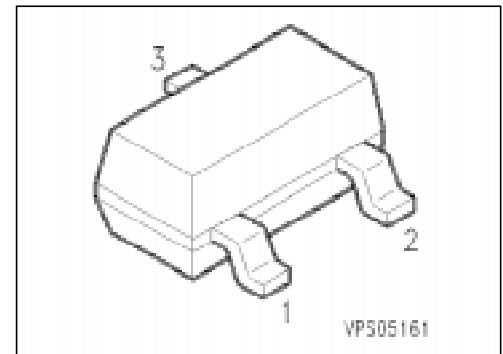


NPN Silicon Darlington Transistors

SMBTA 13
SMBTA 14

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



Type	Marking	Ordering Code (tape and reel)	Pin Configuration			Package ¹⁾
			1	2	3	
SMBTA 13 SMBTA 14	s1M s1N	Q68000-A6475 Q68000-A6476	B	E	C	SOT-23

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE0}	30	V
Collector-base voltage	V_{CB0}	30	
Emitter-base voltage	V_{EB0}	10	
Collector current	I_C	300	mA
Peak collector current	I_{CM}	500	
Base current	I_B	100	
Peak base current	I_{BM}	200	
Total power dissipation, $T_s = 81\text{ °C}$	P_{tot}	330	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	– 65 ... + 150	

Thermal Resistance

Junction - ambient ²⁾	$R_{th\ JA}$	≤ 280	K/W
Junction - soldering point	$R_{th\ JS}$	≤ 210	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

Collector-emitter breakdown voltage $I_C = 10\ \mu\text{A}$	$V_{(BR)CE0}$	30	—	—	V
Collector-base breakdown voltage $I_C = 10\ \mu\text{A}$	$V_{(BR)CB0}$	30	—	—	
Emitter-base breakdown voltage $I_E = 10\ \mu\text{A}$	$V_{(BR)EB0}$	10	—	—	
Collector-base cutoff current $V_{CB} = 30\ \text{V}$	I_{CB0}	—	—	100	nA
Emitter-base cutoff current $V_{EB} = 10\ \text{V}$	I_{EB0}	—	—	100	
DC current gain $I_C = 10\ \text{mA}$, $V_{CE} = 5\ \text{V}^{1)}$ SMBTA 13 SMBTA 14 $I_C = 100\ \text{mA}$, $V_{CE} = 5\ \text{V}^{1)}$ SMBTA 13 SMBTA 14	h_{FE}	5000 10000 10000 20000	— — — —	— — — —	—
Collector-emitter saturation voltage ¹⁾ $I_C = 100\ \text{mA}$, $I_B = 0.1\ \text{mA}$	V_{CEsat}	—	—	1.5	V
Base-emitter saturation voltage ¹⁾ $I_C = 100\ \text{mA}$, $I_B = 0.1\ \text{mA}$	V_{BEsat}	—	—	2	

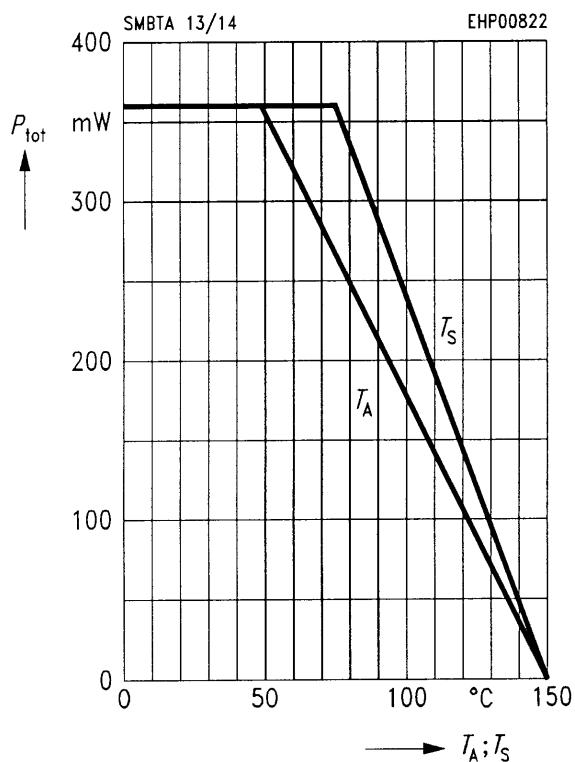
AC characteristics

Transition frequency $I_C = 50\ \text{mA}$, $V_{CE} = 5\ \text{V}$, $f = 20\ \text{MHz}$	f_T	125	—	—	MHz
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¹⁾ Pulse test conditions: $t \leq 300\ \mu\text{s}$, $D = 2\ \%$.

Total power dissipation $P_{\text{tot}} = f(T_A^*; T_S)$

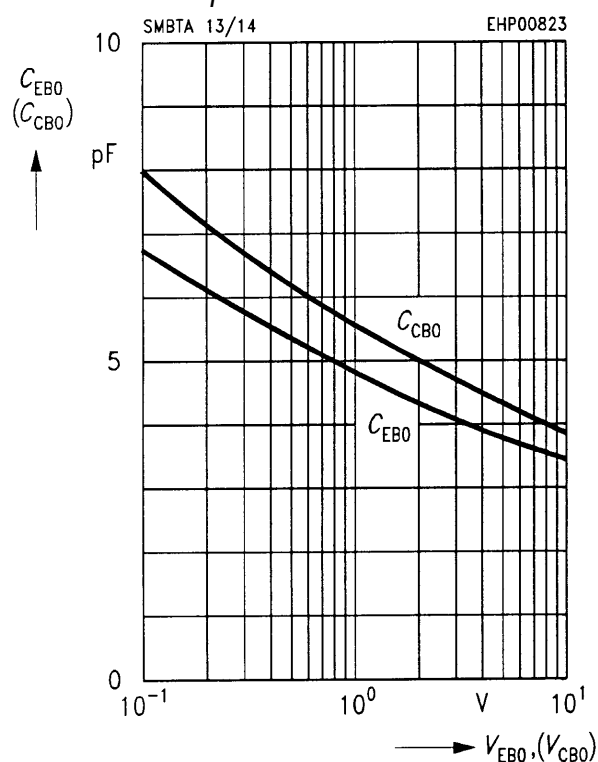
* Package mounted on epoxy



Capacitance $C_{CB0} = f(V_{CB0})$

$$C_{EB0} = f(V_{EB0})$$

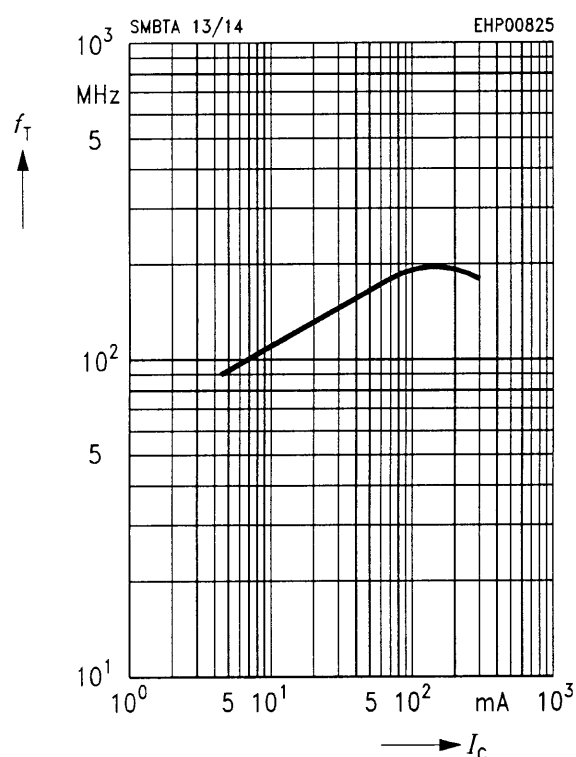
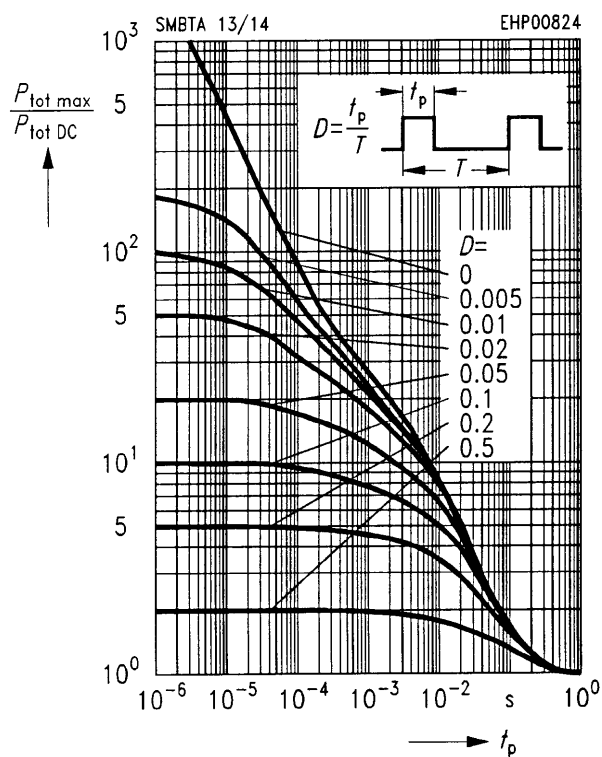
$$f = 1 \text{ MHz}$$



Permissible pulse load $P_{\text{tot max}} / P_{\text{tot DC}} = f(t_p)$

Transition frequency $f_T = f(I_C)$

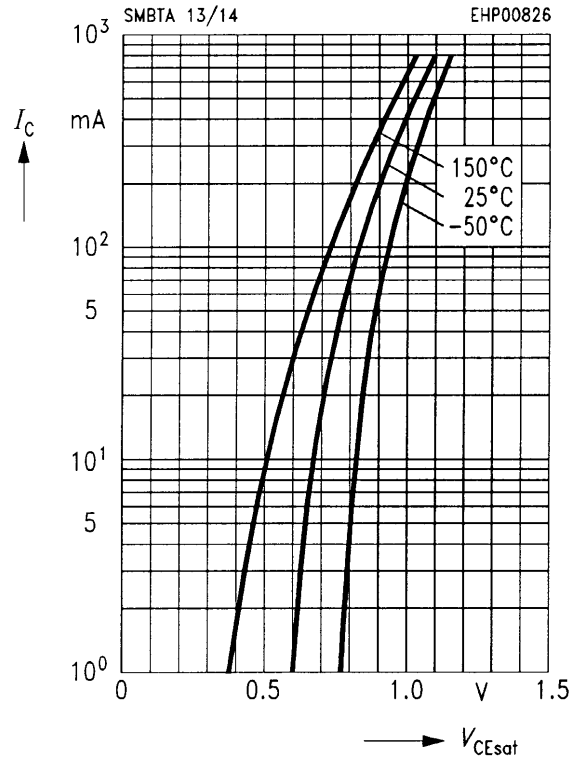
$$V_{CE} = 5 \text{ V}, f = 20 \text{ MHz}$$



Base-emitter saturation voltage

$$I_C = f(V_{BE \text{ sat}})$$

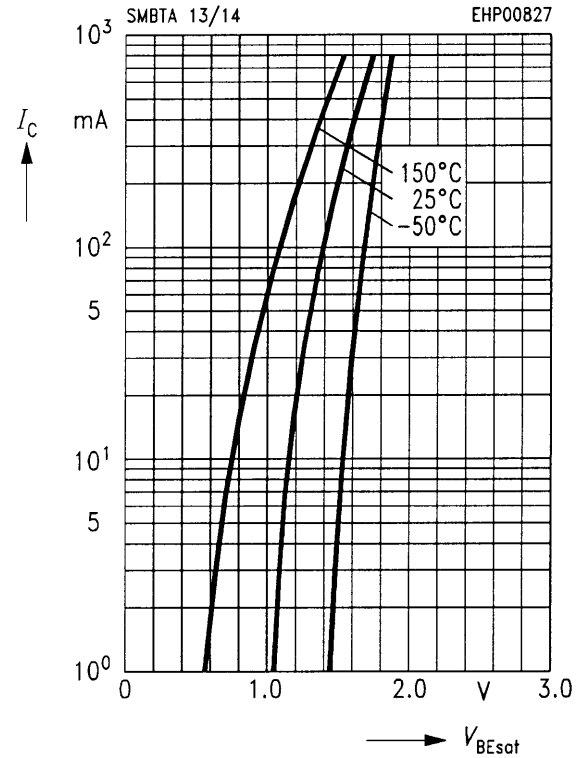
$$h_{FE} = 1000$$



Collector-emitter saturation voltage

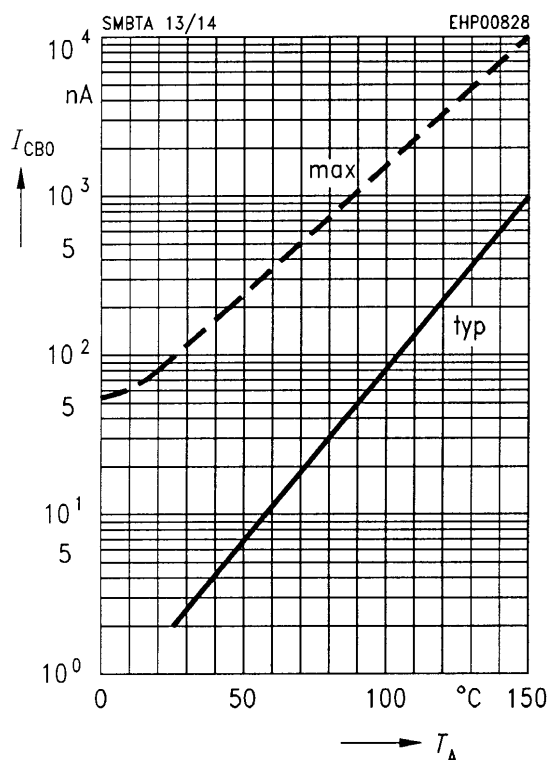
$$I_C = f(V_{CE \text{ sat}})$$

$$h_{FE} = 1000$$



Collector cutoff current $I_{CB0} = f(T_A)$

$$V_{CB} = 30 \text{ V}$$



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

$$V_{CE} = 5 \text{ V}$$

