

QUASI-SPLIT-SOUND CIRCUIT WITH DUAL SOUND DEMODULATORS

GENERAL DESCRIPTION

The TDA2556 is a monolithic integrated circuit for quasi-split-sound processing, including two FM demodulators, for two carrier stereo TV receivers and VTR.

Features

First IF (vision carrier plus sound carrier).

- 3 stage gain controlled IF amplifier
- AGC circuit
- Reference amplifier and limiter amplifier for vision carrier (V.C.) processing
- Linear multiplier for quadrature demodulation

Second IF (two separate channels for both FM sound signals).

- 4-stage-limiting amplifier
- Quadrature demodulator
- AF amplifier with de-emphasis
- Output buffer
- Muting for one or both AF outputs

QUICK REFERENCE DATA

Supply voltage, pin 23	$V_P = V_{23-24}$	typ.	12 V
Supply current, pin 23	$I_P = I_{23}$	typ.	73 mA
Minimum IF vision carrier input voltage (rms value)	$V_{VC} = V_{3-4}$	typ.	150 μ V
IF control range	ΔG_V	typ.	64 dB
AF output voltage	V_O 10, 15-24(rms)	typ.	600 mV
Signal-to-weighted-noise ratio (relative to 1 kHz; 30 kHz deviation)			
at 5,5 MHz	} for 2T/20T pulses with white bars	typ.	58 dB
at 5,74 MHz		typ.	56 dB

PACKAGE OUTLINE

24-lead DIL; plastic (SOT101B).

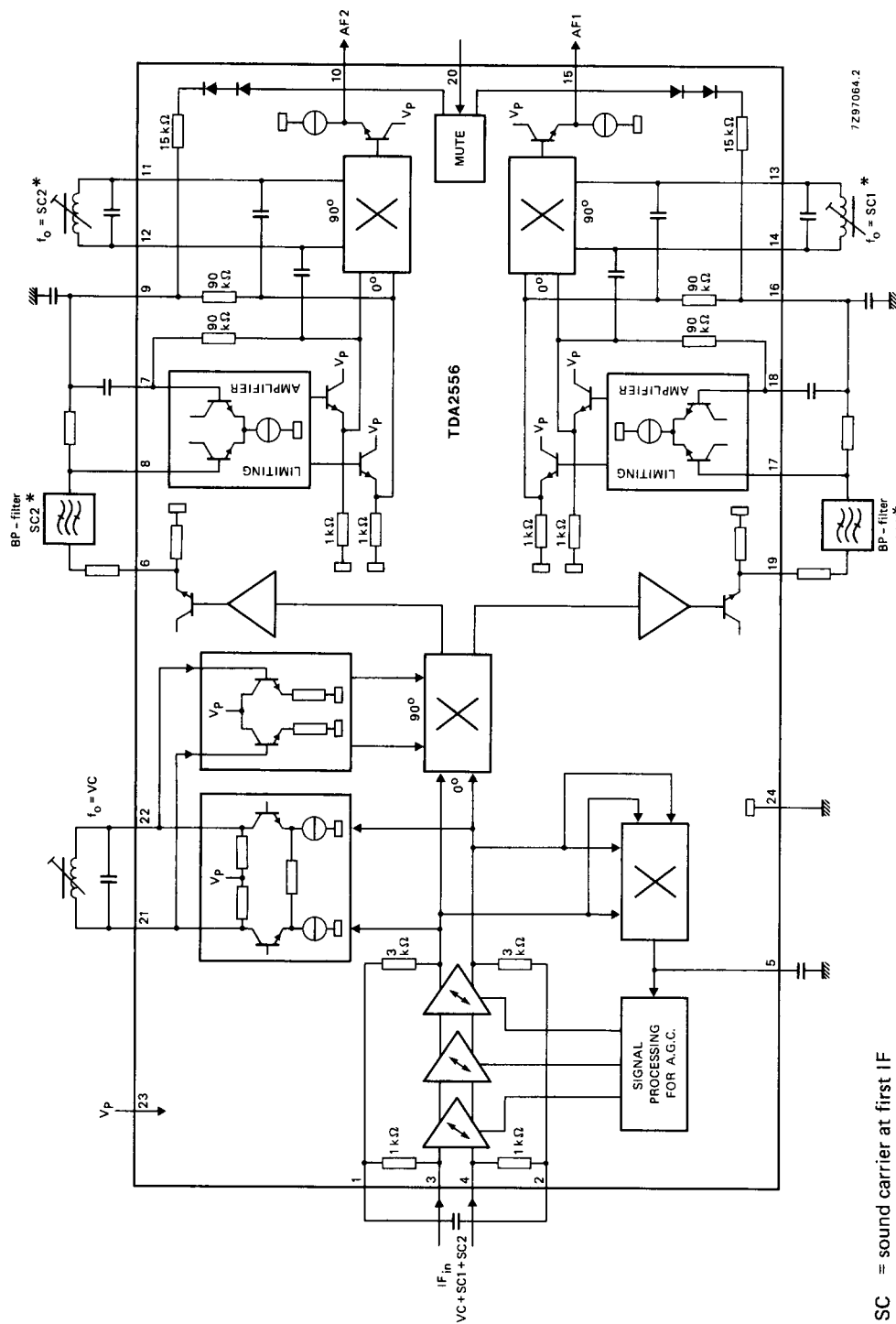


Fig. 1 Block diagram.

SC = sound carrier at first IF
 SC* = sound carrier at second IF

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Supply voltage, pin 23	$V_P = V_{23-24}$	max.	13,2 V
Supply current, pin 23	$I_P = I_{23}$	max.	95 mA
Storage temperature range	T_{stg}	-25 to + 150 °C	
Operating ambient temperature range	T_{amb}	0 to + 70 °C	

CHARACTERISTICS

$V_P = V_{23-24} = 12$ V; $T_{amb} = 25$ °C; measured at $f_{VC} = 38,9$ MHz, $f_{SC1} = 33,4$ MHz, $f_{SC2} = 33,158$ MHz.

Vision carrier (V.C.) modulated with different video signals (see below); modulation depth 100% (proportional to 10% residual carrier).

Vision carrier amplitude: $V_{VC(rms)} = 10$ mV.

Vision-to-sound carrier ratios: VC/SC1 = 13 dB, VC/SC2 = 20 dB.

Sound carrier (SC1, SC2) modulated with $f = 1$ kHz and deviation $\Delta f = \pm 30$ kHz.

For measuring circuit see Fig. 2; unless otherwise specified.

parameter	symbol	min.	typ.	max.	unit
Supply (pin 23)					
Supply voltage	$V_P = V_{23-24}$	10,8	12	13,2	V
Supply current	$I_P = I_{23}$	—	73	95	mA
First IF amplifier					
Input voltage for start of gain control (intercarrier signals -3 dB)	$V_{VC} = V_{3-4} (rms)$	—	150	200	μV
Input voltage for end of gain control (intercarrier signals + 1 dB)	$V_{VC} = V_{3-4} (rms)$	100	250	—	mV
Gain control range	ΔG_V	60	64	—	dB
Control voltage range (see Fig. 6)	V_{5-24}	4	—	V_P	V
Input resistance (differential)	R_{3-4}	—	2	—	k Ω
Input capacitance (differential)	C_{3-4}	—	2	—	pF
Intercarrier signal					
Output voltage; 5,5 MHz (SC1*)	$V_{19-24(rms)}$	60	100	140	mV
Output voltage; 5,742 MHz (SC2*)	$V_{6-24(rms)}$	27	45	63	mV
Output voltage d.c. (emitter follower with minimum 1,5 mA bias current)	$V_{6-24/19-24}$	—	5,9	—	V
Allowable d.c. load resistance	$R_{6-24/19-24}$	7	—	—	k Ω
Second IF					
Input voltage for start of limiting	$V_{8-24/17-24(rms)}$	—	700	—	μV
Maximum input voltage	$V_{8-24/17-24(rms)}$	—	200	—	mV
Voltage level d.c.	$V_{7-24/18-24}$	—	2,2	—	V
Voltage level d.c.	$V_{9-24/16-24}$	—	2,2	—	V

CHARACTERISTICS (continued)

parameter	symbol	min.	typ.	max.	unit
Second IF (continued)					
AF output voltage	V _{10-24/15-24}	450	600	810	mV
Output voltage d.c. (emitter follower with 1,0 mA bias current)	V _{10-24/15-24}	—	4,5	—	V
External d.c. load resistance	R _{10-24/15-24}	2	—	—	k Ω
External a.c. load current (note 5)	I _{10/15}	—	—	0,5	mA
Total harmonic distortion of V _{10-24/15-24} (note 3)	THD	—	0,4	1	%
(note 4)	THD	—	—	0,1	%
AM suppression; f _{AM} = 1 kHz, M = 0,3; f _{FM} = 70 Hz; f = $\pm$ 50 kHz (note 2)		50	60	—	dB
Crosstalk attenuation (note 2)		60	—	—	dB
S/N ratio (second IF) (note 2) f = 1 kHz; f = $\pm$ 50 kHz	V _{10-24/15-24}	65	70	—	dB
Mute (see Fig. 4)					
Switching voltage for:					
demodulator 1 ON	V ₂₀₋₂₄	4	—	V _p	V
demodulator 1 OFF	V ₂₀₋₂₄	0	—	3	V
demodulator 2 ON	V ₂₀₋₂₄	4	—	8	V
demodulator 2 OFF	V ₂₀₋₂₄	0 or 9	—	3 or V _p	V
Input current	I ₂₀	—500	—	+ 200	μ A
Input d.c. potential	V ₂₀₋₂₄	—	6,3	—	V
AF signal performance, weighted					
S/N ratio at audio outputs, pins 10, 15;					
V ₃₋₄ = 20 mV rms weighted according to CCIR 468-2, quasi-peak, (see note 1)					
(a) 2T/20T pulse with white bars (see also Fig. 5)					
at 5,5 MHz	(S + W)/W	—	58	—	dB
at 5,74 MHz	(S + W)/W	—	56	—	dB
(b) 6 kHz sine wave					
at 5,5 MHz	(S + W)/W	—	52	—	dB
at 5,74 MHz	(S + W)/W	—	50	—	dB
(c) black level (sync pulses only)					
at 5,5 MHz	(S + W)/W	—	65	—	dB
at 5,74 MHz	(S + W)/W	—	63	—	dB

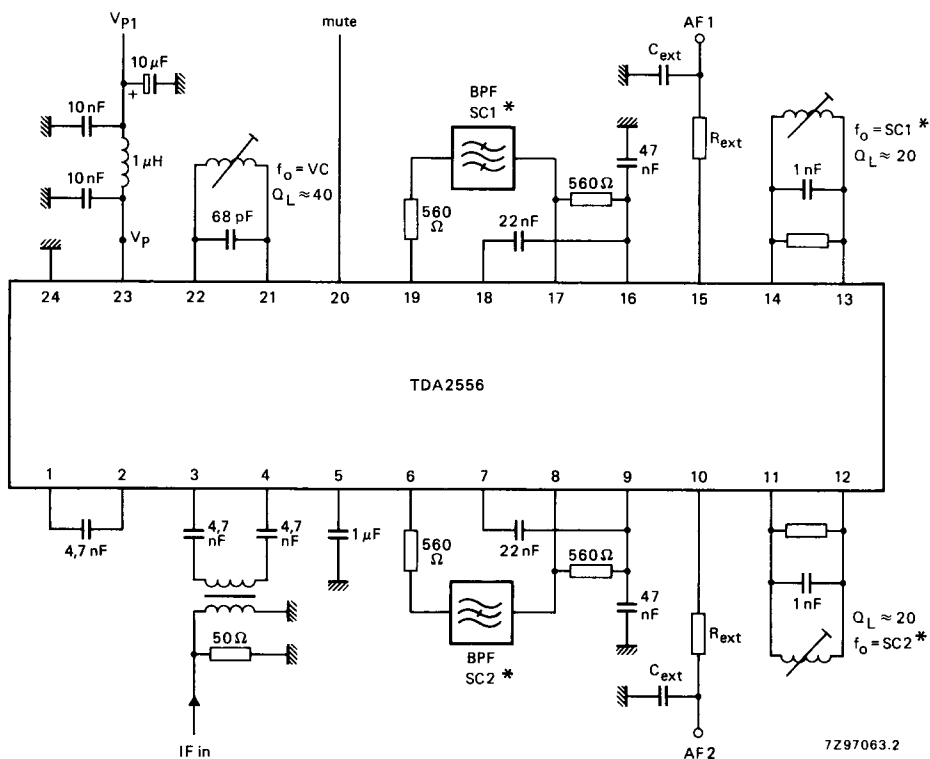


Fig. 2 Application diagram ($\tau_{deemph} = R_{ext} \cdot C_{ext}$)
(Input transformer "IF in" only for testing)

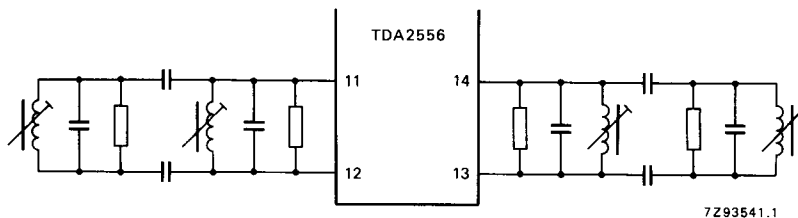


Fig. 3 Distortion improvement (see note 3 and 4).

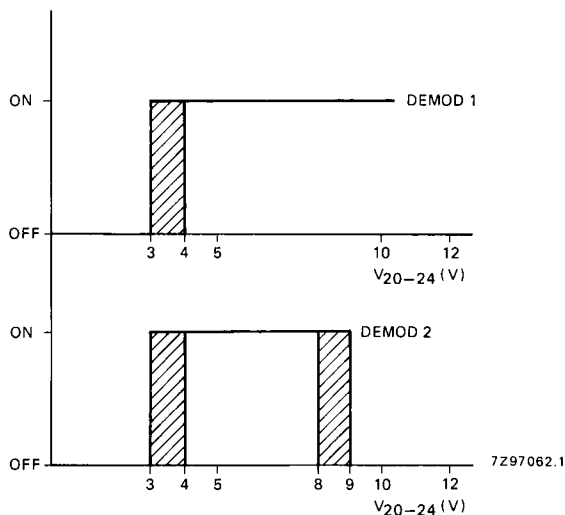


Fig. 4 Mute function.

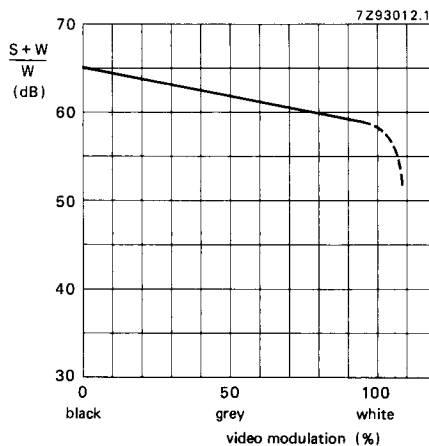
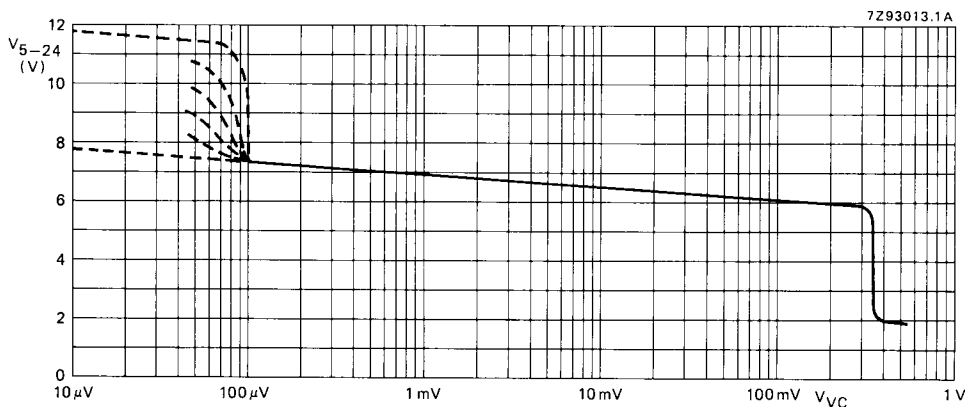


Fig. 5 Signal to weighted noise ratio depending on video modulation.

Fig. 6 Control voltage at pin 5 as a function of the input voltage $V_{VC} = V_{3.4}(\text{rms})$.

Notes to the characteristics

1. Incidental phase on the vision carrier, caused by the TV transmitter, has to be less than 0,5 degrees for black and white transient; this is equivalent to $S + W/W = 56 \text{ dB}$ for a 6 kHz sine wave.
2. Input signal second IF $V_{8.24/17.24} = 10 \text{ mVrms}$.
3. THD value is valid for ceramic bandpass filters of SC* and single resonance circuits at pins 11 and 12 and pins 13 and 14.
4. THD value is valid for LC bandpass filters of SC* and double resonance circuits at pins 11 and 12 and pins 13 and 14.
5. If higher a.c. output current is required an external resistor has to be applied from output (pins 10 and 15) to ground (minimum 2 k Ω) in order to improve the THD performance.