SILICON PLANAR EPITAXIAL N-P-N TRANSISTOR

BF194

TENTATIVE DATA

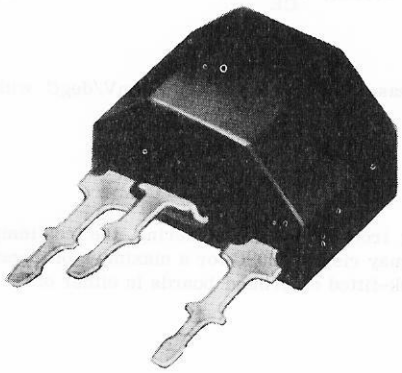
N-P-N transistor in epoxy resin encapsulation with three rigid self-locking strips suitable for insertion into printed circuit boards using standard grids. The transistor is recommended for use in the i.f. amplifier stages of car radios and a.m./f.m. receivers, also for use in the sound i.f. stages of television receivers.

QUICK REFERENCE DATA

V_{CBO} max.	30	V
V_{CEO} max.	20	V
I_C max.	30	mA
P_{tot} max.	220	mW
T_j max.	125	°C
h_{FE} typ. (I_C=1.0mA, V_{CE}=10V)	115	
f_T typ. (I_C=1.0mA, V_{CE}=10V)	260	MHz
N typ. (I_C=1.0mA, V_{CE}=10V, g_s=20mmho, f=100MHz)	4.0	dB
N_c typ. (I_C=1.0mA, V_{CE}=10V, g_s=10mmho, f=1.0MHz)	2.0	dB

OUTLINE AND DIMENSIONS

For details see page 4



RATINGS

Limiting values of operation according to the absolute maximum system.

Electrical

V_{CBO} max. (I_E=0)	30	V
V_{CEO} max. (I_B=0, see curve on page 7)	20	V
V_{EBO} max. (I_C=0)	5.0	V
I_C max.	30	mA
I_{CM} max.	30	mA
P_{tot} max. (T_{amb} ≤25°C)	220	mW

Temperature

T_{stg} min.	-65	°C
T_{stg} max.	125	°C
T_j max.	125	°C

THERMAL CHARACTERISTIC

$R_{th(j\text{-}amb)}$	0.45	degC/mW

ELECTRICAL CHARACTERISTICS (T_{amb}=25°C unless otherwise stated)

		Min.	Typ.	Max.	
V_{BE}	Base-emitter voltage (see note 1) I_C=1.0mA, V_{CE}=10V	650	-	740	mV
I_B	Base current I_C=1.0mA, V_{CE}=10V	4.5	8.7	15	μA
$-C_{re}$	Feedback capacitance I_C=1.0mA, V_{CE}=10V, f=0.45MHz	-	0.95	-	pF
f_T	Transition frequency I_C=1.0mA, V_{CE}=10V	-	260		MHz

NOTE

1. V_{BE} decreased by approximately 1.7mV/degC with increasing temperature.

SOLDERING NOTE

For soldering irons or for dip-soldering, the iron temperature or solder temperature may rise to 300°C for a maximum of three seconds, with the transistor lock-fitted on printed boards in either of the possible mounting positions.

ELECTRICAL CHARACTERISTICS (cont'd)

		Min.	Typ.	Max.	
N	Noise figure I_C=1.0mA, V_{CE}=10V				
	g_s=2.0mmho, f=0.2MHz	-	1.5	-	dB
	g_s=1.5mmho, f=1.0MHz	-	1.2	-	dB
	g_s=10mmho, f=100MHz	-	4.0	-	dB
N_c	Conversion noise figure I_C=1.0mA, V_{CE}=10V				
	g_s=0.6mmho, f=0.2MHz	-	3.0	-	dB
	g_s=1.2mmho, f=1.0MHz	-	2.0	-	dB

Typical y-parameters

Common base

I_C=1.0mA, V_{CE}=10V, f=100MHz, lead length=3.0mm

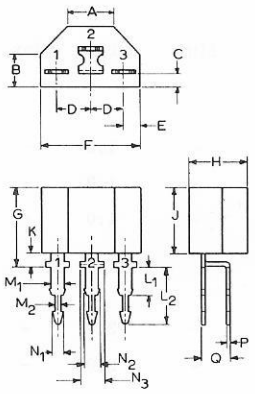
g_{ib}	Input conductance	36	mmho
$-b_{ib}$	Input susceptance	3.0	mmho
$\lvert y_{rb} \rvert$	Feedback admittance	450	μmho
ϕ_{rb}	Phase angle of feedback admittance	272	deg
$\lvert y_{fb} \rvert$	Transfer admittance	33	mmho
ϕ_{fb}	Phase angle of transfer admittance	146	deg
g_{ob}	Output conductance	22	μmho
b_{ob}	Output susceptance	1.1	mmho

Common emitter

I_C=1.0mA, V_{CE}=10V, lead length=3.0mm

		f =	10.7	0.45	MHz
g_{ie}	Input conductance		<0.64	<0.54	mmho
g_{oe}	Output conductance		<13.5	<11.5	μmho

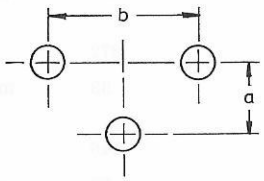
OUTLINE AND DIMENSIONS



	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

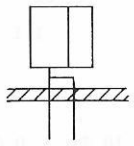
Pin connections
1. Base
2. Emitter
3. Collector

Mounting details



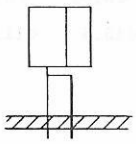
a = 2.49 to 2.59mm

b = 5.03 to 5.13mm



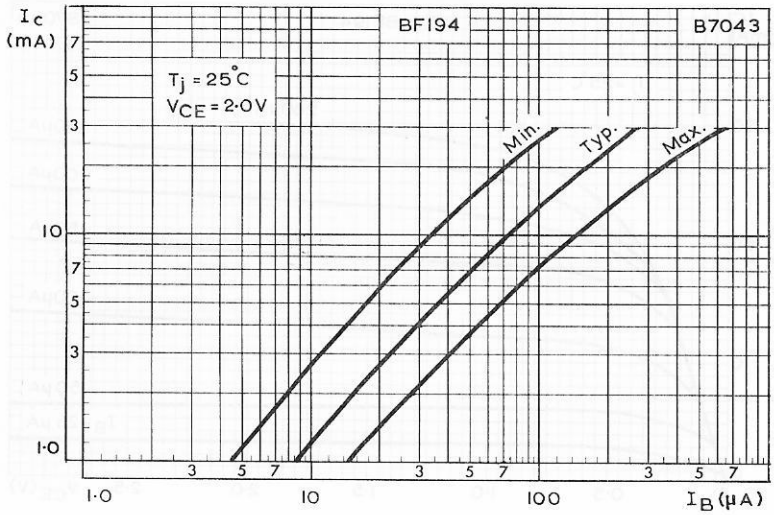
Maximum thickness of printed board = 1.7mm

Hole diameter = 1.25 to 1.35mm

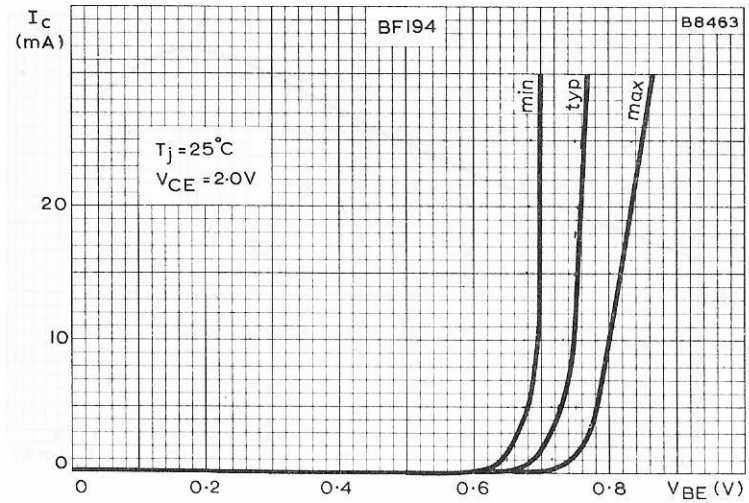


Maximum thickness of printed board = 1.1mm

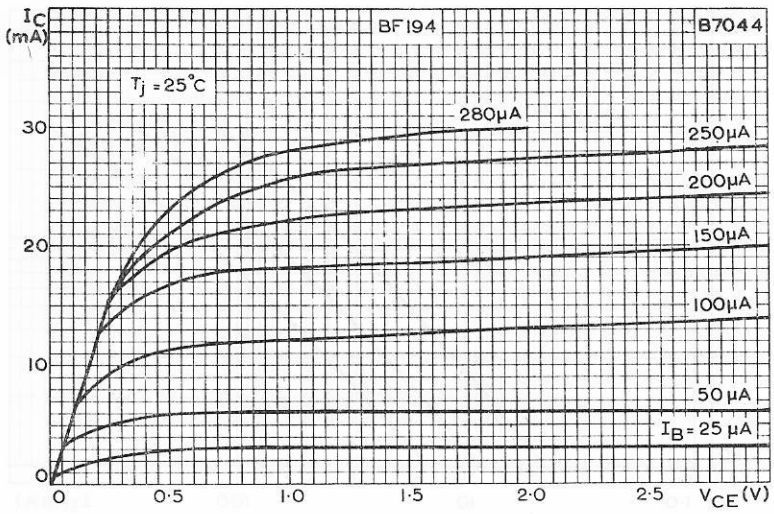
Hole diameter = 0.77 to 0.83mm



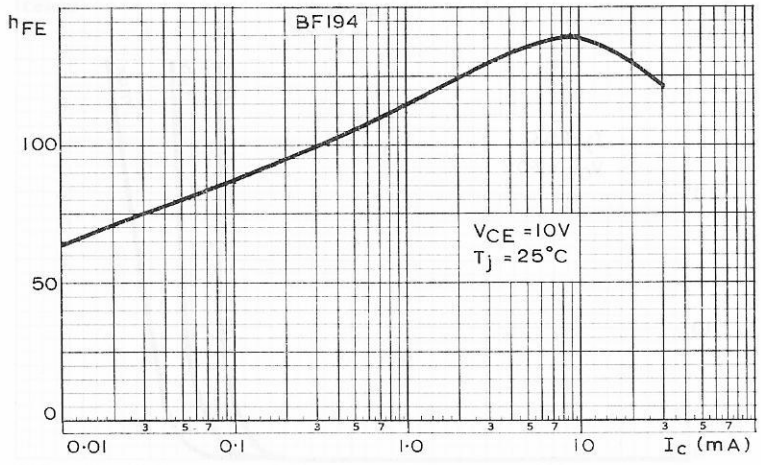
TRANSFER CHARACTERISTICS. $T_j = 25^oC$



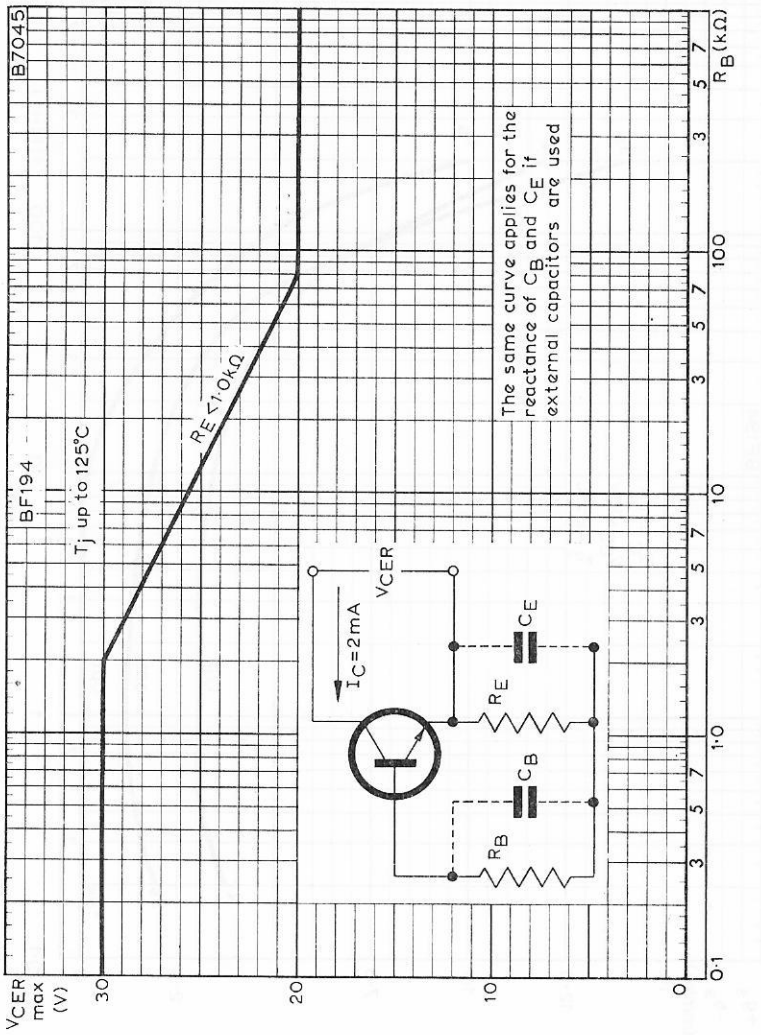
MUTUAL CHARACTERISTICS. $T_j = 25^oC$



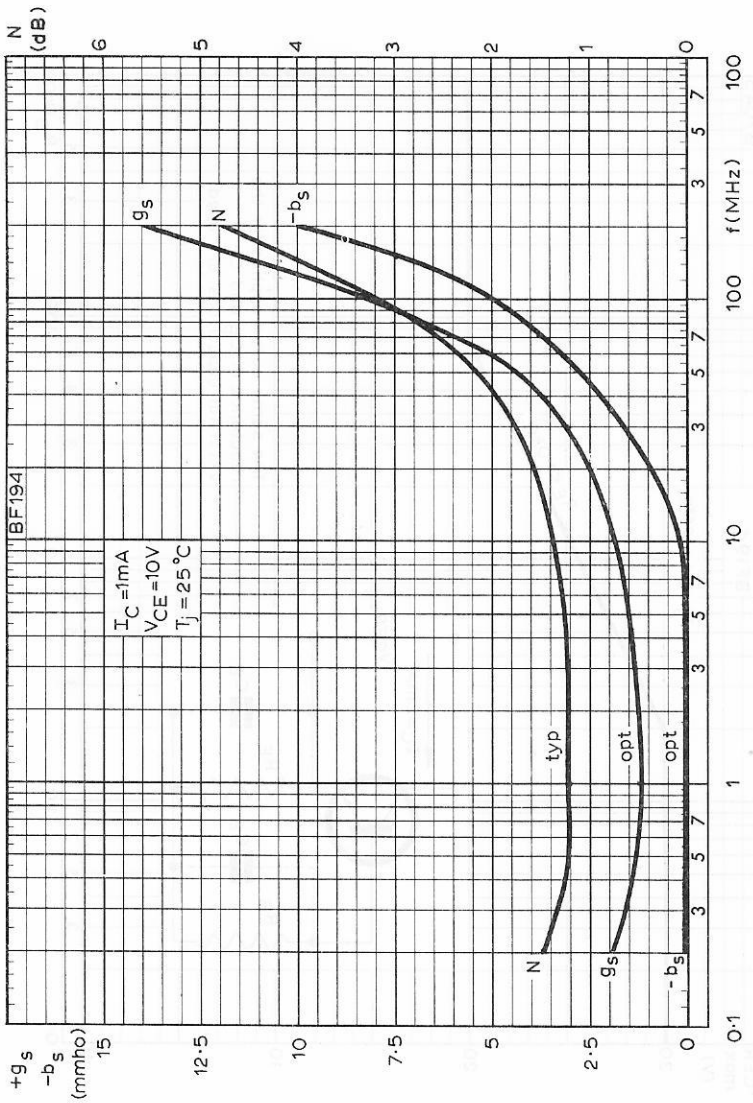
TYPICAL OUTPUT CHARACTERISTICS. $T_j = 25^{\circ}C$



TYPICAL STATIC FORWARD CURRENT TRANSFER RATIO PLOTTED AGAINST COLLECTOR CURRENT

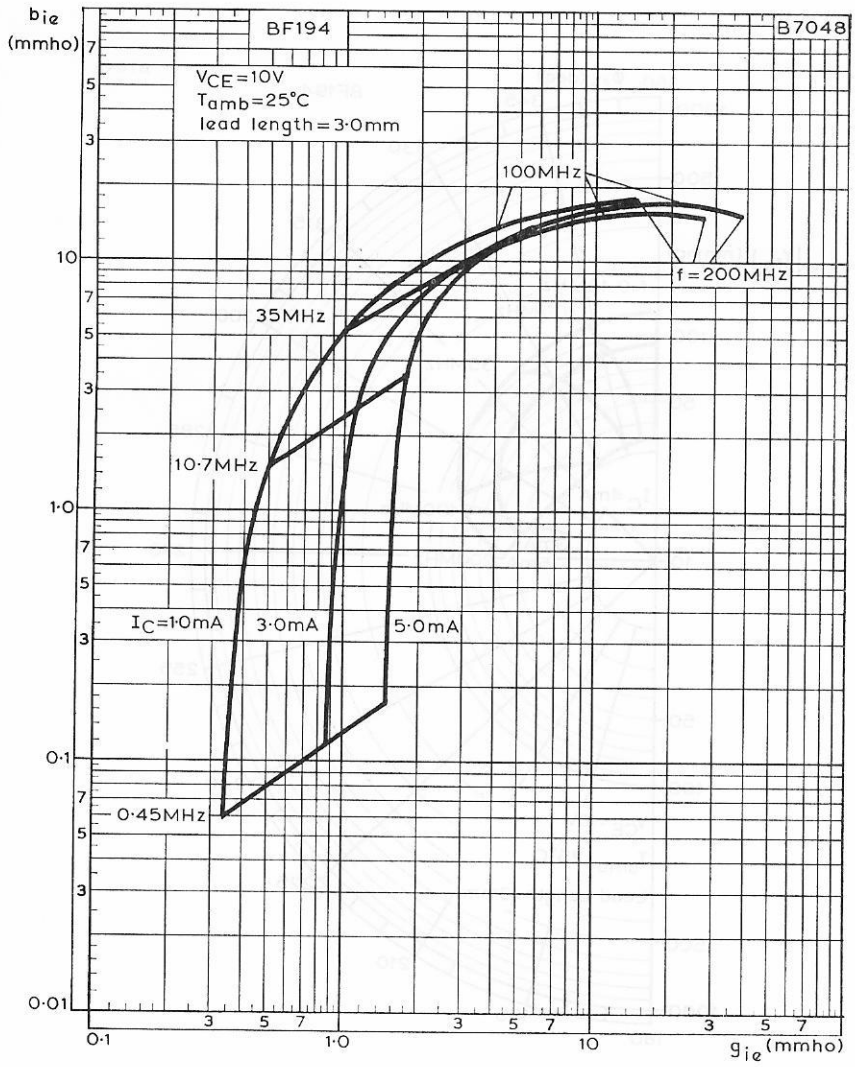


MAXIMUM COLLECTOR-EMITTER VOLTAGE PLOTTED AGAINST EXTERNAL BASE RESISTANCE

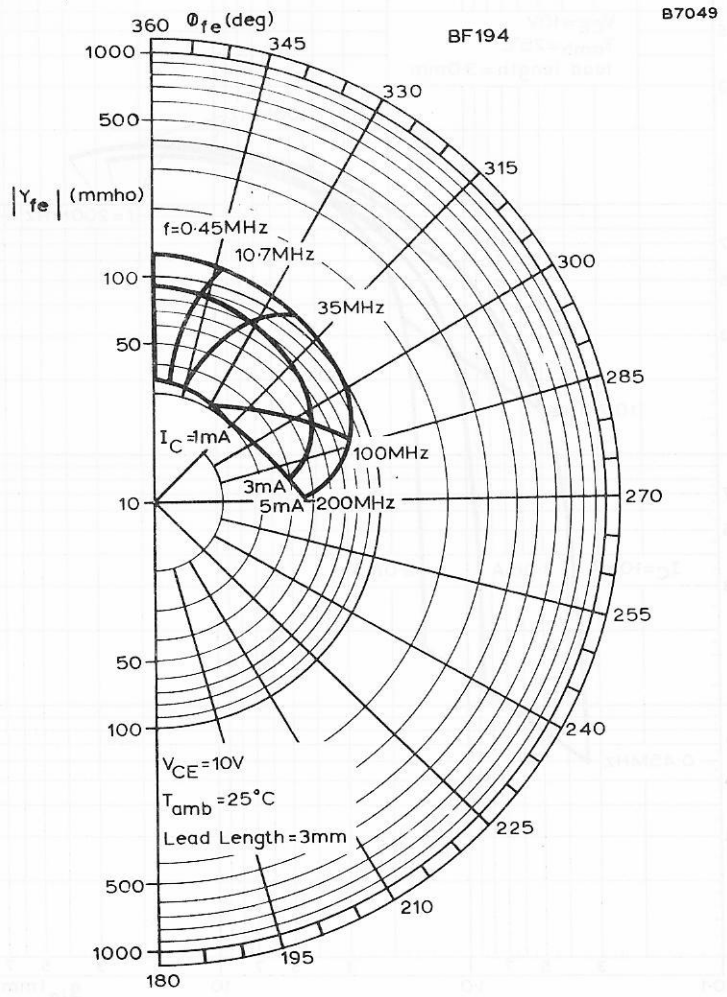


TYPICAL SOURCE CONDUCTANCE AND SOURCE SUSCEPTANCE PLOTTED AGAINST FREQUENCY AT OPTIMUM SOURCE ADMITTANCE

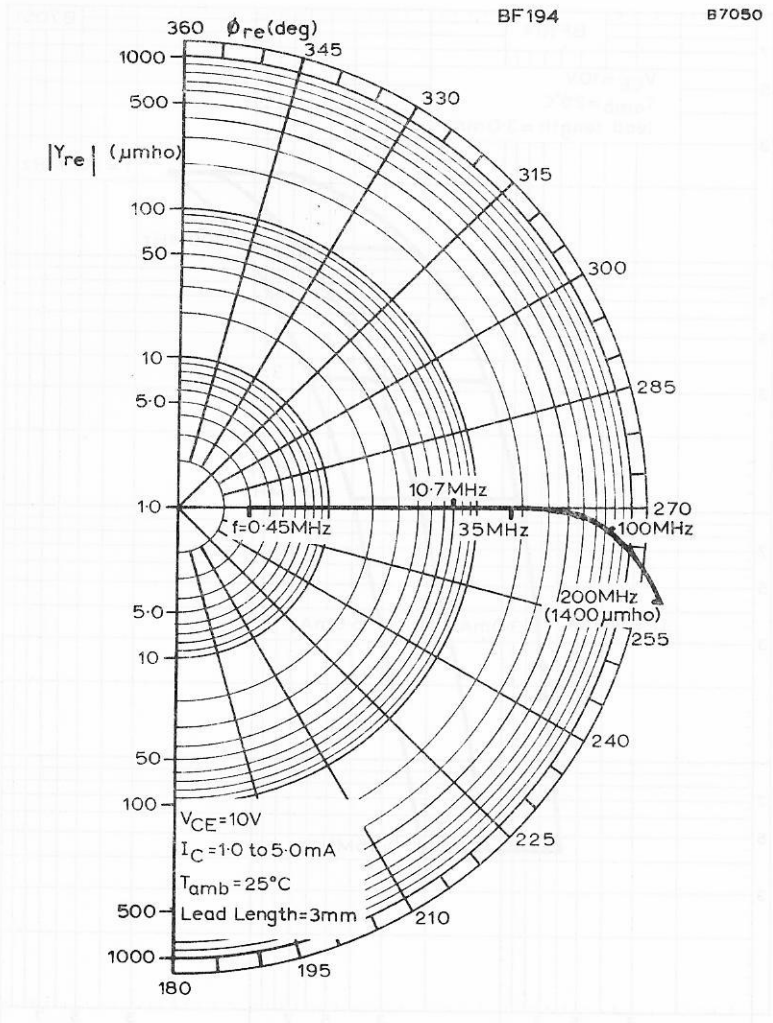
TYPICAL NOISE FIGURE PLOTTED AGAINST FREQUENCY AT OPTIMUM SOURCE CONDUCTANCE



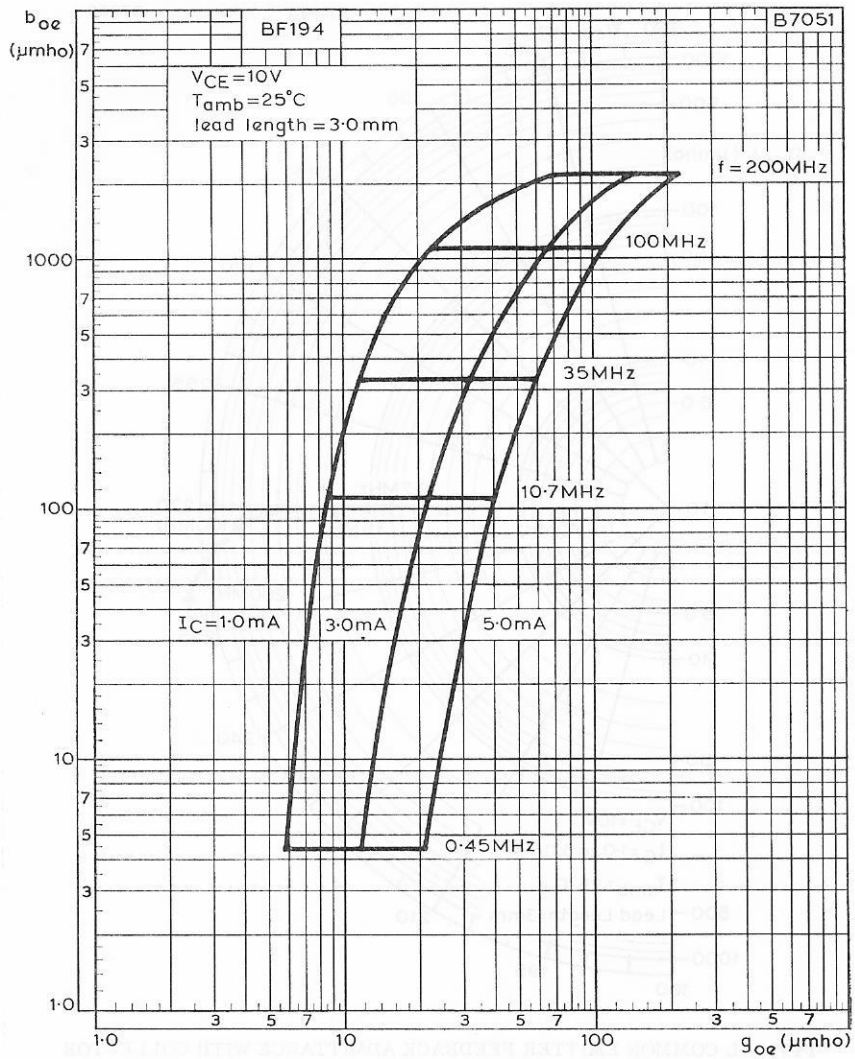
TYPICAL COMMON EMITTER INPUT ADMITTANCE WITH COLLECTOR CURRENT AND FREQUENCY AS PARAMETERS



TYPICAL COMMON EMITTER TRANSFER ADMITTANCE WITH COLLECTOR CURRENT AND FREQUENCY AS PARAMETERS



TYPICAL COMMON EMITTER FEEDBACK ADMITTANCE WITH COLLECTOR CURRENT AND FREQUENCY AS PARAMETERS



TYPICAL COMMON EMITTER OUTPUT ADMITTANCE WITH COLLECTOR CURRENT AND FREQUENCY AS PARAMETERS