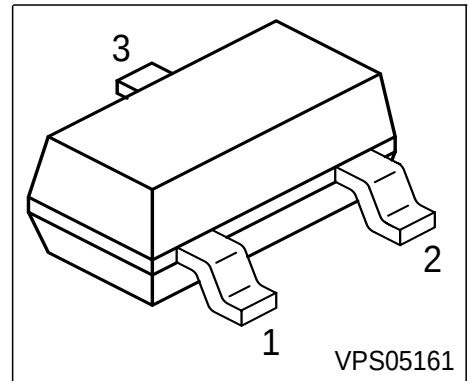


PNP Silicon Transistor

- 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 ¹⁾	R_{thJS}	≤240	K/W

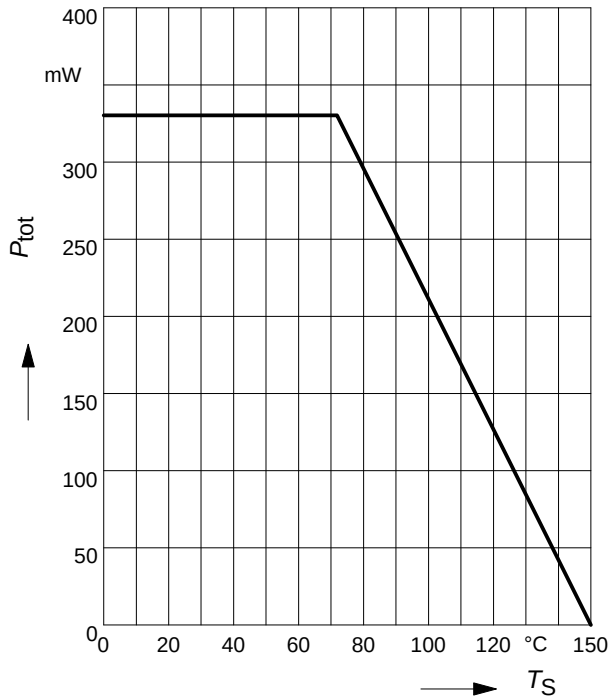
¹⁾For calculation of R_{thJA} please refer to Application Note Thermal Resistance

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage $I_C = 1\text{ mA}$, $I_B = 0$	$V_{(BR)CEO}$	50	-	-	V
Collector-base breakdown voltage $I_C = 100\text{ }\mu\text{A}$, $I_E = 0$	$V_{(BR)CBO}$	50	-	-	
Emitter-base breakdown voltage $I_E = 10\text{ }\mu\text{A}$, $I_C = 0$	$V_{(BR)EBO}$	3	-	-	
Collector -base cutoff current $V_{CB} = 10\text{ V}$, $I_E = 0$ $V_{CB} = 35\text{ V}$, $I_E = 0$ $V_{CB} = 35\text{ V}$, $I_E = 0$, $T_A = 150\text{ }^{\circ}\text{C}$	I_{CBO}	- - -	- - -	10 50 20	nA nA μA
DC current gain ¹⁾ $I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$ $I_C = 1\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$	h_{FE}	250 250 250	- - -	800 - -	-
Collector-emitter saturation voltage ¹⁾ $I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$	V_{CEsat}	-	-	0.3	V
Base emitter saturation voltage-1) $I_C = 10\text{ mA}$, $I_B = 1\text{ mA}$	V_{BEsat}	-	-	0.85	
AC Characteristics					
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 $I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, $\Delta f = 200\text{ Hz}$, $R_S = 3\text{ k}\Omega$ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 10\text{HZ to }15\text{kHz}$, $R_S = 10\text{ k}\Omega$	F	- -	- -	2 2	dB

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

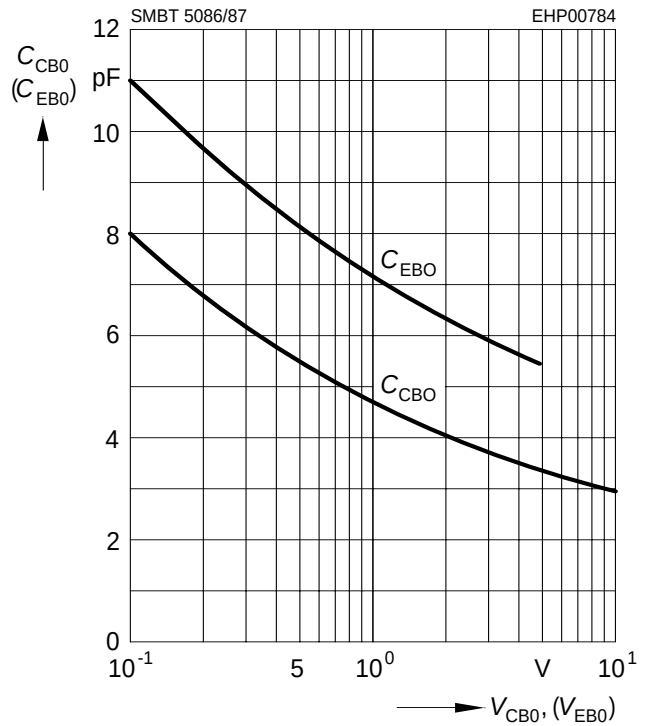
Total power dissipation $P_{\text{tot}} = f(T_S)$



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

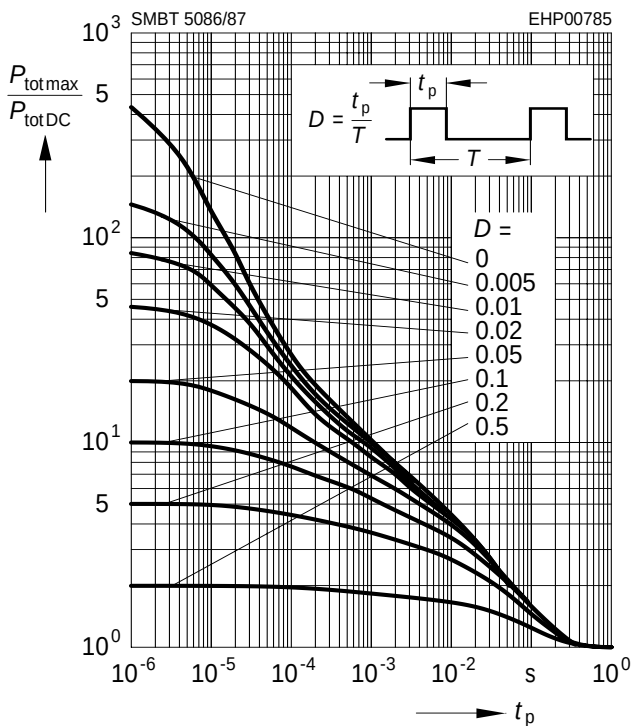
Emitter-base capacitance $C_{\text{EB}} = f(V_{\text{EB0}})$

$f = 1\text{MHz}$



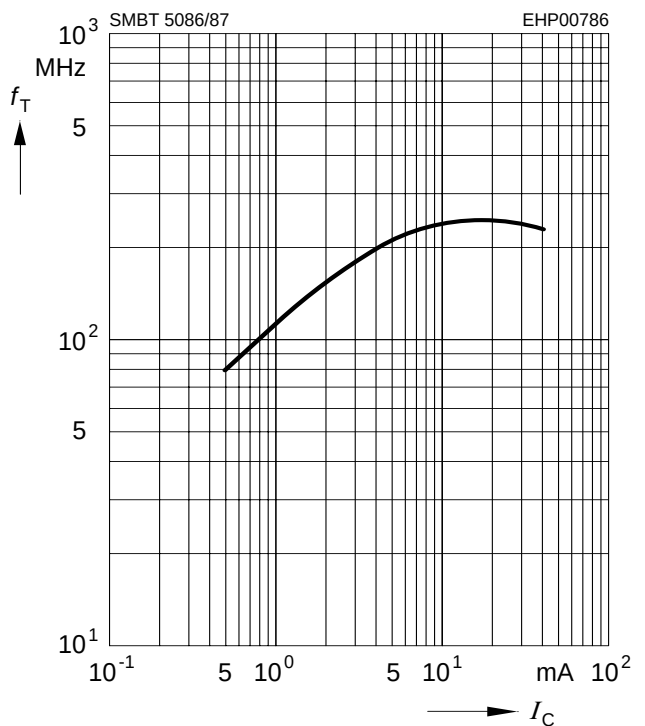
Permissible Pulse Load

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



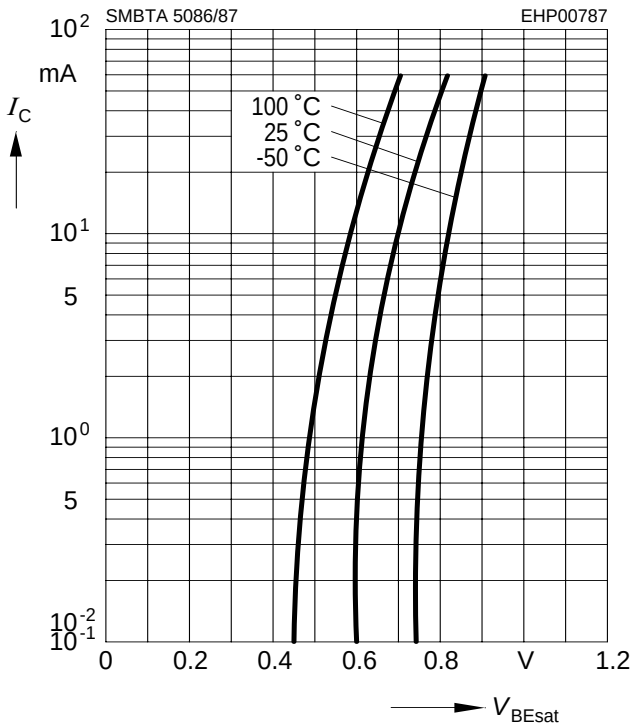
Transition frequency $f_T = f(I_C)$

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

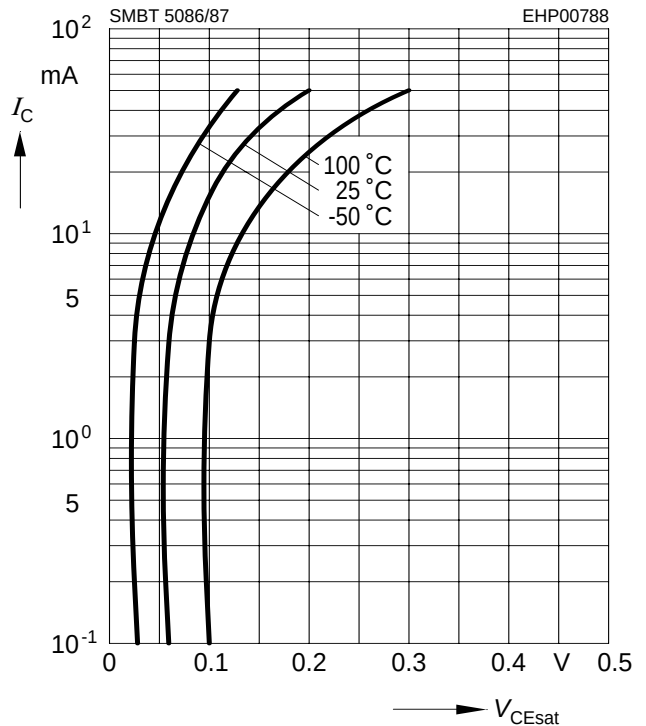


Base-emitter saturation voltage

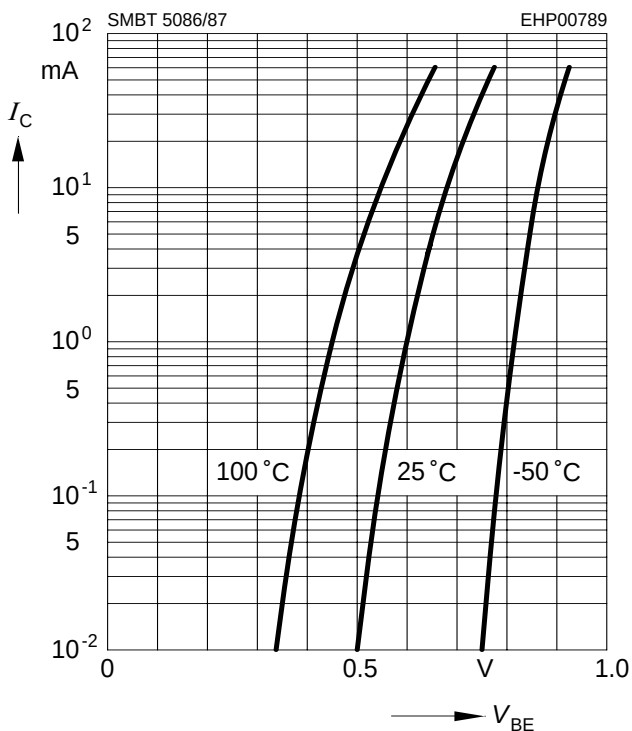
$$I_C = f(V_{BEsat}), h_{FE} = 40$$


Collector-emitter saturation voltage

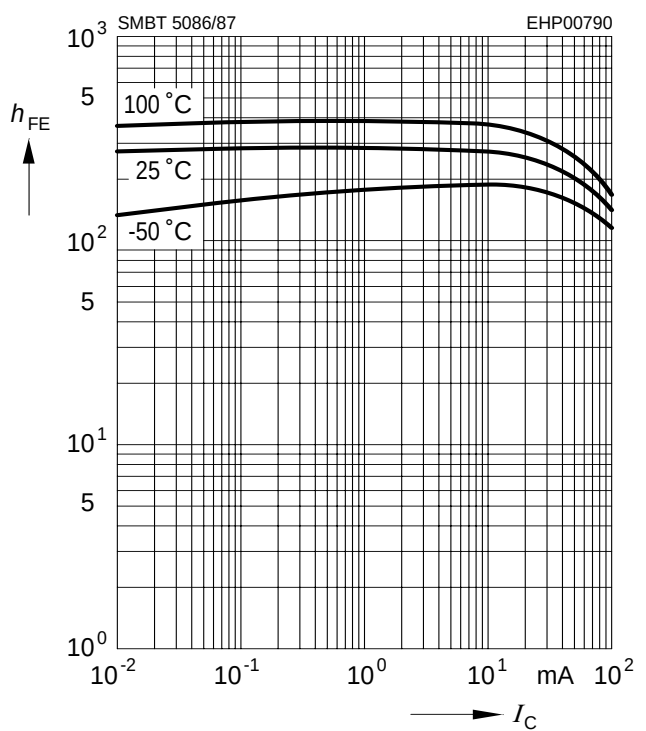
$$I_C = f(V_{CEsat}), h_{FE} = 40$$


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

$$V_{CE} = 1V$$

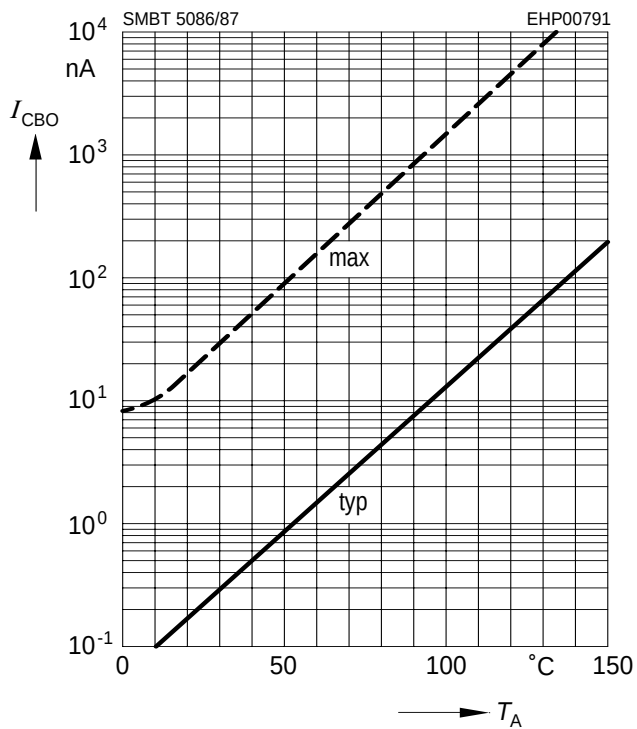

DC current gain $h_{FE} = f(I_C)$

$$V_{CE} = 1V$$



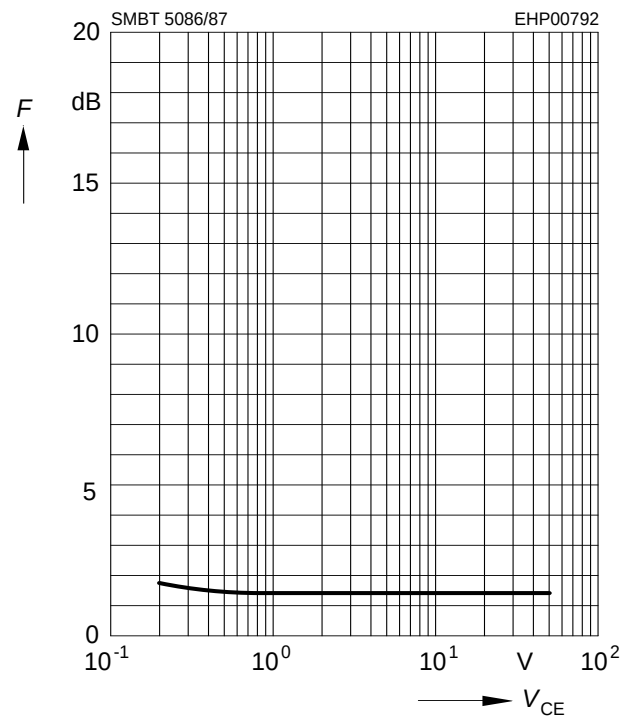
Collector cutoff current $I_{CBO} = f(T_A)$

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



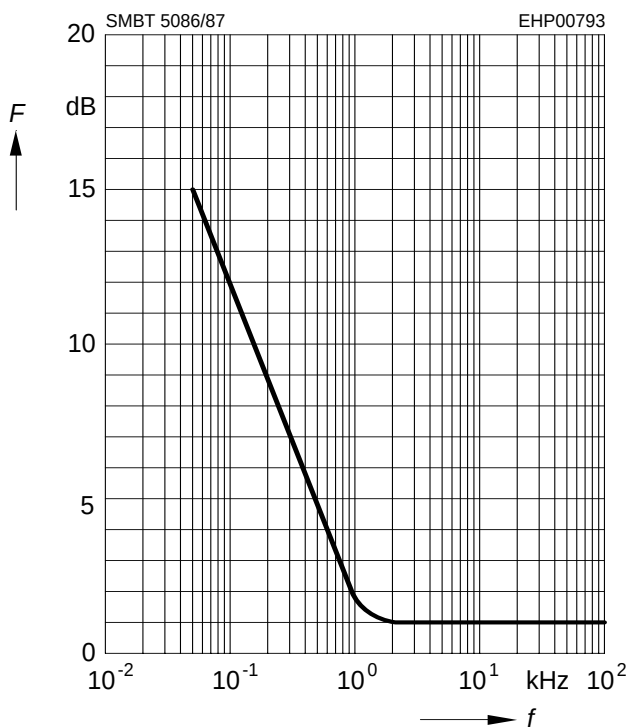
Noise figure $F = f(V_{CE})$

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



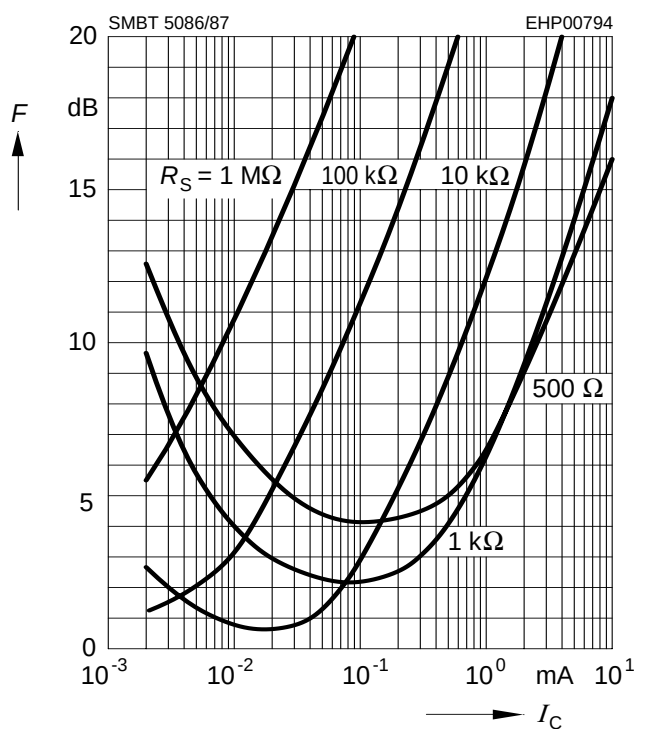
Noise figure $F = f(f)$

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



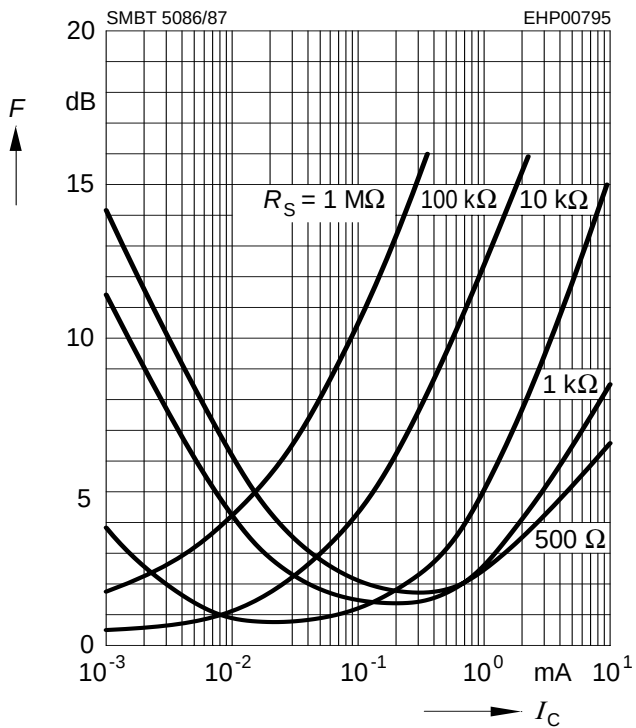
Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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

