

## Baseband delay line

## TDA4661

## FEATURES

- Two comb filters, using the switched-capacitor technique, for one line delay time (64  $\mu$ s)
- Adjustment-free application
- No crosstalk between SECAM colour carriers (diaphoty)
- Handles negative or positive colour-difference input signals
- Clamping of AC-coupled input signals ( $\pm(R-Y)$  and  $\pm(B-Y)$ )
- VCO without external components
- 3 MHz internal clock signal derived from a 6 MHz CCO, line-locked by the sandcastle pulse (64  $\mu$ s line)
- Sample-and-hold circuits and low-pass filters to suppress the 3 MHz clock signal
- Addition of delayed and non-delayed output signals
- Output buffer amplifiers
- Comb filtering functions for NTSC colour-difference signals to suppress cross-colour.

## GENERAL DESCRIPTION

The TDA4661 is an integrated baseband delay line circuit with one line delay. It is suitable for decoders with colour-difference signal outputs  $\pm(R-Y)$  and  $\pm(B-Y)$ .

## QUICK REFERENCE DATA

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
$V_{P1}$	analog supply voltage (pin 9)	4.5	5	6	V
$V_{P2}$	digital supply voltage (pin 1)	4.5	5	6	V
$I_{P(\text{tot})}$	total supply current	–	4.9	7.0	mA
$V_i$	$\pm(R-Y)$ input signal PAL/NTSC (peak-to-peak value; pin 16)	–	525	–	mV
	$\pm(B-Y)$ input signal PAL/NTSC (peak-to-peak value; pin 14)	–	665	–	mV
	$\pm(R-Y)$ input signal SECAM (peak-to-peak value; pin 16)	–	1.05	–	V
	$\pm(B-Y)$ input signal SECAM (peak-to-peak value; pin 14)	–	1.33	–	V
$G_v$	gain $V_O / V_i$ of colour-difference output signals				
	$V_{11} / V_{16}$ for PAL and NTSC	5.3	5.8	6.3	dB
	$V_{12} / V_{14}$ for PAL and NTSC	5.3	5.8	6.3	dB
	$V_{11} / V_{16}$ for SECAM	–0.6	–0.1	+0.4	dB
	$V_{12} / V_{14}$ for SECAM	–0.6	–0.1	+0.4	dB

## ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TDA4661	DIP16	plastic dual in-line package; 16 leads (300 mil) long body	SOT38-4
TDA4661T	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1

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## BLOCK DIAGRAM

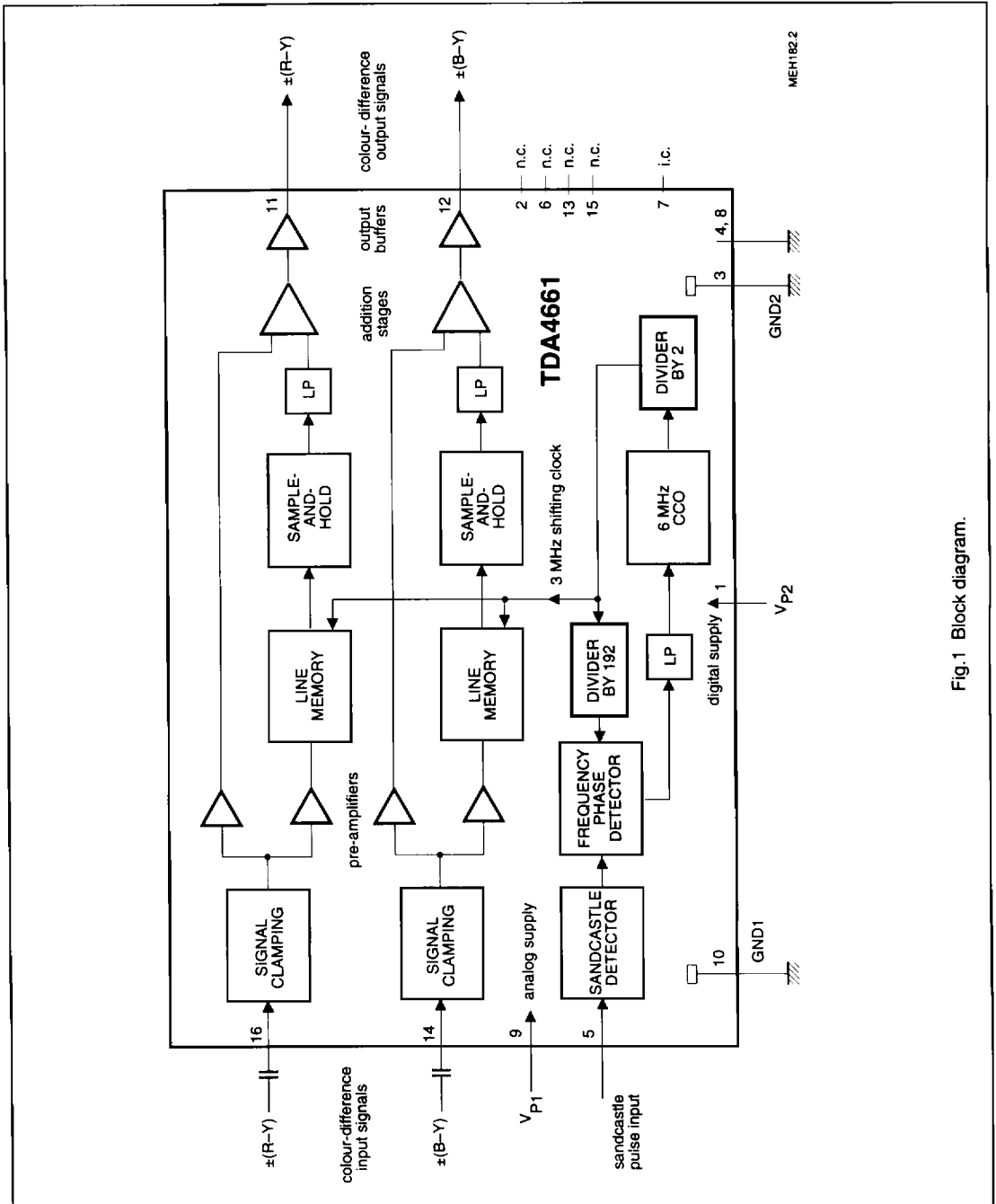


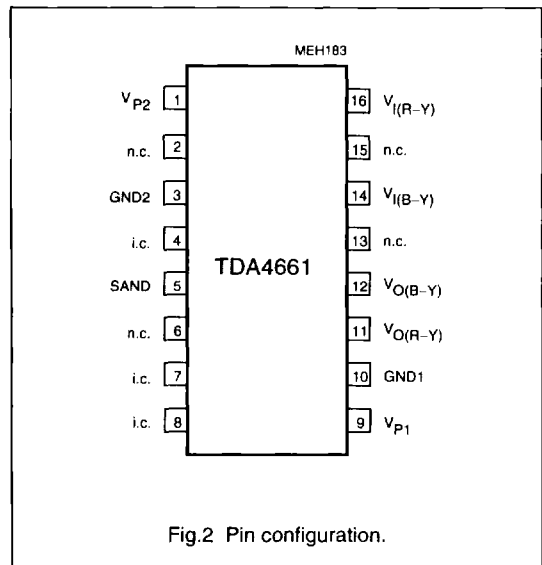
Fig.1 Block diagram.

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## PINNING

SYMBOL	PIN	DESCRIPTION
V <sub>P2</sub>	1	+5 V supply voltage for digital part
n.c.	2	not connected
GND2	3	ground for digital part (0 V)
i.c.	4	internally connected
SAND	5	sandcastle pulse input
n.c.	6	not connected
i.c.	7	internally connected
i.c.	8	internally connected
V <sub>P1</sub>	9	+5 V supply voltage for analog part
GND1	10	ground for analog part (0 V)
V <sub>O(R-Y)</sub>	11	±(R-Y) output signal
V <sub>O(B-Y)</sub>	12	±(B-Y) output signal
n.c.	13	not connected
V <sub>I(B-Y)</sub>	14	±(B-Y) input signal
n.c.	15	not connected
V <sub>I(R-Y)</sub>	16	±(R-Y) input signal



## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134). Ground pins 3 and 10 connected together.

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V <sub>P1</sub>	supply voltage (pin 9)	-0.5	+7	V
V <sub>P2</sub>	supply voltage (pin 1)	-0.5	+7	V
V <sub>5</sub>	voltage on pin 5	-0.5	V <sub>P</sub> + 1.0	V
V <sub>n</sub>	voltage on pins 11, 12, 14 and 16	-0.5	V <sub>P</sub>	V
T <sub>stg</sub>	storage temperature	-25	+150	°C
T <sub>amb</sub>	operating ambient temperature	0	70	°C
V <sub>ESD</sub>	electrostatic handling for all pins (note 1)	-	±500	V

## Note

1. Equivalent to discharging a 200 pF capacitor through a 0 Ω series resistor.

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	VALUE	UNIT
R <sub>thj-a</sub>	thermal resistance from junction to ambient in free air		
	SOT38-4	75	K/W
	SOT109-1	220	K/W

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## CHARACTERISTICS

$V_P = 5.0$  V; input signals as specified in characteristics with 75% colour bars; super-sandcastle frequency of 15.625 kHz;  $T_{amb} = +25$  °C; measurements taken in Fig.3 unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{P1}$	supply voltage (analog part; pin 9)		4.5	5	6	V
$V_{P2}$	supply voltage (digital part; pin 1)		4.5	5	6	V
$I_{P1}$	supply current		–	4.2	6.0	mA
$I_{P2}$	supply current		–	0.7	1.0	mA
<b>Colour-difference input signals</b>						
$V_i$	input signal (peak-to-peak value)					
	$\pm(R-Y)$ PAL and NTSC (pin 16)		–	525	–	mV
	$\pm(B-Y)$ PAL and NTSC (pin 14)		–	665	–	mV
	$\pm(R-Y)$ SECAM (pin 16)	note 1	–	1.05	–	V
	$\pm(B-Y)$ SECAM (pin 14)	note 1	–	1.33	–	V
$V_{I(max)}$	maximum symmetrical input signal (peak-to-peak value)					
	$\pm(R-Y)$ or $\pm(B-Y)$ for PAL and NTSC	before clipping	1	–	–	V
	$\pm(R-Y)$ or $\pm(B-Y)$ for SECAM	before clipping	2	–	–	V
$R_{14, 16}$	input resistance		–	–	40	k $\Omega$
$C_{14, 16}$	input capacitance		–	–	10	pF
$V_{14, 16}$	input clamping voltage	proportional to $V_P$	1.3	1.5	1.7	V
<b>Colour-difference output signals</b>						
$V_O$	output signal (peak-to-peak value)					
	$\pm(R-Y)$ on pin 11	all standards	–	1.05	–	V
	$\pm(B-Y)$ on pin 12	all standards	–	1.33	–	V
$V_{11}/V_{12}$	ratio of output amplitudes at equal input signals	$V_{14, 16} = 1.33$ V (p-p)	–0.4	0	+0.4	dB
$V_{11, 12}$	DC output voltage	proportional to $V_P$	2.5	2.9	3.3	V
$R_{11, 12}$	output resistance		–	330	400	$\Omega$
$G_v$	gain for PAL and NTSC	ratio $V_O/V_i$	5.3	5.8	6.3	dB
	gain for SECAM	ratio $V_O/V_i$	–0.6	–0.1	+0.4	dB
$V_n/V_{n+1}$	ratio of output signals on pins 11 and 12 for adjacent time samples at constant input signals	$V_{14, 16} = 1.33$ V (p-p); SECAM signals	–0.1	0	+0.1	dB
$V_n$	noise voltage (RMS value; pins 11 and 12)	$V_{14, 16} = 0$ V; note 2	–	–	1.2	mV
S/N(W)	weighted signal-to-noise ratio	$V_O = 1$ V (p-p); note 2	–	54	–	dB
$t_d$	delay of delayed signals		63.94	64.0	64.06	$\mu$ s
	delay of non-delayed signals		40	60	80	ns
$t_{tr}$	transient time of delayed signal on pins 11 respectively 12	300 ns transient of SECAM signal	–	350	–	ns
	transient time of non-delayed signal on pins 11 respectively 12	300 ns transient of SECAM signal	–	320	–	ns

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>Sandcastle pulse input (pin 5)</b>						
$f_{BK}$	burst-key frequency		14.2	15.625	17.0	kHz
$f_{SAND}$	sandcastle frequency		14.2	15.625	17.0	kHz
$V_5$	top pulse voltage	note 3	4.0	–	$V_P + 1.0$	V
$V_{slice}$	internal slicing level		$V_5 - 1.0$	–	$V_5 - 0.5$	V
$I_5$	input current		–	–	10	$\mu A$
$C_5$	input capacitance		–	–	10	pF

**Notes**

1. The signal must be blanked line-sequentially. The blanking level must be equal to the non-colour signal.
2. Noise voltage at  $f = 10$  kHz to 1 MHz;  $V_{114, 16} = 0$  ( $R_S < 300 \Omega$ ).
3. The leading edge of the burst-key pulse or H-blanking pulse is used for timing.

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APPLICATION INFORMATION

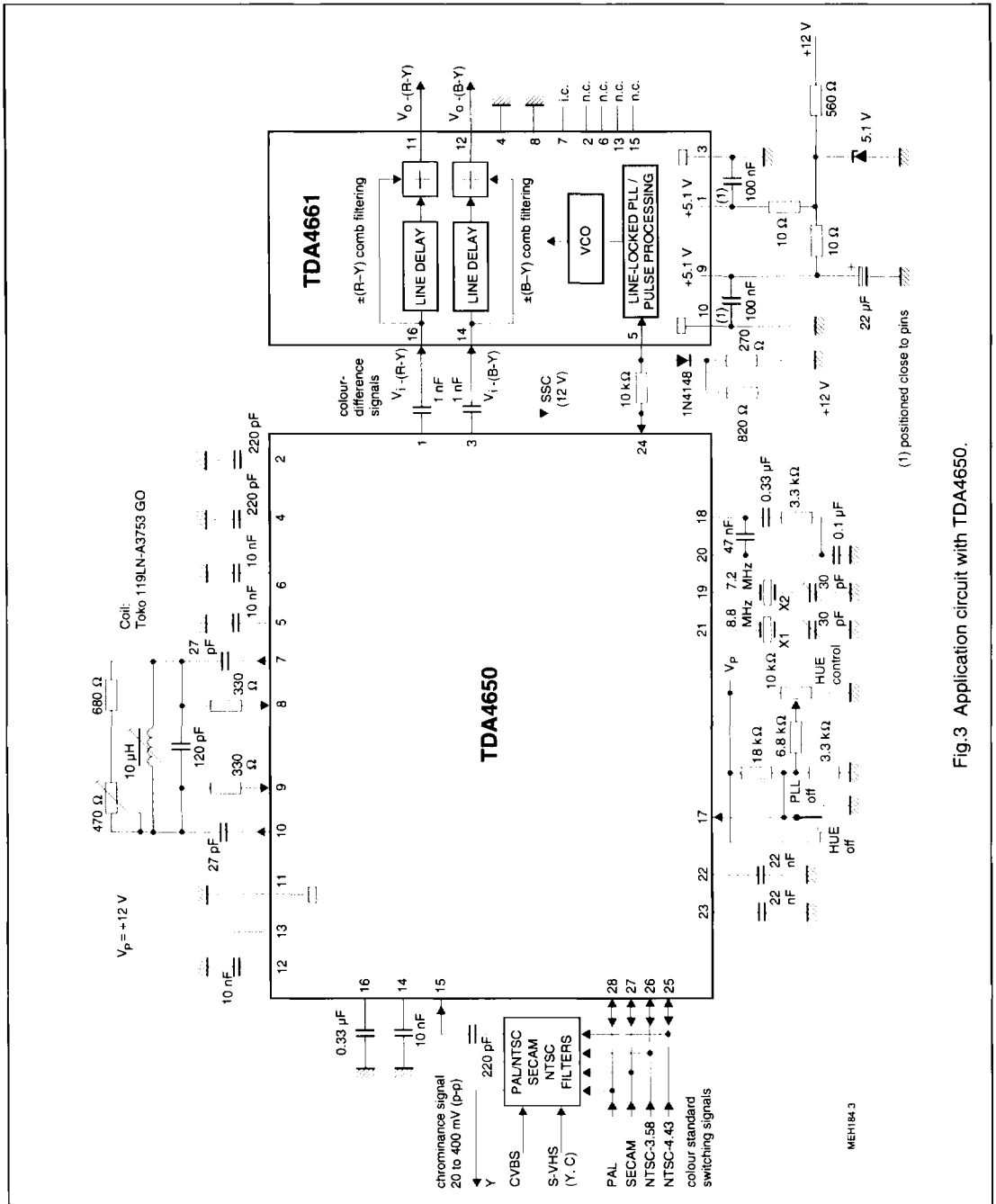


Fig.3 Application circuit with TDA4650.