S 787 T

N-channel dual gate MOS-fieldeffect tetrode. Depletion mode.

Electrostatic sensitive device.
Observe precautions for handling.

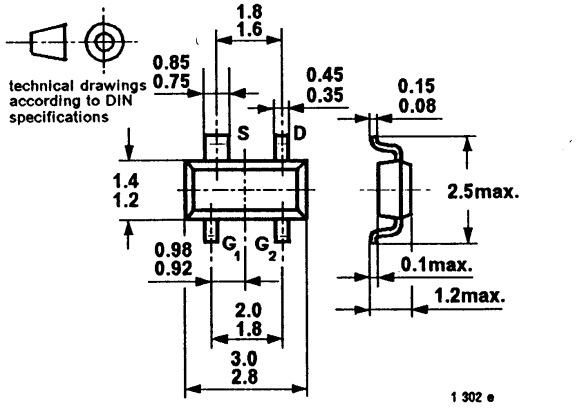
Applications

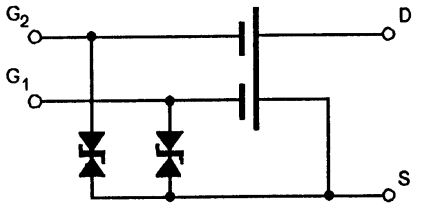
Input- and mixer stages in UHF- and VHF-tuner.

Features

- Integrated gate protection diodes
- Low noise figure
- Low feedback capacitance
- High cross modulation performance
- Low input capacitance
- High AGC-range
- High gain

Dimensions in mm





Plastic case (SOT 143 R) Marking: 787

Absolute Maximum Ratings

Parameters	Symbol	Value	Unit
Drain source voltage	V_{DS}	20	V
Drain current	I_D	30	mA
Gate 1/gate 2-source peak current	$\pm I_{G1/G2SM}$	10	mA
Gate 1/gate 2-source voltage	$\pm V_{G1S/G2S}$	7	V
Total power dissipation $T_{amb} \leq 60°C$	P_{tot}	200	mW
Channel temperature	T_{Ch}	150	°C
Storage temperature range	T_{stg}	–65 to +150	°C

Maximum Thermal Resistance

Parameters	Symbol	Maximum	Unit
Channel ambient on glass fibre printed board (25 x 20 x 1.5) mm^3 plated with 35 µm Cu	R_{thChA}	450	K/W

Electrical DC Characteristics

T_{amb} = 25°C

Parameters / Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
Drain-source breakdown voltage I_D = 10 µA, $-V_{G1S} = -V_{G2S}$ = 4 V		$V_{(BR)DS}$	20			V
Gate 1-source breakdown voltage $\pm I_{G1S}$ = 10 mA, $V_{G2S} = V_{DS}$ = 0 V		$\pm V_{(BR)G1SS}$	8		14	V
Gate 2-source breakdown voltage $\pm I_{G2S}$ = 10 mA, $V_{G1S} = V_{DS}$ = 0 V		$\pm V_{(BR)G2SS}$	8		14	V
Gate 1-source cut-off current $\pm V_{G1S}$ = 5 V, $V_{G2S} = V_{DS}$ = 0 V		I_{G1SS}			50	nA
Gate 2-source cut–off current $\pm V_{G2S}$ = 5 V, $V_{G1S} = V_{DS}$ = 0 V		I_{G2SS}			50	nA
Drain current V_{DS} = 10 V, V_{G1S} = 0 V, V_{G2S} = 4 V	S 787 T S 787 TA S 787 TB	I_{DSS} I_{DSS} I_{DSS}	0.5 0.5 3		8 5 8	mA mA mA
Gate 1-source cut-off voltage V_{DS} = 10 V, V_{G2S} = 4 V, I_D = 10 µA		$-V_{G1S(OFF)}$			2.0	V
Gate 2-source cut-off voltage V_{DS} = 10 V, V_{G1S} = 4 V, I_D = 10 µA		$-V_{G2S(OFF)}$			0.7	V

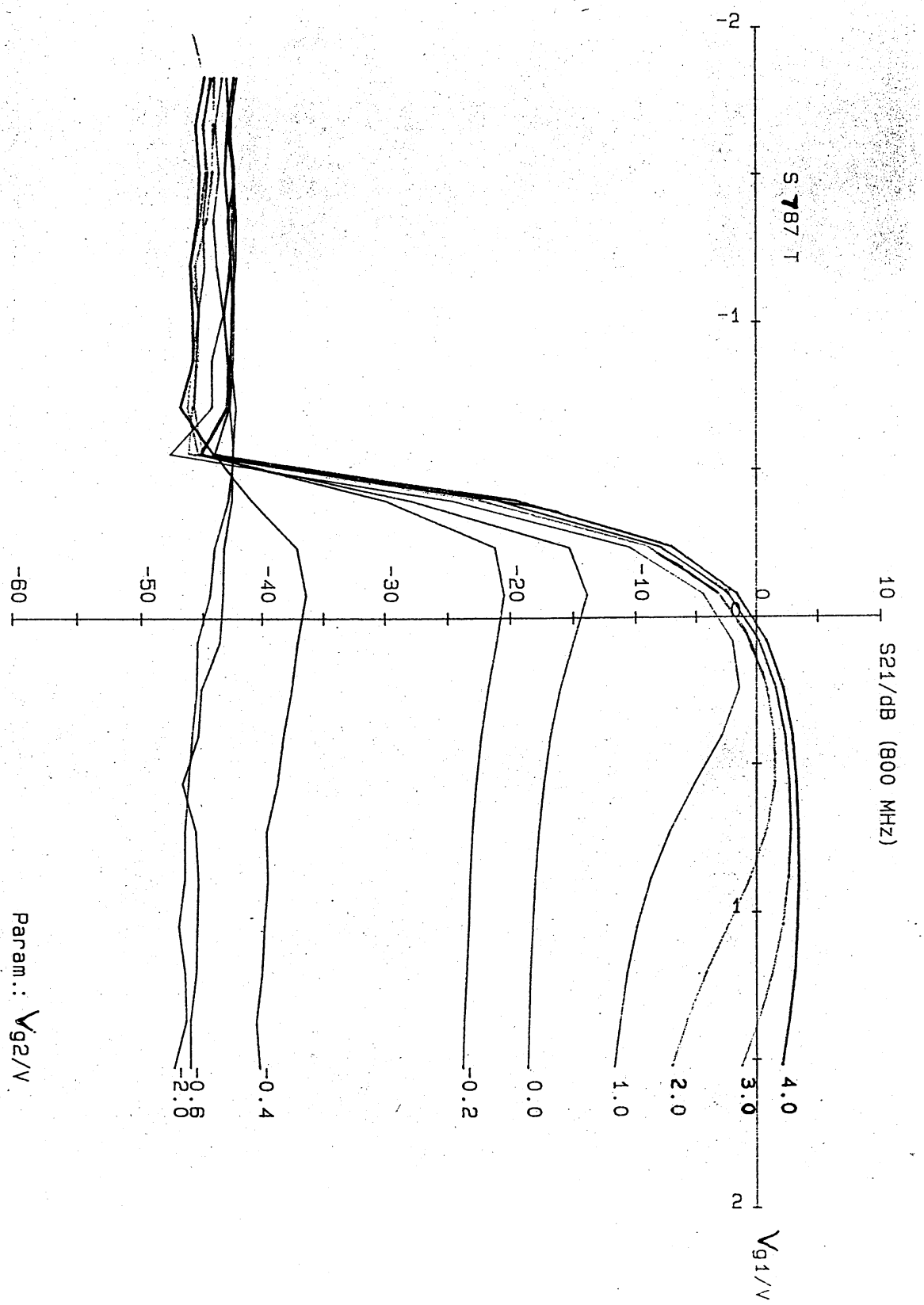
Electrical AC Characteristics

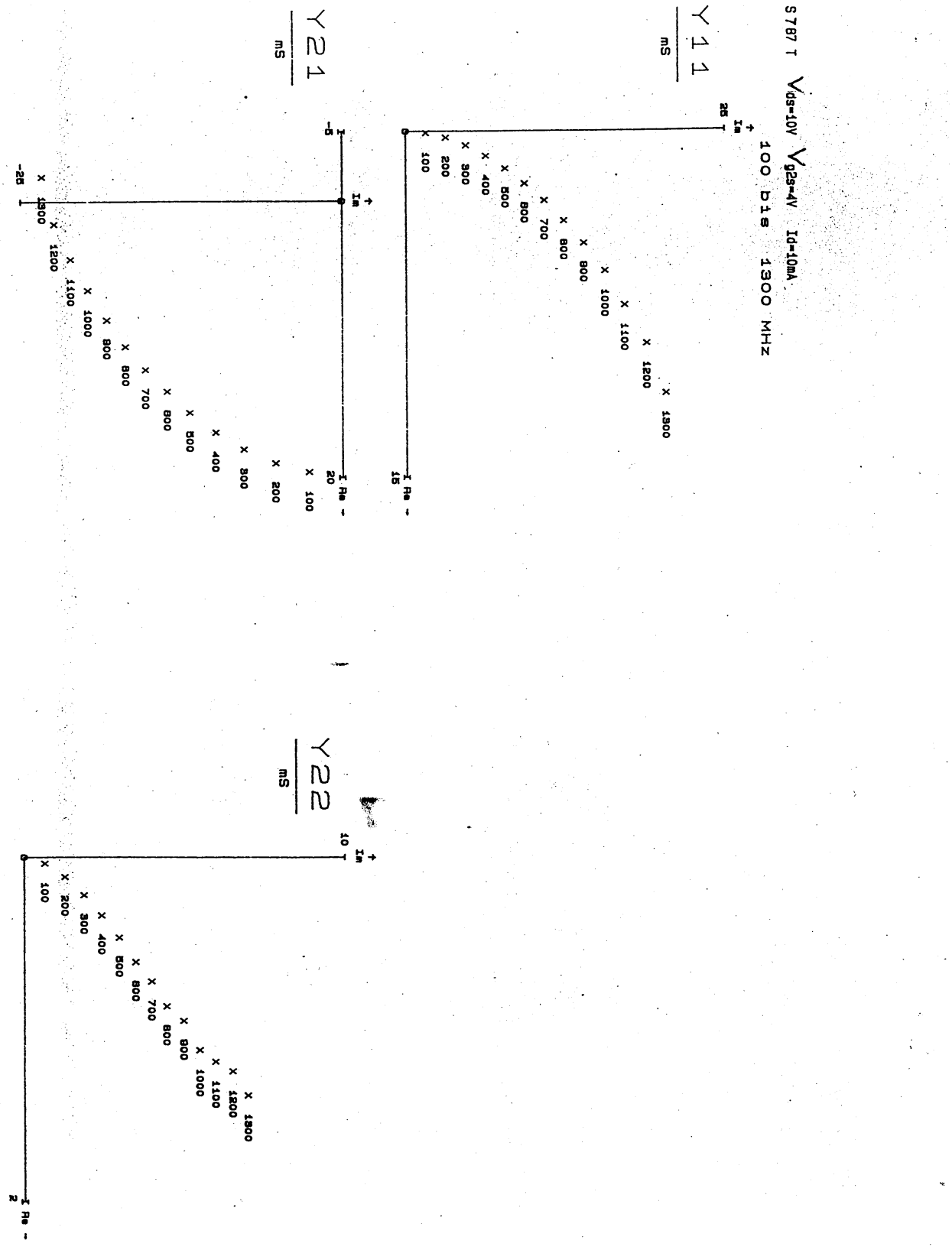
V_{DS} = 10 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz, T_{amb} = 25°C

Parameters / Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
Forward transadmittance		$\lvert y_{21s} \rvert$	18	22		mS
Gate 1 input capacitance		C_{issg1}		2.4	3.3	pF
Gate 2 input capacitance V_{G1S} = 0 V, V_{G2S} = 4 V		C_{issg2}		1.1		pF
Feedback capacitance		C_{rss}		25	35	fF
Output capacitance		C_{oss}		0.9	1.3	pF
Power gain g_G = 3.3 mS, g_L = 1 mS, f = 800 MHz		G_{ps}		19		dB
AGC range V_{G2S} = 4 to –2 V, f = 800 MHz		ΔG_{ps}	40			dB
Noise figure g_G = 3.3 mS, g_L = 1 mS, f = 800 MHz		F		2.0		dB

Caution for Gate 1 switch off mode

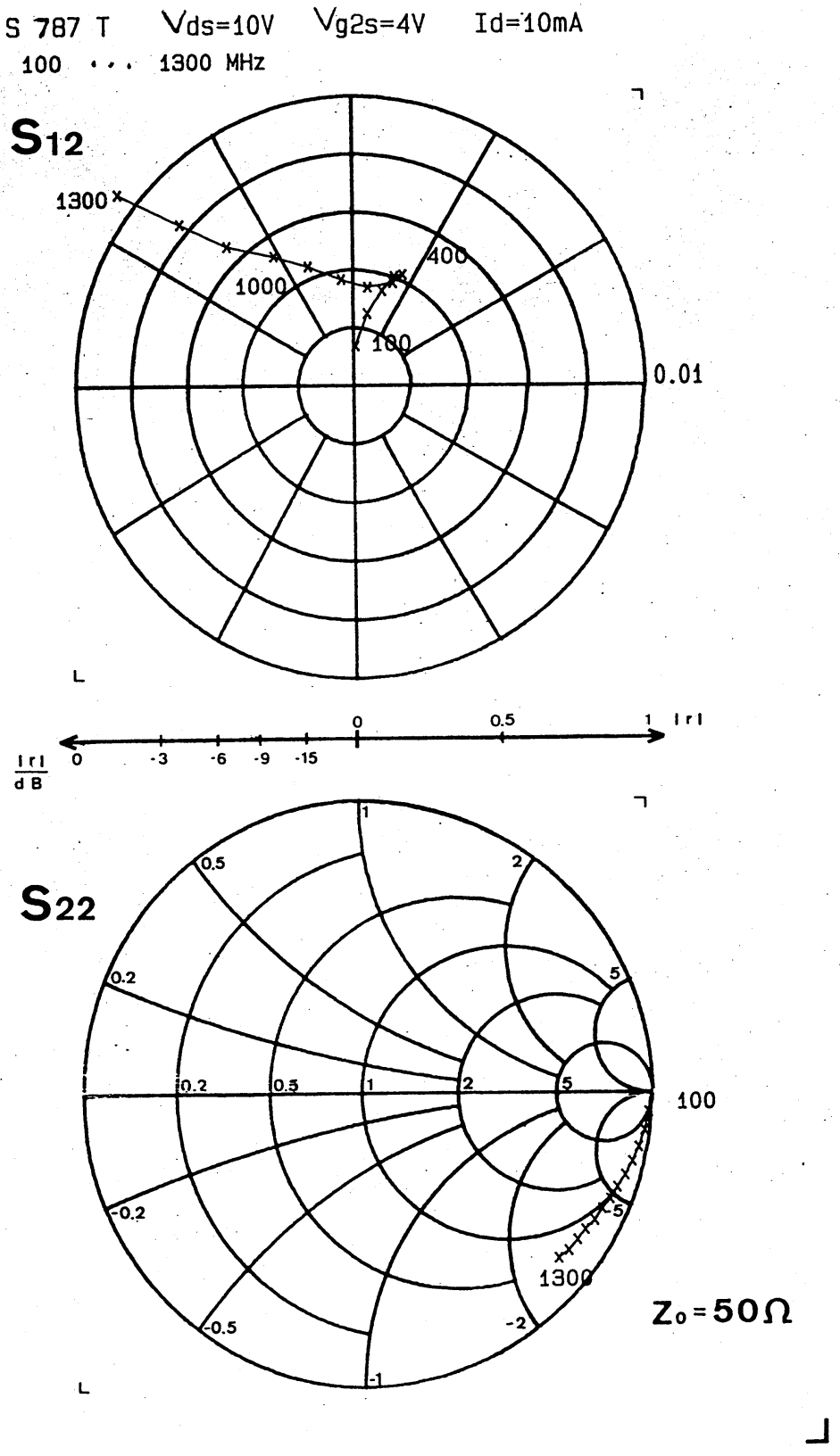
No external DC-voltage on Gate 1!
Switch off at Gate 1 only with connection to ground.
At using open collector switching transistor (PLL), use 10 kΩ collector resistor.

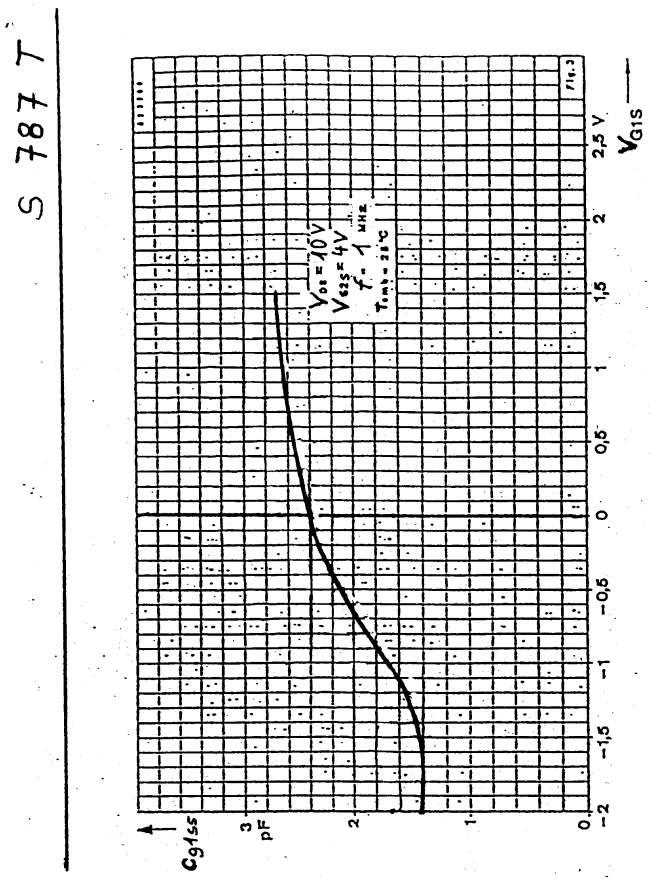

S 787 T
S21/dB (800 MHz)
Vg1/V
Param.: Vg2/V
-60
-50
-40
-30
-20
-10
0
10
-2
-1
0
1
2
-0.6
-2.0
-0.4
-0.2
0.0
1.0
2.0
3.0
4.0


S787 T Vds=10V Vg2s=4V Id=10mA
100 bis 1300 MHz
Y11
mS
Y21
mS
Y22
mS
Im
Re

Common emitter S-parameters
V_{g2s} = 4 V

V_{DS}/V	I_D/mA	f/MHz	S_{11}		S_{21}		S_{12}		S_{22}	
			$\|S_{11}\|$	$\angle\phi$	$\|S_{21}\|$	$\angle\phi$	$\|S_{12}\|$	$\angle\phi$	$\|S_{22}\|$	$\angle\phi$
			dB	grd	dB	grd	dB	grd	dB	grd
10	10	100	–0.06	–9.4	5.84	166.0	–57.33	82.8	–0.03	–3.8
		200	–0.24	–18.4	5.56	152.1	–51.97	76.3	–0.11	–7.4
		300	–0.52	–27.1	5.17	138.5	–49.32	70.9	–0.21	–10.9
		400	–0.87	–35.6	4.72	125.8	–47.92	67.5	–0.31	–13.9
		500	–1.25	–43.3	4.22	113.9	–47.54	64.1	–0.43	–17.0
		600	–1.65	–50.8	3.69	102.9	–48.39	66.9	–0.54	–19.9
		700	–2.03	–58.1	3.25	92.3	–49.34	79.6	–0.62	–22.7
		800	–2.44	–65.1	2.82	82.3	–48.79	95.1	–0.74	–25.3
		900	–2.82	–72.1	2.40	72.3	–47.28	110.3	–0.80	–28.2
		1000	–3.23	–79.2	1.98	62.4	–45.72	121.8	–0.92	–31.0
		1100	–3.69	–86.0	1.61	53.4	–43.77	132.8	–0.97	–33.7
		1200	–4.08	–93.3	1.29	44.1	–41.74	137.7	–1.00	–36.7
		1300	–4.55	–100.5	0.89	34.3	–39.56	141.6	–1.11	–39.4


S 787 T Vds=10V Vg2s=4V Id=10mA
100 • • • 1300 MHz
S12
1300
1000
400
100
0.01
0
0.5
1
|r|
|r|
dB
0
-3
-6
-9
-15
S22
1
0.5
2
0.2
5
0.2
0.5
1
2
5
100
-0.2
-5
1300
-0.5
-2
-1
Z0 = 50Ω


S 787 T
Fig.3
V_{DS} = 10 V
V_{GSS} = 4 V
f = 1 MHz
T_{amb} = 25 °C
C_{g1ss}
pF
V_{G1S}

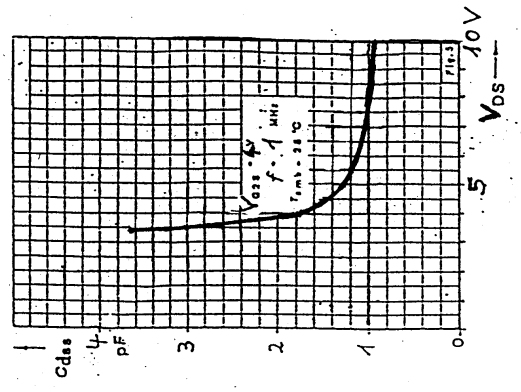
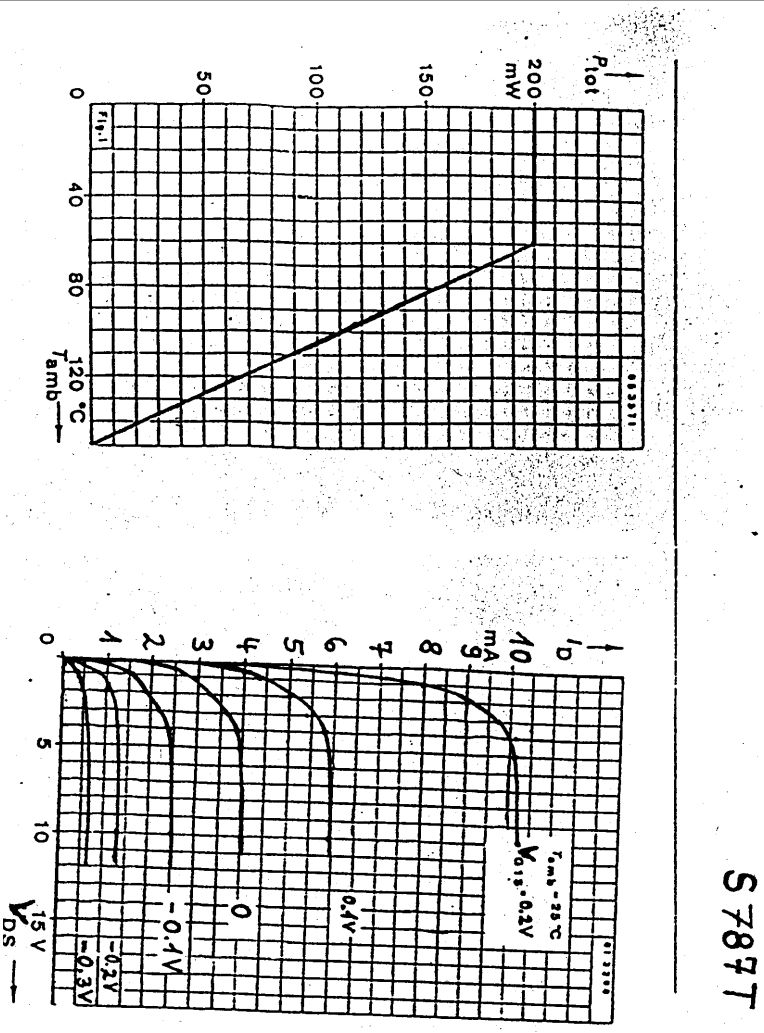


Fig.3
V_{DS} = 10 V
V_{GSS} = 4 V
f = 1 MHz
T_{amb} = 25 °C
C_{dss}
pF


P_tot
mW
200
150
100
50
0
T_amb
°C
120
80
40
0
i_D
mA
10
9
8
7
6
5
4
3
2
1
0
5
10
V_DS
15 V
0
-0.1V
-0.2V
-0.3V
0.4V
V_GS=-0.2V
T_amb=25°C

S 787 T

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