

# P-N-P SILICON PLANAR EPITAXIAL TRANSISTORS

# BC157 BC158 BC159

## TENTATIVE DATA

P-N-P silicon planar epitaxial transistors in plastic encapsulation with three rigid self-locking strips suitable for insertion in printed circuit boards using standard grids.

The BC157 is primarily intended for use in audio driver stages and television signal processing circuits.

The BC158 is a general purpose l.f. transistor.

The BC159 is primarily intended for low noise audio input stages.

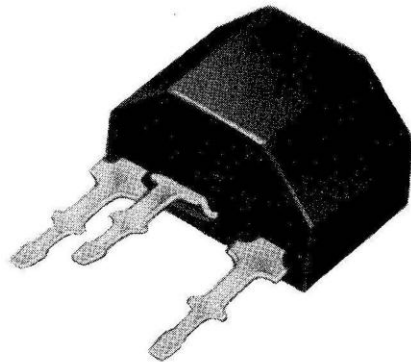
### QUICK REFERENCE DATA

	BC157	BC158	BC159	
$-V_{CEX}$ max. ( $+V_{BE} = 1V$ )	50	30	25	V
$-V_{CEO}$ max.	45	25	20	V
$-I_{CM}$ max.			200	mA
$P_{tot}$ max. ( $T_{amb} = 25^{\circ}C$ )			220	mW
$T_j$ max.			125	$^{\circ}C$
$h_{fe}$ ( $-I_C = 2mA$ , $-V_{CE} = 5V$ , $f = 1kHz$ )	75-260	75-260	125-500	
$f_T$ typ. ( $-I_C = 10mA$ , $-V_{CE} = 5V$ )			130	MHz
N ( $-I_C = 200\mu A$ , $-V_{CE} = 5V$ , $R_s = 2k\Omega$ )	typ.	-	2.0	dB
	max.	-	4.0	dB
$f = 1kHz$ , $B = 200Hz$	max. 10	10	4.0	dB

Unless otherwise stated data is applicable to all types

### OUTLINE AND DIMENSIONS

For details see page 4



## RATINGS

Limiting values of operation according to the absolute maximum system.

### Electrical

	BC157	BC158	BC159	
$-V_{CBO}$ max.	50	30	25	V
$-V_{CEX}$ max.	50	30	25	V
$-V_{CEO}$ max.	45	25	20	V
$-V_{EBO}$ max.			5.0	V
$-I_C$ max.			100	mA
$-I_{CM}$ max.			200	mA
$I_{EM}$ max.			200	mA
$-I_{BM}$ max.			200	mA
$P_{tot}$ max. ( $T_{amb} = 25^{\circ}C$ )			220	mW

### Temperature

$T_{stg}$ min.			-65	$^{\circ}C$
$T_{stg}$ max.			125	$^{\circ}C$
$T_j$ max.			125	$^{\circ}C$

### THERMAL CHARACTERISTIC

$R_{th(j-amb)}$	0.45 degC/mW
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### ELECTRICAL CHARACTERISTICS ( $T_j = 25^{\circ}C$ unless otherwise stated)

		Min.	Typ.	Max.	
$-I_{CBO}$	Collector cut-off current				
	$-V_{CB} = 20V, I_E = 0$	-	2.0	100	nA
	$-V_{CB} = 20V, I_E = 0, T_j = 125^{\circ}C$	-	-	5.0	$\mu A$
$-V_{BE}$	*Base-emitter voltage				
	$-I_C = 2.0mA, -V_{CE} = 5.0V$	600	650	750	mV
$-V_{CE(sat)}$	Collector-emitter saturation voltage				
	$-I_C = 10mA, -I_B = 0.5mA$	-	100	-	mV
	$-I_C = 100mA, -I_B = 5.0mA$	-	300	-	mV
$-V_{BE(sat)}$	Base-emitter saturation voltage				
	$-I_C = 10mA, -I_B = 0.5mA$	-	700	-	mV
	$-I_C = 100mA, -I_B = 5.0mA$	-	900	-	mV

\* $-V_{BE}$  decreases by about 2mV/degC with increasing temperature



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BC158  
BC159**

## ELECTRICAL CHARACTERISTICS (cont'd)

		Min.	Typ.	Max.		
$-V_{CEK}$	Collector knee voltage (see Fig.1) $-I_C = 10\text{mA}$ , $-I_B$ = the value for which $-I_C = 11\text{mA}$ at $-V_{CE} = 1.0\text{V}$	-	300	600	mV	
$h_{FE}$	Static forward current transfer ratio $-I_C = 2.0\text{mA}$ , $-V_{CE} = 5.0\text{V}$	BC157 BC158 BC159	- 140 230	- - -	-	
$h_{fe}$	Small signal forward current transfer ratio $-I_C = 2.0\text{mA}$ , $-V_{CE} = 5.0\text{V}$	BC157 BC158 BC159	75 75 125	- - -	260 260 500	
$f_T$	Transition frequency $-I_C = 10\text{mA}$ , $-V_{CE} = 5.0\text{V}$	-	130	-	MHz	
$C_{Tc}$	Collector capacitance $I_E = I_e = 0$ , $-V_{CB} = 10\text{V}$ , $f = 1.0\text{MHz}$	-	4.5	-	pF	
N	Noise figure $-I_C = 200\mu\text{A}$ , $-V_{CE} = 5.0\text{V}$ , $R_s = 2.0\text{k}\Omega$ $f = 30\text{Hz to } 15\text{kHz}$ $f = 1.0\text{kHz}$ , $B = 200\text{Hz}$	BC159 BC157 BC158 BC159	- - - -	2.0 - - -	4.0 10 10 4.0	dB dB dB dB

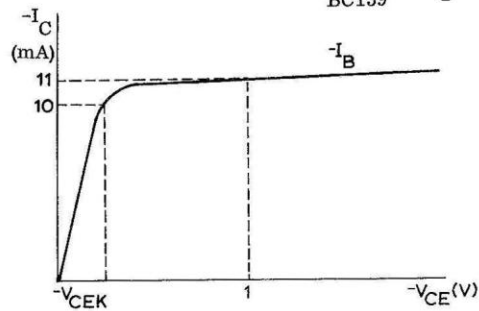
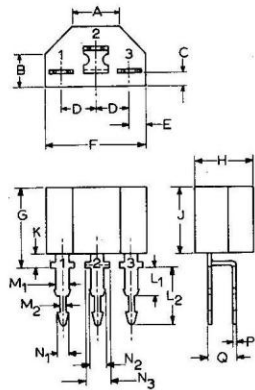


Fig.1



OUTLINE AND DIMENSIONS



Millimetres

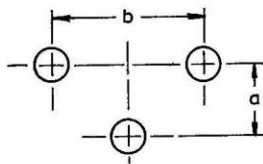
	Min.	Max.
A	3.4	3.6
B	2.4	2.6
C	0.8	1.1
D	2.44	2.64
E	1.1	1.3
F	7.4	7.6
G	6.0	6.4
H	4.4	4.6
J	4.9	5.1
K	1.0	1.3
L1	2.1	2.2
L2	4.0	4.3
M1	0.65	0.80
M2	0.45	0.60
N1	0.70	0.80
N2	1.15	1.25
N3	1.75	2.00
P	0.17	0.25
Q	1.75	2.00

Connections

1. Emitter
2. Base
3. Collector

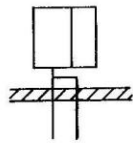
MOUNTING DETAILS

See also General Explanatory Notes, Section IV



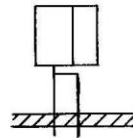
$a = 2.49$  to  $2.59\text{mm}$

$b = 5.03$  to  $5.13\text{mm}$



Maximum thickness of printed board =  $1.7\text{mm}$

Hole diameter =  $1.25$  to  $1.35\text{mm}$



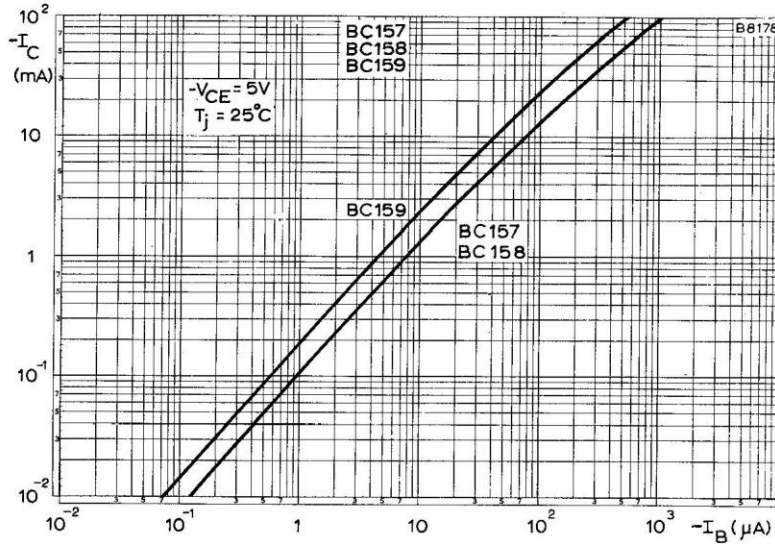
Maximum thickness of printed board =  $1.1\text{mm}$

Hole diameter =  $0.77$  to  $0.83\text{mm}$

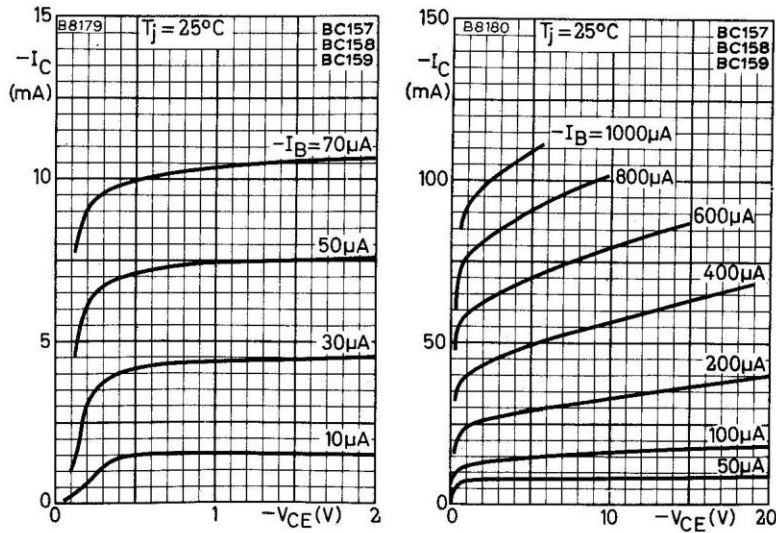


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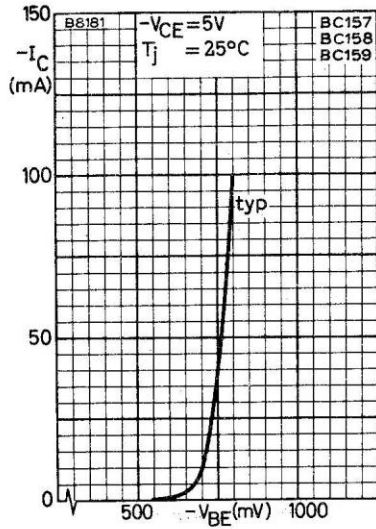


Typical transfer characteristics

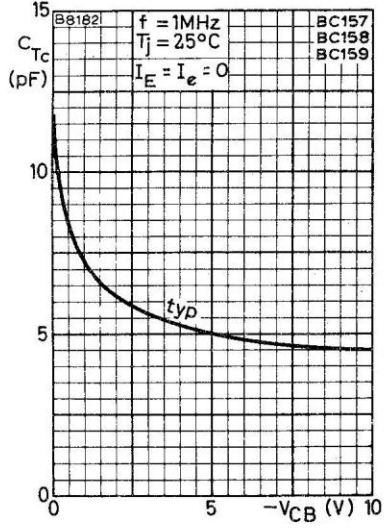


Typical output characteristics

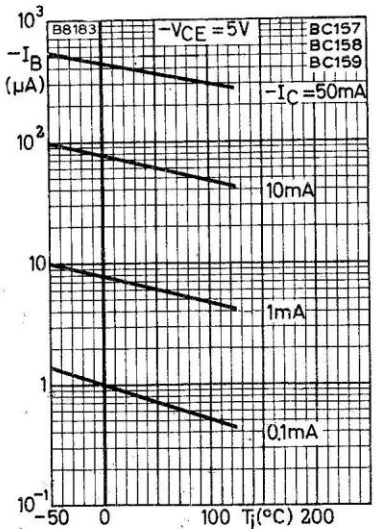




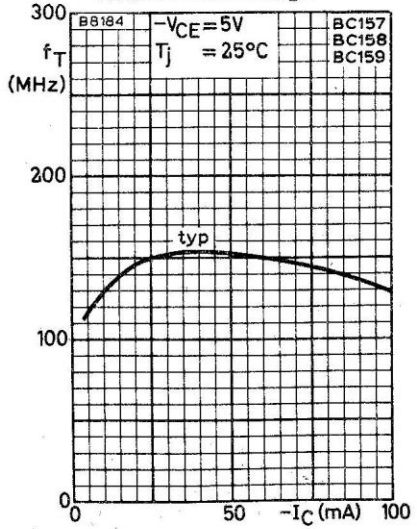
Typical mutual characteristics



Typical collector capacitance versus collector-base voltage



Typical base current versus junction temperature

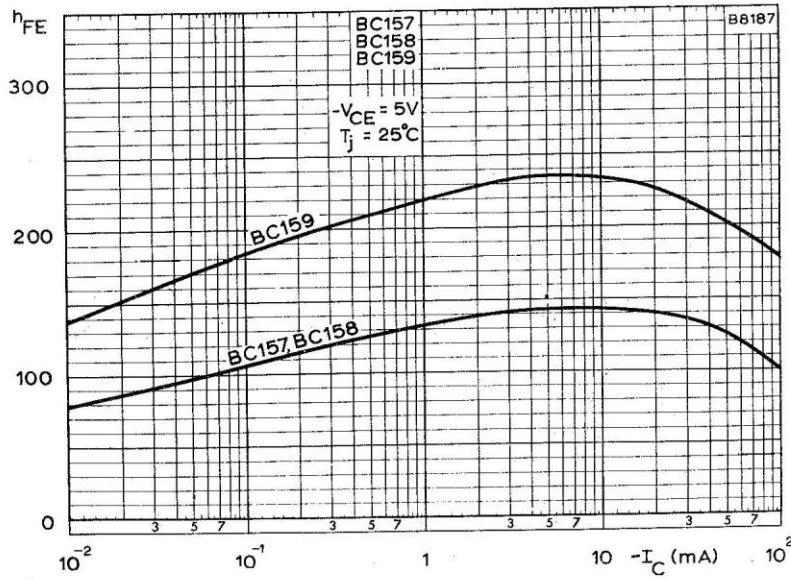
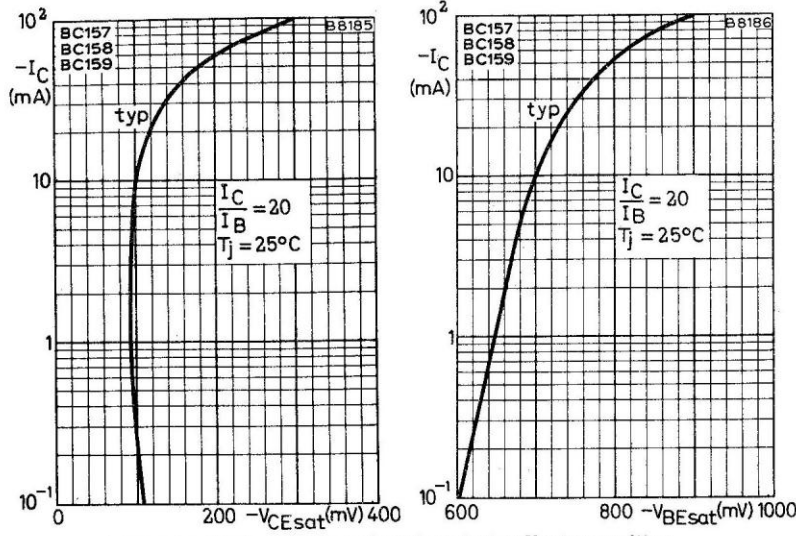


Typical transition frequency versus collector current

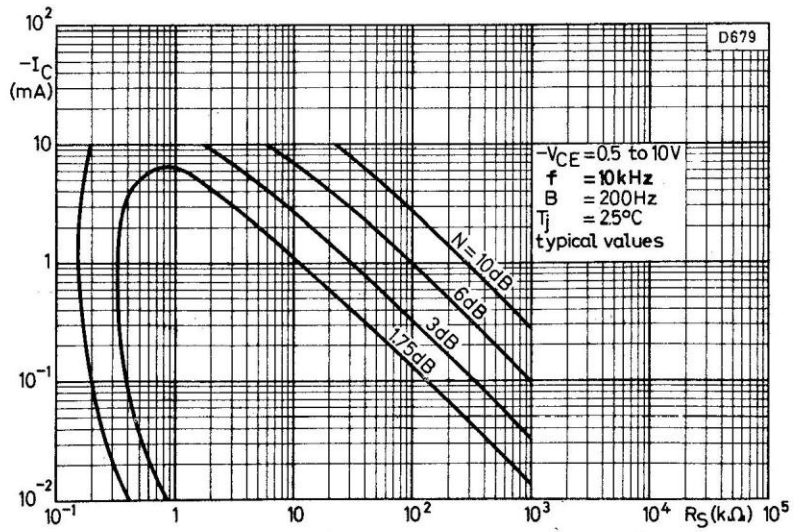
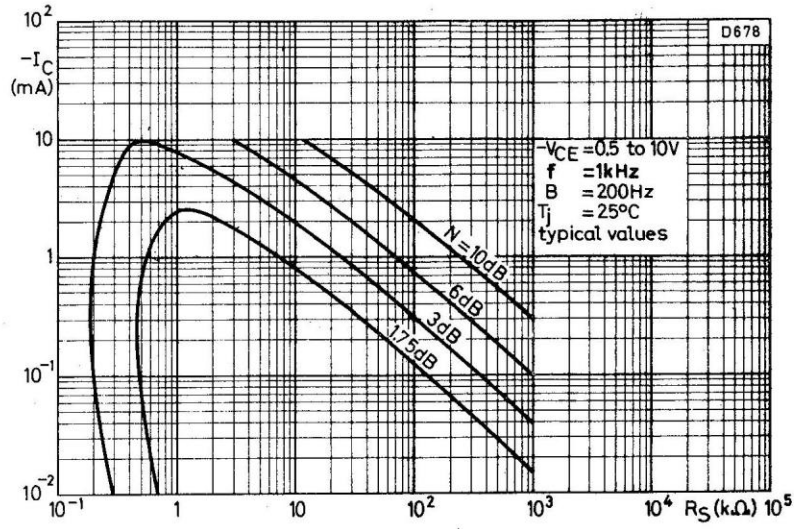


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Constant noise figure curves



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