

# 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



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

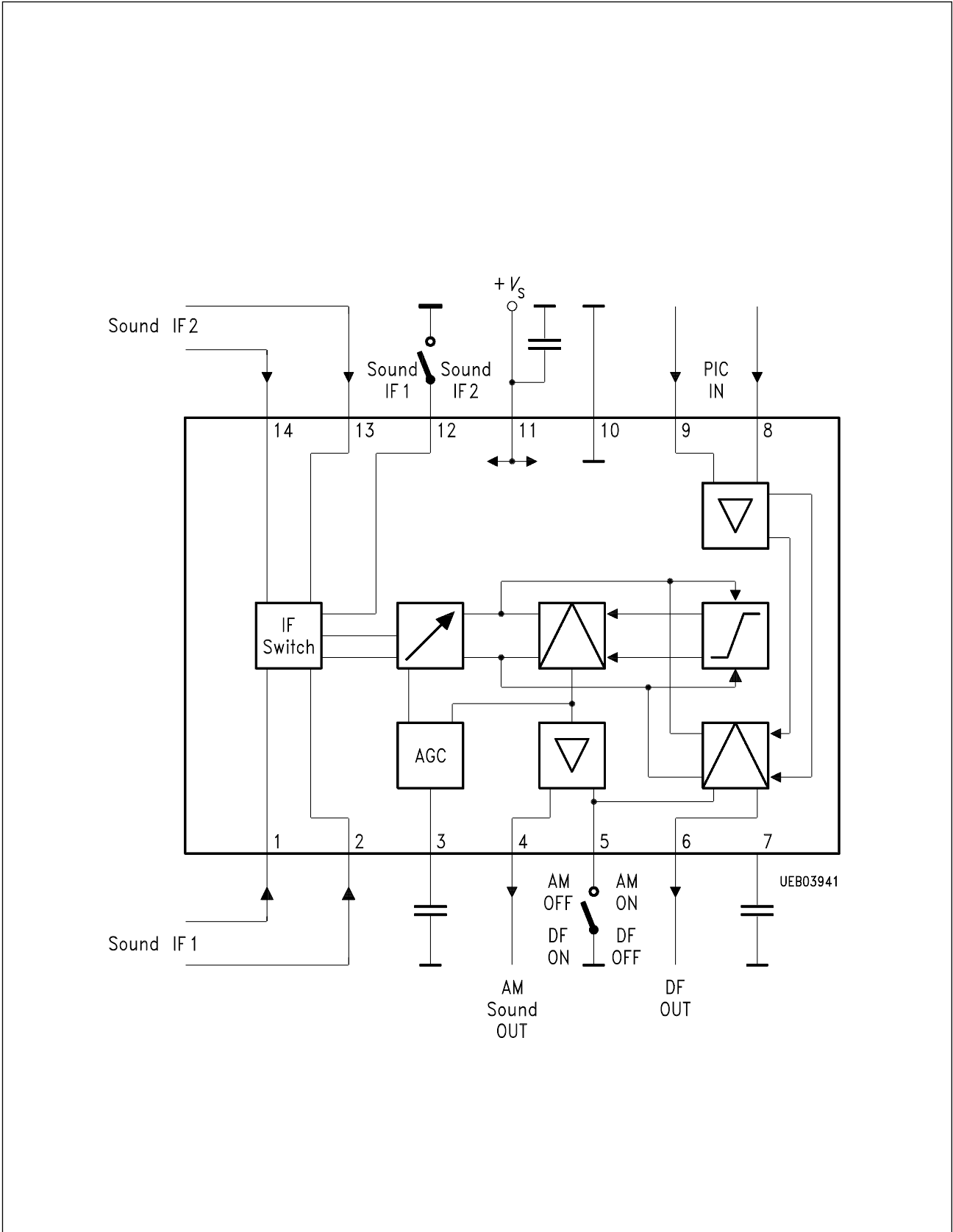
### Application

For use in multistandard VCR- and TV sets.



**Pin Functions**

<b>Pin No.</b>	<b>Function</b>
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

$T_A = 25\text{ °C}; V_S = 12\text{ V}$

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	$V_3$	0	0.5	1.0	V	$V_{1/2}/V_{13/14} = 45\text{ }\mu\text{Vrms}$
Max. AGC	$V_3$	2.6	2.85	3.5	V	$V_{1/2}/V_{13/14} = 175\text{ mVrms}$

#### AGC-Time Constant

Charge current	$I_3$		1.2		$\mu\text{A}$	Integral mean value control Integral mean value control $V_3 = 0.5\text{ V}$ $V_3 = 2.8\text{ V}$ $V_{IF} = 0\text{ V}$ Signal step > 20 dB
Discharge current	$I_3$		1.2		$\mu\text{A}$	
Charge current with quick charge	$I_3$	-3.5	-1.7	-0.6	mA	
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	$\mu\text{A}$	$V_5 = 6\text{ V}$
Output current AM/DF switch	$I_5$	175	220	300	$\mu\text{A}$	$V_5 = 0\text{ V}$
Input current IF select	$I_{12}$		165		$\mu\text{A}$	$V_{12} = 5\text{ V}$
Input current IF select	$I_{12}$		-240		$\mu\text{A}$	$V_{12} = 0\text{ V}$

### Dynamic Characteristics

Min sound IF-input voltage (min. AGC)	$V_{1/2}/V_{13/14}$		60		$\mu\text{V}$	$V_6 = -3\text{ dB}$ $V_{8/9} > 50\text{ mV}$
Max. sound IF-input voltage (max. AGC)	$V_{1/2}/V_{13/14}$		140		mV	$V_6 = +3\text{ dB}$ $V_{8/9} > 50\text{ mV}$
IF-control range	$\Delta V$		66		dB	
FM-sound IF output voltage	$V_{6\text{rms}}$		140		mV	$V_{1/2} = V_{13/14} = 10\text{ mV}$ $V_{8/9} > 50\text{ mV}$
AF output voltage in AM operation	$V_4$		500		mV	$V_{1/2} = V_{13/14} = 10\text{ mV}$ $m = 80\%$

### AC/DC Characteristics (cont'd)

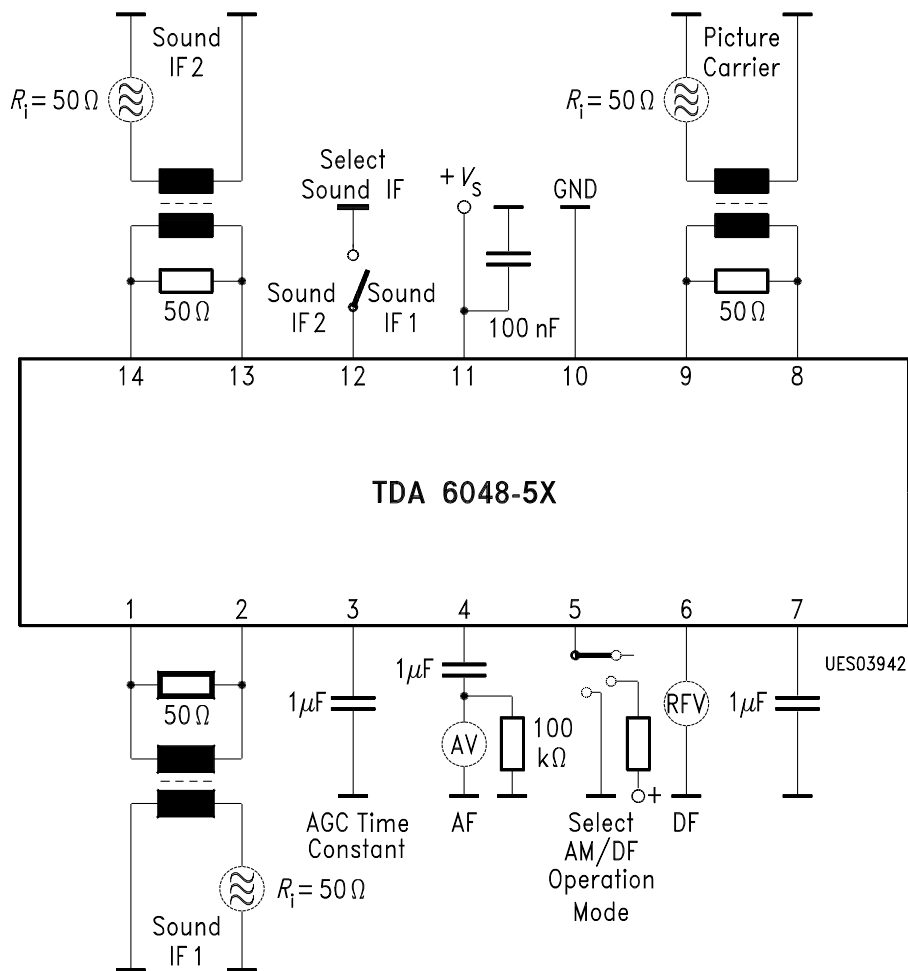
Parameter	Symbol	Limit Values			Unit	Test Condition
		min.	typ.	max.		
Total harmonic distortion in AM operation	$THD_4$		0.3 1		% %	$V_{1/2} = V_{13/14} = 1 \text{ mV}$ $m > 30 \%$ $m > 80 \%$
Crosstalk	$a_{1/2}/a_{13/14}$		50		dB	

### Design Notes for FM Operation

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

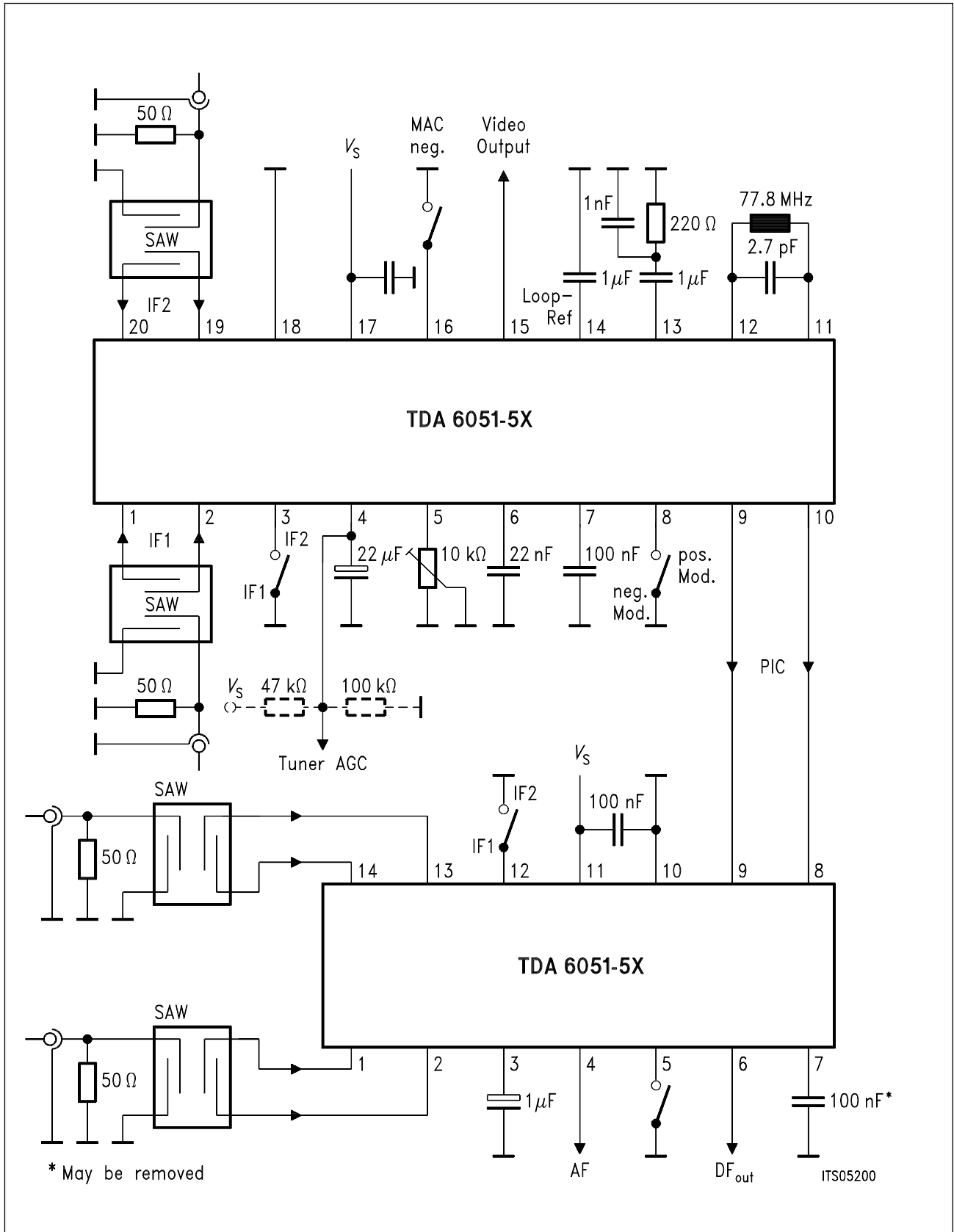
Intercarrier signal to noise ratio (weighted according to CCIR 468)  $f_{SC} = 5.5 \text{ MHz}$  with transmitting sound carrier – 13 dB

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



Test Circuit





Application Circuit