SILICON PLANAR EPITAXIAL TRANSISTORS

P-N-P transistors in a plastic TO-92 envelope, primarily intended for low-noise input stages in tape recorders, hi-fi amplifiers and other audio-frequency equipment.

QUICK REFERENCE DATA

			BC559	BC560	
Collector-emitter voltage ($+V_{BE}$ = 0 V)	$-V_{CES}$	max.	30	50	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	30	45	V
Collector current (peak value)	$-I_{CM}$	max.	200	200	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	500	500	mW
Junction temperature	T_j	max.	150	150	°C
D.C. current gain $-I_C$ = 2 mA; $-V_{CE}$ = 5 V	h_{FE}	>	125	125	
		<	800	800	
Transition frequency $-I_C$ = 10 mA; $-V_{CE}$ = 5 V	f_T	typ.	200	200	MHz
Noise figure at R_S = 2 kΩ $-I_C$ = 200 μA; $-V_{CE}$ = 5 V					
f = 30 Hz to 15 kHz	F	typ.	1,2	1	dB
		<	4	3	dB
f = 1 kHz; B = 200 Hz	F	<	4	4	dB
f = 10 kHz to 50 Hz (equivalent noise voltage)	Vn	<	–	0,11	μV

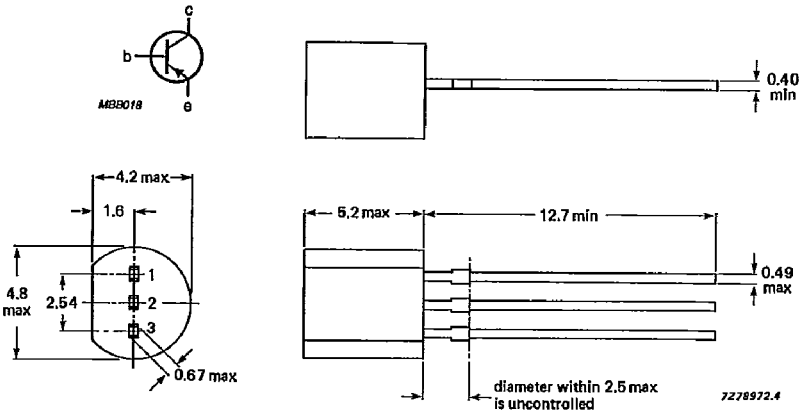
MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-92.

Pinning

1 = emitter
2 = base
3 = collector



Capability approved to CECC NECC-C-002

RATINGS

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

			BC559	BC560	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	30	50	V
Collector-emitter voltage ($+V_{BE}$ = 0 V)	$-V_{CES}$	max.	30	50	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	30	45	V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	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.	500		mW
Storage temperature	T_{stg}		−65 to +150		°C
Junction temperature	T_j	max.	150		°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	250	K/W
From junction to case	$R_{th\ j\text{-}c}$	=	150	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current				
I_E = 0; $-V_{CB}$ = 30 V; T_j = 25 °C	$-I_{CBO}$	typ.	1	nA
	$-I_{CBO}$	<	15	nA
T_j = 150 °C	$-I_{CBO}$	<	4	μA
Base-emitter voltage*				
$-I_C$ = 2 mA; $-V_{CE}$ = 5 V	$-V_{BE}$	typ.	650	mV
			600 to 750	mV
$-I_C$ = 10 mA; $-V_{CE}$ = 5 V	$-V_{BE}$	<	820	mV
Saturation voltages**				
$-I_C$ = 10 mA; $-I_B$ = 0,5 mA	$-V_{CEsat}$	typ.	60	mV
	$-V_{CEsat}$	<	300	mV
	$-V_{BEsat}$	typ.	750	mV
$-I_C$ = 100 mA; $-I_B$ = 5 mA	$-V_{CEsat}$	typ.	180	mV
	$-V_{CEsat}$	<	650	mV
	$-V_{BEsat}$	typ.	930	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.			4	pF
Transition frequency at f = 35 MHz						
$-I_C = 10$ mA; $-V_{CE} = 5$ V	f_T	typ.			200	MHz
Small-signal current gain at f = 1 kHz						
$-I_C = 2$ mA; $-V_{CE} = 5$ V	h_{fe}				125 to 900	
Noise figure at $R_S = 2$ kΩ						
$-I_C = 200$ μA; $-V_{CE} = 5$ V			BC559		BC560	
f = 30 Hz to 15 kHz	F	typ.	1,2		1	dB
		<	4		3	dB
f = 1 kHz; B = 200 Hz	F	typ.	1		1	dB
		<	4		4	dB
Equivalent noise voltage at $R_S = 2$ kΩ						
$-I_C = 200$ μA; $-V_{CE} = 5$ V f = 10 Hz to 50 Hz; $T_{amb} = 25$ °C	V_n	<	–		0,11	μV

			BC559 BC560	BC559A BC560A	BC559B BC560B	BC559C BC560C
D.C. current gain						
$-I_C = 2$ mA; $-V_{CE} = 5$ V	h_{FE}	>	125	125	220	420
		<	800	250	475	800

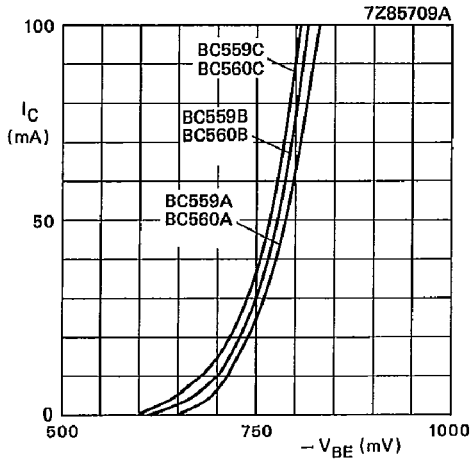


Fig. 2 $-V_{CE}$ = 5 V; T_j = 25 °C.

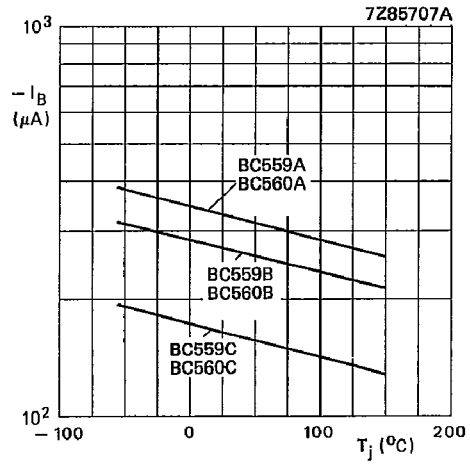


Fig. 3 $-V_{CE}$ = 5 V; I_C = 50 mA.

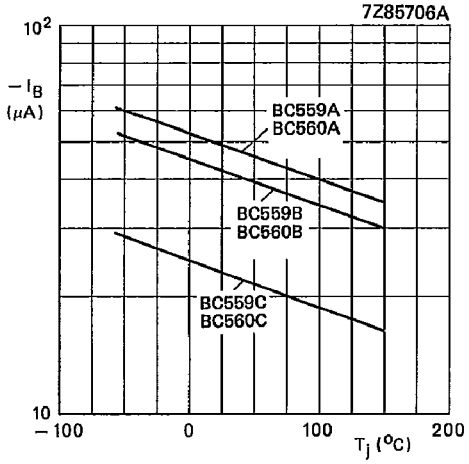


Fig. 4 $-V_{CE}$ = 5 V; I_C = 10 mA.

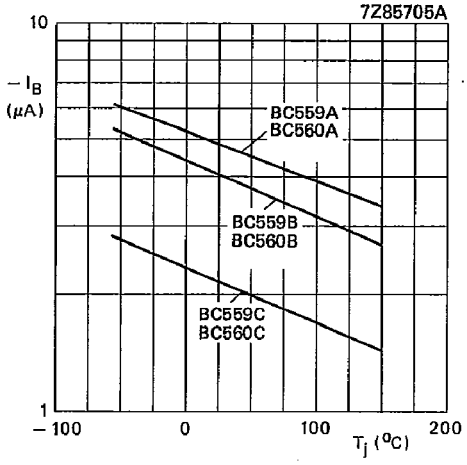


Fig. 5 $-V_{CE}$ = 5 V; I_C = 1 mA.

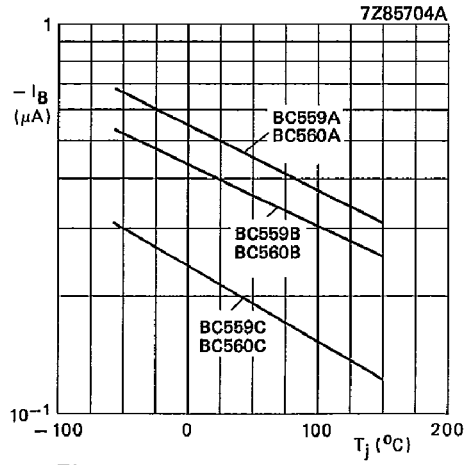


Fig. 6 $-V_{CE}$ = 5 V; I_C = 0,1 mA.

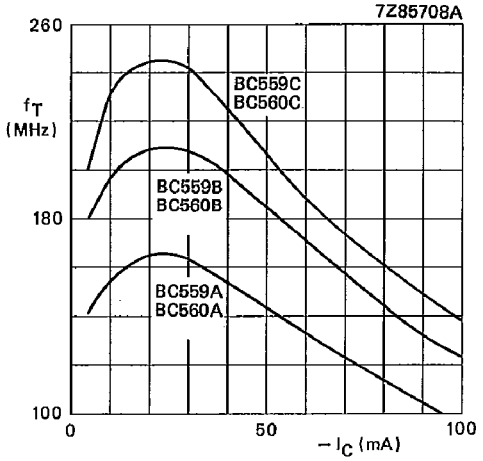


Fig. 7 $-V_{CE}$ = 5 V; T_j = 25 °C; f = 35 MHz.

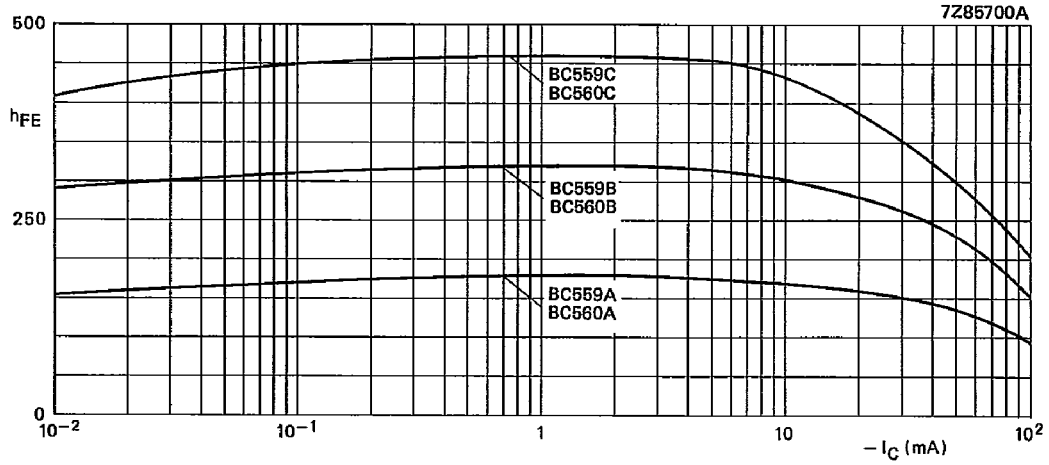


Fig. 8 $-V_{CE} = 5$ V; $T_j = 25$ °C.

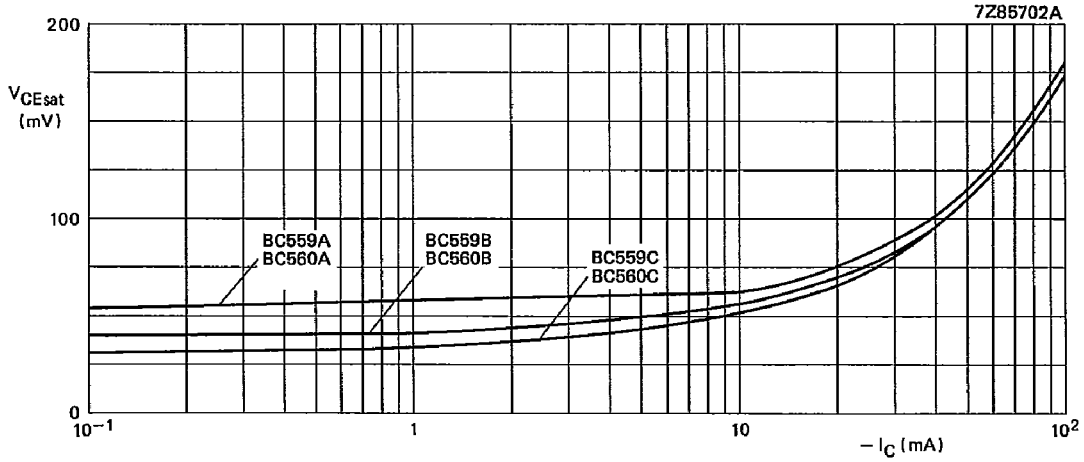


Fig. 9 $\frac{-I_C}{-I_B} = 20$; $T_j = 25$ °C.

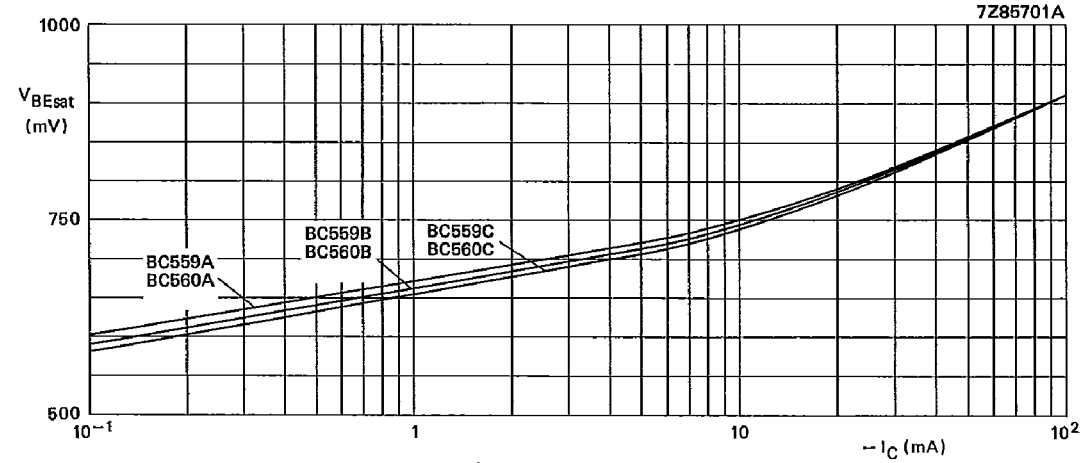


Fig. 10 $\frac{-I_C}{-I_B} = 20$; $T_j = 25$ °C.

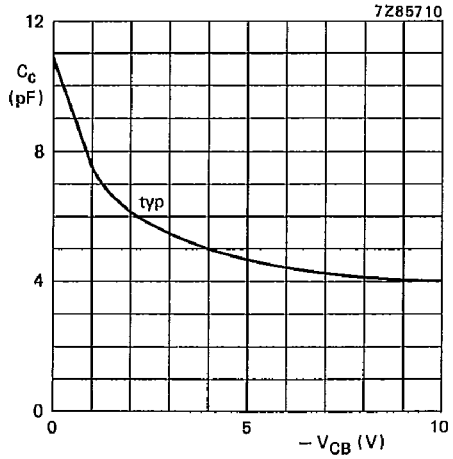


Fig. 11 f = 1 MHz; T_j = 25 °C.

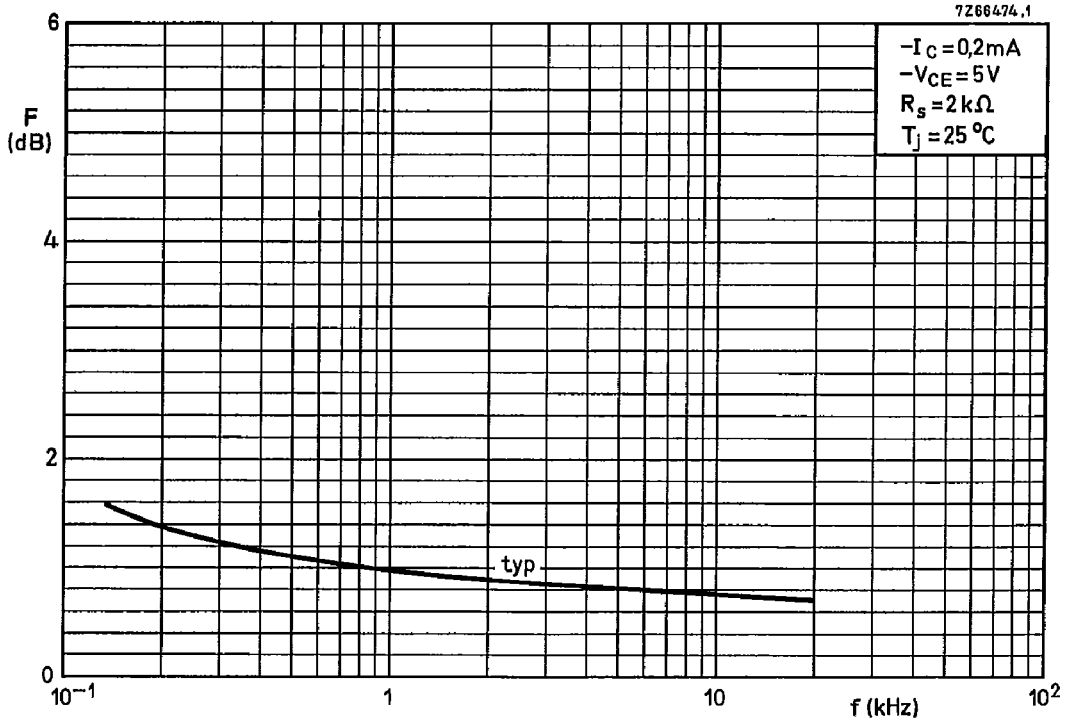


Fig. 12.

curves of constant noise figure

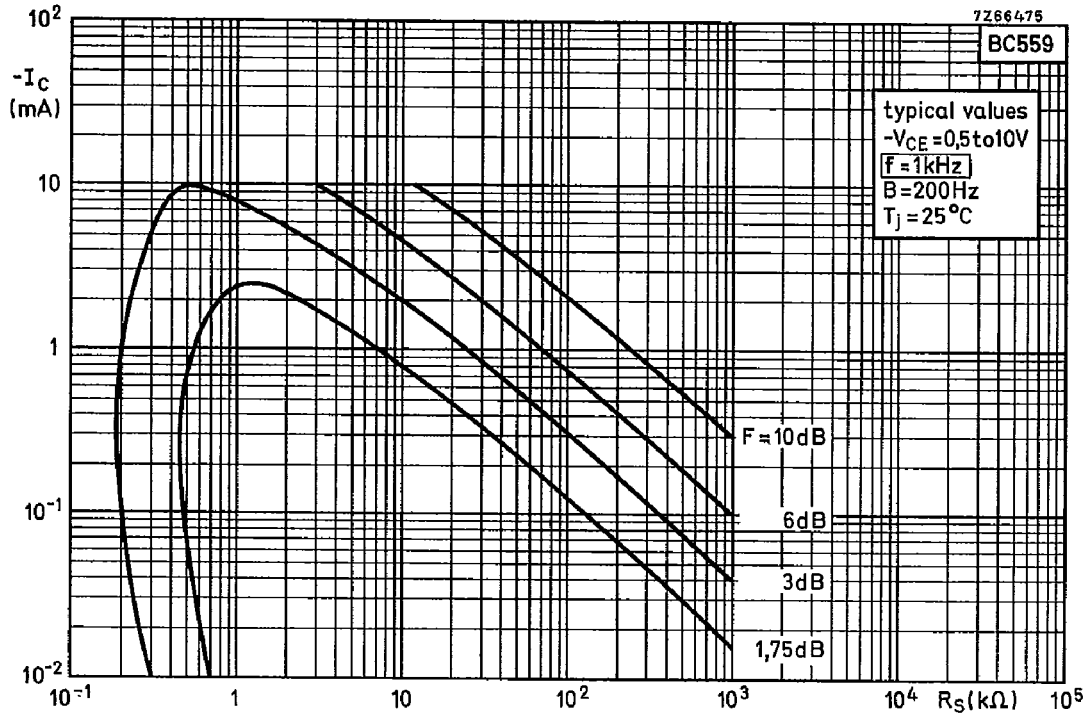


Fig. 13.

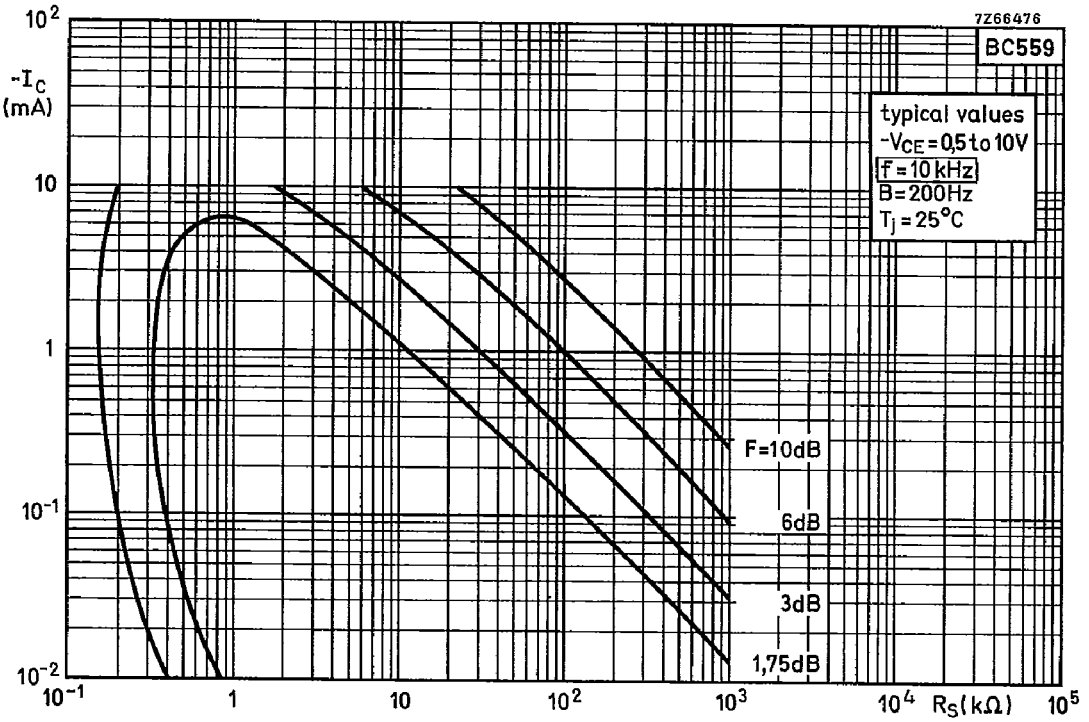


Fig. 14.