

## 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, LO output and two-state band switch.

Together with the Easy Link PLL U6220B economical 9 V tuner with excellent RF-performance can be build.

### 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
- Balanced LO output for prescalers or PLL
- SAW filter driver with low impedance output
- Voltage regulator for stable operating characteristic

### Benefits

The integration of 2 bands and the small SSO24 package allows to design very small and low cost 9 V two-band tuners with high performance.

### Block Diagram

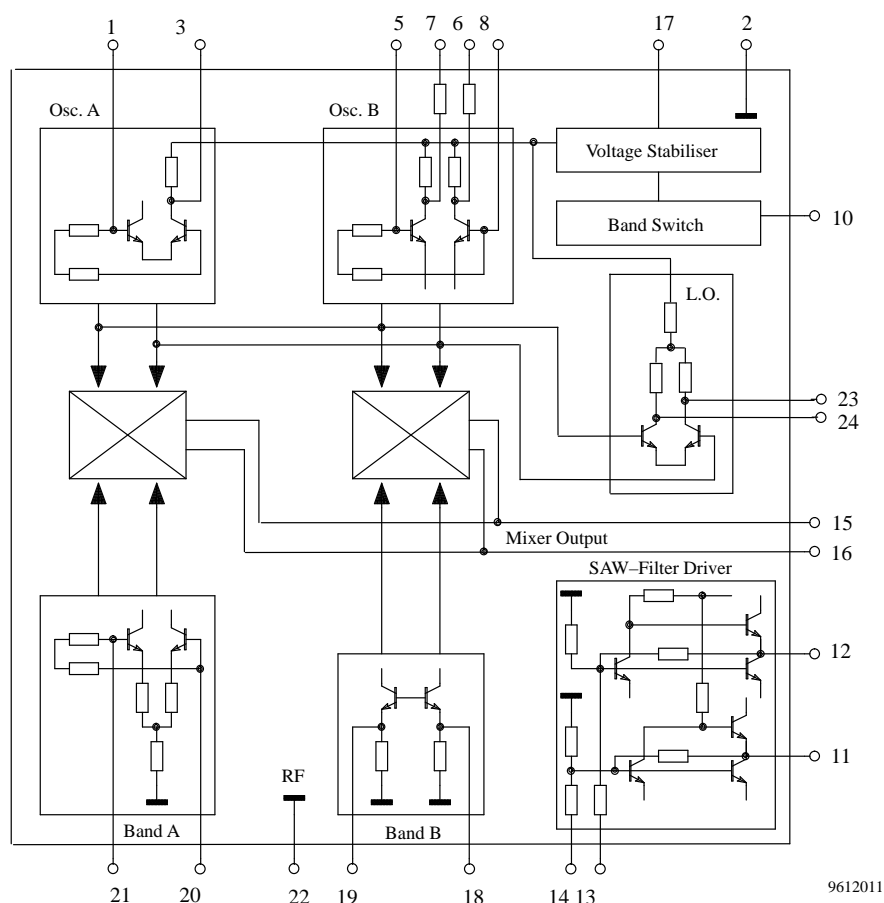


Figure 1. Block diagram

## Ordering Information

Extended Type Number	Package	Remarks
U2326B-AFSG3	SSO24 plastic package	Taped and reeled

## Pin Description

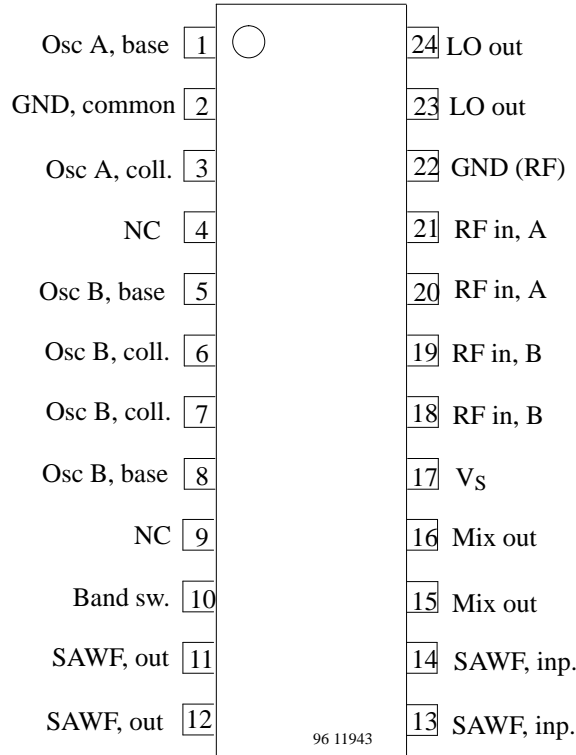


Figure 2. Pinning

Pin	Symbol	Function
1	Osc A, base	Oscillator band A, base
2	GND, common	Ground, common
3	Osc A, coll.	Oscillator band A, collector
4, 9	NC	Not connected
5, 8	Osc B, base	Oscillator band B, bases
6, 7	Osc B, coll.	Oscillator band B, collectors
10	Band sw.	Dual - state band switch
11, 12	SAWF, out	SAW filter driver outputs
13, 14	SAWF, inp.	SAW filter driver inputs
15, 16	Mix out	Mixer outputs, open collector
17	V <sub>S</sub>	Supply voltage V <sub>S</sub>
18, 19	RF in, B	RF inputs, band B
20, 21	RF in, A	RF inputs, band A
22	GND (RF)	Ground, RF part
23, 24	LO out	LO outputs

## Absolute Maximum Ratings

All voltages are referred to GND, Pin 2

Parameters	Symbol	Min.	Max.	Unit
Supply voltage	V <sub>S</sub>		10.5	V
RF inputs			5.0	V
IF outputs			10.5	V
Dual - state switch voltage	V <sub>ITRI</sub>		10.5	V
Junction temperature	T <sub>j</sub>		150	°C
Storage temperature	T <sub>stg</sub>	- 40	+ 150	°C

## Operating Range

All voltages are referred to GND, Pin 2

Parameters	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	V <sub>S</sub>	8.1	9	9.9	V
Ambient temperature	T <sub>amb</sub>	- 20		+ 85	°C

## Thermal Resistance

Parameters	Test Conditions	Symbol	Typ	Unit
Junction ambient	Package SS024 soldered to PCB	R <sub>thJA</sub>	125	K/W

## Electrical Characteristics

Test conditions (unless otherwise specified):  $V_S = 9\text{ V}$ ,  $T_{\text{amb}} = 25\text{ }^\circ\text{C}$ .

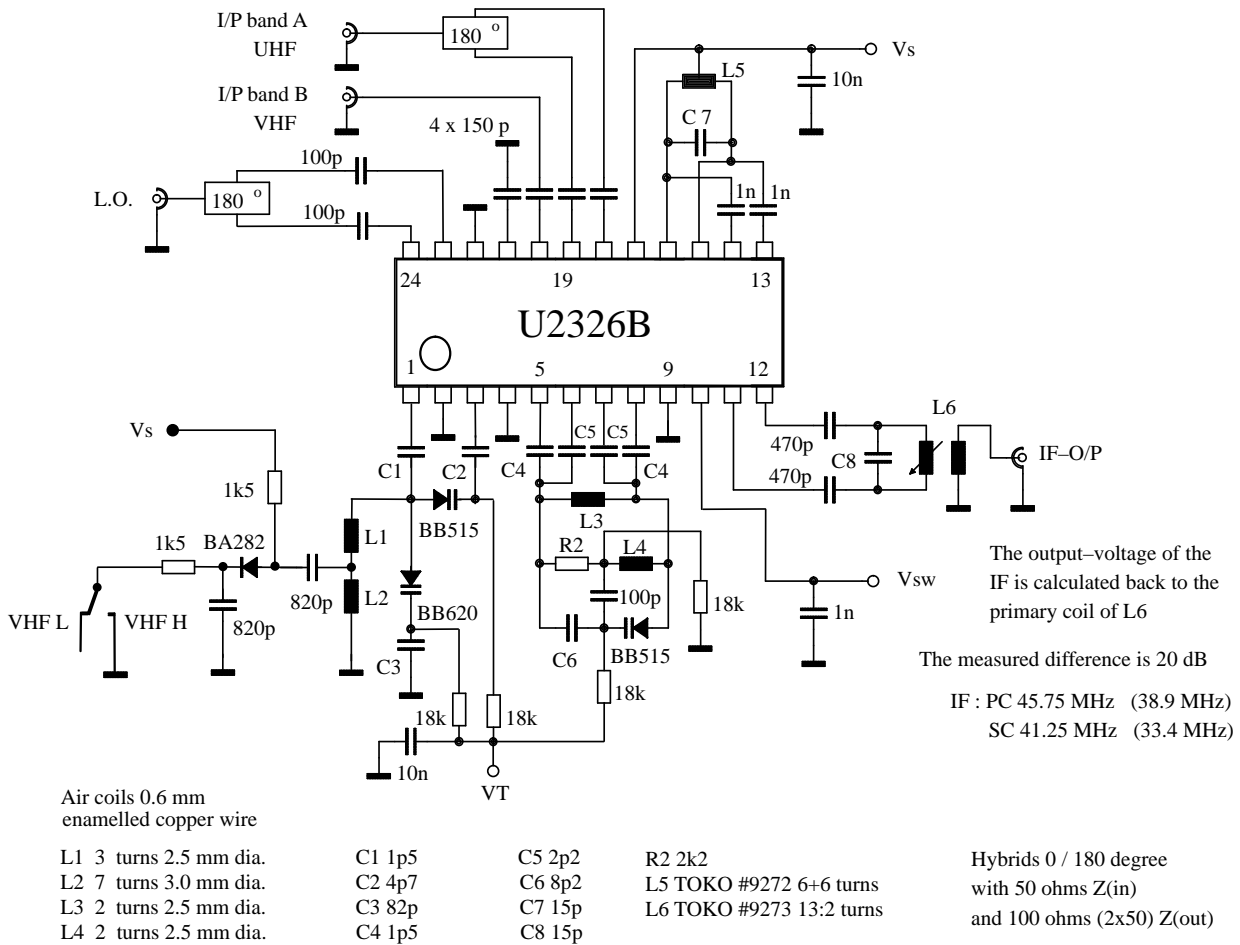
Reference point Pin 2, referred to figure 3.

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	Pins 15 to 17	$V_S$	8.1	9.0	9.9	V
Supply current	Pins 15 to 17	$I_S$		42		mA
<b>Band switch</b>						
Voltage band A	Pin 10	VSWA	0	0	1.0	V
Voltage band B	Pin 10	VSWB	3.4	4.0	$V_S$	V
Switching current	VSW = 5 V Pin 10	ISW			100	$\mu\text{A}$
<b>L.O.-output</b>						
L.O. Level each output	$R_L = 50\ \Omega$ Pins 23 and 24	PLO	-25		-17	dBm
<b>SAW filter driver, <math>f_i = 36\text{ MHz}</math></b>						
Input impedance	Pins 13 and 14	ZiSAW		450		$\Omega$
Output impedance	Pins 11 and 12	ZoSAW		70		$\Omega$
Voltage gain	Pins 13, 14 $\rightarrow$ 11, 12	GvSAW		17		dB
<b>Band A</b>						
Input frequency range (note 5)	Pin 20	fiA	48		470	MHz
Input impedance	Pin 20	S11A		see fig. 4		
Gain (note 4)	I/P to O/P	GA		28		dB
Noise figure DSB (note 2)	I/P to O/P, fiA = 50 MHz fiA = 150 MHz	NF		11.5 12		dB dB
Input level for IM3 (note 3, interm. of 3rd order)	fiA = 71 MHz	ViA		(note 6) -20		dBm
IM2 (interm. of 2nd order)	fiA = 71 MHz	ViA		-22 (note 6)		dBm
<b>Band B (note 1)</b>						
Input frequency range (note 5)	Pins 18 and 19	fiB	300		860	MHz
Input impedance	Pins 18 and 19	S11B		see fig. 4		
Gain (note 4)	I/P to O/P	GB		32		dB
Noise figure DSB (note 2)	I/P to O/P, fiB = 500 MHz fiB = 800 MHz	NF		10.5 11.5		dB
Input level for IM3 (note 3, interm. of 3rd order)	fiB = 600 MHz	ViB		(note 6) -25		dBm

### Notes:

1. The RF input B is symmetrical driven by means of a hybrid for 180°C phase shifting, consequently the source impedance is 100  $\Omega$ . All other impedance for RF tests is 50  $\Omega$ .
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 L6 to the available voltage at the input.
5. Depending on the oscillator's external circuitry
6. For each carrier

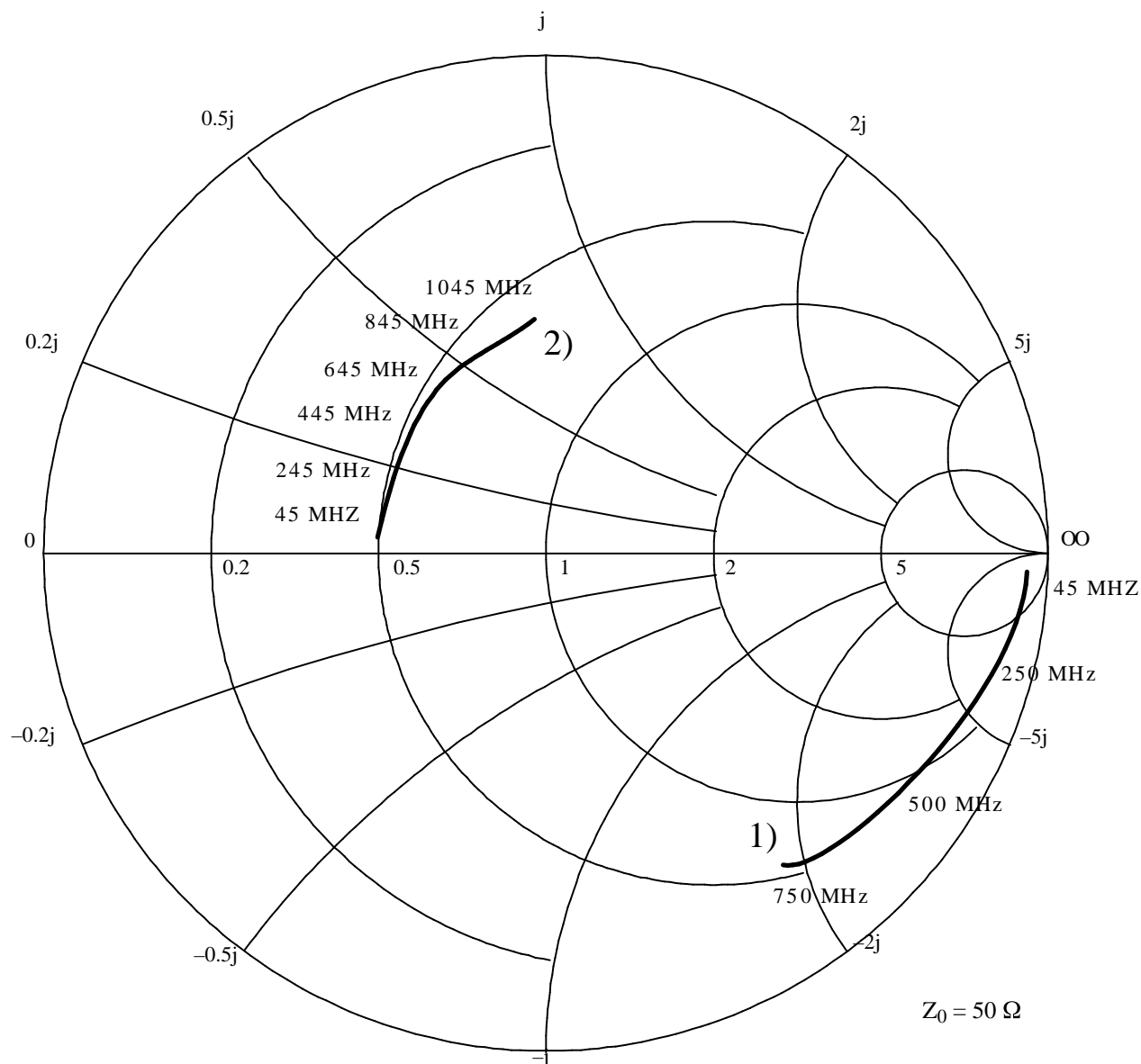
## Test and Principle Application Circuit



9612012

Figure 3. Test and principle application circuit

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



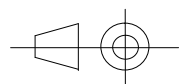
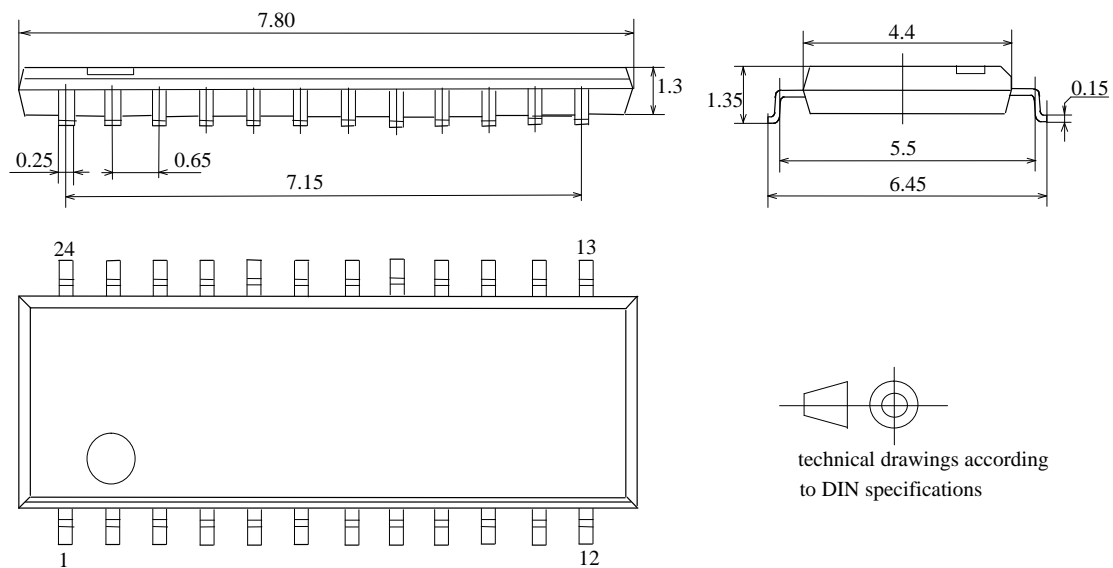
9612013

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

- 1) **VHF**  
Normalised to  $50 \Omega$ , measuring range 45 to 750 MHz.
- 2) **UHF**  
Normalised to  $50 \Omega$ , measuring range 45 to 1045 MHz. Both inputs are driven symmetrical.  
The output impedance of the hybrid is  $100 \Omega$ , the measured levels are then calculated in reference to  $50 \Omega$ .

## Dimensions in mm

Package: SSO24



technical drawings according  
to DIN specifications

## 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.

**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 TEMIC products for any unintended or unauthorized application, the buyer shall indemnify TEMIC 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.

TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany  
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423