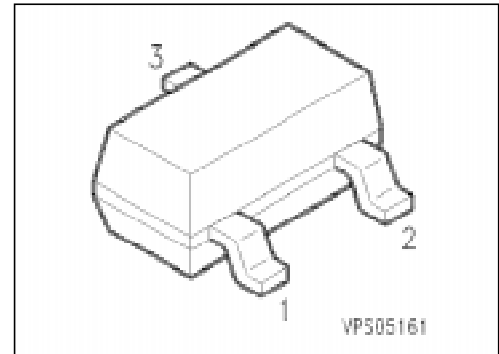# SIEMENS

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 1	2	3	Package[1]
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, $T_S = 81\ °C$	P_{tot}	330	mW
Junction temperature	T_j	150	°C
Storage temperature range	T_{stg}	− 65 … + 150	

Thermal Resistance

Parameter	Symbol	Values	Unit
Junction - ambient[2]	$R_{th\ JA}$	≤ 280	K/W
Junction - soldering point	$R_{th\ JS}$	≤ 210	

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[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 $T_A = 25\ °C$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

Parameter	Symbol	min.	typ.	max.	Unit
Collector-emitter breakdown voltage $I_C = 10\ \mu A$	$V_{(BR)CE0}$	30	–	–	V
Collector-base breakdown voltage $I_C = 10\ \mu A$	$V_{(BR)CB0}$	30	–	–	
Emitter-base breakdown voltage $I_E = 10\ \mu A$	$V_{(BR)EB0}$	10	–	–	
Collector-base cutoff current $V_{CB} = 30\ V$	I_{CB0}	–	–	100	nA
Emitter-base cutoff current $V_{EB} = 10\ V$	I_{EB0}	–	–	100	

DC current gain $I_C = 10\ mA,\ V_{CE} = 5\ V$[1]   SMBTA 13
    SMBTA 14
 $I_C = 100\ mA,\ V_{CE} = 5\ V$[1]   SMBTA 13
    SMBTA 14
	h_{FE}	5000
		 10000
		 10000
		 20000
			–
			 –
			 –
			 –
				–
				 –
				 –
				 –
					–

Collector-emitter saturation voltage[1] $I_C = 100\ mA,\ I_B = 0.1\ mA$	V_{CEsat}	–	–	1.5	V
Base-emitter saturation voltage[1] $I_C = 100\ mA,\ I_B = 0.1\ mA$	V_{BEsat}	–	–	2	

AC characteristics

Parameter	Symbol	min.	typ.	max.	Unit
Transition frequency $I_C = 50\ mA,\ V_{CE} = 5\ V,\ f = 20\ MHz$	f_T	125	–	–	MHz

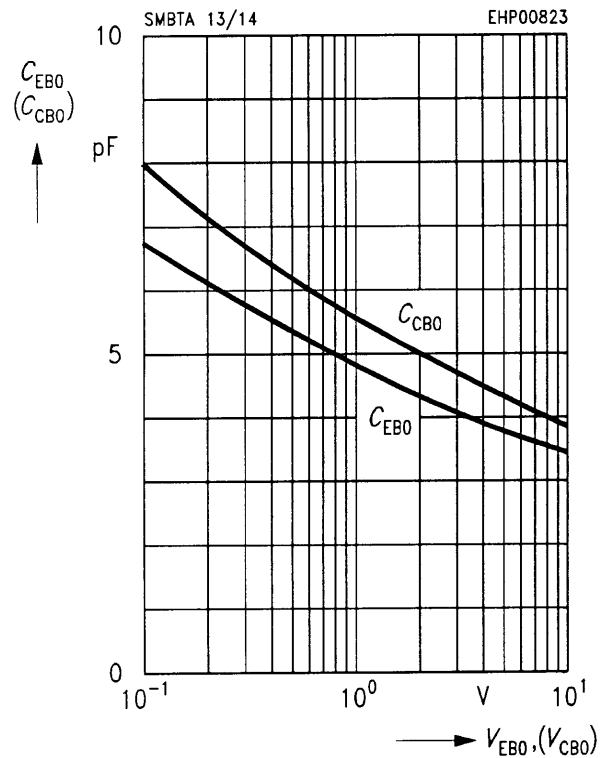[1] Pulse test conditions: $t \leq 300\ \mu s$, $D = 2\ \%$.

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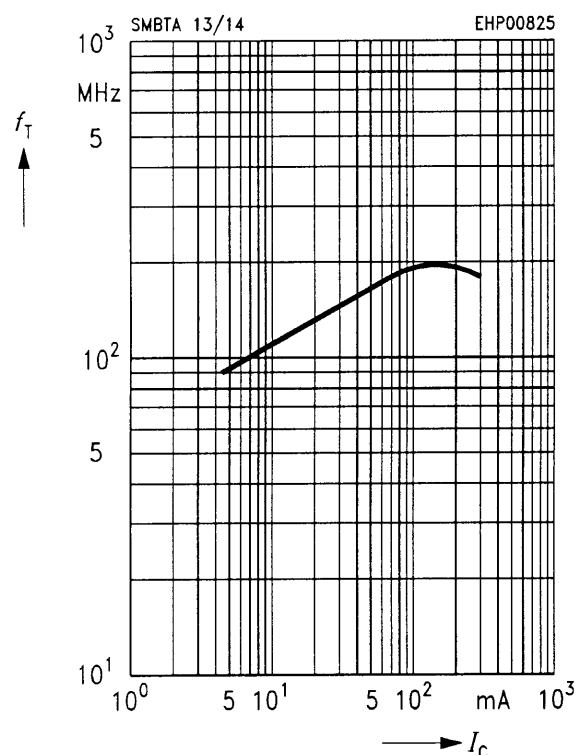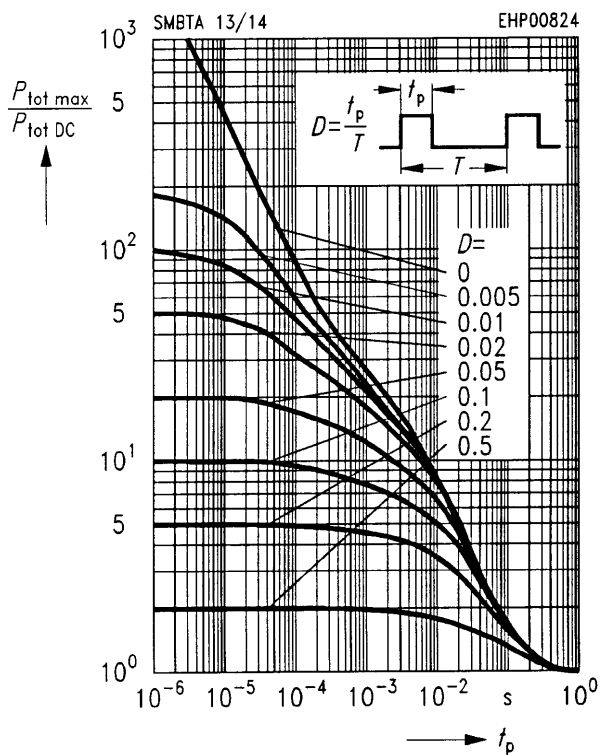* Package mounted on epoxy

Capacitance $C_{CB0} = f(V_{CB0})$
$C_{EB0} = f(V_{EB0})$
$f = 1$ MHz

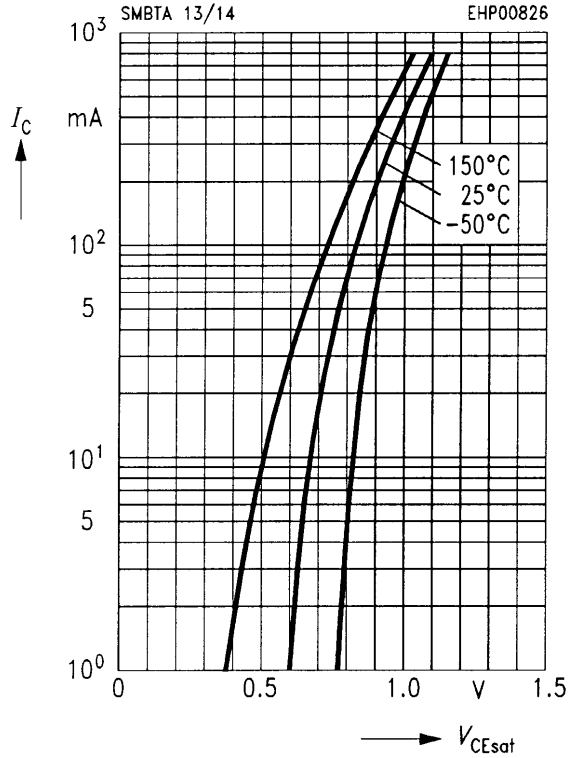**Permissible pulse load** $P_{tot\,max} / P_{tot\,DC} = f(t_p)$

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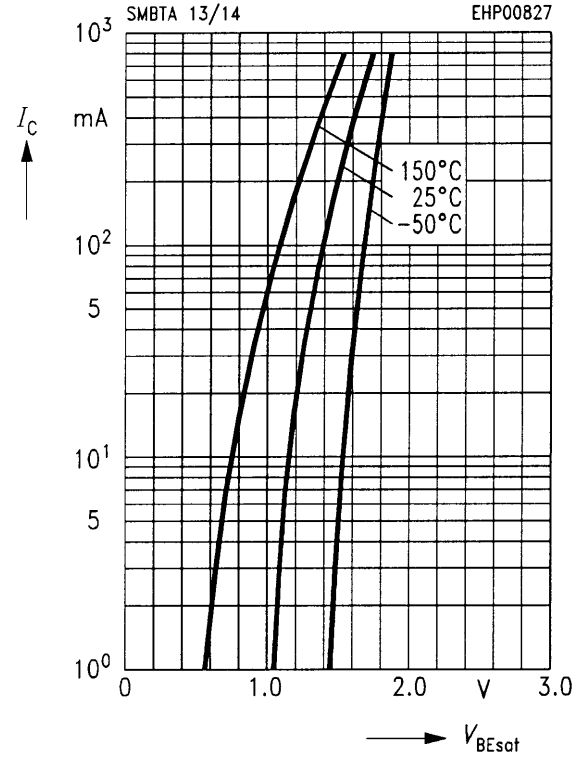$V_{CE} = 5$ V, $f = 20$ MHz

Base-emitter saturation voltage

$I_C = f (V_{BE\,sat})$
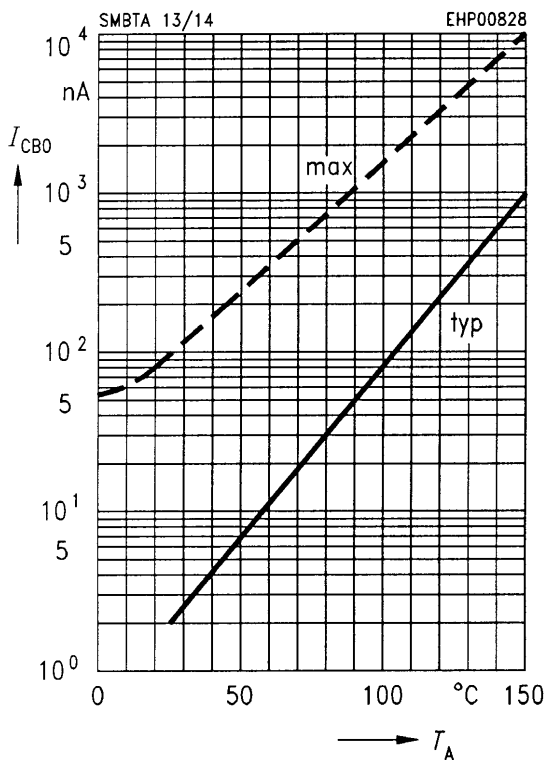
$h_{FE} = 1000$

Collector-emitter saturation voltage

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

$h_{FE} = 1000$

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

$V_{CB} = 30$ V

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

$V_{CE} = 5$ V