

# Pedestal Clamp 2-Input 1-Output 3-Circuit Video Switch Monolithic IC MM1389

## Outline

This is a video switch IC developed for use in video cameras, with 2-input and 1-output circuits. It has pedestal clamp input, making it ideal for RGB and video signal switching,

## Features

- |                                   |                               |
|-----------------------------------|-------------------------------|
| 1. Pedestal clamp input           |                               |
| 2. Low current consumption        | 12mA typ.(V <sub>cc</sub> 5V) |
| 3. Frequency response             | 10MHz typ. 0dB                |
| 4. Operating power supply voltage | 4.5~12V                       |

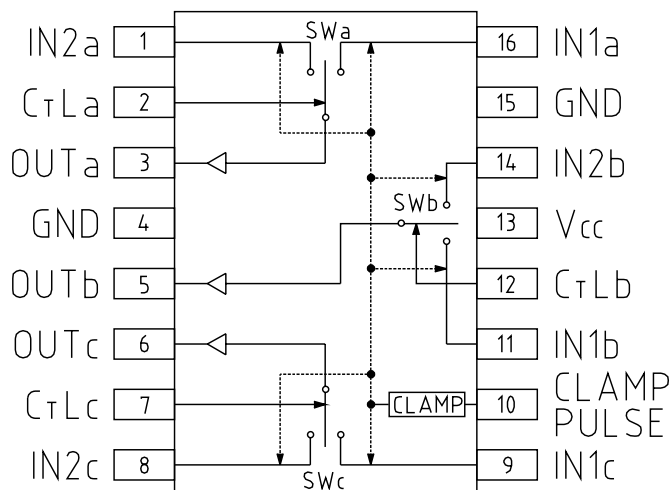
## Package

SOP-16B (MM1389XF)

## Applications

1. TV
2. VCR
3. Other video equipment

## Block Diagram



Control input truth table

SW	OUT
L	IN2a
	IN2b
	IN2c
H	IN1a
	IN1b
	IN1c

## Pin Description

Pin no.	Pin name	Function	Internal equivalent circuit diagram
1 8 9 11 14 16	IN2a IN2c IN1c IN1b IN2b IN1a	Input pin 2SWa Input pin 2SWc Input pin 1SWc Input pin 1SWb Input pin 2SWb Input pin 1SWa	
2 7 12	C <sub>T</sub> La C <sub>T</sub> Lb C <sub>T</sub> Lc	Switching pin a Switching pin b Switching pin c	
3 5 6	OUTa OUTb OUTc	Output pin SWa Output pin SWb Output pin SWc	
4 15	GND GND	GND pin 1 GND pin 2	
10	CLAMP PULSE	Clamp pulse input pin	
13	V <sub>CC</sub>	Power supply voltage pin	

## Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Units
Storage temperature	T <sub>STG</sub>	-40~+125	°C
Operating temperature	T <sub>OPR</sub>	-25~+75	°C
Power supply voltage	V <sub>CC</sub> max.	15	V
Allowable loss	P <sub>d</sub>	350	mW

## Recommended Operating Conditions

Item	Symbol	Ratings	Units
Operating temperature	T <sub>OPR</sub>	-25~+75	°C
Operating voltage	V <sub>OP</sub>	4.5~12.0	V

## Electrical Characteristics (Except where noted otherwise, Ta=25°C, V<sub>CC</sub>=5.0V)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Consumption current	I <sub>D</sub>	Refer to Measuring Circuit		12.0	17.0	mA
Voltage gain	G <sub>V</sub>	Refer to Measuring Circuit	-0.5	0	+0.5	dB
Frequency characteristic	F <sub>C</sub>	Refer to Measuring Circuit	-1	0	+1	dB
Dynamic range 1	V <sub>D1</sub>	Refer to Measuring Circuit	1.40	1.65		V <sub>P-P</sub>
Dynamic range 2	V <sub>D2</sub>	Refer to Measuring Circuit	0.80	0.95		V <sub>P-P</sub>
Crosstalk	C <sub>T</sub>	Refer to Measuring Circuit		-70	-60	dB
Switch input voltage H	V <sub>IH</sub>	Refer to Measuring Circuit	2.1			V
Switch input voltage L	V <sub>IL</sub>	Refer to Measuring Circuit			0.7	V
Clamp pin input voltage H	V <sub>CTH</sub>	Refer to Measuring Circuit	2.1			V
Clamp pin input voltage L	V <sub>CTL</sub>	Refer to Measuring Circuit			0.7	V

V<sub>D1</sub> : Positive dynamic range (from clamp level)

V<sub>D2</sub> : Negative dynamic range (from clamp level)

# Measuring Procedures

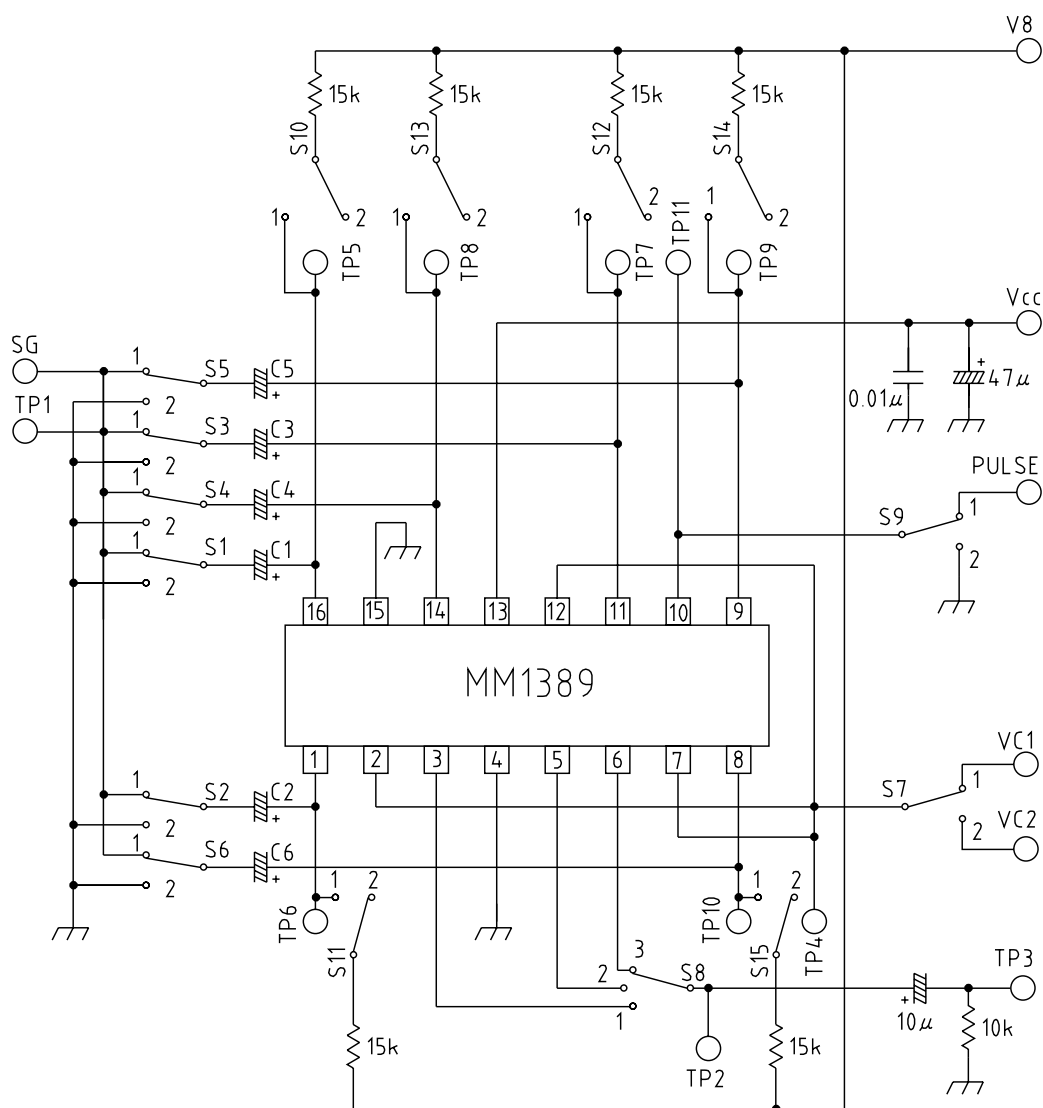
(Except where noted otherwise,  $V_{CC}=5.0V$ ,  $V_{C1}=V_{CC}$ ,  $V_{C2}=0V$ ,  $PULSE=V_{CC}$ ,  $C1\sim C6=0.1\mu F$ , impress  $V_B=3.5V$  when S9 is 2)

Item	Symbol	Switch state										Notes
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10~S15	
Consumption current	$I_D$	2	2	2	2	2	2	2	2	1	2	
Voltage gain	$G_V$	1	2	2	2	2	2	1	1	2	1	
		2	1	2	2	2	2	2	1	2	1	
		2	2	1	2	2	2	1	2	2	1	
		2	2	2	1	2	2	2	2	2	1	
		2	2	2	2	1	2	1	3	2	1	
		2	2	2	2	2	1	2	3	2	1	
Frequency characteristic	$FC$	1	2	2	2	2	2	1	1	2	1	
		2	1	2	2	2	2	2	1	2	1	
		2	2	1	2	2	2	1	2	2	1	
		2	2	2	1	2	2	2	2	2	1	
		2	2	2	2	1	2	1	3	2	1	
		2	2	2	2	2	1	2	3	2	1	
Dynamic range 1, 2	$V_{D1}$ $V_{D2}$	1	2	2	2	2	2	1	1	1	2	VD1: Positive dynamic range (from clamp level) VD2: Negative dynamic range (from clamp level)
		2	1	2	2	2	2	2	1	1	2	
		2	2	1	2	2	2	1	2	1	2	
		2	2	2	1	2	2	2	2	1	2	
		2	2	2	2	1	2	1	3	1	2	
		2	2	2	2	2	1	2	3	1	2	
Crosstalk	$C_T$	1	2	2	2	2	2	1	1	2	1	
		2	1	2	2	2	2	2	1	2	1	
		2	2	1	2	2	2	1	2	2	1	
		2	2	2	1	2	2	2	2	2	1	
		2	2	2	2	1	2	1	3	2	1	
		2	2	2	2	2	1	2	3	2	1	
Switch input voltage H, L	$V_{IH}$ $V_{IL}$	1	2	2	2	2	2	1	1	2	1, 2	
		2	2	1	2	2	2	1	2	2	1, 2	
		2	2	2	2	1	2	1	3	2	1, 2	
		2	1	2	2	2	2	1	1	2	1, 2	
		2	2	2	1	2	2	1	2	2	1, 2	
		2	2	2	2	2	1	1	3	2	1, 2	
Clamp pin input voltage H, L	$V_{CTH}$ $V_{CTL}$	2	2	2	2	2	2	1	1	2	1	
		2	2	2	2	2	2	1	2	2	1	
		2	2	2	2	2	2	1	3	2	1	

(Except where noted otherwise,  $V_{CC}=5.0V$ ,  $V_{C1}=V_{CC}$ ,  $V_{C2}=0V$ ,  $PULSE=V_{CC}$ ,  $C1 \sim C6=0.1\mu F$ , impress  $V_B=3.5V$  when S9 is 2)

Item	Symbol	Measurement conditions	Notes
Consumption current	$I_D$	Connect a DC ammeter to the $V_{CC}$ pin and measure. The ammeter is shorted for subsequent measurements.	
Voltage gain	$G_V$	Input a $2.0V_{P-P}$ , 100kHz sine wave to SG, and obtain $G_V$ from the following formula given TP1 voltage as $V_1$ and TP3 voltage as $V_2$ . $G_V=20\text{Log} (V_2/V_1) \text{ dB}$	$f=100\text{kHz}$ $V=2.0V_{P-P}$
Frequency characteristic	$F_C$	For the above $G_V$ measurement, given TP3 voltage for 10MHz as $V_3$ , $F_C$ is obtained from the following formula. $F_C=20\text{Log} (V_3/V_2) \text{ dB}$	10MHz/100kHz $V=2.0V_{P-P}$
Dynamic range 1, 2	$V_{D1}$ $V_{D2}$	Input a video signal to SG and a $5V_{P-P}$ clamp pulse to PULSE. Given input amplitude on the positive side of clamp level $V_C$ as $V_{D1IN}$ , and output amplitude as $V_{D1OUT}$ and negative side input amplitude as $V_{D2IN}$ , and output amplitude as $V_{D2OUT}$ , $V_{D2}$ is obtained from the following formula. $V_{D1} : 20\text{Log} (V_{D1OUT}/V_{D1IN}) \leq V_{D1IN} \text{ for } -1\text{dB}$ $V_{D2} : 20\text{Log} (V_{D2OUT}/V_{D2IN}) \leq V_{D2IN} \text{ for } -1\text{dB}$	
Crosstalk	$C_T$	Input a $2.0V_{P-P}$ , 4.43MHz sine wave to SG, and given TP1 voltage as $V_4$ and TP3 voltage as $V_5$ , $C_T$ is obtained from the following formula. $C_T=20\text{Log} (V_5/V_4) \text{ dB}$	$f=4.43\text{MHz}$ $V=2.0V_{P-P}$
Switch input voltage H, L	$V_{IH}$ $V_{IL}$	Make S10, S12 and S14 1, and S11, S13 and S15 2. Input a $2.0V_{P-P}$ , 100kHz sine wave to SG, and raise gradually from $V_{C1}=0V$ . TP4 voltage when the SG signal appears on TP2 is $V_{IN}$ . Next, reverse S10~S15 settings and lower gradually from $V_{C1}=V_{CC}$ . TP4 voltage when the SG signal appears on TP2 is $V_{IL}$ .	
Clamp pin input voltage H, L	$V_{CTH}$ $V_{CTL}$	Impress 4V on $V_B$ and raise gradually from $PULSE=0V$ . TP11 voltage when less than 2.0V appears on TP2 is $V_{CTH}$ . Lower from $PULSE=V_{CC}$ , and TP11 voltage when more than 2.2V appears on TP2 is $V_{CTL}$ .	

## Measuring Circuit



## Application Circuits

