SIEMENS

AM Receiver for AM Stereo

TDA 4010

Preliminary Data

Bipolar IC

Features

- Internal demodulation
- Search tuning stop signal
- Low total harmonic distortion
- Minimal IF leakage at the AF output
- 2-stage integrated low pass
- Standard IF-output

Type	Ordering Code	Package
TDA 4010	Q67000-A8074	P-DIP-18

Circuit Description

Compared to TDA 4001 the TDA 4010 is an extended AM-receiver. This type is suitable for applications in car radios.
The IF-output $V_{Q\,IF}$ is at pin 15.

The monolithic integrated bipolar receiver has been designed to convert, amplify and demodulate AM-signals. In addition, the component provides a search tuning pulse.

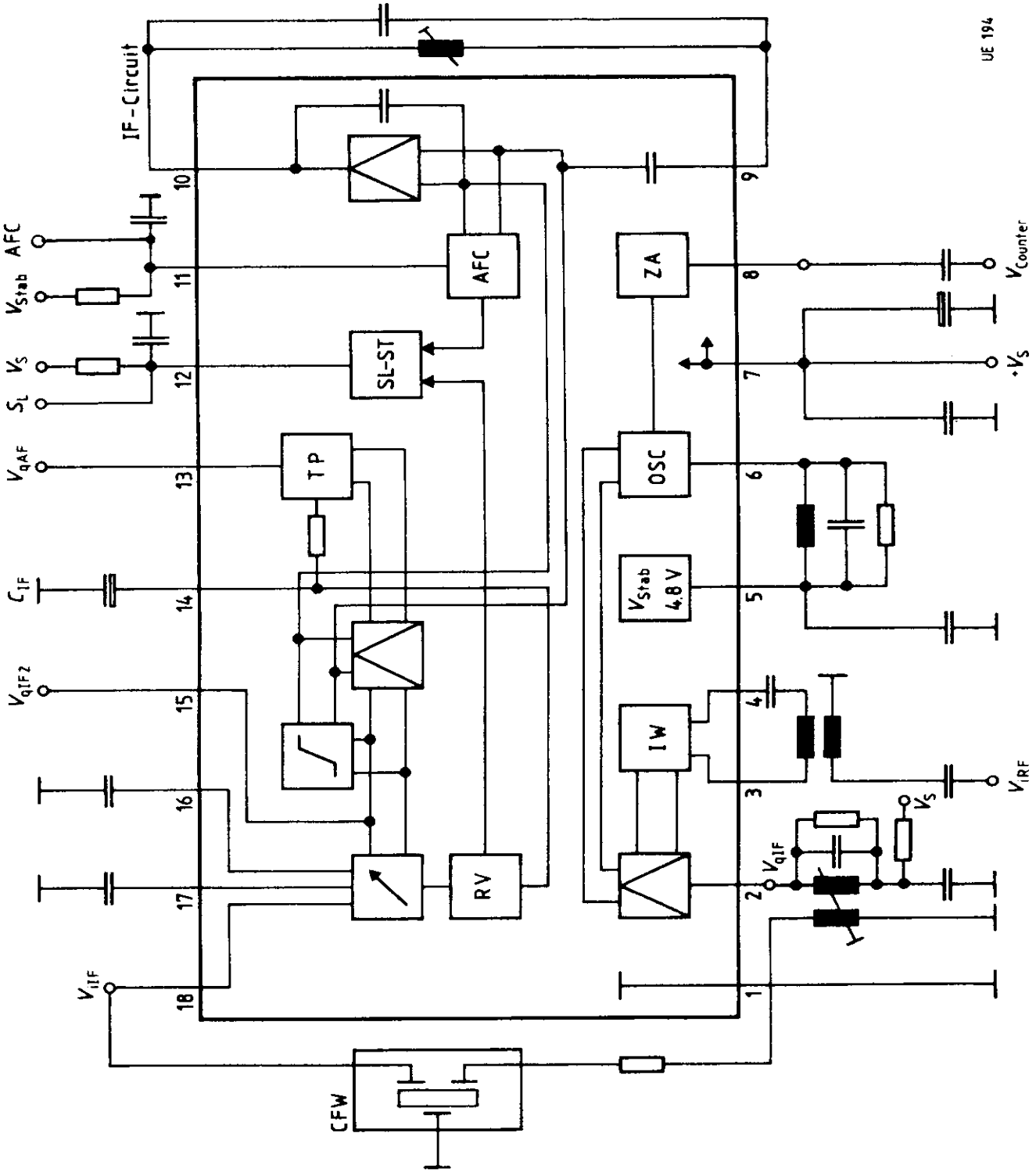
The search tuning stop pulses are processed from the input signal.

The standard AM-IF signal is available at the output of the IF-receiver.

The impedance converter forwards the input signal V_{iRF} to the symmetrical double balanced mixer. Subsequently the signal is converted to IF with the amplitude-controlled oscillator. An external filter forwards the IF signal to the controlled IF amplifier. The amplifier IF signal and the carrier signal will be converted to AF in the subsequent synchronous demodulator. The 2-stage low pass filter forwards the available AF to the AF output.

Via an additional limiter amplifier (LA), the AF uses the carrier signal to control the coincidence demodulator (CD). The output signal of the coincidence demodulator provides the stop pulse during exact tuning and sufficient field strengh.

Block Diagram



Pin Functions

Pin No.	Function
1	Ground
2	Mixer output, IF circuit
3	RF-input
4	RF-input
5	V_{Stab}
6	Oscillator
7	Supply voltage
8	Counter output
9	FM-demodulator circuit IF circuit
10	FM-demodulator circuit IF circuit
11	AFC-output
12	Search tuning stop output
13	AF-output
14	IF-time constant
15	Controlled IF-output
16	IF-operating point follow up device
17	IF-operating point follow up device
18	IF-input

Absolute Maximum Ratings

T_A = 25 °C

Parameter	Symbol	Limit Values		Unit
		min.	max.	
Operating voltage	V_S		16.5	V
Current consumption	I_S		33	mA
Junction temperature	T_j		150	°C
Storage temperature	T_{stg}	– 40	125	°C

Thermal Resistance

Chip ambient	$R_{th\ SU}$		78	K/W
Chip package	$R_{th\ SG}$			

Operating Range

Operating voltage	V_S	7	15	V
Temperature range	T_A	– 25	85	°C

Characteristics

V_S = 12 V; T_A = 25 °C

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Current consumption	I_S	9	15	30	mA	
Reference voltage	V_{Stab}	4.2	4.8	5.4	V	
IF-output voltage	$V_{Q\,IF}$	600	800 300	1000	mVrms mVrms	m = 0.8 m = 0.3
Total harmonic distortion	THD	m = 0.8		2.5 1	% %	m = 0.8 m = 0.3
IF-output voltage	$V_{Q\,IF}$			3	dB	20xlg(V_{QNF}/30mV0: V_{QNF}/1mV)
Input sensitivity	$V_{I\,RF}$	30	30		µV rms	V_{qNF} for V_{iHF} = 1mV – 3dB
Signal-to-noise ratio	$\frac{S+N}{N}$		6		dB	m = 0.3 V_{iHF} = 10 µVrms
Signal-to-noise	$S+N$	44	46		dB	m = 0.3 V_{iHF} = 1mV
Oscillator voltage	V_{OSC}		100		mV pp	
Counter output voltage	V_{QC}			100	mV pp	
Control range (ΔV_{qIF} = 6dB)	a	60			dB	
3dB limit frequency of the integrated TP	f_g		5		kHz	

Characteristics (cont'd)
V_S = 12 V; T_A = 25 °C

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
IF-suppresion	a_{IF}		40		dB	
Conversion gain	V_m		30		dB	
IF-output pin 15	V_{QIF}	8	10	22	mV rms	1MΩ/1.5pF
AFC-offset current without signal	I_{AFC}			± 25	µA	
AFC-offset current over control range	ΔI_{AFC}			± 25	µA	
AFC-current	I_{AFC}	± 60		± 100	µA	f_{IIF} = 1MHz ± 3kHz
SLS-output voltage	V_{12}			0.4	V	f_{IF} = 455kHz
SLS-output voltage	V_{12}	11			V	f_{IF} = 0V
SLS-output voltage	V_{12}	11			V	f_{IF} > 455kHz + 3kHz
SLS-output voltage	V_{12}	11			V	f_{IF} > 455kHz – 3kHz
Input impedance	Z_{IRF}		10/1.5		kΩ//pF	pin 3, 4
Input impedance	Z_{IRF}		3.3/1.5		kΩ//pF	pin 18

Test Circuit