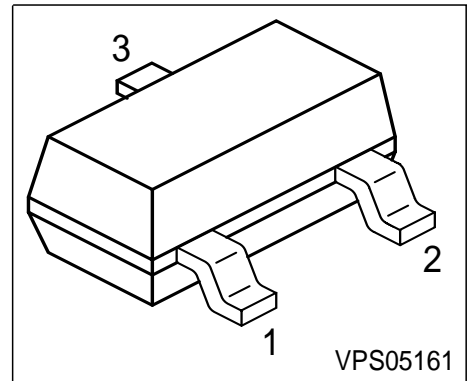


**PNP Silicon Transistor**

- For AF input stages and driver applications
- High current gain
- Low collector-emitter saturation voltage
- Low noise between 30Hz and 15kHz



Type	Marking	Pin Configuration			Package
SMBT5087	s2Q	1 = B	2 = E	3 = C	SOT23

**Maximum Ratings**

Parameter	Symbol	Value	Unit
Collector-emitter voltage	$V_{CEO}$	50	V
Collector-base voltage	$V_{CBO}$	50	
Emitter-base voltage	$V_{EBO}$	3	
Collector current	$I_C$	50	mA
Total power dissipation- $T_S = 71\text{ °C}$	$P_{tot}$	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>	$R_{thJS}$	≤240	K/W

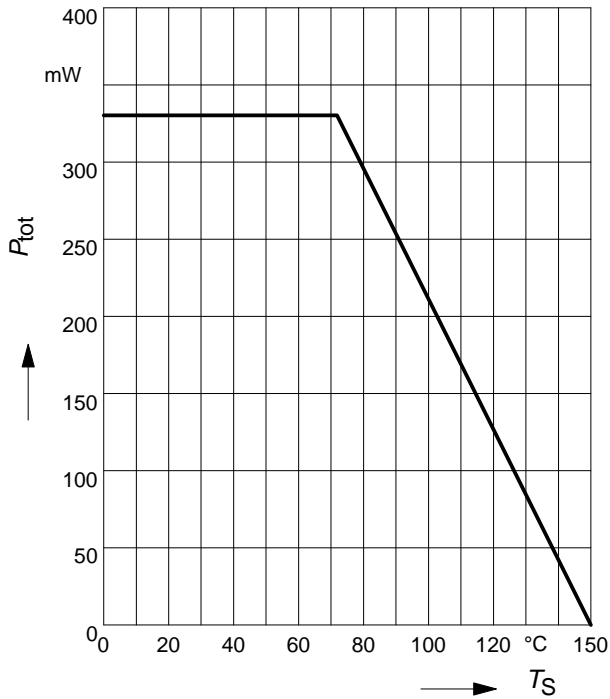
<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

**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 $I_C = 1 \text{ mA}, I_B = 0$	$V_{(BR)CEO}$	50	-	-	V
Collector-base breakdown voltage $I_C = 100 \mu\text{A}, I_E = 0$	$V_{(BR)CBO}$	50	-	-	
Emitter-base breakdown voltage $I_E = 10 \mu\text{A}, I_C = 0$	$V_{(BR)EBO}$	3	-	-	
Collector -base cutoff current $V_{CB} = 10 \text{ V}, I_E = 0$ $V_{CB} = 35 \text{ V}, I_E = 0$ $V_{CB} = 35 \text{ V}, I_E = 0, T_A = 150^\circ\text{C}$	$I_{CBO}$	-	-	10 50 20	nA nA $\mu\text{A}$
DC current gain <sup>1)</sup> $I_C = 100 \mu\text{A}, V_{CE} = 5 \text{ V}$ $I_C = 1 \text{ mA}, V_{CE} = 5 \text{ V}$ $I_C = 10 \text{ mA}, V_{CE} = 5 \text{ V}$	$h_{FE}$	250 250 250	- - -	800 - -	-
Collector-emitter saturation voltage <sup>1)</sup> $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$	$V_{CEsat}$	-	-	0.3	V
Base emitter saturation voltage <sup>-1)</sup> $I_C = 10 \text{ mA}, I_B = 1 \text{ mA}$	$V_{BEsat}$	-	-	0.85	
<b>AC Characteristics</b>					
Transition frequency $I_C = 0.5 \text{ mA}, V_{CE} = 5 \text{ V}, f = 100 \text{ MHz}$	$f_T$	40	-	-	MHz
Collector-base capacitance $V_{CB} = 5 \text{ V}, f = 1 \text{ MHz}$	$C_{cb}$	-	-	4	pF
Short-circuit forward current transf. ratio $I_C = 1 \text{ mA}, V_{CE} = 5 \text{ V}, f = 1 \text{ kHz}$	$h_{21e}$	250	-	900	-
Noise figure $I_C = 100 \mu\text{A}, V_{CE} = 5 \text{ V}, f = 1 \text{ kHz},$ $\Delta f = 200 \text{ Hz}, R_S = 3 \text{ k}\Omega$ $I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}, f = 10\text{Hz to } 15\text{kHz},$ $R_S = 10 \text{ k}\Omega$	$F$	- -	- -	2 2	dB

<sup>1</sup>Puls test:  $t \leq 300 \mu\text{s}, D = 2\%$

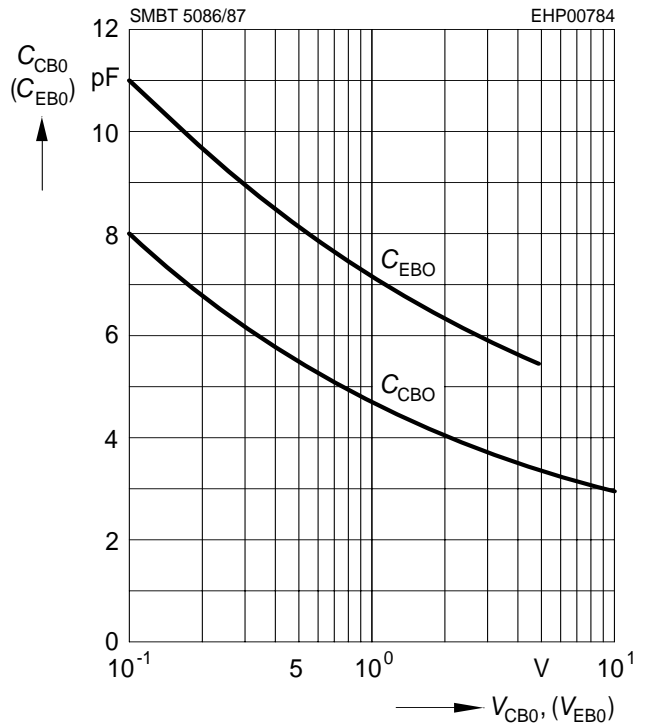
**Total power dissipation  $P_{tot} = f(T_S)$**



**Collector-base capacitance  $C_{CB} = f(V_{CB0})$**

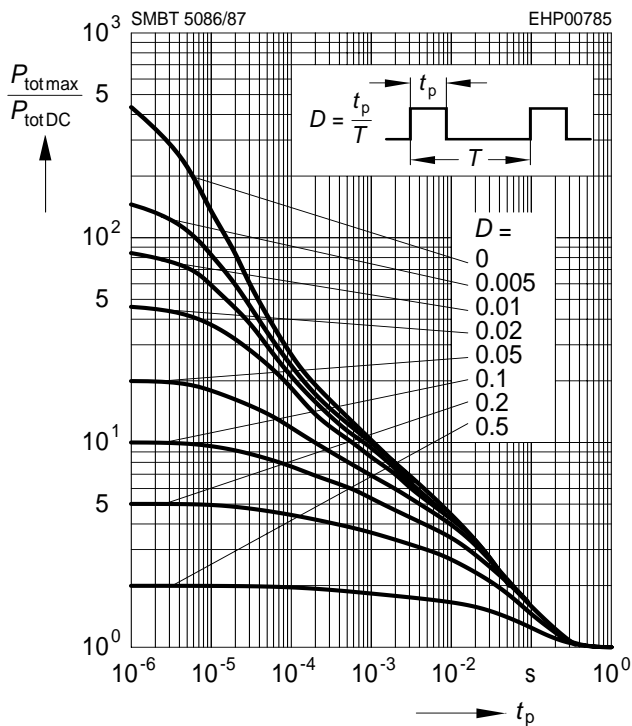
**Emitter-base capacitance  $C_{EB} = f(V_{EB0})$**

$f = 1\text{MHz}$



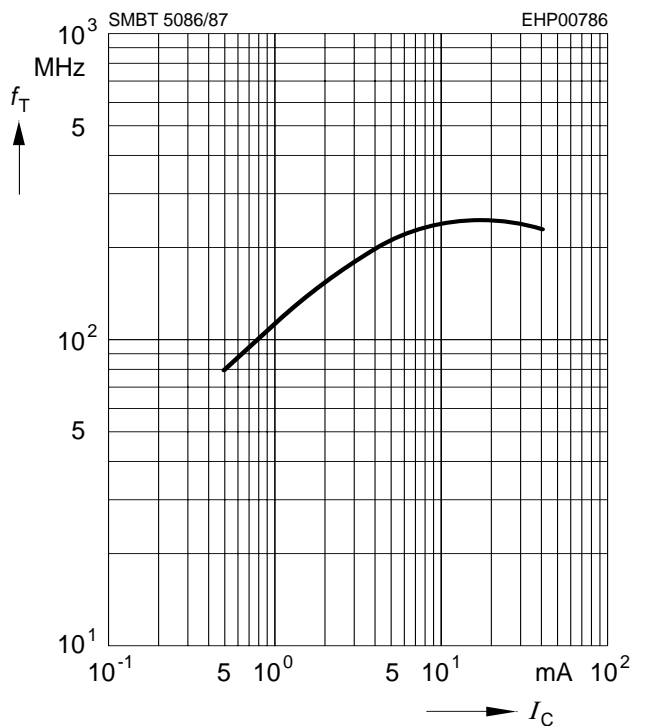
**Permissible Pulse Load**

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



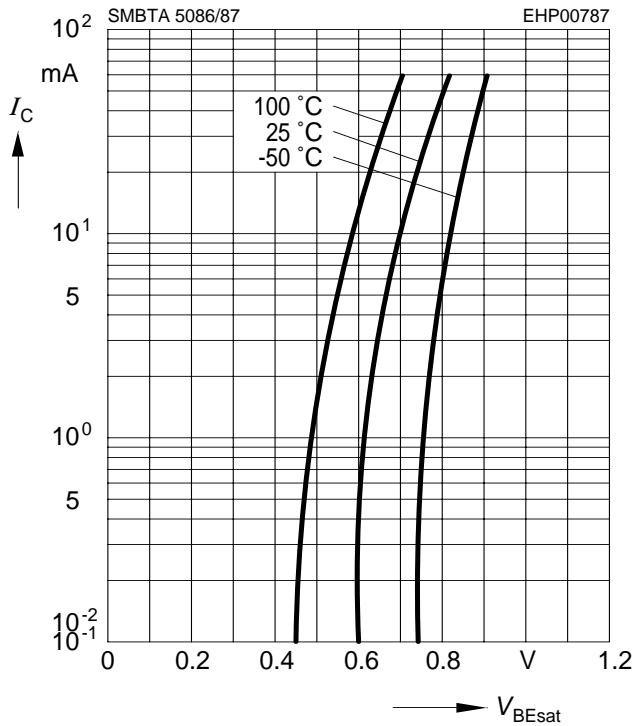
**Transition frequency  $f_T = f(I_C)$**

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



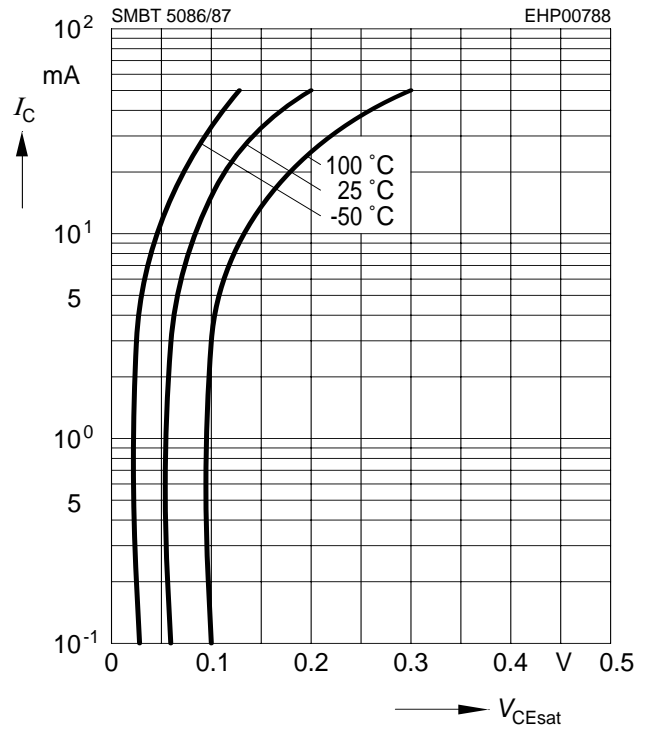
**Base-emitter saturation voltage**

$I_C = f(V_{BEsat}), h_{FE} = 40$



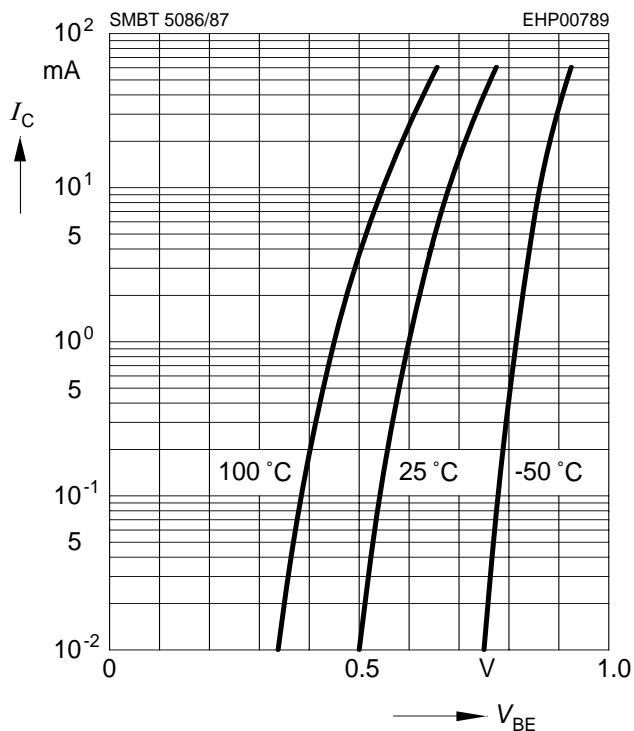
**Collector-emitter saturation voltage**

$I_C = f(V_{CEsat}), h_{FE} = 40$



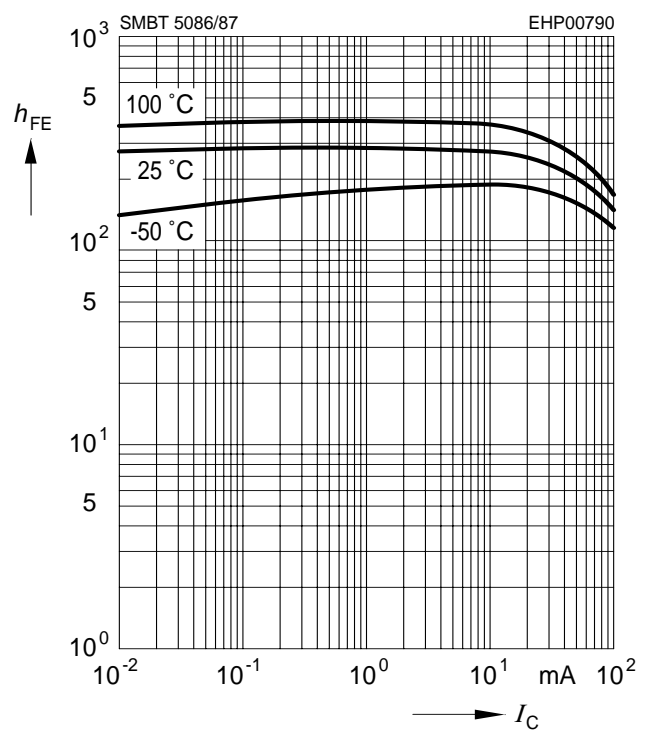
**Collector current  $I_C = f(V_{BE})$**

$V_{CE} = 1V$



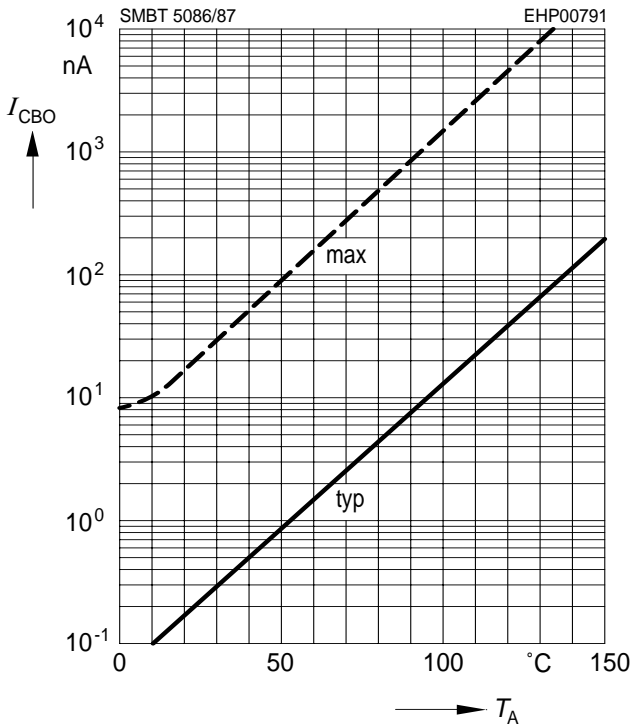
**DC current gain  $h_{FE} = f(I_C)$**

$V_{CE} = 1V$



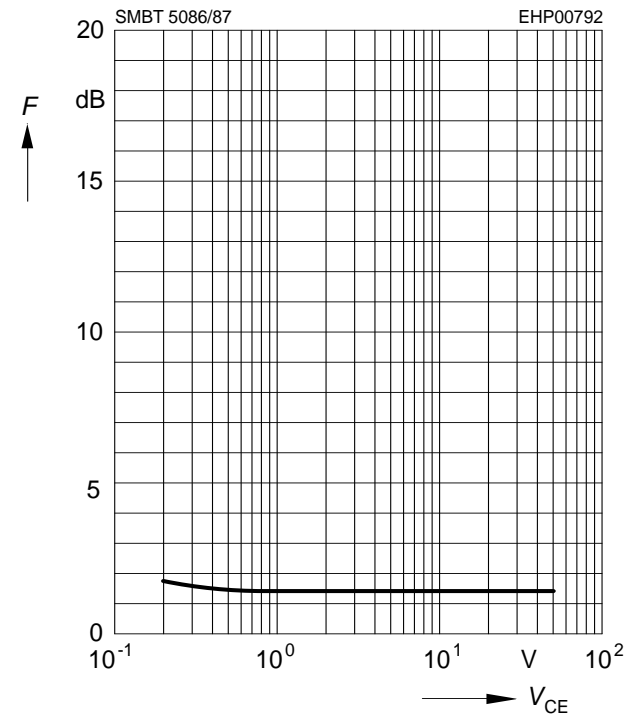
**Collector cutoff current  $I_{CBO} = f(T_A)$**

$V_{CB} = 30\text{ V}$



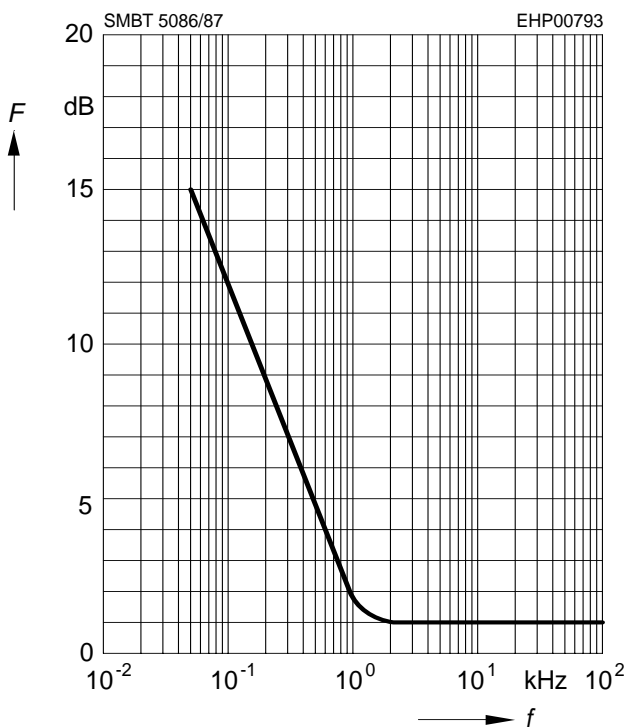
**Noise figure  $F = f(V_{CE})$**

$I_C = 0.2\text{ mA}$ ,  $R_S = 2\text{ k}\Omega$ ,  $f = 1\text{ kHz}$



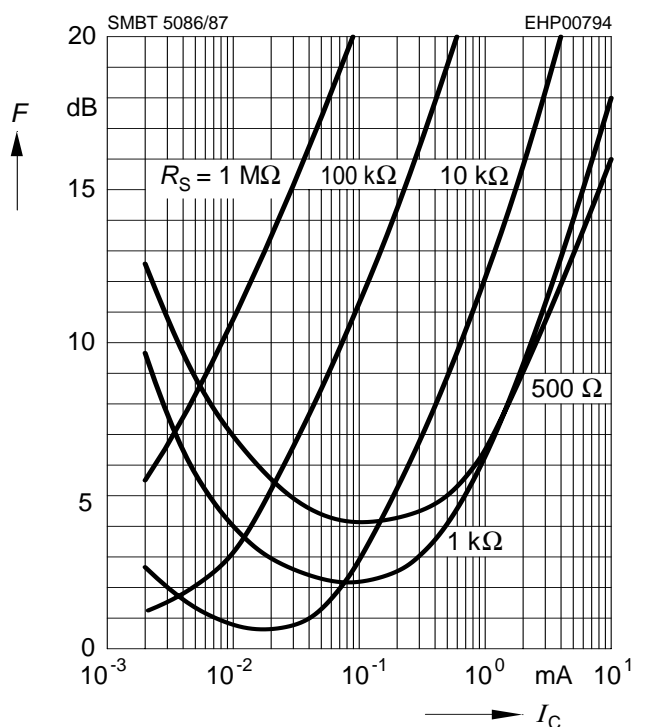
**Noise figure  $F = f(f)$**

$I_C = 0.2\text{ mA}$ ,  $V_{CE} = 5\text{ V}$ ,  $R_S = 2\text{ k}\Omega$



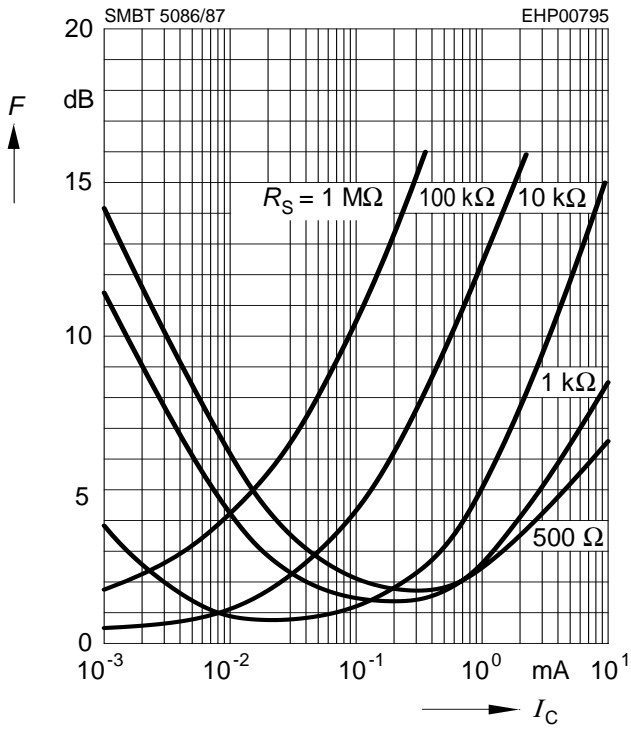
**Noise figure  $F = f(I_C)$**

$V_{CE} = 5\text{ V}$ ,  $f = 120\text{ Hz}$



Noise figure  $F = f(I_C)$

$V_{CE} = 5V, f = 1kHz$



Noise figure  $F = f(I_C)$

$V_{CE} = 5V, f = 10kHz$

