

# TEMIC

TELEFUNKEN Semiconductors

# TDA4439

## Video IF Amplifier for Multistandard TV and VTR

**Technology:** Bipolar

### Features

- Standard B/G-L suitable, processes negatively and positively modulated IF-signals with equal polarity of the output signal
  - Ultra white inverter and ultra black limiter for reducing transmission interference
  - Internally noise protected gain control, no flyback pulses required
  - Expanded video frequency response allows the demodulation of amplitude modulated MAC signals
  - High input sensitivity
  - Fast AGC by controlled discharge of the AGC capacitor
- Standard L mode: AGC acting on peak white level, capacitor discharge control by averaged video signal
- Standard B/G: AGC acting on the sync. pulse peak
- The direction of the AFC curve is selectable independently from the standard switch

**Case:** DIP18

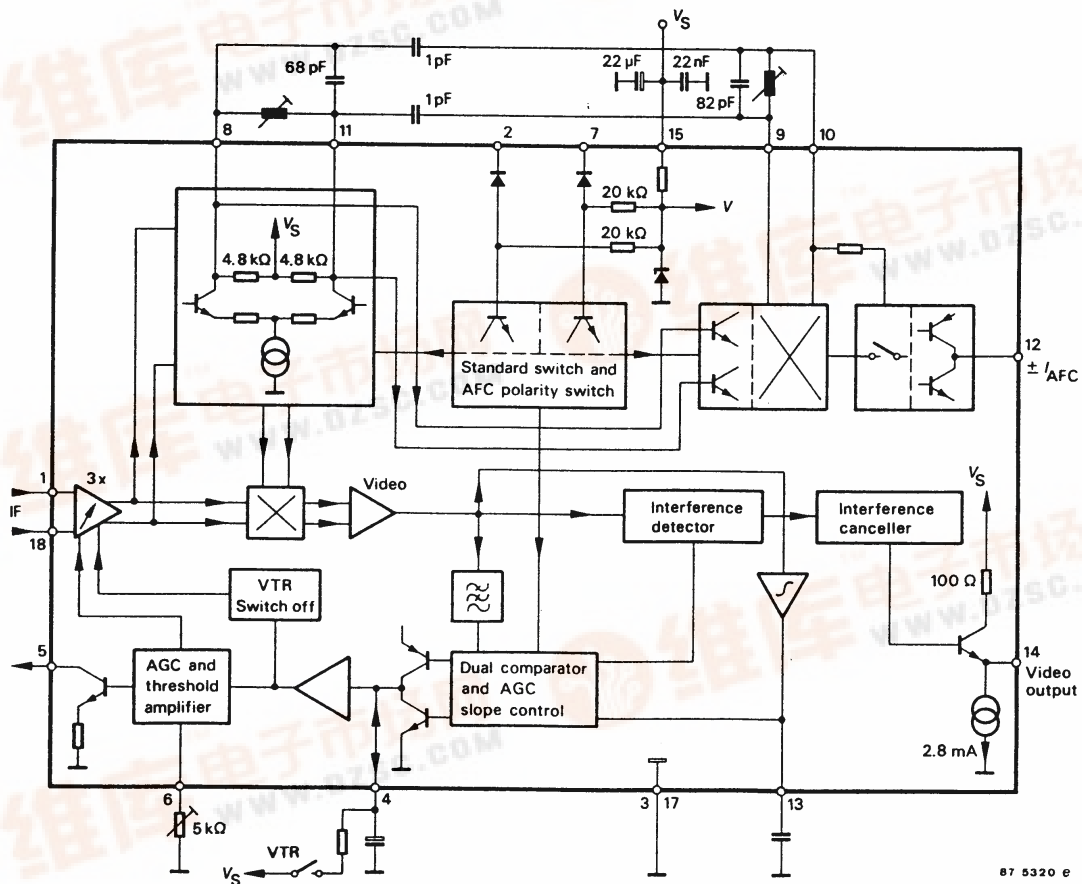
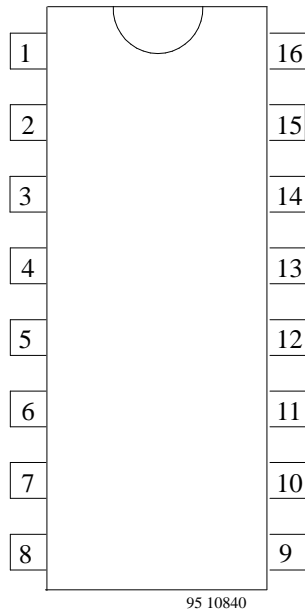


Figure 1. Block diagram

## Pin Description



| Pin   | Function   |
|-------|--|
| 1, 18 | IF input   |
| 2     | Standard switch: open B/G<br>ground L                  |
| 3, 17 | Ground   |
| 4     | IF-AGC storage capacitor                               |
| 5     | AGC (tuner control)                                    |
| 6     | Tuner AGC take over                                    |
| 7     | Polarity switch:<br>open AFC "DOWN"<br>ground AFC "UP" |
| 8, 11 | Demodulator circuit                                    |
| 9, 10 | AFC circuit  |
| 12    | AFC output   |
| 13    | Average capacitor standard L                           |
| 14    | Video output   |
| 15    | Supply voltage   |
| 16    | n.c.   |

## Circuit Description

The following function units are integrated in this circuit combination for video-IF processing:

- Three symmetric, highly stable, gain controlled wide-band amplifier, quasi galvanic coupling eliminates feed back
- Video carrier controlled demodulator of high linearity
- Polarity switch over for video and AFC-signal
- Video output amplifier with low-pass characteristics, limiter for ultra black and inverter for ultra white interference
- Disconnectable AFC – generator with push pull current output
- High impedance, interference free controlled voltage facilities, best possible AGC time constant with small storage capacitor
- Controlled discharge circuit for fast gain control
- With VTR – operation the video output level is according to the ultra white level in B/G, ultra black level in L

## Absolute Maximum Ratings

Reference point pin 3, unless otherwise specified

| Parameters  | Symbol    | Value       | Unit             |
|---|-----------|-------------|------------------|
| Supply voltage Pin 15                             | $V_S$     | 10 to 15    | V                |
| Supply current Pin 15                             | $I_S$     | 75          | mA               |
| Open loop voltage Pin 5                           | $V_5$     | $V_S$       | V                |
| External voltage Pin 4                            | $V_4$     | 10          | V                |
| Pin 14  | $V_{14}$  | 8           | V                |
| Breaking current for VTR operation Pin 4          | $I_4$     | 0.5         | mA               |
| Video output current max load Pin 14              | $I_0$     | 5           | mA               |
| short circuit max 1 s Pin 14                      |           | 50          |                  |
| Power dissipation $T_{amb} \leq 60^\circ\text{C}$ | $P_{tot}$ | 1.0         | W                |
| Junction temperature                              | $T_j$     | 125         | $^\circ\text{C}$ |
| Ambient temperature range                         | $T_{amb}$ | -25 to +70  | $^\circ\text{C}$ |
| Storage temperature range                         | $T_{stg}$ | -25 to +125 | $^\circ\text{C}$ |



## Thermal Resistance

| Parameters       | Symbol     | Maximum | Unit |
|------------------|------------|---------|------|
| Junction ambient | $R_{thJA}$ | 60      | K/W  |

## Electrical Characteristics

$V_S = 12\text{ V}$ ,  $T_{amb} = 25^\circ\text{C}$ , Reference point Pin 3, unless otherwise specified

| Parameters  | Test Conditions / Pins                               |          | Symbol             | Min.                                  | Typ. | Max.  | Unit          |
|---|--|----------|--------------------|---------------------------------------|------|-------|---------------|
| Supply current  | Pin 15   |          | $I_S$              |                                       | 65   |       | mA            |
| Ultra white level at <sup>1)</sup> standard B/G                     | Pin 14   |          | $v_0$              | 4.8                                   | 5.2  | 5.6   | V             |
| Ultra black clamping level at standard B/G                          | Pin 14   |          | $v_0$              | 1.75                                  | 1.9  | 2.05  | V             |
| Composite video output <sup>2)</sup> signal B/G                     | Peak to peak   | Pin 14   | $v_0$              | 2.7                                   | 3.0  | 3.3   | V             |
| Video signal standard L <sup>3)</sup> (black/white)                 | Peak to peak   | Pin 14   | $v_0$              | 1.85                                  | 2.1  | 2.35  | V             |
| Difference of the video signals standard L-B/G                      | Pin 14   |          | $\Delta$           |                                       |      | 10    | %             |
| Clamping level of black limiter                                     | Pin 14   |          | $V_{14}$           | 250 mV below Sync. (typ.)             |      |       |               |
| Threshold of the ultra white inverter                               | Pin 14   |          | $V_{14}$           | 900 mV upper ultra white level (typ.) |      |       |               |
| Grey level of the ultra white inverter                              | Pin 14   |          | $V_{14}$           |                                       | 3.6  |       | V             |
| Supply voltage influence on the ultra black level in standard B/G   | Pin 14   |          | $\Delta$           |                                       | 0.5  |       | %/V           |
| Supply voltage influence on the ultra white level in standard B/G   | Pin 14   |          | $\Delta$           |                                       | 1.0  |       | %/V           |
| Video bandwidth   | -3 dB  | Pin 14   | $B_{video}$        |                                       | 10   |       | MHz           |
| Video frequency response over the AGC control range                 | Pin 14   |          | $\Delta V_{video}$ |                                       |      | 2.0   | dB            |
| Output DC current   | $V_{14} = 8\text{ V}$                                | Pin 14   | $I_{14}$           |                                       | 2.8  |       | mA            |
| Response time of the peak <sup>4)</sup> white control in standard L | Pin 4  |          | $t_r$              |                                       |      | 10    | $\mu\text{s}$ |
| Voltage level standard B/G <sup>5)</sup>                            | Pin 2  |          | $V_2$              | 2                                     |      | $V_S$ | V             |
| Voltage level standard L <sup>5)</sup>                              | Pin 2  |          | $V_2$              | 0                                     |      | 1.2   | V             |
| Input sensitivity (sym.) <sup>6)</sup>                              | $v_{14}=3.0\text{ V}_{pp}$ ,<br>$V_4 = 0.8\text{ V}$ | Pin 1-18 | $v_i$              |                                       | 120  |       | $\mu\text{V}$ |
| IF-AGC gain reduction   |  |          | $\Delta v_p$       | 60                                    |      |       | dB            |
| Available tuner AGC 10 dB via AGC use                               | Pin 5  |          | $I_5$              | 3                                     | 4    |       | mA            |
| Automatic tuner AGC with IF-control Pin 6 n.c.                      | Pin 5  |          | AGC                |                                       | 61   |       | dB            |



| Parameters  | Test Conditions / Pins  | Symbol                             | Min.   | Typ.     | Max.         | Unit                |
|---|---|------------------------------------|--------|----------|--------------|---------------------|
| IF-residual voltage at the video output in the AGC area                                       | f = 38.9 MHz Pin 14<br>f = 77.8 MHz Pin 14                                      | v                                  |        | 10<br>20 |              | mV                  |
| Differential gain error   | Pin 14  | d                                  |        | 3        | 5            | %                   |
| Differential phase error  | Pin 14  | $\varphi$                          |        | 3        | 5            | degree              |
| Sound-chroma beat (1.07 MHz intermodulation) relating to demodulated auxiliary colour carrier | Video carrier = 0 dB Pin 14<br>Colour carrier = -6 dB<br>Sound carrier = -24 dB | $\alpha_{IM}$                      |        | 50       |              | dB                  |
| Upsetting factor sync. pulse  |   | $\frac{\Delta V_{sync}}{V_{sync}}$ |        | 3        |              | %                   |
| Input impedance   | Pin 1-18<br>Pin 1-18  | $R_i$<br>$C_i$                     |        | 1.6<br>2 |              | k $\Omega$<br>pF    |
| Switch OFF voltage for VTR-operation  | Pin 4   | $V_4$                              | 8      |          | 10           | V                   |
| Switch OFF current for VTR-operation  | Pin 4   | $I_4$                              |        |          | 150          | $\mu$ A             |
| DC voltage at the AFC circuit   | Pins 9 and 10   | V                                  |        | 5.0      |              | V                   |
| Scope of the AFC voltage  | Pin 12  | V                                  | 1.0    |          | $V_S - 1.5$  | V                   |
| AFC current   | Pin 12  | $i_{12}$                           |        | 0.8      |              | mA                  |
| AFC transconductance  | Pin 12  | g                                  |        | 0.2      |              | $\frac{mA}{100kHz}$ |
| AFC residual current (AFC "OFF")  | $V_{12} = V_S/2$ Pin 12   | $\pm I_R$                          |        |          | 10           | $\mu$ A             |
| AFC current - OFF   | Pins 9 and 10   | $I_{OFF}$                          | 100    | 150      |              | $\mu$ A             |
| AFC polarity switching voltage <sup>7)</sup>  | "AFC-up" Pin 7<br>"AFC-down"  | $V_7$                              | 0<br>2 |          | 1.2<br>$V_S$ | V                   |

- 1) All measurements Pin 14 without load
- 2) Residual carrier 10 %<sup>3)</sup>, Blanking level 30 % carrier amplitude
- 4) A peak white value for at least 10  $\mu$ s must be transmitted for each complete frame
- 5) Direct control of standard reversing switch with TTL level
- 6) Sync peak value standard B/G
- 7) AFC polarity switch may be directly matched to TTL-output (i.e. processor output)

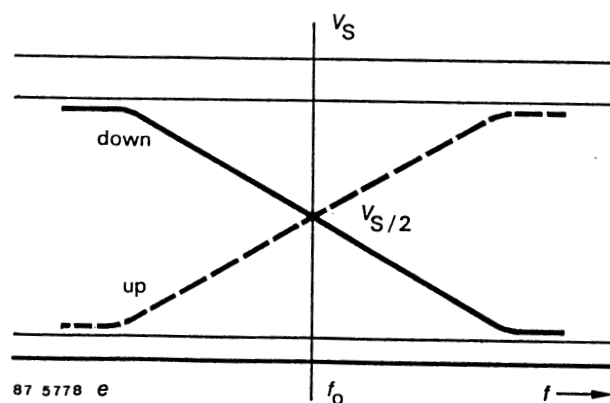


Figure 2. AFC characteristics/polarity



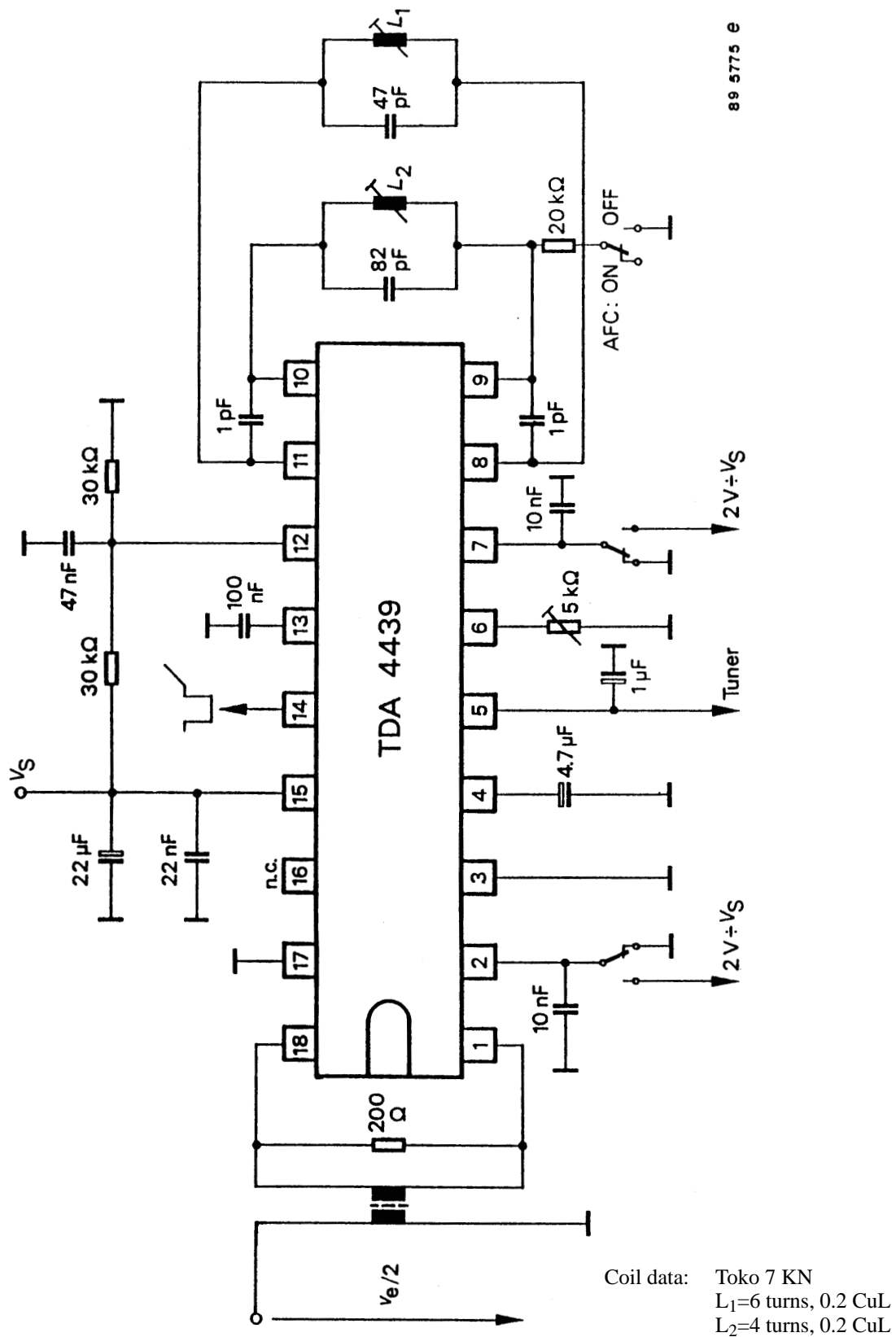


Figure 3. Test circuit

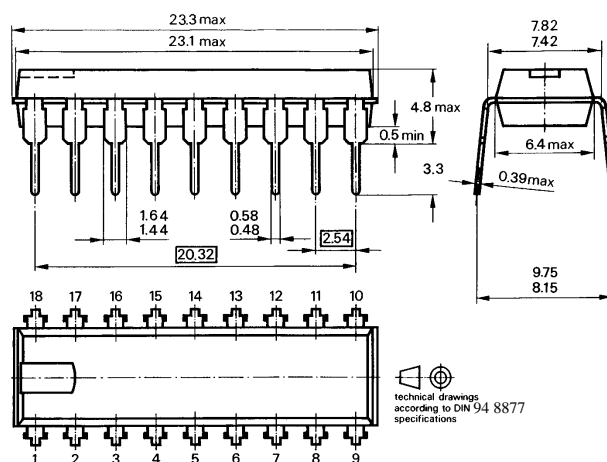
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## Dimensions in mm

Package: DIP 16



### 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.

**We reserve the right to make changes to improve technical design and may do so without further notice.**

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TEMIC TELEFUNKEN microelectronic GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany  
Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423

