DATA SHEET

TDA4661

Baseband delay line

Product specification

Supersedes data of April 1993

File under Integrated Circuits, IC02

December 1994

Philips Semiconductors

PHILIPS

PHILIPS

Baseband delay line

TDA4661

FEATURES

- Two comb filters, using the switched-capacitor technique, for one line delay time (64 µs)
- 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 µs 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
$I_{P(tot)}$	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

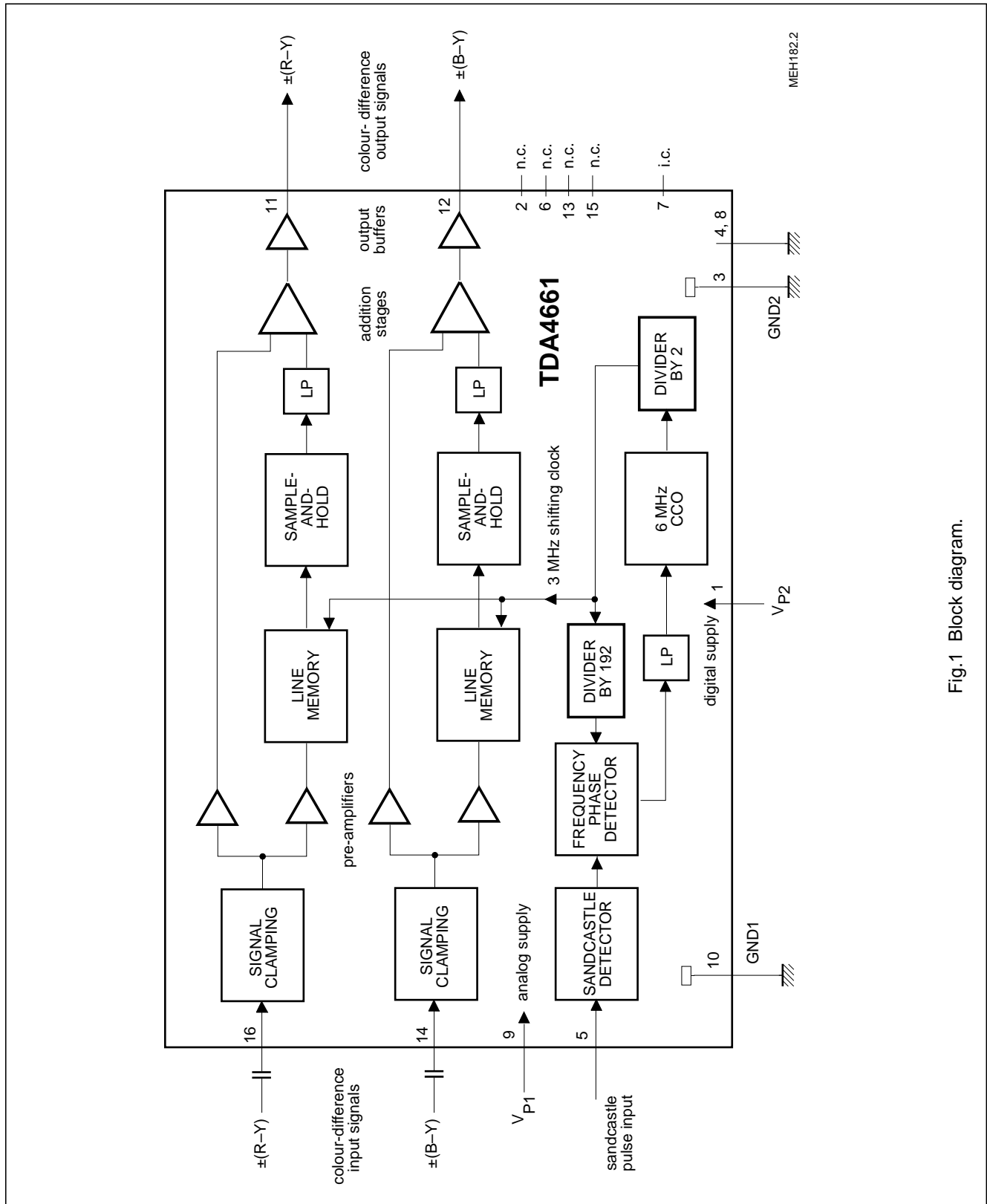| TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
TDA4661	DIP16	plastic dual in-line package; 16 leads (300 mil) long body	SOT38-4
TDA4661T	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1

Baseband delay line

TDA4661

BLOCK DIAGRAM

Fig.1 Block diagram.

Baseband delay line

TDA4661

PINNING

| SYMBOL	PIN	DESCRIPTION
V_{P2}	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_{P1}	9	+5 V supply voltage for analog part
GND1	10	ground for analog part (0 V)
$V_{O(R-Y)}$	11	$\pm(R-Y)$ output signal
$V_{O(B-Y)}$	12	$\pm(B-Y)$ output signal
n.c.	13	not connected
$V_{I(B-Y)}$	14	$\pm(B-Y)$ input signal
n.c.	15	not connected
$V_{I(R-Y)}$	16	$\pm(R-Y)$ input signal
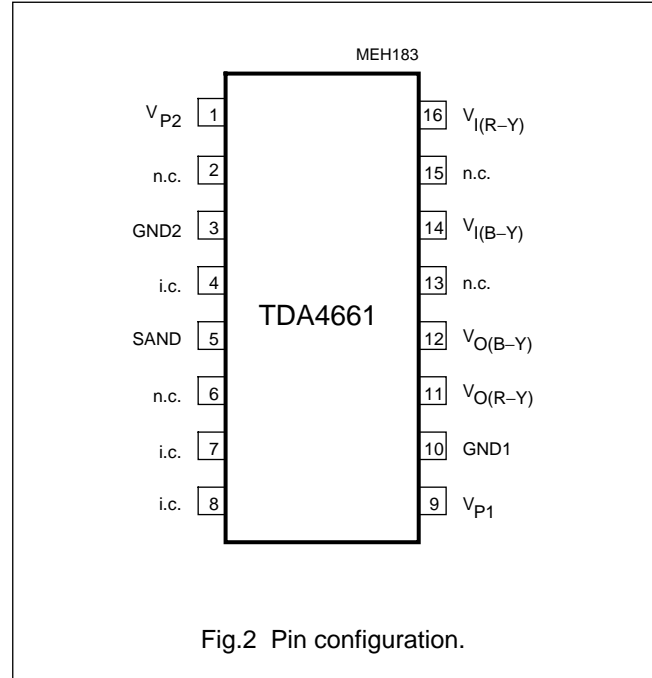
Fig.2 Pin configuration.

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_{P1}	supply voltage (pin 9)	−0.5	+7	V
V_{P2}	supply voltage (pin 1)	−0.5	+7	V
V_5	voltage on pin 5	−0.5	$V_P + 1.0$	V
V_n	voltage on pins 11, 12, 14 and 16	−0.5	V_P	V
T_{stg}	storage temperature	−25	+150	°C
T_{amb}	operating ambient temperature	0	70	°C
V_{ESD}	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_{thj-a}	thermal resistance from junction to ambient in free air		
	SOT38-4	75	K/W
	SOT109-1	220	K/W

Baseband delay line

TDA4661

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
Colour-difference input signals						
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	kΩ
$C_{14, 16}$	input capacitance		–	–	10	pF
$V_{14, 16}$	input clamping voltage	proportional to V_P	1.3	1.5	1.7	V
Colour-difference output signals						
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	$V_{I14, 16}$ = 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	Ω
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	$V_{I14, 16}$ = 1.33 V (p-p); SECAM signals	−0.1	0	+0.1	dB
V_n	noise voltage (RMS value; pins 11 and 12)	$V_{I14, 16}$ = 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	μs
	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

Baseband delay line TDA4661

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
Sandcastle pulse input (pin 5)						
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	μA
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; $V_{I14, 16} = 0$ ($R_S < 300\ \Omega$).

3. The leading edge of the burst-key pulse or H-blanking pulse is used for timing.

Baseband delay line
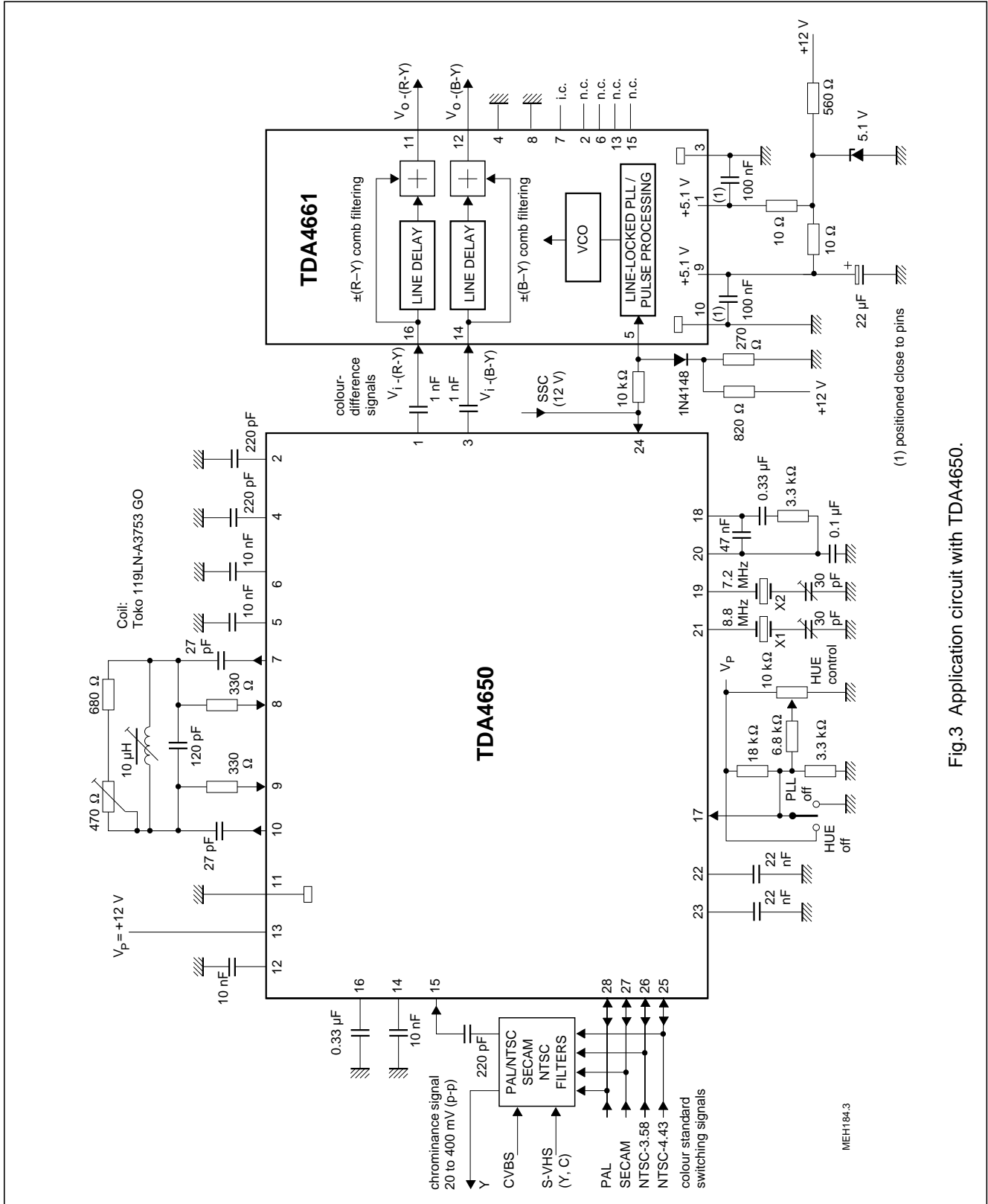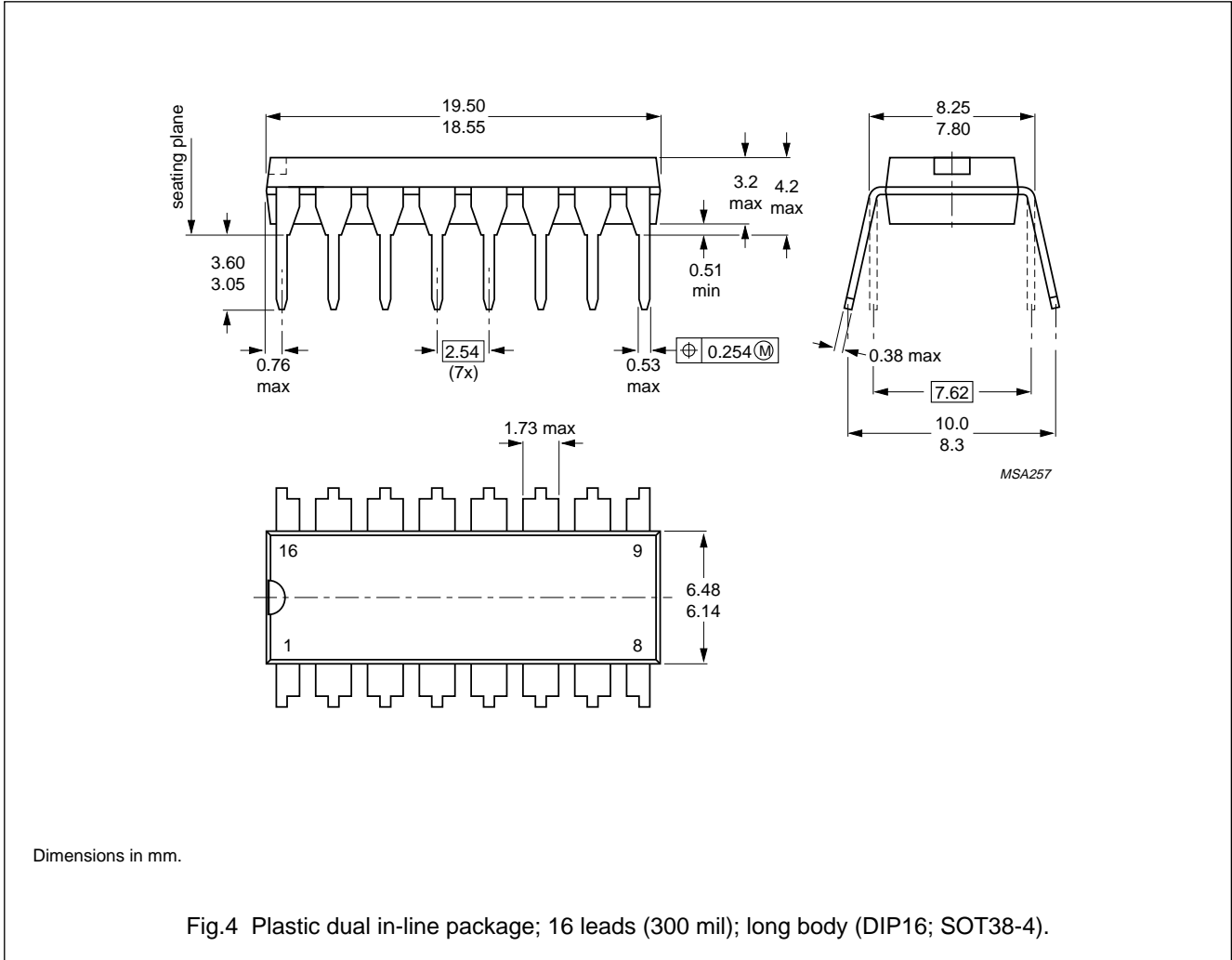
TDA4661

APPLICATION INFORMATION

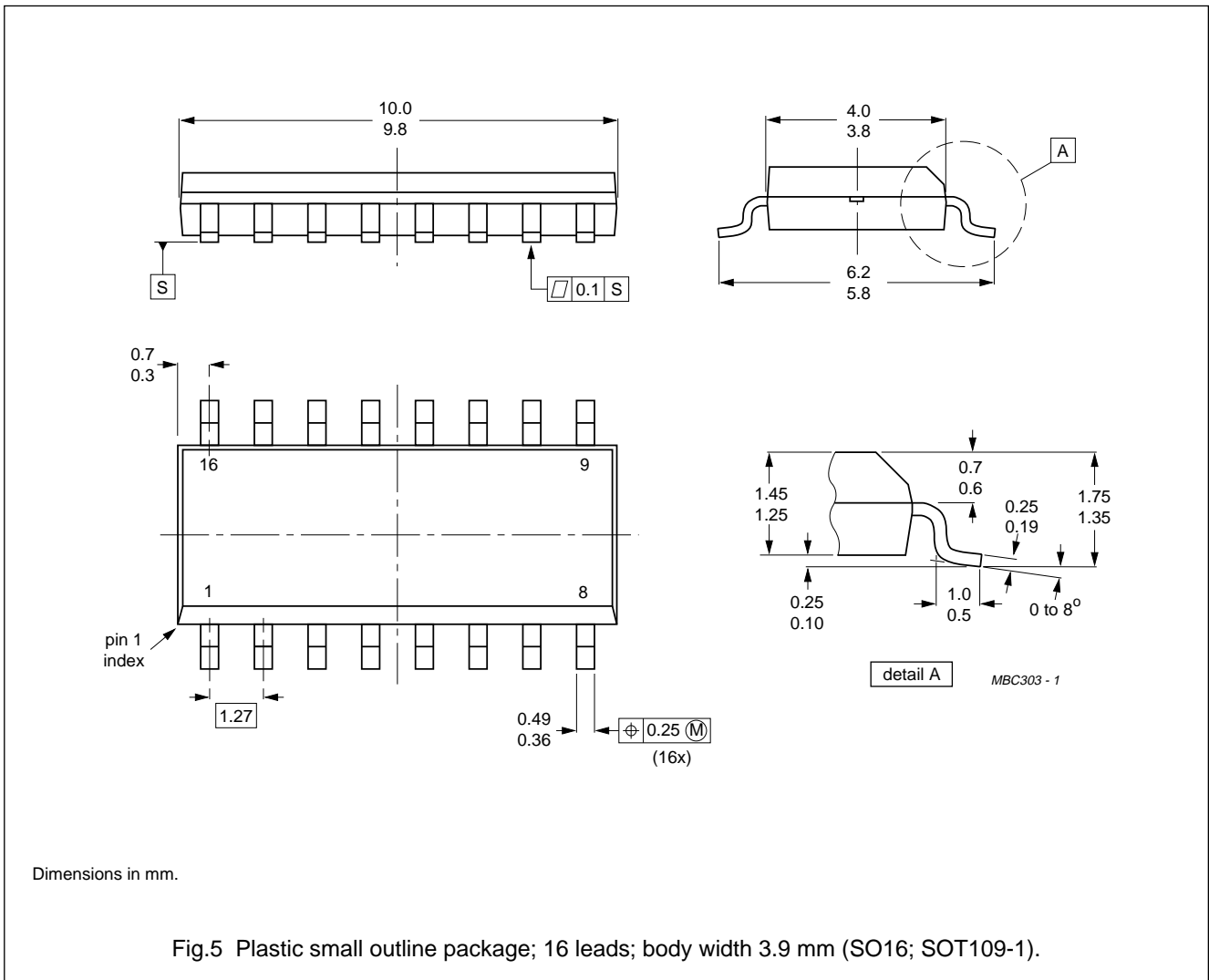Fig.3 Application circuit with TDA4650.

Baseband delay line

TDA4661

PACKAGE OUTLINES

Dimensions in mm.

Fig.4 Plastic dual in-line package; 16 leads (300 mil); long body (DIP16; SOT38-4).

Baseband delay line

TDA4661

Dimensions in mm.

Fig.5 Plastic small outline package; 16 leads; body width 3.9 mm (SO16; SOT109-1).

Baseband delay line

TDA4661

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 pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature within the permissible limit.

REPAIRING SOLDERED JOINTS

Apply a low voltage 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.

Plastic small-outline packages

BY WAVE

During placement and before soldering, the component must be fixed with a droplet of adhesive. After curing the adhesive, the component can be soldered. The adhesive can be applied by screen printing, pin transfer or syringe dispensing.

Maximum permissible solder temperature is 260 °C, and maximum duration of package immersion in solder bath is 10 s, if allowed to cool to less than 150 °C within 6 s. Typical dwell time is 4 s at 250 °C.

A modified wave soldering technique is recommended using two solder waves (dual-wave), in which a turbulent wave with high upward pressure is followed by a smooth laminar wave. Using a mildly-activated flux eliminates the need for removal of corrosive residues in most applications.

BY SOLDER PASTE REFLOW

Reflow soldering requires the solder paste (a suspension of fine solder particles, flux and binding agent) to be applied to the substrate by screen printing, stencilling or pressure-syringe dispensing before device placement.

Several techniques exist for reflowing; for example, thermal conduction by heated belt, infrared, and vapour-phase reflow. Dwell times vary between 50 and 300 s according to method. Typical reflow temperatures range from 215 to 250 °C.

Preheating is necessary to dry the paste and evaporate the binding agent. Preheating duration: 45 min at 45 °C.

REPAIRING SOLDERED JOINTS (BY HAND-HELD SOLDERING IRON OR PULSE-HEATED SOLDER TOOL)

Fix the component by first soldering two, diagonally opposite, end pins. Apply the heating tool to the flat part of the pin only. Contact time must be limited to 10 s at up to 300 °C. When using proper tools, all other pins can be soldered in one operation within 2 to 5 s at between 270 and 320 °C. (Pulse-heated soldering is not recommended for SO packages.)

For pulse-heated solder tool (resistance) soldering of VSO packages, solder is applied to the substrate by dipping or by an extra thick tin/lead plating before package placement.

Baseband delay line

TDA4661

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 the 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.