BF 996 S

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

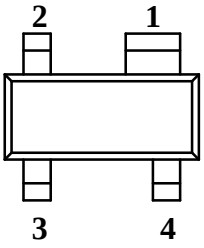
Electrostatic sensitive device.
Observe precautions for handling.

Applications

Input- and mixer stages in UHF tuner.

Features

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



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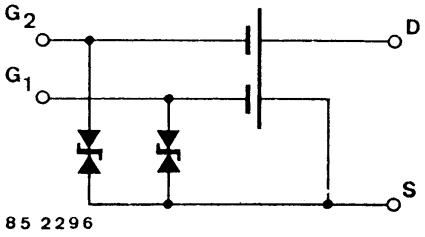
BF996S Marking: MH
Plastic case (SOT 143)
1 = Source; 2 = Drain; 3 = Gate 2; 4 = Gate 1



BF996S Marking
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	$\pm I_{G1/G2SM}$	10	mA
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	Value	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} = 15 V, V_{G1S} = 0 V, V_{G2S} = 4 V	BF 996 S BF 996 SA BF 996 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 V, 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

Parameters / Test Conditions	Type	Symbol	Min.	Typ.	Max.	Unit
Forward transadmittance		$\lvert y_{21s} \rvert$	15	18		mS
Gate 1 input capacitance		C_{issg1}		2.2	2.6	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}		10.8	1.2	pF
Power gain V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, g_G = 2 mS, g_L = 0.5 mS, f = 200 MHz g_G = 3.3 mS, g_L = 1 mS, f = 800 MHz		 G_{ps} G_{ps}		 25 18		 dB dB
AGC range V_{DS} = 15 V, V_{G2S} = 4 to –2 V, f = 800 MHz		ΔG_{ps}	40			dB
Noise figure V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, g_G = 2 mS, f = 200 MHz f = 800 MHz		 F F		 1.0 1.8		 dB dB

Common Source S-Parameters
V_{DS} = 15 V, V_{G2S} = 4 V, I_D = 5 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
100	0.99	–8.5	1.45	164.9	0.001	82.2	0.99	–3.4
200	0.98	–17.7	1.52	150.9	0.003	75.6	0.98	–7.1
300	0.95	–24.6	1.33	134.7	0.004	67.7	0.97	–9.7
400	0.92	–32.1	1.26	121.3	0.004	62.8	0.95	–12.3
500	0.89	–39.2	1.18	108.4	0.005	57.8	0.93	–15.1
600	0.86	–45.8	1.11	96.5	0.005	57.3	0.92	–17.4
700	0.83	–52.3	1.05	85.0	0.004	58.9	0.90	–19.7
800	0.80	–58.7	0.99	74.1	0.004	63.3	0.88	–22.0
900	0.78	–64.7	0.93	63.6	0.004	73.1	0.86	–24.3
1000	0.75	–70.7	0.88	53.1	0.004	83.5	0.85	–26.2
1100	0.72	–76.6	0.84	43.7	0.004	102.1	0.83	–28.4
1200	0.70	–82.5	0.80	33.6	0.004	120.4	0.82	–30.5
1300	0.68	–88.6	0.76	24.1	0.006	131.7	0.80	–32.7

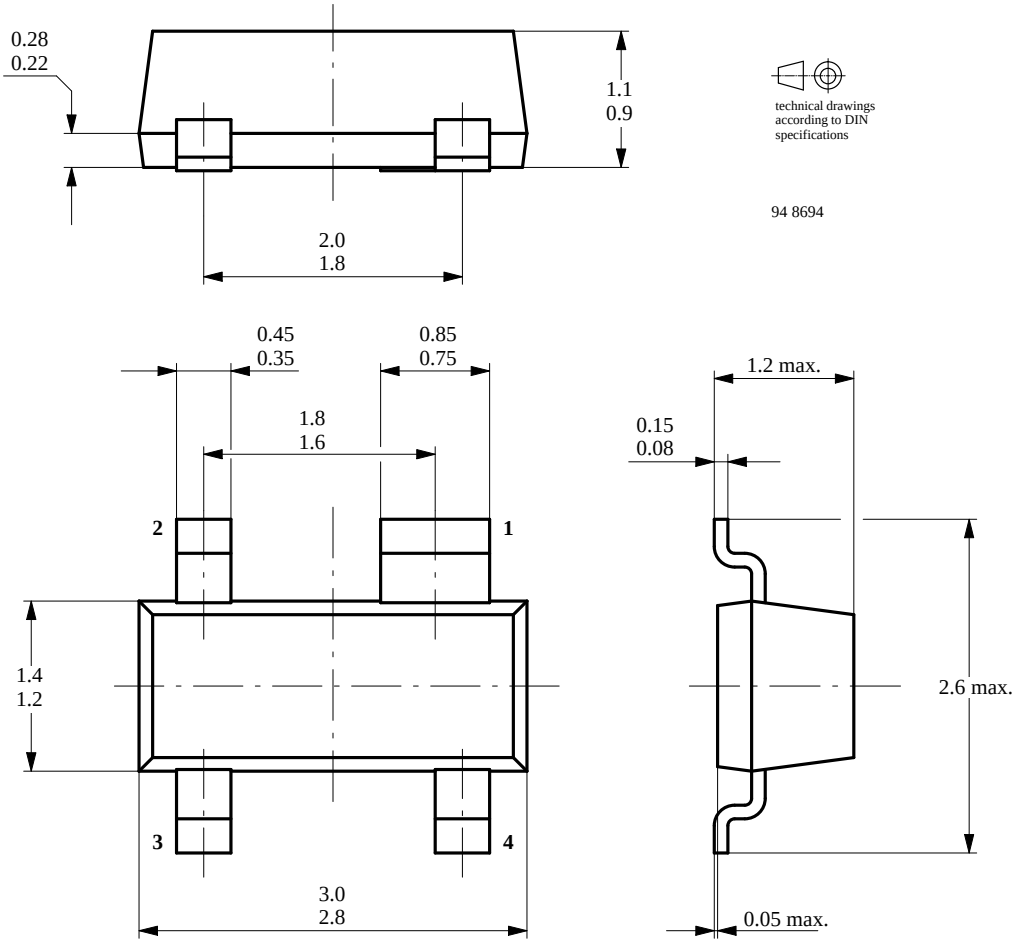
Common Source S-Parameters
V_{DS} = 15 V, V_{G2S} = 4 V, I_D = 10 mA

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
100	0.99	–9.0	1.82	165.3	0.002	81.9	0.99	–3.5
200	0.98	–18.7	1.90	151.8	0.003	75.0	0.98	–7.2
300	0.95	–26.0	1.67	136.3	0.004	67.2	0.96	–9.8
400	0.92	–33.7	1.58	123.3	0.005	61.8	0.95	–12.6
500	0.88	–41.2	1.48	110.9	0.005	56.3	0.93	–15.3
600	0.85	–48.3	1.39	99.5	0.005	55.8	0.91	–17.8
700	0.82	–55.1	1.32	88.7	0.005	56.7	0.90	–20.0
800	0.79	–61.6	1.24	78.1	0.004	60.7	0.88	–22.4
900	0.76	–67.9	1.17	67.9	0.004	69.9	0.86	–24.6
1000	0.73	–74.2	1.11	57.9	0.004	80.0	0.84	–26.6
1100	0.71	–80.2	1.06	48.7	0.004	98.9	0.83	–28.8
1200	0.68	–86.4	1.01	38.9	0.004	118.2	0.81	–31.0
1300	0.66	–92.3	0.97	29.6	0.006	130.5	0.80	–33.3

Common Source S-Parameters
V_{DS} = 15 V, V_{G2S} = 4 V, I_D = 15 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
100	0.99	–9.4	2.01	165.4	0.002	81.4	0.98	–3.6
200	0.98	–19.4	2.10	152.0	0.003	74.6	0.97	–7.3
300	0.94	–27.1	1.84	136.7	0.004	66.4	0.96	–10.0
400	0.91	–35.0	1.74	123.8	0.005	60.8	0.94	–12.9
500	0.87	–42.9	1.63	111.5	0.005	55.1	0.92	–15.7
600	0.84	–50.3	1.53	100.3	0.005	54.4	0.91	–18.0
700	0.81	–57.2	1.45	89.6	0.005	54.9	0.89	–20.4
800	0.78	–63.9	1.37	79.4	0.005	58.5	0.87	–22.7
900	0.75	–70.4	1.29	69.2	0.004	67.3	0.86	–25.0
1000	0.72	–76.8	1.22	59.4	0.004	76.7	0.84	–27.1
1100	0.69	–82.9	1.17	50.2	0.004	95.2	0.83	–29.4
1200	0.67	–89.0	1.12	40.8	0.004	115.3	0.81	–31.6
1300	0.65	–95.1	1.07	31.5	0.006	128.7	0.79	–33.9

Dimensions in mm



Ozone Depleting Substances Policy Statement

It is the policy of **TEMIC TELEFUNKEN microelectronic GmbH** to

1. Meet all present and future national and international statutory requirements.

2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

TEMIC TELEFUNKEN microelectronic GmbH semiconductor division has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively

2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA

3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

TEMIC can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

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