SIEMENS

Multistandard Sound IF with Vision Carrier Input

TDA 6048-5X

Preliminary Data

Bipolar IC

Features

- High input sensitivity
- Low distortion for AM-sound application
- AM detector is alignmentfree
- Few external components
- Selectable IF inputs low crosstalk
- Intercarrier output for quasi parallel sound application
- All pins are ESD protected

P-DSO-14-1

Type	Ordering Code	Package
TDA 6048-5X	Q67000-A5061	P-DSO-14-1 (SMD)

Functional Description

Multistandard sound IF with two selectable IF inputs. The selection between the two IF inputs is made by applying ground to a special IF-select pin, or by leaving it in a high impedance state.

Both IF inputs are symmetrical inputs. There are two possible ways of processing the select sound IF:

An audio frequency signal is available after amplifying and demodulating a selected AM sound IF signal (e.g. L standard).

For applications with quasi parallel sound a selected FM-sound IF is mixed with a picture carrier which is applied symmetrically to a picture carrier input stage (e.g. B/G standard).

The difference of both, picture carrier and FM-sound IF, is available for further processing.

A three-level switch defines the activating of the AM- and/or FM-signal path. So, three modes of operating are possible:

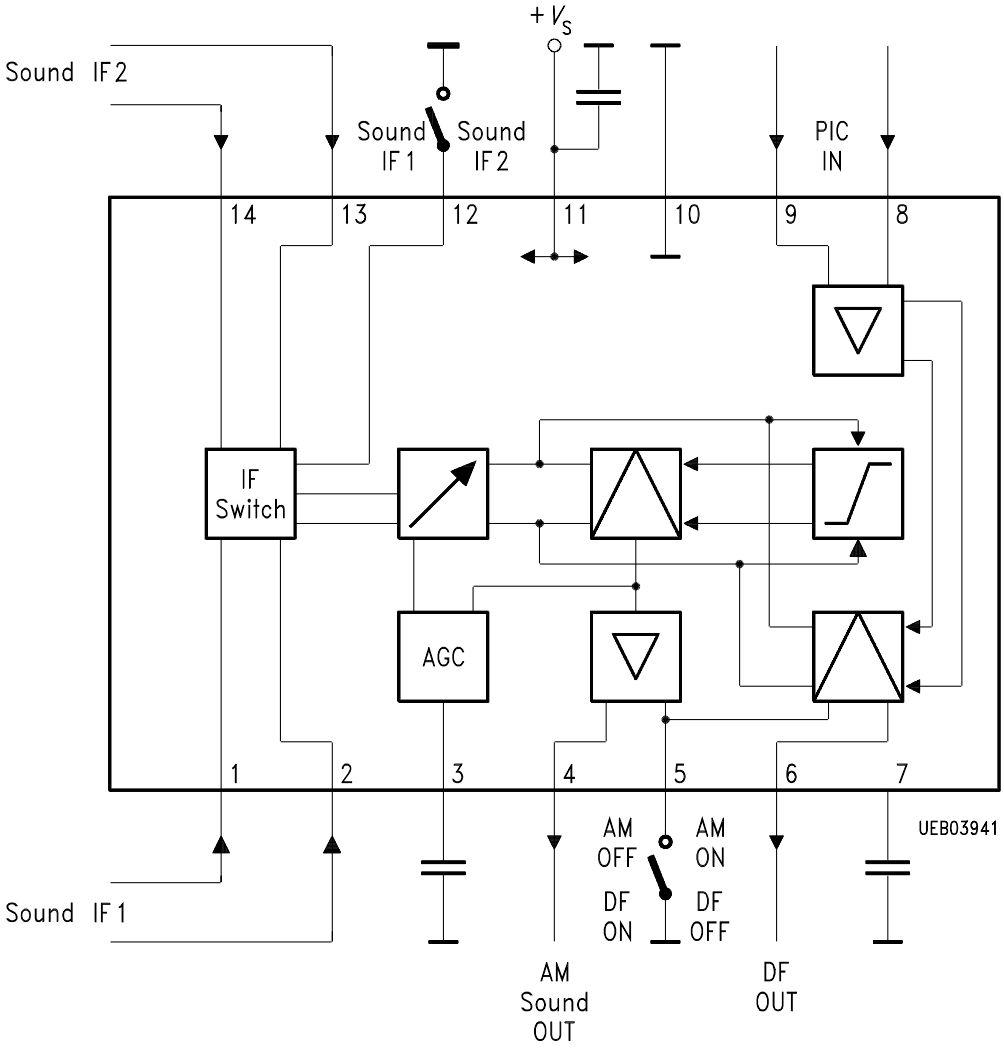
AM sound	difference frequency
ON	OFF
OFF	ON
ON	ON

Application

For use in multistandard VCR- and TV sets.

Pin Functions

Pin No.	Function
1	IF input 1
2	IF input 1
3	AGC-time constant
4	AM-sound output
5	AM / DF switch
6	Difference frequency output
7	Reference bypass
8	Picture carrier input
9	Picture carrier input
10	Ground
11	+ V_S supply voltage
12	IF-input switch
13	IF input 2
14	IF input 2



Block Diagram

Circuit Description

This circuit selects one of two sound IF-input signals by applying ground or low level to pin 12 (sound IF2 is chosen) or by leaving it open (sound IF1 is chosen). The following IF amplifier consists of four capacitively coupled stages. A quasi synchronous detector provides in case of AM operation the audio frequency on pin 4. Furthermore, the detector supplies a regulation voltage to control the gain of the IF amplifier (AGC). In case of FM operation, the amplified IF signal is branched and multiplied with a regenerated picture carrier, so that on pin 6 the difference signal of both is available. The picture carrier has to be applied symmetrically to pin 8 and 9. The three possible modes of operation are determined by the voltage level that is applied to pin 5.

Absolute Maximum Ratings
T_A = 0 to 70 ˚C

Parameter	Symbol	Limit Values		Unit	Remarks
		min.	max.		
Power supply	V_{11}	0	14	V	
Junction temperature	T_j		150	˚C	
Storage temperature	T_{stg}	– 40	125	˚C	
Thermal resistance (system-air)	$R_{th\ SA}$		125	K/W	without additional copper on the pc board for better heat dissipation
$V_{12} - V_{10}$ $V_5 - V_{10}$			5 5	V V	

Operating Range

Supply voltage	V_{11}	10.8	13.2	V	
Ambient temperature during operation	T_A	0	70	˚C	
IF-frequency range – 3 dB	$f_{SoundIF}$	12	80	MHz	
$V_3 - V_{10}$			3.3	V	

AC/DC Characteristics
T_A = 25 ℃; V_S = 12 V

Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Total current	I	27	35	44	mA	I_{11}
Static Characteristics						
AGC Voltage						
Min. AGC Max. AGC	V_3 V_3	0 2.6	0.5 2.85	1.0 3.5	V V	$V_{1/2}/V_{13/14}$ = 45 µVrms $V_{1/2}/V_{13/14}$ = 175 mVrms
AGC-Time Constant						
Charge current Discharge current Charge current with quick charge	I_3 I_3 I_3	 – 3.5	1.2 1.2 – 1.7	 – 0.6	µA µA mA	Integral mean value control Integral mean value control V_3 = 0.5 V V_3 = 2.8 V V_{IF} = 0 V Signal step > 20 dB
IF inputs $V_{1/2}$, $V_{13/14}$		5.7	6	6.3	V	
FM-sound IF output difference frequency	V_6		2.6		V	
Input current AM/DF switch	I_5	215	270	365	µA	V_5 = 6 V
Output current AM/DF switch	I_5	175	220	300	µA	V_5 = 0 V
Input current IF select	I_{12}		165		µA	V_{12} = 5 V
Input current IF select	I_{12}		– 240		µA	V_{12} = 0 V
Dynamic Characteristics						
Min sound IF-input voltage (min. AGC)	$V_{1/2}/V_{13/14}$		60		µV	V_6 = – 3 dB $V_{8/9}$ > 50 mV
Max. sound IF-input voltage (max. AGC)	$V_{1/2}/V_{13/14}$		140		mV	V_6 = + 3 dB $V_{8/9}$ > 50 mV
IF-control range	ΔV		66		dB	
FM-sound IF output voltage	V_{6rms}		140		mV	$V_{1/2}$ = $V_{13/14}$ = 10 mV $V_{8/9}$ > 50 mV
AF output voltage in AM operation	V_4		500		mV	$V_{1/2}$ = $V_{13/14}$ = 10 mV m = 80 %

AC/DC Characteristics (cont'd)

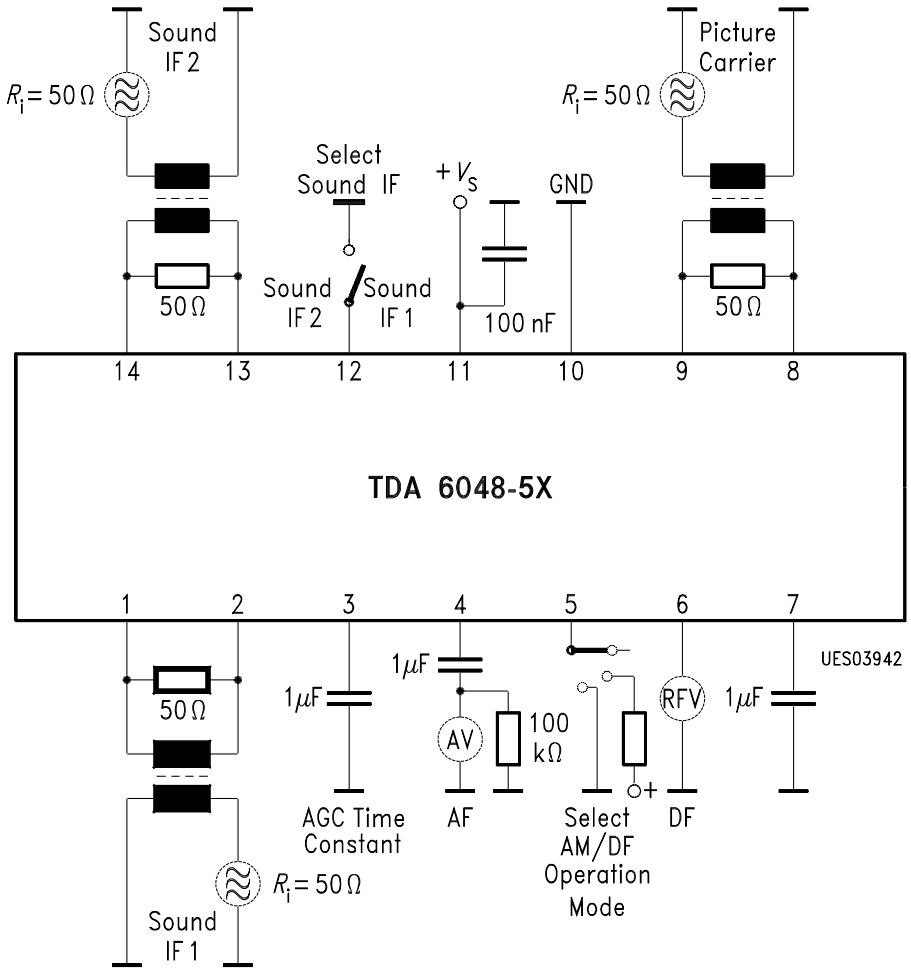
Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Total harmonic distortion in AM operation	THD_4		 0.3 1		 % %	$V_{1/2} = V_{13/14}$ = 1 mV m > 30 % m > 80 %
Crosstalk	$a_{1/2}/a_{13/14}$		50		dB	

Design Notes for FM Operation

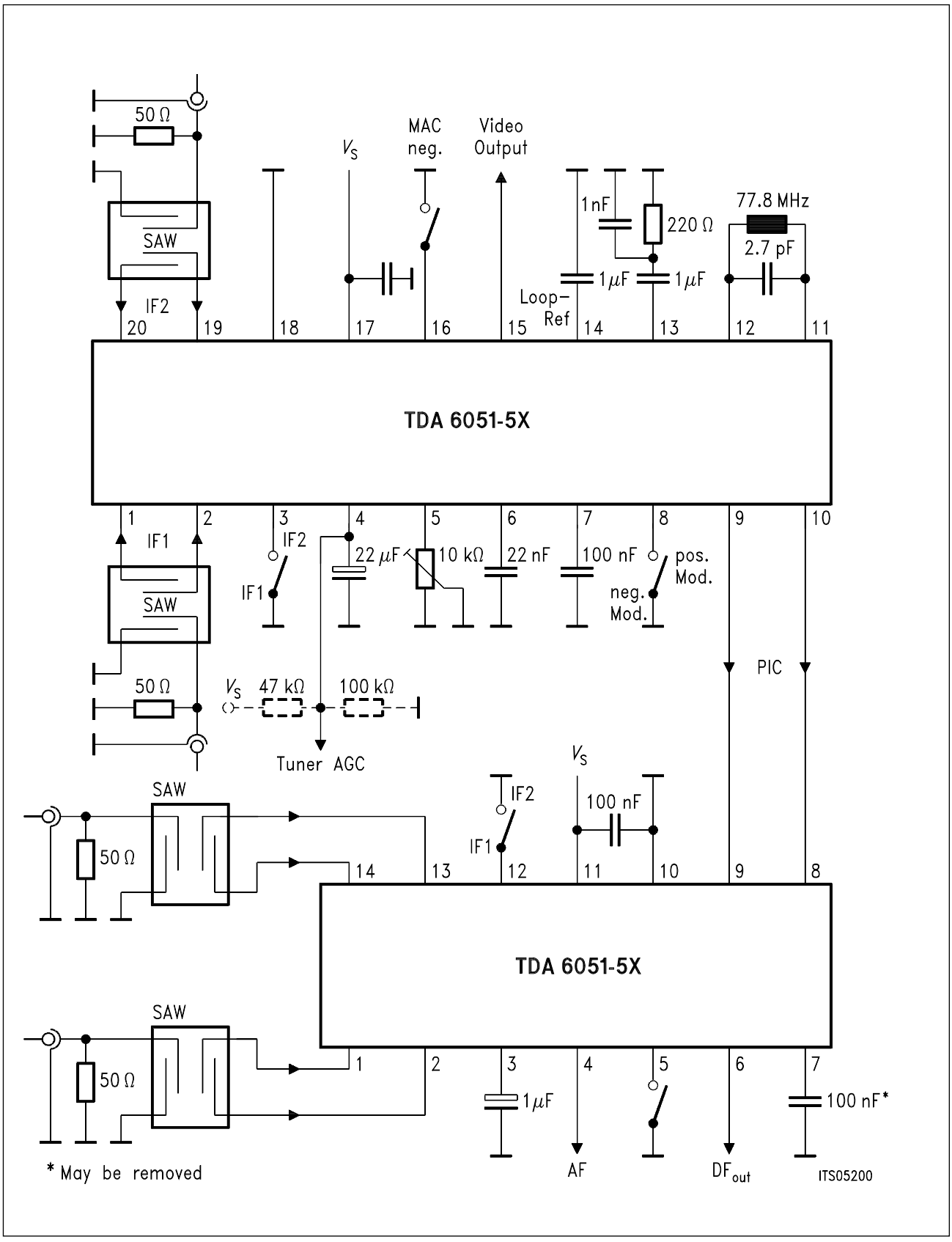
Input resistance symmetrical	$R_{1/2} = R_{13/14}$	1.5	2	2.5	kΩ	
Input capacitance symmetrical	$C_{1/2} = C_{13/14}$	1.5	2	5	pF	

Intercarrier signal to noise ratio (weighted according to CCIR 468) f_{SC} = 5.5 MHz with transmitting sound carrier – 13 dB

	S/N		tbf		dB	$V_{1/2} = V_{13/14}$ = 10 mV FuBk
	S/N		tbf		dB	$V_{1/2} = V_{13/14}$ = 10 mV 2.753-MHz mod.
FuBk-test picture	$\Delta S/N$		tbf		dB	with detuning Δf = – 400 kHz
FuBk-test picture	$\Delta S/N$		tbf		dB	with detuning Δf = + 400 kHz
Output resistance	R_6			150	Ω	
Noise figure	F			5	dB	$V_{1/2} = V_{13/14}$ = 50 dBµV R_G = 800 Ω



Test Circuit



Application Circuit