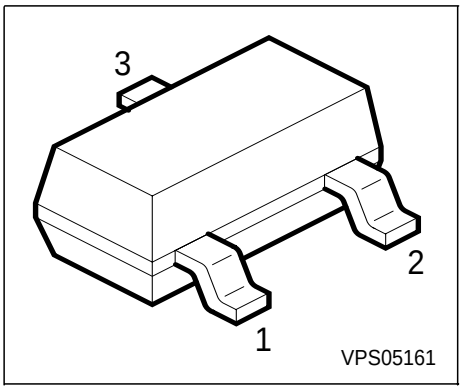
PNP Silicon Transistor

- 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	Pin Configuration			Package
SMBT 5087	s2Q	Q68000-A8319	1=B	2=E	3=C	SOT-23

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	
DC collector current	I_C	50	mA
Total power dissipation, T_S = 71 °C	P_{tot}	330	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	-65 ... +150	

Thermal Resistance

Junction ambient [1)]	R_{thJA}	≤310	K/W
Junction - soldering point	R_{thJS}	≤240	

1) Package mounted on pcb 40mm x 40mm x 1.5mm / 6cm^2 Cu

Electrical Characteristics at T_A = 25°C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Collector-emitter breakdown voltage I_C = 1 mA, I_B = 0	$V_{(BR)CEO}$	50	-	-	V
Collector-base breakdown voltage I_C = 100 µA, I_B = 0	$V_{(BR)CBO}$	50	-	-	
Emitter-base breakdown voltage I_E = 10 µA, I_C = 0	$V_{(BR)EBO}$	3	-	-	
Collector cutoff current V_{CB} = 10 V, I_E = 0 V_{CB} = 35 V, I_E = 0	I_{CBO}	 - -	 - -	 10 50	nA
Collector cutoff current V_{CB} = 35 V, I_E = 0 , T_A = 150 °C	I_{CBO}	-	-	20	µA
DC current gain 1) I_C = 100 mA, V_{CE} = 5 V I_C = 1 mA, V_{CE} = 5 V I_C = 10 mA, V_{CE} = 5 V	h_{FE}	 250 250 250	 - - -	 800 - -	-
Collector-emitter saturation voltage1) I_C = 10 mA, I_B = 1 mA	V_{CEsat}	-	-	0.3	V
Base-emitter saturation voltage 1) I_C = 10 mA, I_B = 1 mA	V_{BEsat}	-	-	0.85	

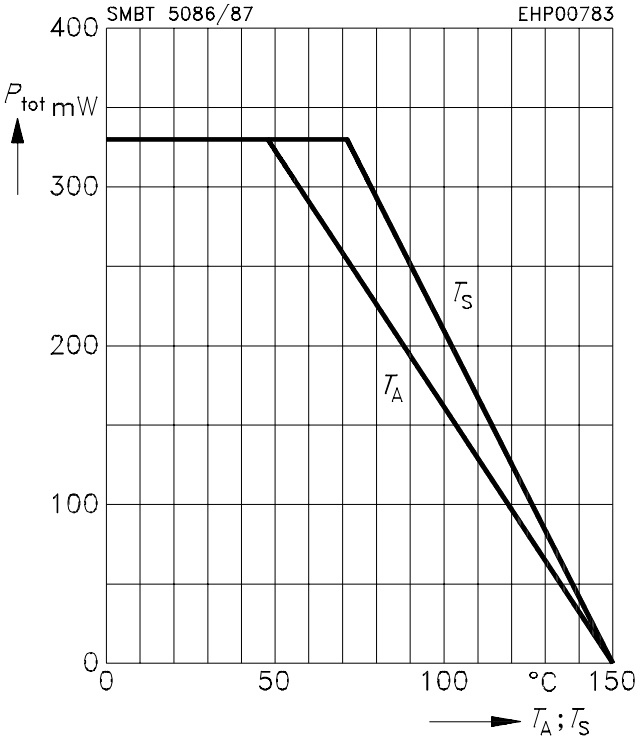
1) Pulse test: t ≤ 300µs, D = 2%

Electrical Characteristics at T_A = 25°C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Transition frequency I_C = 0.5 mA, V_{CE} = 5 V, f = 100 MHz	f_T	40	-	-	MHz
Collector-base capacitance V_{CB} = 5 V, f = 1 MHz	C_{cb}	-	-	4	pF
Short-circuit forward current transf.ratio I_C = 1 mA, V_{CE} = 5 V, f = 1 kHz	h_{21e}	250	-	900	-
Noise figure I_C = 100 µA, V_{CE} = 5 V, R_S = 3 kΩ, f = 1 kHz, Δ f = 200 Hz I_C = 2 mA, V_{CE} = 5 V, R_S = 10 kΩ, f=10Hz to 15kHz	F	 - -	 - -	 2 2	dB

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

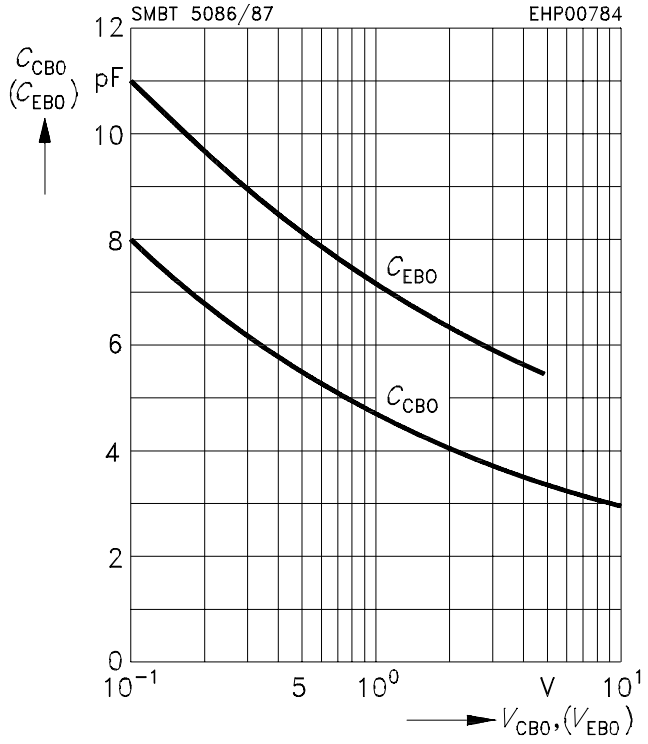
* Package mounted on epoxy



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

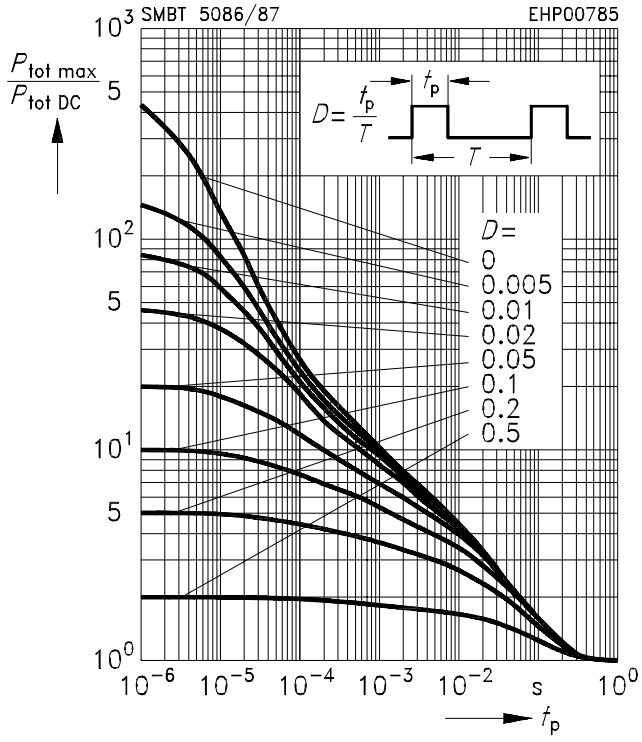
Emitter-base capacitance $C_{EB} = f(V_{EB0})$

f = 1MHz



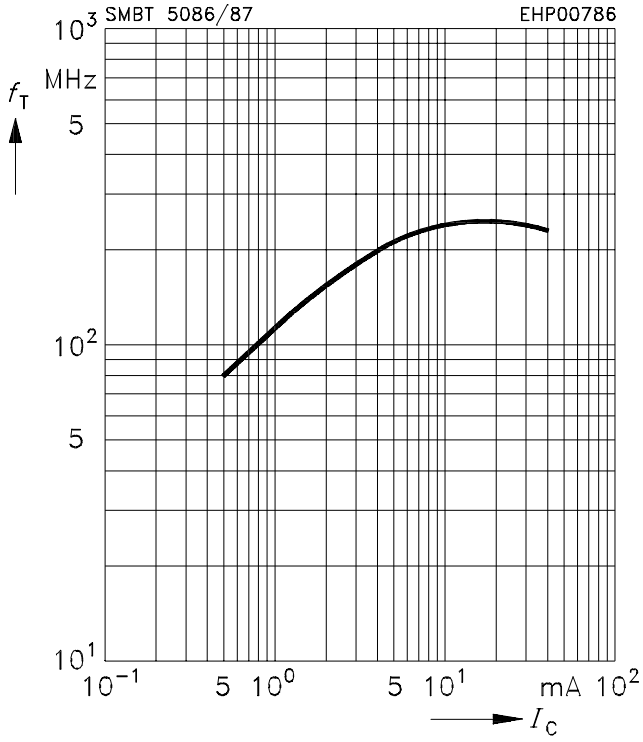
Permissible pulse load

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



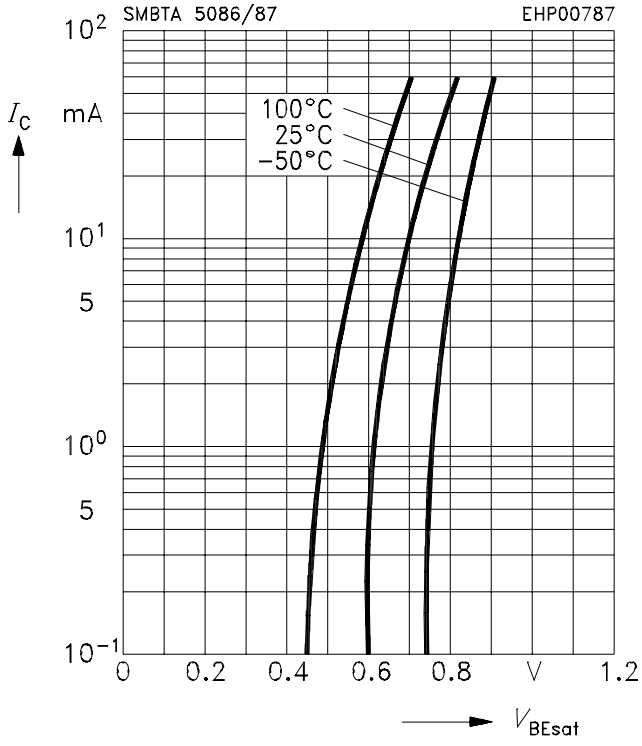
Transition frequency $f_T = f(I_C)$

V_{CE} = 5V



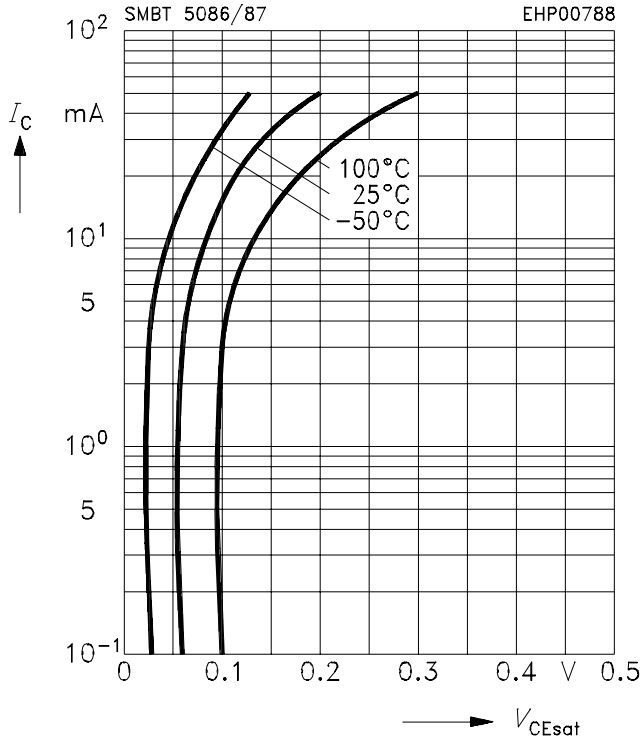
Base-emitter saturation voltage

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



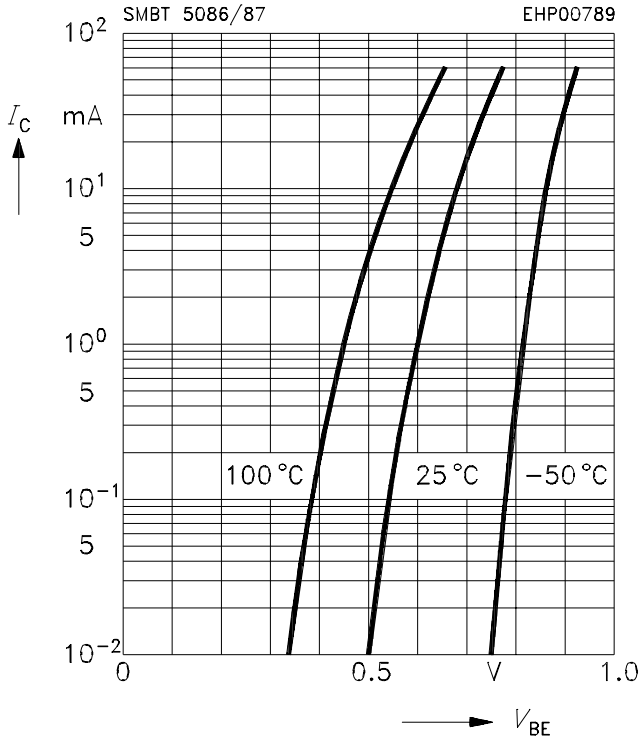
Collector-emitter saturation voltage

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



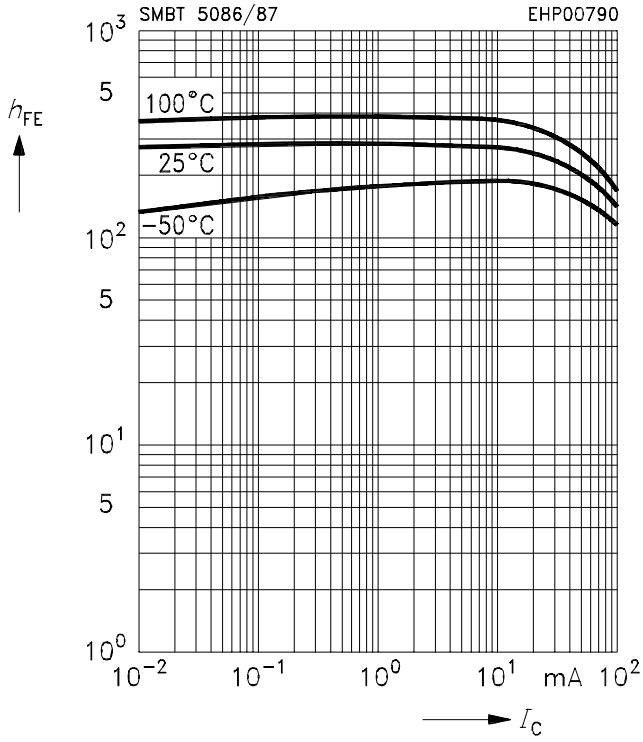
Collector current $I_C = f(V_{BE})$

V_{CE} = 1V



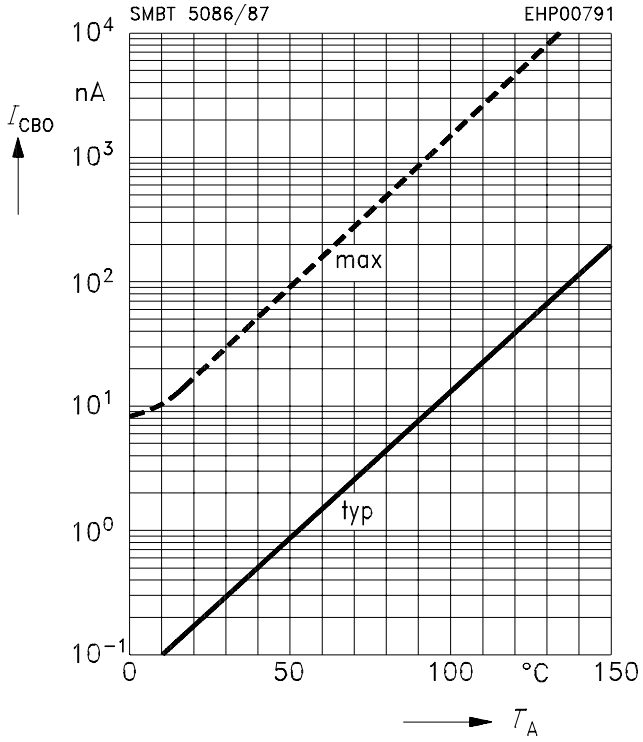
DC current gain $h_{FE} = f(I_C)$

V_{CE} = 1V



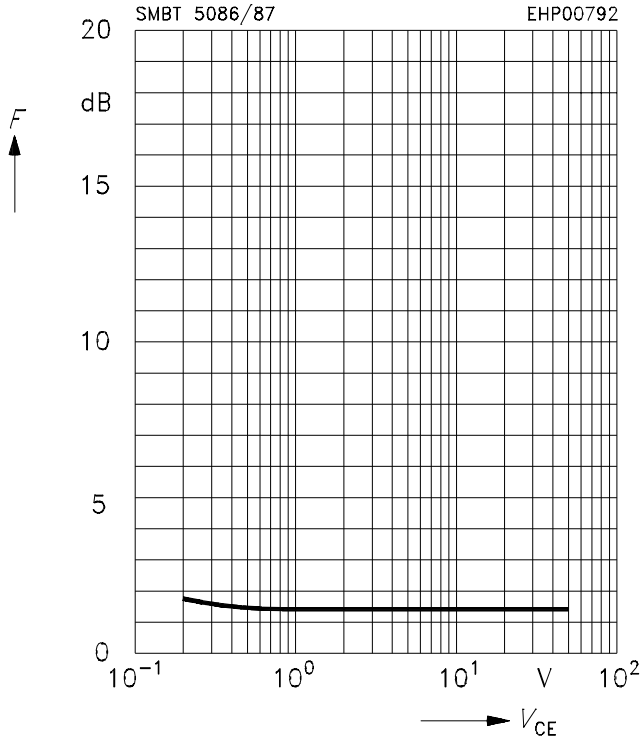
Collector cutoff current $I_{CBO} = f(T_A)$

V_{CB} = 30V



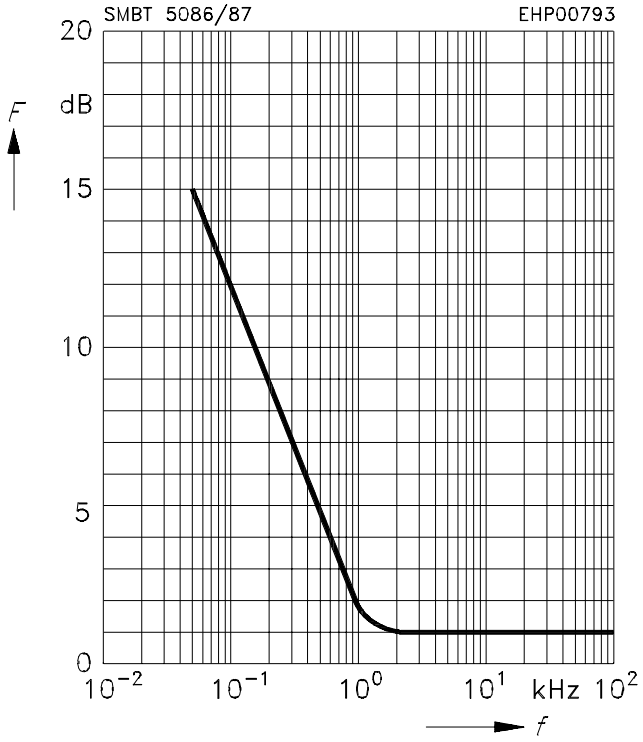
Noise figure $F = f(V_{CE})$

I_C = 0.2mA, R_S = 2kΩ, f = 1kHz



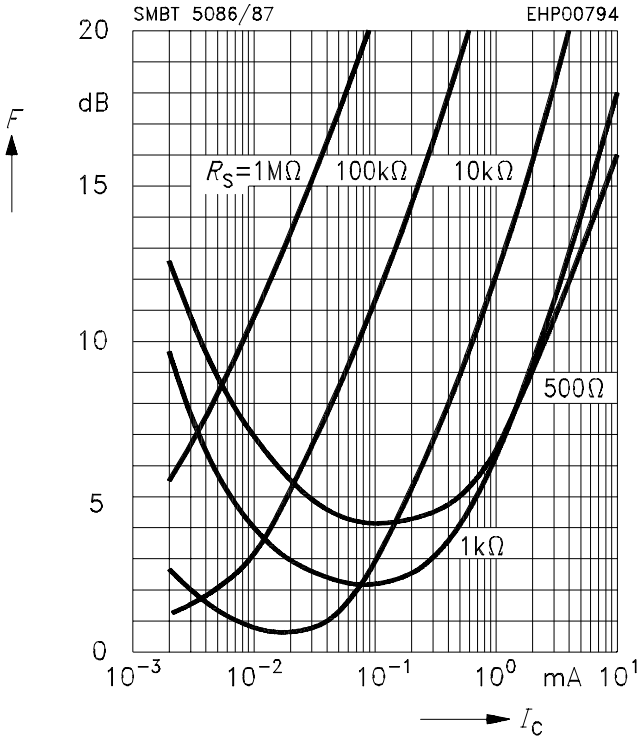
Noise figure $F = f(f)$

I_C = 0.2mA, V_{CE} = 5V, R_S = 2kΩ



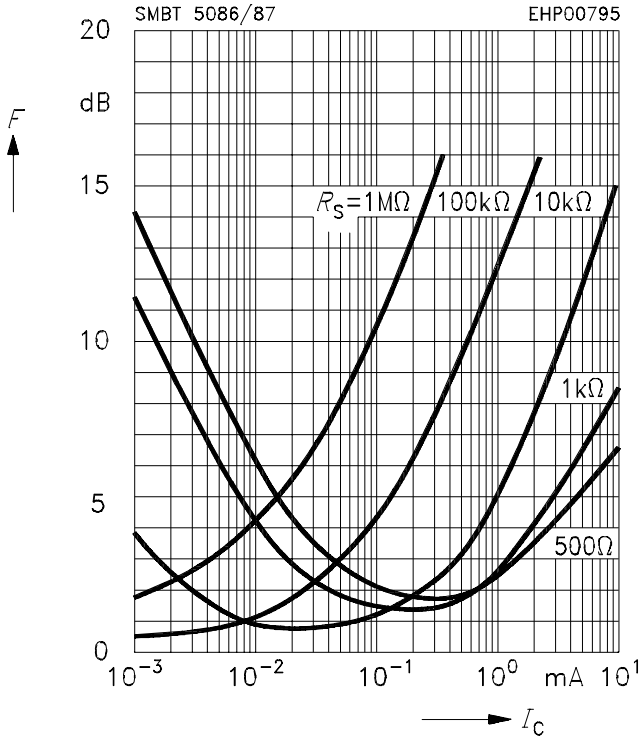
Noise figure $F = f(I_C)$

V_{CE} = 5V, f = 120Hz



Noise figure $F = f(I_C)$

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



Noise figure $F = f(I_C)$

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