

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

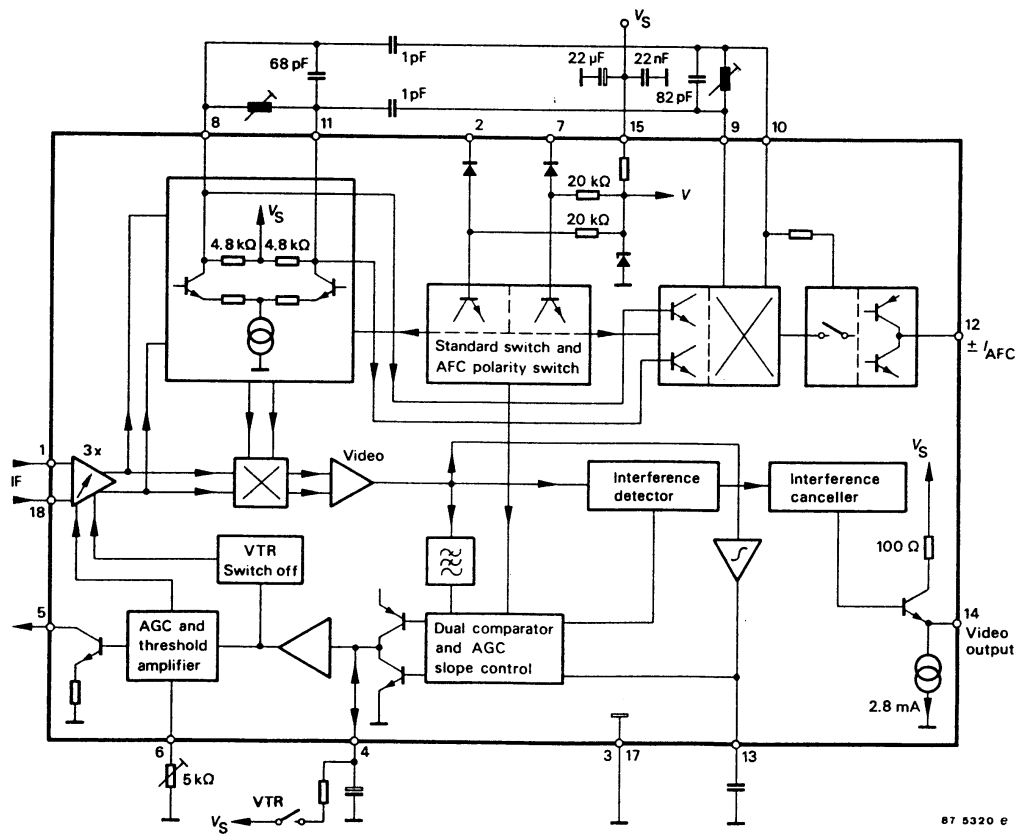
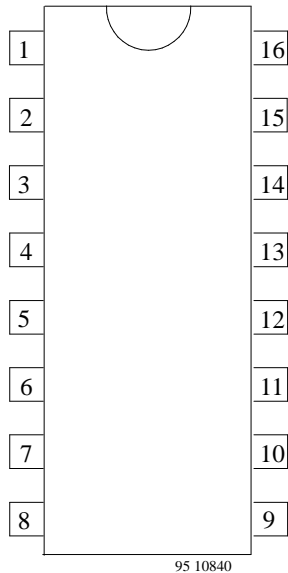


Figure 1. Block diagram

Pin Description



| Pin | Function |
|-------|--|
| 1, 18 | IF input |
| 2 | Standard switch: open B/G ground L |
| 3, 17 | Ground |
| 4 | IF-AGC storage capacitor |
| 5 | AGC (tuner control) |
| 6 | Tuner AGC take over |
| 7 | Polarity switch: open AFC "DOWN" 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 | 10 | V | |
| | Pin 14 | 8 | V | |
| Breaking current for VTR operation Pin 4 | I_4 | 0.5 | mA | |
| Video output current | Pin 14 | max load | 5 | mA |
| | | short circuit max 1 s | 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 standard B/G ¹⁾ | 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 signal B/G ²⁾ | Peak to peak Pin 14 | v_0 | 2.7 | 3.0 | 3.3 | V |
| Video signal standard L ³⁾ (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 | Δ | | | 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 | Δ | | 0.5 | | %/V |
| Supply voltage influence on the ultra white level in standard B/G | Pin 14 | Δ | | 1.0 | | %/V |
| Video bandwidth | -3 dB Pin 14 | B_{video} | | 10 | | MHz |
| Video frequency response over the AGC control range | Pin 14 | ΔV_{video} | | | 2.0 | dB |
| Output DC current | $V_{14} = 8\text{ V}$ Pin 14 | I_{14} | | 2.8 | | mA |
| Response time of the peak white control in standard L ⁴⁾ | Pin 4 | t_r | | | 10 | μs |
| Voltage level standard B/G ⁵⁾ | Pin 2 | V_2 | 2 | | V_S | V |
| Voltage level standard L ⁵⁾ | Pin 2 | V_2 | 0 | | 1.2 | V |
| Input sensitivity (sym.) ⁶⁾ | $v_{14} = 3.0\text{ V}_{pp}$, $V_4 = 0.8\text{ V}$ Pin 1-18 | v_i | | 120 | | μV |
| IF-AGC gain reduction | | Δv_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 f = 77.8 MHz Pin 14 | v | | 10 20 | | mV |
| Differential gain error | Pin 14 | d | | 3 | 5 | % |
| Differential phase error | Pin 14 | φ | | 3 | 5 | degree |
| Sound-chroma beat (1.07 MHz intermodulation) relating to demodulated auxiliary colour carrier | Video carrier = 0 dB Pin 14 Colour carrier = -6 dB Sound carrier = -24 dB | α_{IM} | | 50 | | dB |
| Upsetting factor sync. pulse | | $\frac{\Delta V_{sync}}{V_{sync}}$ | | 3 | | % |
| Input impedance | Pin 1-18 Pin 1-18 | R_i C_i | | 1.6 2 | | k Ω 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 | μ 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 | μ A |
| AFC current - OFF | Pins 9 and 10 | I_{OFF} | 100 | 150 | | μ A |
| AFC polarity switching voltage ⁷⁾ | "AFC-up" Pin 7 "AFC-down" | V_7 | 0 2 | | 1.2 V_S | V |

- 1) All measurements Pin 14 without load
- 2) Residual carrier 10 %³⁾, Blanking level 30 % carrier amplitude
- 4) A peak white value for at least 10 μ 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)

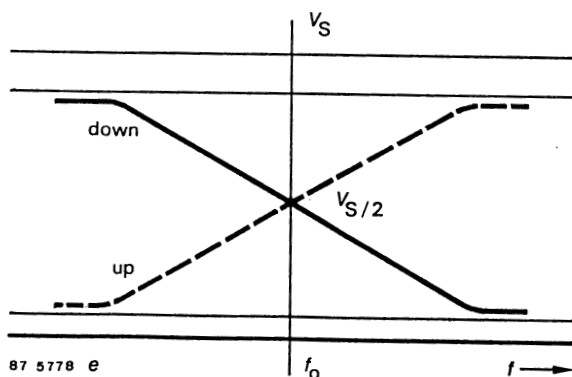
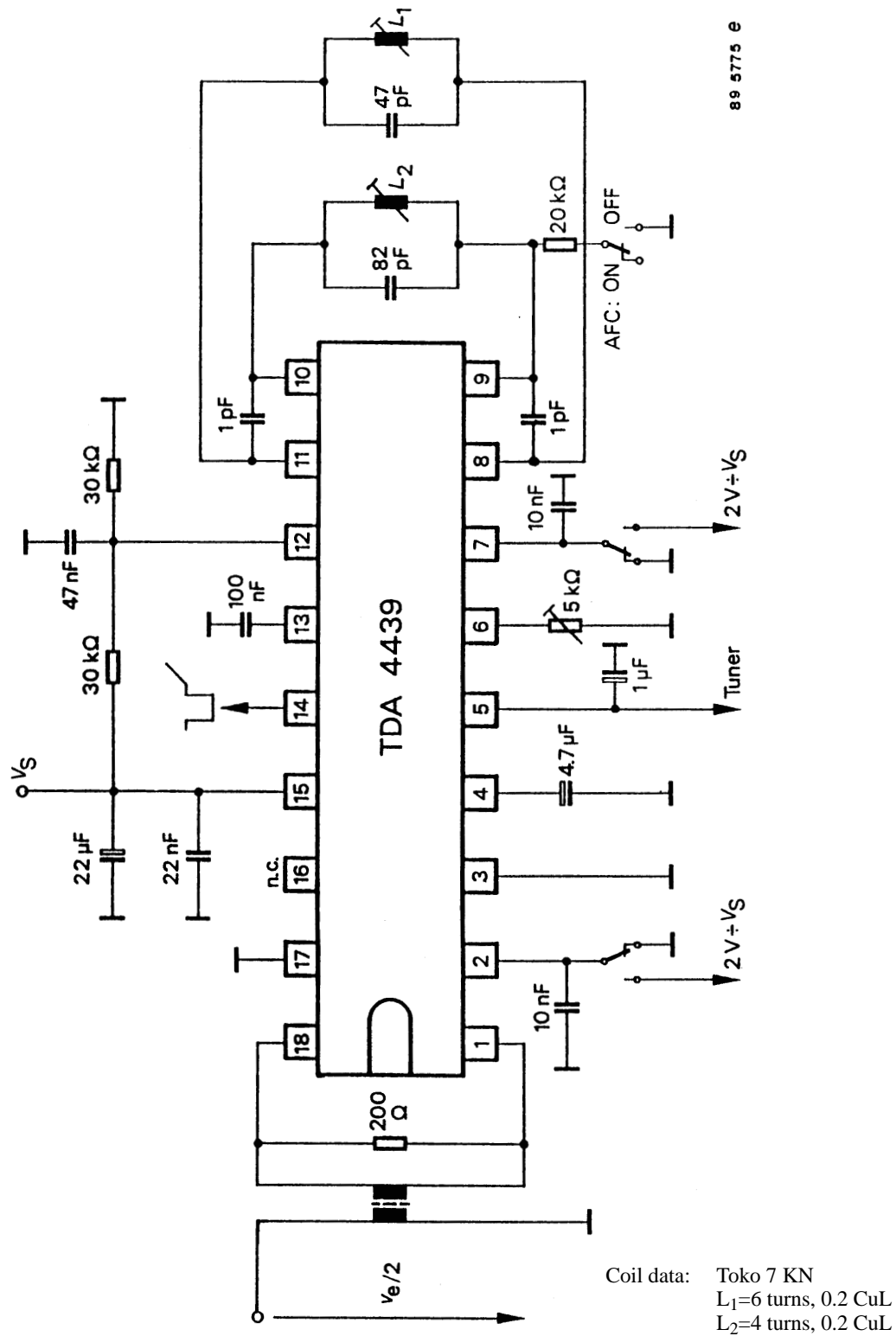


Figure 2. AFC characteristics/polarity



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Figure 3. Test circuit

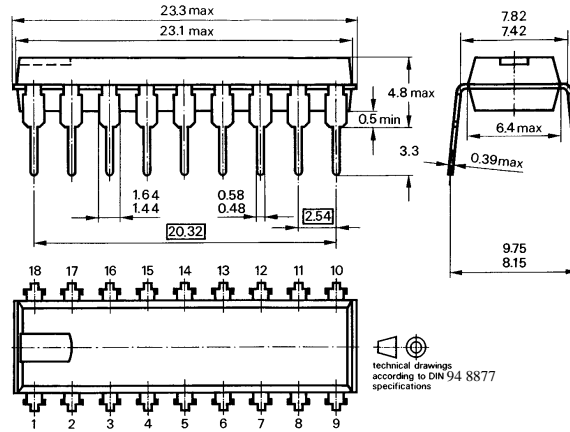
TDA4439

TEMIC

TELEFUNKEN Semiconductors

Dimensions in mm

Package: DIP 16



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It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

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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.

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