VHF/ UHF-Tuner-IC

Description

This tuner IC requires a power supply of 9 V and performs the function of two separate oscillators and mixers, SAWF-driver and dual-sate band switch. Applications are 9 V TV-and VCR-tuners.

Features

- 9 V supply voltage
- Frequency range from 48 to 860 MHz
- Band A: balanced high impedance mixer input and amplitude controlled oscillator
- Band B: balanced low impedance mixer input and symmetrical oscillator
- SAW filter driver with low impedance output
- Voltage regulator for stable operating characteristics
- ESD protection on all pins except oscillator pins and RF-inputs

Benefits

- The small SO20 package allows to develop small and economic 2-band tuners

Block Diagram

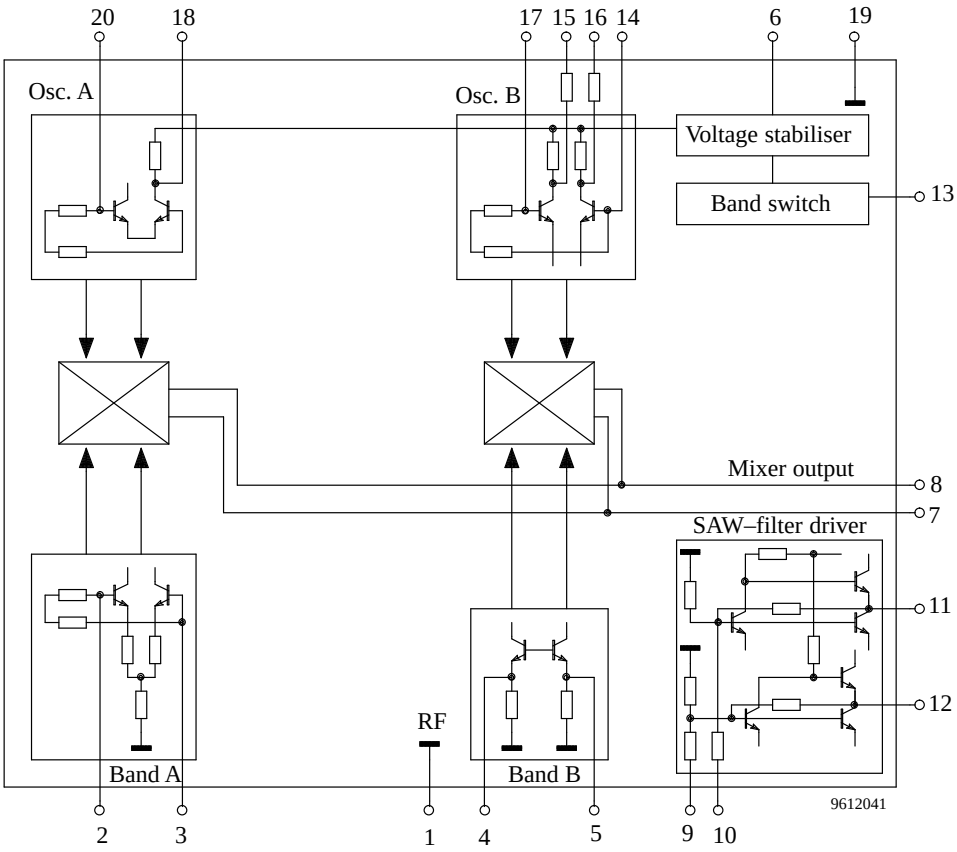
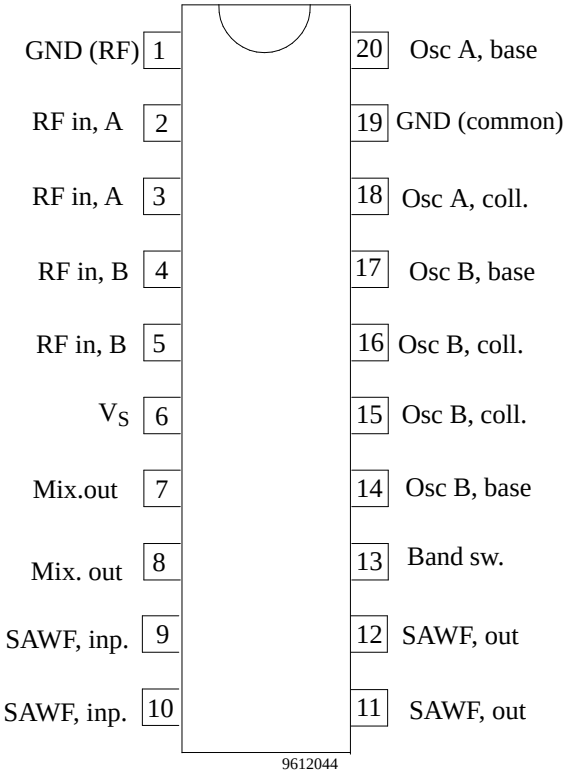


Figure 1. Block diagram

Pin Configuration



Pin	Symbol	Function
20	Osc A, base	Oscillator band A, base
19	GND (common)	Ground, common
18	Osc A, coll.	Oscillator band A, collector
14, 17	Osc B, base	Oscillator band B, bases
15, 16	Osc B, coll.	Oscillator band B, collectors
13	Band sw.	Dual-state band switch
11, 12	SAWF, out	SAW filter driver outputs
9, 10	SAWF, inp.	SAW filter driver input
7, 8	Mix, out	Mixer outputs, open collector
6	V_S	Supply voltage V_s
4, 5	RF in, B	RF inputs, band B
2, 3	RF in, A	RF inputs, band A
1	GND (RF)	Ground, RF part

Ordering Information

Extended Type Number	Package	Remarks
U2339B-FLG3	SO20	Taped and reeled

Absolute Maximum Ratings

All voltages are referred to GND, Pin 19

Parameters		Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Pin 6	V_S			10.5	V
RF inputs	Pin 2-5				5.0	V
IF outputs	Pin 7-8				10.5	V
Dual-state switch voltage	Pin 13	ViDSW			10.5	V
Junction temperature		T_{jmax}			125	°C
Storage temperature		T_{stg}	–40		125	°C

Operating Range

All voltages are referred to GND, Pin 2

Parameters	Test Conditions / Pins	Symbol	Min	Typ	Max	Unit
Supply voltage	Pin 6-8	V_S	8.1	9	9.9	V
Ambient temperature		T_{amb}	–25		75	°C
Thermal resistance	Test conditions page 4	R_{thJA}		90		K/W

Electrical Characteristics

Test conditions (unless otherwise specified): V_s = 9 V. T_{amb} = 25 °C. Reference point Pin 2

Parameters	Test Conditions / Pins	Symbol	Min	Typ	Max	Unit
Supply voltage	Pin 6-8	V_S	8.1	9.0	9.9	V
Supply current	Pin 6-8	I_S		42		mA
Band switch						
Voltage band A	Pin 13	VSWA	0	0	1.0	V
Voltage band B	Pin 13	VSWB	3.4	4.0	5.0	V
Switching current	VSW = 5 V Pin 13	ISW			100	µA
SAW filter driver fi = 36 MHz						
Input impedance	Pin 9, 10	ZiSAW		450		Ω
Output impedance	Pin 11, 12	ZoSAW		70		
Voltage gain	11, 12 → Pin 11, 12	GvSAW		17		dB
Band A (note 1)						
Input frequency range	Pin 3	fiA	48		470	MHz
Input impedance	Pin 3	S11A		see Fig. 3		
Gain (note 4)	Pin I/P to O/P	GA		28		dB
Noise figure DSB (note 2): fiA = 50 MHz fiA = 150 MHz	Pin I/P to O/P	 NF NF		 11.5 12		 dB dB
Input level for (note 3):	Each carrier					
IM3 (interm. of 3rd order	fiA = 71 MHz Pin I/P	ViA		–23		dBm
IM2 (interm. of 2nd order)	fiA = 71 MHz Pin I/P	ViA		–22		dBm
Band B (note 1)						
Input frequency range	Pin 4, 5	fiB	470		860	MHz
Input impedance	Pin 4, 5	S11B		see Fig. 3	8	
Gain (note 4)	Pin I/P to O/P	GB		32		dB
Noise figure DSB (note 2) fiB = 500 MHZ fiB = 800 MHz	Pin I/P to O/P	 NF NF		 10.5 11.5		 dB dB
Input level for IM3 (intem. of 3rd order, note 3)	Each carrier fiB = 600 MHz Pin I/P	ViB		–25		dBm

Notes

1) The RF input B is symmetrical driven by means of a hybrid for 180° phase shifting, consequently the source impedance is 100 Ω. All other impedance for RF tests is 50 Ω.

2) The noise figure (NF) is the value for double-side-band measurement.

3) The intermodulation test (2-carrier-method) which is made on IF-center is in reference to a signal-to-IM ratio of 60 dB.

4) Gain is the ratio of the voltage at the primary coil of L5 to the available voltage at the input.

Test and Principle Application Circuit

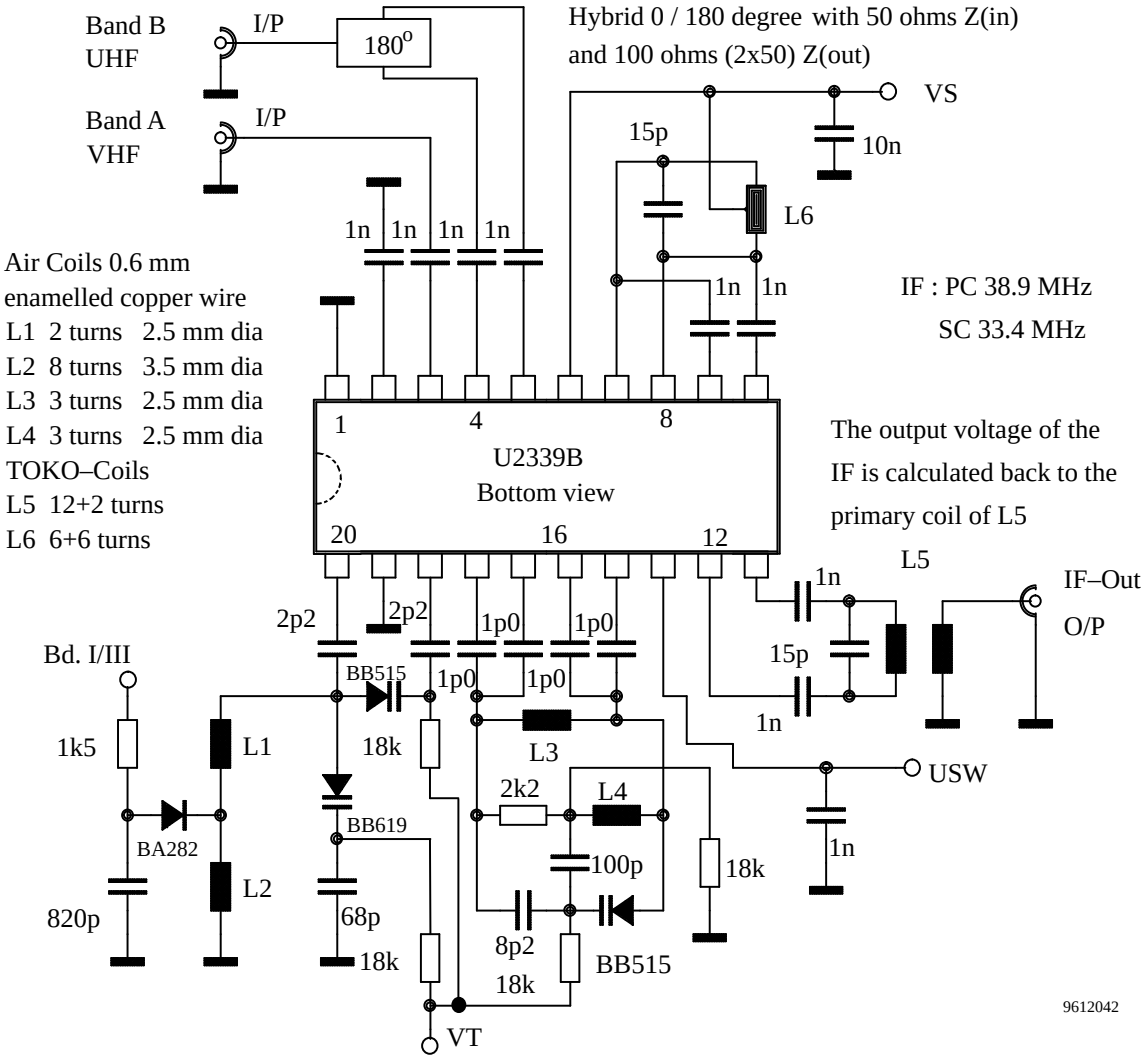
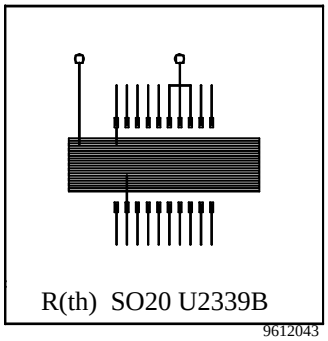


Figure 2. Test and principle application circuit

PCB for the R_{thJA}-Measurement



Material: 35 µm one-sided Cu-coated epoxy PCB,
40 mm x 40 mm x 1.5 mm

Figure 3. PCB for the R_{thja}-measurement

Input Impedance Mixer Band A (S11A) and B (S11B)

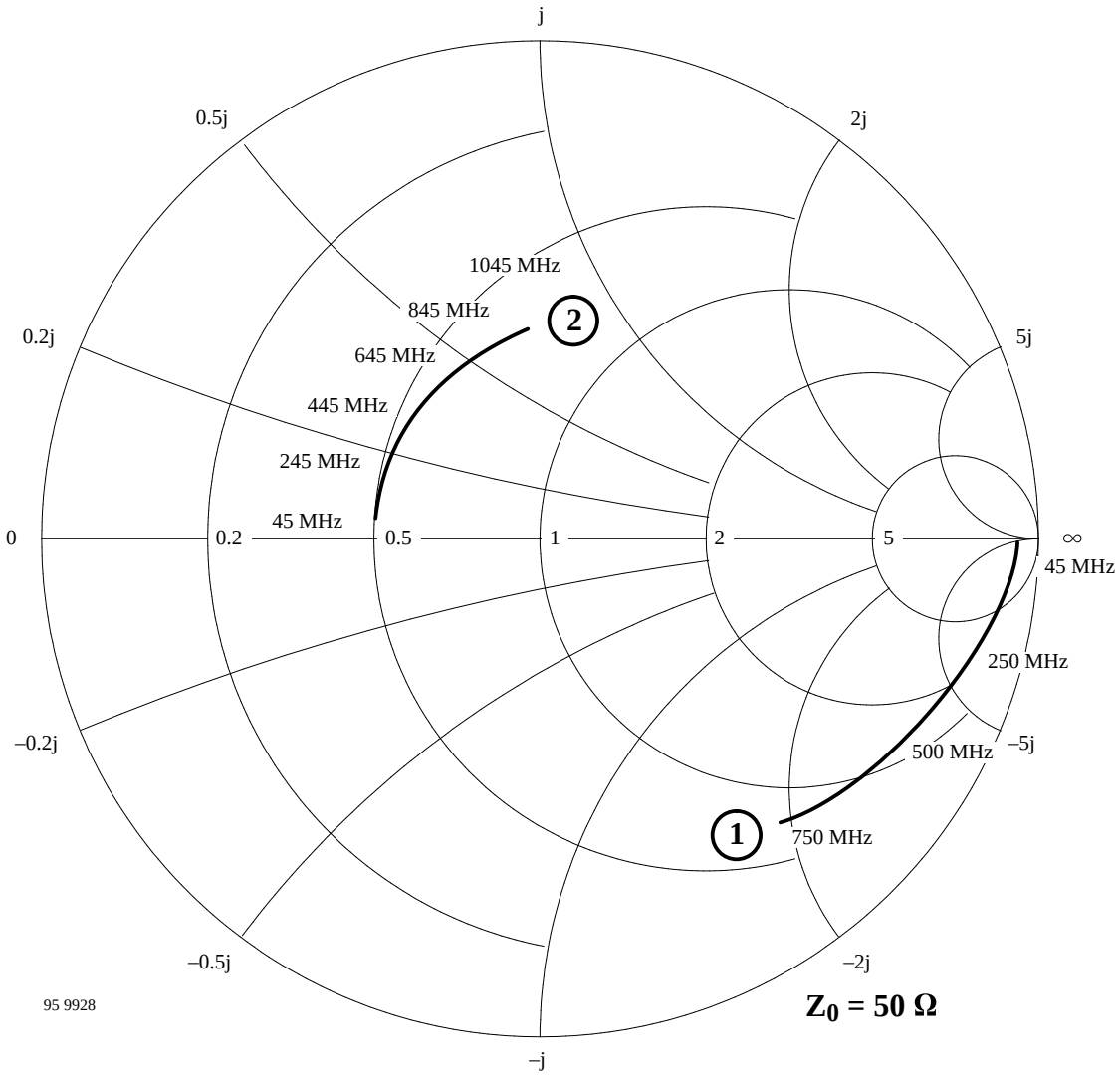


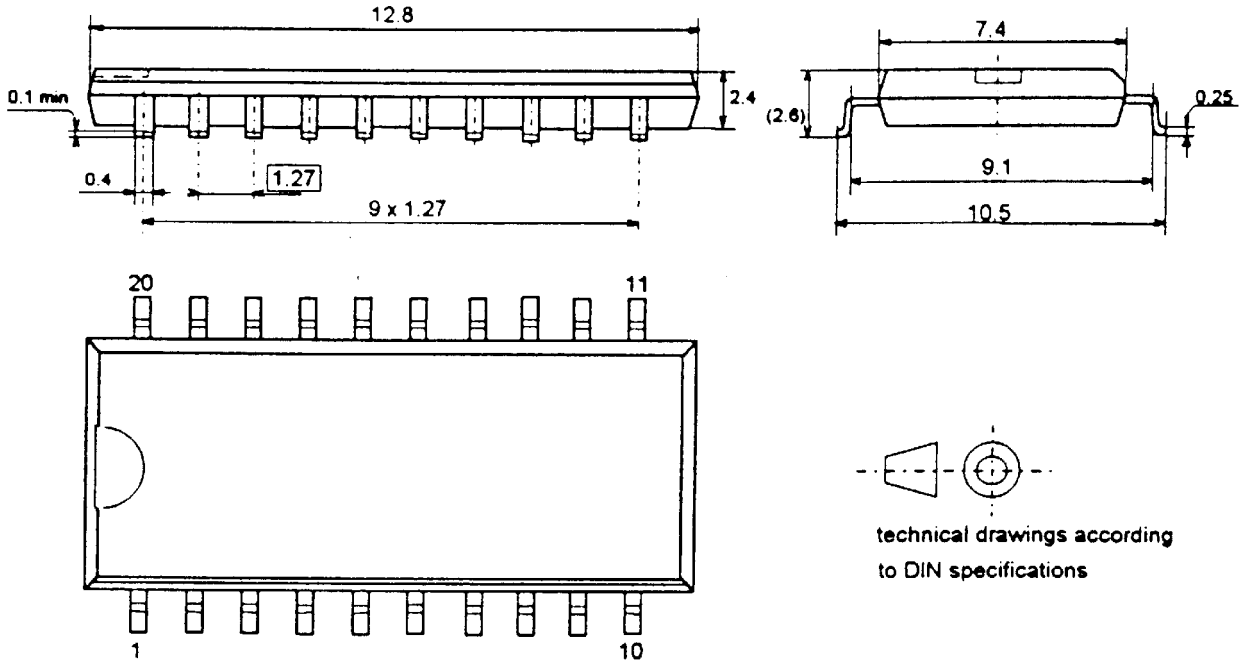
Figure 4. Input impedance mixer band A (S11A) and B (S11B)

1) **VHF-Low**
Normalised to 50 Ω, measuring range 45 MHz to 750 MHz.

2) **VHF-High and UHF**
Normalised to 50 Ω, measuring range 45 MHz to 1045 MHz. Input is driven symmetrical. The output impedance of hybrid is 100 Ω, the measured level is then calculated in reference to 50 Ω.

Dimensions in mm:

Package: SO20



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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