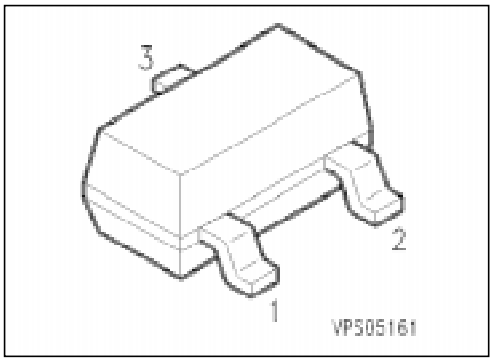
SIEMENS

NPN Silicon AF Transistor

SMBTA 20

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



Type	Marking	Ordering Code (tape and reel)	Pin Configuration 1	2	3	Package[1)]
SMBTA 20	s1C	Q6800-A6477	B	E	C	SOT-23

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE0}	40	V
Emitter-base voltage	V_{EB0}	4	
Collector current	I_C	100	mA
Peak collector current	I_{CM}	200	
Peak base current	I_{BM}	200	
Total power dissipation, T_S = 71 ˚C	P_{tot}	330	mW
Junction temperature	T_j	150	˚C
Storage temperature range	T_{stg}	– 65 … + 150	

Thermal Resistance

Junction - ambient[2)]	$R_{th\ JA}$	≤ 310	K/W
Junction - soldering point	$R_{th\ JS}$	≤ 240	

1) For detailed information see chapter Package Outlines.

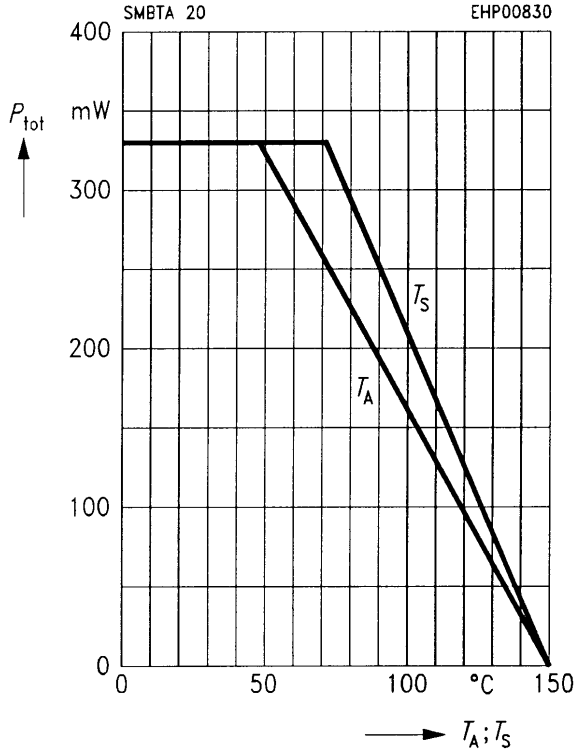
2) Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm^2 Cu.

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

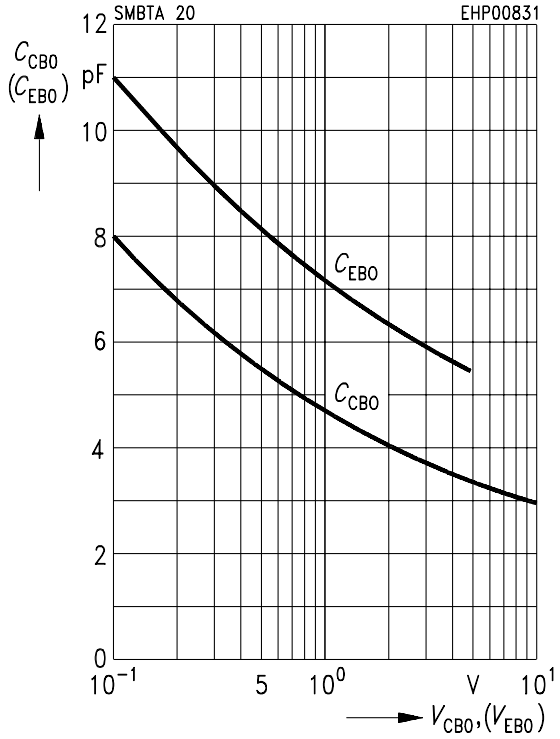
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC characteristics					
Collector-emitter breakdown voltage I_C = 1 mA	$V_{(BR)CE0}$	40	–	–	V
Emitter-base breakdown voltage I_E = 100 µA	$V_{(BR)EB0}$	4	–	–	
Collector-base cutoff current V_{CB} = 30 V V_{CB} = 30 V, T_A = 150 °C	I_{CB0}	 – –	 – –	 100 20	 nA µA
Emitter-base cutoff current V_{EB} = 4 V	I_{EB0}	–	–	20	nA
DC current gain I_C = 5 mA, V_{CE} = 10 V	h_{FE}	40	–	400	–
Collector-emitter saturation voltage[1)] I_C = 10 mA, I_B = 1 mA	V_{CEsat}	–	–	0.25	V
AC characteristics					
Transition frequency I_C = 20 mA, V_{CE} = 5 V, f = 100 MHz	f_t	125	–	–	MHz
Output capacitance V_{CB} = 10 V, f = 1 MHz	C_{obo}	–	–	4	pF

1) Pulse test conditions: $t \leq 300$ µs, D = 2 %.

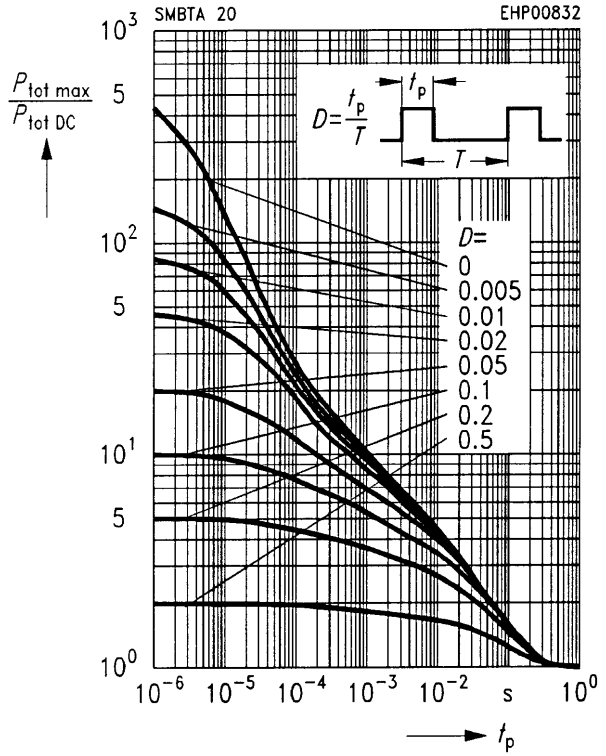
Total power dissipation $P_{tot} = f(T_A^*; T_S)$
* Package mounted on epoxy



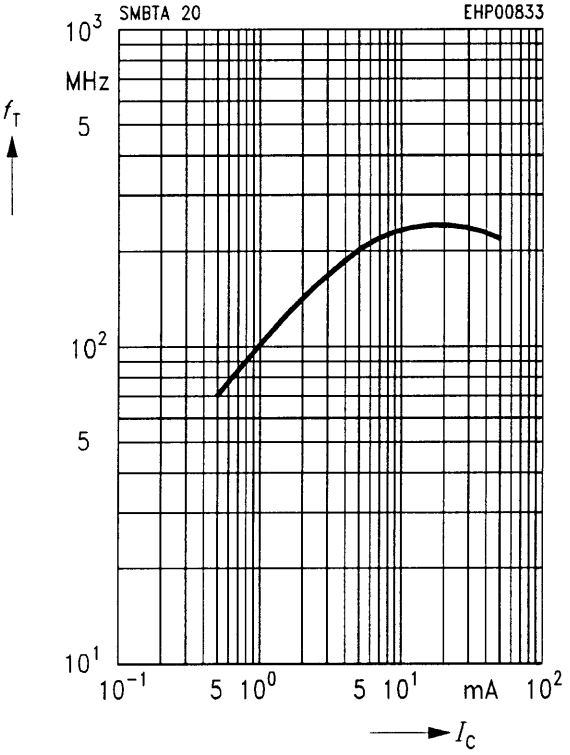
Collector-base capacitance $C_{CB0} = f(V_{CB0})$
Emitter-base capacitance $C_{EB0} = f(V_{EB0})$
f= 1 MHz



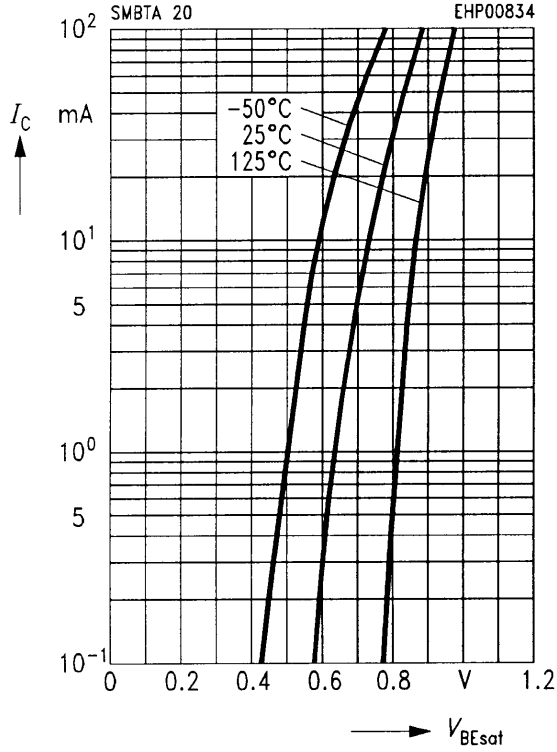
Permissible pulse load $P_{tot\,max}/P_{tot\,DC} = f(t_p)$



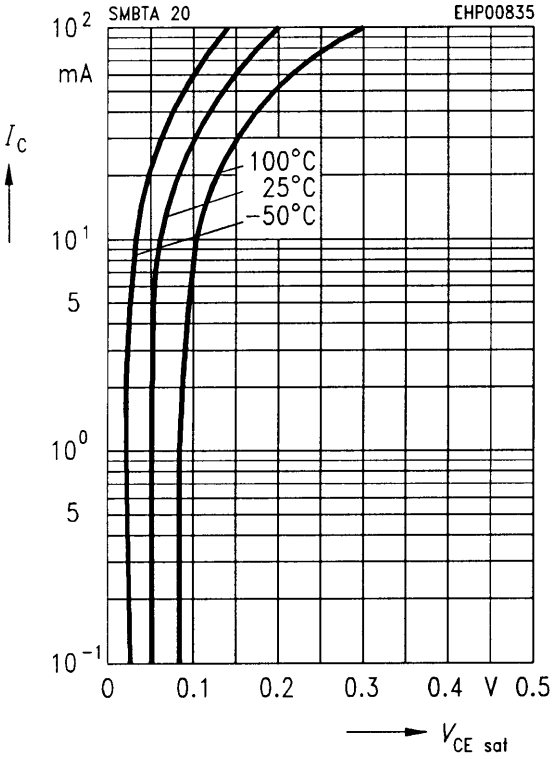
Transition frequency $f_T = f(I_C)$
V_{CE} = 5 V, f = 100 MHz



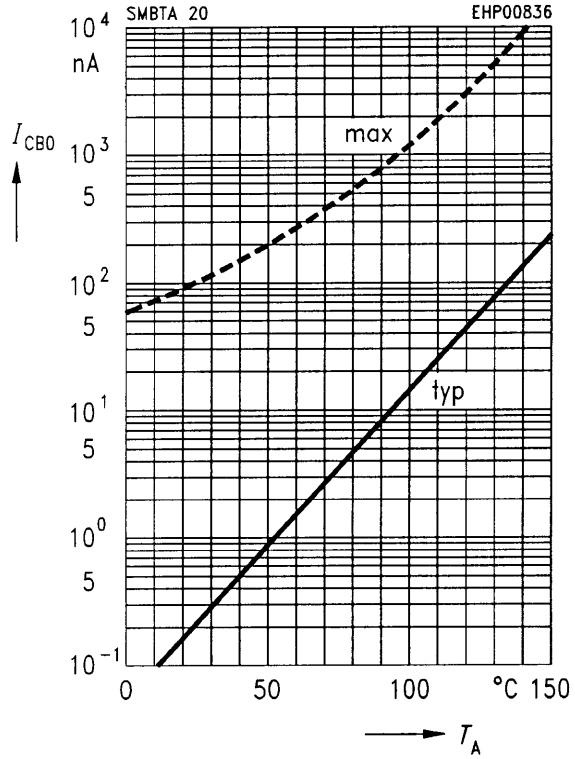
Base-emitter saturation voltage
$I_C = f(V_{BE\ sat})$, $h_{FE} = 20$



Collector-emitter saturation voltage
$I_C = f(V_{CE\ sat})$, $h_{FE} = 20$



Collector cutoff current $I_{CB0} = f(T_A)$
V_{CB} = 30 V



DC current gain $h_{FE} = f(I_C)$
V_{CE} = 1 V