

N-Channel Dual Gate MOS-Fieldeffect Tetrode, Depletion Mode

Electrostatic sensitive device.
Observe precautions for handling.

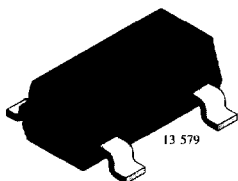
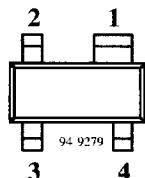


Applications

Input and mixer stages especially for VHF TV-tuners.

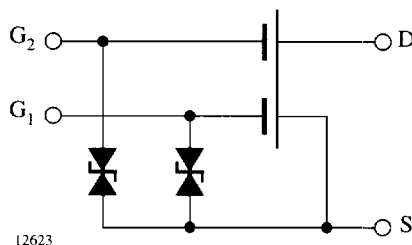
Features

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



BF994S Marking: MG
Plastic case (SOT 143)

1 = Source; 2 = Drain; 3 = Gate 2; 4 = Gate 1



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	$\pm I_{G1/2SM}$	10	mA
Total power dissipation $T_{amb} \leq 60^\circ\text{C}$	P_{tot}	200	mW
Channel temperature	T_{Ch}	150	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55 to +150	$^\circ\text{C}$

Maximum Thermal Resistance

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

Electrical DC Characteristics

T_{amb} = 25°C, unless otherwise specified

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 ±I _{G1S} = 10 mA, V _{G2S} = V _{DS} = 0		±V _{(BR)G1SS}	6		20	V
Gate 2-source breakdown voltage ±I _{G2S} = 10 mA, V _{G1S} = V _{DS} = 0		±V _{(BR)G2SS}			20	V
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	nA
Drain current V _{DS} = 15 V, V _{G1S} = 0, V _{G2S} = 4 V	BF 994 S BF 994 SA BF 994 SB	I _{DSS} I _{DSS} I _{DSS}	4 4 9.5		18 10.5 18	mA mA mA
Gate 1-source cut-off voltage V _{DS} = 15 V, V _{G2S} = 4 V, I _D = 20 μA		-V _{G1S(OFF)}			2.5	V
Gate 2-source cut-off voltage V _{DS} = 15 V, V _{G1S} = 0, I _D = 20 μA		-V _{G2S(OFF)}			2.0	V

Electrical AC Characteristics

V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz, T_{amb} = 25°C, unless otherwise specified

Parameters / Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
Forward transadmittance		y _{21s}	15	18.5		mS
Gate 1-input capacitance		C _{issg1}		2.5	3.0	pF
Gate 2-input capacitance V _{G1S} = 0, V _{G2S} = 4 V		C _{issg2}		1.2		pF
Feedback capacitance		C _{rss}		25	35	fF
Output capacitance		C _{oss}		1.0	1.3	pF
Power gain g _S = 2 mS, g _L = 0.5 mS, f = 200 MHz		G _{ps}		25		dB
AGC range V _{G2S} = 4...-2 V, f = 200 MHz		ΔG _{ps}		50		dB
Noise figure g _S = 2 mS, g _L = 0.5 mS, f = 200 MHz		F		1.0		dB

Common Source S-Parameters

$V_{G2S} = 4 \text{ V}$, $Z_0 = 50 \Omega$

V_{DS}/V	I_D/mA	f/MHz	S_{11}		S_{21}		S_{12}		S_{22}	
			LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG	LIN MAG	ANG
				deg		deg		deg		deg
15	5	50	1.00	-4.4	1.48	172.6	0.001	85.9	0.99	-1.8
		100	0.99	-8.5	1.46	165.0	0.001	81.9	0.99	-3.4
		150	0.99	-12.6	1.44	157.0	0.002	77.7	0.99	-5.2
		200	0.98	-16.8	1.41	149.6	0.003	74.5	0.98	-6.7
		250	0.97	-20.8	1.37	141.9	0.003	71.0	0.97	-8.4
		300	0.95	-24.6	1.35	135.2	0.004	67.9	0.97	-9.6
		350	0.94	-28.6	1.30	128.2	0.004	65.4	0.96	-11.1
		400	0.92	-32.0	1.27	121.7	0.004	63.0	0.95	-12.5
		450	0.91	-35.7	1.23	115.3	0.005	60.6	0.94	-13.8
		500	0.89	-39.1	1.19	108.9	0.005	58.1	0.93	-15.1
		550	0.88	-42.5	1.16	102.9	0.005	57.9	0.93	-16.4
		600	0.86	-46.0	1.12	96.6	0.005	57.7	0.91	-17.6
	650	0.85	-49.3	1.09	91.2	0.005	57.7	0.91	-18.7	
	700	0.84	-52.5	1.06	85.2	0.004	59.4	0.90	-19.9	
	10	50	1.00	-4.5	1.85	172.8	0.001	86.3	0.99	-1.8
		100	1.00	-8.9	1.82	165.3	0.002	81.7	0.99	-3.4
		150	0.99	-13.3	1.80	157.5	0.002	77.6	0.98	-5.3
		200	0.98	-17.8	1.76	150.5	0.003	74.1	0.98	-6.7
		250	0.96	-22.0	1.71	143.2	0.004	70.4	0.97	-8.6
		300	0.95	-26.0	1.67	136.5	0.004	67.3	0.96	-9.7
		350	0.94	-30.1	1.63	129.9	0.004	64.5	0.95	-11.4
		400	0.92	-33.8	1.58	123.5	0.005	61.9	0.95	-12.6
		450	0.90	-37.7	1.53	117.5	0.005	59.5	0.94	-14.1
		500	0.89	-41.2	1.49	11.2	0.005	56.7	0.93	-15.4
		550	0.87	-44.9	1.44	105.5	0.005	56.6	0.92	-16.6
		600	0.85	-48.4	1.40	99.4	0.005	56.1	0.91	-17.8
	650	0.84	-51.8	1.36	95.5	0.005	55.8	0.90	-18.9	
	700	0.82	-55.1	1.32	88.8	0.005	57.3	0.89	-20.2	
15	50	1.00	-4.9	2.04	172.8	0.001	85.8	0.99	-1.8	
	100	0.99	-9.5	2.01	165.4	0.002	81.4	0.98	-3.5	
	150	0.99	-13.9	1.98	157.6	0.002	77.2	0.98	-5.4	
	200	0.98	-18.5	1.94	150.7	0.003	73.4	0.97	-7.0	
	250	0.96	-22.8	1.89	143.3	0.004	69.7	0.96	-8.8	
	300	0.95	-26.9	1.84	136.8	0.004	66.5	0.96	-10.0	
	350	0.93	-31.2	1.79	130.1	0.005	63.6	0.95	-11.6	
	400	0.91	-35.1	1.74	124.1	0.005	60.9	0.94	-13.0	
	450	0.90	-39.2	1.68	118.0	0.005	58.2	0.93	-14.3	
	500	0.88	-42.9	1.63	111.7	0.005	55.4	0.92	-15.7	
	550	0.86	-46.6	1.59	106.3	0.005	55.6	0.91	-16.9	
	600	0.85	-50.2	1.54	100.3	0.005	55.0	0.90	-18.1	
650	0.83	-53.7	1.49	95.3	0.005	54.8	0.90	-19.3		
700	0.81	-57.2	1.45	89.7	0.005	55.5	0.89	-20.7		

Typical Characteristics ($T_j = 25^\circ\text{C}$ unless otherwise specified)

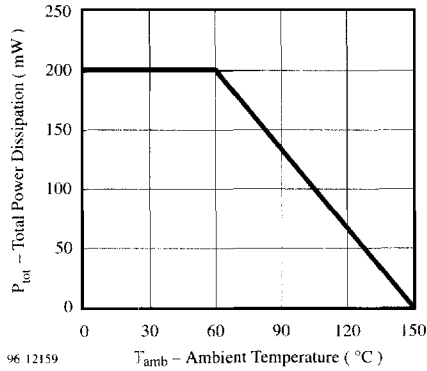


Figure 1. Total Power Dissipation vs. Ambient Temperature

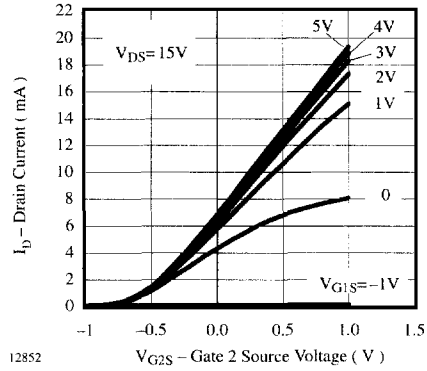


Figure 4. Drain Current vs. Gate 2 Source Voltage

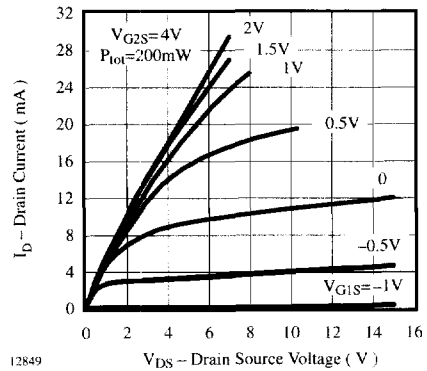


Figure 2. Drain Current vs. Drain Source Voltage

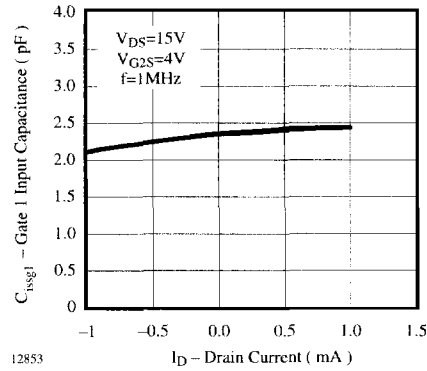


Figure 5. Gate 1 Input Capacitance vs. Drain Current

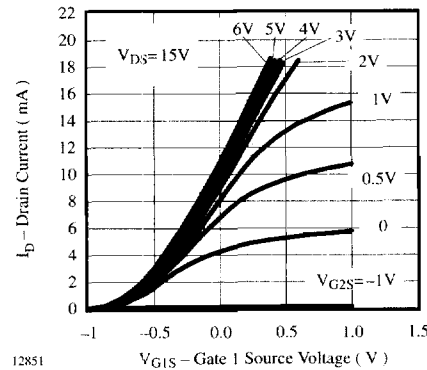


Figure 3. Drain Current vs. Gate 1 Source Voltage

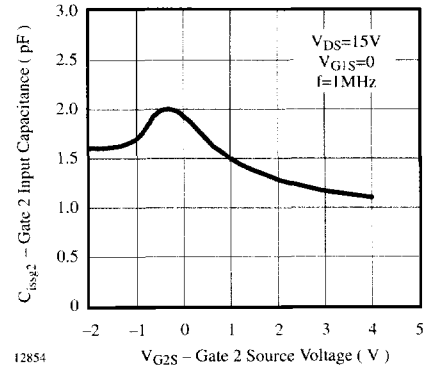


Figure 6. Gate 2 Input Capacitance vs. Gate 2 Source Voltage

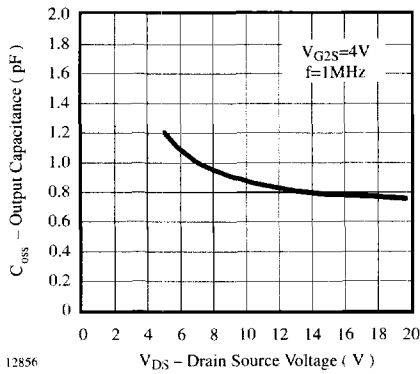


Figure 7. Output Capacitance vs. Drain Source Voltage

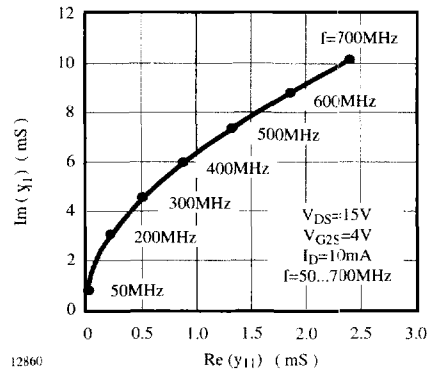


Figure 10. Short Circuit Input Admittance

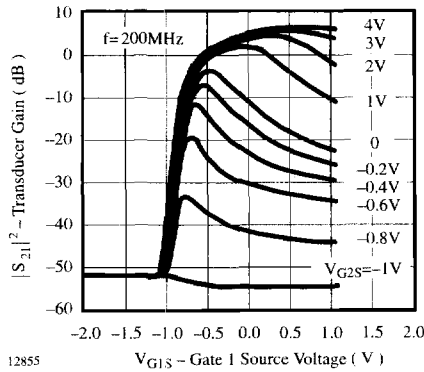


Figure 8. Transducer Gain vs. Gate 1 Source Voltage

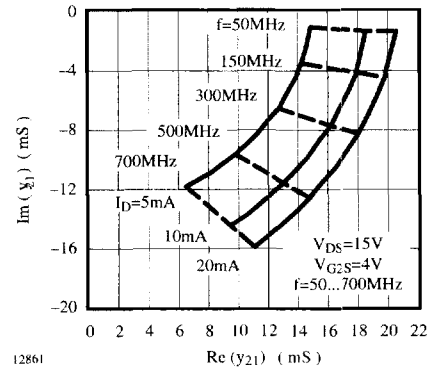


Figure 11. Short Circuit Forward Transfer Admittance

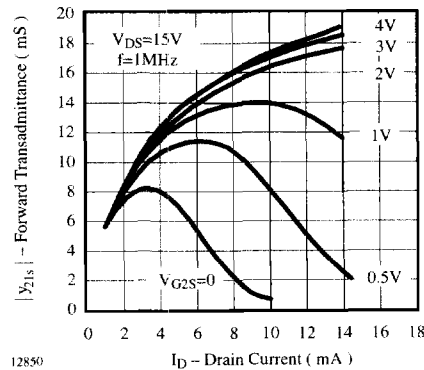


Figure 9. Forward Transadmittance vs. Drain Current

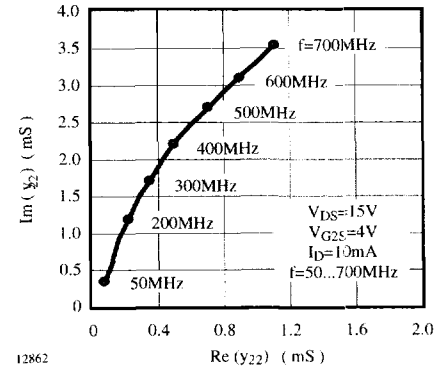


Figure 12. Short Circuit Output Admittance

$V_{DS} = 15 \text{ V}; I_D = 10 \text{ mA}; V_{G2S} = 4 \text{ V}; Z_0 = 50 \Omega$

S_{11}

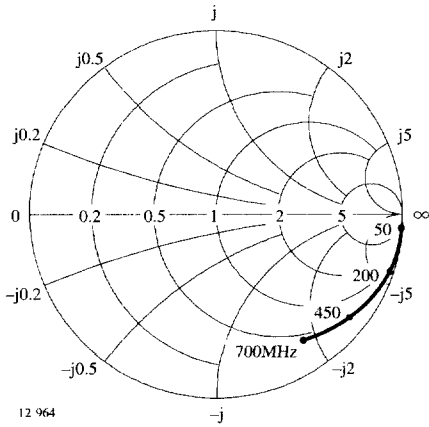


Figure 13. Input reflection coefficient

S_{12}

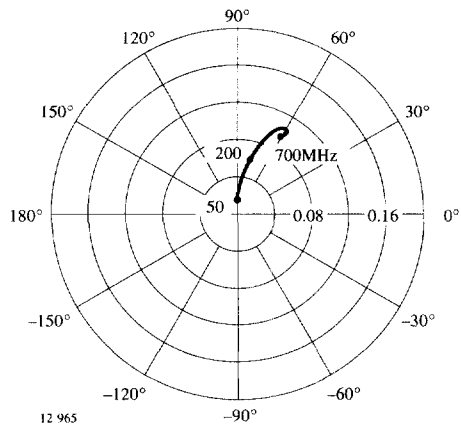


Figure 15. Reverse transmission coefficient

S_{21}

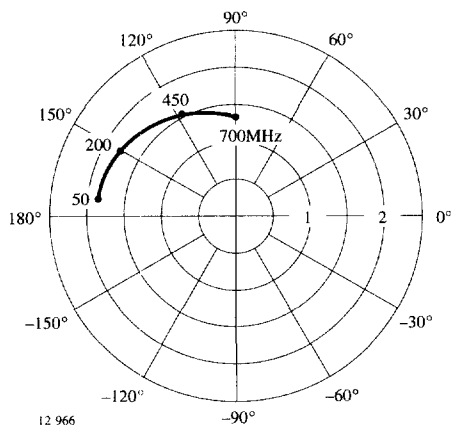


Figure 14. Forward transmission coefficient

S_{22}

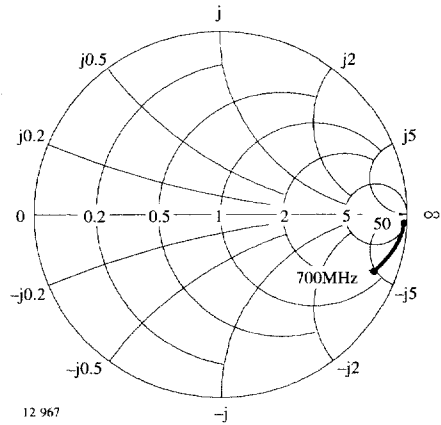
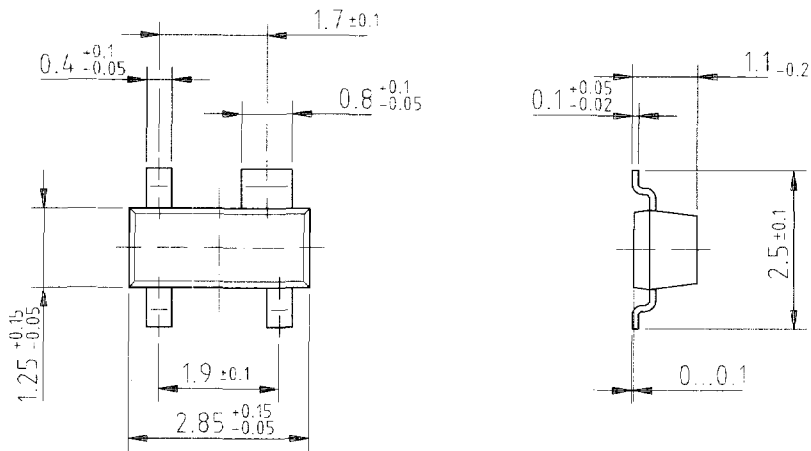
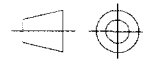


Figure 16. Output reflection coefficient

Dimensions in mm



96 12240



technica: drawings
according to DIN
specifications