

DATA SHEET

TDA4722;TDA4724 SECAM-L chrominance processor for VHS recorders

Preliminary specification
File under Integrated Circuits, IC02

June 1994

Philips Semiconductors



PHILIPS

SECAM-L chrominance processor
for VHS video recorders

TDA4722/TDA4724

FEATURES

- Forced recording or playback mode input
- One circuit for Bell and anti-Bell filter (1.07 MHz)
- Fully ESD protected
- Low power consumption (170 mW)
- 5 V supply.

GENERAL DESCRIPTION

The TDA4722/24 is a bipolar integrated circuit for chrominance processing of SECAM-L signals in SECAM-L or multistandard VHS video recorders.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V _{18-24,26}	supply voltage		4.5	5.0	5.5	V
I ₁₈	supply current		–	34	–	mA
V _{25-24(p-p)}	chrominance input (peak-to-peak value)	record mode	–	–	645	mV
V _{21-24(p-p)}		playback mode	–	300	600	mV
V _{15-24(p-p)}	chrominance output (peak-to-peak value)	record mode	560	630	700	mV
V _{1-24(p-p)}		playback mode	–	–	1000	mV
T _{amb}	operating ambient temperature		0	–	+70	°C
T _{stg}	storage temperature		–25	–	+150	°C

ORDERING INFORMATION

EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
TDA4722	32	ShrDIL	plastic	SOT232AH
TDA4724	28	DIL	plastic	SOT117

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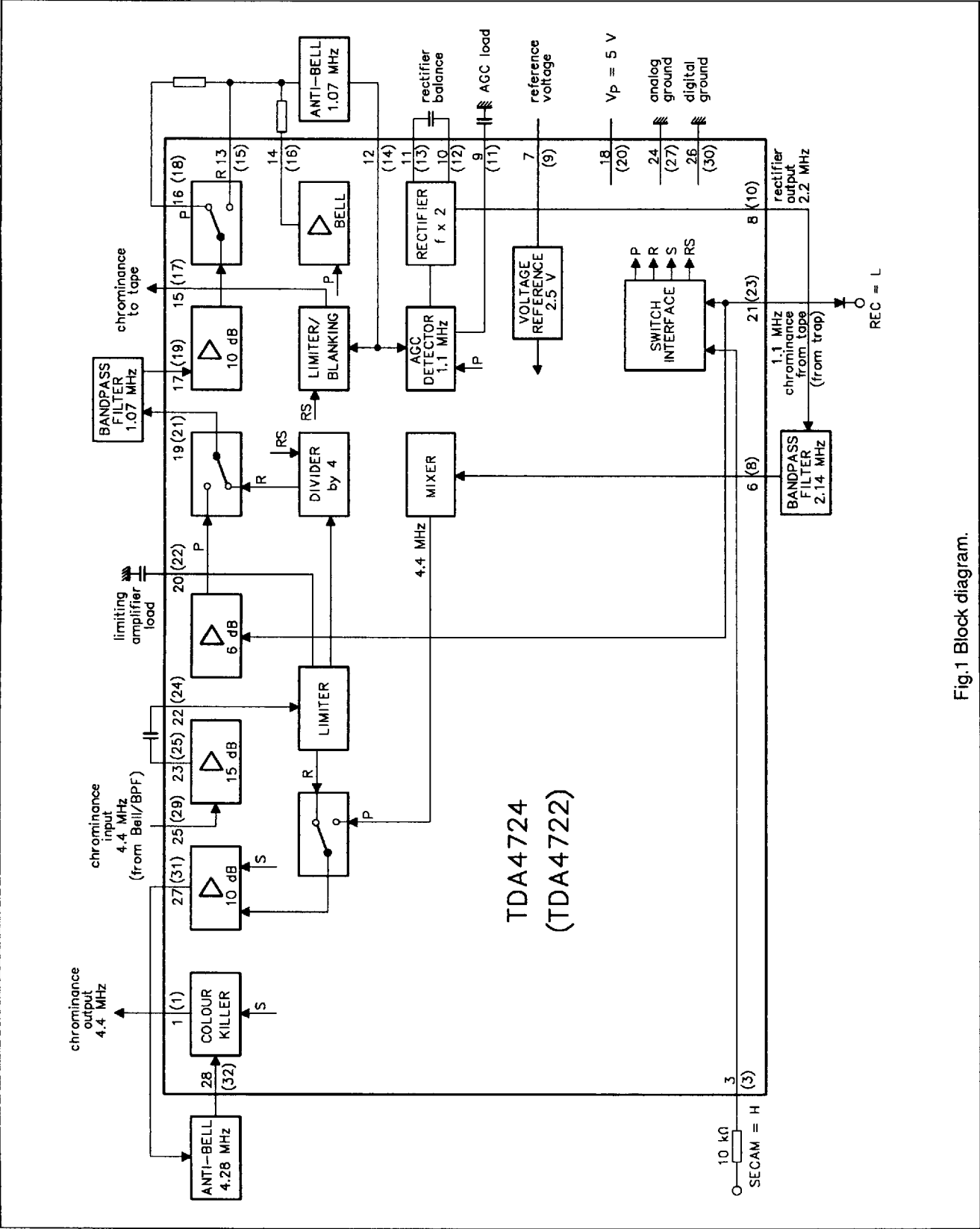


Fig.1 Block diagram.

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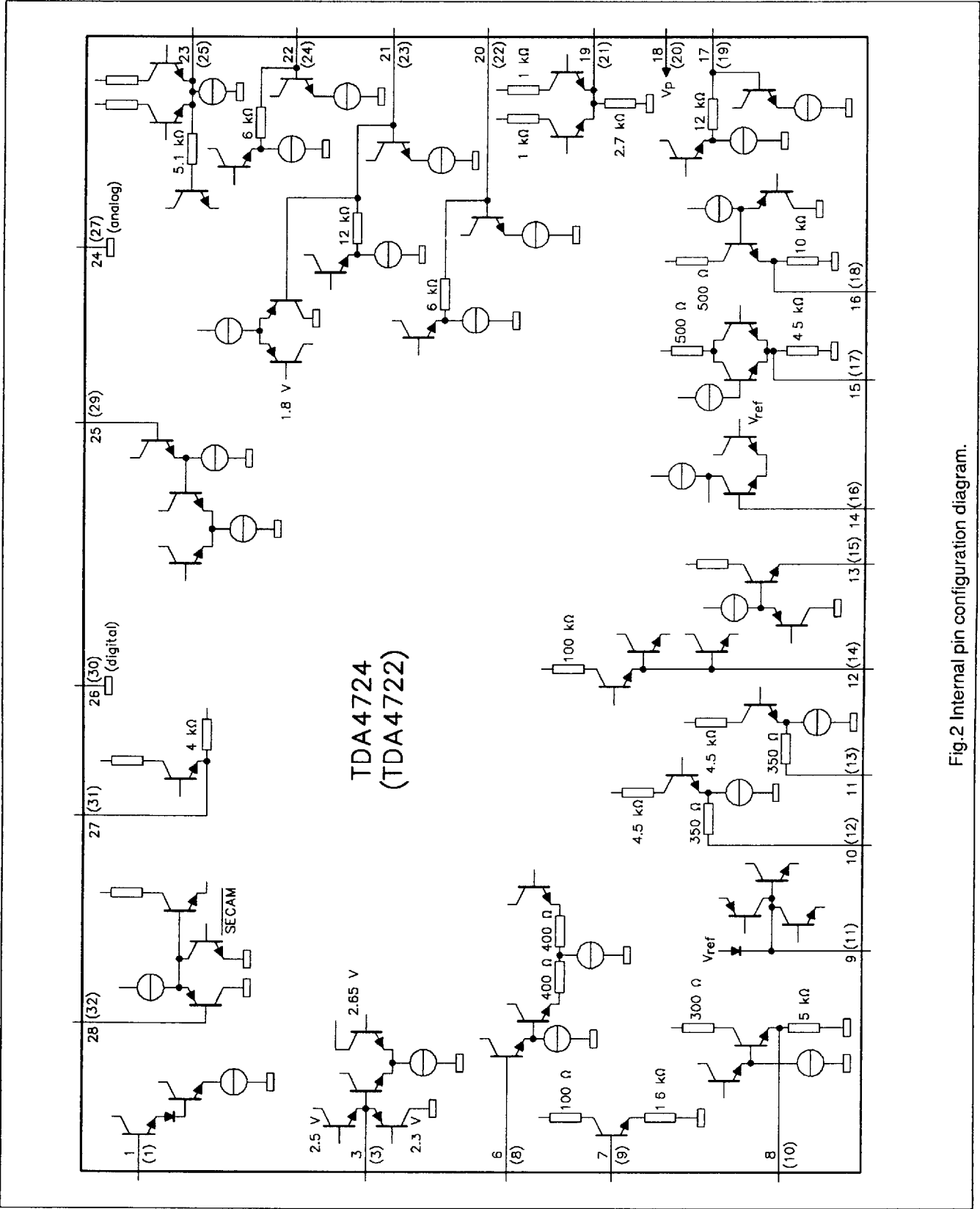


Fig.2 Internal pin configuration diagram.

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PINNING

TDA4722	TDA4724	DESCRIPTION
1	1	chrominance output (4.4 MHz)
2	2	not connected
3	3	SECAM switch
4	4	not connected
5	5	not connected
6	–	not connected
7	–	not connected
8	6	mixer input
9	7	reference voltage
10	8	rectifier circuit output (2.2 MHz)
11	9	connection for external load capacitor for the AGC
12	10	connection for external balancing capacitor for the rectifier circuit
13	11	connection for external balancing capacitor for the rectifier circuit
14	12	output to passive anti-Bell circuit and limiter circuit (record mode) or output to Bell circuit and AGC circuit (playback mode)
15	13	10 dB amplifier output to anti-Bell circuit (record mode only)
16	14	virtual ground
17	15	chrominance signal output to tape (1.1 MHz)
18	16	output 10 dB amplifier and input active Bell filter (playback mode only)
19	17	input to 10 dB amplifier
20	18	power supply
21	19	divider output (record mode) or 6 dB amplifier output (playback mode)
22	20	external capacitor for limiting amplifier
23	21	chrominance signal input from tape (1.1 MHz) and record/playback switch
24	22	limiting amplifier input
25	23	15 dB amplifier output
26	–	not connected
27	24	analog ground
28	–	not connected
29	25	15 dB amplifier input (4.4 MHz)
30	26	digital ground
31	27	10 dB amplifier output
32	28	input for colour killer circuit

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FUNCTIONAL DESCRIPTION
(see Fig.1 and pinning of TDA4724)

Recording mode
The chrominance signal is separated from the CVBS signal using an external bandpass filter and an external Bell circuit. The signal is applied to a divider (+4) via a 15 dB amplifier (pin 25) and limiter (pin 22). Once divided the 1.1 MHz signal is fed via an external bandpass filter (pins 17 and 19), an internal 10 dB amplifier (via pin 17), an external anti-Bell filter (pins 12 and 13) and a limiter stage.

E to E mode
The 4.4 MHz signal is obtained from a tap in the limiter circuit and is applied to the chrominance output (pin 1) via the 10 dB amplifier, the external anti-Bell circuit and the colour killer stage.

Playback mode
The 1.1 MHz signal from the tape is applied, via a trap, to an internal 6 dB amplifier (via pin 21). Once amplified the signal is applied via an external bandpass filter and 10 dB amplifier to an operational amplifier (pins 12 and 14). The operational amplifier has an external anti-Bell circuit connected in its feedback path and, consequently, performs as a Bell circuit. From the operational amplifier the signal is applied to the AGC stage. The output signal from the AGC stage is applied to a rectifier where the frequency is doubled. Unwanted harmonics are removed by an external bandpass filter (pins 6 and 8) and the frequency is again doubled by the mixer at pin 6. The resultant 4.4 MHz signal is applied to the output stage at pin 1 via the 10 dB amplifier, the external anti-Bell circuit and the colour killer stage.

NOTE: The 1.07 MHz bandpass filter (pins 17 and 19) and the anti-Bell circuit (pins 12 and 13) are used in both the record and playback mode.

LIMITING VALUES
In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V _p	supply voltage	–	6	V
P _{tot}	total power dissipation	–	250	mW
T _{stg}	storage temperature	–25	+150	°C
T _{amb}	operating ambient temperature	0	+70	°C

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CHARACTERISTICS (TDA4722 pinning in parenthesis)

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Pin 1 (Pin 1)						
$V_{1-24(p-p)}$	chrominance output signal (peak-to-peak value)	4.4 MHz sinusoidal signal	—	—	1	V
V_{1-24}	DC level	SECAM signal	—	V_{28-24}	—	V
		non-SECAM signal	—	—	0.1	V
R_{1-24}	output resistance		—	V_I/I_e	—	Ω
α_1	non-SECAM signal suppression		40	—	—	dB
Pin 3 (Pin 3)						
V_{3-24}	SECAM mode active voltage		3.0	—	—	V
V_{3-24}	SECAM mode inactive voltage		—	—	2.2	V
R_{3-24}	input resistance 1	$V_3 = 1.8$ to 3.0 V	22	25	28	k Ω
R_{3-24}	input resistance 2		—	V_I/I_e	—	Ω
Pin 6 (Pin 8)						
V_{6-24}	input signal	2.2 MHz sinusoidal signal	—	300	—	mV
V_{6-24}	DC level		—	V_{7-24}	—	V
R_{6-7}	input resistance		—	560	1200	Ω
C_{6-24}	input capacitance		—	—	5	pF
Pin 7 (Pin 9)						
V_{7-24}	DC level		2.4	2.5	2.6	V
I_7	output current		—	—	—5	mA
I_7	input current		1	—	—	mA
R_{7-24}	output resistance		—	—	1	Ω
Pin 8 (Pin 10)						
$V_{8-24(p-p)}$	output signal voltage (peak-to-peak value)	2.2 MHz	—	600	—	mV
V_{8-24}	DC level		—	2.45	—	V
R_{8-24}	output resistance		—	V_I/I_e	—	Ω
α_8	1.1 MHz suppression		30	—	—	dB
α_8	3.3 MHz suppression		30	—	—	dB
α_8	4.4 MHz suppression		10	—	—	dB
Pin 12 (Pin 14)						
$V_{12-24(p-p)}$	input signal (peak-to-peak value)	playback mode	24	—	320	mV
V_{12-24}	DC level	record mode	—	V_{13-24}	—	V
		playback mode (closed loop)	—	V_{7-24}	—	V
B	gain bandwidth (operational amplifier)	playback mode	40	—	—	MHz
R_{12-24}	input resistance	record mode	100	—	—	k Ω
R_{12}	open-loop output resistance		—	V_I/I_e	—	Ω
Pin 13 (Pin 15)						
V_{13-24}	DC level	record mode	—	$V_{7-24} - 85$ mV	—	V
G_{13-24}	signal gain	record mode	—	10	—	dB
R_{13-24}	output resistance	record mode	—	V_I/I_e	—	Ω

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Pin 14 (Pin 16)						
V ₁₄₋₂₄	DC level	playback mode	—	V ₇₋₂₄	—	V
Pin 15 (Pin 17)						
V _{15-24(p-p)}	chrominance output (peak-to-peak value)		560	630	700	mV
V ₁₅₋₂₄	DC level		—	V ₇₋₂₄ – 80 mV	—	V
R ₁₅₋₂₄	output resistance		—	—	10	Ω
α ₁₅	playback suppression		30	—	—	dB
α ₁₅	non-SECAM suppression		40	—	—	dB
Pin 16 (Pin 18)						
V ₁₆₋₂₄	DC level	playback mode	—	V ₇₋₂₄ – 54 mV	—	V
G ₁₆₋₁₇	signal gain	playback mode	—	10	—	dB
R ₁₆₋₂₄	input resistance	record mode	—	10	—	kΩ
R ₁₆₋₂₄	output resistance	playback mode	—	V _i /I _e	—	Ω
Pin 17 (Pin 19)						
V _{17-24(p-p)}	input signal (peak-to-peak value)		—	400	—	mV
V ₁₇₋₂₄	DC level		—	V ₇₋₂₄ – 30 mV	—	V
R ₁₇₋₂₄	input resistance		8	12	16	kΩ
C ₁₇₋₂₄	input capacitance		—	—	5	pF
Pin 19 (Pin 21)						
V ₁₉₋₂₄	DC level	record mode	—	1.82	—	V
		playback mode	—	1.7	—	V
V _{19-24(p-p)}	AC level (peak-to-peak value)	sinusoidal	—	800	—	mV
		block	—	621	—	mV
G ₁₉₋₂₄	signal gain	playback mode	—	6	—	dB
R ₁₉₋₂₄	output resistance		—	V _i /I _e	—	Ω
Pin 21 (Pin 23)						
V _{21-24(p-p)}	input signal (peak-to-peak value)	playback mode	—	300	600	mV
V ₂₁₋₂₄	DC level		—	3.25	—	V
V ₂₁₋₂₄	record mode active voltage level		—	—	1.5	V
V ₂₁₋₂₄	playback mode active voltage level		2.2	—	—	V
R ₂₁₋₂₄	input resistance		8	12	16	kΩ
C ₂₁₋₂₄	input capacitance		—	—	5	pF
Pin 25 (Pin 29)						
V _{25-24(p-p)}	input signal (peak-to-peak value)		—	—	645	mV
V ₂₅₋₂₄	DC level		—	V ₇₋₂₄	—	V
R ₂₅₋₂₄	input resistance		100	—	—	kΩ
C ₂₅₋₂₄	input capacitance		—	—	5	pF

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Pin 27 (Pin 31)						
R ₂₇₋₂₄	output resistance		–	–	10	Ω
RECORD MODE						
V _{27-24(p-p)}	output signal (peak-to-peak value)	4.4 MHz sinusoidal signal; V ₂₂ = 600 mV _(p-p)	–	1175	–	mV
V _{27-24(p-p)}	output signal (peak-to-peak value)	4.4 MHz sinusoidal signal; V ₂₂ = 300 mV _(p-p)	–	1110	–	mV
V _{27-24(p-p)}	output signal (peak-to-peak value)	4.4 MHz sinusoidal signal; V ₂₂ = 30 mV _(p-p)	–	272	–	mV
V ₂₇₋₂₄	DC level		–	1.65	–	V
PLAYBACK MODE						
V _{27-24(p-p)}	output signal (peak-to-peak value)	4.4 MHz sinusoidal signal	–	1175	–	mV
V ₂₇₋₂₄	DC level		–	3	–	V
G ₂₇₋₆	signal gain		–	12	–	dB
α ₂₇	2.2 MHz suppression		23	–	–	dB
α ₂₇	6.6 MHz suppression		30	–	–	dB
α ₂₇	8.8 MHz suppression		10	–	–	dB
Pin 28 (Pin 32)						
V _{28-24(p-p)}	input signal (peak-to-peak value)		–	–	1000	mV
V ₂₈₋₂₄	DC level		–	V ₂₇₋₂₄	–	V
R ₂₈₋₂₄	input resistance		100	–	–	kΩ
C ₂₈₋₂₄	input capacitance		–	–	5	pF

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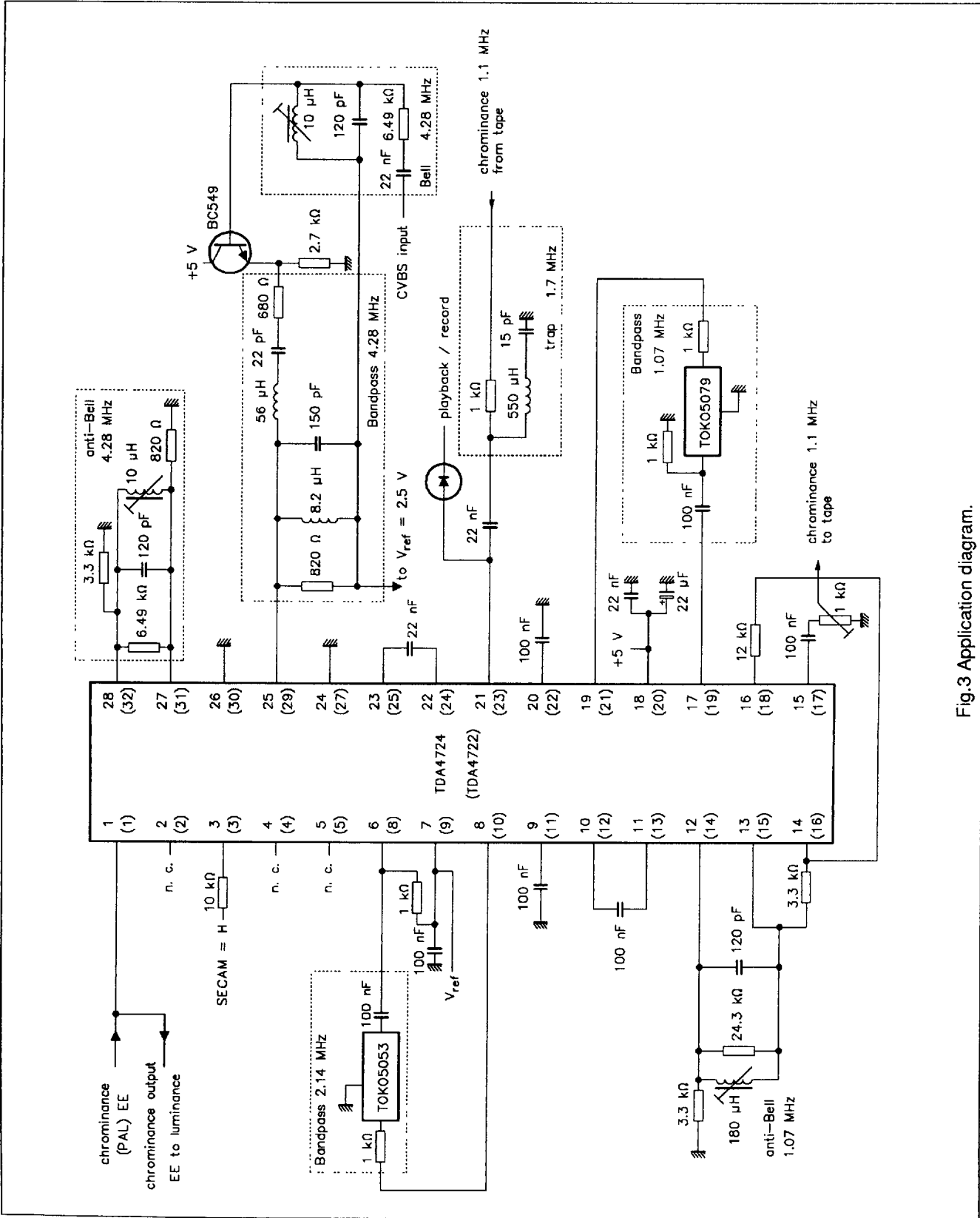
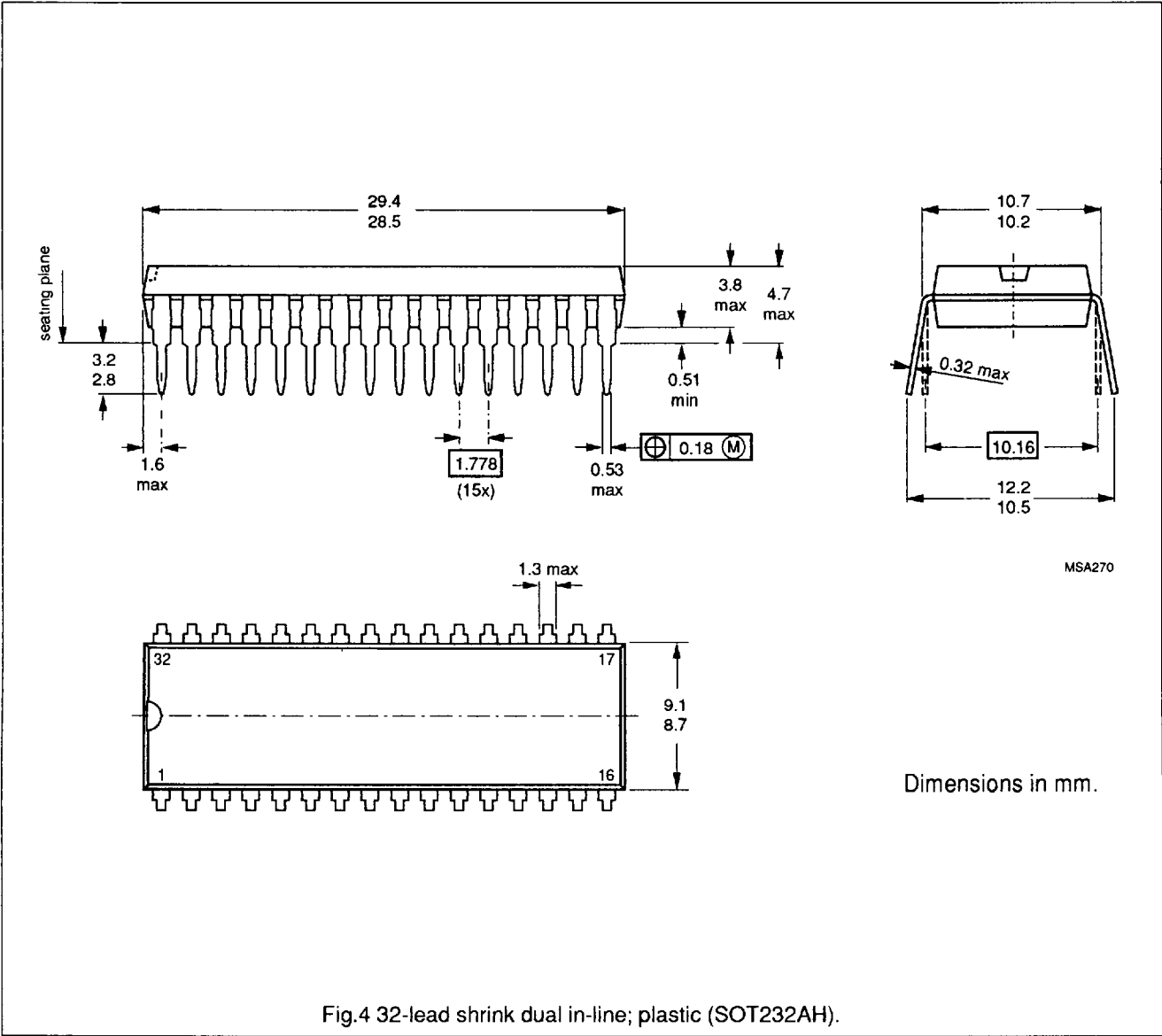


Fig. 3 Application diagram.

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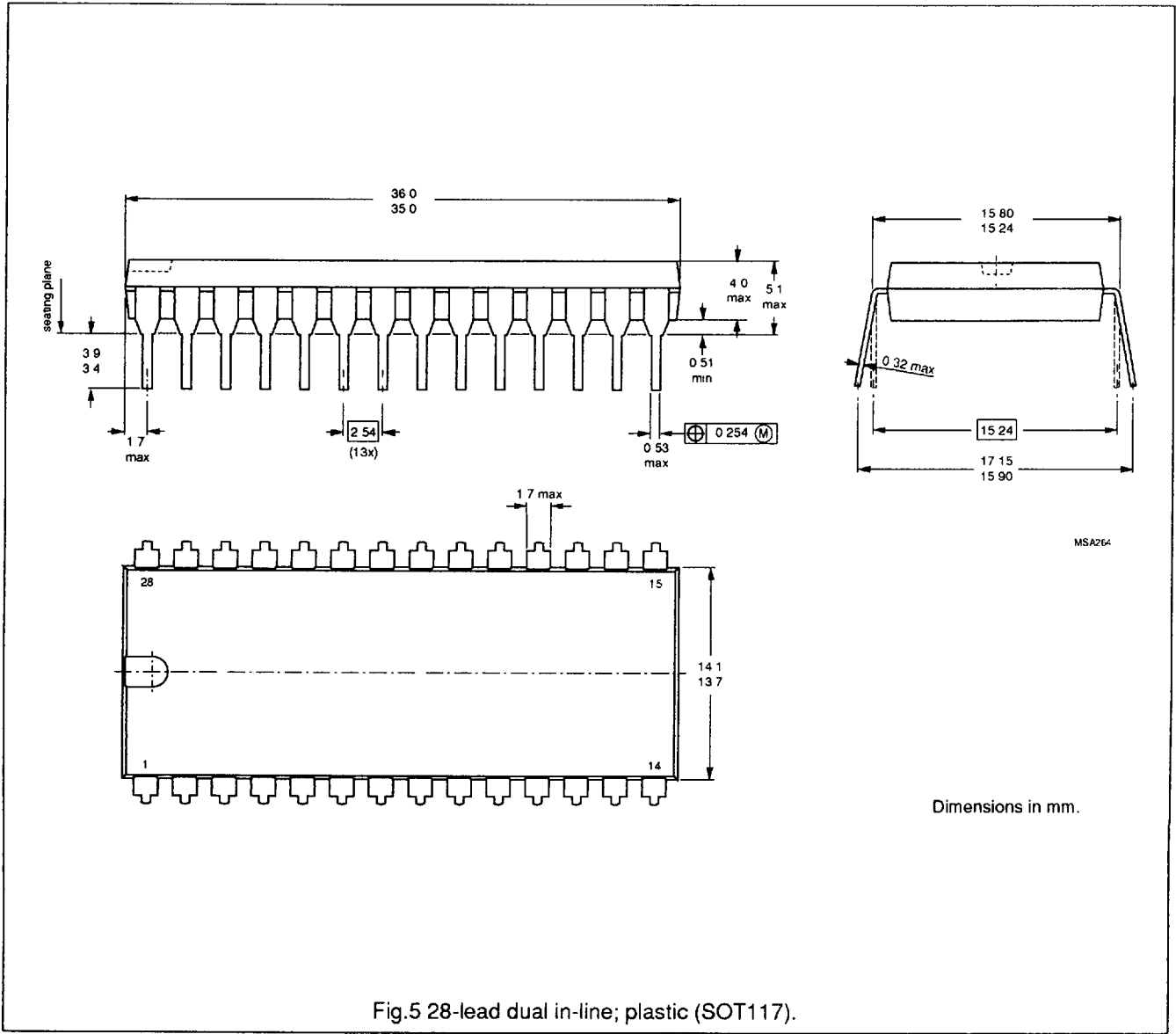
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PACKAGE OUTLINES



SECAM-L chrominance processor
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**SECAM-L chrominance processor
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TDA4722/TDA4724**SOLDERING****Plastic dual in-line packages****BY DIP OR WAVE**

The maximum permissible temperature of the solder is 260 °C; this temperature must not be in contact with the joint for more than 5 s. The total contact time of successive solder waves must not exceed 5 s.

The device may be mounted up to the seating plane, but the temperature of the plastic body must not exceed the specified storage maximum. If the printed-circuit board has been preheated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

REPAIRING SOLDERED JOINTS

Apply the soldering iron below the seating plane (or not more than 2 mm above it). If its temperature is below 300 °C it must not be in contact for more than 10 s; if between 300 and 400 °C, for not more than 5 s.

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DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of this specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.