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NPN Silicon RF Transistor 25C 04446 D BF 198

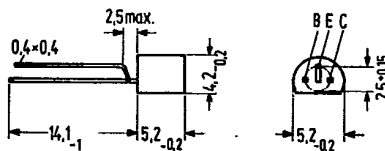
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T-31-21

for gain-controlled TV IF amplifier stages

BF 198 is an NPN silicon planar radio-frequency transistor in TO 92 plastic package (10 A 3 DIN 41868). The transistor is characterized by a low reverse transfer capacitance and is recommended for use in gain-controlled IF amplifier stages of TV sets in common-emitter configuration.

Type	Ordering code
BF 198	Q62702-F354



Approx. weight 0.25 g

Dimensions in mm

Maximum ratings

Collector-emitter-voltage
 Collector-base voltage
 Base-emitter voltage
 Collector current
 Base current
 Junction temperature
 Storage temperature range
 Total power dissipation ($T_{amb} \leq 25^\circ\text{C}$)

V_{CEO}	30	V
V_{CBO}	40	V
V_{EBO}	4	V
I_C	25	mA
I_B	3	mA
T_j	150	$^\circ\text{C}$
T_{stg}	-55 to +150	$^\circ\text{C}$
P_{tot}	500	mW

Thermal resistance

Junction to ambient air

R_{thJA}	≤ 250	K/W
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Static characteristics ($T_{amb} = 25^\circ\text{C}$)

Collector cutoff current

($V_{CB} = 40\text{ V}$) I_{CBO}

<100

nA

DC current gain

($V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$) h_{FE}

70 (>26)

-

($V_{CE} = 3\text{ V}$; $I_C = 10\text{ mA}$) h_{FE}

>10

-

Base-emitter voltage

($V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$) V_{BE}

750

mV

Dynamic characteristics ($T_{amb} = 25^\circ\text{C}$)

Transition frequency

($V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$; $f = 100\text{ MHz}$) f_T

400

MHz

Reverse transfer capacitance

($V_{CE} = 10\text{ V}$; $I_C = 1\text{ mA}$; $f = 1\text{ MHz}$) $-C_{12e}$

0.22

pF

Noise figure

($V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$; $f = 35\text{ MHz}$; $R_g = 100\ \Omega$) NF

3

dB

Obtainable power gain

($V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$; $f = 35\text{ MHz}$) $G_{peopt}^{1)}$

42

dB

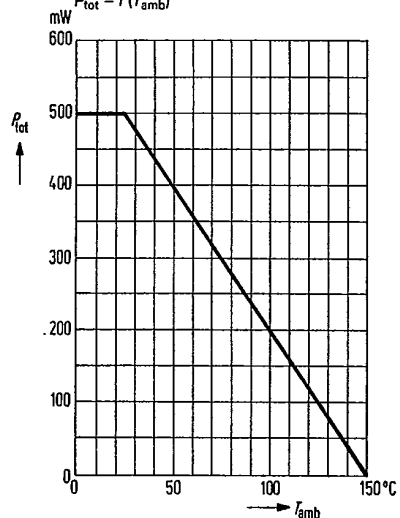
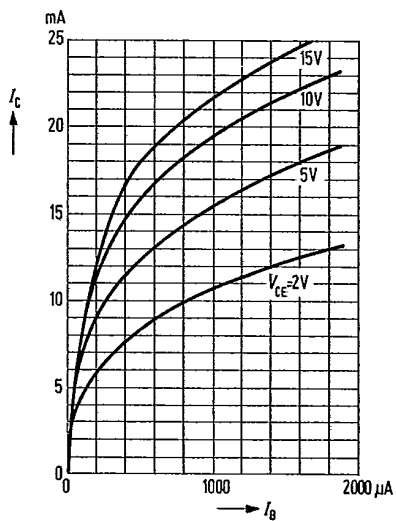
Four-pole characteristics: ($V_{CE} = 10\text{ V}$; $I_C = 4\text{ mA}$; $f = 35\text{ MHz}$) $g_{11e} = 4,5\text{ mS}$ $[y_{12e}] = 47\ \mu\text{S}$ $[y_{21e}] = 105\text{ mS}$ $g_{22e} = 40\ \mu\text{S}$ $c_{11e} = 40\text{ pF}$ $-\varphi_{12e} = 95^\circ$ $-\varphi_{21e} = 20^\circ$ $c_{22e} = 1,3\text{ pF}$

$$1) G_{peopt} = \frac{|y_{21e}|^2}{4g_{11e} \cdot g_{22e}}$$

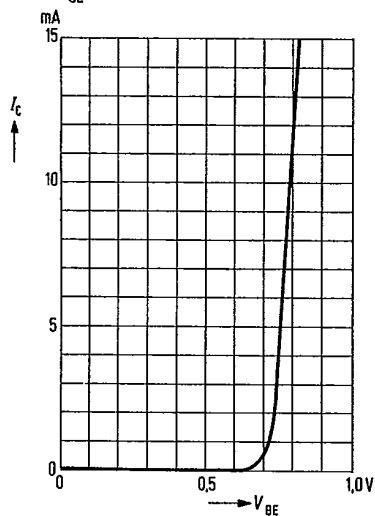
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Total perm. power dissipation
versus temperature

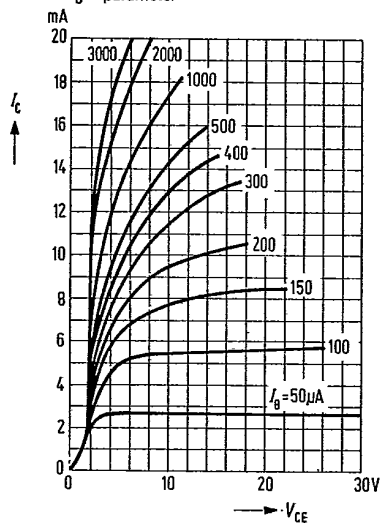
$$P_{\text{tot}} = f(T_{\text{amb}})$$

Collector current $I_C = f(I_B)$ Input characteristic $I_C = f(V_{BE})$

$$V_{CE} = 10\text{V}$$

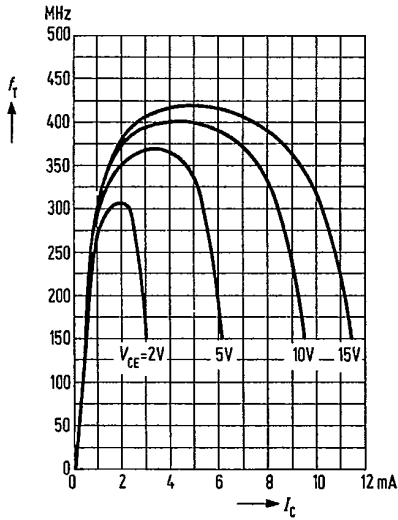
Output characteristics $I_C = f(V_{CE})$

$$I_B = \text{parameter}$$

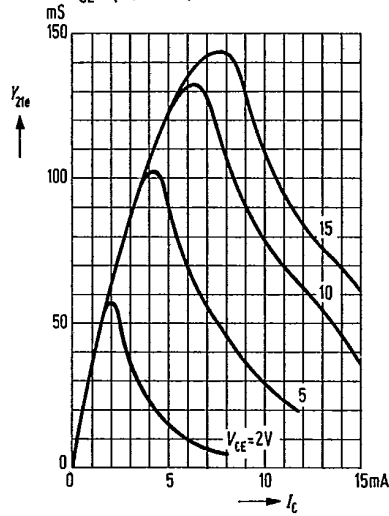


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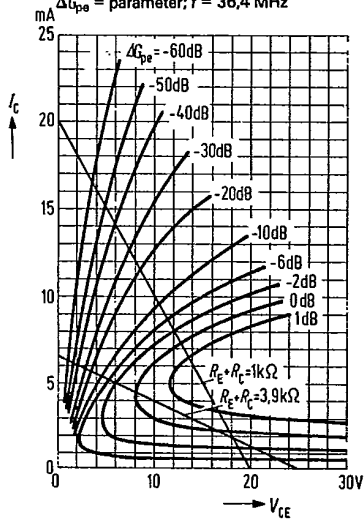
Transition frequency $f_T = f(I_C)$
 $V_{CE} = \text{parameter}$



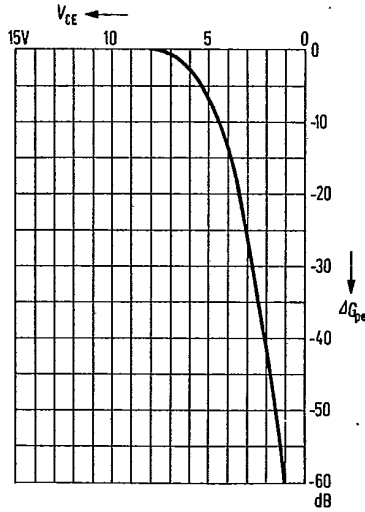
Short-circuit forward transfer admittance $y_{21e} = f(I_C)$
 $V_{CE} = \text{parameter}; f = 35 \text{ MHz}$



Constant power gain characteristics
 $I_C = f(V_{CE})$
 $\Delta G_{pe} = \text{parameter}; f = 36.4 \text{ MHz}$



Power gain control range
 $\Delta G_{pe} = f(V_{CE}); R_E + R_C = 3.9 \text{ k}\Omega$
 $f = 36.4 \text{ MHz}; -V_{EE} = 25 \text{ V}$



T-31-21

25C 04450 D

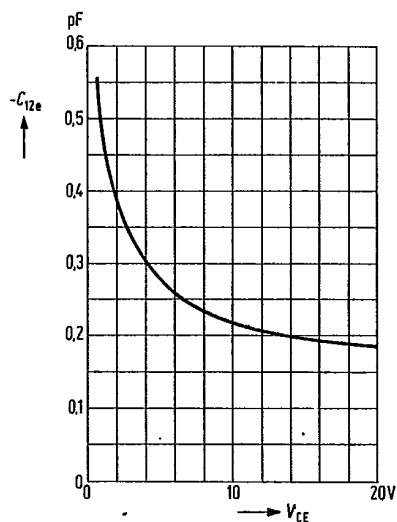
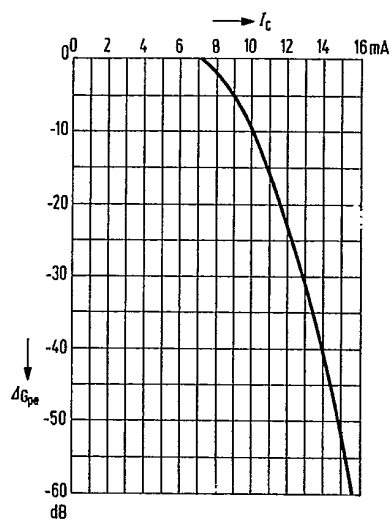
BF 198

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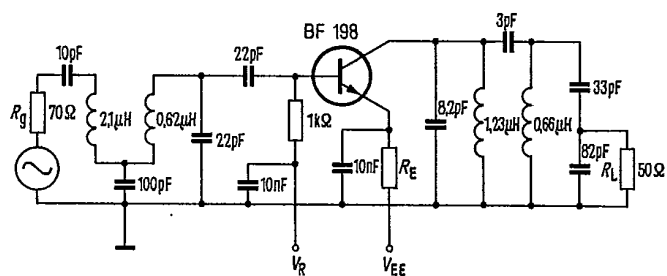
Control range of power gain

 $\Delta G_{DB} = f(I_C); R_E + R_C = 1 \text{ k}\Omega;$
$$-V_{EE} = 20 \text{ V}; f = 36.4 \text{ MHz}$$

Reverse transfer capacitance

 $C_{120} = f(V_{CE}); I_C = 1 \text{ mA}; f = 1 \text{ MHz}$ 

First stage of a TV IF amplifier incl. voltage gain control $f = 36.4 \text{ MHz}$.



Power gain ($I_C = 4 \text{ mA}$;

$-V_{EE} = 25 \text{ V}; R_E + R_C = 3.9 \text{ k}\Omega$)

Gain control range

G_p	26	dB
ΔG_p	60	dB