



LA7152

VCR Electronic Switch

Overview

The LA7152 is a three-input (clamped input) single-output analog switch for video signals. The LA7152 high input impedance structure allows 0.01 μ F ceramic capacitors to be used as the input coupling capacitors.

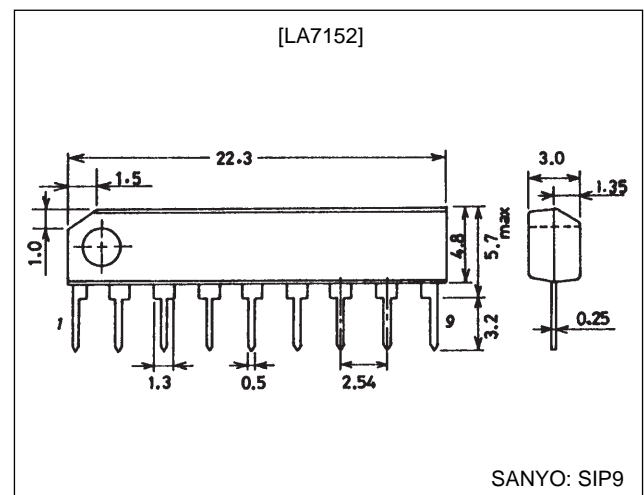
Features

- Three inputs - one output
- Built-in video clamping circuits
- Built-in muting function

Package Dimensions

unit: mm

3017C-SIP9



Specifications

Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$		7.0	V
Allowable power dissipation	$P_d \text{ max}$		100	mW
Operating temperature	T_{opr}		-10 to +70	$^\circ\text{C}$
Storage temperature	T_{stg}		-40 to +150	$^\circ\text{C}$

Recommended Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		5.0	V
Operating supply voltage range	V_{opg}		4.5 to 6.0	V

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Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 5\text{ V}$

Parameter	Symbol	Conditions	min	typ	max	Unit
Current drain	I_{CC}	*1	3.0	4.1	5.2	mA
Maximum input level	$V_{IN\text{ max}}$	*2	2.0	2.5		Vp-p
Frequency characteristics	Gf	*3		0	± 0.5	dB
Total harmonic distortion	THD	*4		0.03	0.1	%
Inter-channel crosstalk	CT_C	*5		-65	-60	dB
Muting circuit crosstalk	CT_M	*6		-55	-50	dB
Output DC offset	ΔV_{OUT}	*7		5	20	mV
Differential gain	DG	*8		0.5	1	%
Differential phase	DP	*9		0.5	1	deg

Note: 1. Current drain

$$S1 = S2 = S3 = 2, S4 = S5 = S6 = 3$$

2. Maximum input level (input C = 10 μF)

$$S1 = 1, S4 = 1, S2 = S3 = 2, S5 = S6 = 3,$$

$$S2 = 1, S5 = 1, S1 = S3 = 2, S4 = S6 = 3,$$

$$S3 = 1, S1 = S2 = 2, S4 = S5 = S6 = 3$$

For each of the above three conditions, with an input signal frequency $f = 1\text{ kHz}$, gradually increase the input signal level and determine the level where the total harmonic distortion reaches 0.1%.

3. Frequency characteristics

For each of the three conditions in Note 2,

$$V_{IN} = 2.0\text{ V}_{p-p}, V_{OUT} (5\text{ MHz})/V_{OUT} (100\text{ KHz})$$

4. Total harmonic distortion (input C = 10 μF)

For each of the three conditions in item 2, measure the total harmonic distortion with $V_{IN} = 2.0\text{ V}_{p-p}$ and $f = 1\text{ kHz}$.

5. Crosstalk

With $S6 = 3$, measure in the modes for all combinations of $S1$ to $S5$ except for the following three conditions: a) $S1 = S4 = 1$, b) $S2 = S5 = 1$ and c) $S3 = 1, S4 = S5 = 3$.

$$V_{IN} = 2.0\text{ V}_{p-p}, f = 4.43\text{ MHz}, V_{OUT}/V_{IN}$$

6. Muting circuit crosstalk

With $S6 = 1$, measure in the modes for all combinations of $S1$ to $S5$.

$$V_{IN} = 2.0\text{ V}_{p-p}, f = 4.43\text{ MHz}, V_{OUT}/V_{IN}$$

7. Output DC offset

Measure the output DC voltage difference between the following modes with $S1 = S2 = S3 = 2$.

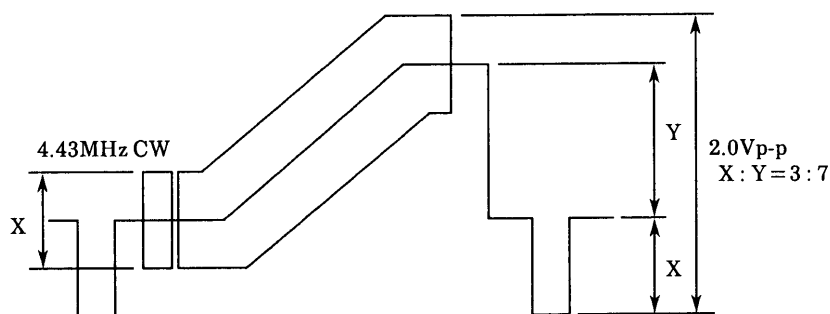
a. $S4 = 1, S5 = S6 = 3$

b. $S5 = 1, S4 = S6 = 3$

c. $S4 = S5 = S6 = 3$

d. $S6 = 1, S4 = S5 = 1$ or 2

8, 9. Differential gain, differential phase

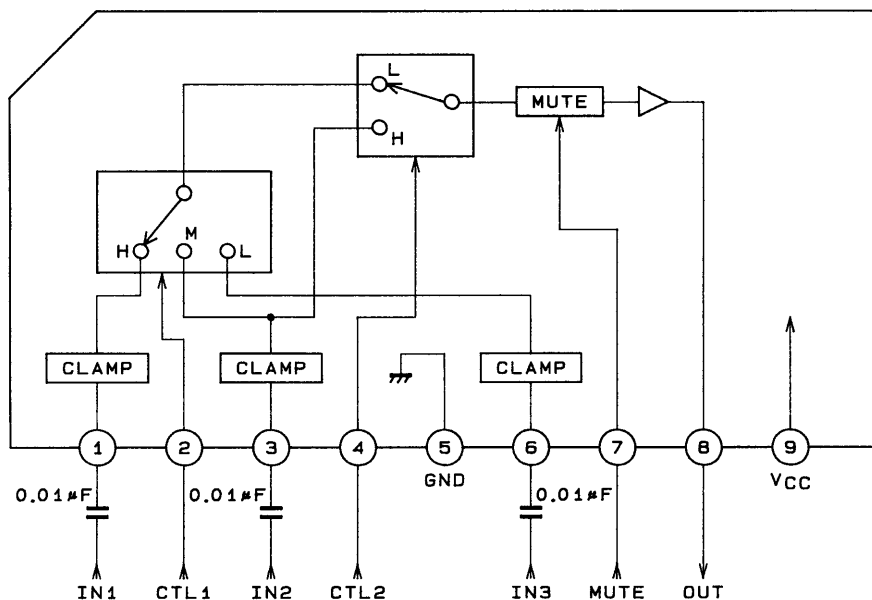


Switching Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 5\text{ V}$

Parameter		Symbol	Conditions	min	typ	max	Unit
CTL1	H	V_{C1H}	In the state with $S4 = 2, S5 = 2$ and $S6 = 2$, measure the control voltage level when the input signal switches.	3.5		V_{CC}	V
	M	V_{C1M}		1.5		3.0	V
	L	V_{C1L}		0		1.0	V
CTL2	H	V_{C2H}		2.5		V_{CC}	V
	L	V_{C2L}		0		1.5	V
MUTE	H	V_{CMH}		3.0		V_{CC}	V
	L	V_{CML}		0		1.5	V

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Equivalent Circuit Block Diagram and Application Circuit Diagram

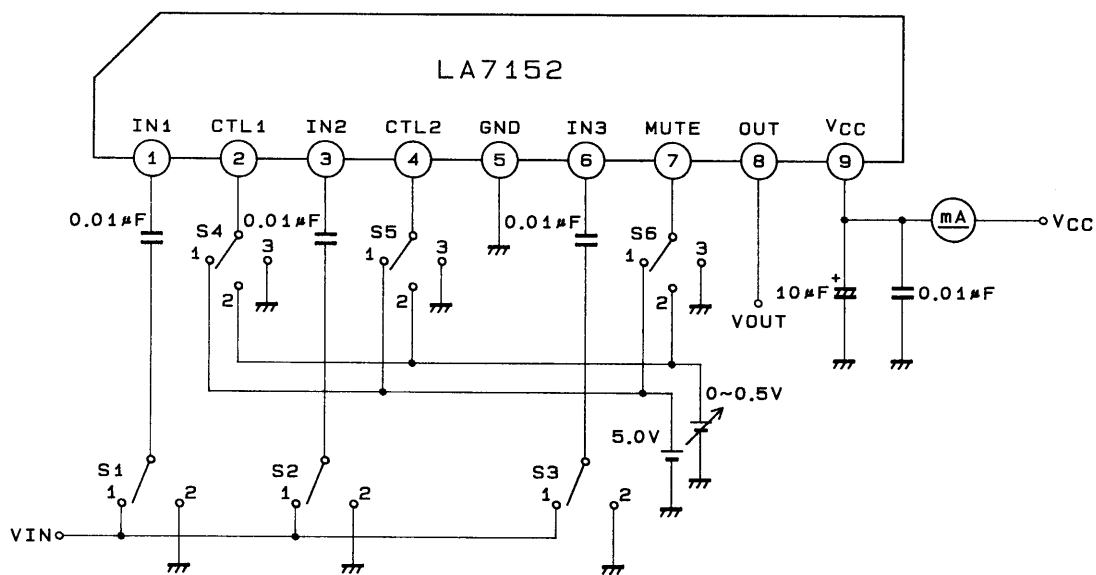


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Truth Table

CTL1	L	L	M	M	H	H	—
CTL2	L	H	L	H	L	H	—
MUTE	L	L	L	L	L	L	H
OUT	IN3	IN2	IN2	IN2	IN1	IN2	DC

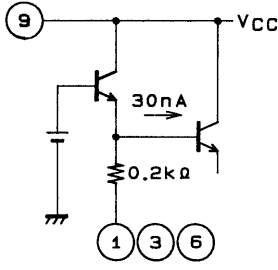
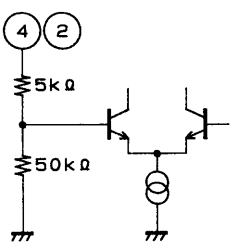
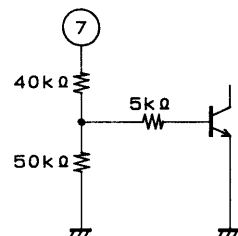
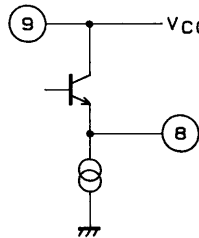
Test Circuit



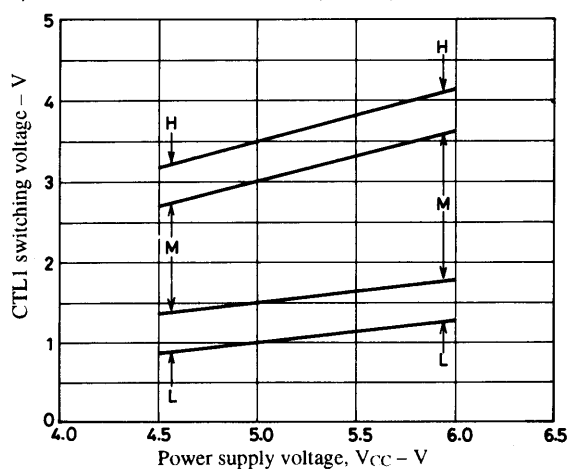
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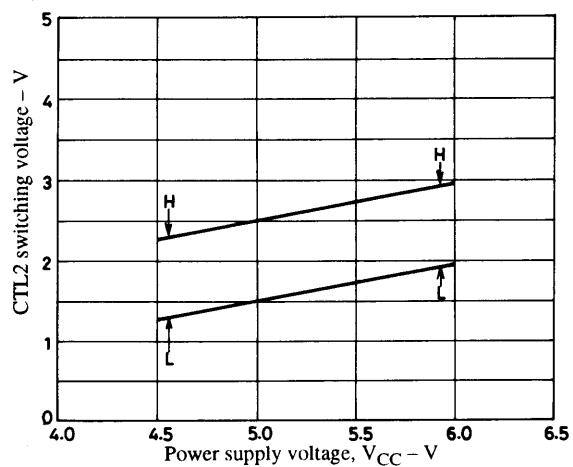
Pin Functions

Pin No.	Symbol	I/O type	Note
1 3 6	IN1 IN2 IN3	 <p style="text-align: center;">A03035</p>	High impedance input
2 4	CONTROL1 CONTROL2	 <p style="text-align: center;">A03036</p>	Tie CONTROL2 (pin 4) to ground when using three-value control by CONTROL1 (pin 2).
5	GND		
7	MUTE CONTROL	 <p style="text-align: center;">A03037</p>	
8	OUT	 <p style="text-align: center;">A03038</p>	Collector current: 1.3 mA
9	V _{CC}		

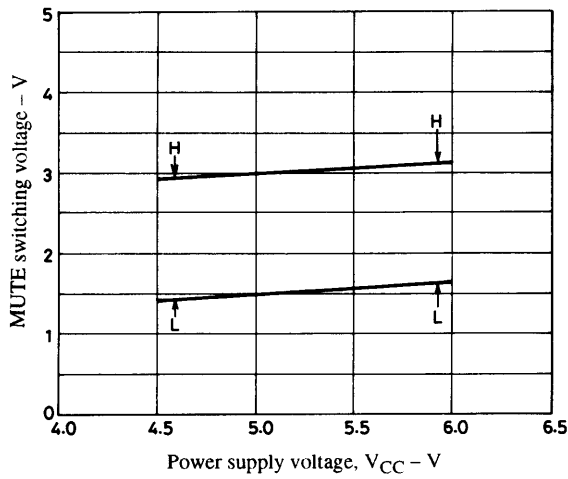
Dependence of CTL1 switching voltage on supply voltage



Dependence of CTL2 switching voltage on supply voltage



Dependence of MUTE switching voltage on supply voltage



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