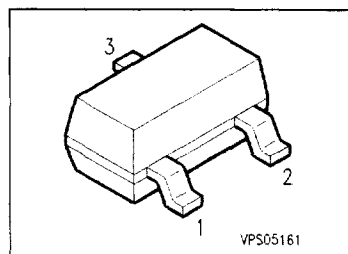


## NPN Silicon Darlington Transistors

**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 <sup>1)</sup>
			1	2	3	
SMBTA 13	s1M	Q68000-A6475	B	E	C	SOT-23
SMBTA 14	s1N	Q68000-A6476				

### 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 <sup>2)</sup>	$R_{thJA}$	≤ 280	K/W
Junction - soldering point	$R_{thJS}$	≤ 210	

<sup>1)</sup> For detailed information see chapter Package Outlines.

<sup>2)</sup> Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm<sup>2</sup> Cu.

### Electrical Characteristics

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

### DC characteristics

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

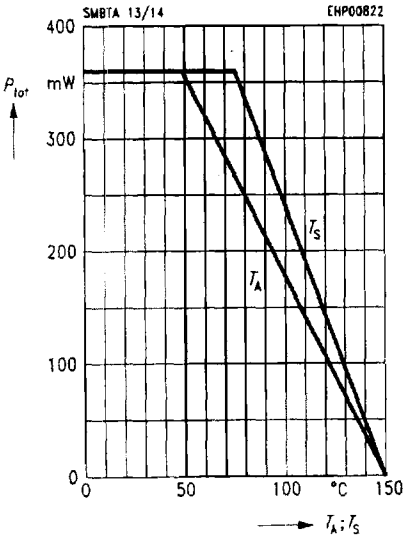
### AC characteristics

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

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

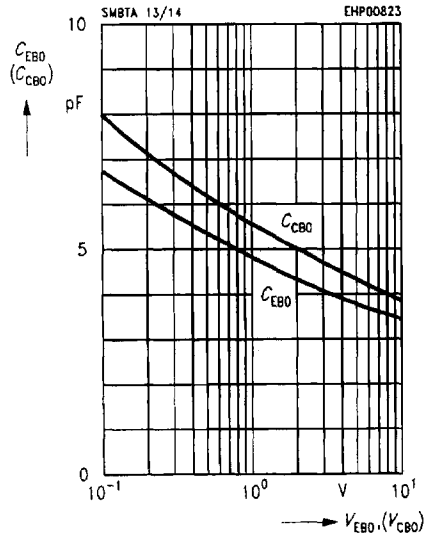
\* Package mounted on epoxy



**Capacitance**  $C_{CBO} = f(V_{CBO})$

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

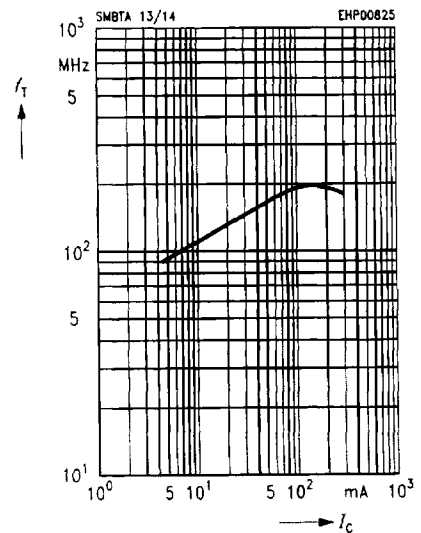
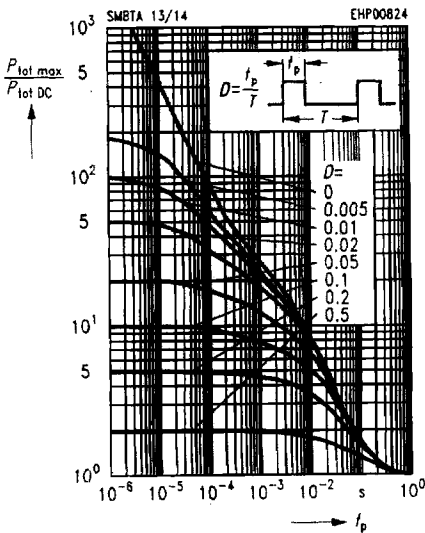
$f = 1 \text{ MHz}$



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

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

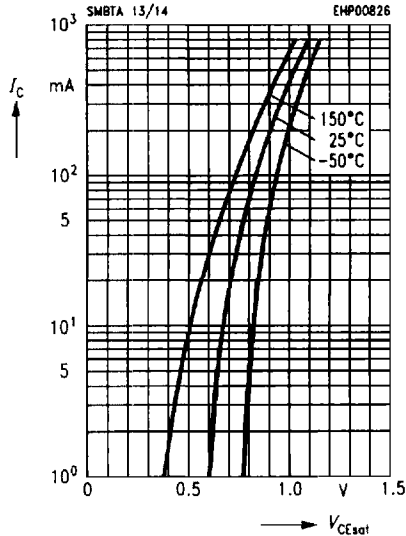
$V_{CE} = 5 \text{ V}, f = 20 \text{ MHz}$



**Base-emitter saturation voltage**

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

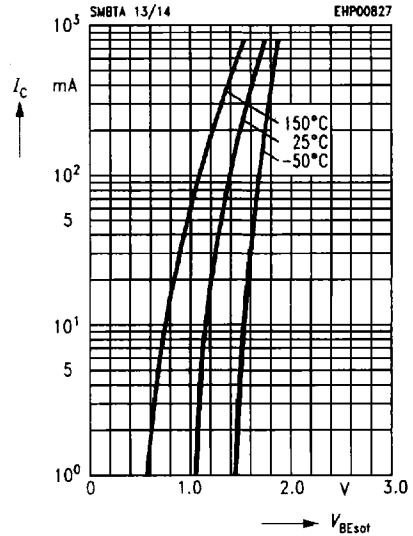
$h_{FE} = 1000$



**Collector-emitter saturation voltage**

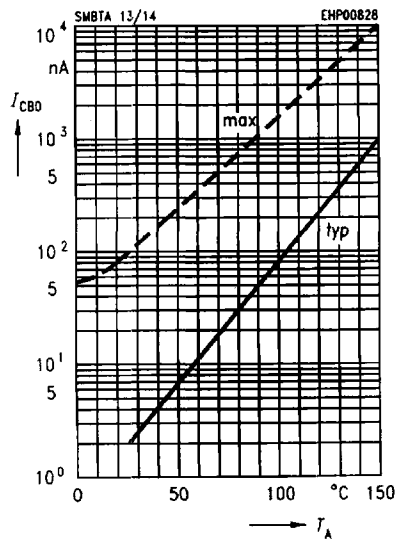
$I_C = f(V_{CE\ sat})$

$h_{FE} = 1000$



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

$V_{CB} = 30\ V$



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

$V_{CE} = 5\ V$

