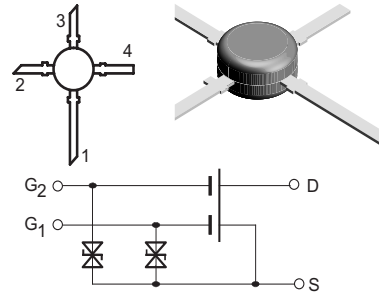


N-Channel Dual Gate MOS-Fieldeffect Tetrode, Depletion Mode

Features

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



Applications

Input- and mixer stages especially for FM- and VHF TV-tuners up to 300 MHz.

Mechanical Data

Case: TO-50 Plastic case

Weight: approx. 124 mg

Marking: BF961

Pinning:

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



Electrostatic sensitive device.
Observe precautions for handling.

13625

Parts Table

Part	Ordering Ccode	Marking	Package
BF961	BF961A or BF961B	BF961	TO50
BF961A	BF961A	BF961	TO50
BF961B	BF961B	BF961	TO50

Absolute Maximum Ratings

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Parameter	Test condition	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	$T_{amb} \leq 60\text{ }^{\circ}\text{C}$	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

Parameter	Test condition	Symbol	Value	Unit
Channel ambient	¹⁾	R_{thChA}	450	K/W

¹⁾ on glass fibre printed board (40 x 25 x 1.5) mm³ plated with 35 μm Cu

Electrical DC Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Parameter	Test condition	Part	Symbol	Min	Typ.	Max	Unit
Drain - source breakdown voltage	$I_D = 10\text{ }\mu\text{A}$, $-V_{G1S} = -V_{G2S} = 4\text{ V}$		$V_{(BR)DS}$	20			V
Gate 1 - source breakdown voltage	$\pm I_{G1S} = 10\text{ mA}$, $V_{G2S} = V_{DS} = 0$		$\pm V_{(BR)G1SS}$	8		14	V
Gate 2 - source breakdown voltage	$\pm I_{G2S} = 10\text{ mA}$, $V_{G1S} = V_{DS} = 0$		$\pm V_{(BR)G2SS}$	8		14	V
Gate 1 - source leakage current	$\pm V_{G1S} = 5\text{ V}$, $V_{G2S} = V_{DS} = 0$		$\pm I_{G1SS}$			100	nA
Gate 2 - source leakage current	$\pm V_{G2S} = 5\text{ V}$, $V_{G1S} = V_{DS} = 0$		$\pm I_{G2SS}$			100	nA
Drain current	$V_{DS} = 15\text{ V}$, $V_{G1S} = 0$, $V_{G2S} = 4\text{ V}$	BF961	I_{DSS}	4		20	mA
		BF961A	I_{DSS}	4		10.5	mA
		BF961B	I_{DSS}	9.5		20	mA
Gate 1 - source cut-off voltage	$V_{DS} = 15\text{ V}$, $V_{G2S} = 4\text{ V}$, $I_D = 20\text{ }\mu\text{A}$		$-V_{G1S(OFF)}$			3.5	V
Gate 2 - source cut-off voltage	$V_{DS} = 15\text{ V}$, $V_{G1S} = 0$, $I_D = 20\text{ }\mu\text{A}$		$-V_{G2S(OFF)}$			3.5	V

Electrical AC Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

$V_{DS} = 15\text{ V}$, $I_D = 10\text{ mA}$, $V_{G2S} = 4\text{ V}$, $f = 1\text{ MHz}$

Parameter	Test condition	Symbol	Min	Typ.	Max	Unit
Forward transadmittance		$ y_{21s} $	12	15		mS
Gate 1 input capacitance		C_{issg1}		3.7		pF
Gate 2 input capacitance	$V_{G1S} = 0$, $V_{G2S} = 4\text{ V}$	C_{issg2}		1.6		pF
Feedback capacitance		C_{rss}		25		fF
Output capacitance		C_{oss}		1.6		pF
Power gain	$G_S = 2\text{ mS}$, $G_L = 0.5\text{ mS}$, $f = 200\text{ MHz}$	G_{ps}		20		dB
AGC range	$V_{G2S} = 4\text{ to } -2\text{ V}$, $f = 200\text{ MHz}$	ΔG_{ps}		50		dB
Noise figure	$G_S = 2\text{ mS}$, $G_L = 0.5\text{ mS}$, $f = 200\text{ MHz}$	F		1.8	2.5	dB

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

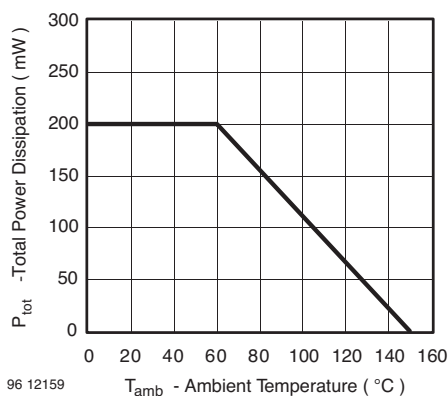


Figure 1. Total Power Dissipation vs. Ambient Temperature

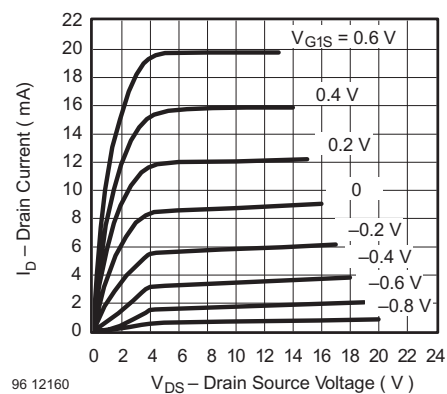


Figure 2. Drain Current vs. Drain Source Voltage

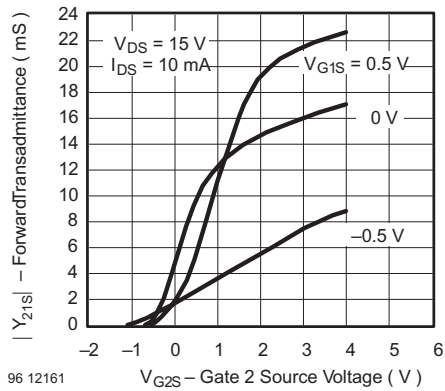


Figure 3. Forward Transadmittance vs. Gate 2 Source Voltage

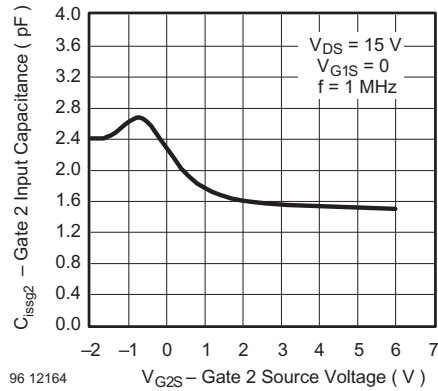


Figure 6. Gate 2 Input Capacitance vs. Gate 2 Source Voltage

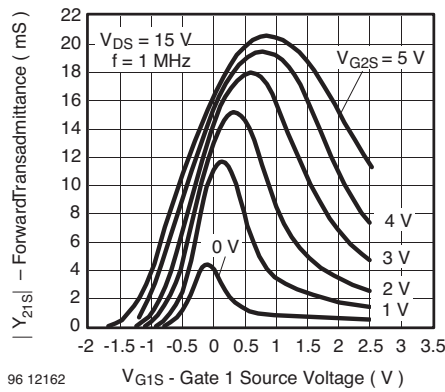


Figure 4. Forward Transadmittance vs. Gate 1 Source Voltage

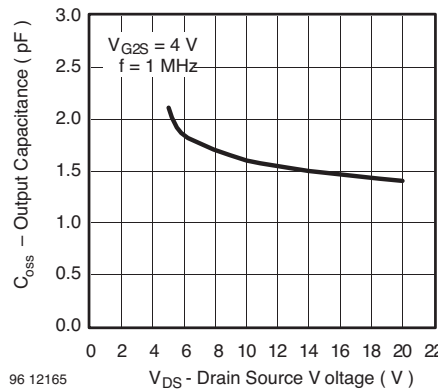


Figure 7. Output Capacitance vs. Drain Source Voltage

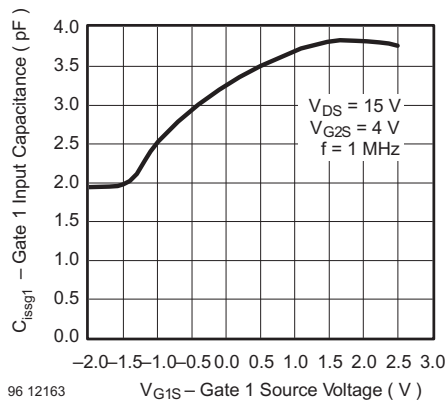


Figure 5. Gate 1 Input Capacitance vs. Gate 1 Source Voltage

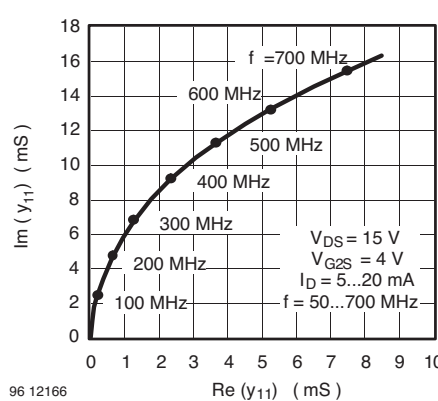


Figure 8. Short Circuit Input Admittance

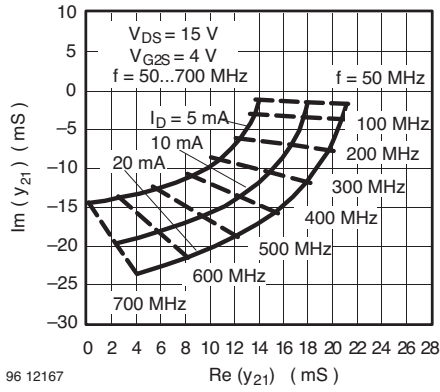


Figure 9. Short Circuit Forward Transfer Admittance

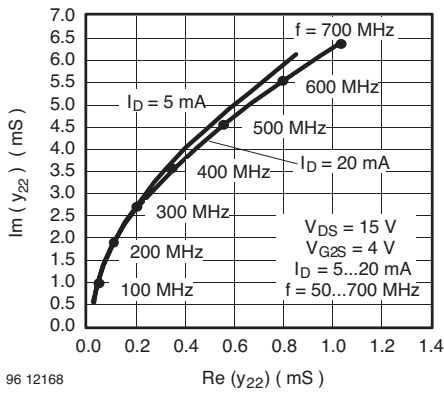
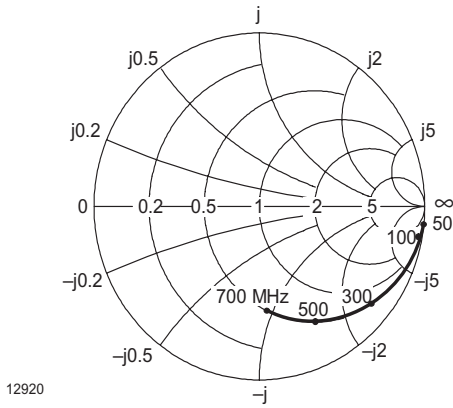


Figure 10. Short Circuit Output Admittance

$V_{DS} = 15\text{ V}$, $I_D = 5\text{ to }20\text{ mA}$, $V_{GS} = 4\text{ V}$, $Z_0 = 50\ \Omega$

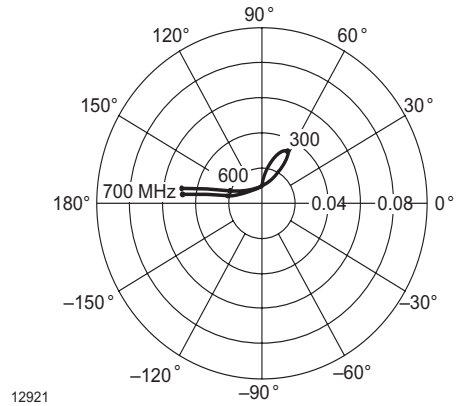
S_{11}



12920

Figure 11. Input Reflection Coefficient

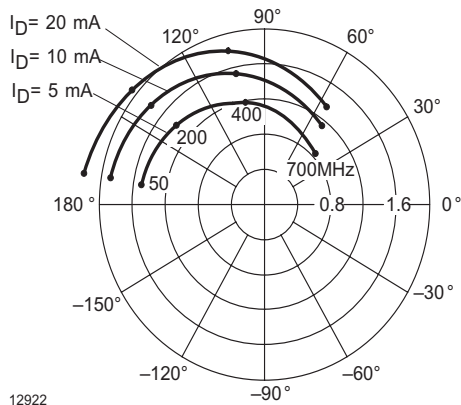
S_{12}



12921

Figure 13. Reverse Transmission Coefficient

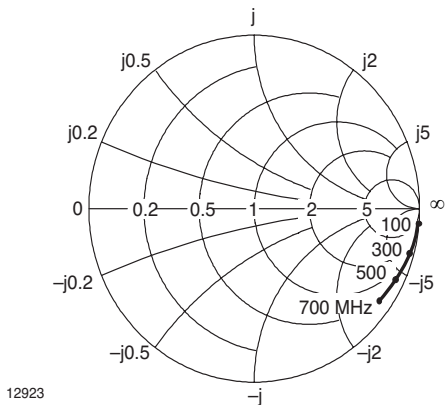
S_{21}



12922

Figure 12. Forward Transmission Coefficient

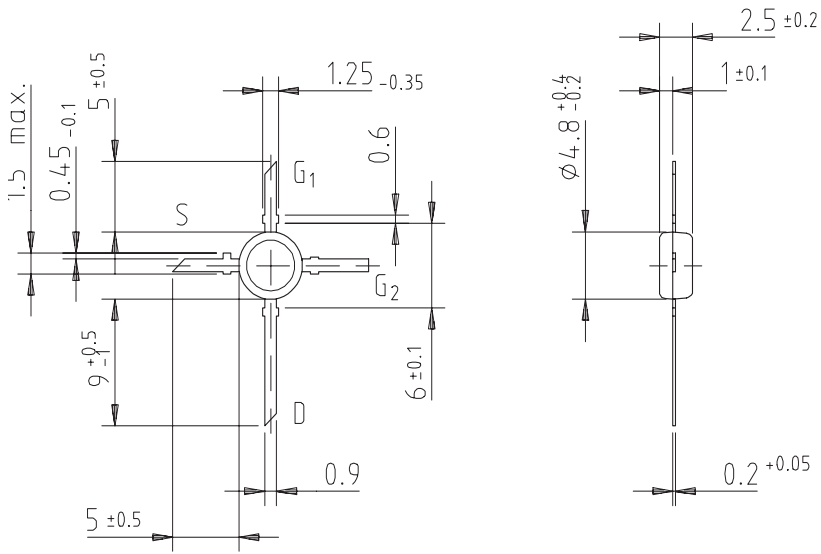
S_{22}



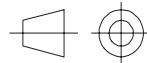
12923

Figure 14. Output Reflection Coefficient

Package Dimensions in mm



96 12242



technical drawings
according to DIN
specifications

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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