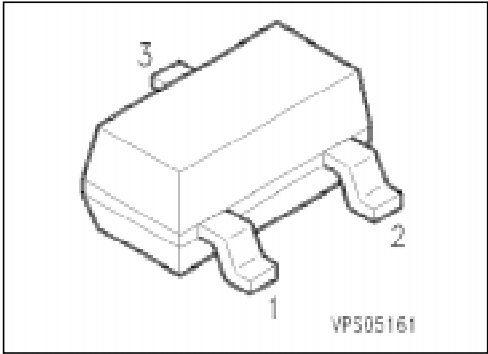


PNP Silicon Transistors

SMBT 5086
SMBT 5087

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



Type	Marking	Ordering Code (tape and reel)	Pin Configuration			Package ¹⁾
			1	2	3	
SMBT 5086 SMBT 5087	s2P s2Q	Q62702-M0002 Q68000-A8319	B	E	C	SOT-23

Maximum Ratings

Parameter	Symbol	Values	Unit
Collector-emitter voltage	V_{CE0}	50	V
Collector-base voltage	V_{CB0}	50	
Emitter-base voltage	V_{EB0}	3	
Collector current	I_C	50	mA
Total power dissipation, $T_s = 71^\circ\text{C}$	P_{tot}	330	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	- 65 ... + 150	

Thermal Resistance

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

¹⁾ For detailed information see chapter Package Outlines.

²⁾ Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm² Cu.

Electrical Characteristics

at $T_A = 25\text{ °C}$, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	

DC characteristics

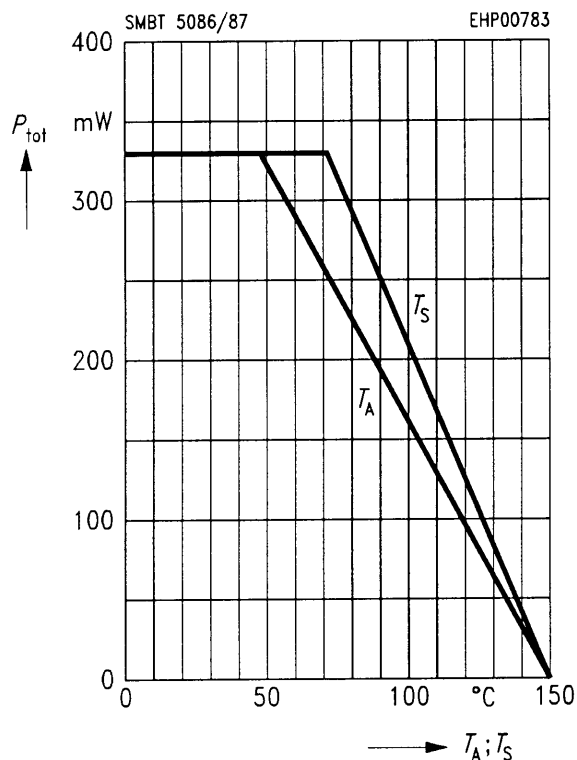
Collector-emitter breakdown voltage $I_C = 1\text{ mA}$	$V_{(BR)CE0}$	50	—	—	V
Collector-base breakdown voltage $I_C = 100\text{ }\mu\text{A}$	$V_{(BR)CB0}$	50	—	—	
Emitter-base breakdown voltage, $I_E = 10\text{ }\mu\text{A}$	$V_{(BR)EB0}$	3	—	—	
Collector-base cutoff current $V_{CB} = 10\text{ V}$, $I_E = 0$ $V_{CB} = 35\text{ V}$, $I_E = 0$ $V_{CB} = 35\text{ V}$, $I_E = 0$, $T_A = 150\text{ °C}$	I_{CB0}	— — —	— — —	10 50 20	nA nA μA
DC current gain $I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$ $I_C = 1\text{ mA}$, $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$	h_{FE}	150 250 150 250 150 250	— — — — — —	500 800 — — — —	—
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

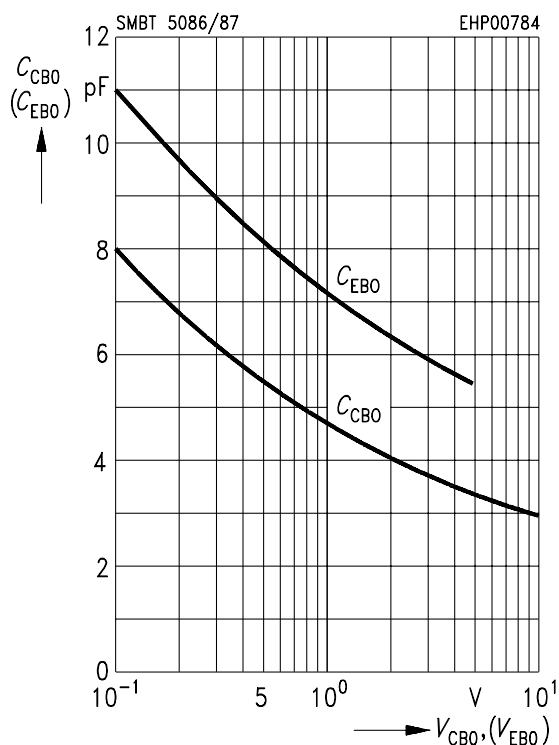
Transition frequency $I_C = 0.5\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 100\text{ MHz}$	f_T	40	—	—	MHz
Output capacitance, $V_{CB} = 5\text{ V}$, $f = 1\text{ MHz}$	C_{obo}	—	—	4	pF
Small-signal current gain $I_C = 1\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$ $I_C = 1\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$	h_{fe}	150 250	— —	600 900	—
Noise figure $I_C = 100\text{ }\mu\text{A}$, $V_{CE} = 5\text{ V}$, $f = 1\text{ kHz}$, $R_S = 3\text{ k}\Omega$ $I_C = 2\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 10\text{ Hz to }15\text{ kHz}$, $R_S = 10\text{ k}\Omega$	NF	— — — —	— — — —	3 2 3 2	dB dB dB dB

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

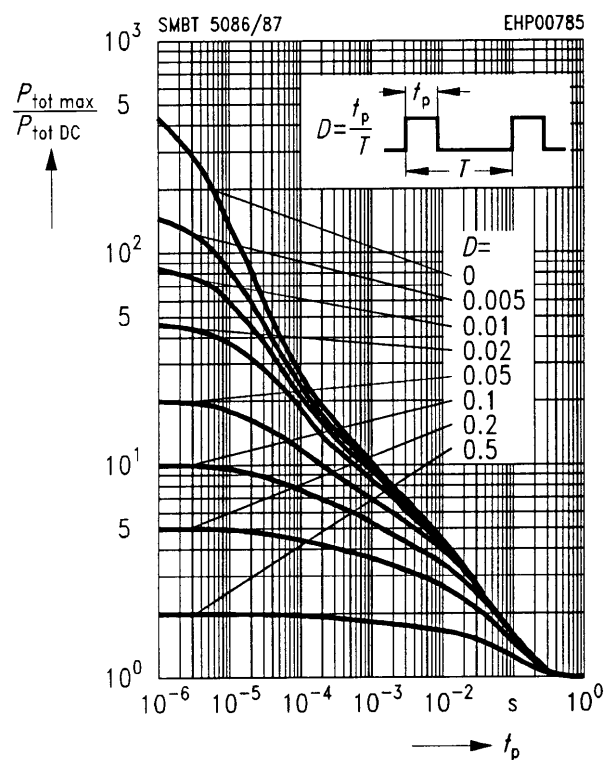
Total power dissipation $P_{\text{tot}} = f(T_A^*; T_S)$
* Package mounted on epoxy



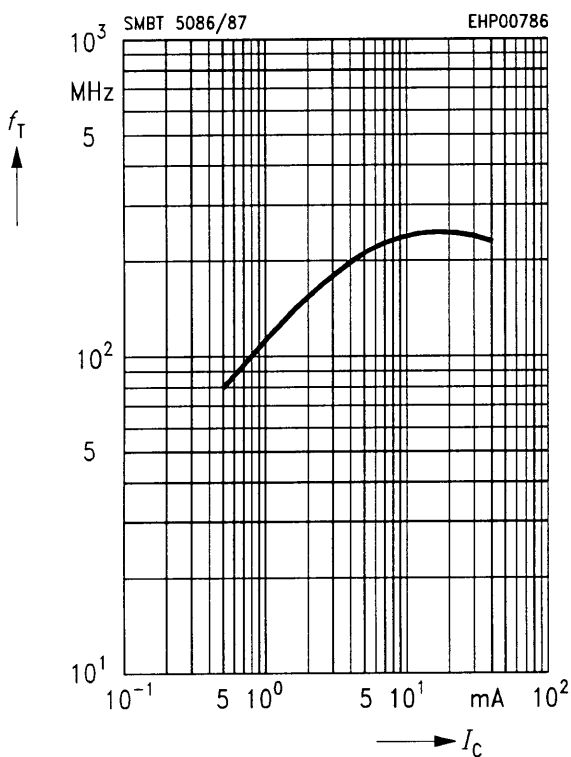
Collector-base capacitance $C_{CB0} = f(V_{CB0})$
Emitter-base capacitance $C_{EB0} = f(V_{EB0})$



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

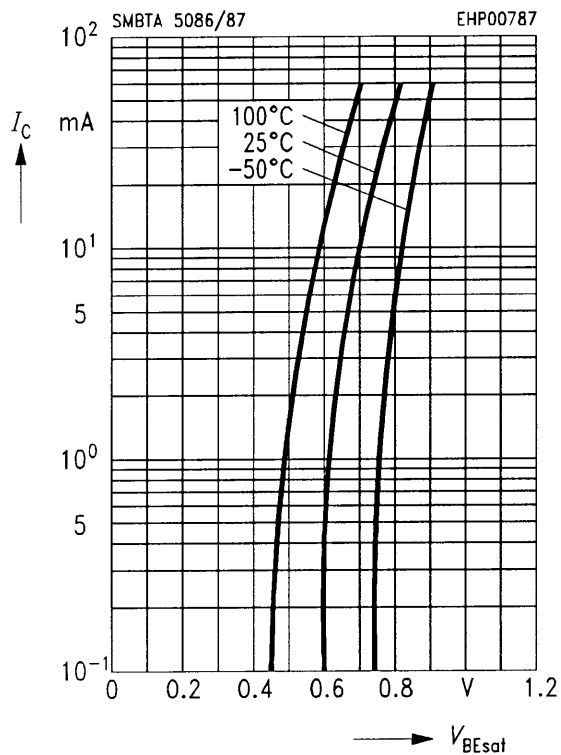


Transition frequency $f_T = f(I_C)$
 $V_{CE} = 5 \text{ V}$



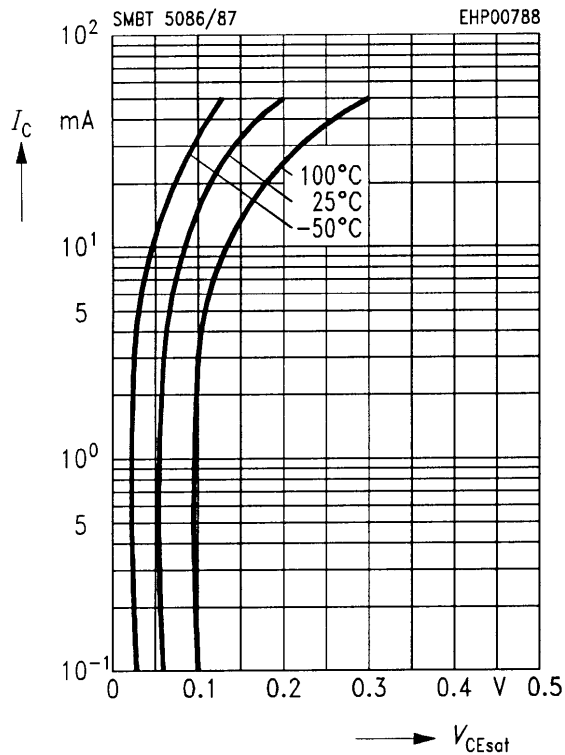
Base-emitter saturation voltage

$$I_C = f(V_{BE\text{ sat}}, h_{FE} = 40)$$



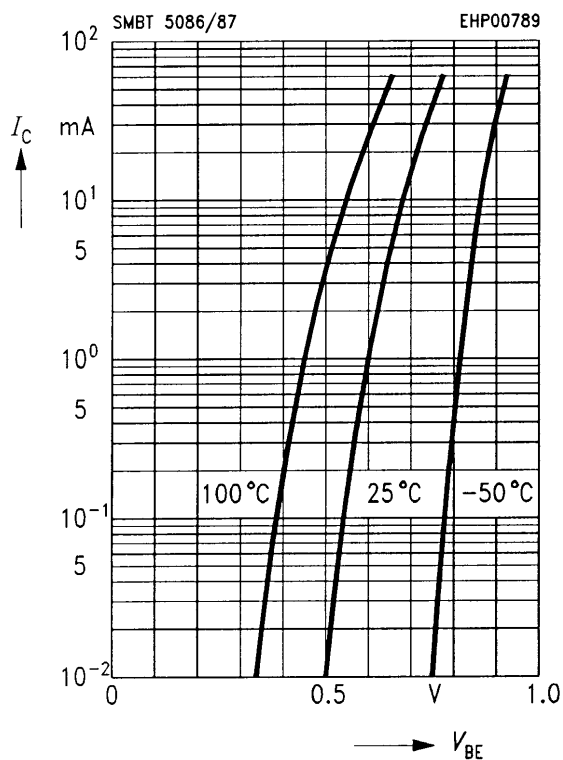
Collector-emitter saturation voltage

$$I_C = f(V_{CE\text{ sat}}, h_{FE} = 40)$$



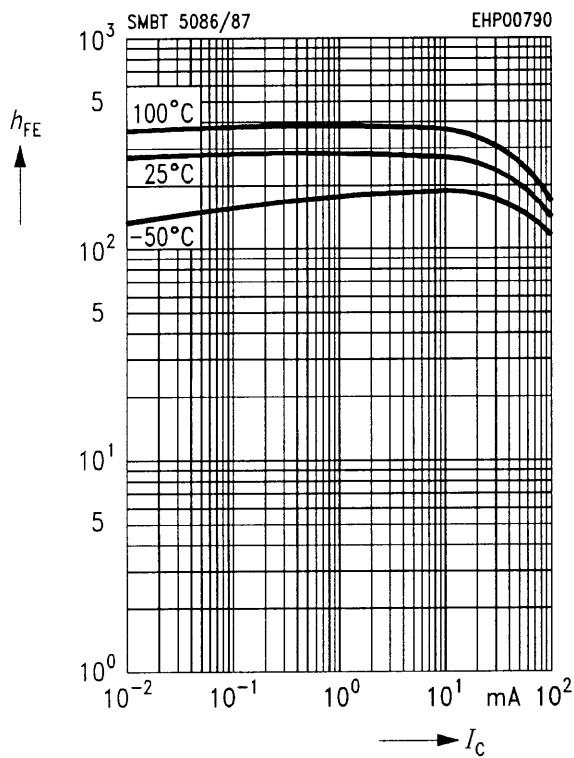
Collector current $I_C = f(V_{BE})$

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

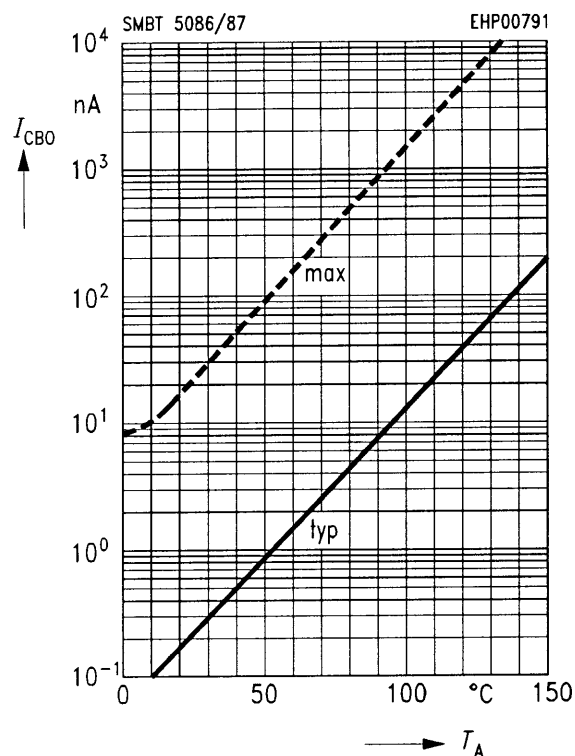


DC current gain $h_{FE} = f(I_C)$

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

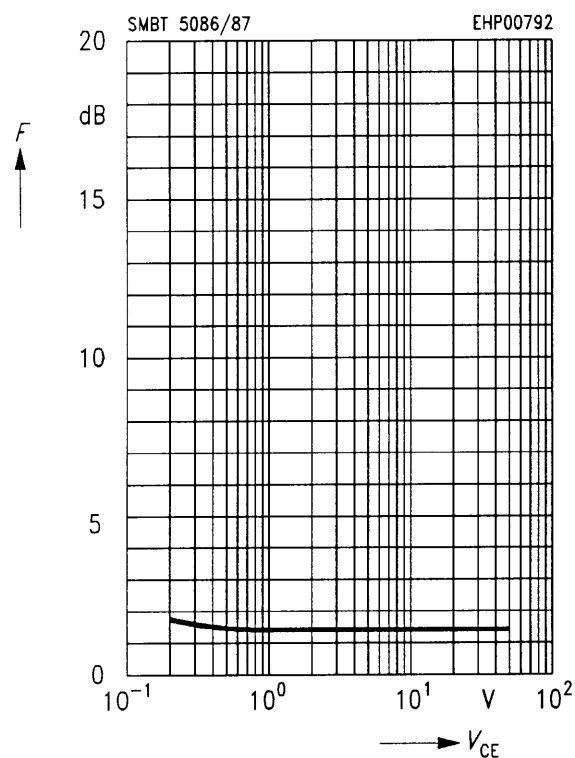


Collector cutoff current $I_{CB0} = f(T_A)$



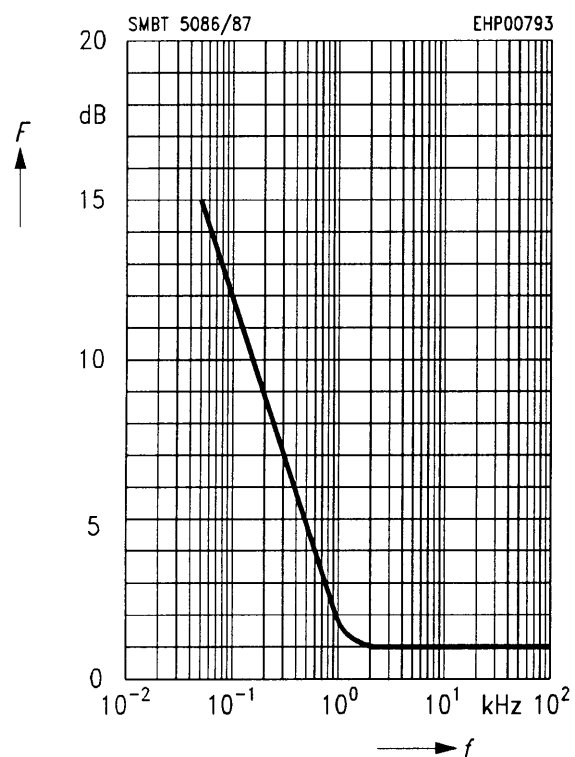
Noise figure $NF = f(V_{CE})$

$I_C = 0.2$ mA, $R_S = 2$ k Ω , $f = 1$ kHz



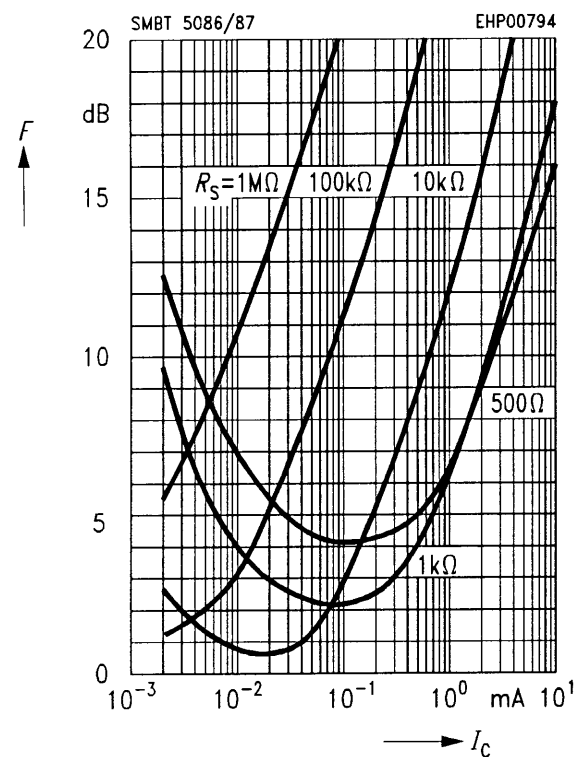
Noise figure $NF = f(I_C)$

$I_C = 0.2$ mA, $R_S = 2$ k Ω , $V_{CE} = 5$ V



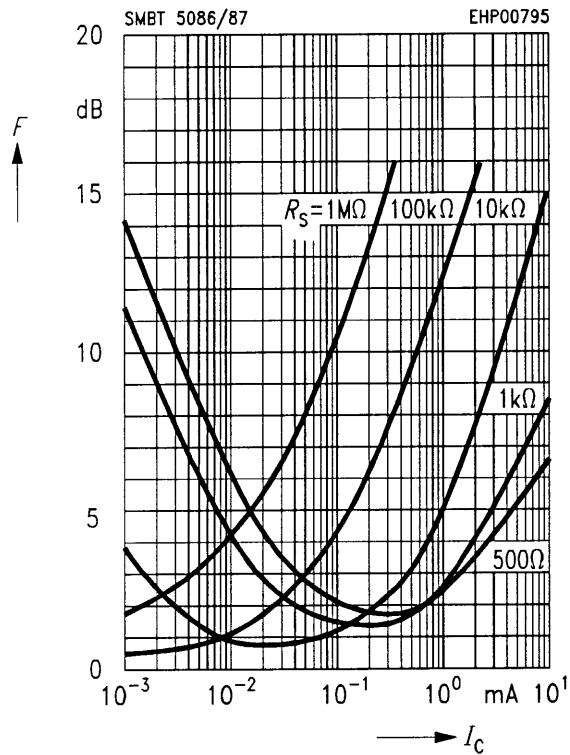
Noise figure $NF = f(I_C)$

$V_{CE} = 5$ V, $f = 120$ kHz



Noise figure $NF = f(I_C)$

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



Noise figure $NF = f(I_C)$

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

