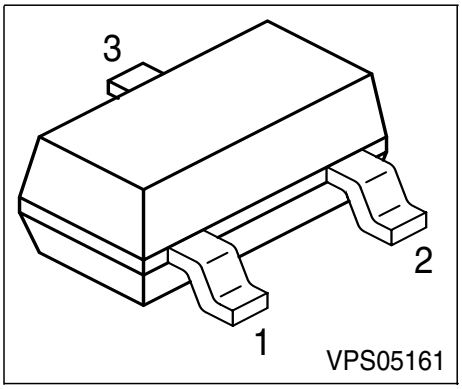
NPN Silicon Darlington Transistors

- 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	mA
Base current	I_B	100	
Peak base current	I_{BM}	200	
Total power dissipation, T_S = 81 °C	P_{tot}	330	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... 150	

Thermal Resistance

Junction - soldering point[1)]	R_{thJS}	≤210	K/W

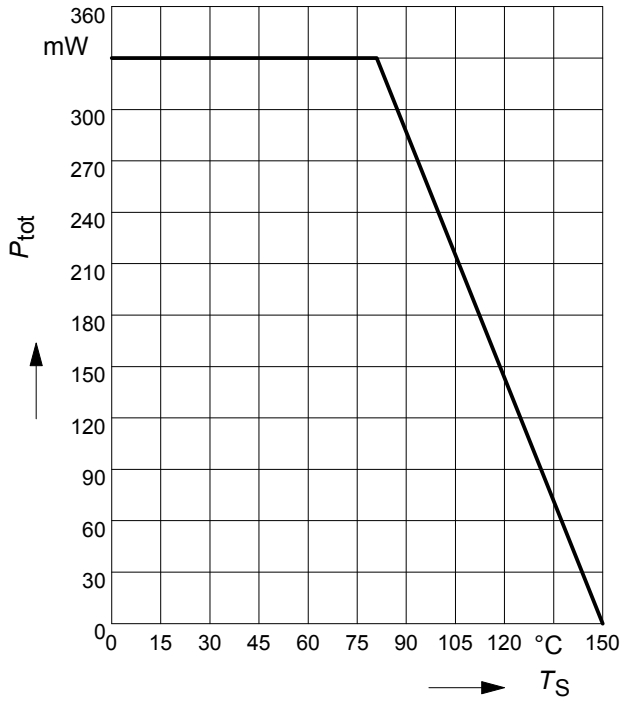
[1]For calculation of R_{thJA} please refer to Application Note Thermal Resistance

Electrical Characteristics at T_A = 25°C, unless otherwise specified.

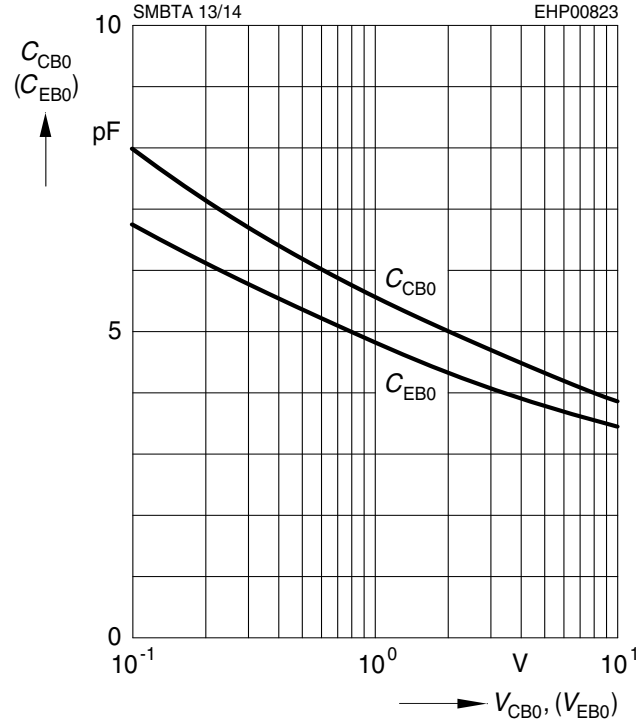
Parameter		Symbol	Values			Unit
			min.	typ.	max.	
DC Characteristics						
Collector-emitter breakdown voltage I_C = 10 µA, V_{BE} = 0		$V_{(BR)CES}$	30	-	-	V
Collector-base breakdown voltage I_C = 10 µA, I_E = 0		$V_{(BR)CBO}$	30	-	-	
Emitter-base breakdown voltage I_E = 10 µA, I_C = 0		$V_{(BR)EBO}$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

1) Pulse test: t ≤ 300µs, D = 2%

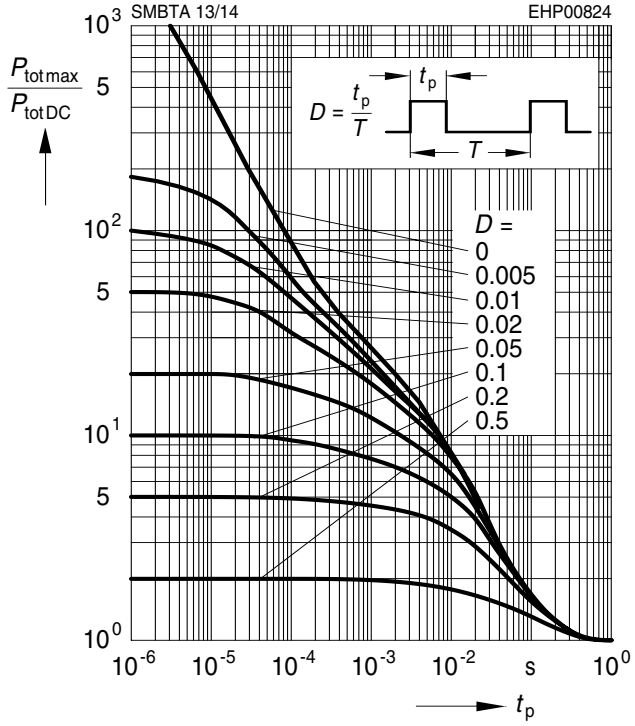
Total power dissipation $P_{tot} = f(T_S)$



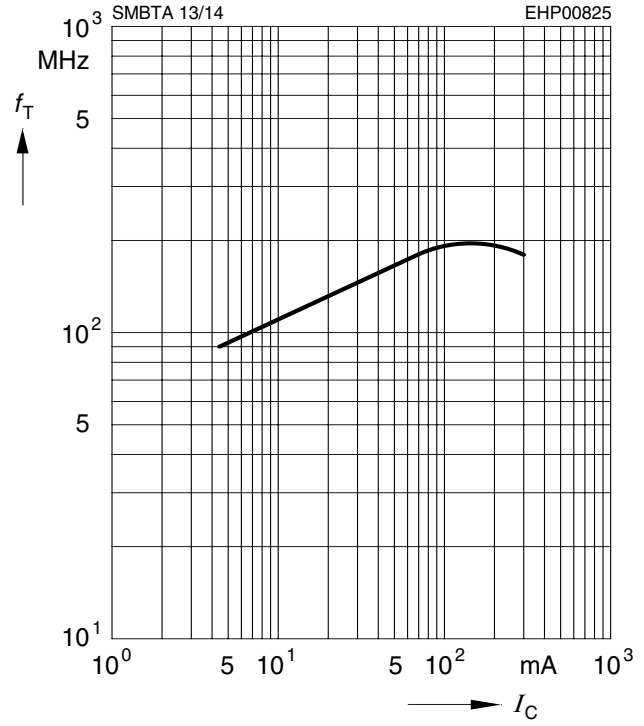
Collector-base capacitance $C_{CB} = f(V_{CBO})$
Emitter-base capacitance $C_{EB} = f(V_{EBO})$



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

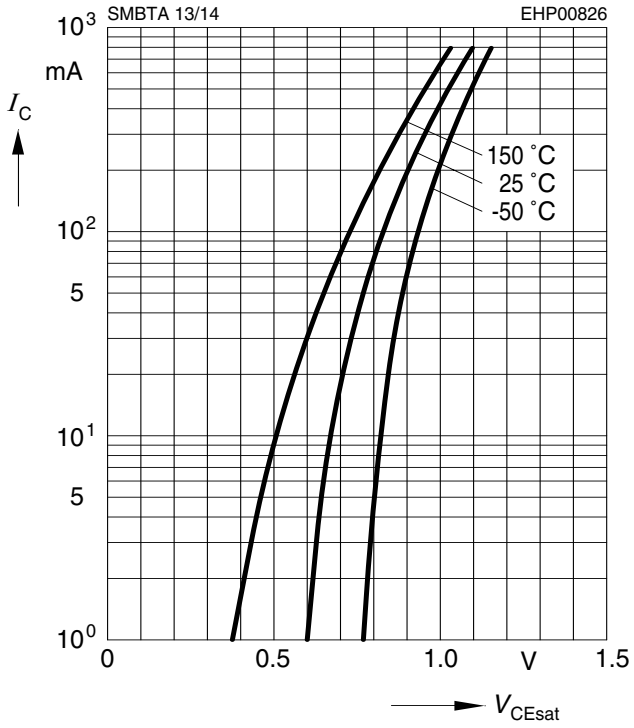


Transition frequency $f_T = f(I_C)$
V_{CE} = 5V, f = 20MHz



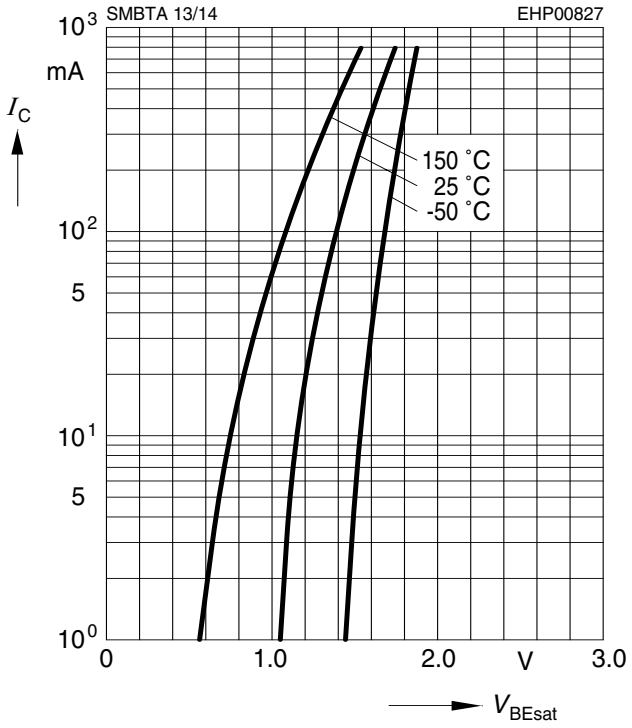
Collector-emitter saturation voltage

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



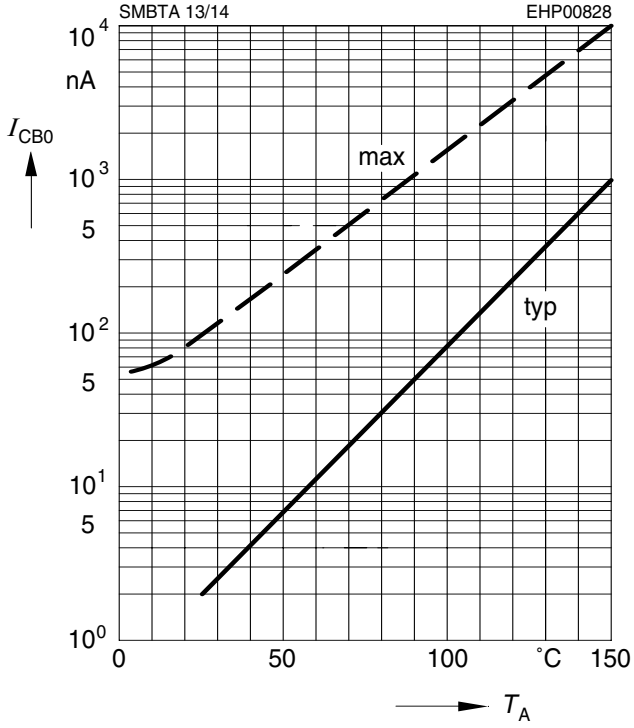
Base-emitter saturation voltage

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



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

V_{CB} = 30V



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

V_{CE} = 5V