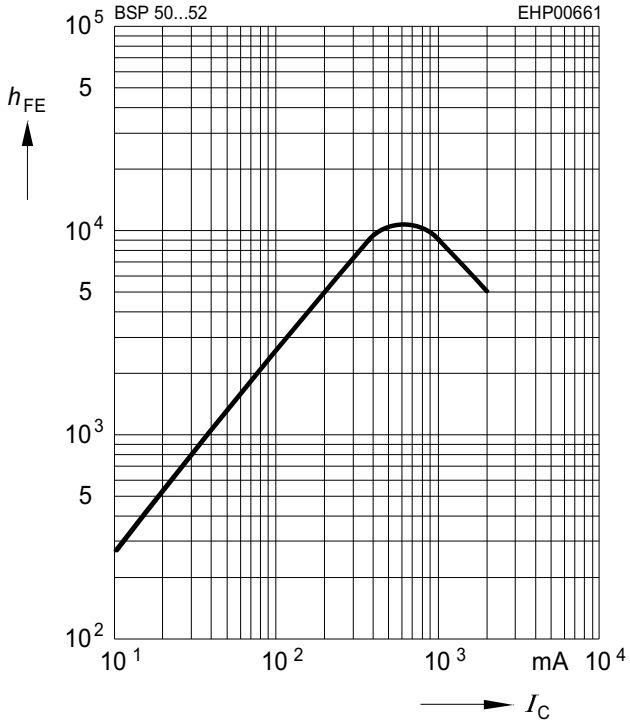
Permissible pulse load

$P_{totmax} / P_{totDC} = f(t_p)$



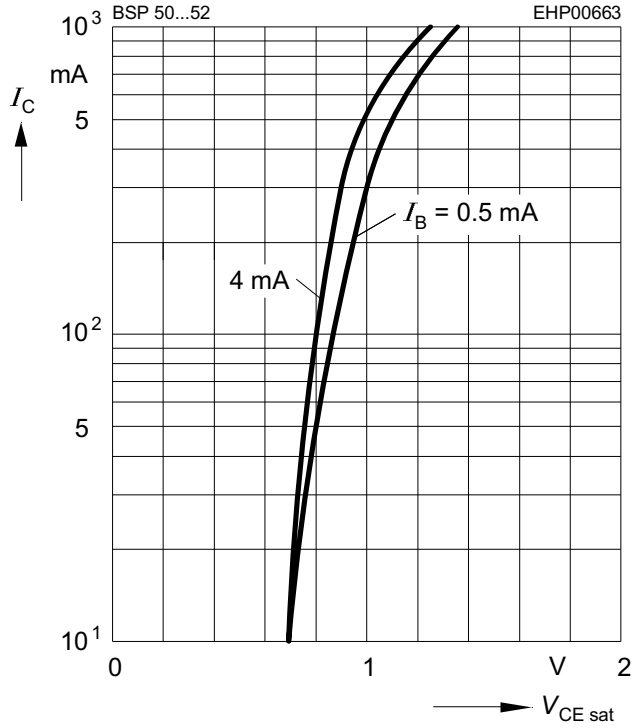
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 10V



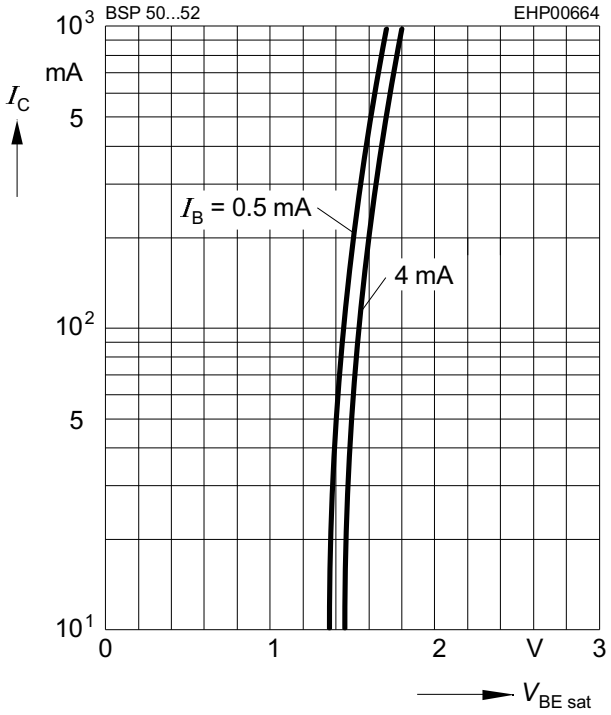
Collector-emitter saturation voltage

$I_C = f(V_{CEsat})$, I_B - parameter



Base-emitter saturation voltage

$I_C = f(V_{BEsat})$, I_B - parameter



Transition frequency $f_T = f(I_C)$

V_{CE} = 5V, f = 100MHz