SIEMENS

Silicon N Channel MOSFET Tetrode — BF 995

- For input and mixer stages in FM and VHF TV tuners

5:1

Type	Marking	Ordering Code (tape and reel)	Pin Configuration 1	2	3	4	Package[1)]
BF 995	MB	Q62702-F936	S	D	G_2	G_1	SOT-143

Maximum Ratings

Parameter	Symbol	Values	Unit
Drain-source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2 peak source current	$\pm I_{G1/2SM}$	10	
Total power dissipation, T_S < 76 ˚C	P_{tot}	200	mW
Storage temperature range	T_{stg}	– 55 … + 150	˚C
Channel temperature	T_{ch}	150	

Thermal Resistance

Junction - soldering point	$R_{th\ JS}$	< 370	K/W

1) For detailed information see chapter Package Outlines.

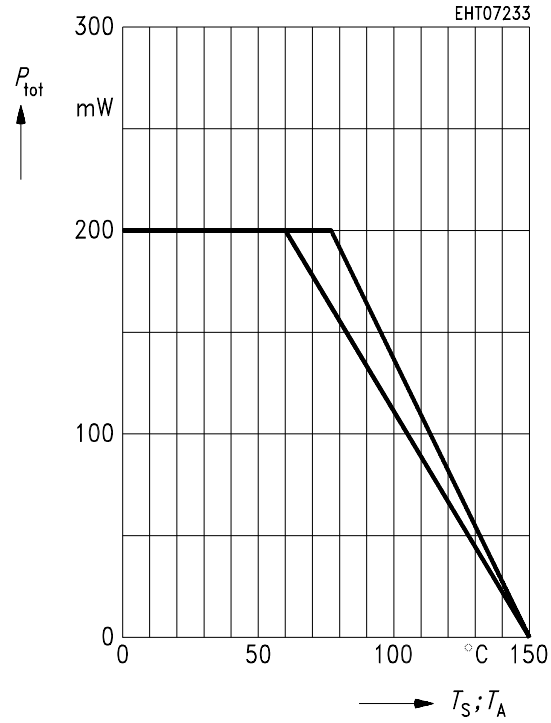
Electrical Characteristics
at T_A = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
DC Characteristics					
Drain-source breakdown voltage I_D = 10 µA, – V_{G1S} = – V_{G2S} = 4 V	$V_{(BR)\ DS}$	20	–	–	V
Gate 1 source breakdown voltage ± I_{G1S} = 10 mA, V_{G2S} = V_{DS} = 0	± $V_{(BR)\ G1SS}$	8.5	–	14	
Gate 2 source breakdown voltage ± I_{G2S} = 10 mA, V_{G1S} = V_{DS} = 0	± $V_{(BR)\ G2SS}$	8.5	–	14	
Gate 1 source leakage current ± V_{G1S} = 5 V, V_{G2S} = V_{DS} = 0	± I_{G1SS}	–	–	50	nA
Gate 2 source leakage current ± V_{G2S} = 5 V, V_{G1S} = V_{DS} = 0	± I_{G2SS}	–	–	50	
Drain current V_{DS} = 15 V, V_{G1S} = 0, V_{G2S} = 4 V	I_{DSS}	4	–	20	mA
Gate 1 source pinch-off voltage V_{DS} = 15 V, V_{G2S} = 4 V, I_D = 20 µA	– $V_{G1S\ (p)}$	–	–	2.5	V
Gate 2 source pinch-off voltage V_{DS} = 15 V, V_{G1S} = 0, I_D = 20 µA	– $V_{G2S\ (p)}$	–	–	2.0	

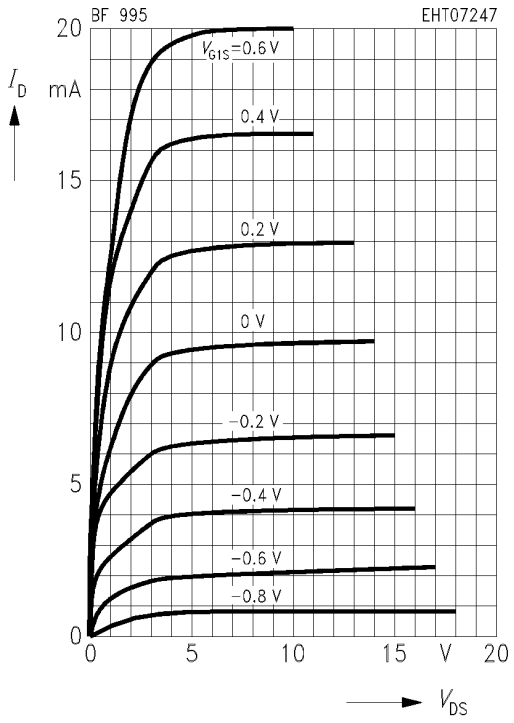
Electrical Characteristics
at T_A = 25 °C, unless otherwise specified.

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
AC Characteristics					
Forward transconductance V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 kHz	g_{fs}	12	17	–	mS
Gate 1 input capacitance V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz	C_{g1ss}	–	3.6	–	pF
Gate 2 input capacitance V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz	C_{g2ss}	–	1.6	–	
Feedback capacitance V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz	C_{dg1}	–	25	–	fF
Output capacitance V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz	C_{dss}	–	1.6	–	pF
Power gain V_{DS} = 15 V, I_D = 10 mA f = 200 MHz, G_G = 2 mS, G_L = 0.5 mS 2 Δf = 12 MHz (see test circuit 1)	G_{ps}	–	23	–	dB
Noise figure V_{DS} = 15 V, I_D = 10 mA f = 200 MHz, G_G = 2 mS, G_L = 0.5 mS (see test circuit 1)	F	–	1.1	–	
Gain control range V_{DS} = 15 V, V_{G2S} = 4 … – 2 V, f = 200 MHz (see test circuit 1)	ΔG_{ps}	–	50	–	
Mixer gain (additive) V_{DS} = 15 V, V_{G2S} = 6 V, R_S = 220 Ω f = 200 MHz, f_{IF} = 36 MHz 2 Δf_{IF} = 5 MHz, V_{osc} = 0.5 V (see test circuit 2)	G_{psc}	–	16	–	
Mixer gain (multiplicative) V_{DS} = 15 V, V_{G1S} = 1.7 V, V_{G2S} = 2.5 V R_S = 220 Ω, f = 200 MHz, f_{IF} = 36 MHz 2 Δf_{IF} = 5 MHz, V_{osc} = 2 V (see test circuit 3)	G_{psc}	–	18	–	

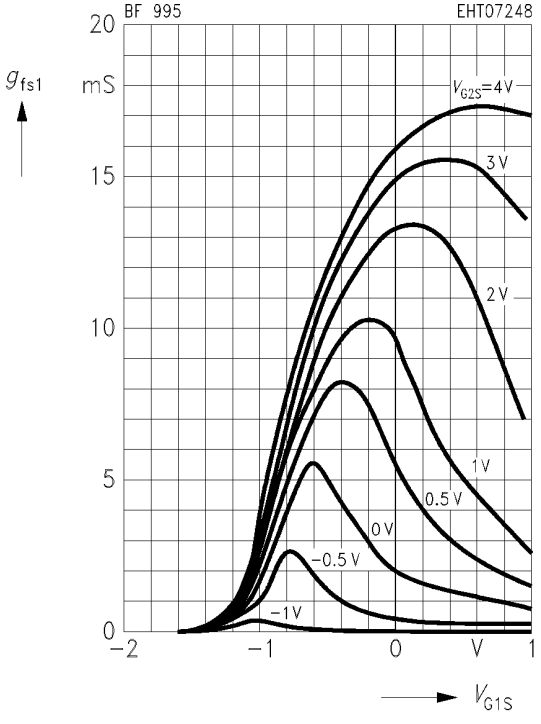
Total power dissipation $P_{tot} = f(T_A)$



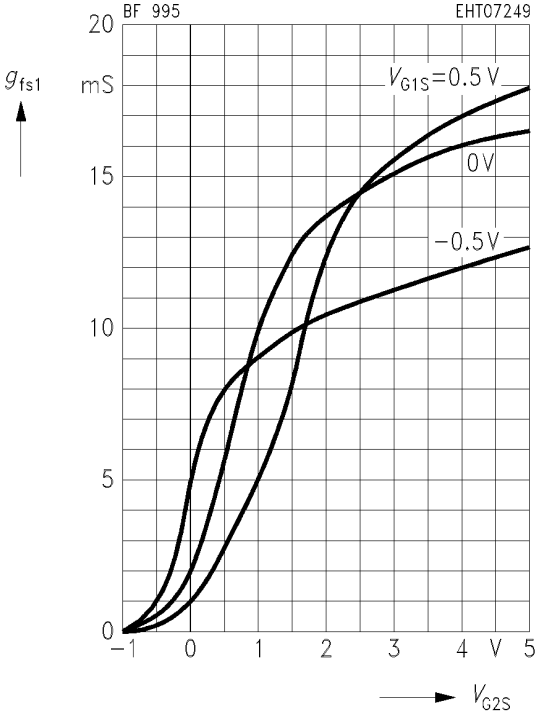
Output characteristics $I_D = f(V_{DS})$
V_{G2S} = 4 V



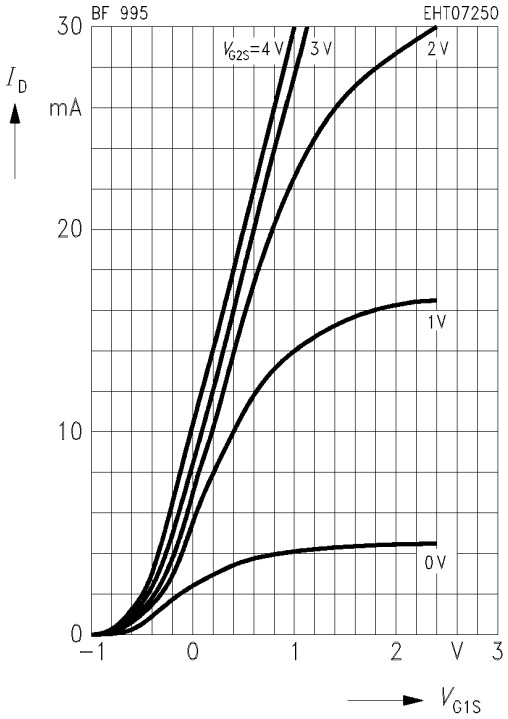
Gate 1 forward transconductance $g_{fs1} = f(V_{G1S})$
V_{DS} = 15 V, I_{DSS} = 10 mA, f = 1 kHz



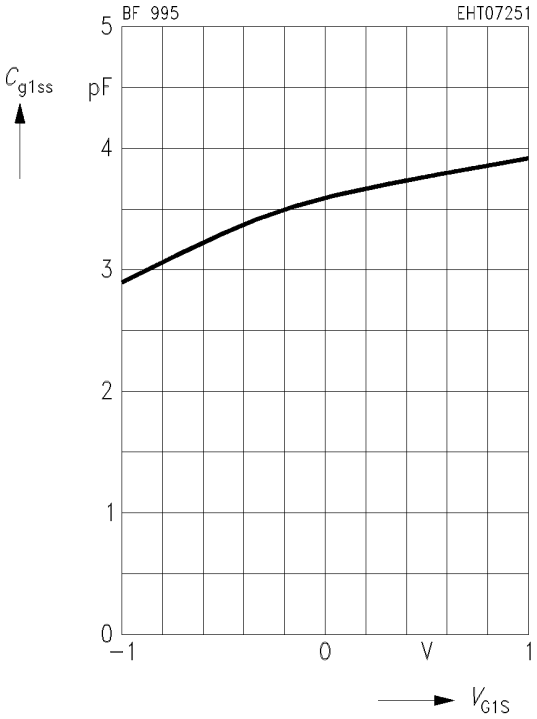
Gate 1 forward transconductance $g_{fs1} = f(V_{G2S})$
V_{DS} = 15 V, I_{DSS} = 10 mA, f = 1 kHz



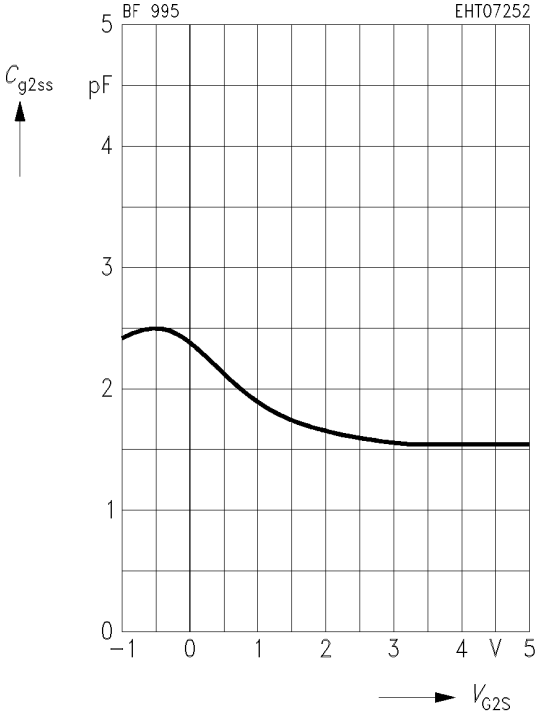
Drain current $I_D = f(V_{G1S})$
V_{DS} = 15 V



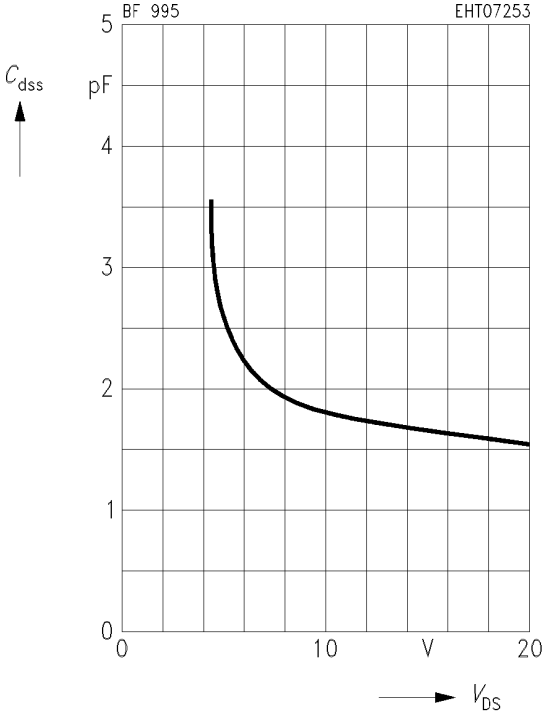
Gate 1 input capacitance $C_{g1ss} = f(V_{G1S})$
V_{G2S} = 4 V, V_{DS} = 15 V
I_{DSS} = 10 mA, f = 1 MHz



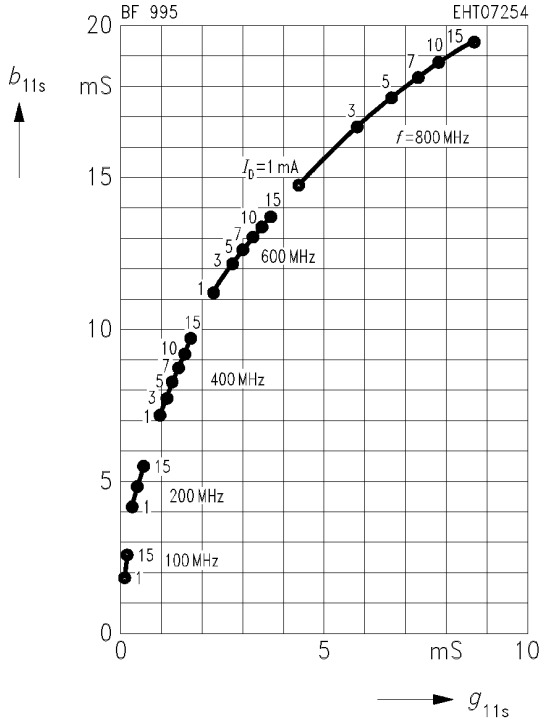
Gate 2 input capacitance $C_{g2ss} = f(V_{G2S})$
V_{G1S} = 0 V, V_{DS} = 15 V
I_{DSS} = 10 mA, f = 1 MHz



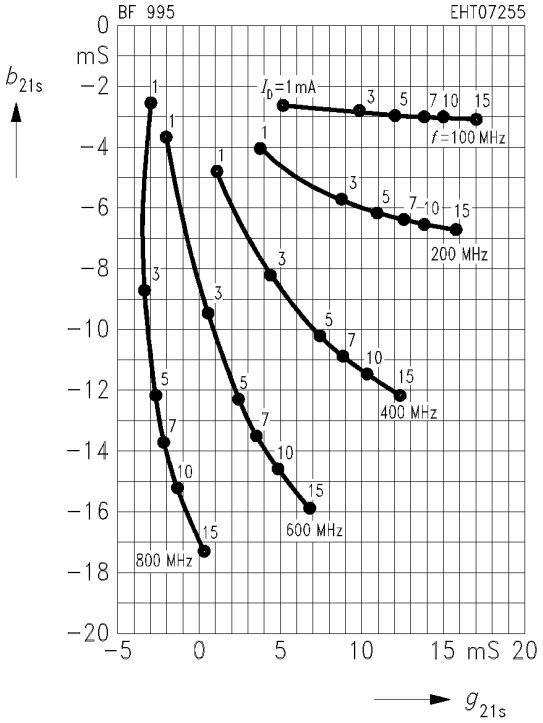
Output capacitance $C_{dss} = f(V_{DS})$
V_{G1S} = 0 V, V_{G2S} = 4 V
I_{DSS} = 10 mA, f = 1 MHz



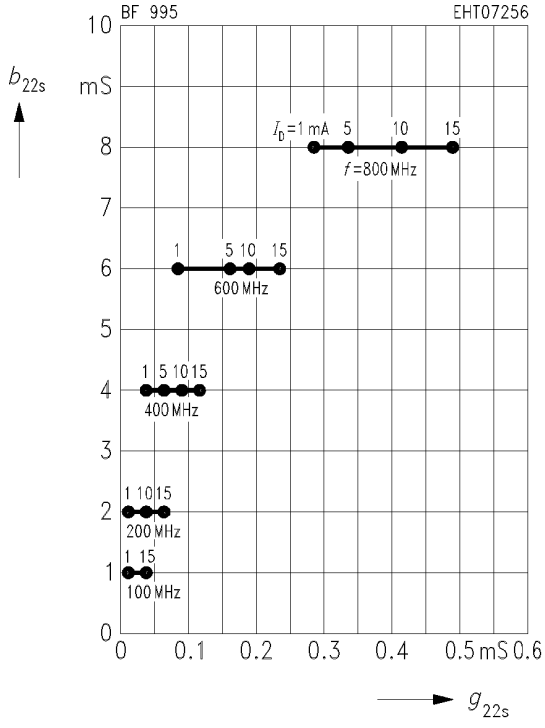
Gate 1 input admittance y_{11s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



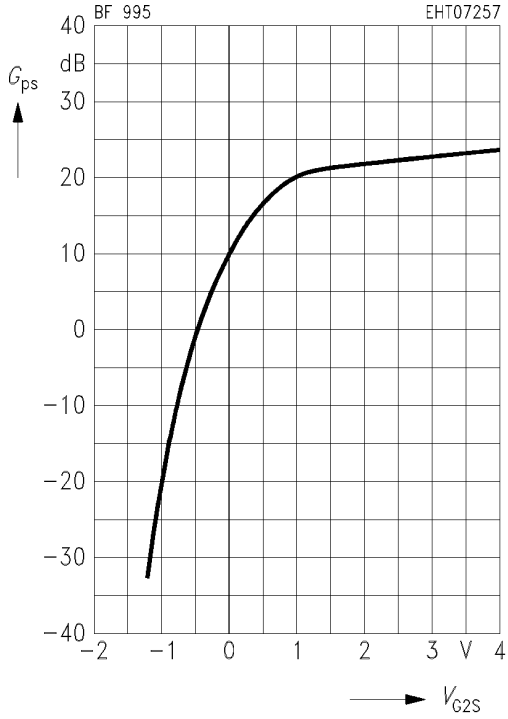
Gate 1 forward transfer admittance y_{21s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



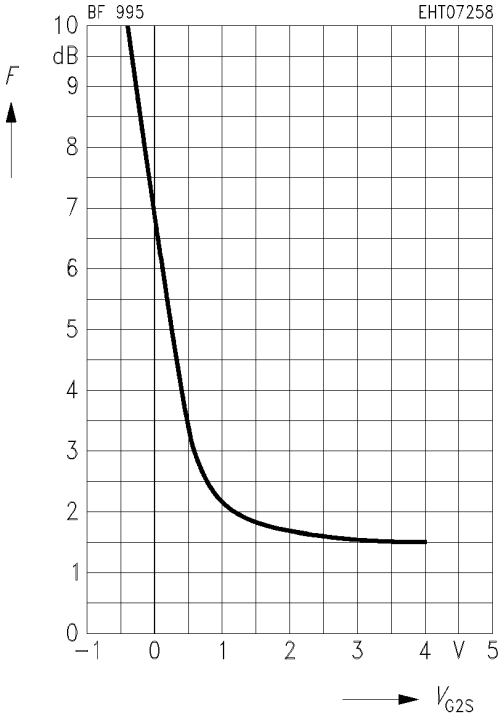
Output admittance y_{22s}
V_{DS} = 15 V, V_{G2S} = 4 V
(common source)



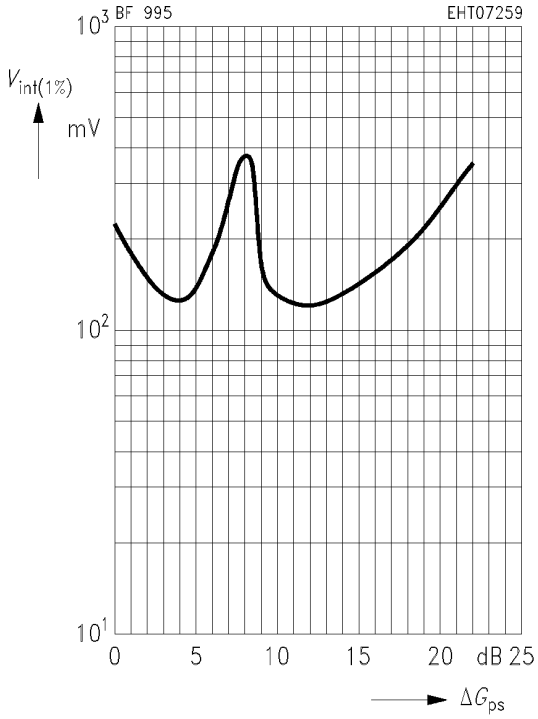
Power gain $G_{ps} = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f= 200 MHz (see test circuit 1)



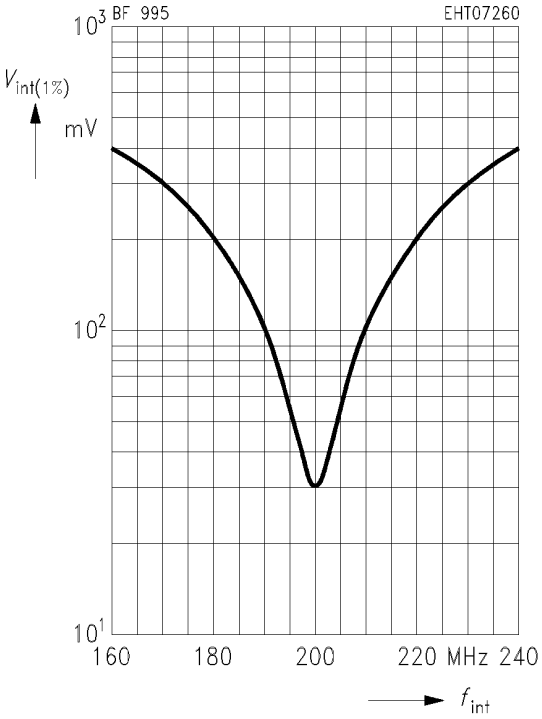
Noise figure $F = f(V_{G2S})$
V_{DS} = 15 V, V_{G1S} = 0 V, I_{DSS} = 10 mA
f= 200 MHz (see test circuit 1)



Interference voltage for 1% cross modulation $V_{int\,(1\%)} = f(\Delta G_{ps})$[1)]
V_{DS} = 15 V, V_{G1S} = 0, f = 200 MHz
f_{int} = 221 MHz (see test circuit 1)

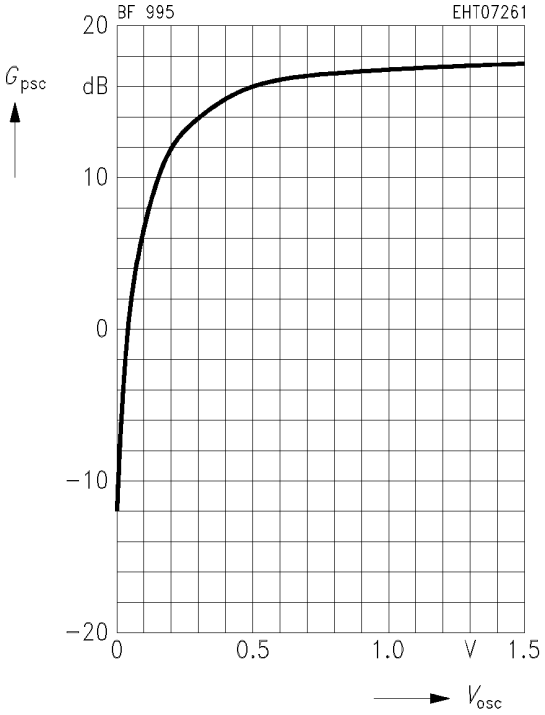


Interference voltage for 1% cross modulation $V_{int\,(1\%)} = f(f_{int})$[1)]
V_{DS} = 15 V, V_{G2S} = 4 V, V_{G1S} = 0
f= 200 MHz (see test circuit 1)

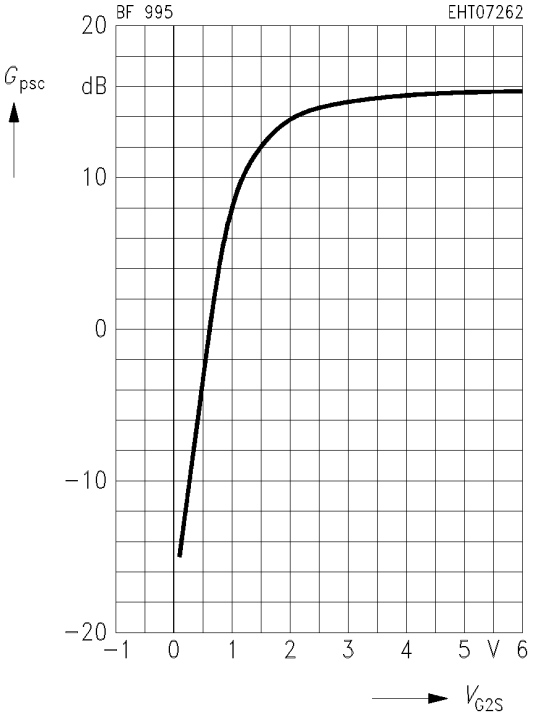


1) For footnote refer to the last page of this data sheet.

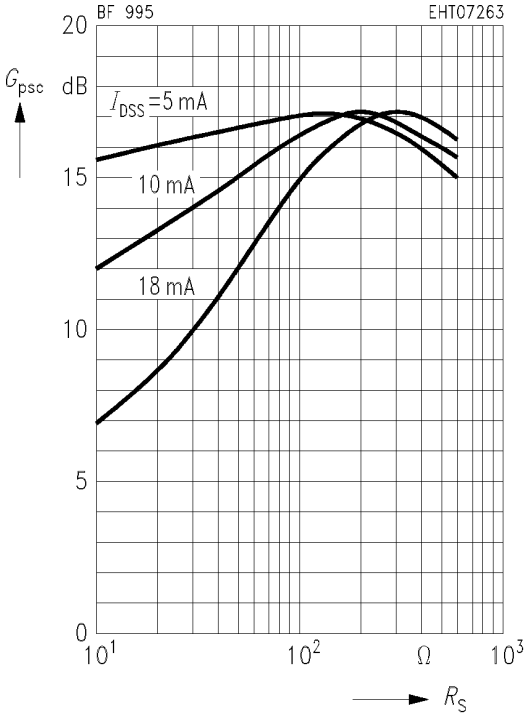
Mixer gain (additive) $G_{psc} = f(V_{osc})$
V_D = 15 V, V_{G1S} = 0, V_{G2S} = 6 V
R_S = 220 Ω, I_{DSS} = 10 mA, f = 200 MHz
f_{IF} = 36 MHz (see test circuit 2)



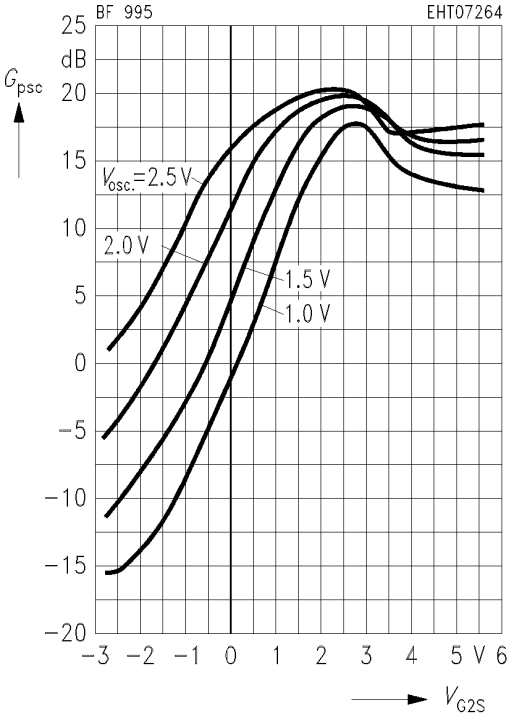
Mixer gain (additive) $G_{psc} = f(V_{G2S})$
V_D = 15 V, V_{G1S} = 0, R_S = 220 Ω
V_{osc} = 0.5 V, I_{DSS} = 10 mA, f = 200 MHz
f_{IF} = 36 MHz (see test circuit 2)



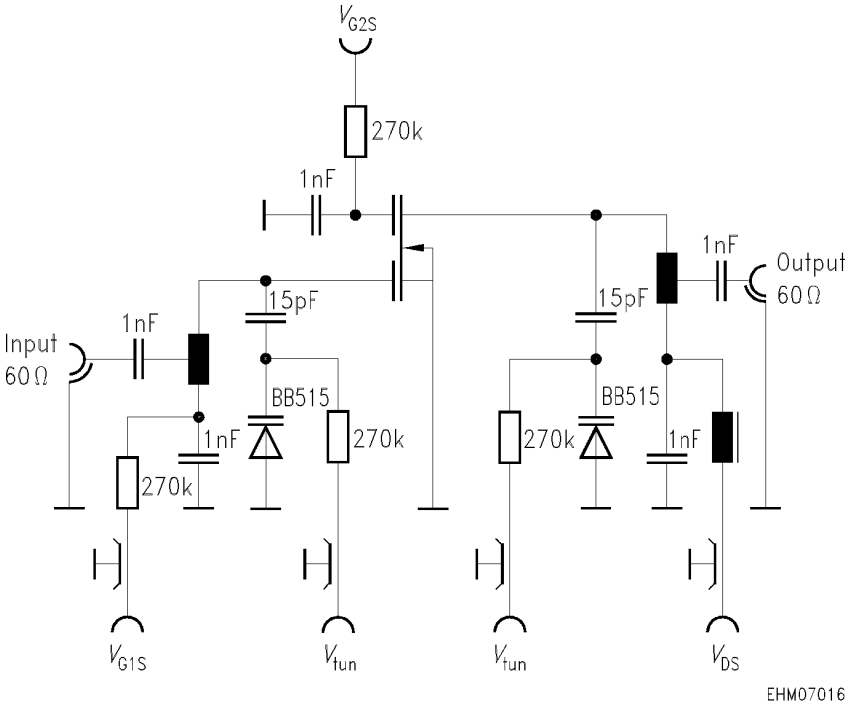
Mixer gain (additive) $G_{psc} = f(R_S)$
V_D = 15 V, V_{G1S} = 0, V_{G2S} = 6 V
V_{osc} = 0.5 V, f = 200 MHz
f_{IF} = 36 MHz (see test circuit 2)



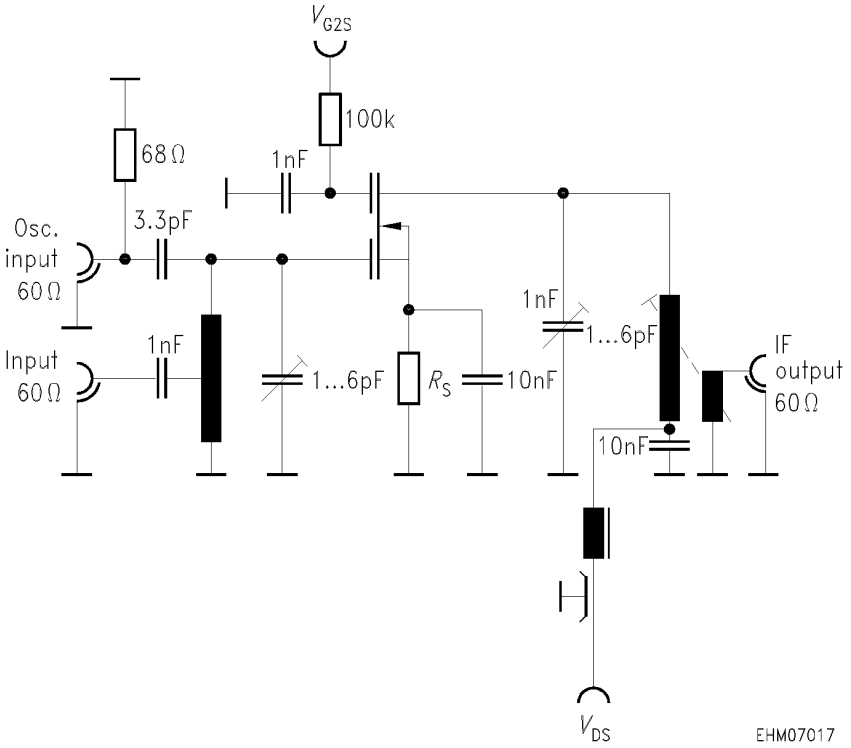
Mixer gain (multiplicative) $G_{psc} = f(V_{G2S})$
V_D = 15 V, V_{G1S} = 1.7 V, R_S = 200 Ω
I_{DSS} = 10 mA, f = 200 MHz
f_{IF} = 36 MHz (see test circuit 3)



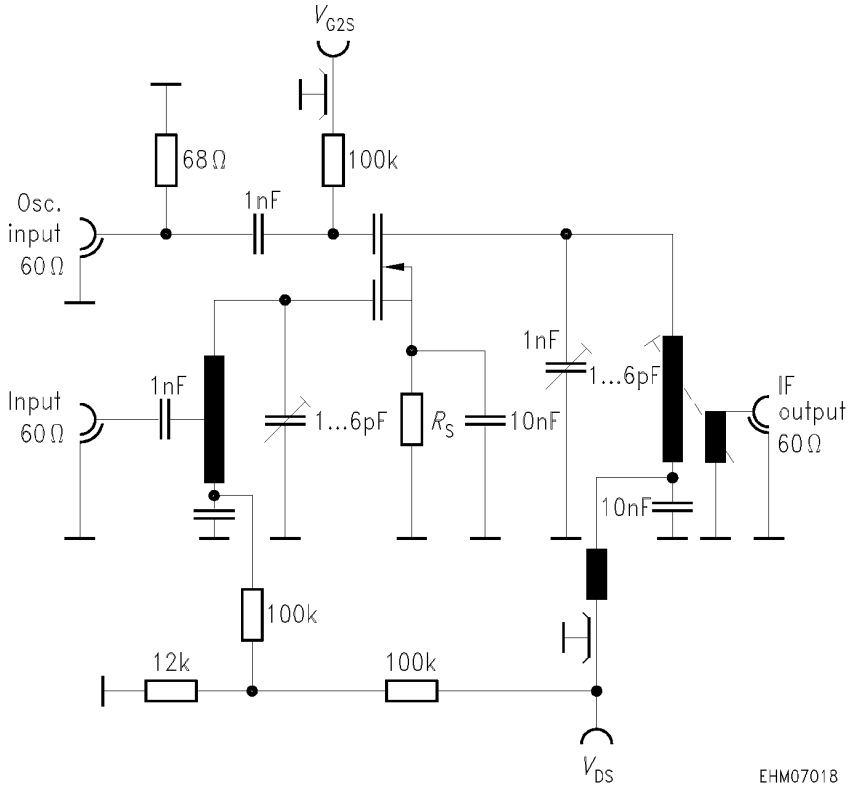
Test circuit 1 for power gain, noise figure and cross modulation
f= 200 MHz, G_G = 2 mS, G_L = 0.5 mS



Test circuit 2 for mixer gain (additive)
f= 200 MHz, f_{osc} = 236 MHz, $2\Delta f_F$ = 5 MHz



Test circuit 3 for mixer gain (multiplicative)
f= 200 MHz, f_{osc} = 236 MHz, $2\Delta f_{IF}$ = 5 MHz



1) $V_{int\ (1\%)}$ is the rms value of half the emf (terminal voltage at matching) of a 100 % sine modulated TV carrier at an internal generator resistance of 60 Ω, causing 1 % amplitude modulation on the active carrier.