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

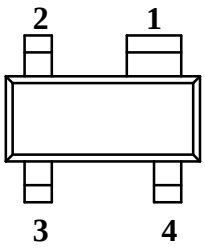
Electrostatic sensitive device.
Observe precautions for handling.

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



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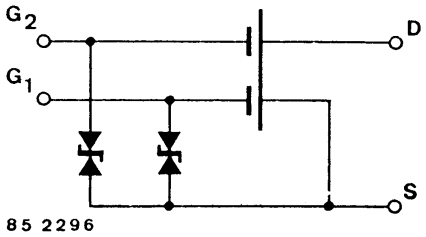


BF994S Marking: MG
Plastic case (SOT 143)
1 = Source; 2 = Drain; 3 = Gate 2; 4 = Gate 1

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 $T_{amb} \leq 60°C$	P_{tot}	200	mW
Channel temperature	T_{Ch}	150	°C
Storage temperature range	T_{stg}	–55 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 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 $\pm I_{G1S}$ = 10 mA, $V_{G2S} = V_{DS}$ = 0		$\pm V_{(BR)G1SS}$	6		20	V
Gate 2-source breakdown voltage $\pm I_{G2S}$ = 10 mA, $V_{G1S} = V_{DS}$ = 0		$\pm V_{(BR)G2SS}$			20	V
Gate 1-source leakage current $\pm V_{G1S}$ = 5 V, $V_{G2S} = V_{DS}$ = 0		$\pm I_{G1SS}$			50	nA
Gate 2-source leakage current $\pm V_{G2S}$ = 5 V, $V_{G1S} = V_{DS}$ = 0		$\pm I_{G2SS}$			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

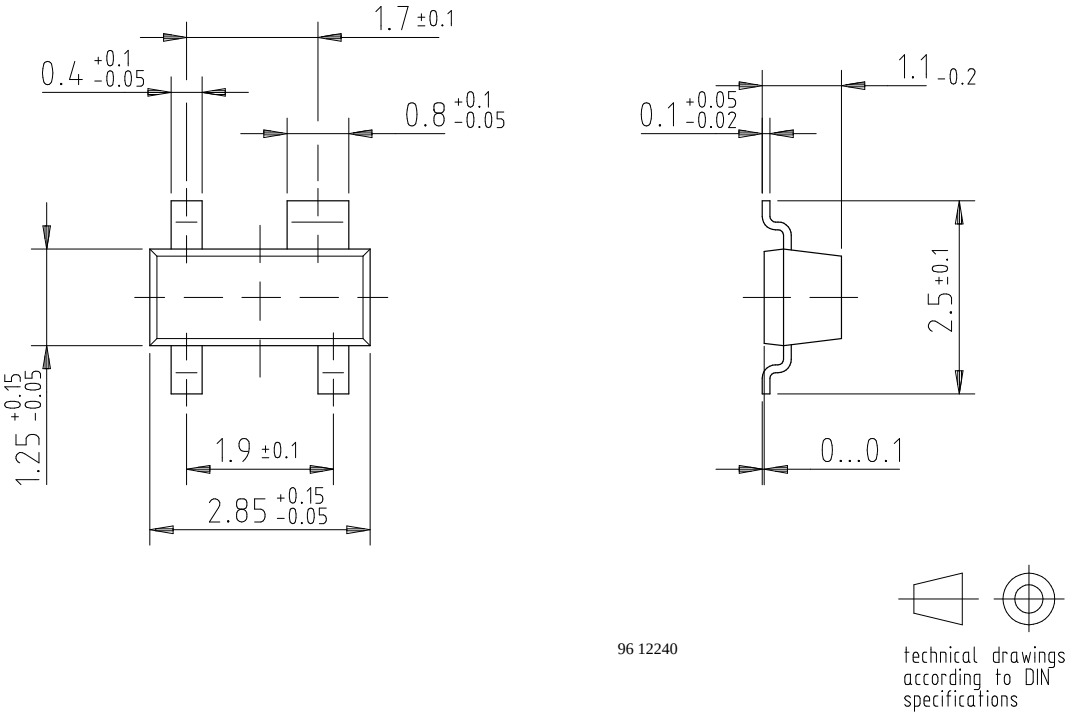
V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz, T_{amb} = 25°C, unless otherwise specified

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 V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, 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 V_{DS} = 15 V, I_D = 10 mA, V_{G2S} = 4 V, g_S = 2 mS, f = 200 MHz		F		1.0		dB

Common Source S-Parameters
V_{G2S} = 4 V, Z_0 = 50 Ω

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

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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