



## Description

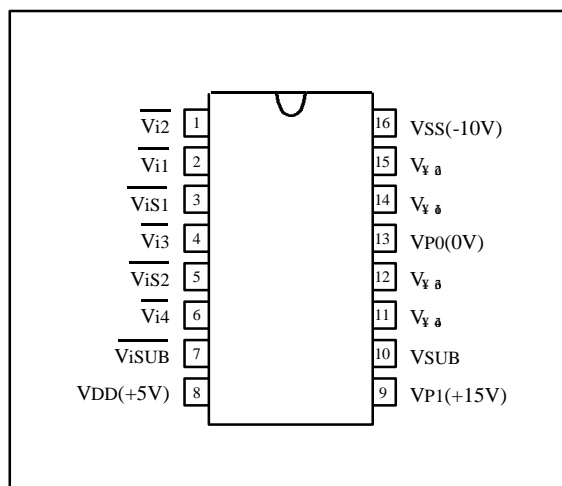
The Ai1001S is a clock driver for the vertical resistor drive of CCD.

Ai1001S is well suited for the B/W or color CCD camera and camcorder in NTSC or PAL camera system.

## Feature

- 4 channel vertical clock driver and 1 channel substrate driver.
- Implemented with high voltage(+50V) and high performance CMOS process.

## Pin Configuration



16 PIN SOP / SSOP  
( Top View )

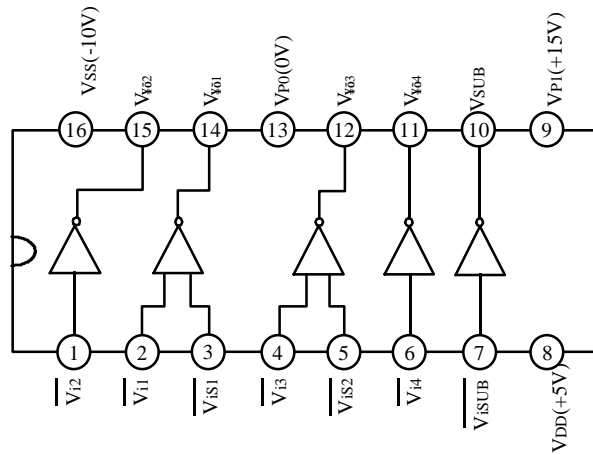
## Absolute Maximum Ratings (Ta = 25; j É

Parameter	Symbol	Rating	Unit
Supply voltage	V <sub>SS</sub>	Reference voltage	V
	V <sub>DD</sub> , V <sub>P0</sub> , V <sub>P1</sub>	V <sub>SS</sub> ± 0.3 to V <sub>SS</sub> +35	V
Input voltage	V <sub>I</sub>	V <sub>SS</sub> ± 0.3 to V <sub>DD</sub> +0.3	V
Output voltage	V <sub>Y a</sub> , V <sub>Y a</sub>	V <sub>SS</sub> ± 0.3 to V <sub>P0</sub> +0.3	V
	V <sub>Y a</sub> , V <sub>Y a</sub> , V <sub>Sub</sub>	V <sub>SS</sub> ± 0.3 to V <sub>P1</sub> +0.3	V
Operating temperature	T <sub>OPR</sub>	-25 to +85	j É
Storage temperature	T <sub>STG</sub>	-40 to +125	j É

## Recommended Operating Conditions

Parameter	Symbol	Rating	Unit
Supply Voltage	V <sub>DD</sub>	V <sub>SS</sub> +15	V
	V <sub>P0</sub>	V <sub>SS</sub> +10	V
	V <sub>P1</sub>	V <sub>SS</sub> +25	V
Operating temperature	T <sub>OPR</sub>	-20 to +75	j É

**Block Diagram**



**Truth Table**

Input				Output		
$\overline{V_{i1,3}}$	$\overline{V_{iS1,2}}$	$\overline{V_{i2,4}}$	$\overline{V_{iSUB}}$	$V_{Y a,3}$	$V_{Y a,4}$	$V_{SUB}$
L L H H	L H L H			VP1 VP0 *Z VSS		
		L H			VP0 VSS	
			L H			VP1 VSS

\* Z is high impedance.

**Pin Description**

No.	Symbol	I/O	Description
1	$\overline{V_{i2}}$	I	Output control ( $V_{Y a}$ )
2	$\overline{V_{i1}}$	I	Output control ( $V_{Y a}$ )
3	$\overline{V_{iS1}}$	I	Output control ( $V_{Y a}$ )
4	$\overline{V_{i3}}$	I	Output control ( $V_{Y a}$ )
5	$\overline{V_{iS2}}$	I	Output control ( $V_{Y a}$ )
6	$\overline{V_{i4}}$	I	Output control ( $V_{Y a}$ )
7	$\overline{V_{iSUB}}$	I	Output control ( $V_{SUB}$ )
8	VDD	-	Power supply (+5V)
9	VP1	-	Power supply (+15V)
10	VSUB	O	Output (2 level : VP1, VSS)
11	$V_{Y a,3}$	O	Output (2 level : VP0, VSS)
12	$V_{Y a,4}$	O	Output (3 level : VP1, VP0, VSS)
13	VP0	-	Power supply (0V)
14	$V_{Y a,4}$	O	Output (3 level : VP1, VP0, VSS)
15	$V_{Y a,3}$	O	Output (2 level : VP0, VSS)
16	VSS	-	Power supply (-10V)

**DC Characteristics**

( $T_A=25$ ;  $V_{DD} = 5V$ ,  $V_{SS} = -10V$ ,  $V_{P0} = 0V$ ,  $V_{P1} = 15V$ )

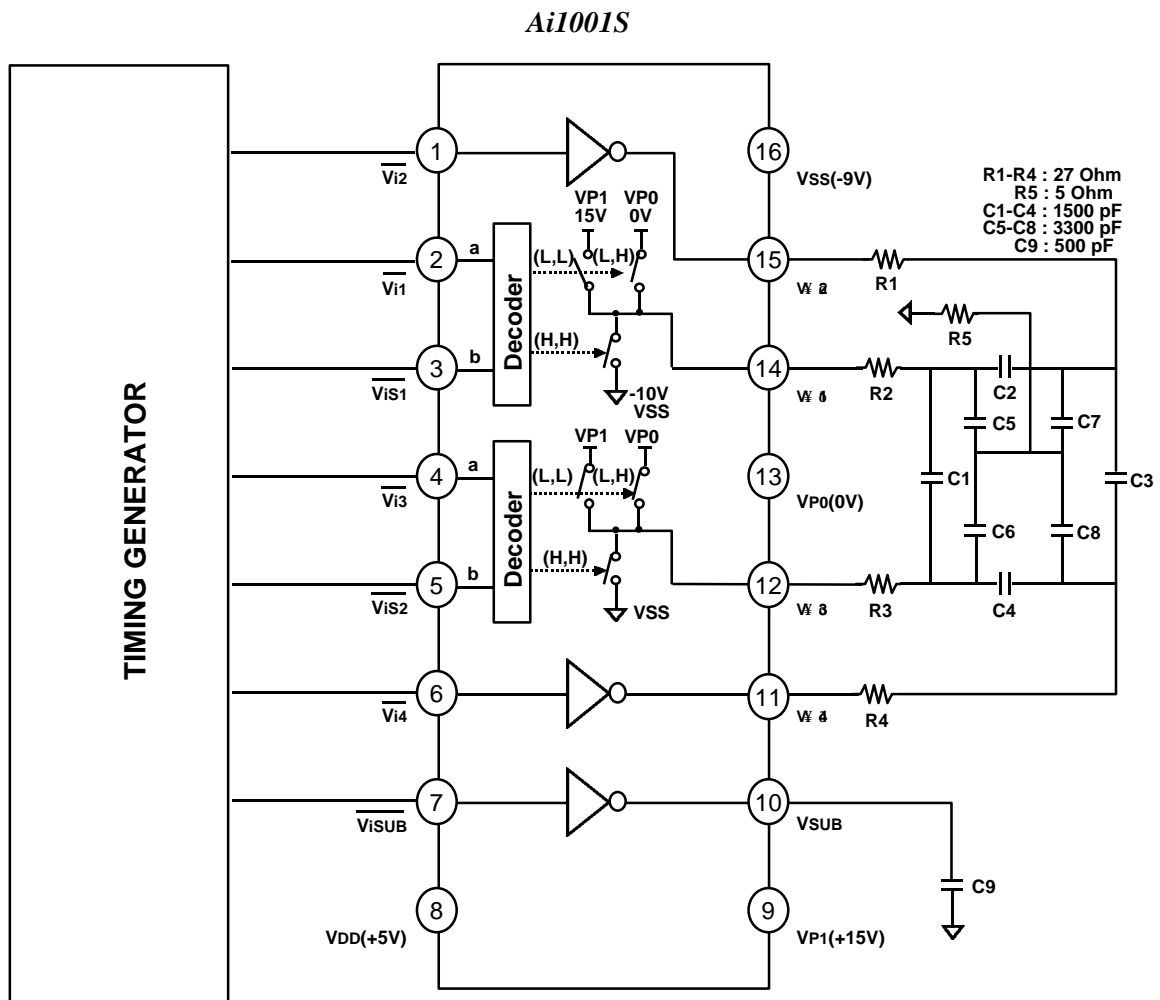
Item	Symbol	Test Condition	Min	Typ	Max	Unit
Input high voltage	$V_{IP1}$		3.5			V
Input low voltage	$V_{ISS}$				1.5	V
Output high voltage	$V_{Y \ 01}$	$I_{Y \ 01} = -20 \ \mu A$	14.9	15		V
Output middle voltage	$V_{Y \ 00}$	$I_{Y \ 00} = -20 \ \mu A$		0	0.1	V
Output middle voltage	$V_{Y \ 00}$	$I_{Y \ 00} = 20 \ \mu A$	-0.1	0		V
Output low voltage	$V_{Y \ 0S}$	$I_{Y \ 0S} = 20 \ \mu A$		-10	-9.9	V
Input current	$I_{IN}$			1.0		$\mu A$
Power supply current	$I_{PD}$			0.3	0.5	$\mu A$
Power supply current	$I_{P1}$			0.15	0.3	$\mu A$
Power supply current	$I_{P0}$			4.5	5.0	$\mu A$

**Switching Characteristics**

(See the Test Circuit  $T_A = 25$ ;  $V_{P1}=15V$ ,  $V_{P0}=0V$ ,  $V_{DD}=5V$ ,  $V_{SS}= -10V$ )

Item	Symbol	Conditions	Max.	Min.	Unit
Output Current	$I_L$	$V_{Y \ 0} \text{ to } V_{Y \ 1} = -9.5V$	-25		$\mu A$
Output Current	$I_{M1}$	$V_{Y \ 0} \text{ to } V_{Y \ 1} = -0.5V$		10	$\mu A$
Output Current	$I_{M2}$	$V_{Y \ 0}, V_{Y \ 1} = 0.5V$	-9		$\mu A$
Output Current	$I_H$	$V_{Y \ 0}, V_{Y \ 1} = 14.5V$		12	$\mu A$
Output Current	$I_{SL}$	$V_{SUB} = -9.5V$	-12		$\mu A$
Output Current	$I$	$V_{SUB} = 14.5V$		12	$\mu A$
Rise time $V_{SS} \rightarrow V_{P0}$	$T_{TLM}$	$V_{Y \ 0} \text{ to } V_{Y \ 1} = -0.5V$ after input transient	1000		ns
Fall time $V_{P0} \rightarrow V_{SS}$	$T_{TML}$	$V_{Y \ 0, 3} = -9.5V$ after input transient	1000		ns
Rise time $V_{P0} \rightarrow V_{P1}$	$T_{TMH}$	$V_{Y \ 0, 3} = 14V$ after input transient	1000		ns
Fall time $V_{P1} \rightarrow V_{P0}$	$T_{THM}$	$V_{Y \ 0, 3} = 1V$ after input transient	1000		ns
Rise time $V_{P0} \rightarrow V_{P1}$	$T_{TLHH}$	$V_{SUB} = 14V$	200		ns
Fall time $V_{P1} \rightarrow V_{SS}$	$T_{THHL}$	$V_{SUB} = -9.5V$	200		ns
Coupling amplitude (middle level)	$V_{COM}$	$V_{Y \ 0} \text{ to } V_{Y \ 1}$	0.5		V
Coupling amplitude (low level)	$V_{COL}$	$V_{Y \ 0} \text{ to } V_{Y \ 1}$	0.5		V

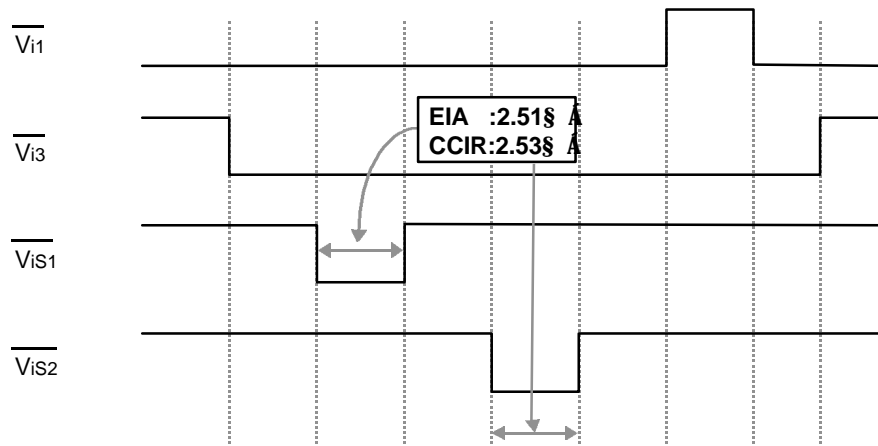
Test Circuit



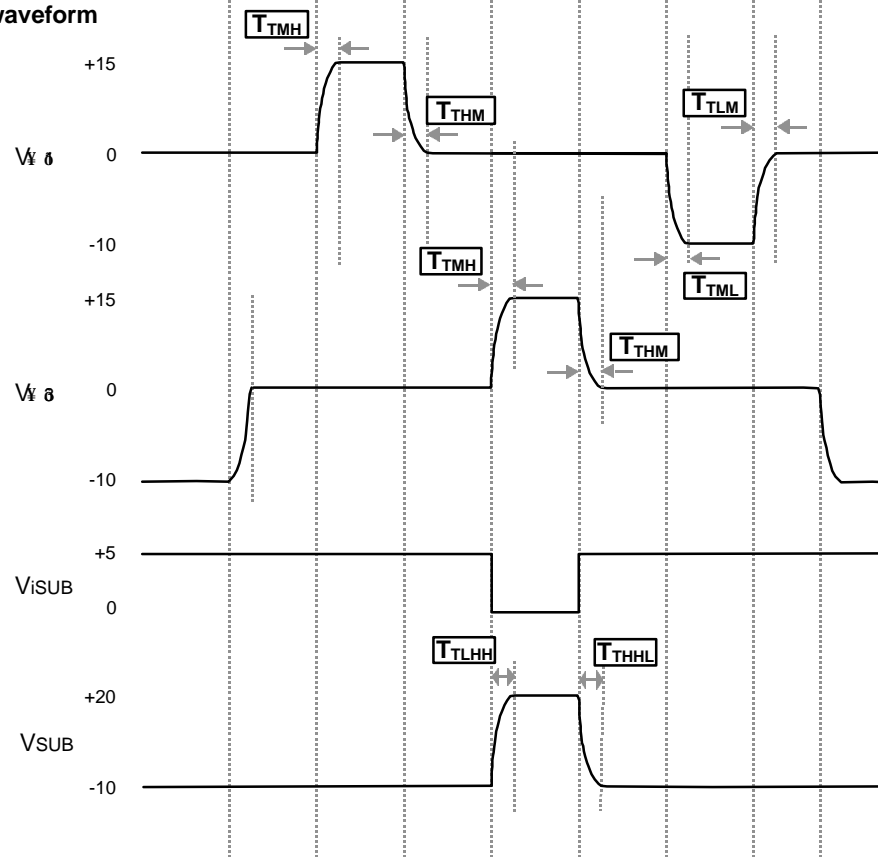
\*(L, H) means the on-status of the switch when a = "L", b = "H".

**Test Circuit I/O Waveform Diagram**

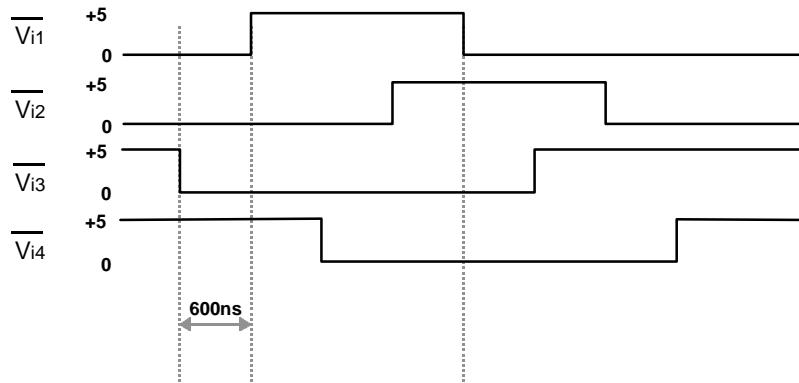
**Input waveform**



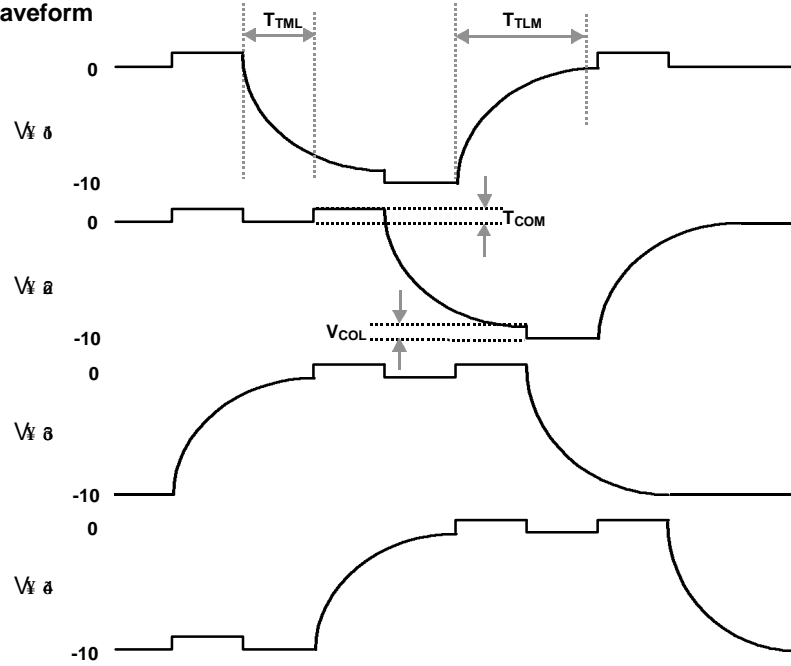
**Output waveform**



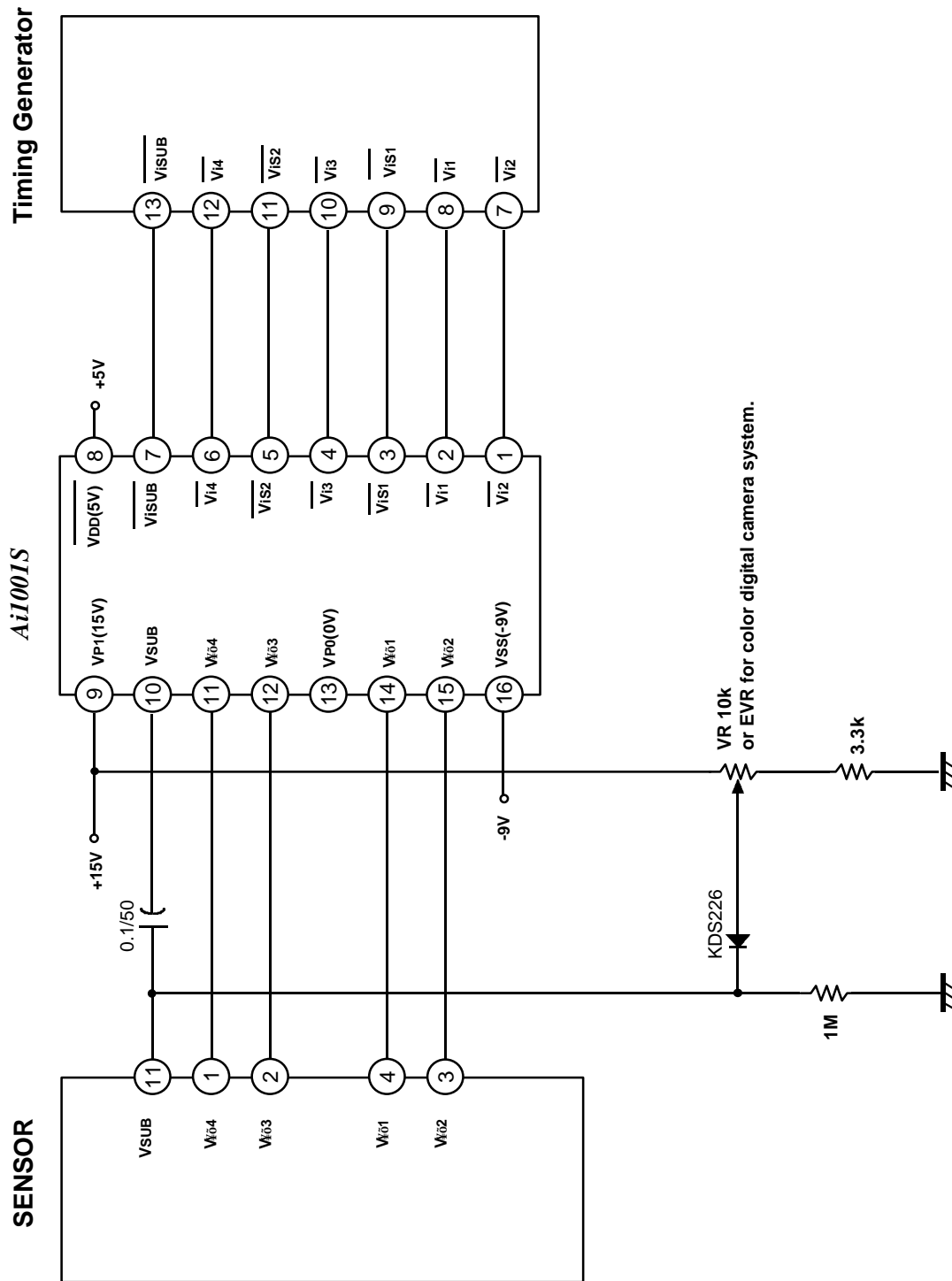
**Input waveform  
(Repeat Cycle 15.7kHz)**



**Output waveform**



Application Circuit



**Package Dimension ( Ai1001S : 16 PIN SSOP )**

UNIT = inch (mm)

