

SECAM colour decoder with negative colour difference output signals

TDA4632

FEATURES

- Gain controlled chrominance amplifier
- Internal colour-difference signal output filters
- SECAM demodulation
 - Limiter-amplifier
 - Quadrature-demodulator with a single external reference tuned circuit
 - Alternate line blanking, H and V blanking
 - External de-emphasis
- Identification
 - Secure SECAM identification at 50 Hz only
 - External service switch

GENERAL DESCRIPTION

The TDA4632 is a bipolar integrated colour decoder for SECAM with negative colour difference output signals. The colour difference output signals are fed to the TDA4660/TDA4661, switched capacitor delay line.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_P	positive supply voltage (pin 13)	10.8	12	13.2	V
I_P	supply current (pin 13)	–	60	–	mA
$V_{i(p-p)}$	chrominance input voltage (pin 15) (peak-to-peak value)	20	100	400	mV
$V_{o(p-p)}$	colour difference output voltage (pin 1) (peak-to-peak value)	0.83	1.05	1.32	V
	colour difference output voltage (pin 3) (peak-to-peak value)	1.06	1.33	1.67	V

ORDERING INFORMATION

EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
TDA4632	28	DIL	plastic	SOT117

SECAM colour decoder
with negative colour difference output signals

TDA4632

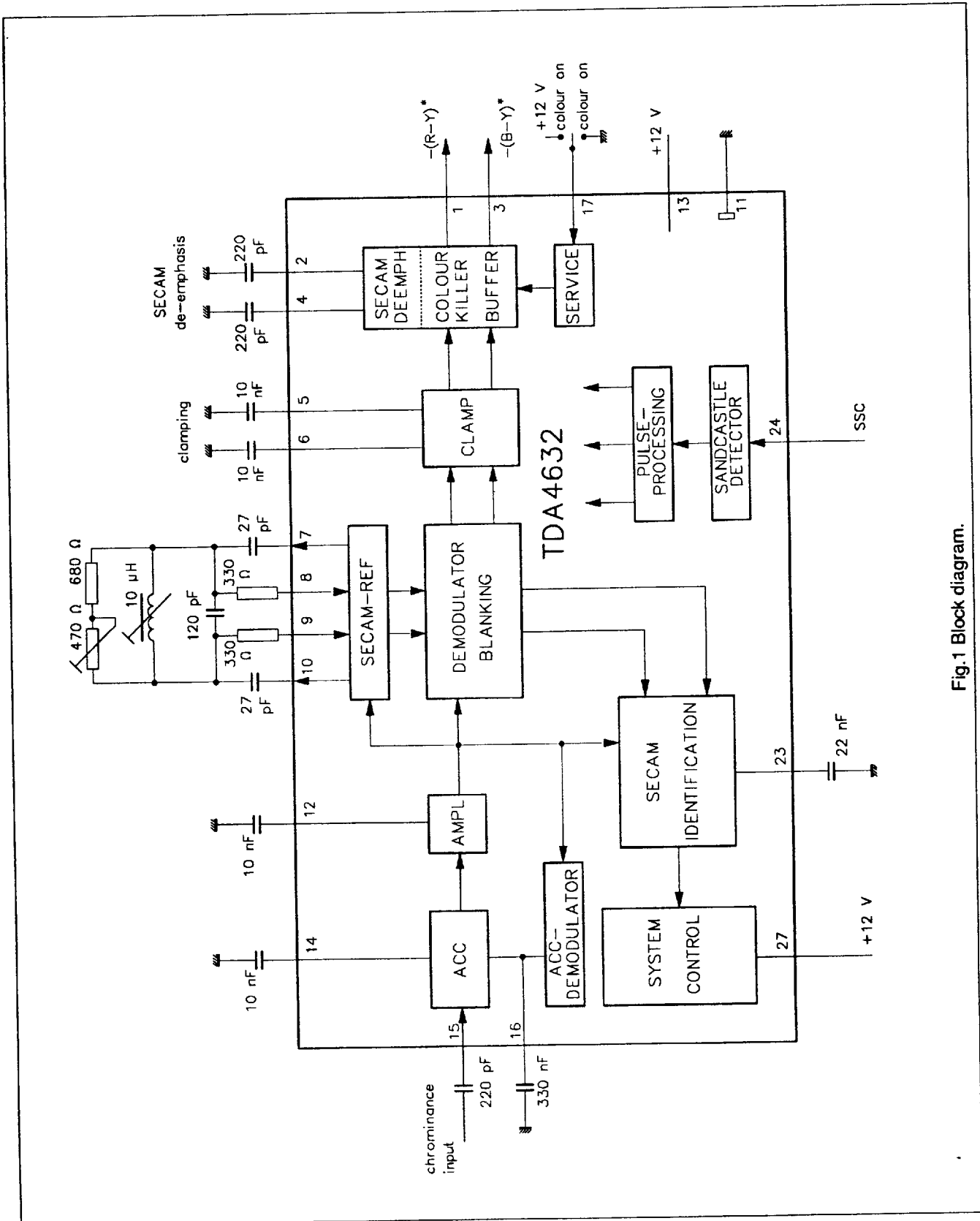


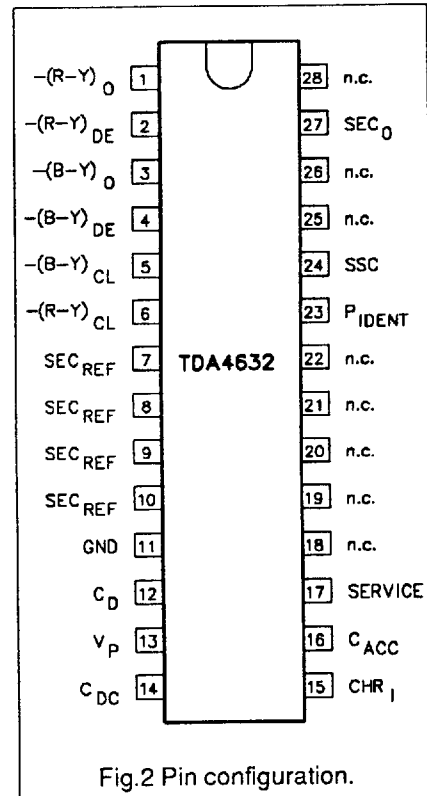
Fig.1 Block diagram.

SECAM colour decoder with negative colour difference output signals

TDA4632

PINNING

SYMBOL	PIN	DESCRIPTION
$-(R-Y)_o$	1	$-(R-Y)$ output
$-(R-Y)_{DE}$	2	$(R-Y)$ de-emphasis
$-(B-Y)_o$	3	$-(B-Y)$ output
$-(B-Y)_{DE}$	4	$(B-Y)$ de-emphasis
$-(B-Y)_{CL}$	5	$(B-Y)$ clamping
$-(R-Y)_{CL}$	6	$(R-Y)$ clamping
SEC _{REF}	7	SECAM reference tuned circuit
	8	
	9	
	10	
GND	11	ground
C _D	12	DC for demodulators
V _P	13	supply voltage
C _{DC}	14	DC feedback
CHR _I	15	chrominance input
C _{ACC}	16	automatic colour control
SERVICE	17	service
n.c.	18	not connected
	19	
	20	
	21	
	22	
P _{IDENT}	23	PAL/SECAM identification
SSC	24	super sandcastle pulse input
n.c.	25	not connected
	26	
SEC ₀	27	SECAM identification
n.c.	28	not connected



SECAM colour decoder with negative colour difference output signals

TDA4632

FUNCTIONAL DESCRIPTION

The IC (see block diagram Fig.1) contains all functions required for the identification and demodulation of SECAM signals. When a SECAM signal is fed into the input, the circuit is demodulating the signal and, after having identified the signal, it switches on the colour. At the outputs the two colour difference signals $-(R-Y)$ and $-(B-Y)$ are available.

Chrominance amplifier

The chrominance amplifier has an asymmetrical input. The input signal has to be AC coupled (pin 15). The differential amplifier stage at the input is followed by the gain control stage and a differential amplifier with lateral pnp-transistors having the function of a level-shifter. The gain control stage consists of an ACC-rectifier circuit. The rectifier circuit is switched on during part of the burst-gate-pulse and it is disabled during the prolonged frame flyback. The DC-potential of the symmetrical signal-connections to the demodulators is kept at the same level by means of a working point control stage.

Demodulators

The demodulation of the SECAM colour-signal needs a demodulator for frequency modulated signals. The SECAM demodulator is a combined demodulator for $-(B-Y)$ and $-(R-Y)$ with artificial black level being inserted alternately every second line and during line- and field-flyback. The load resistors of the demodulator are connected to two differential amplifiers, one for $-(B-Y)$ and one for $-(R-Y)$. The not wanted signals occurring every second line ($(R-Y)$ in the $-(B-Y)$ -channel and $(B-Y)$ in the $-(R-Y)$ -channel), have to be blanked.

Clamp

Behind the demodulators the signals are being filtered and the black level is clamped to a constant DC-level during the burst-gate-pulse. For the SECAM signals this happens every second line, when the appropriate artificial black level is present.

De-emphasis and output-buffer

Behind the clamping stages is the de-emphasis for the SECAM signals and just in front of the stages are the colour-killer and blanking-stages. The blanking level is the same as the clamping level and the black level.

Identification

The identification part contains a separate identification-demodulator for SECAM. The identification-demodulator is active during part of the burst clamping time. It uses the same signals as the SECAM-demodulator that is not active during field-flyback. The identification-demodulator is followed by a H/2-switch 'rectifying' the demodulated signal. The result is an identification signal (P_{IDENT}) that is positive for a SECAM signal. In the event of a field frequency of 60 Hz the signal cannot be identified as a SECAM signal, even if the P_{IDENT} is positive. If the H/2 signal is of the wrong polarity, the identification signal is negative and the H/2-flip flop is set to the correct phase. If a signal has been identified, after a delay time the colour is switched on.

SECAM colour decoder with negative colour difference output signals

TDA4632

LIMITING VALUES

In accordance with the Absolute Maximum System (IEC134)

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V _P	supply voltage (pin 13)	–	13.2	V
V _I	voltage range at pins 1, 3, 17, 24 and 27	0	V _P	V
I _o	output current (pins 1 and 3)	–	–5	mA
I _{i/o}	input/output current (pin 25 to 28)	–	–5	μA
T _{amb}	operating ambient temperature range	0	+70	°C
T _{stg}	storage temperature range	–25	+150	°C
P _{tot}	total power dissipation	–	1.4	W

THERMAL RESISTANCE

SYMBOL	PARAMETER	THERMAL RESISTANCE
R _{th j-a}	from junction to ambient in free air	37 K/W

SECAM colour decoder with negative colour difference output signals

TDA4632

CHARACTERISTICS

All voltages are measured to GND (pin 11); $V_P = 12\text{ V}$; chrominance input signal $V_{15(p-p)} = 100\text{ mV}$ (with 75% colour bar signal); $4.3\text{ }\mu\text{s}$ burst-blanking pulse and vertical blanking superimposed on super sandcastle pulse; $T_{amb} = +25\text{ }^\circ\text{C}$; measured in test circuit of Fig.1; unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_P	positive supply voltage (pin 13)		10.8	12	13.2	V
I_P	supply current		50	60	80	mA
Chrominance part						
$V_{i(p-p)}$	input signal (pin 15) (peak-to-peak value)	see note 1	20	100	400	mV
R_i	input resistance (pin 15)		7	10	13	k Ω
C_i	input capacitance (pin 15)		-	4	5	pF
Demodulator part (SECAM) (see note 2)						
$V_{1(p-p)}$	colour difference $-(R-Y)$ output signals (peak-to-peak value)	every second line blanked	0.83	1.05	1.32	V
$V_{3(p-p)}$	colour difference $-(B-Y)$ output signals (peak-to-peak value)	every second line blanked	1.06	1.33	1.67	V
$V_{1,3}$	DC output level	proportional to V_P	6.3	6.8	7.3	V
	H/2 ripples outputs	without colour bars; every second line blanked	-	-	10	mV
$V_{1,3(p-p)}$	residual carrier at CD outputs	4.43 MHz	-	-	30	mV
		8.87 MHz	-	-	30	mV
$\Delta V_{1,3} / \Delta V_P$	shift of blanking level relative to demodulated f_0 levels		-	-	3	mV/V
$\Delta V_1 / \Delta T$			-	0.16	-	mV/K
$\Delta V_3 / \Delta T$			-	-0.25	-	mV/K
Service switch						
V_{17}	internal bias voltage		-	3	-	V
	switching voltage for forced colour ON	colour ON	0	-	0.5	V
	switching voltage for forced colour ON	colour ON	5.5	-	V_P	V
R_{17}	input resistance		3.8	5.0	6.2	k Ω
Identification part						
t_d	delay time for colour ON		2	-	3	cycles
	delay time for colour OFF		0	-	1	cycles
Super sandcastle pulse detector (see note 3)						
V_{24}	input voltage pulse levels to separate V and H blanking pulses	pulse ON	1.3	1.6	1.9	V
		pulse OFF	1.1	1.4	1.7	V
	voltage pulse amplitude		2.0	2.5	3.0	V
	input voltage pulse levels to separate H blanking pulse	pulse ON	3.3	3.6	3.9	V
		pulse OFF	3.1	3.4	3.7	V
	voltage pulse amplitude		4.1	4.5	4.9	V
	input voltage pulse levels to separate burst gating pulse	pulse ON	6.2	6.6	7.0	V
		pulse OFF	6.0	6.4	6.8	V
voltage pulse amplitude		7.7	-	V_P	V	
input voltage	during line scan	-	-	1.0	V	
I_{24}	input current	during line scan	-	-	-100	μA

**SECAM colour decoder
with negative colour difference output signals**

TDA4632**Notes to the characteristics**

1. With 20 mV, 3 dB decrease of the output signal is allowed. The level shift of demodulated f_0 relative to blanking level is less than 5 mV.
2. For the SECAM standard, amplitude and H/2 ripple content of the CD signals (R-Y) and (B-Y) depend on the characteristics of the external tuned circuit at pins 7 to 10. The resonant frequency of the external tuned circuit must be adjusted such that the demodulated f_0 voltage level is zero in the -(B-Y) output channel at pin 3.
Now it is possible to adjust the quality of the external circuit such that the demodulated f_0 voltage level is zero in the -(R-Y) output channel at pin 1. If necessary, the f_0 voltage level in the -(B-Y) output channel must be readjusted to zero by the coil of the tuned circuit.
The external capacitors at pins 2 and 4 (220 pF each) are matched to the internal resistance of the de-emphasis network such that every alternate scanned line is blanked.
3. The super sandcastle pulse is compared with three internal threshold levels which are proportional to V_p .

SECAM colour decoder with negative colour difference output signals

TDA4632

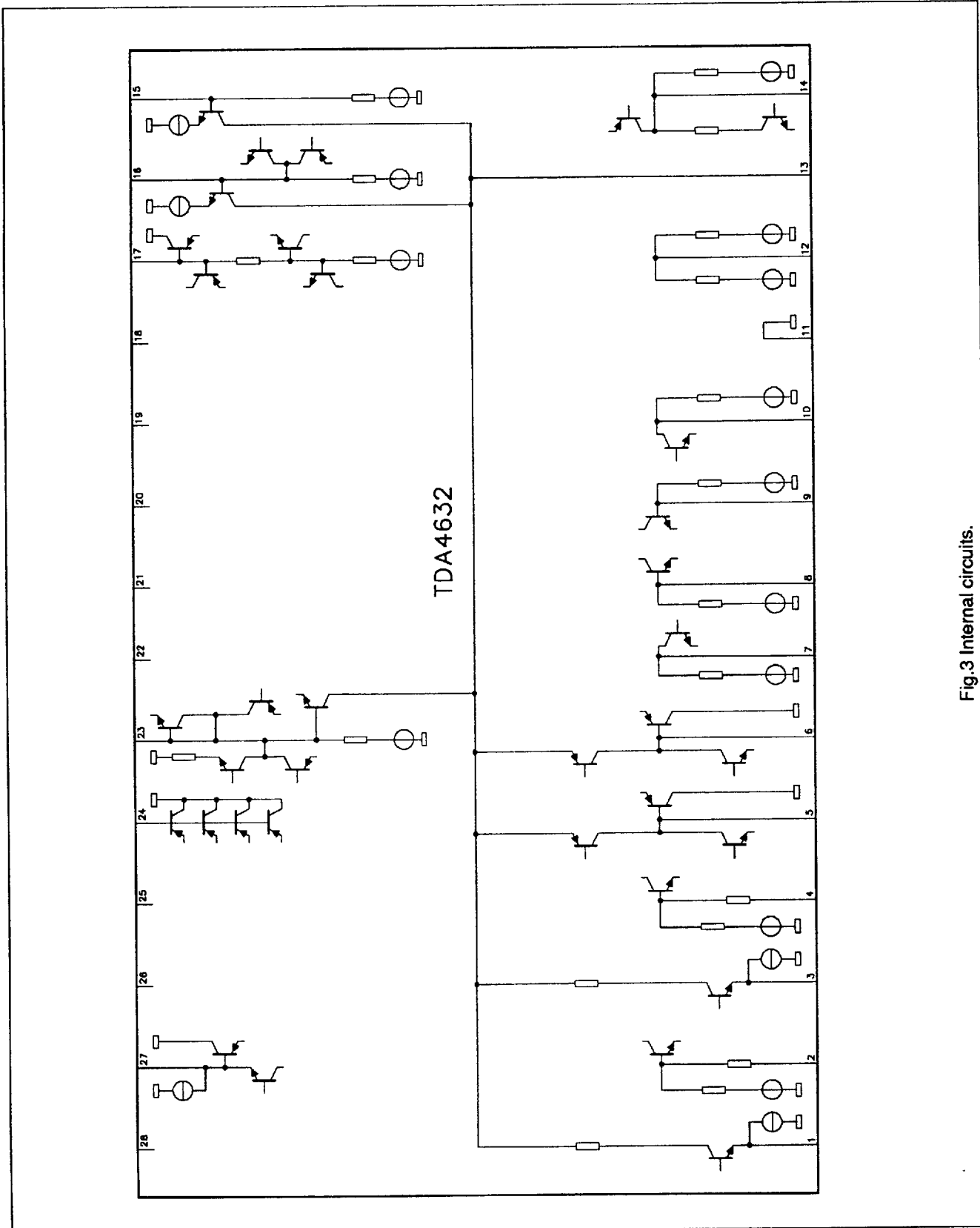
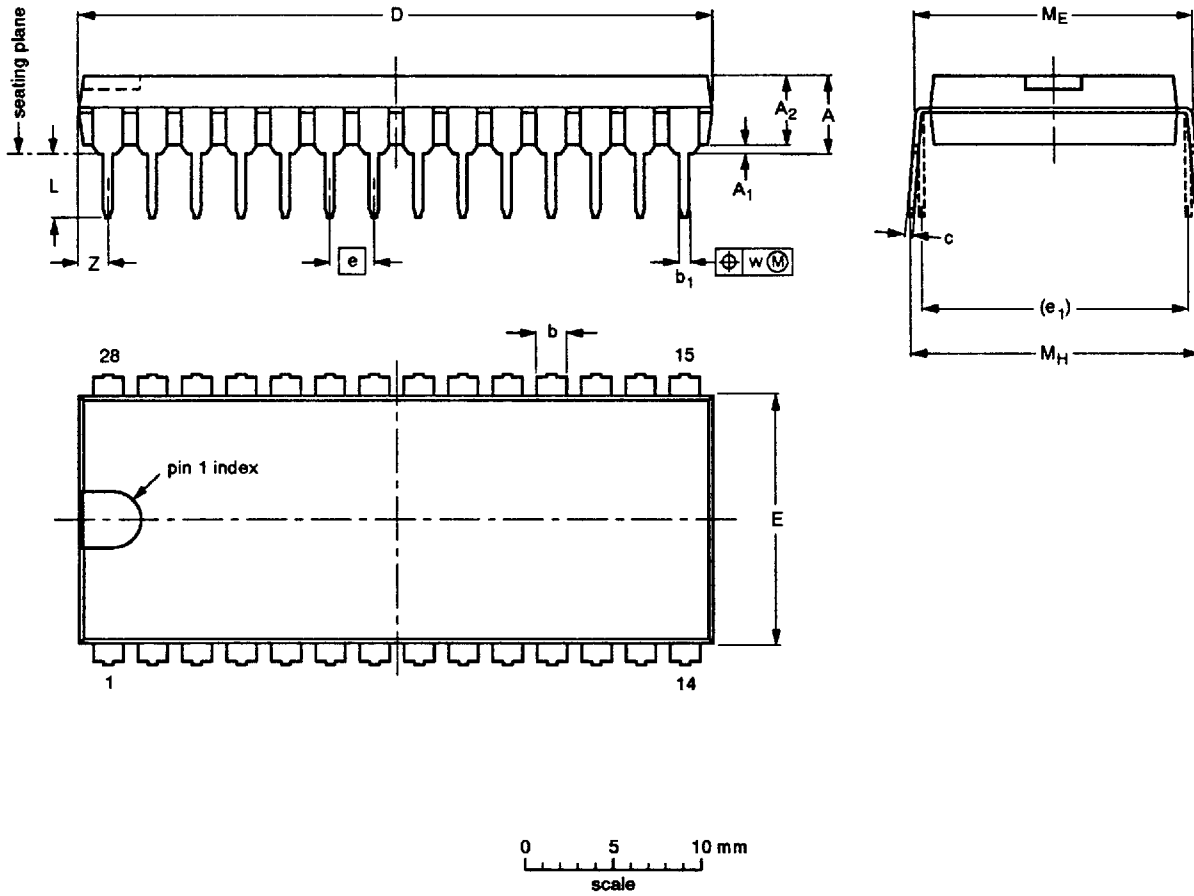


Fig.3 Internal circuits.

Package outlines

DIP28: plastic dual in-line package; 28 leads (600 mil)

SOT117-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁ min.	A ₂ max.	b	b ₁	c	D ⁽¹⁾	E ⁽¹⁾	e	e ₁	L	M _E	M _H	w	Z ⁽¹⁾ max.
mm	5.1	0.51	4.0	1.7 1.3	0.53 0.38	0.32 0.23	36.0 35.0	14.1 13.7	2.54	15.24	3.9 3.4	15.80 15.24	17.15 15.90	0.25	1.7
inches	0.20	0.020	0.16	0.066 0.051	0.020 0.014	0.013 0.009	1.41 1.34	0.56 0.54	0.10	0.60	0.15 0.13	0.62 0.60	0.68 0.63	0.01	0.067

Note

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT117-1	051G05	MO-015AH			92-11-17 95-01-14