

# M51321P

ANALOG SWITCH

## DESCRIPTION

The M51321P is a semiconductor integrated circuit containing analog switches designed for use in a video system. It contains two audio switches and one video switch. Each switch has three inputs and can be simultaneously controlled. In addition, the video switch contains an amplifier with gain of about 6.7dB.

## FEATURES

- Video and stereo sound switches in one package
- Wide frequency range (video switch).....DC~10MHz
- High separation (video).....Crosstalk 55dB(typ.)(@5MHz)

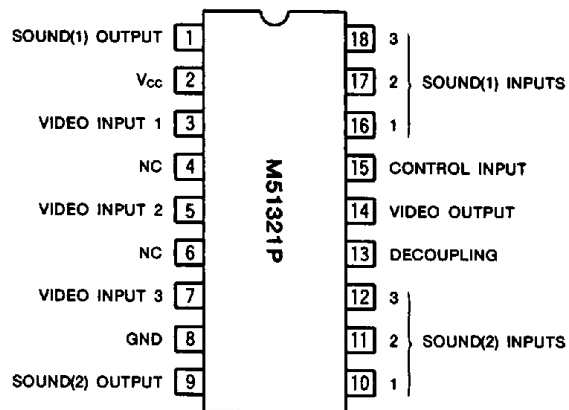
## APPLICATION

Video equipment.

## RECOMMENDED OPERATING CONDITION

Supply voltage range.....5~14V

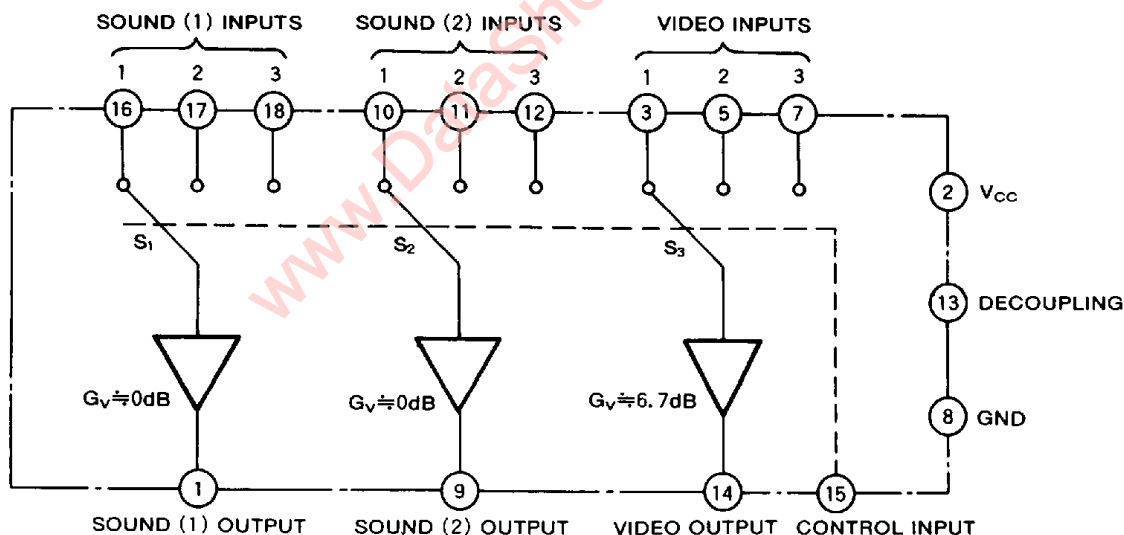
## PIN CONFIGURATION (TOP VIEW)



Outline 18P4

NC: No connection

## BLOCK DIAGRAM



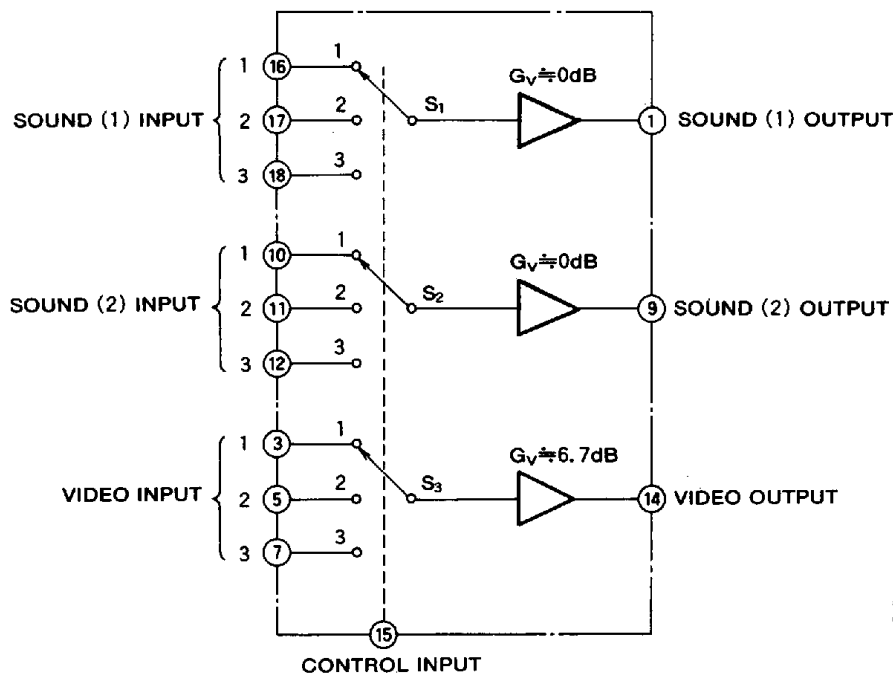
**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Ratings	Unit
V <sub>CC</sub>	Supply voltage	14	V
V <sub>IS</sub>	Input signal voltage	6	V
V <sub>IC</sub>	Input control voltage	V <sub>CC</sub>	V
P <sub>d</sub>	Power dissipation	1.25	W
K <sub>θ</sub>	Thermal derating	12.5	mW/°C
T <sub>opr</sub>	Operating range	-20~75	°C
T <sub>stg</sub>	Storage temperature range	-40~125	°C

**ELECTRICAL CHARACTERISTICS** (T<sub>a</sub>=25°C, V<sub>CC</sub>=12V, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I <sub>CC</sub>	Circuit current			40	50	mA
V <sub>I DC</sub>	Input bias voltage		3.8	4.2	4.6	V
V <sub>O DC</sub>	Output bias voltage	Video	5.0	5.6	6.2	V
		Sound	3.0	3.6	4.2	
V <sub>OP</sub>	Output DC offset voltage			15	100	mV
V <sub>IC H</sub>	Control-pin threshold voltage		7.0	8.0	9.0	V
V <sub>IC L</sub>			3.0	4.0	5.0	V
G <sub>v</sub>	Voltage gain	Video, f=1MHz	5.7	6.7	7.7	dB
		Sound, f=1kHz	-0.5	-0.1		
THD	Total harmonic distortion	Sound, f=1kHz, V <sub>o</sub> =1Vrms		0.02	0.2	%
V <sub>N</sub>	Output noise voltage	Sound, R <sub>g</sub> =600Ω, BW=15kHz		3	50	μVrms
		Video, R <sub>g</sub> =75Ω, BW=10MHz		0.5	1.0	mVrms
CT	Crosstalk	Sound, f=1kHz	65	80		dB
		Video, f=5MHz	45	55		

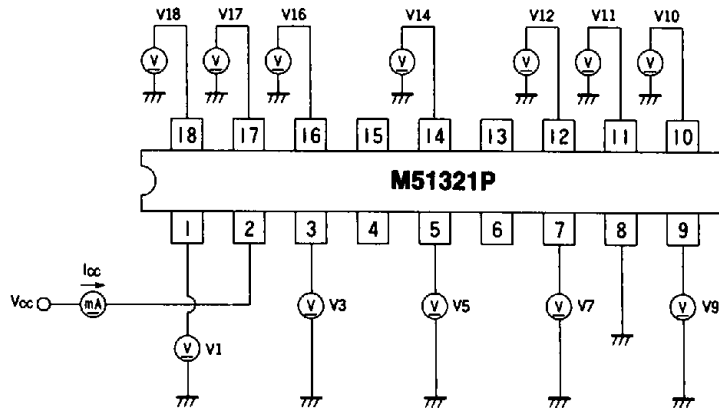
**SWITCHING MODE**



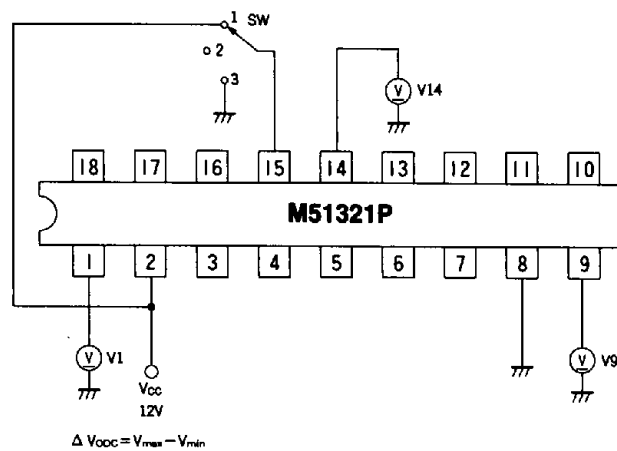
Control input \ Switch No.	S <sub>1</sub>	S <sub>2</sub>	S <sub>3</sub>
V <sub>CC</sub>	1	1	1
OPEN	2	2	2
GND	3	3	3

TEST CIRCUIT (Ta=25°C, Vcc=12V, unless otherwise noted)

CIRCUIT CURRENT I<sub>cc</sub>, INPUT BIAS VOLTAGE V<sub>10c</sub>, OUTPUT BIAS VOLTAGE V<sub>00c</sub> TEST CIRCUIT

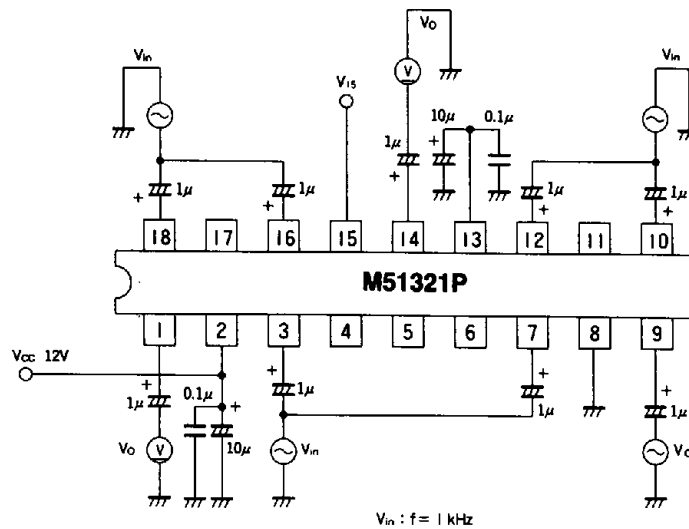


OUTPUT DC OFFSET VOLTAGE TEST CIRCUIT



In video, sound (1), and sound (2) test, measure each DC output voltage of V14, V1, and V9 with SW turned to 1, 2, or 3.

CONTROL PIN THRESHOLD VOLTAGE TEST CIRCUIT

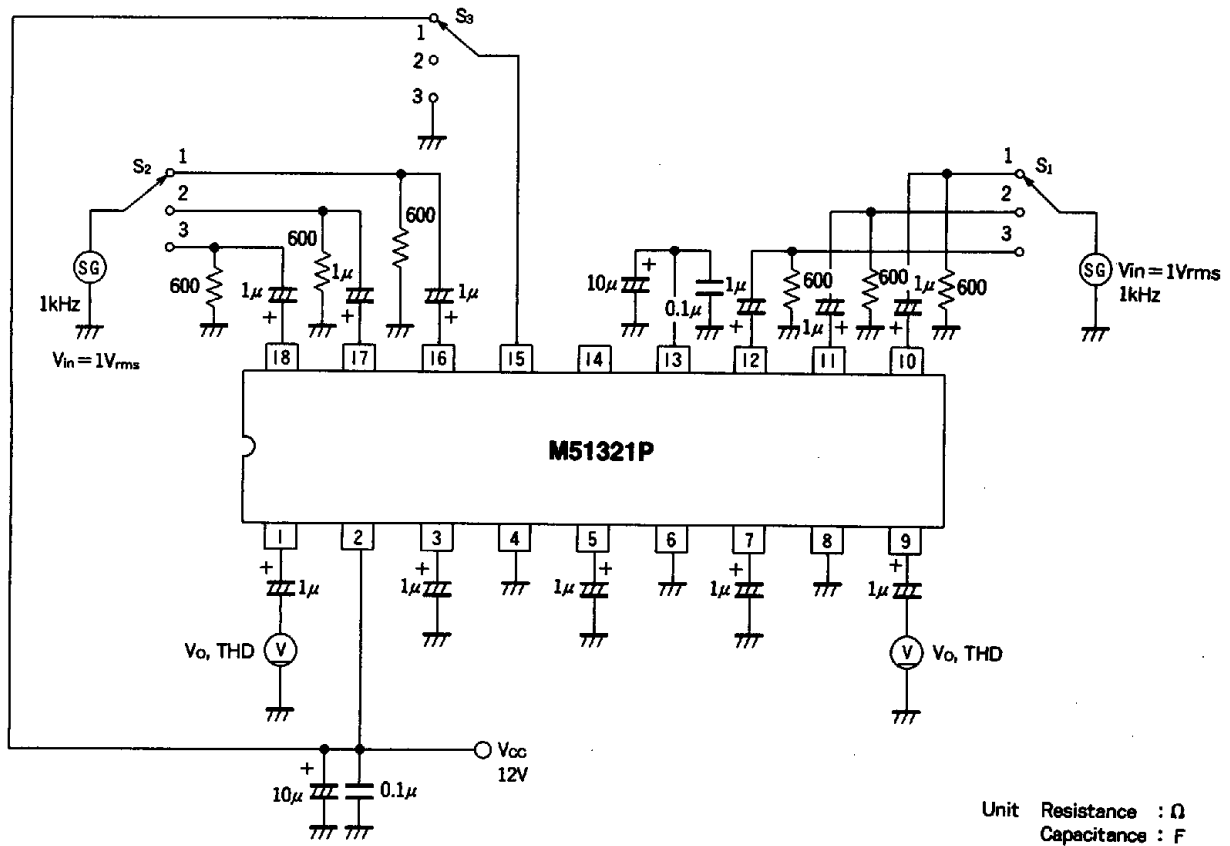


Unit Resistance : Ω  
Capacitance : F

V<sub>1cL</sub>: shows the value of V15 when AC component of each output pin is switched OFF after initially raising DC voltage V15 to 3-5V

V<sub>1cH</sub>: shows the value of V15 when AC component of each output pin is switched ON after initially raising DC voltage V15 to 7-9V

CROSSTALK, VOLTAGE GAIN, TOTAL HARMONIC DISTORTION TEST CIRCUIT (SOUND SWITCH)



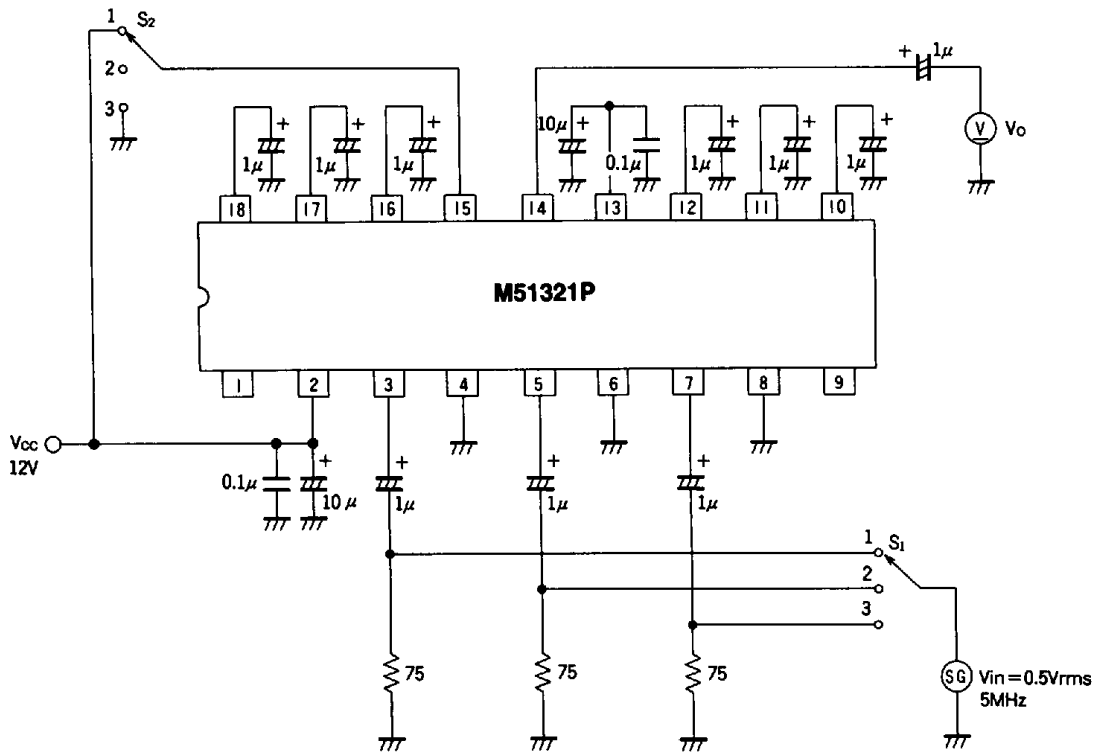
SWITCH MODE LIST

Switch conditions		Output mode
S1 and S2	S3	
1	1	Vos, THD
	2, 3	Voc
2	2	Vos, THD
	1, 3	Voc
3	3	Vos, THD
	1, 2	Voc

Crosstalk  $CT = 20 \log \left( \frac{V_{os}}{V_{oc}} \right)$  dB

Voltage gain  $G_v = 20 \log \left( \frac{V_{os}}{V_{in}} \right)$  dB

CROSSTALK, VOLTAGE GAIN TEST CIRCUIT (VIDEO SWITCH)



Unit Resistance : Ω  
Capacitance : F

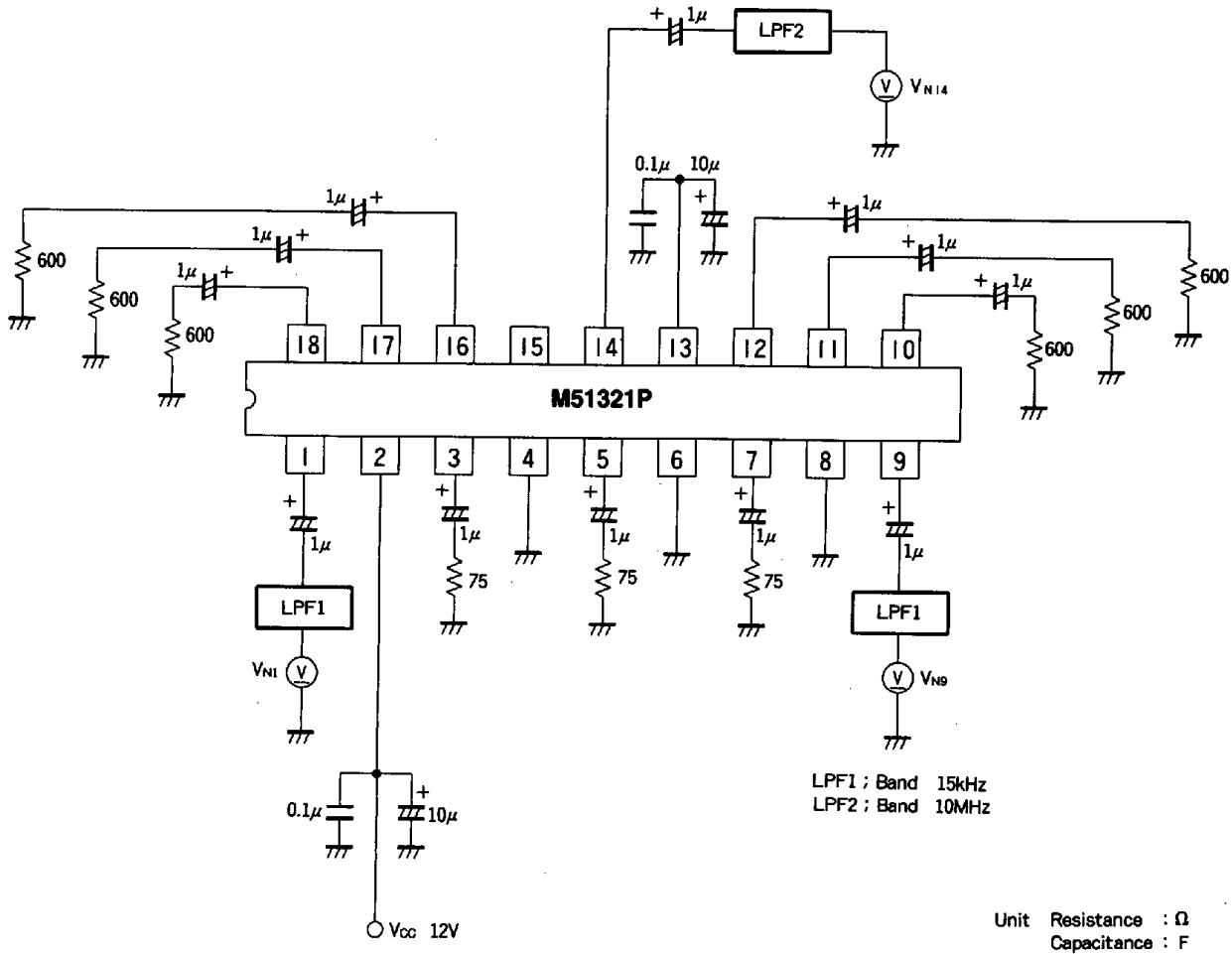
SWITCH MODE LIST

S1	S2	Vo
1	1	Vos
	2, 3	Voc
2	2	Vos
	1, 3	Voc
3	3	Vos
	1, 2	Voc

Crosstalk  $CT = 20 \log \left( \frac{V_{os}}{V_{oc}} \right)$  dB

Voltage gain  $G_v = 20 \log \left( \frac{V_{os}}{V_{in}} \right)$  dB

**OUTPUT NOISE VOLTAGE**



**TYPICAL CHARACTERISTICS** ( $T_a=25^\circ\text{C}$ , unless otherwise noted)

