SIEMENS

FM-Tuner IC

TUA 1574

Preliminary Data

Bipolar IC

Features

- Double-balanced mixer
- AGC generation
- Strictly symmetrical RF parts
- Standby switch
- Decoupled counter output
- IF-driver

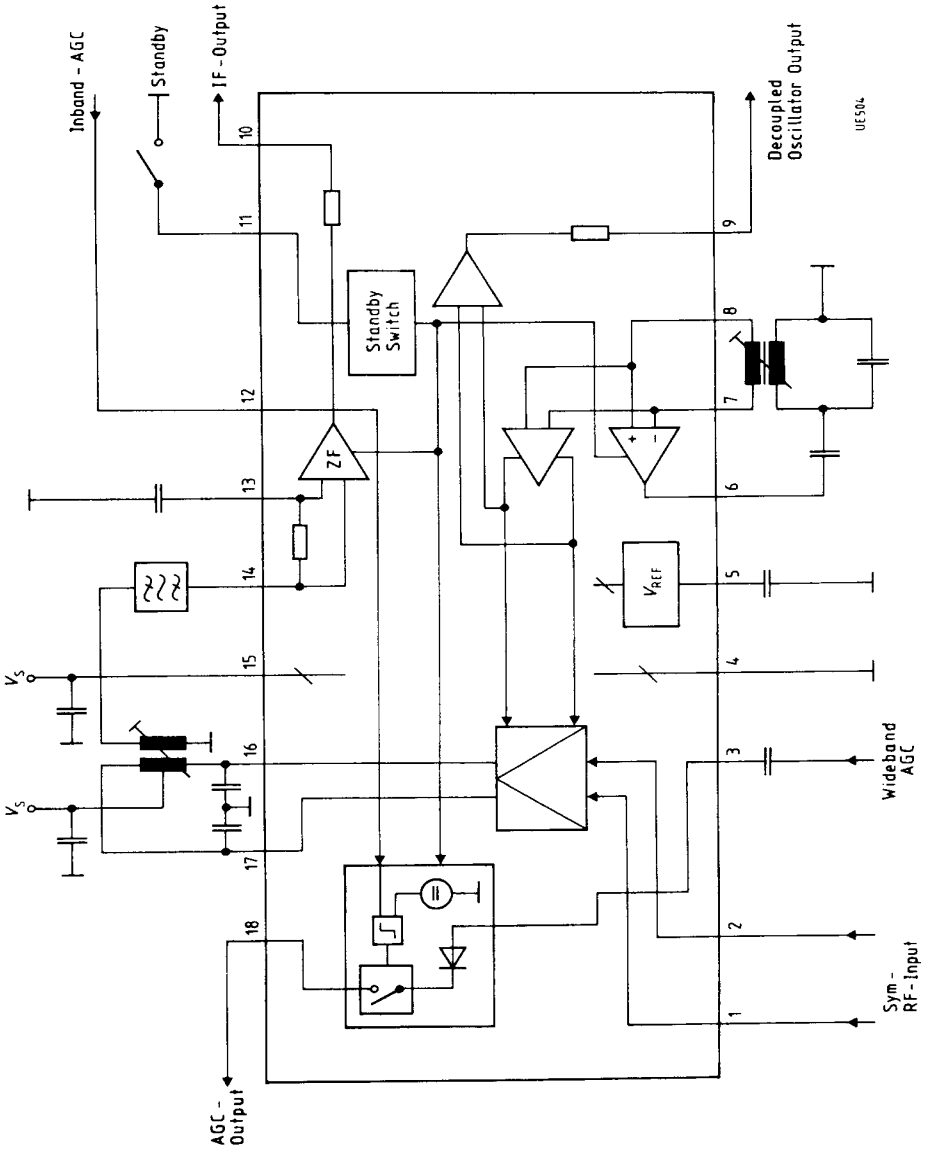
Type	Ordering Code	Package
TUA 1574	Q67000-A8101	P-DIP-18

The TUA 1574 has been designed as monolithic integrated tuner with strictly symmetrical RF parts. In addition the IC provides a pre-stage control by means of narrow and wideband information and IF post amplification.

The integrated circuit includes an oscillator with symmetrical input, buffered output and a double balanced mixer for frequency conversion. The resulting IF is post-amplified in a linear IF driver. The AGC stage integrated for pre-stage control generates combined wide and narrowband information. The IC also includes a reference voltage source and a standby switch.

The TUA 1574 is especially suitable for use in car radios and home receivers with pre-stage control and distributed IF selection.

Block Diagram



Pin Functions

Pin No.	Function
1, 2	**RF input for mixer** Low-impedance (basic circuitry) input directly to the mixer pair
3	**Input for wideband information** RF signal is present after pre-stage selection. Strong adjacent channel transmitter activates control.
4	**Ground** Decoupling should be referenced to this pin.
5	**Reference voltage** To be decoupled to pin 4.
6, 7, 8	**Oscillator** 3 point oscillator with low levels especially for tuning vector diodes.
9	**Decoupled oscillator output** Buffered output specially designed for synthesizer.
10	**Output IF driver** Output with 300 Ω corresponding to impedance of conventional IF ceramic filters.
11	**Standby-switch** The tuner is activated when this pin is tied to ground.
12	**Input for narrowband information** Field strength information of inband signal is forwarded to this pin for use in pre-stage control.
13, 14	**IF driver input** IF signal is forwarded to mixer via selection.
15	**Supply voltage** Pin should be RF decoupled against pin 4.
16, 17	**Mixer output** Symmetrical open collector output.
18	**C output** Output can be used as current output (pin diodes) or as voltage output (for bipolar and/or field effect transistors).

Absolute Maximum Ratings
T_A = 25 °C

Parameter	Symbol	Limit Values		Unit
		min.	max.	
Supply voltage	V_{15}	– 0.3	13.5	V
Mixer	V_{16},V_{17}	– 0.3	13.5	V
Standby- switch	V_{11}	– 0.3	V_{15}	V
Reference voltage	V_5	– 0.3	7	V

Operating Range

Supply voltage	V_{15}	7	12	V
Ambient temperature	T_A	– 25	85	°C

Characteristics
V_{15} = 8.5 V; T_A = 25 °C

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Current consumption		19	27	33	mA	$I_{15} + I_{16} + I_{17}$
Reference voltage	V_5	3.9	4.1	4.4	V	
Total gain	V_0	37	39	41	dB	V_0 = 20 lg (V_{IF}/EMF1)

Mixer

Third order intercept point	I_{P3}		115		dB/µV	random sample test
Noise figure	F		11	14	dB	
Mixer gain	V		10		dB	

Characteristics

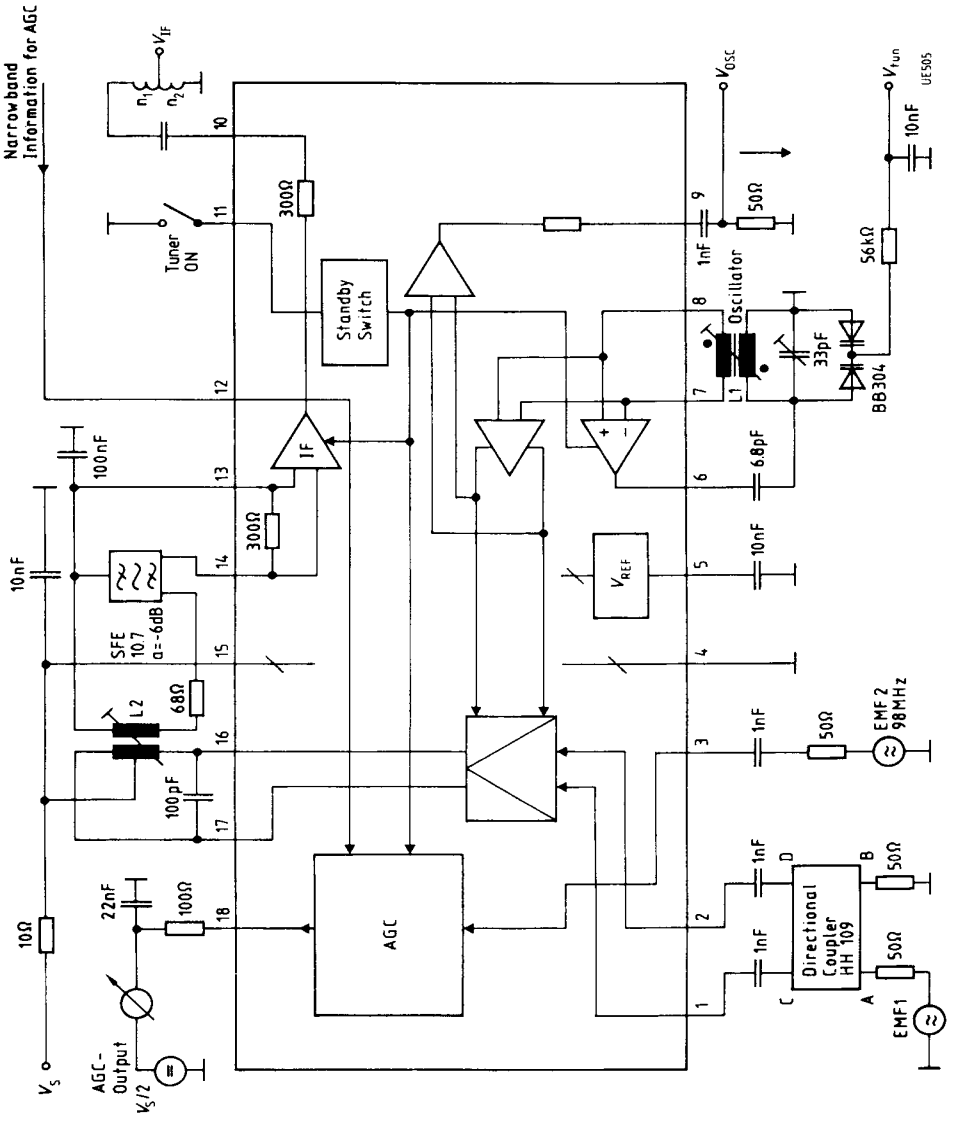
V_{15} = 8.5 V; T_A = 25 °C

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Oscillator						
DC characteristics	V_7, V_8	1.0	1.3	1.5	V	
DC characteristics	V_6	2.4	2.8	3.3	V	
Interference modulation	Δf		2.2		Hz	random sample test
Output signal 50 Ω	V_9	33	45	78	mV_{pp}	
Output impedance (ohmic)	R_9	2.0	2.5	3.0	kΩ	
Control Voltage Generation						
Control voltage	V_{18}	0.7		V_{15}-0.3	V	
Output current	$-I_{18}$	25	90	150	µA	V_3 = 0 oder V_{12} = 550 mV und $V_{18} = V_{15}/2$
Output current	I_{18}	2	3	5	mA	V_3 = 2 V und V_{12} = 1 V
Narrowband-control threshold V_3 = 2 V	V_{12}	450	500	550	mV	
Wideband control threshold	$V_{I\,HF\,EMF2}$	8	17	20	mV	V_{12} = 0.7 V $V_1 = V_{15/2}$

Characteristics (cont'd)
T_A = 25 °C

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Linear IF Amplifier						
Input DC voltage	$V_{13,14}$	1	1.2	1.5	V	
Output DC voltage	V_{10}	3.7	4.8	6.0	V	
Input resistance	R_{13}	240	300	360	Ω	
Input capacitance	C_{13}		13		pF	random sample test
Output impedance	R_{10}	240	300	360	Ω	
Output capacitance	C_{10}		3		pF	
Voltage gain	G_V		30		dB	$G_V = 20 \lg \frac{V_{10}}{\lvert V_{13}-V_{14}\rvert}$
Noise figure at R_S = 300 Ω	F		6.5		dB	
Standby OFF	V_{11}	3.3		V_{15}	V	

Test Circuit



Application Circuit