

Baseband delay line

TDA4665

FEATURES

- Two comb filters, using the switched-capacitor technique, for one line delay time (64 μ 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 μ 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.

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	—	5.9	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

GENERAL DESCRIPTION

The TDA4665 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 $\pm(B-Y)$.

ORDERING INFORMATION

EXTENDED TYPE NUMBER	PACKAGE			
	PINS	PIN POSITION	MATERIAL	CODE
TDA4665	16	DIL	plastic	SOT38-4
TDA4665T	16	mini-pack	plastic	SOT109A

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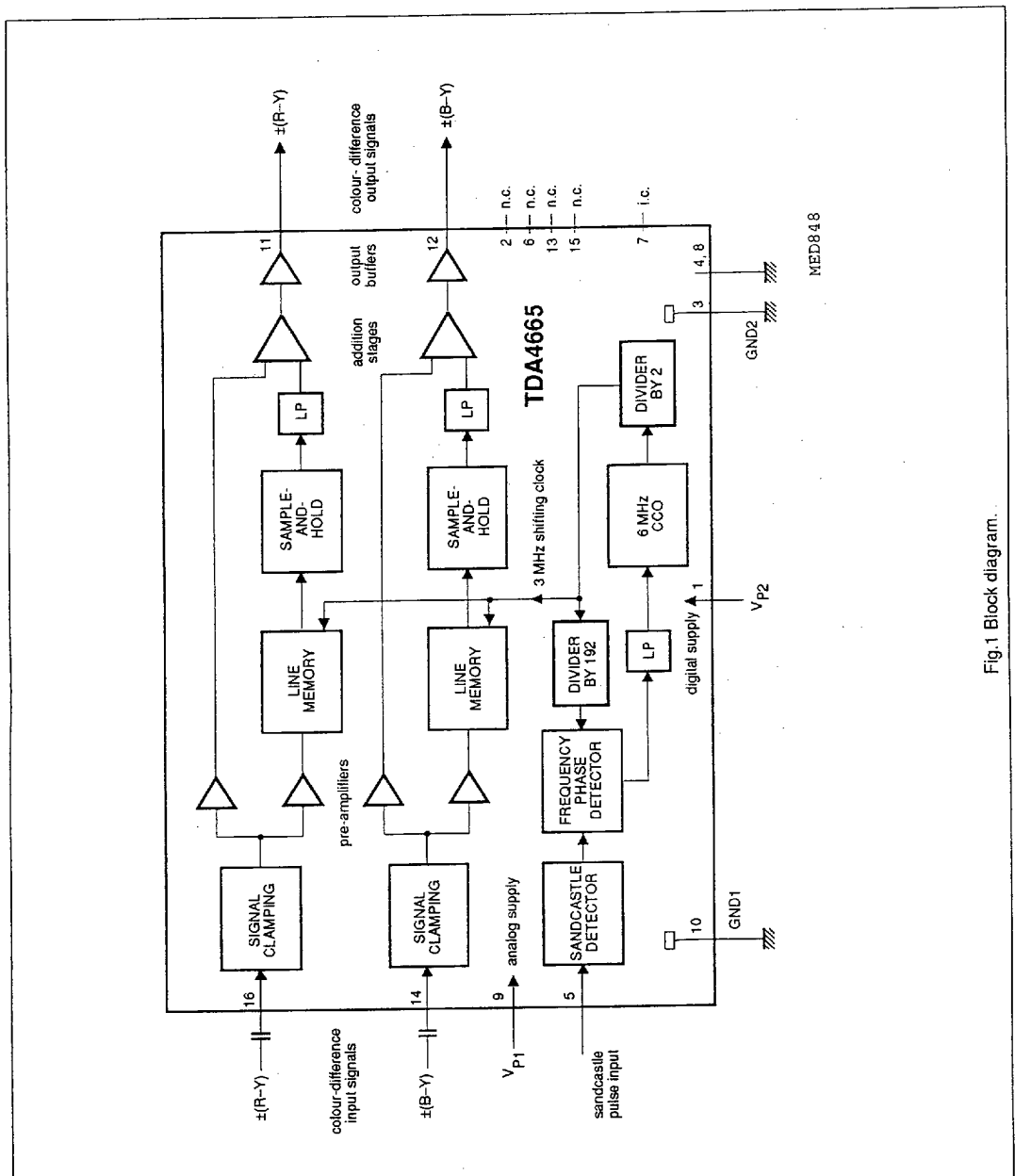


Fig.1 Block diagram.

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PINNING

SYMBOL	PIN	DESCRIPTION
VP2	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
VP1	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

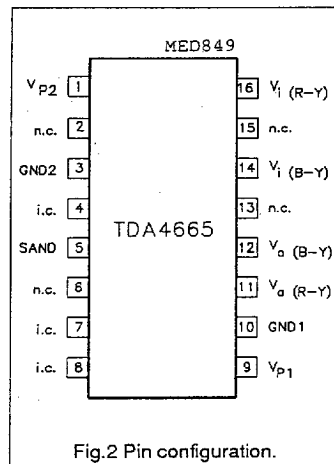


Fig.2 Pin configuration.

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
VP1	supply voltage (pin 9)	-0.5	+7	V
VP2	supply voltage (pin 1)	-0.5	+7	V
V5	voltage on pin 5	-0.5	VP + 1.0	V
Vn	voltage on pins 11, 12, 14 and 16	-0.5	VP	V
Tstg	storage temperature	-25	+150	°C
Tamb	operating ambient temperature	0	+70	°C
VESD	electrostatic handling for all pins (note 1)	-	±500	V

Note to the Limiting Values

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

THERMAL RESISTANCE

SYMBOL	PARAMETER	THERMAL RESISTANCE
Rth j-a	from junction to ambient in free air SOT38-4 SOT109A	75 K/W 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		—	5.2	6.0	mA
I_{P2}	supply current		—	0.7	1.0	mA
Colour-difference input signals						
V_i	input signal (peak-to-peak value; note 1)					
	$\pm(R-Y)$ PAL and NTSC (pin 16)		—	525	—	mV
	$\pm(B-Y)$ PAL and NTSC (pin 14)		—	665	—	mV
	$\pm(R-Y)$ SECAM (pin 16)		—	1.05	—	V
	$\pm(B-Y)$ SECAM (pin 14)		—	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 Ω
$C_{14, 16}$	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	$V_{i\ 14, 16} = 1.33$ V (p-p)	-0.4	0	+0.4	dB
$V_{11, 12}$	DC output voltage	proportional to V_P	2.90	3.10	3.30	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	$V_{i\ 14, 16} = 1.33$ V (p-p); SECAM signals	-0.1	0	+0.1	dB
V_n	noise voltage (RMS value, pins 11 and 12)	$V_{i\ 14, 16} = 0$ V; note 2	—	—	1.2	mV
$S/N(W)$	weighted signal-to-noise ratio	$V_o = 1$ V (p-p); $f = f_{bn}$	—	54	—	dB
t_d	delay of delayed signals		63.94	64.0	64.06	μ 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
Sandcastle pulse input (pin 5)						
f_{BK}	burst-key frequency / 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 to the characteristics

1. For SECAM the signal must be blanked line-sequentially. The blanking level must be equal to the non-colour signal.
For SECAM, PAL and NTSC the input signal must be equal to the non-colour signal during the internal clamping of TDA4665 (3 μs to 1 μs before the leading edge of the top pulse of V_5).
2. Noise voltage at $f = 10$ kHz to 1 MHz; $V_{14, 16} = 0$ ($R_S < 300 \Omega$).
3. The leading edge of the burst-key pulse or top pulse is used for timing.

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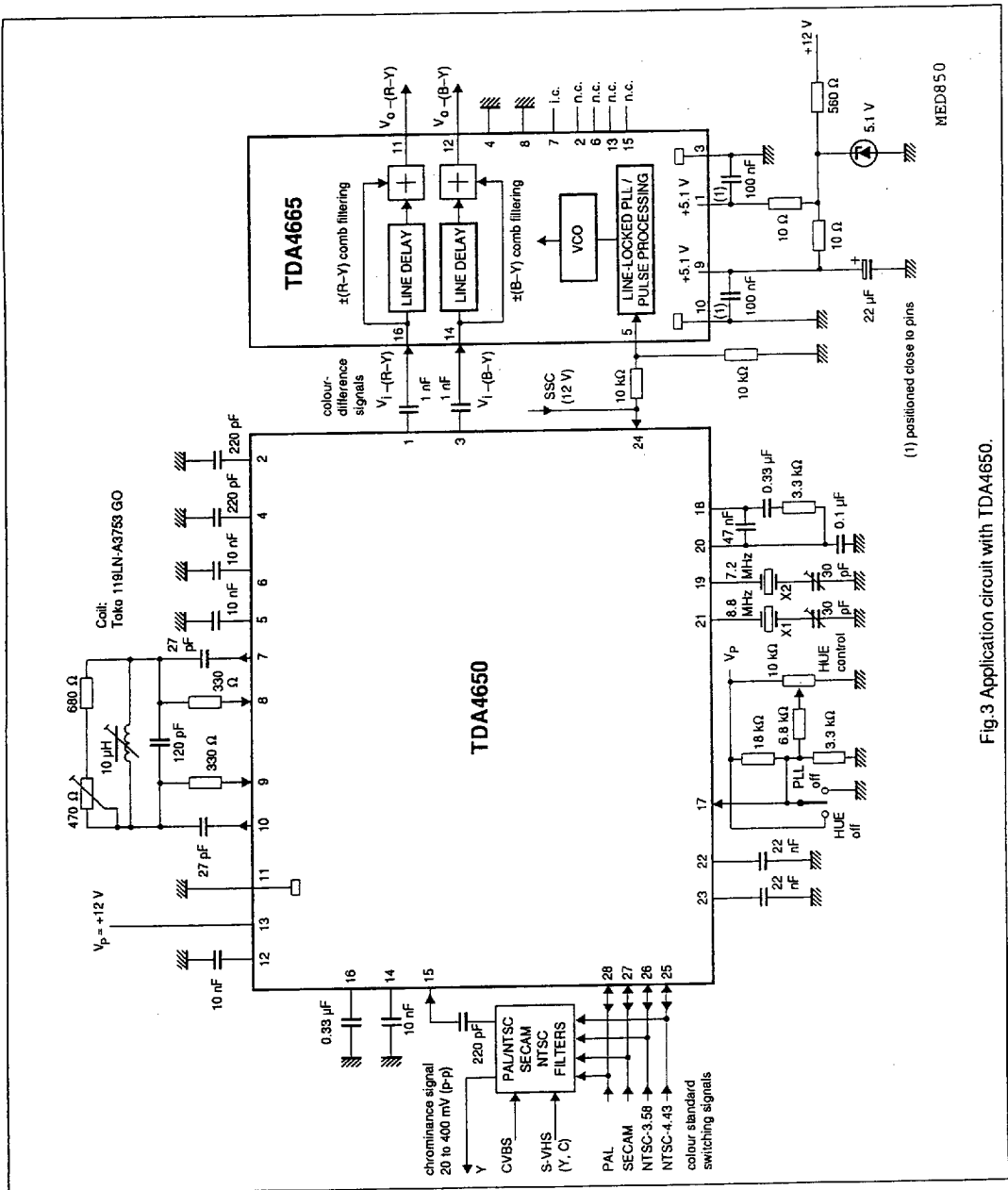


Fig. 3 Application circuit with TDA4650.