



## MOSMIC<sup>®</sup> for TV-Tuner Prestage with 5 V Supply Voltage

MOSMIC - MOS Monolithic Integrated Circuit

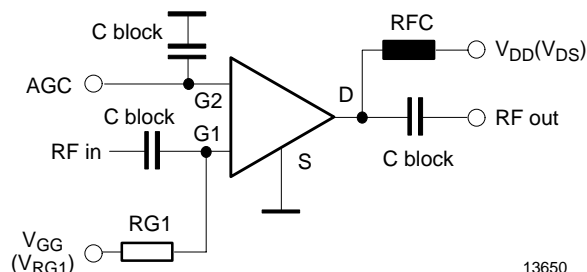
Electrostatic sensitive device.

Observe precautions for handling.



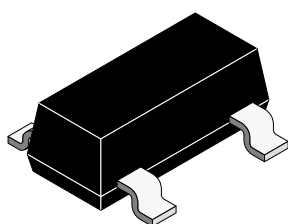
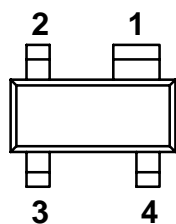
### Applications

Low noise gain controlled input stages in UHF-and VHF- tuner with 5 V supply voltage.



### Features

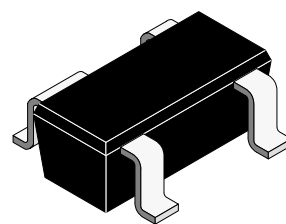
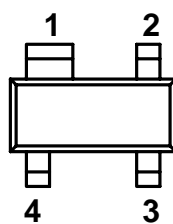
- Easy Gate 1 switch-off with PNP switching transistors inside PLL
- High AGC-range with less steep slope
- Integrated gate protection diodes
- Low noise figure
- High gain, very high forward transadmittance (40 mS typ.)
- Improved cross modulation at gain reduction
- SMD package



13628

S503TX Marking: X03  
Plastic case (SOT 143)

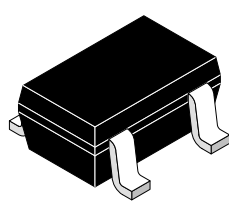
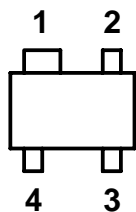
1 = Source, 2 = Drain, 3 = Gate 2, 4 = Gate 1



13629

S503TXR Marking: X8R  
Plastic case (SOT 143R)

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



13633

S503TXRW Marking: WX8  
Plastic case (SOT 343R)

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

## Absolute Maximum Ratings

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

Parameter	Test Conditions	Symbol	Value	Unit
Drain - source voltage		$V_{DS}$	8	V
Drain current		$I_D$	30	mA
Gate 1/Gate 2 - source peak current		$\pm I_{G1/G2SM}$	10	mA
Gate 1 - source voltage		$+V_{G1S}$	6	V
		$-V_{G1S}$	1.5	V
Gate 2 - source voltage		$\pm V_{G2SM}$	6	V
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

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

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

## Electrical DC Characteristics

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

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Drain - source breakdown voltage	$I_D = 10\text{ }\mu\text{A}$ , $V_{G1S} = V_{G2S} = 0$	$V_{(BR)DSS}$	12			V
Gate 1 - source breakdown voltage	$\pm I_{G1S} = 10\text{ mA}$ , $V_{G2S} = V_{DS} = 0$	$\pm V_{(BR)G1SS}$	7		10	V
Gate 2 - source breakdown voltage	$\pm I_{G2S} = 10\text{ mA}$ , $V_{G1S} = V_{DS} = 0$	$\pm V_{(BR)G2SS}$	7		10	V
Gate 1 - source leakage current	$+V_{G1S} = 5\text{ V}$ , $V_{G2S} = V_{DS} = 0$	$+I_{G1SS}$			20	nA
Gate 2 - source leakage current	$\pm V_{G2S} = 5\text{ V}$ , $V_{G1S} = V_{DS} = 0$	$\pm I_{G2SS}$			20	nA
Drain - source operating current	$V_{DS} = V_{RG1} = 5\text{ V}$ , $V_{G2S} = 4\text{ V}$ , $R_{G1} = 56\text{ k}\Omega$	$I_{DSO}$	10	15	20	mA
Gate 1 - source cut-off voltage	$V_{DS} = 5\text{ V}$ , $V_{G2S} = 4\text{ V}$ , $I_D = 20\text{ }\mu\text{A}$	$V_{G1S(OFF)}$	0.3		1.3	V
Gate 2 - source cut-off voltage	$V_{DS} = V_{RG1} = 5\text{ V}$ , $R_{G1} = 56\text{ k}\Omega$ , $I_D = 20\text{ }\mu\text{A}$	$V_{G2S(OFF)}$	0.8	1.0	1.4	V

## Remark on improving intermodulation behavior:

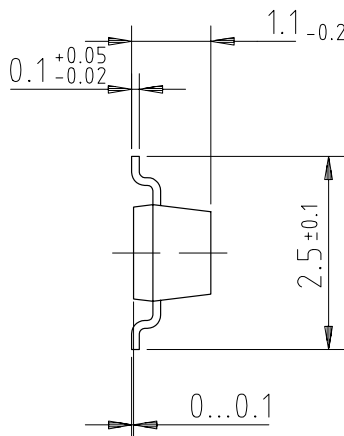
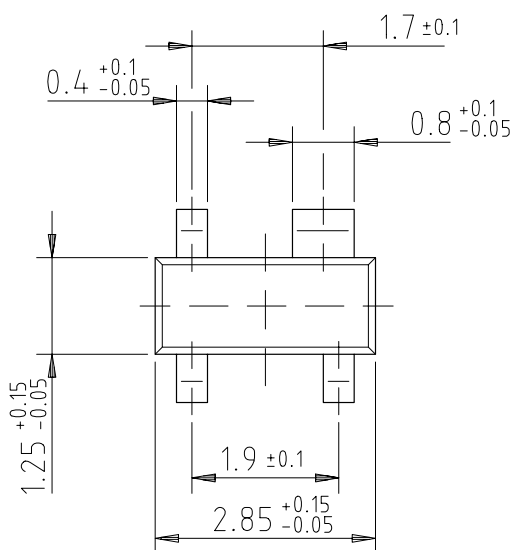
By setting  $R_{G1}$  smaller than 56 kΩ, typical value of  $I_{DSO}$  will raise and improved intermodulation behavior will be performed.

## Electrical AC Characteristics

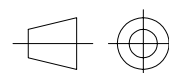
$V_{DS} = V_{RG1} = 5\text{ V}$ ,  $V_{G2S} = 4\text{ V}$ ,  $R_{G1} = 56\text{ k}\Omega$ ,  $I_D = I_{DSO}$ ,  $f = 1\text{ MHz}$ ,  $T_{amb} = 25^\circ\text{C}$ , unless otherwise specified

Parameter	Test Conditions	Symbol	Min	Typ	Max	Unit
Forward transadmittance		$ y_{21s} $	35	40	50	mS
Gate 1 input capacitance		$C_{issg1}$		2.3	2.8	pF
Feedback capacitance		$C_{rss}$		30	40	fF
Output capacitance		$C_{oss}$		1.4		pF
Power gain	$G_S = 2\text{ mS}$ , $G_L = 0.5\text{ mS}$ , $f = 200\text{ MHz}$	$G_{ps}$		30		dB
	$G_S = 3,3\text{ mS}$ , $G_L = 1\text{ mS}$ , $f = 800\text{ MHz}$	$G_{ps}$	18	24		dB
AGC range	$V_{DS} = 5\text{ V}$ , $V_{G2S} = 1\text{ to }4\text{ V}$ , $f = 800\text{ MHz}$	$\Delta G_{ps}$	40	45		dB
Noise figure	$G_S = 2\text{ mS}$ , $G_L = 0.5\text{ mS}$ , $f = 200\text{ MHz}$	F		1		dB
	$G_S = 3,3\text{ mS}$ , $G_L = 1\text{ mS}$ , $f = 800\text{ MHz}$	F		1.3		dB
Cross modulation	Input level for $k = 1\%$ @ 0 dB AGC $f_w = 50\text{ MHz}$ , $f_{unw} = 60\text{ MHz}$	$X_{mod}$	90			dB $\mu$ V
	Input level for $k = 1\%$ @ 40 dB AGC $f_w = 50\text{ MHz}$ , $f_{unw} = 60\text{ MHz}$	$X_{mod}$	100	105		dB $\mu$ V

## Dimensions of S503TX in mm

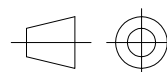
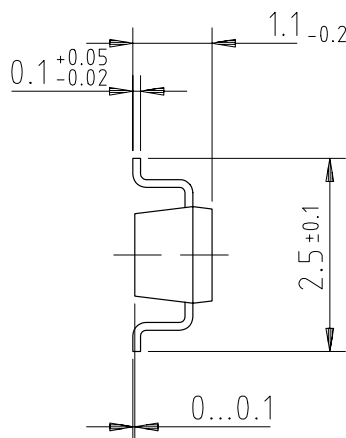
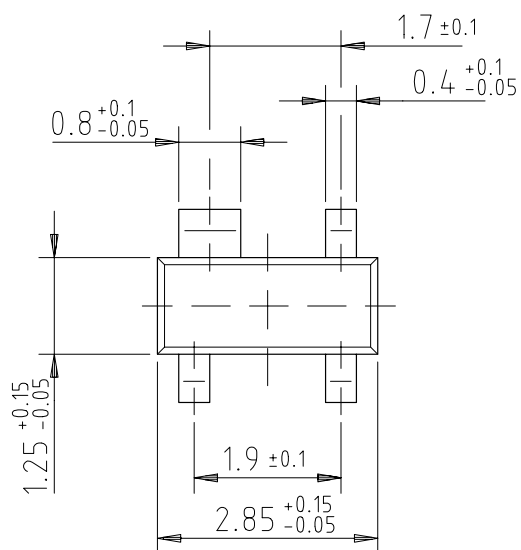


96 12240



technical drawings  
according to DIN  
specifications

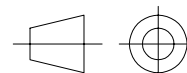
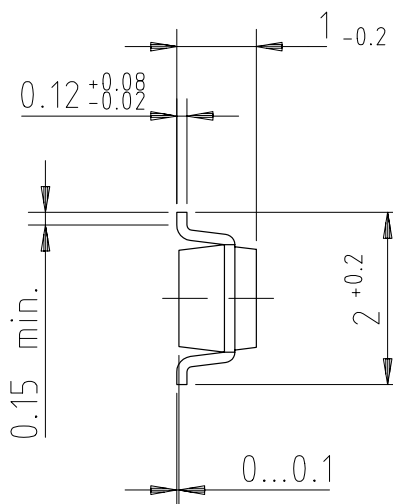
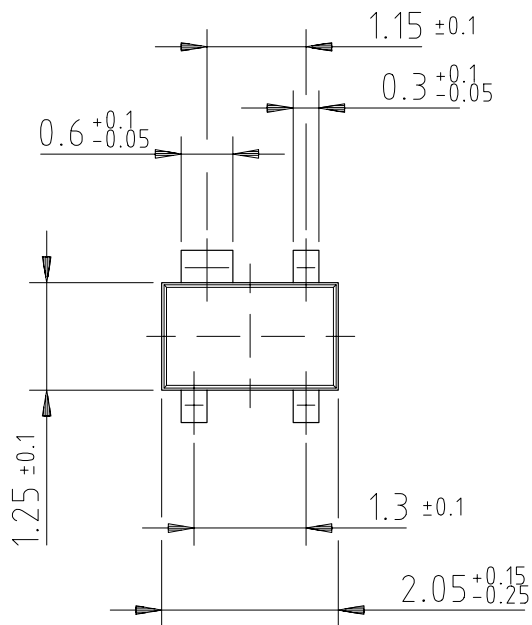
## Dimensions of S503TXR in mm



96 12239

technical drawings  
according to DIN  
specifications

## Dimensions of S503TXRW in mm



96 12238

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-Telefunken products for any unintended or unauthorized application, the buyer shall indemnify Vishay-Telefunken 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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