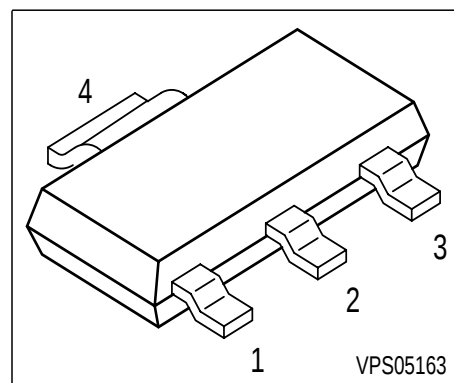


NPN Silicon Darlington Transistors

- 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, $T_S = 124\text{ °C}$	P_{tot}	1.5			W
Junction temperature	T_j	150			°C
Storage temperature	T_{sta}	-65 ... 150			

Thermal Resistance

Junction - soldering point ¹⁾	R_{thJS}	≤17	K/W
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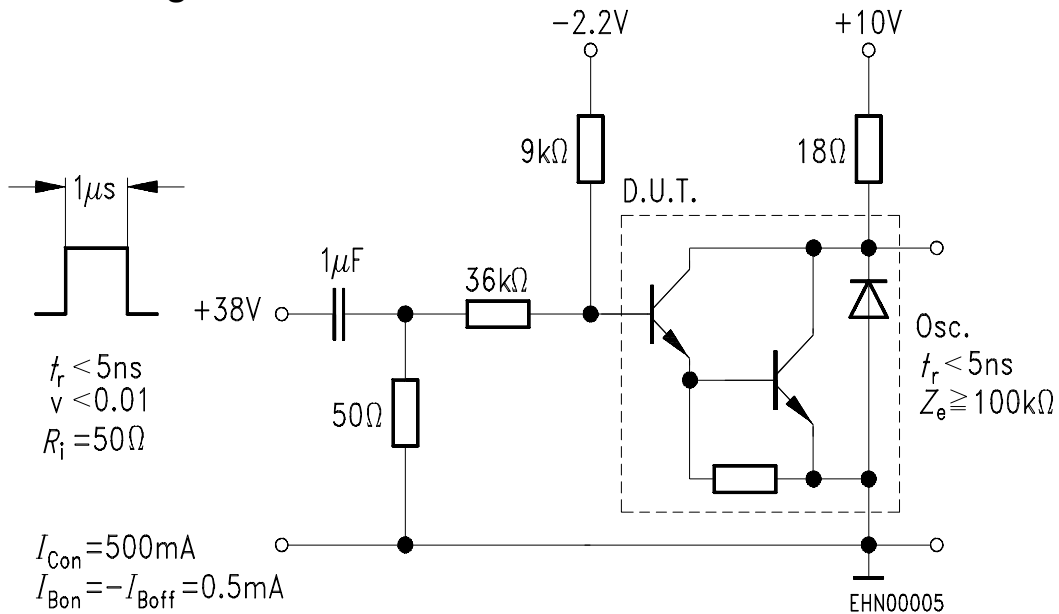
¹⁾For calculation of R_{thJA} please refer to Application Note Thermal Resistance

Electrical Characteristics at $T_A = 25^\circ\text{C}$, unless otherwise specified

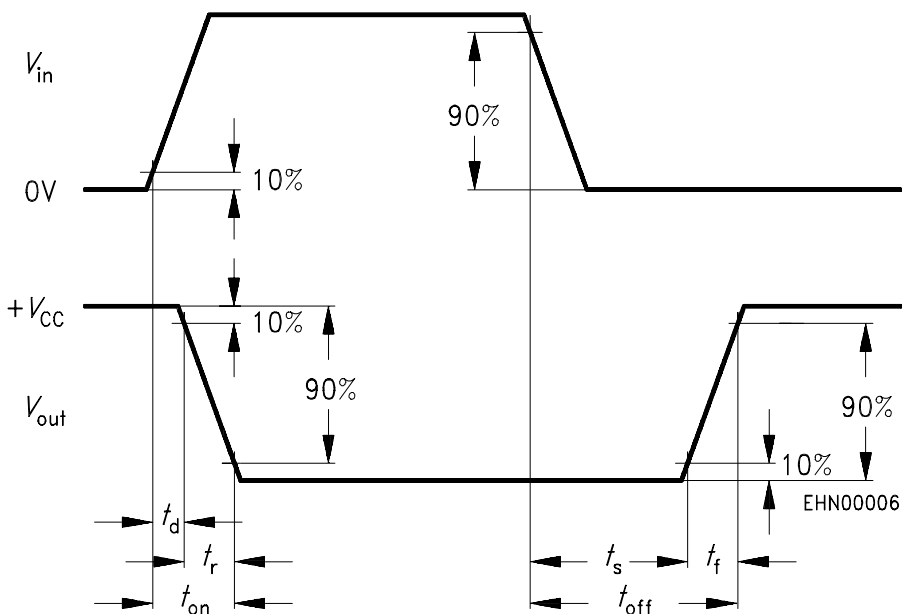
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage $I_C = 10\text{ mA}$, $I_B = 0$ BSP50 BSP51 BSP52	$V_{(BR)CEO}$	45 60 80	- - -	- - -	V
Collector-base breakdown voltage $I_C = 100\text{ }\mu\text{A}$, $I_E = 0$ BSP50 BSP51 BSP52	$V_{(BR)CBO}$	60 80 90	- - -	- - -	
Emitter-base breakdown voltage $I_E = 100\text{ }\mu\text{A}$, $I_C = 0$	$V_{(BR)EBO}$	5	-	-	
Collector-emitter cutoff current $V_{CE} = V_{CEO\text{max}}$, $V_{BE} = 0$	I_{CES}	-	-	10	μA
Emitter cutoff current $V_{EB} = 4\text{ V}$, $I_C = 0$	I_{EBO}	-	-	10	
DC current gain 1) $I_C = 150\text{ mA}$, $V_{CE} = 10\text{ V}$ $I_C = 500\text{ mA}$, $V_{CE} = 10\text{ V}$	h_{FE}	1000 2000	- -	- -	-
Collector-emitter saturation voltage1) $I_C = 500\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 1\text{ A}$, $I_B = 1\text{ mA}$	$V_{CE\text{sat}}$	- -	- -	1.3 1.8	V
Base-emitter saturation voltage 1) $I_C = 500\text{ mA}$, $I_B = 0.5\text{ mA}$ $I_C = 1\text{ A}$, $I_B = 1\text{ mA}$	$V_{BE\text{sat}}$	- -	- -	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
Turn-on time $I_C = 500\text{ mA}$, $I_{B1} = I_{B2} = 0.5\text{mA}$	$t_{(\text{on})}$	-	400	-	ns
Turn-off time $I_C = 500\text{ mA}$, $I_{B1} = I_{B2} = 0.5\text{mA}$	$t_{(\text{off})}$	-	1500	-	

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

Switching time test circuit

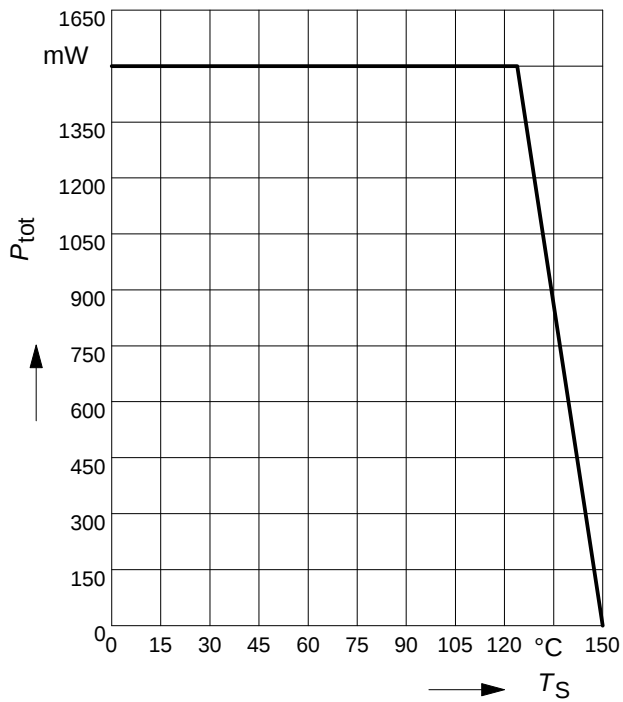


Switching time waveform



1) Pulse test: $t \leq 300\mu s$, $D = 2\%$

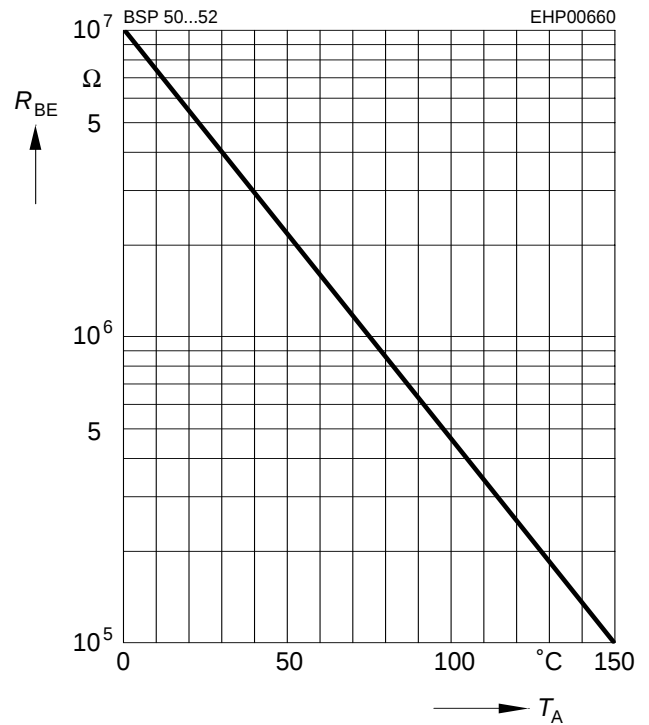
Total power dissipation $P_{\text{tot}} = f(T_S)$



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

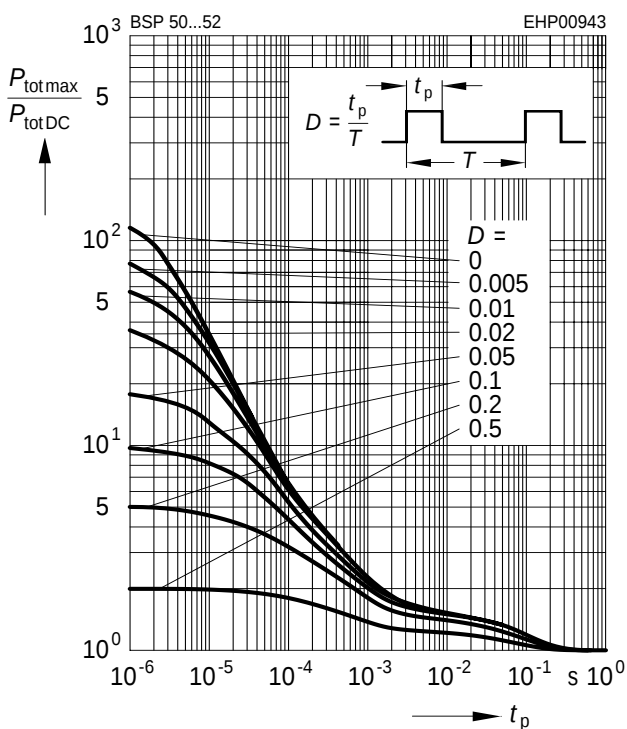
$V_{\text{CB}} = V_{\text{CEmax}}$

**** R_{BEmax} for thermal stability**



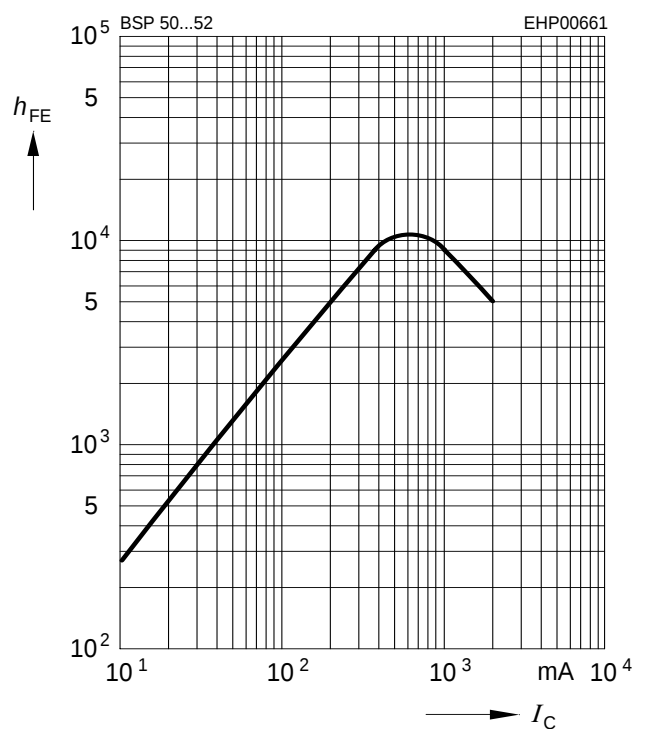
Permissible pulse load

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



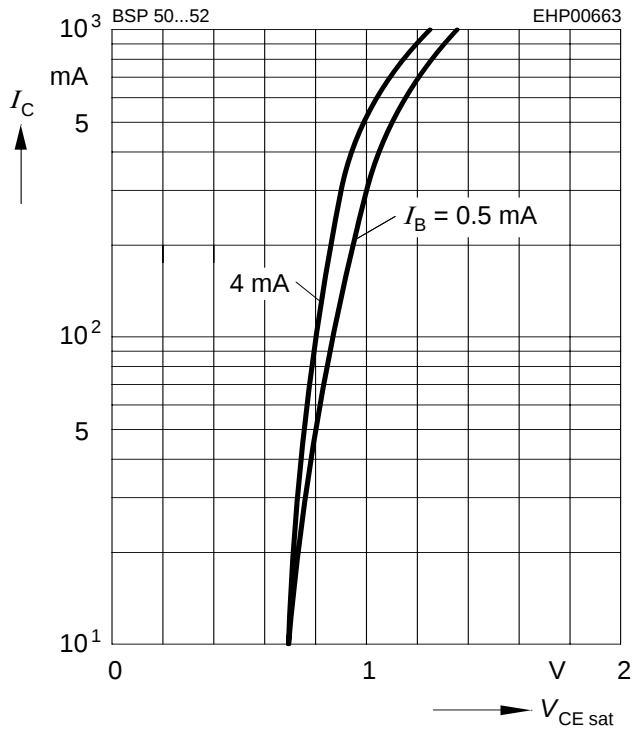
DC current gain $h_{\text{FE}} = f(I_C)$

$V_{\text{CE}} = 10\text{V}$



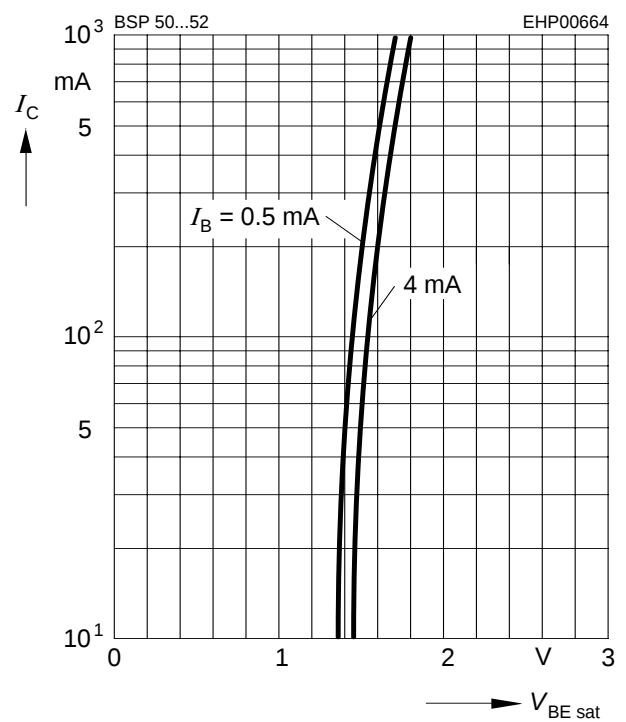
Collector-emitter saturation voltage

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



Base-emitter saturation voltage

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



Transition frequency $f_T = f(I_C)$

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

