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

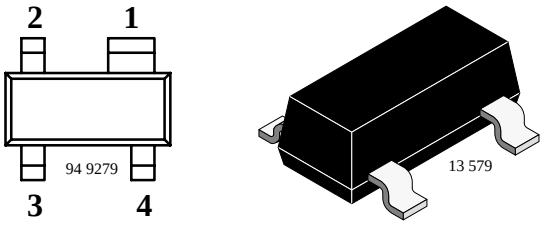
Electrostatic sensitive device.
Observe precautions for handling.

Applications

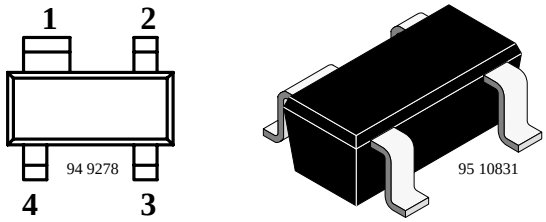
Input and mixer stages in UHF tuners.

Features

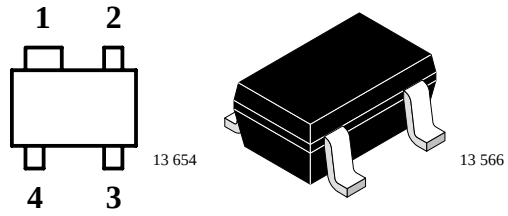
- Integrated gate protection diodes
- Low noise figure
- Low feedback capacitance
- High cross modulation performance
- Low input capacitance
- High AGC-range
- High gain



BF998 Marking: MO
Plastic case (SOT 143)
1 = Source, 2 = Drain, 3 = Gate 2, 4 = Gate 1



BF998R Marking: MOR
Plastic case (SOT 143R)
1 = Source, 2 = Drain, 3 = Gate 2, 4 = Gate 1



BF998RW Marking: WMO
Plastic case (SOT 343R)
1 = Source, 2 = Drain, 3 = Gate 2, 4 = Gate 1

Absolute Maximum Ratings

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

Parameter	Test Conditions	Symbol	Value	Unit
Drain - source voltage		V_{DS}	12	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

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

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

Electrical DC Characteristics

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

Parameter	Test Conditions	Type	Symbol	Min	Typ	Max	Unit
Drain - source breakdown voltage	I_D = 10 µA, $-V_{G1S} = -V_{G2S}$ = 4 V		$V_{(BR)DS}$	12			V
Gate 1 - source breakdown voltage	$\pm I_{G1S}$ = 10 mA, $V_{G2S} = V_{DS}$ = 0		$\pm V_{(BR)G1SS}$	7		14	V
Gate 2 - source breakdown voltage	$\pm I_{G2S}$ = 10 mA, $V_{G1S} = V_{DS}$ = 0		$\pm V_{(BR)G2SS}$	7		14	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} = 8 V, V_{G1S} = 0, V_{G2S} = 4 V	BF998/BF998R/ BF998RW	I_{DSS}	4		18	mA
		BF998A/BF998RA/ BF998RAW	I_{DSS}	4		10.5	mA
		BF998B/BF998RB/ BF998RBW	I_{DSS}	9.5		18	mA
Gate 1 - source cut-off voltage	V_{DS} = 8 V, V_{G2S} = 4 V, I_D = 20 µA		$-V_{G1S(OFF)}$		1.0	2.0	V
Gate 2 - source cut-off voltage	V_{DS} = 8 V, V_{G1S} = 0, I_D = 20 µA		$-V_{G2S(OFF)}$		0.6	1.0	V

Electrical AC Characteristics

V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V, f = 1 MHz , T_{amb} = 25°C, unless otherwise specified

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Forward transadmittance		$\lvert y_{21s} \rvert$	21	24		mS
Gate 1 input capacitance		C_{issg1}		2.1	2.5	pF
Gate 2 input capacitance	V_{G1S} = 0, V_{G2S} = 4 V	C_{issg2}		1.1		pF
Feedback capacitance		C_{rss}		25		fF
Output capacitance		C_{oss}		1.05		pF
Power gain	G_S = 2 mS, G_L = 0.5 mS, f = 200 MHz	G_{ps}		28		dB
	G_S = 3,3 mS, G_L = 1 mS, f = 800 MHz	G_{ps}	16.5	20		dB
AGC range	V_{G2S} = 4 to –2 V, f = 800 MHz	ΔG_{ps}	40			dB
Noise figure	G_S = 2 mS, G_L = 0.5 mS, f = 200 MHz	F		1.0		dB
	G_S = 3,3 mS, G_L = 1 mS, f = 800 MHz	F		1.5		dB

Typical Characteristics (T_{amb} = 25°C unless otherwise specified)

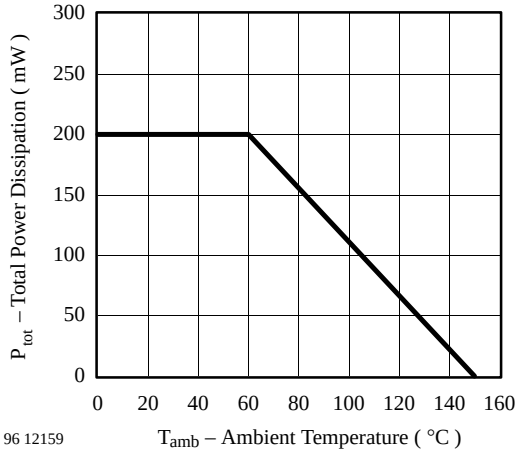


Figure 1. Total Power Dissipation vs. Ambient Temperature

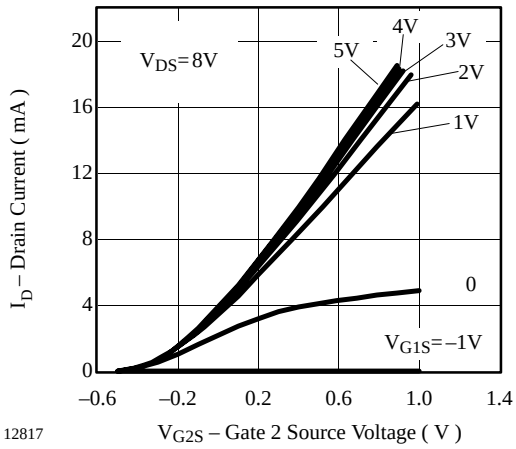


Figure 4. Drain Current vs. Gate 2 Source Voltage

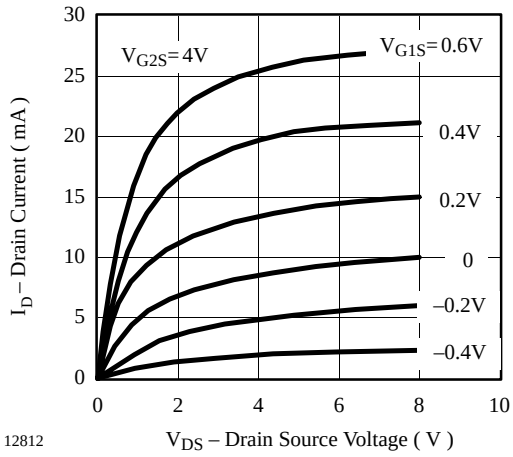


Figure 2. Drain Current vs. Drain Source Voltage

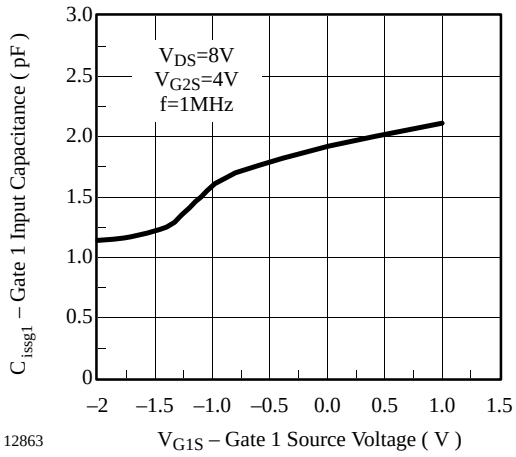


Figure 5. Gate 1 Input Capacitance vs. Gate 1 Source Voltage

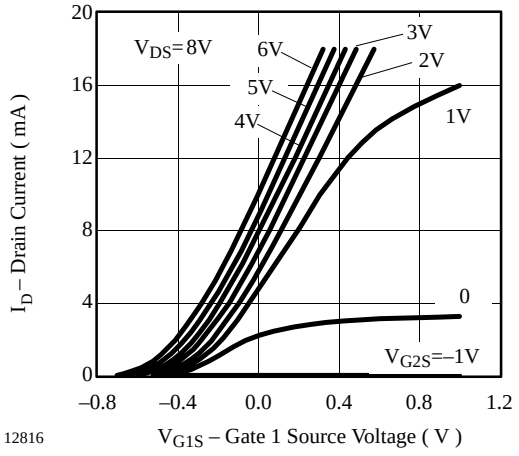


Figure 3. Drain Current vs. Gate 1 Source Voltage

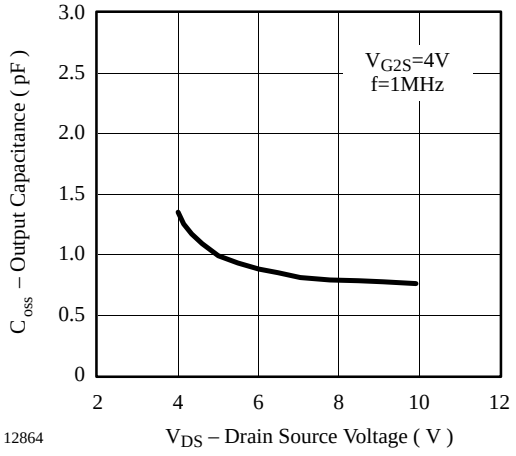


Figure 6. Output Capacitance vs. Drain Source Voltage

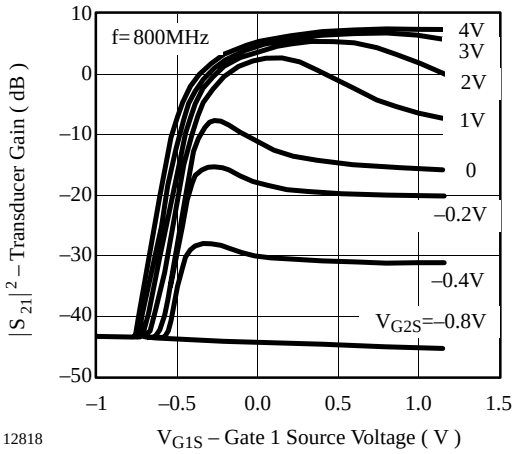


Figure 7. Transducer Gain vs. Gate 1 Source Voltage

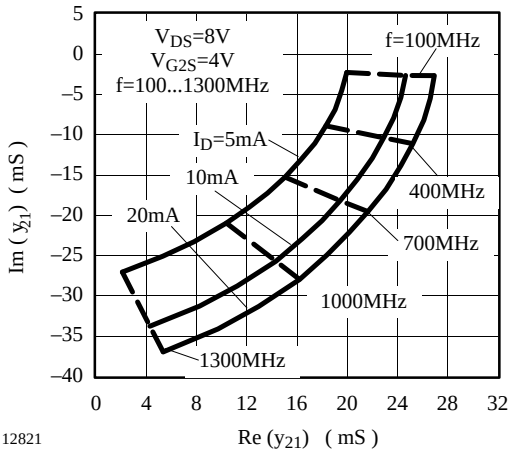


Figure 10. Short Circuit Forward Transfer Admittance

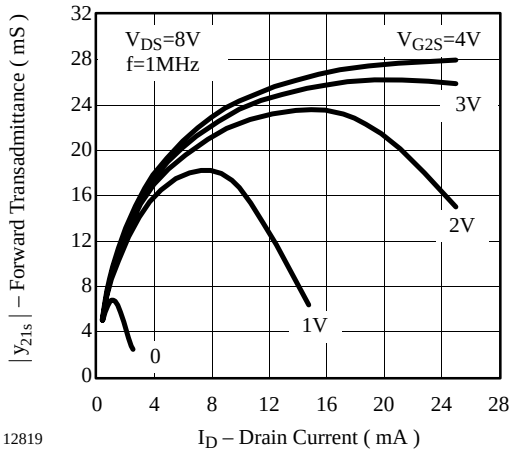


Figure 8. Forward Transadmittance vs. Drain Current

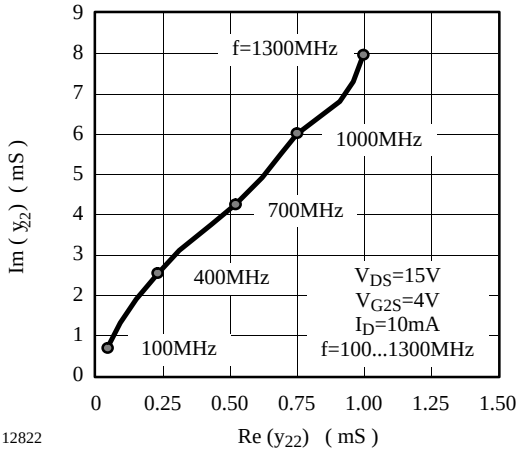


Figure 11. Short Circuit Output Admittance

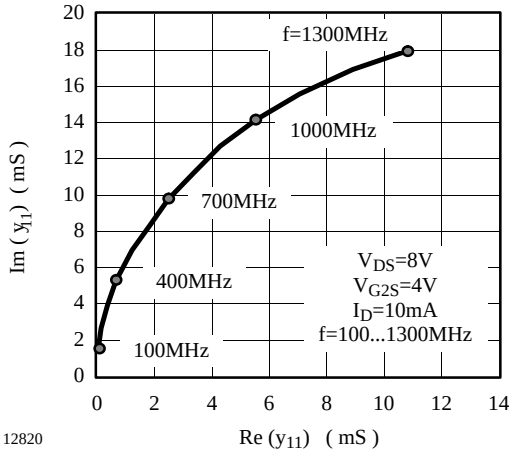


Figure 9. Short Circuit Input Admittance

V_{DS} = 8 V, I_D = 10 mA, V_{G2S} = 4 V , Z_0 = 50 Ω

S_{11}

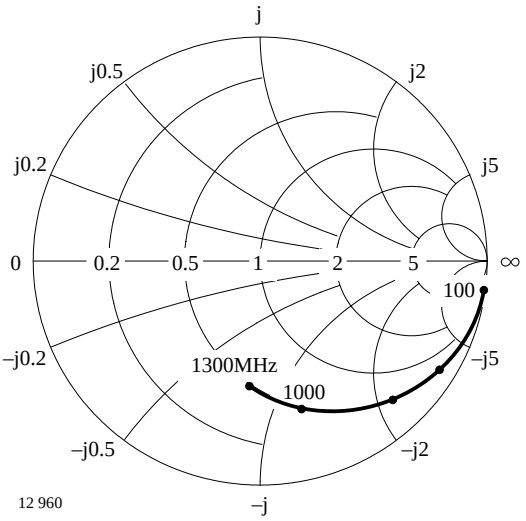


Figure 12. Input reflection coefficient

S_{12}

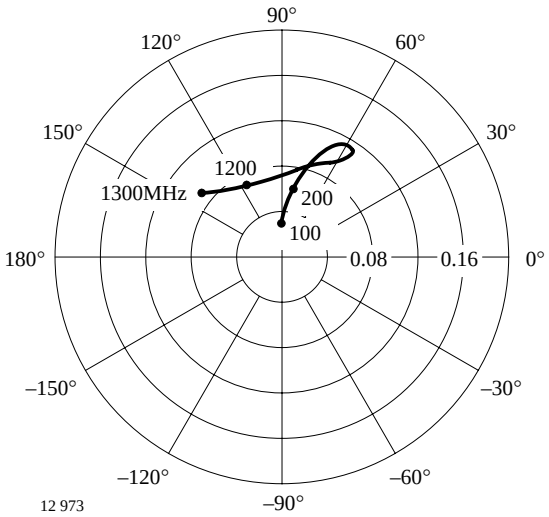


Figure 14. Reverse transmission coefficient

S_{21}

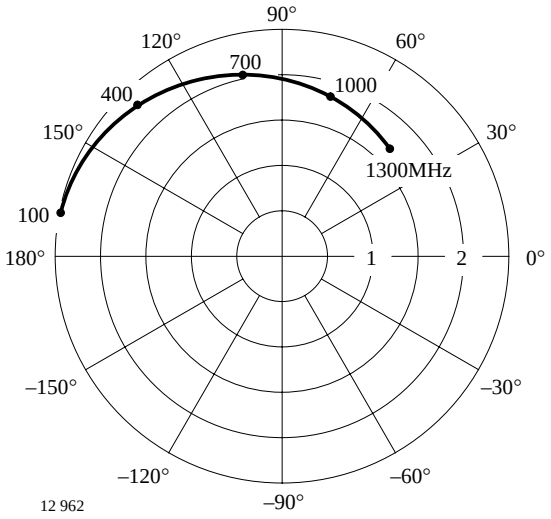


Figure 13. Forward transmission coefficient

S_{22}

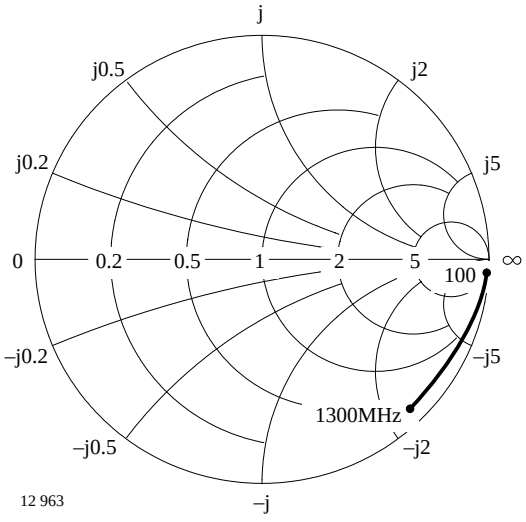
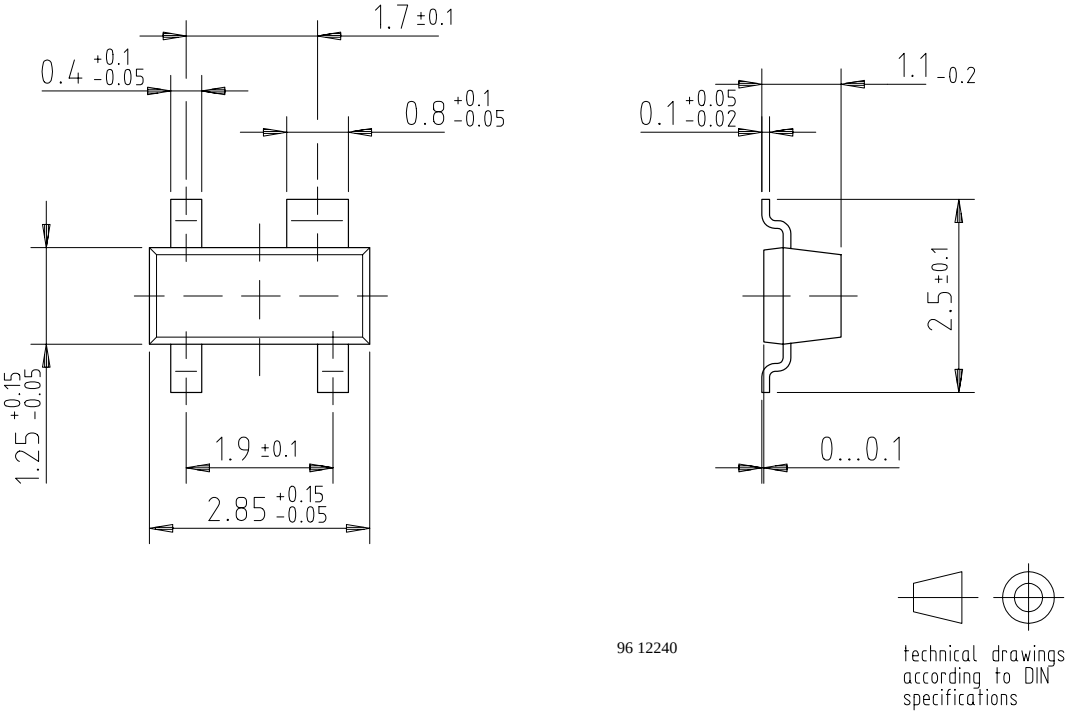
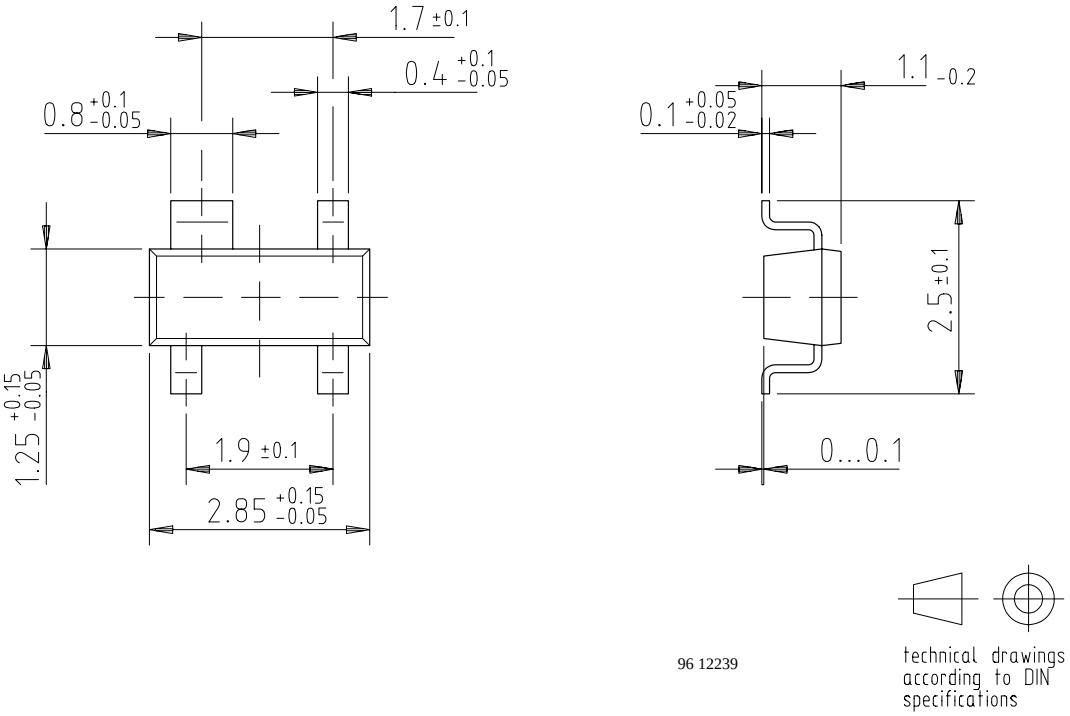


Figure 15. Output reflection coefficient

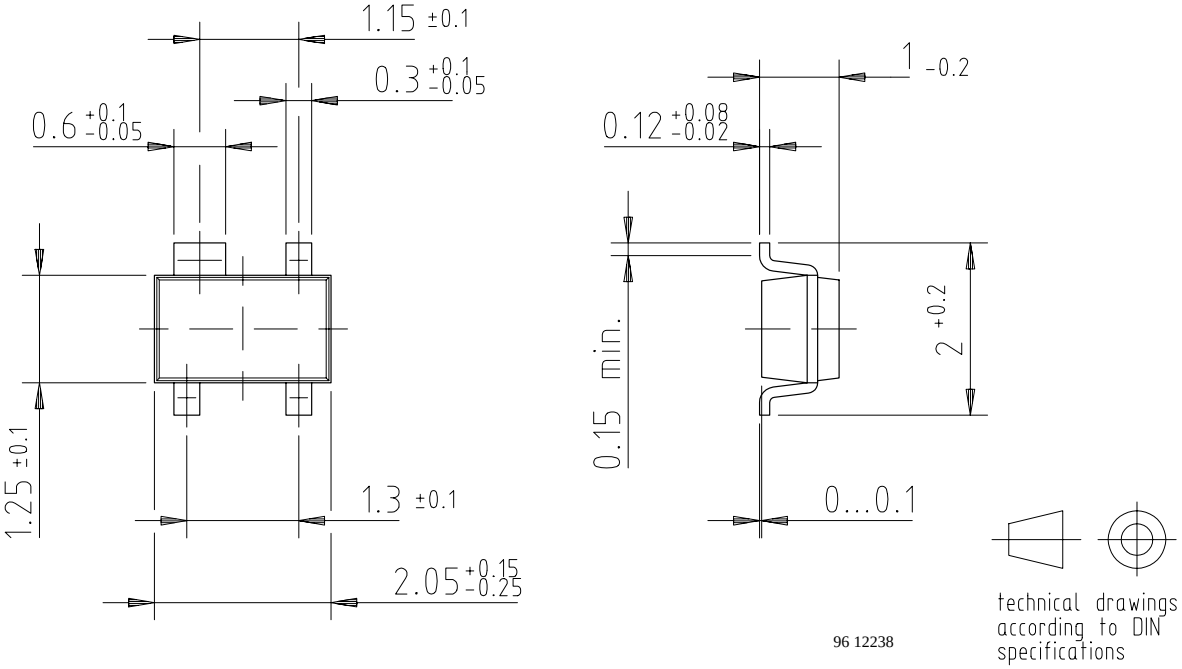
Dimensions of BF998 in mm



Dimensions of BF998R in mm



Dimensions of BF998RW in mm



Ozone Depleting Substances Policy Statement

It is the policy of **Vishay Semiconductor 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.

Vishay Semiconductor GmbH 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.

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

We reserve the right to make changes to improve technical design and may do so without further notice.
Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay-Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay-Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

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