A.F. SILICON PLANAR EPITAXIAL TRANSISTORS

N-P-N transistors in TO-18 metal envelopes with the collector connected to the case.

The **BC107** is primarily intended for use in driver stages of audio amplifiers and in signal processing circuits of television receivers.

The **BC108** is suitable for multitude of low-voltage applications e.g. driver stages or audio preamplifiers and in signal processing circuits of television receivers.

The **BC109** is primarily intended for low-noise input stages in tape recorders, hi-fi amplifiers and other audio-frequency equipment.

QUICK REFERENCE DATA

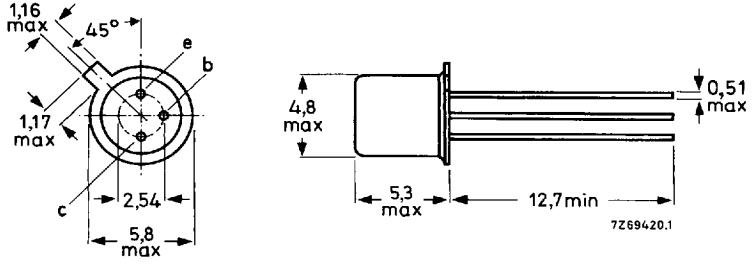
			BC107	BC108	BC109	
Collector-emitter voltage (V_{BE} = 0)	V_{CES}	max.	50	30	30	V
Collector-emitter voltage (open base)	V_{CEO}	max.	45	20	20	V
Collector current (peak value)	I_{CM}	max.	200	200	200	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	300	300	300	mW
Junction temperature	T_j	max.	175	175	175	°C
Small-signal current gain at T_j = 25 °C						
I_C = 2 mA; V_{CE} = 5 V; f = 1 kHz	h_{fe}	>	125	125	240	
		<	500	900	900	
Transition frequency at f = 35 MHz						
I_C = 10 mA; V_{CE} = 5 V	f_T	typ.	300	300	300	MHz
Noise figure at R_S = 2 kΩ						
I_C = 200 μA; V_{CE} = 5 V		typ.	–	–	1,4	dB
f = 30 Hz to 15 kHz	F	<	–	–	4,0	dB
f = 1 kHz; B = 200 Hz	F	typ.	2	2	1,2	dB

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-18.

Collector connected to case



Qualification approved to CECC 50 002-289/290/291

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

			BC107	BC108	BC109	
Collector-base voltage (open emitter)	V_{CBO}	max.	50	30	30	V
Collector-emitter voltage (V_{BE} = 0)	V_{CES}	max.	50	30	30	V
Collector-emitter voltage (open base)	V_{CEO}	max.	45	20	20	V
Emitter-base voltage (open collector)	V_{EBO}	max.	6	5	5	V
Collector current (d.c.)	I_C	max.		100		mA
Collector current (peak value)	I_{CM}	max.		200		mA
Emitter current (peak value)	$-I_{EM}$	max.		200		mA
Base current (peak value)	I_{BM}	max.		200		mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.		300		mW
Storage temperature range	T_{stg}			−65 to + 150		°C
Junction temperature	T_j	max.		175		°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	0,5	K/mW
From junction to case	$R_{th\ j\text{-}c}$	=	0,2	K/mW

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current				
I_E = 0; V_{CB} = 20 V; T_j = 150 °C	I_{CBO}	<	15	μA
Base-emitter voltage*				
I_C = 2 mA; V_{CE} = 5 V	V_{BE}	typ.	620	mV
			550 to 700	mV
I_C = 10 mA; V_{CE} = 5 V	V_{BE}	<	770	mV
Saturation voltages**				
I_C = 10 mA; I_B = 0,5 mA	V_{CEsat}	typ.	90	mV
		<	250	mV
	V_{BEsat}	typ.	700	mV
I_C = 100 mA; I_B = 5 mA	V_{CEsat}	typ.	200	mV
		<	600	mV
	V_{BEsat}	typ.	900	mV

* V_{BE} decreases by about 2 mV/K with increasing temperature.
** V_{BEsat} decreases by about 1,7 mV/K with increasing temperature.

Collector capacitance at f = 1 MHz $I_E = I_e = 0$; $V_{CB} = 10$ V	C_c	typ.		2,5	pF
Emitter capacitance at f = 1 MHz $I_C = I_c = 0$; $V_{EB} = 0{,}5$ V	C_e	typ.		9	pF
Transition frequency at f = 35 MHz $I_C = 10$ mA; $V_{CE} = 5$ V	f_T	typ.		300	MHz

			BC107	BC108	BC109
Small signal current gain at f = 1 kHz $I_C = 2$ mA; $V_{CE} = 5$ V	h_{fe}	>	125	125	240
		<	500	900	900
Noise figure at $R_S = 2$ kΩ $I_C = 200$ μA; $V_{CE} = 5$ V f = 30 Hz to 15 kHz	F	typ.			1,4 dB
		<			4 dB
f = 1 kHz; B = 200 Hz	F	typ.	2	2	1,2 dB
		<	10	10	4 dB

			BC107A BC108A	BC107B BC108B BC109B	BC108C BC109C
D.C. current gain $I_C = 10$ μA; $V_{CE} = 5$ V	h_{FE}	>		40	100
		typ.	90	150	270
$I_C = 2$ mA; $V_{CE} = 5$ V	h_{FE}	>	110	200	420
		typ.	180	290	520
		<	220	450	800
h parameters at f = 1 kHz (common emitter) $I_C = 2$ mA; $V_{CE} = 5$ V					
Input impedance	h_{ie}	>	1,6	3,2	6 kΩ
		typ.	2,7	4,5	8,7 kΩ
		<	4,5	8,5	15 kΩ
Reverse voltage transfer ratio	h_{re}	typ.	1,5	2	$3\ 10^{-4}$
Small signal current gain	h_{fe}	>	125	240	450
		typ.	220	330	600
		<	260	500	900
Output admittance	h_{oe}	typ.	18	30	60 μΩ^{-1}
		<	30	60	110 μΩ^{-1}

Typical behaviour of collector current versus collector-emitter voltage

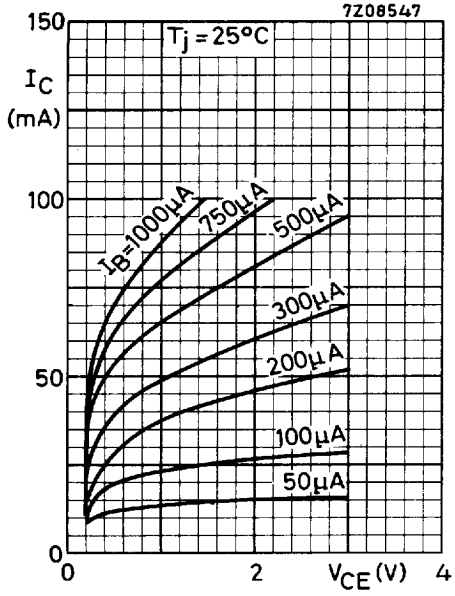


Fig. 2.

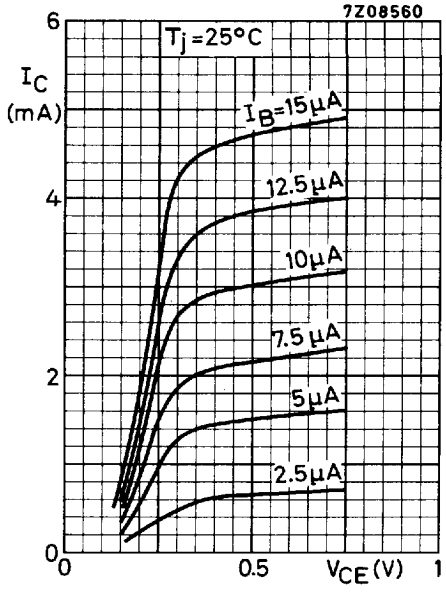


Fig. 3.

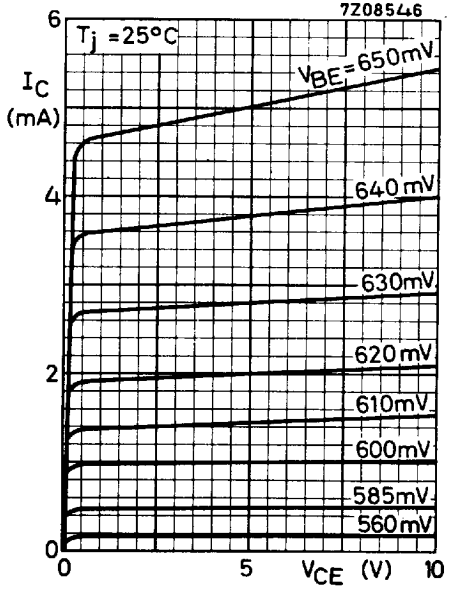


Fig. 4.

Typical behaviour of collector current versus collector-emitter voltage

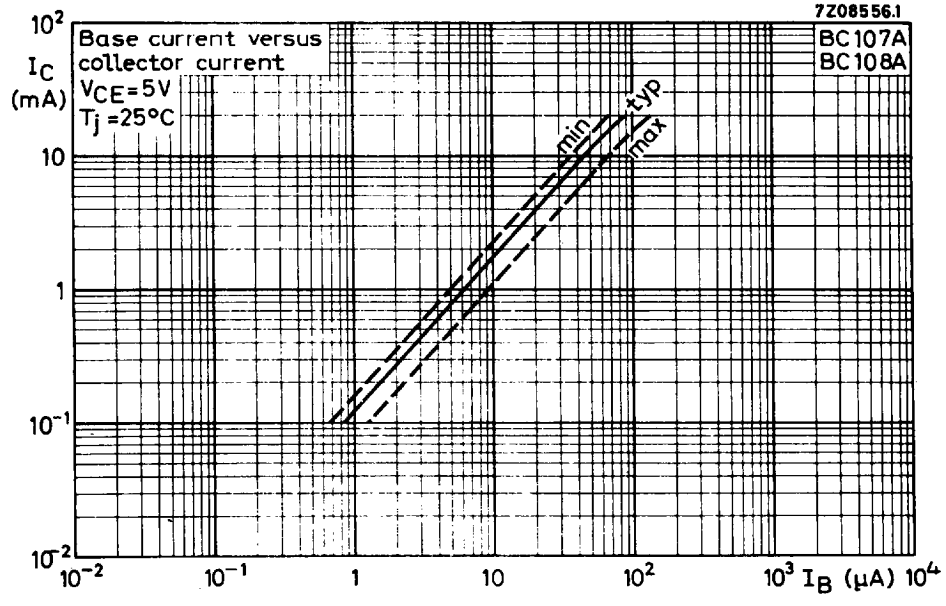
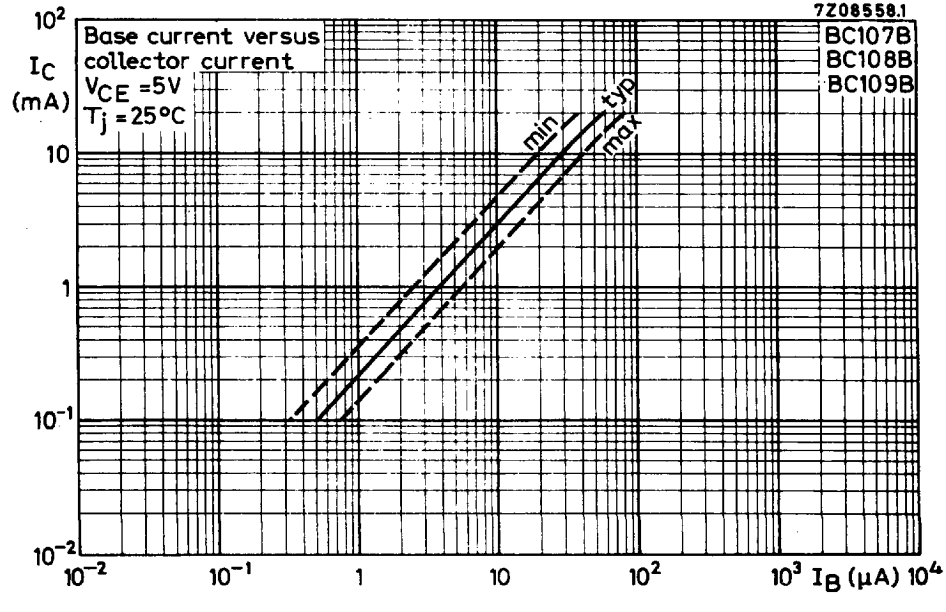


Fig. 5.



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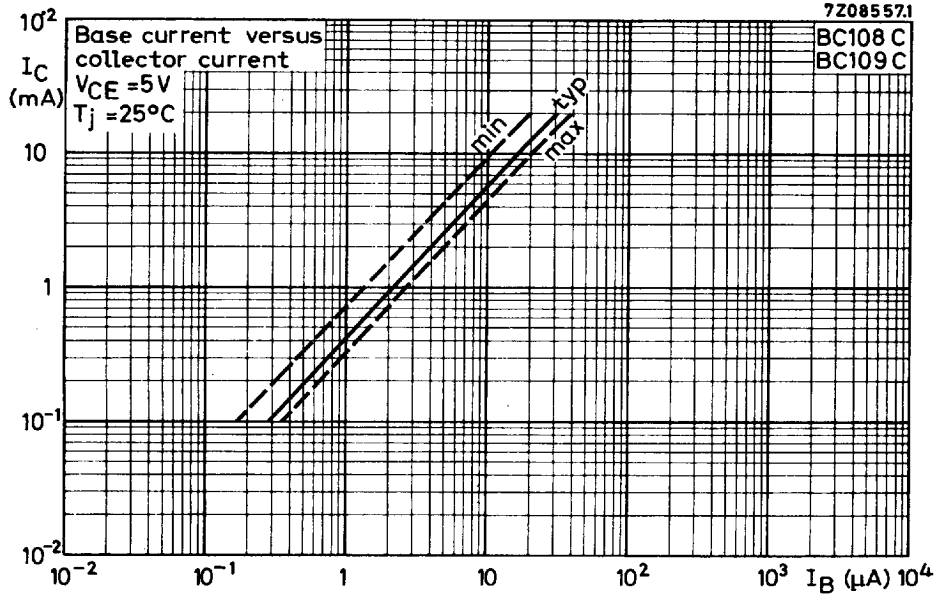

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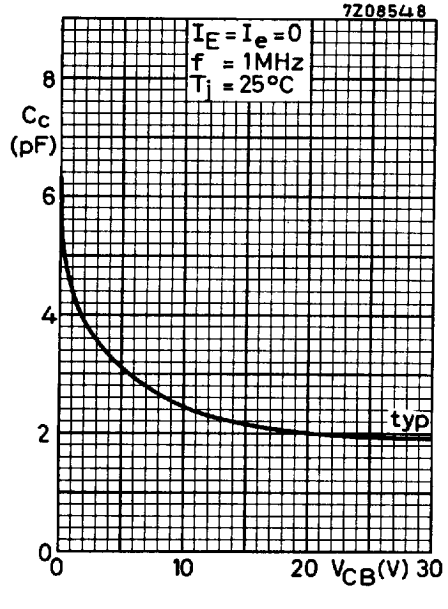

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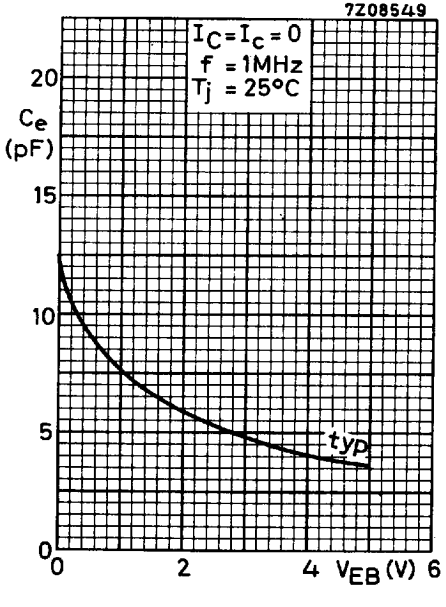

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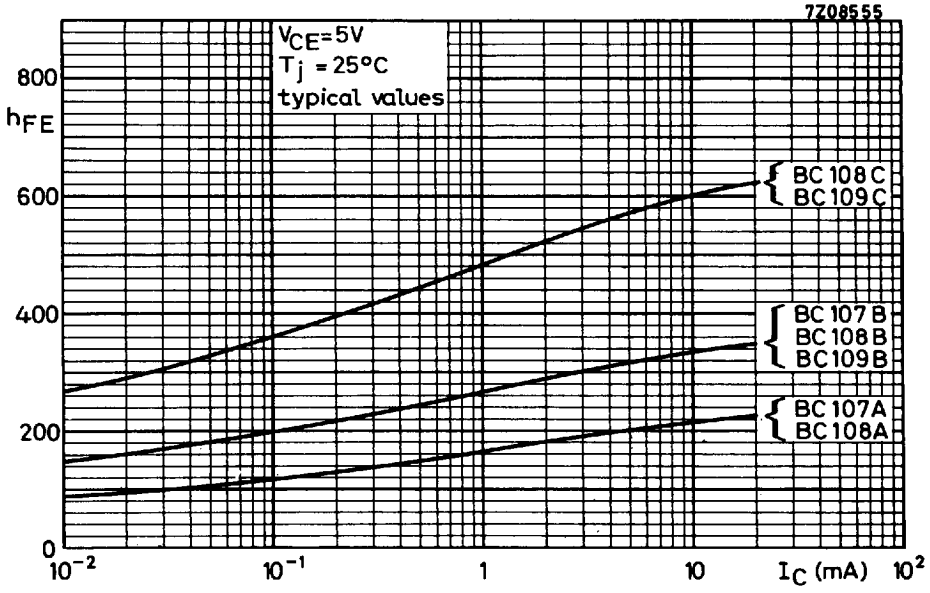
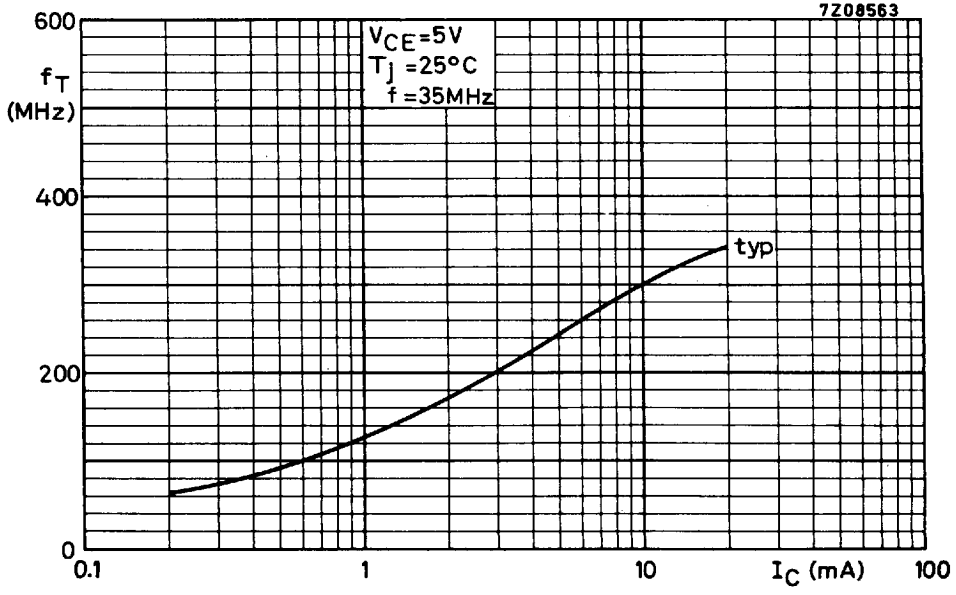


Fig. 10.



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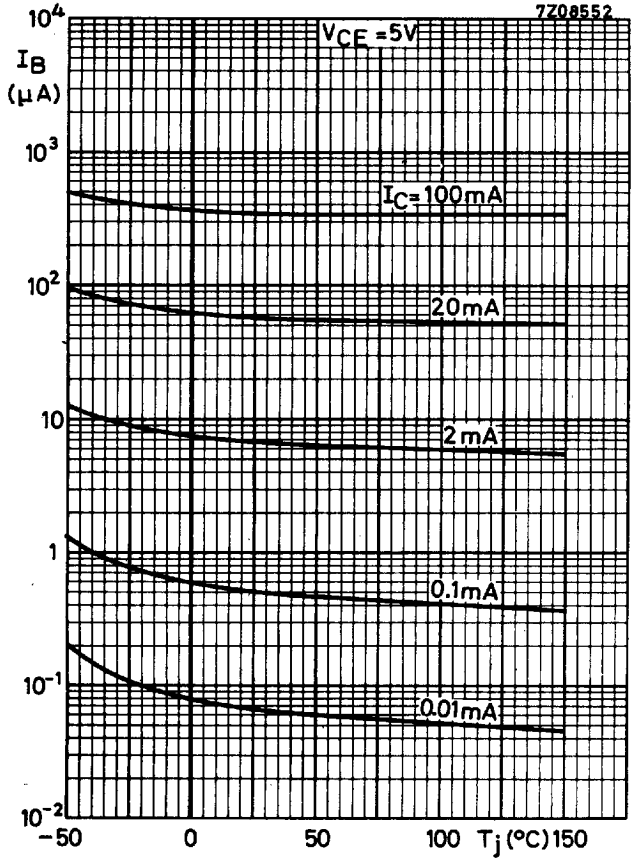
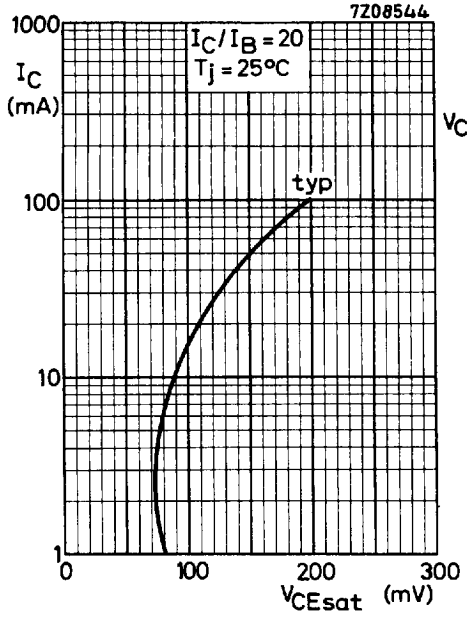


Fig. 12. Typical behaviour of base current versus junction temperature.



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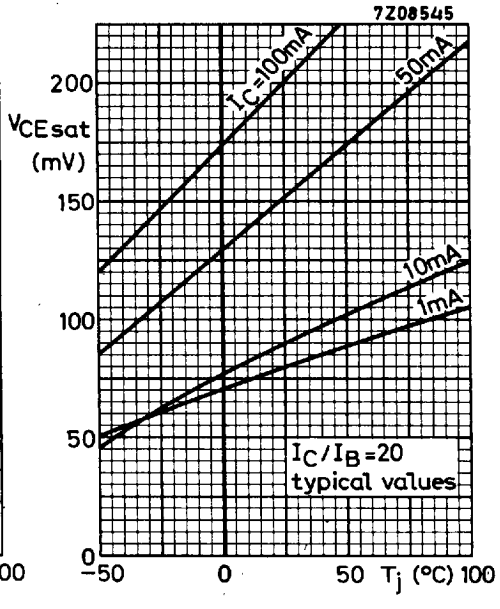

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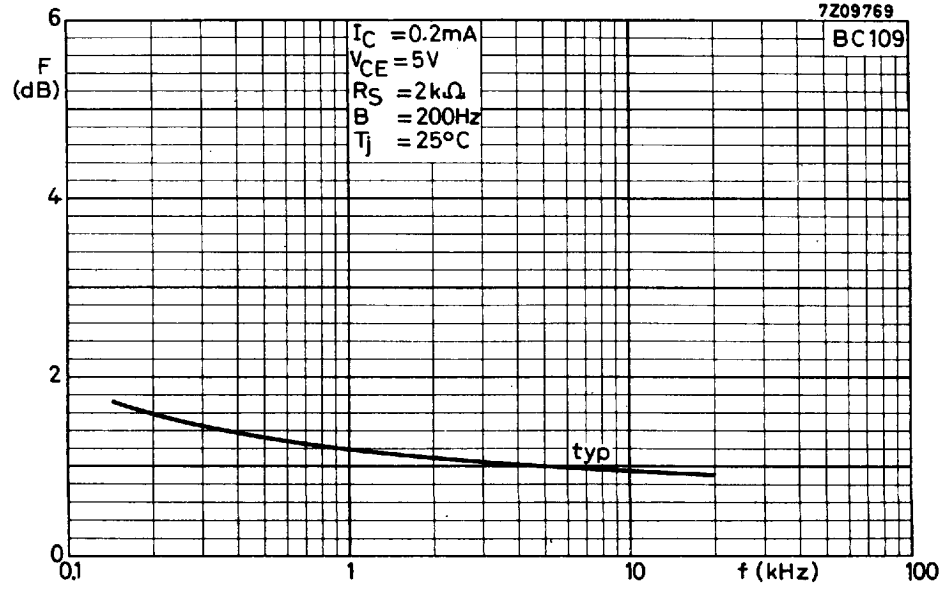
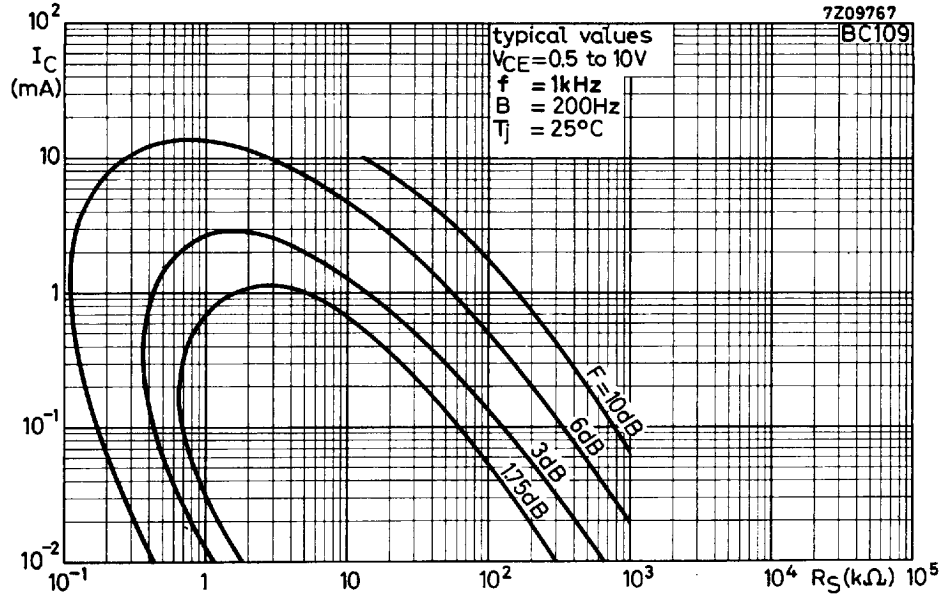


Fig. 15.

Curves of constant noise figure



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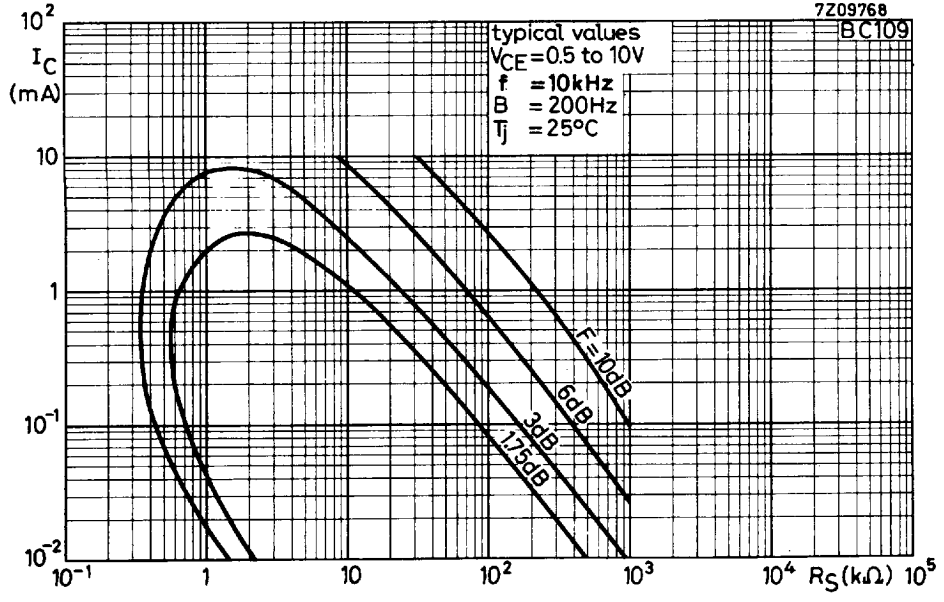

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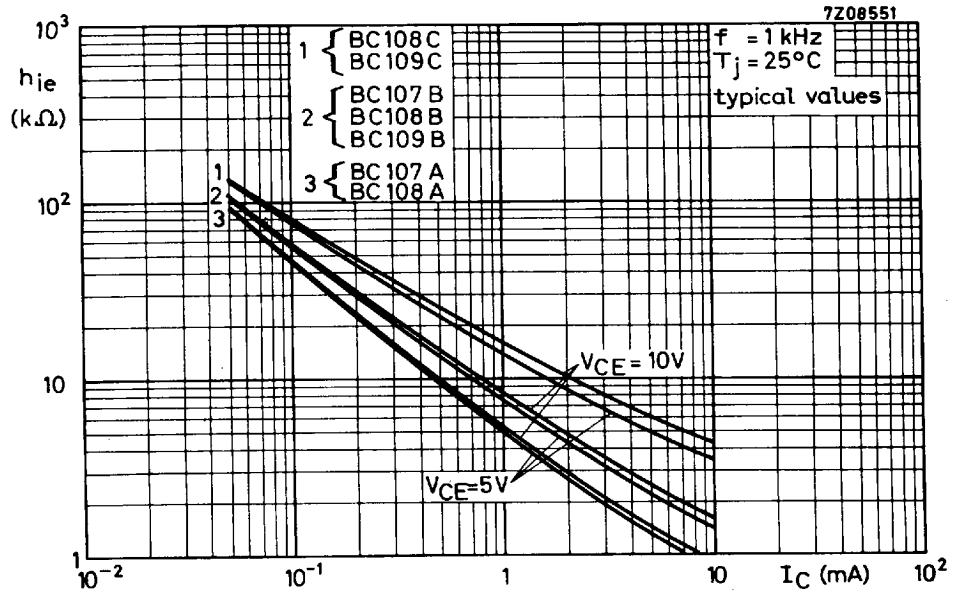

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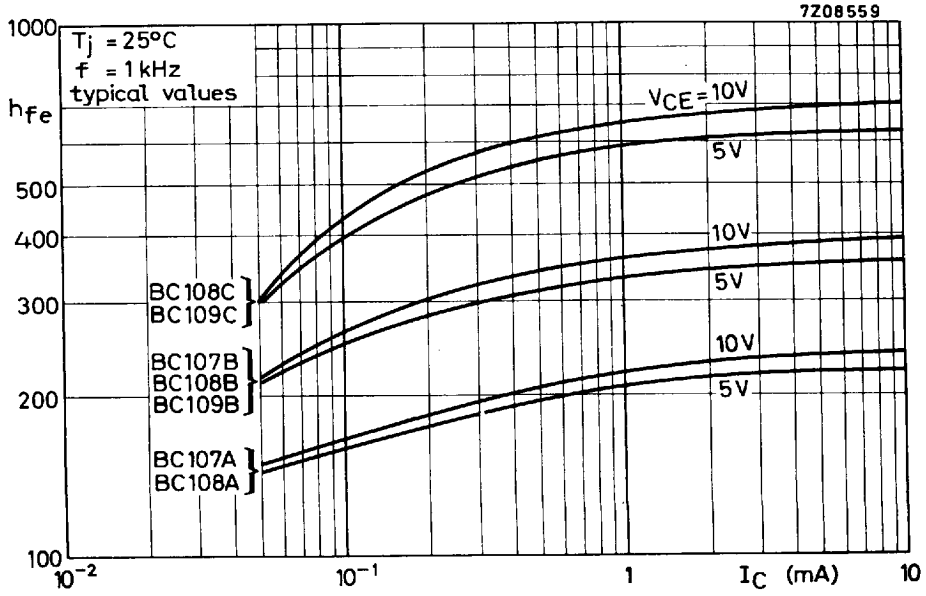

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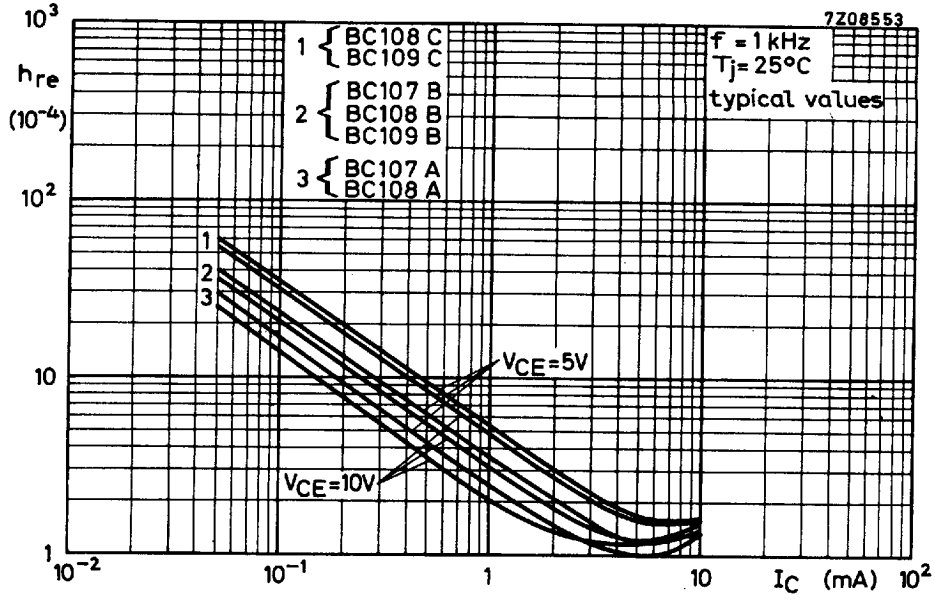

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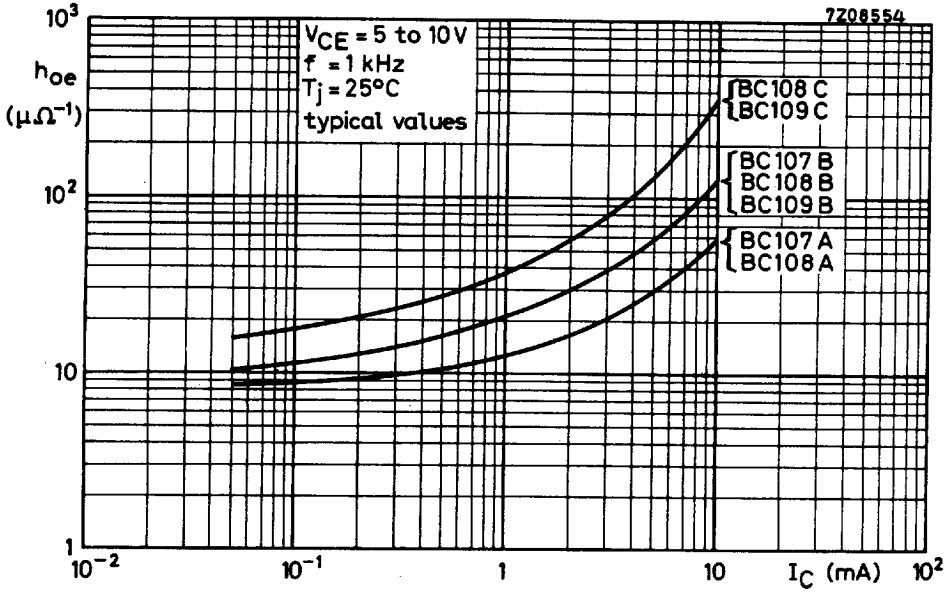

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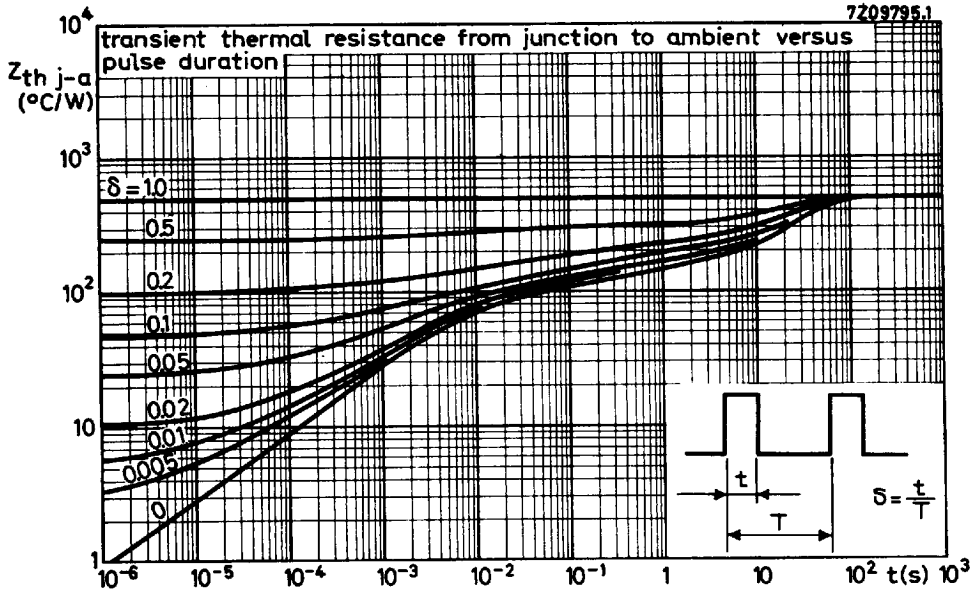

Fig. 22.