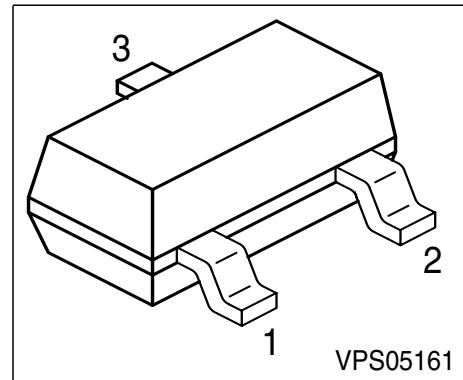


**NPN Silicon AF Transistor**

- High breakdown voltage
  - Low collector-emitter saturation voltage
  - Complementary type: SMBTA56 (PNP)
- MMBTA56 (PNP)



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	
DC collector current	$I_C$	500	mA
Peak collector current	$I_{CM}$	1	A
Base current	$I_B$	100	mA
Peak base current	$I_{BM}$	200	
Total power dissipation, $T_S = 79 \text{ }^\circ\text{C}$	$P_{tot}$	330	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-65 ... 150	

**Thermal Resistance**

Junction - soldering point <sup>1)</sup>	$R_{thJS}$	$\leq 215$	K/W
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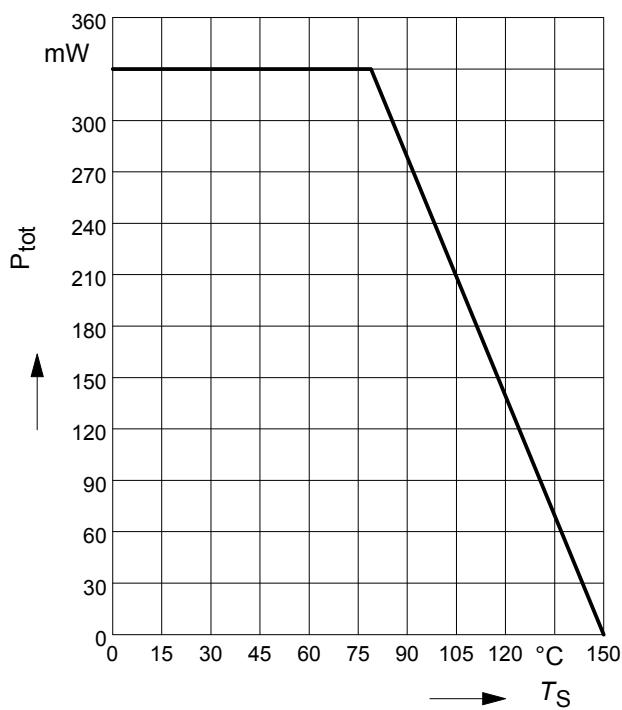
<sup>1</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

**Electrical Characteristics**

<b>Parameter</b>	<b>Symbol</b>	<b>Values</b>			<b>Unit</b>
		<b>min.</b>	<b>typ.</b>	<b>max.</b>	
<b>DC Characteristics</b>					
Collector-emitter breakdown voltage $I_C = 1 \text{ mA}, I_B = 0$	$V_{(\text{BR})\text{CEO}}$	80	-	-	V
Collector-base breakdown voltage $I_C = 100 \mu\text{A}, I_E = 0$	$V_{(\text{BR})\text{CBO}}$	80	-	-	
Emitter-base breakdown voltage $I_E = 10 \mu\text{A}, I_C = 0$	$V_{(\text{BR})\text{EBO}}$	4	-	-	
Collector cutoff current $V_{\text{CB}} = 80 \text{ V}, I_E = 0$	$I_{\text{CBO}}$	-	-	100	nA
Collector cutoff current $V_{\text{CB}} = 80 \text{ V}, I_E = 0, T_A = 150 \text{ }^\circ\text{C}$	$I_{\text{CBO}}$	-	-	20	$\mu\text{A}$
Collector cutoff current $V_{\text{CE}} = 60 \text{ V}, I_B = 0$	$I_{\text{CEO}}$	-	-	100	nA
DC current gain 1) $I_C = 10 \text{ mA}, V_{\text{CE}} = 1 \text{ V}$ $I_C = 100 \text{ mA}, V_{\text{CE}} = 1 \text{ V}$	$h_{\text{FE}}$	100 100	- -	- -	-
Collector-emitter saturation voltage1) $I_C = 100 \text{ mA}, I_B = 10 \text{ mA}$	$V_{\text{CEsat}}$	-	-	0.25	V
Base-emitter voltage 1) $I_C = 100 \text{ mA}, V_{\text{CE}} = 1 \text{ V}$	$V_{\text{BE}(\text{ON})}$	-	-	1.2	
<b>AC Characteristics</b>					
Transition frequency $I_C = 20 \text{ mA}, V_{\text{CE}} = 5 \text{ V}, f = 20 \text{ MHz}$	$f_T$	-	100	-	MHz
Collector-base capacitance $V_{\text{CB}} = 10 \text{ V}, f = 1 \text{ MHz}$	$C_{\text{cb}}$	-	12	-	pF

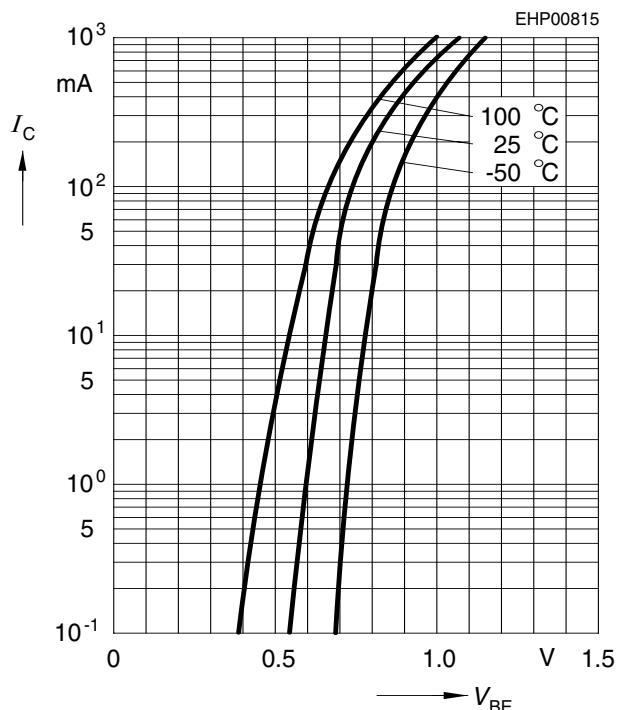
1) Pulse test:  $t \leq 300 \mu\text{s}, D = 2\%$

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



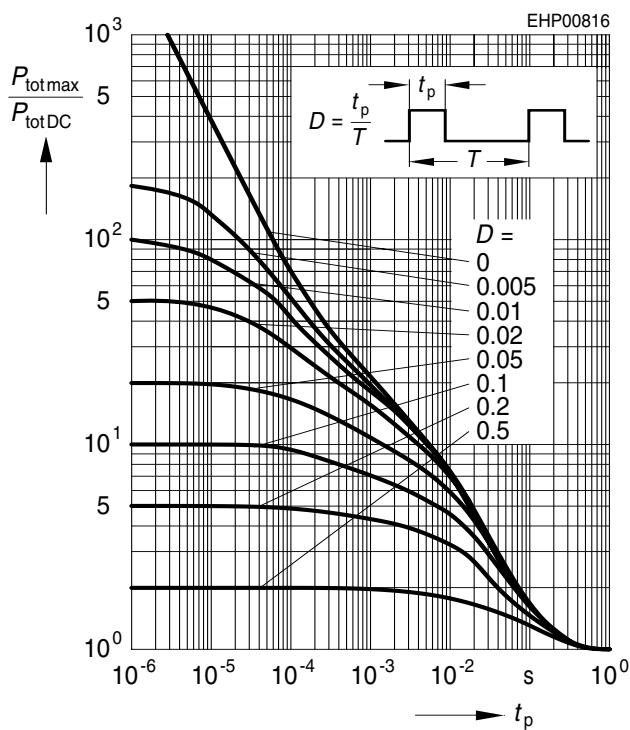
**Collector current  $I_C = f(V_{BE})$**

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



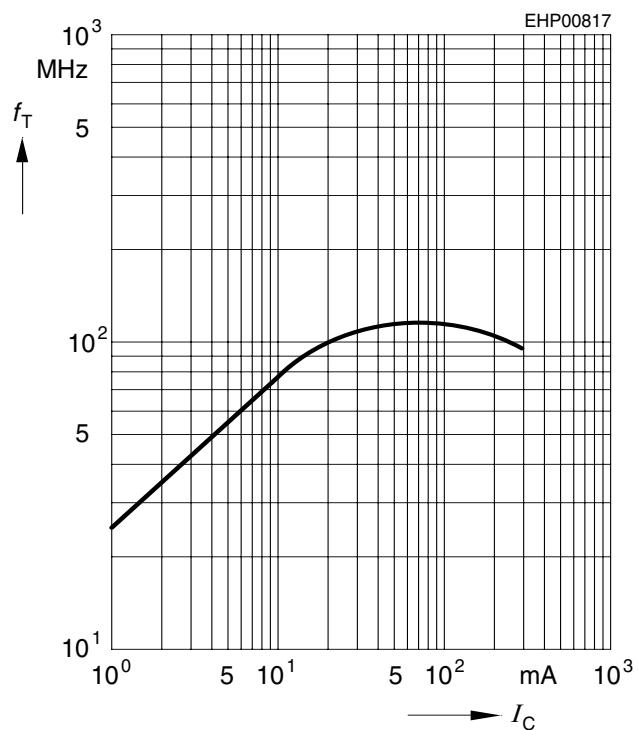
**Permissible pulse load**

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



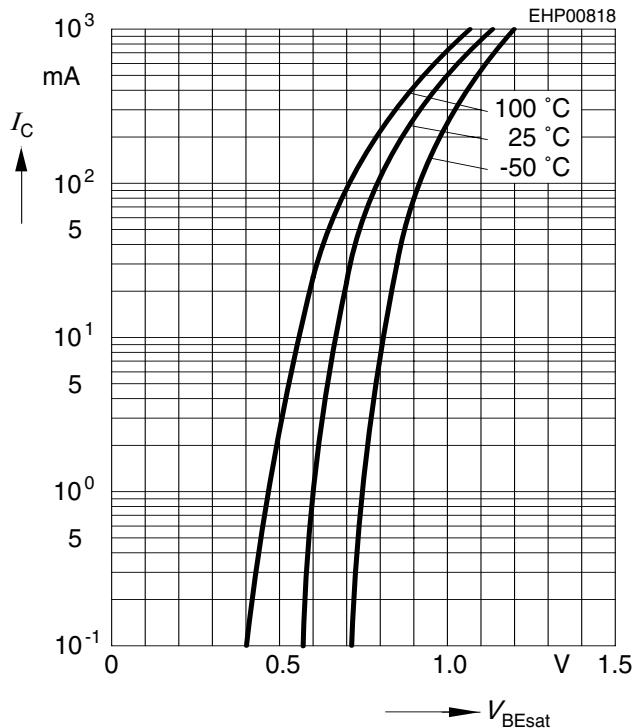
**Transition frequency  $f_T = f(I_C)$**

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

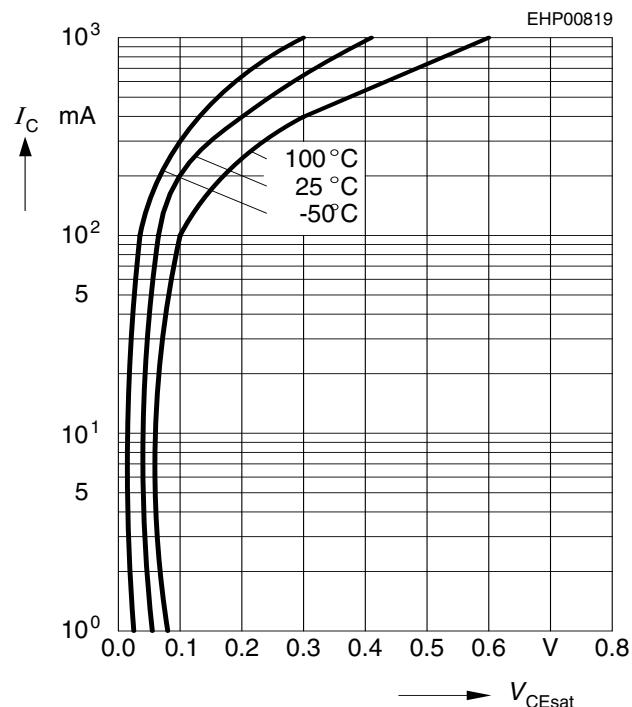


**Base-emitter saturation voltage**

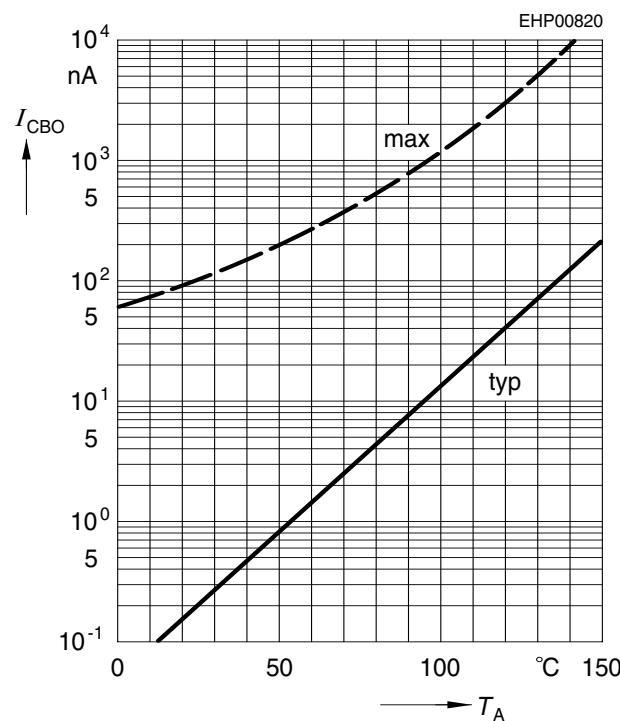
$$I_C = f(V_{BEsat}), h_{FE} = 10$$


**Collector-emitter saturation voltage**

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


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

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


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

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

