PHILIPS

AF178

TENTATIVE DATA

R.F. GERMANIUM ALLOY-DIFFUSED TRANSISTOR

Germanium alloy-diffused transistor of the p-n-p type in a metal case with low noise and high gain up to 260 Mc/s, for use in V.H.F. applications as amplifier-, oscillator- and converter circuits.

LIMITING VALUES (Absolute max. values)

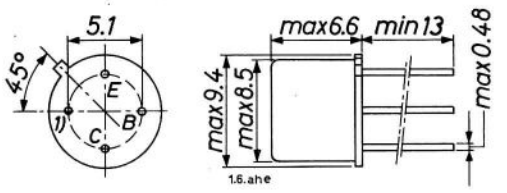
Collector			
Voltage (base reference)	$-V_{CB}$	= max.	25 V
Current	$-I_C$	= max.	10 mA
Emitter			
Reverse current	$-I_E$	= max.	1 mA
Base			
Current	$-I_B$	= max.	1 mA
Dissipation			
Total dissipation	P_{tot}	= max.	110 mW
Temperatures			
Storage temperature	T_s	= −55 °C to +75 °C	
Junction temperature continuous	T_j	= max.	~~90~~ 75 °C
incidentally (total duration max. 200 hrs)	T_j	= max.	~~90~~ 90 °C
	(t	= max.	200 hrs)

THERMAL DATA

Thermal resistance from junction to ambience in free air	K	= max.	0.4 °C/mW

~~1) Shield lead~~

Dimensions in mm
TO-12 case



CHARACTERISTICS at T_{amb} = 25 °C

Collector current at $I_E = 0$

$-V_{CB}$ = 12 V	$-I_{CBO}$	<	10 μA
$-V_{CB}$ = 25 V	$-I_{CBO}$	<	50 μA

Emitter voltage at $I_C = 0$

$-I_E$ = 50 μA	$-V_{EB}$	>	0.5 V

Base current

$-V_{CB}$ = 12 V; $-I_C$ = 1 mA	$-I_B$	<	50 μA

Base voltage

$-V_{CB}$ = 12 V; $-I_C$ = 1 mA	$-V_{BE}$	>	220 mV
	$-V_{BE}$	<	360 mV

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

T_{amb} = 25 °C

Frequency at which $|h_{fe}| = 1$

$-V_{CB}$ = 12 V; I_E = 1 mA	f_1	=	180 Mc/s

Base impedance

$-V_{CB}$ = 12 V; I_E = 1 mA f = 2 Mc/s	$\lvert z_{rb} \rvert$	=	10 Ω

Feedback capacitance

$-V_{CE}$ = 12 V; $-I_C$ = 1 mA f = 0.45 Mc/s	$-c_{re}$	=	0.8 pF

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1) Shield lead

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN (continued)

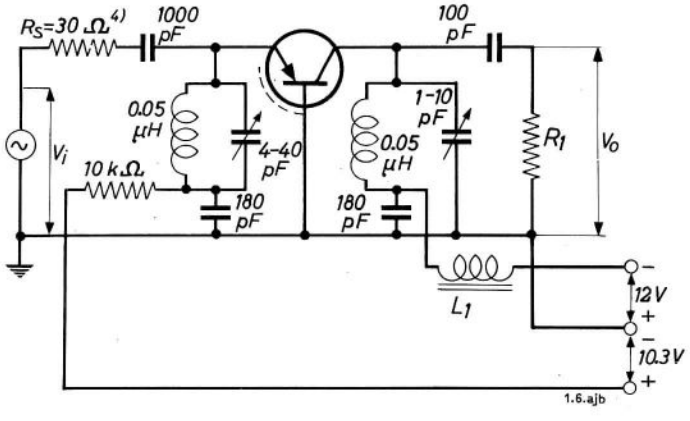
Current amplification factor

$-V_{CE}$ = 12 V; $-I_C$ = 1 mA
f = 1 kc/s — $h_{fe} > 20$

Noise figure

$-V_{CE}$ = 12 V; $-I_C$ = 1 mA
f = 200 Mc/s
Input source resistance = 30 Ω — F = 6 dB — < 7.5 dB

Test circuit for power gain at 200 Mc/s



R_1 is chosen such that the total impedance R_L of the tuned circuit is 2.0 kΩ.

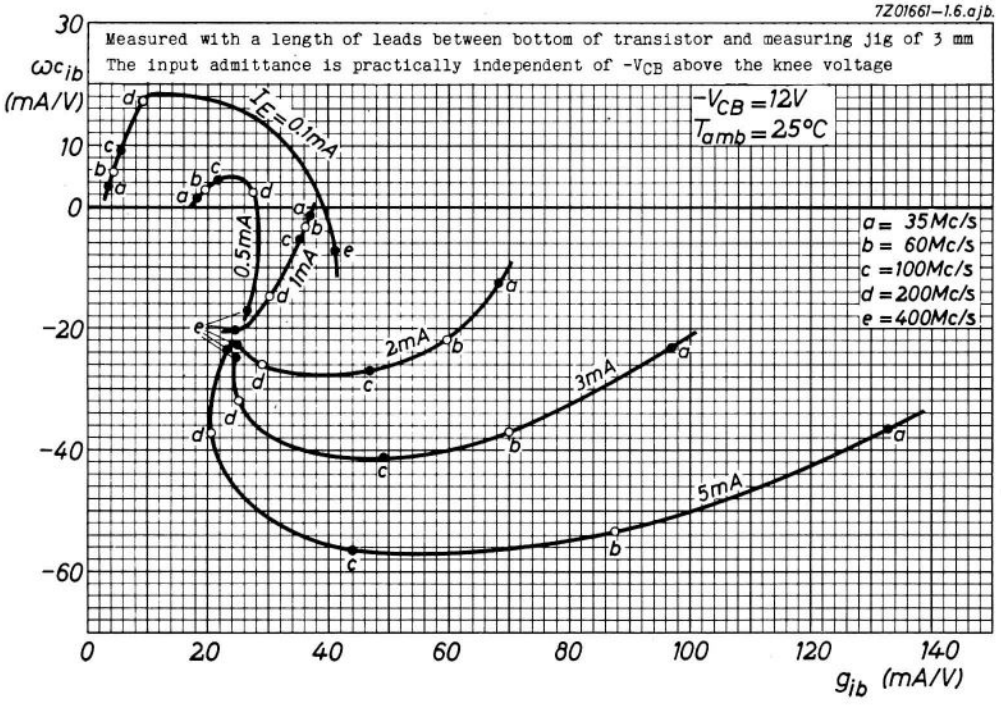
L_1 = ferrite bead

Available power gain at 200 Mc/s in the circuit above

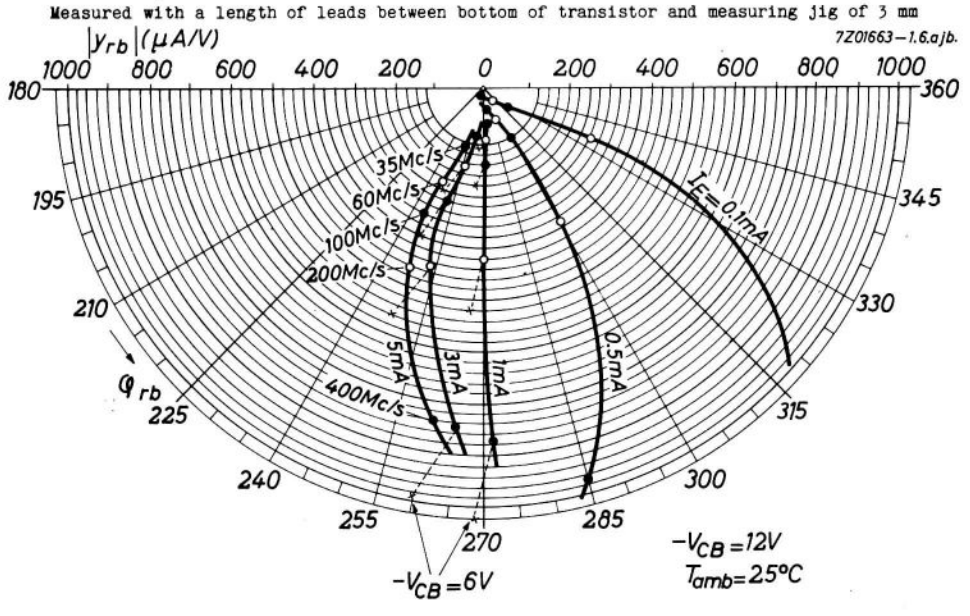
At f = 100 Mc/s — G = 13 dB — > 10 dB

The available power gain is defined as

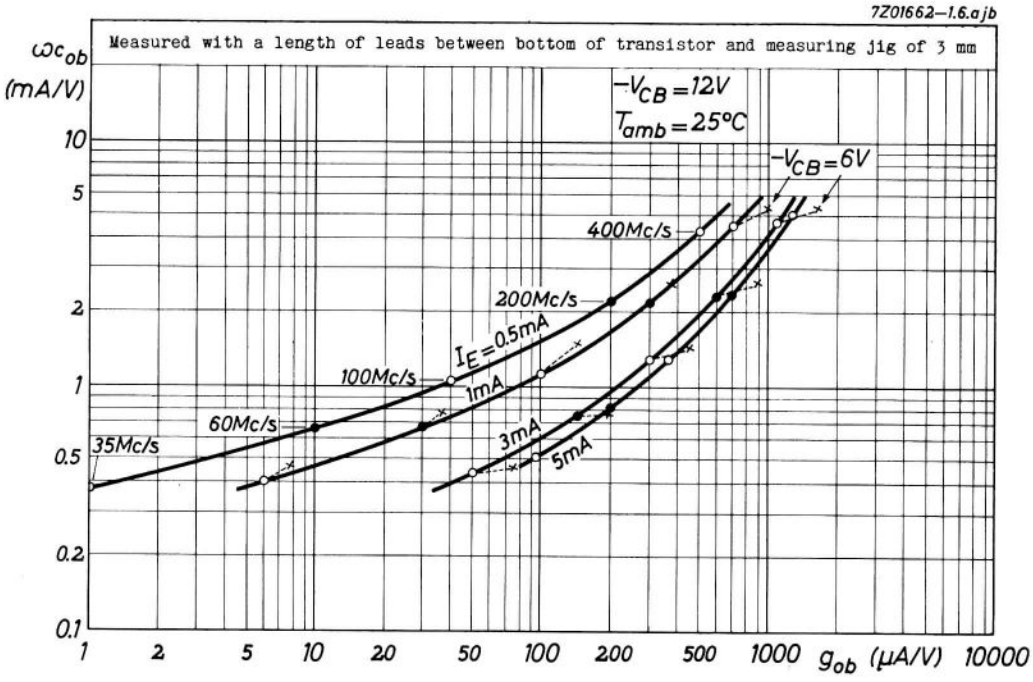
$$G = \frac{V_o^2}{V_i^2} \cdot \frac{4R_s}{R_L} = 0.073 \frac{V_o^2}{V_i^2}$$



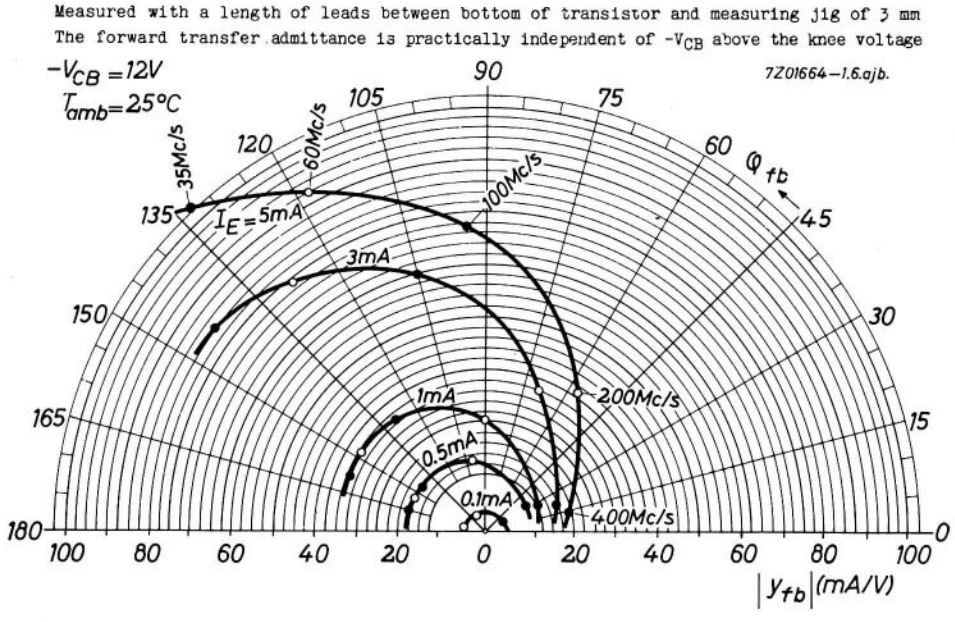
Typical input admittance in common base circuit



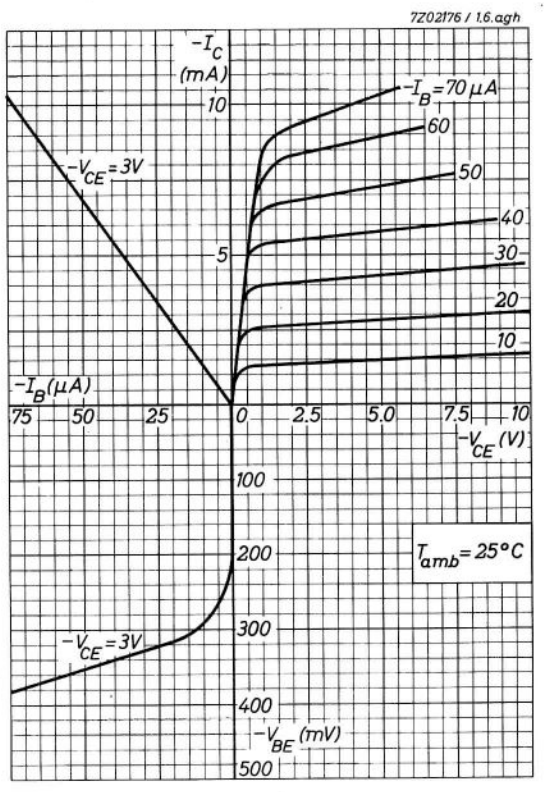
Typical feedback admittance in common base circuit



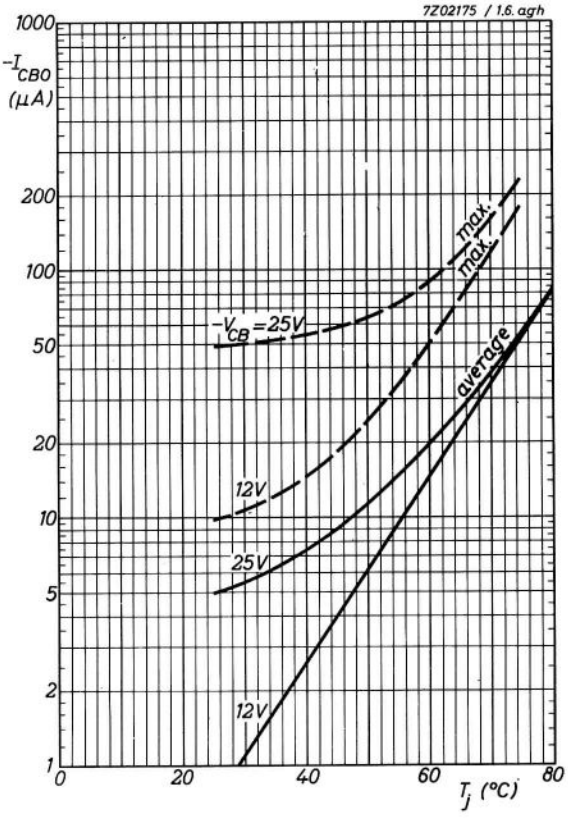
Typical output admittance in common base circuit



Typical forward transfer admittance in common base circuit



Typical characteristics



Collector leakage current as a function of the junction temperature