

**NPN Silicon AF Transistor**

- Low collector-emitter saturation voltage
- Complementary type:  
SMBTA 56 / MMBTA56 (PNP)
- Pb-free (RoHS compliant) package
- Qualified according AEC Q101



Type	Marking	Pin Configuration			Package
SMBTA06/MMBTA06	s1G	1=B	2=E	3=C	SOT23

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	80	V
Collector-base voltage	$V_{CBO}$	80	
Emitter-base voltage	$V_{EBO}$	4	
Collector current	$I_C$	500	mA
Peak collector current, $t_p \leq 10$ ms	$I_{CM}$	1	A
Base current	$I_B$	100	mA
Peak base current	$I_{BM}$	200	
Total power dissipation- $T_S \leq 79$ °C	$P_{tot}$	330	mW
Junction temperature	$T_j$	150	°C
Storage temperature	$T_{stg}$	-65 ... 150	

**Thermal Resistance**

Parameter	Symbol	Value	Unit
Junction - soldering point <sup>1)</sup>	$R_{thJS}$	$\leq 215$	K/W

<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note AN077 (Thermal Resistance Calculation)

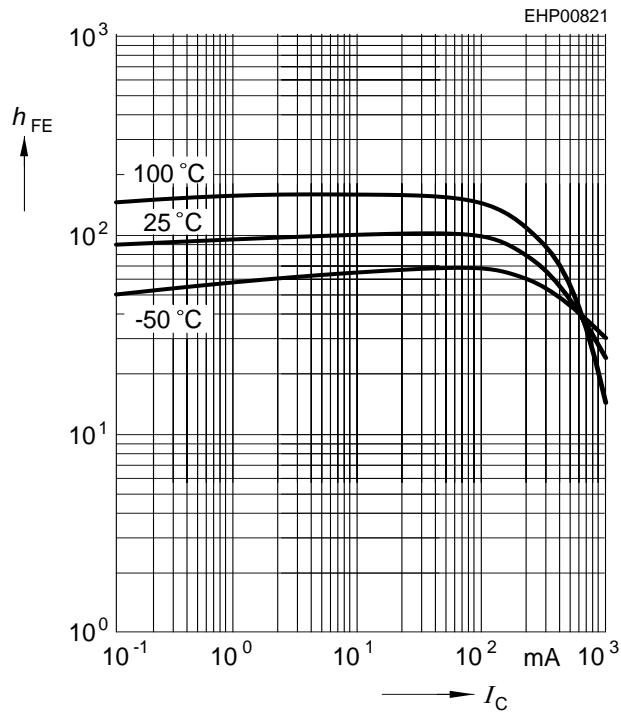
**Electrical Characteristics at  $T_A = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}, I_B = 0$	$V_{(BR)CEO}$	80	-	-	V
Collector-base breakdown voltage $I_C = 100\text{ }\mu\text{A}, I_E = 0$	$V_{(BR)CBO}$	80	-	-	
Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}, I_C = 0$	$V_{(BR)EBO}$	4	-	-	
Collector-base cutoff current $V_{CB} = 80\text{ V}, I_E = 0$ $V_{CB} = 80\text{ V}, I_E = 0, T_A = 150^\circ\text{C}$	$I_{CBO}$	-	-	0.1 20	$\mu\text{A}$
Collector-emitter cutoff current $V_{CE} = 60\text{ V}, I_B = 0$	$I_{CEO}$	-	-	100	nA
DC current gain <sup>1)</sup> $I_C = 10\text{ mA}, V_{CE} = 1\text{ V}$ $I_C = 100\text{ mA}, V_{CE} = 1\text{ V}$	$h_{FE}$	100 100	- -	- -	-
Collector-emitter saturation voltage <sup>1)</sup> $I_C = 100\text{ mA}, I_B = 10\text{ mA}$	$V_{CEsat}$	-	-	0.25	V
Base-emitter voltage <sup>1)</sup> $I_C = 100\text{ mA}, V_{CE} = 1\text{ V}$	$V_{BE(ON)}$	-	-	1.2	
<b>AC Characteristics</b>					
Transition frequency $I_C = 20\text{ mA}, V_{CE} = 5\text{ V}, f = 20\text{ MHz}$	$f_T$	-	100	-	MHz
Collector-base capacitance $V_{CB} = 10\text{ V}, f = 1\text{ MHz}$	$C_{cb}$	-	7	-	pF

<sup>1)</sup>Pulse test:  $t < 300\mu\text{s}$ ;  $D < 2\%$

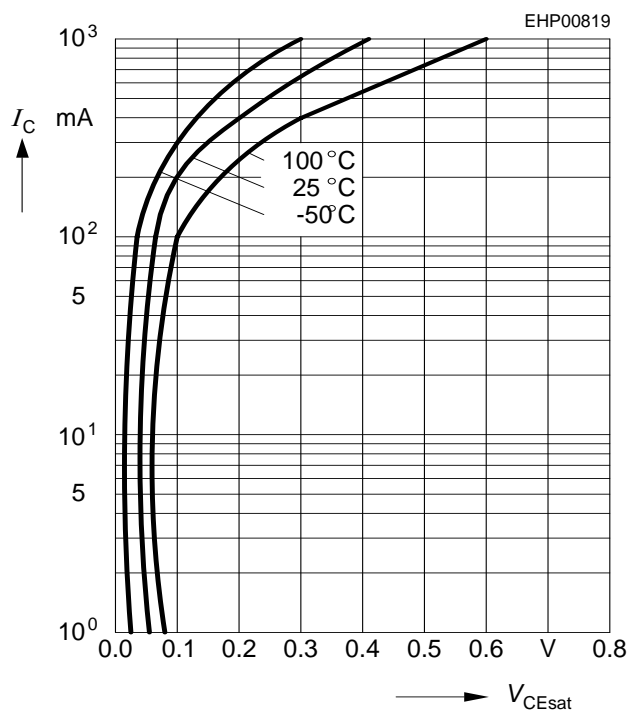
**DC current gain  $h_{FE} = f(I_C)$**

$V_{CE} = 1\text{ V}$



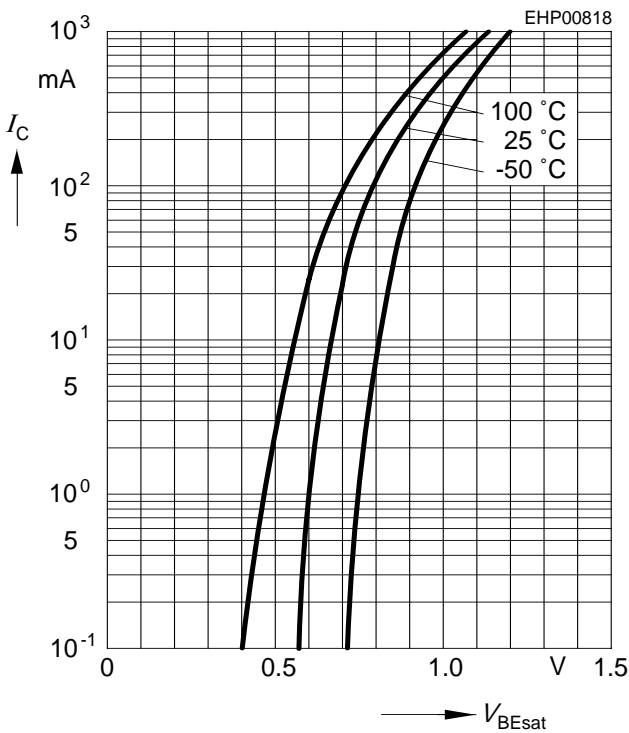
**Collector-emitter saturation voltage**

$I_C = f(V_{CEsat}), h_{FE} = 10$



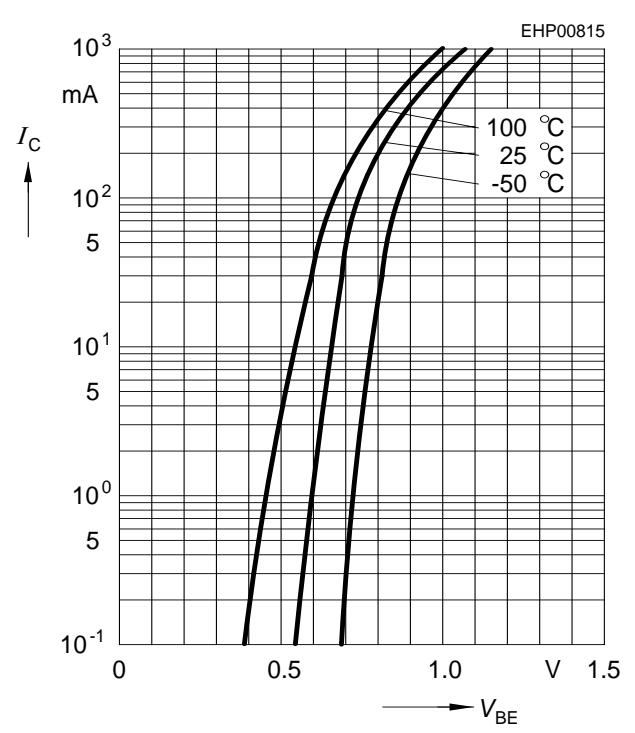
**Base-emitter saturation voltage**

$I_C = f(V_{BEsat}), h_{FE} = 10$



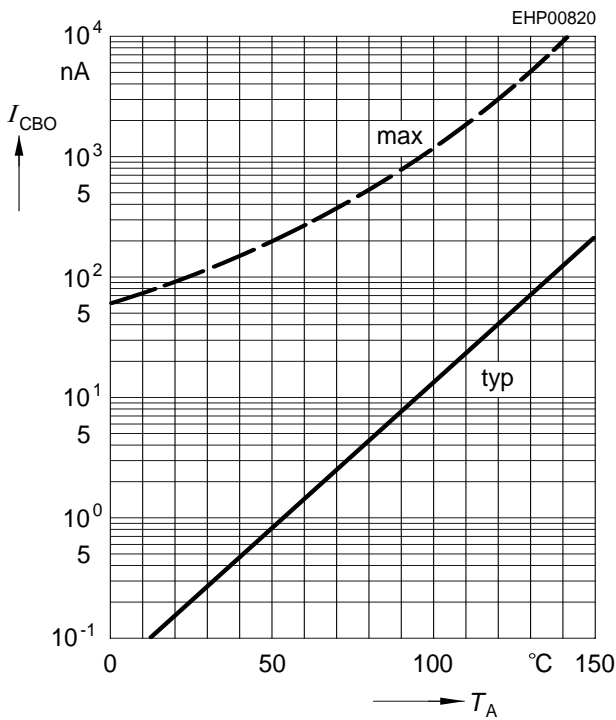
**Collector current  $I_C = f(V_{BE})$**

$V_{CE} = 1\text{ V}$



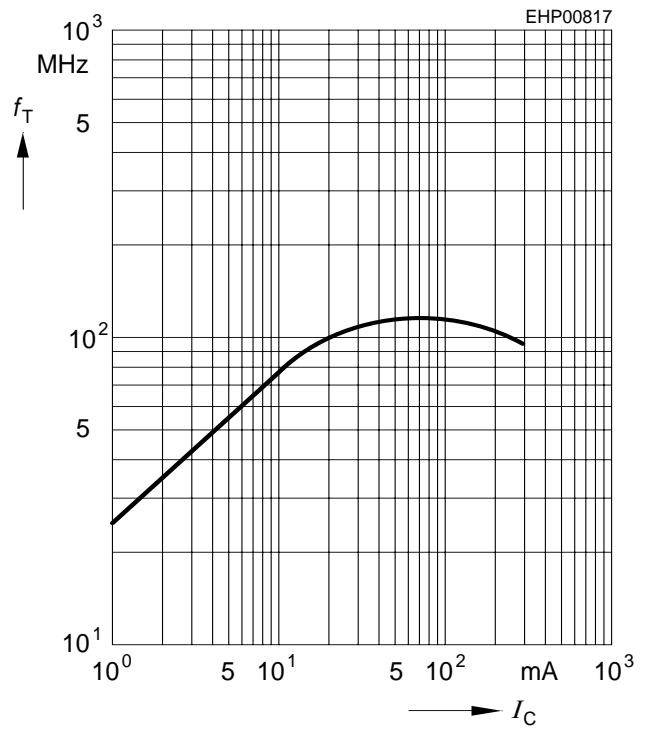
**Collector cutoff current**  $I_{CBO} = f(T_A)$

$V_{CBO} = 80\text{ V}$



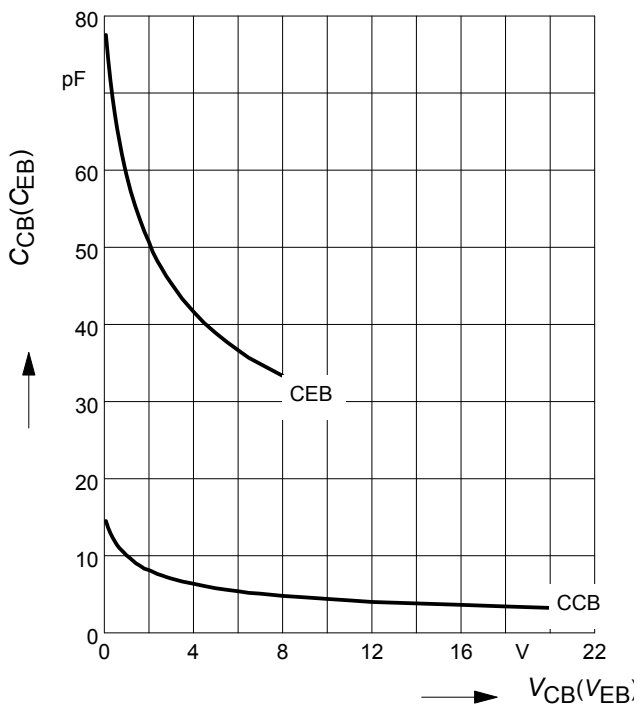
**Transition frequency**  $f_T = f(I_C)$

$V_{CE} = \text{parameter in V, } f = 2\text{ GHz}$

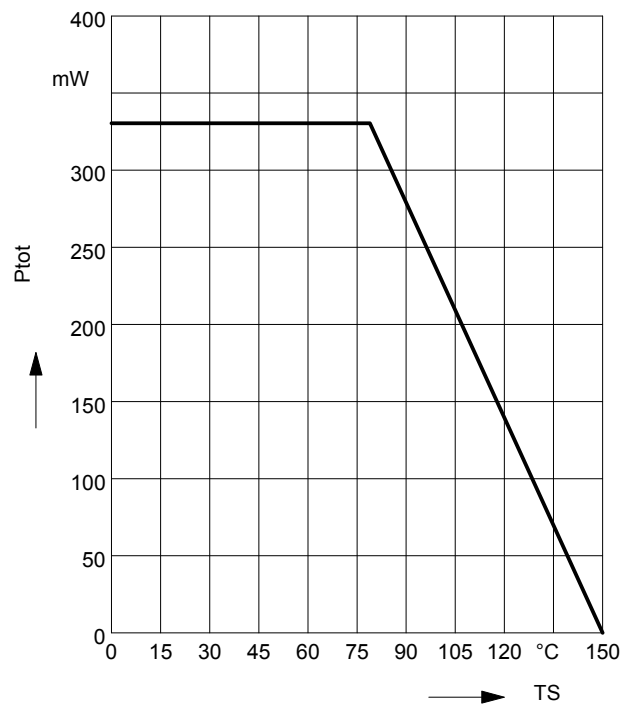


**Collector-base capacitance**  $C_{cb} = f(V_{CB})$

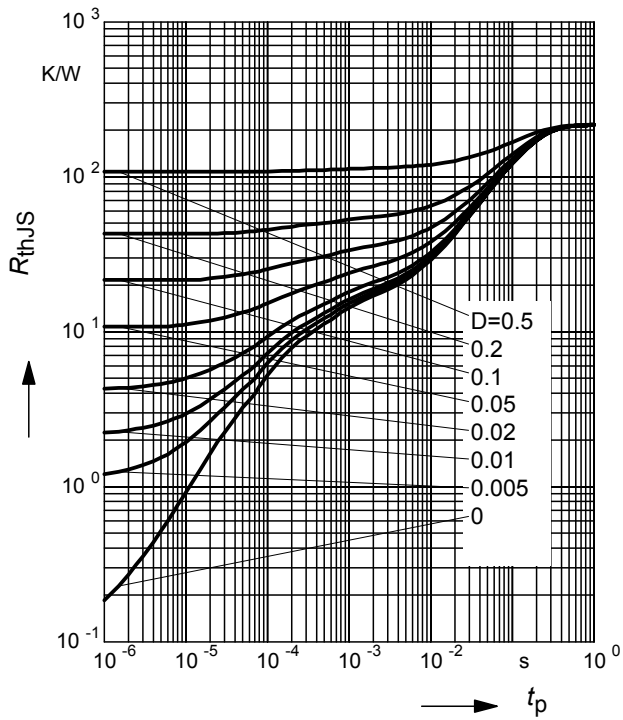
**Emitter-base capacitance**  $C_{eb} = f(V_{EB})$



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

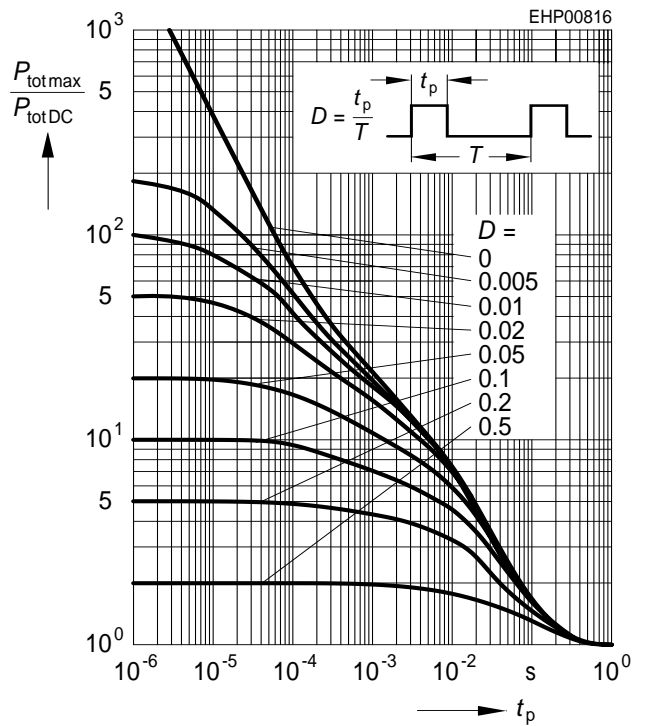


Permissible Pulse Load  $R_{thJS} = f(t_p)$



Permissible Pulse Load

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



Package Outline



1) Lead width can be 0.6 max. in dambar area

Foot Print



Marking Layout (Example)



Standard Packing

Reel  $\varnothing$ 180 mm = 3.000 Pieces/Reel  
 Reel  $\varnothing$ 330 mm = 10.000 Pieces/Reel



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