TDA4483

Monolithic Integrated Circuit

Applications

Intercarrier mixer and AM-demodulator for multistandard sound IF processing in TV and VCR (quasiparallel sound mono/stereo NICAM).

Features

- Very high input sensitivity
- Excellent signal-to-noise ratio
- Intercarrier output signal gain controlled and independent from the picture carrier to sound carrier ratio
- AM demodulator alignment free
- Few external components
- ESD protected

Block Diagram

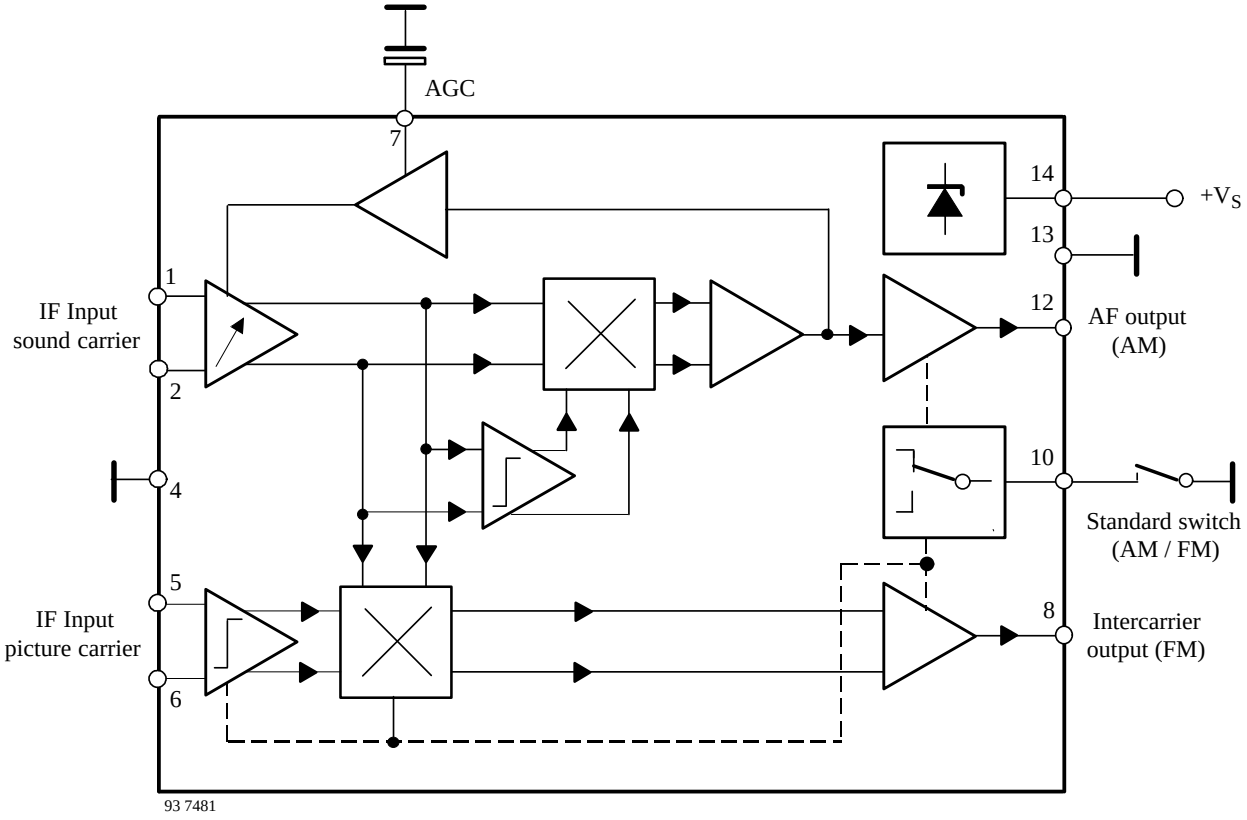
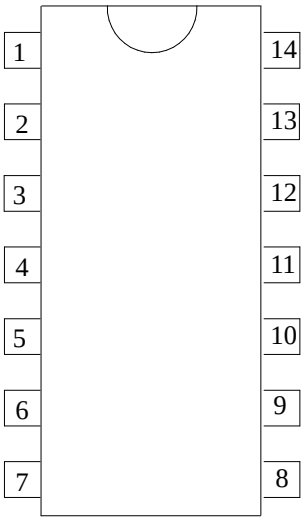


Figure 1.

TDA4483

Pin Configuration



Pin – Function

Pin	Symbol	Function
1, 2		IF input (sound carrier)
3, 9, 11		n.c.
4, 13		Ground
5, 6		IF input (picture carrier)
7		AGC time constant
8		Intercarrier output
10		Standard switch
12		AF output (AM)
14		Supply voltage

Circuit Description

The bipolar circuit TDA4483 enables high quality sound IF processing for multistandard application in TV-sets and VCR. Main principle of this circuit are separated inputs for the sound- and picture carrier. The sound carrier signal (single or dual carrier, modulated with AM, FM or NICAM) from the SAW filter will be fed into a 3-stage, gain controlled, IF amplifier (pin 1 and 2).

The following two mixer stages operate on the different standards. The first mixer works as a quasi synchronous detector and provides in case of AM the audio frequency at pin 12. Furthermore, the first mixer supplies a regulation voltage to control the gain of the 3 stage IF amplifier (AGC).

The second mixer stage works as a intercarrier mixer in FM/NICAM mode and supplies at pin 8 the intercarrier signal (difference signal between picture and sound carrier) independent from the picture carrier to sound carrier ratio. For example in standard B/G the 5.5/5.74 MHz subcarrier is available at pin 8. The required picture carrier for the intercarrier mixer will be coupled out from the tuned demodulator circuit of the vision-IF IC (e.g. TDA4453 or equivalent components). The selective and prelimited picture carrier has to be applied symmetrically to the picture carrier input (pin 5 and pin 6). An additional limiting amplifier delivers the regenerated picture carrier to the intercarrier mixer.

The possible modes of operation (FM/NICAM or AM) are determined by the voltage level that is applied to pin 10 (standard switch). Without external control voltage at pin 10 the FM/NICAM operation is automatically selected. In case of AM the intercarrier output pin 8 is switched off, however DC output voltage remains. Corresponding in FM/NICAM operation the AF output pin 12 is switched off.

Absolute Maximum Ratings

Reference point pin 13 (4), unless otherwise specified.

Parameters		Symbol	Value	Unit
Supply voltage	Pin 14	V_S	13.5	V
Supply current	Pin 14	I_S	50	mA
Power dissipation		P_{tot}	680	mW
Junction temperature		T_j	125	°C
Thermal resistance, Junction-ambient		R_{thJA}	90	K/W
Operating temperature, ambient		T_{amb}	–25 to +70	°C
Storage temperature		T_{stg}	–25 to +125	°C

Thermal Resistance

Parameters	Symbol	Value	Unit
Junction-ambient	R_{thJA}	90	K/W

Electrical Characteristics

T_{amb} = 25°C,V_S = 12 V, reference point: pin 13 (4), unless otherwise specified

Parameters	Test Conditions / Pins	Symbol	Min.	Typ.	Max.	Unit
Supply voltage range	Pin 14	V_S	10		13.5	V
Supply current	FM-mode Pin 14 AM-mode	I_S		37 32		mA
DC output voltage	Pin 8 Pin 12	V_O		3.6 3.2		V
Standard switch						
Control voltage Internal DC voltage FM-mode automatically selected	AM-mode Pin 10 FM-mode (open) Pin 10	V_{CTRL} V_{CTRL}	0 2.2	 2.3	1.5 V_S	V V
Control current	V_{CTRL} < 5 V Pin 10	I_{CTRL}			200	µA
FM-mode Test conditions: picture carrier f_{PC} = 38.9 MHz, sound carrier f_{SC1} = 33.4 MHz, f_{SC2} = 33.1587 MHz, picture carrier to sound carriers ratio = 13/20 dB, picture carrier unmodulated (equivalent to sync peak pulse)						
Sound carrier frequency range		f_{SC}	30		40	MHz
Picture carrier input voltage	Pin 5, 6	v_{PC}	10	20	30	mV
Sound carrier minimal input voltage (5.5 MHz intercarrier signal –3 dB)	Pin 1, 2	v_{SC}		50		µV
Sound carrier gain control range		AGC	60	65		dB
Intercarrier output voltage	Pin 8	v_{OIC}		350		mV
Output resistance	Pin 8	R_O		15		Ω
Signal to ratio Test conditions: Sound carrier V_{SC} = 10 mV, picture carrier v_{PC} = 20 mV, limited carrier from TDA4453 or comparable vision IF circuit, reference signal: frequency deviation Δf = ±30 kHz, sound modulation f_{mod} = 1 kHz. Weighted S + N/N ratio of the demodulated intercarrier signal in accordance with CCIR468-4, measured with FM-demodulator U2829B						
Picture carrier unmodulated	channel 1/2	S + N/N		68/67		dB
Black picture	channel 1/2	S + N/N		62/60		dB
Grid	channel 12	S + N/N		50/48		dB
AM-mode; Test condition: sound carrier f_{SC} = 32.4 MHz						
Sound carrier minimal input voltage (AF output voltage –3 dB)	Pin 1, 2	v_{SC}		50		µV
Sound carrier gain control range		AGC	60	65		dB
AF output voltage	m = 54%, f_{mod} = 1 kHz Pin 12	v_{AF}		500		mV
Total harmonic distortion	m = 80%, f_{mod} = 1 kHz Pin 12	THD		1.5	3.0	%
Allowable external resistance	Pin 12	R_{ext}	3			kΩ
Output resistance	Pin 12	R_O		30		Ω

Test Circuit

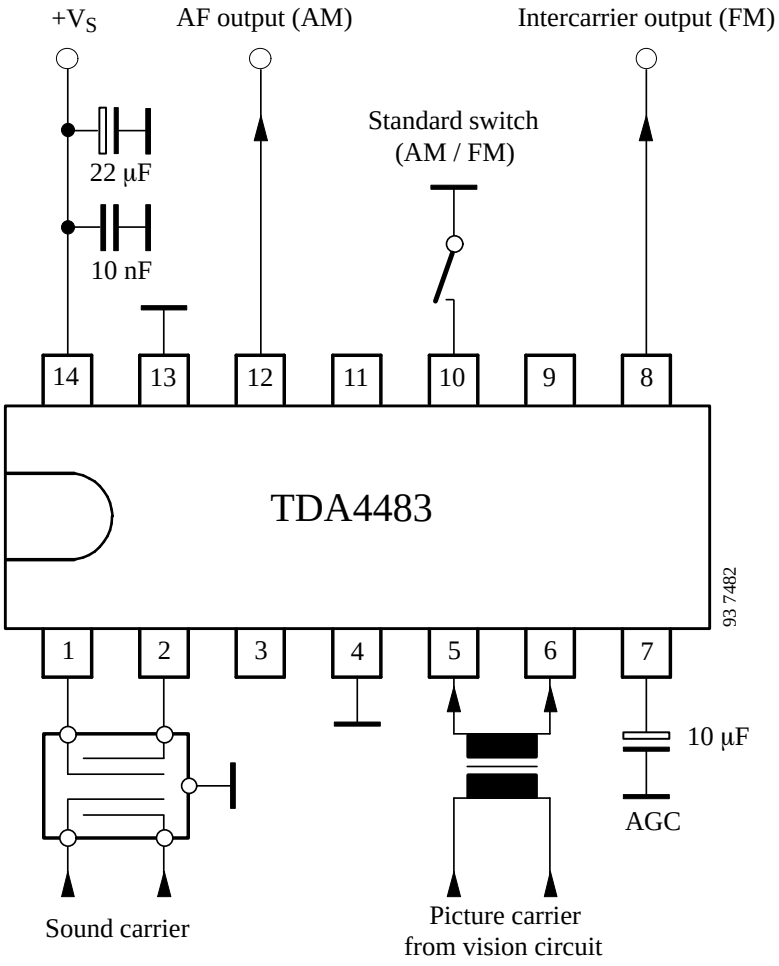


Figure 2.

Internal Pin Circuit Diagrams

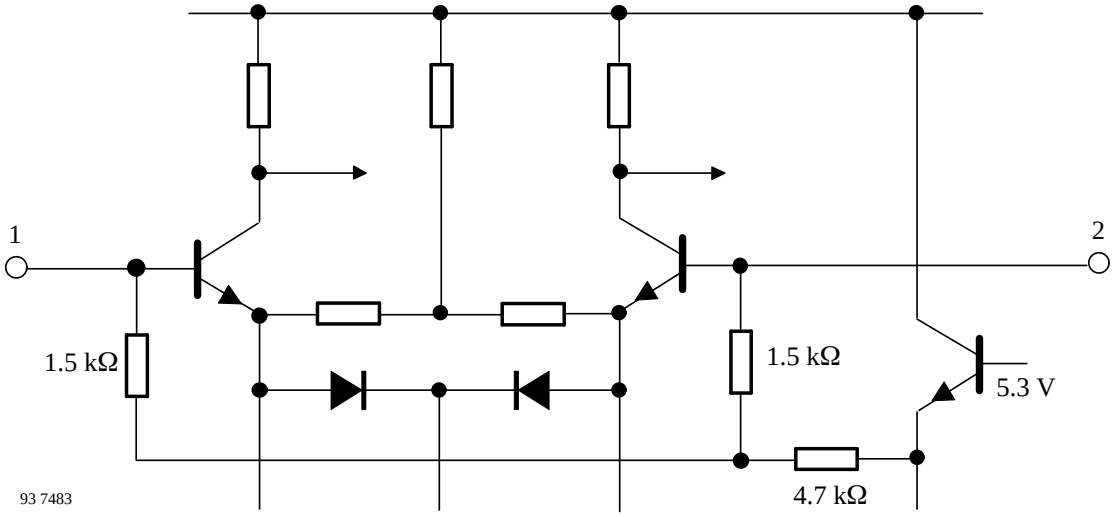


Figure 3. Pin 1 ,2 – Sound carrier input

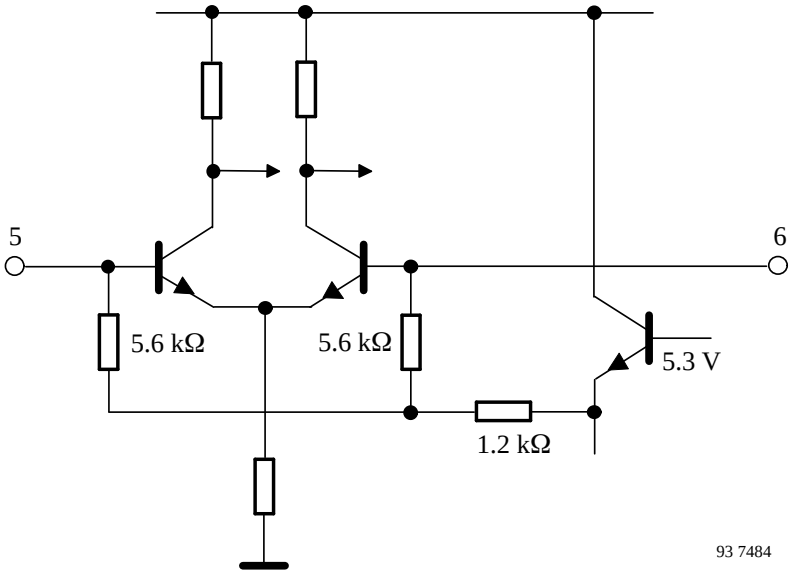


Figure 4. Pin 5, 6 – Picture carrier input

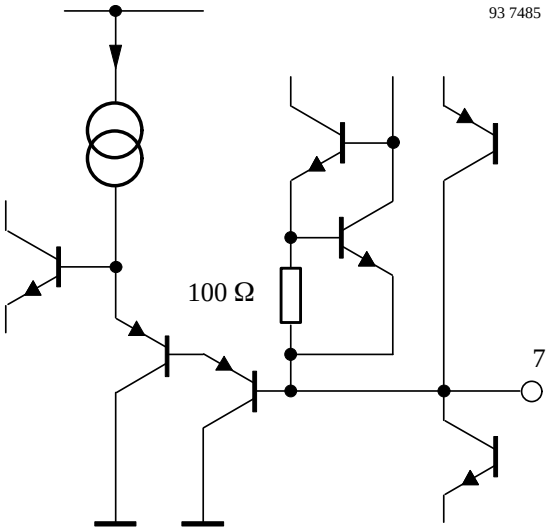


Figure 5. Pin 7 – AGC time constant

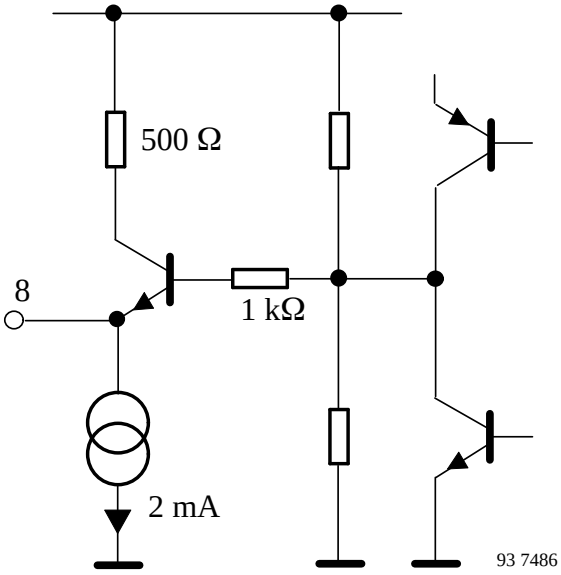


Figure 6. Pin 8 – Intercarrier output, FM-mode

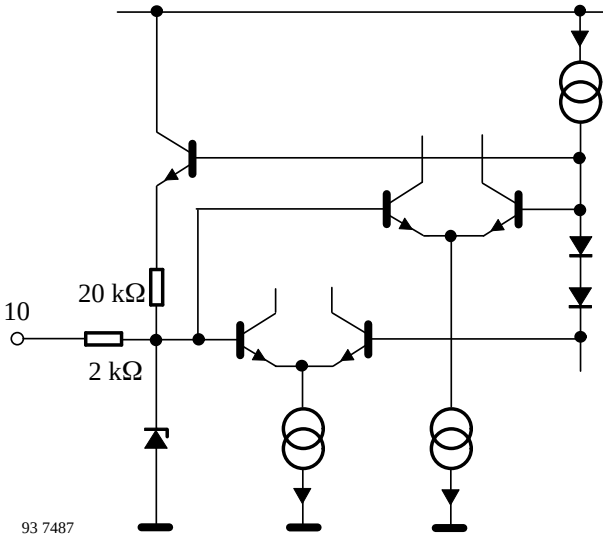


Figure 7. Pin 10 – Standard switch (AM or FM/NICAM)

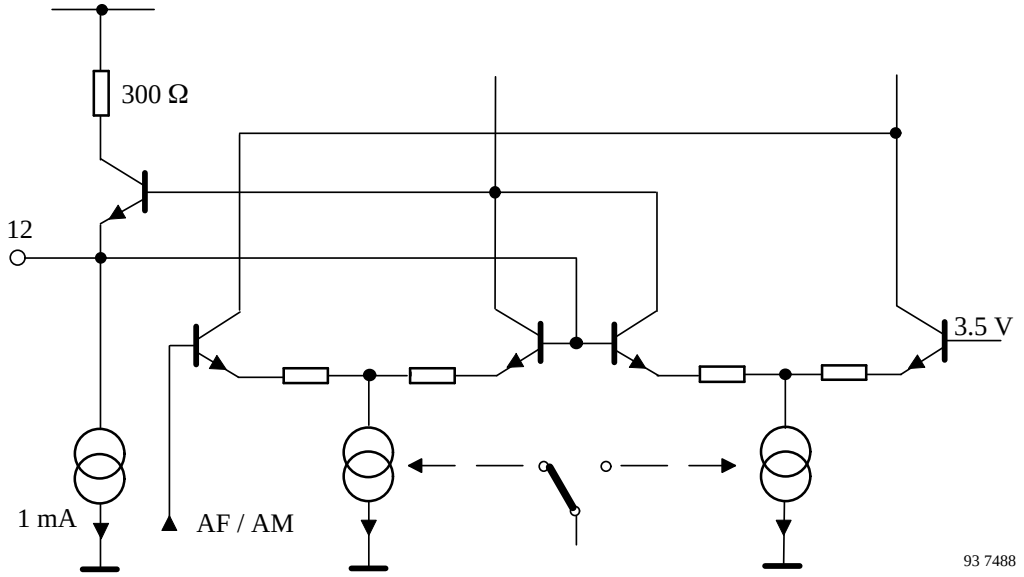
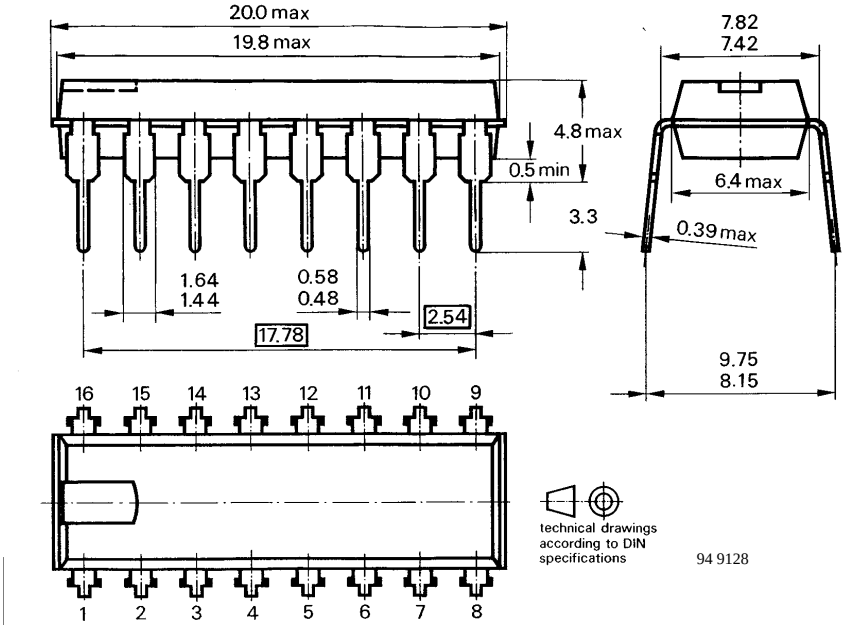


Figure 8. Pin 12 – AF output, AM mode

Dimensions in mm



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.

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