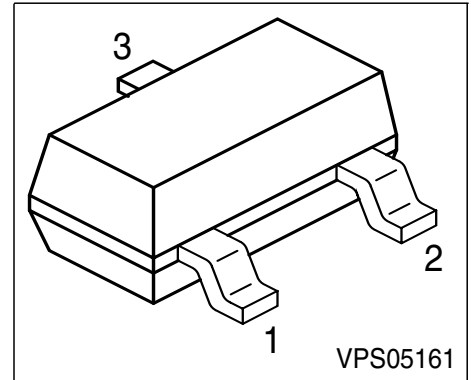


**NPN Silicon Darlington Transistors**

- High DC current gain
- High collector current
- Low collector-emitter saturation voltage



Type	Marking	Pin Configuration			Package
SMBTA13/ MMBTA13	s1M	1 = B	2 = E	3 = C	SOT23
SMBTA14/ MMBTA14	s1N	1 = B	2 = E	3 = C	SOT23

**Maximum Ratings**

Parameter	Symbol	Values	Unit	
Collector-emitter voltage	$V_{CES}$	30	V	
Collector-base voltage	$V_{CBO}$	30		
Emitter-base voltage	$V_{EBO}$	10		
DC collector current	$I_C$	300	mA	
Peak collector current	$I_{CM}$	500		
Base current	$I_B$	100		
Peak base current	$I_{BM}$	200	mA	
Total power dissipation, $T_S = 81\text{ °C}$	$P_{tot}$	330		mW
Junction temperature	$T_j$	150		
Storage temperature	$T_{stg}$	-65 ... 150		

**Thermal Resistance**

Junction - soldering point <sup>1)</sup>	$R_{thJS}$	≤210	K/W
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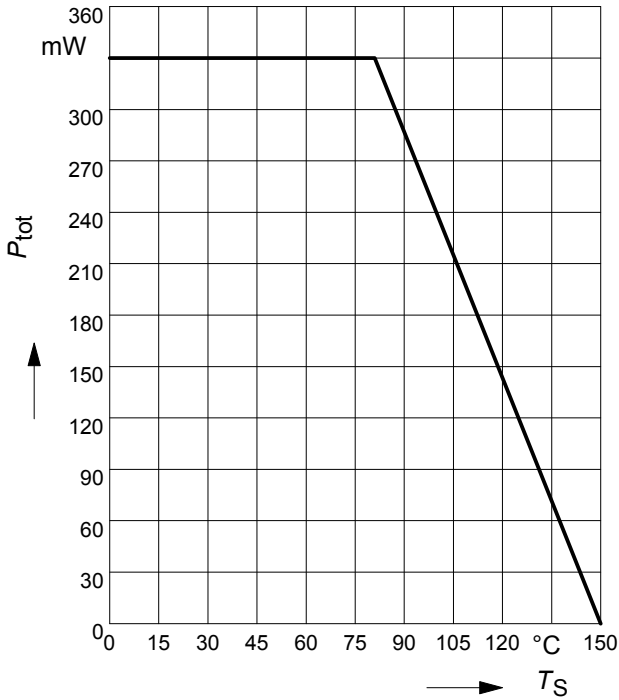
<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

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

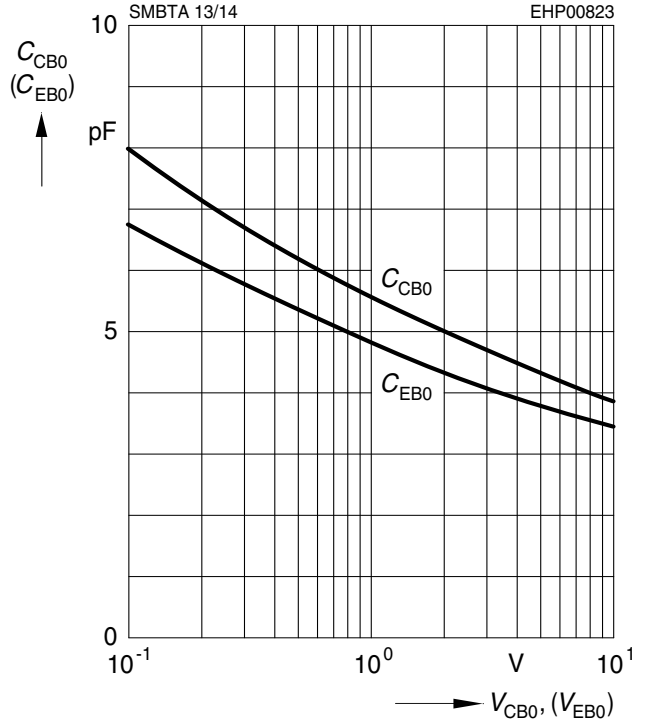
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 10 \mu\text{A}, V_{BE} = 0$	$V_{(BR)CES}$	30	-	-	V
Collector-base breakdown voltage $I_C = 10 \mu\text{A}, I_E = 0$	$V_{(BR)CBO}$	30	-	-	
Emitter-base breakdown voltage $I_E = 10 \mu\text{A}, I_C = 0$	$V_{(BR)EBO}$	10	-	-	
Collector cutoff current $V_{CB} = 30 \text{ V}, I_E = 0$	$I_{CBO}$	-	-	100	nA
Collector cutoff current $V_{CB} = 30 \text{ V}, I_E = 0, T_A = 150^\circ\text{C}$	$I_{CBO}$	-	-	10	$\mu\text{A}$
Emitter cutoff current $V_{EB} = 10 \text{ V}, I_C = 0$	$I_{EBO}$	-	-	100	nA
DC current gain 1) $I_C = 10 \text{ mA}, V_{CE} = 5 \text{ V}$  $I_C = 100 \text{ mA}, V_{CE} = 5 \text{ V}$	$h_{FE}$				-
	SMBTA13	5000	-	-	
	SMBTA14	10000	-	-	
	SMBTA13	10000	-	-	
	SMBTA14	20000	-	-	
Collector-emitter saturation voltage1) $I_C = 100 \text{ mA}, I_B = 0.1 \text{ mA}$	$V_{CEsat}$	-	-	1.5	V
Base-emitter saturation voltage 1) $I_C = 100 \text{ mA}, I_B = 0.1 \text{ mA}$	$V_{BEsat}$	-	-	2	
<b>AC Characteristics</b>					
Transition frequency $I_C = 50 \text{ mA}, V_{CE} = 5 \text{ V}, f = 20 \text{ MHz}$	$f_T$	125	-	-	MHz

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

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

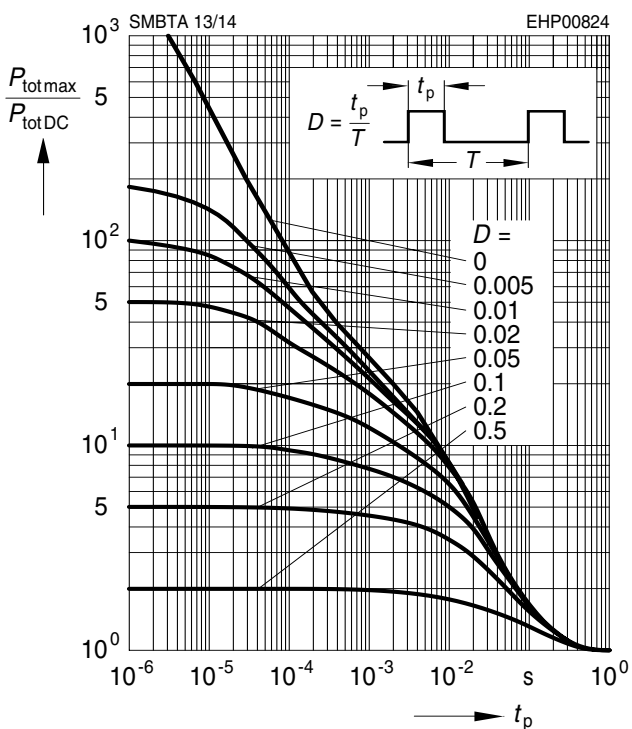


**Collector-base capacitance  $C_{CB} = f(V_{CB0})$   
Emitter-base capacitance  $C_{EB} = f(V_{EB0})$**



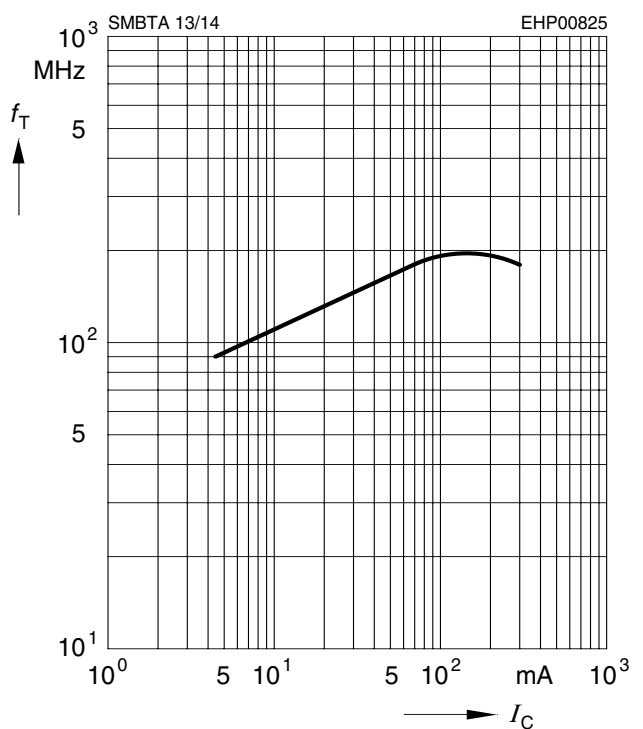
**Permissible pulse load**

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



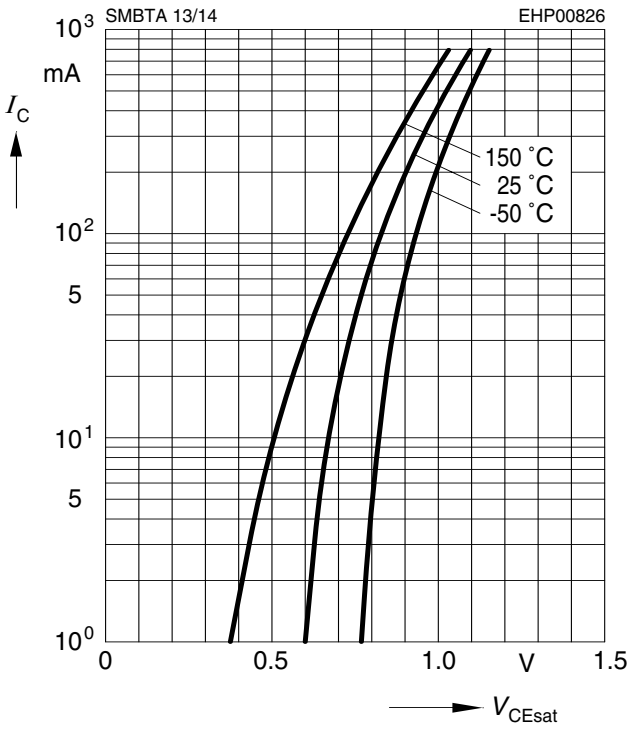
**Transition frequency  $f_T = f(I_C)$**

$V_{CE} = 5V, f = 20MHz$



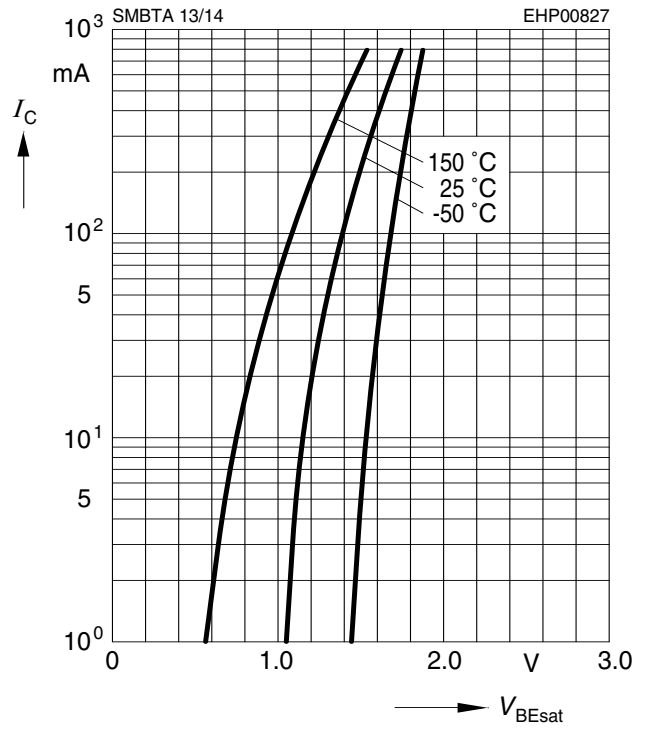
**Collector-emitter saturation voltage**

$I_C = f(V_{CEsat}), h_{FE} = 1000$



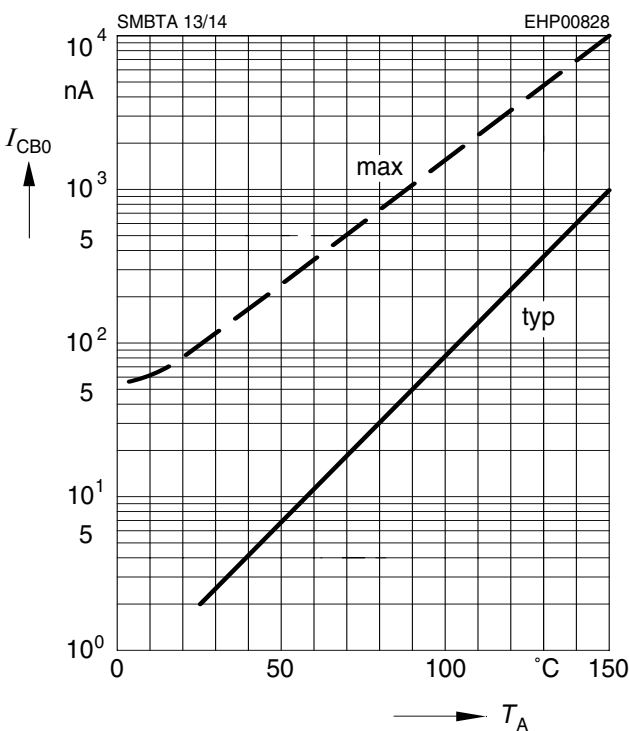
**Base-emitter saturation voltage**

$I_C = f(V_{BEsat}), h_{FE} = 1000$



**Collector cutoff current  $I_{CBO} = f(T_A)$**

$V_{CB} = 30V$



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

$V_{CE} = 5V$

