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_{CC}5V)
3. Frequency response — 10MHz typ. 0dB
4. Operating power supply voltage — 4.5~12V

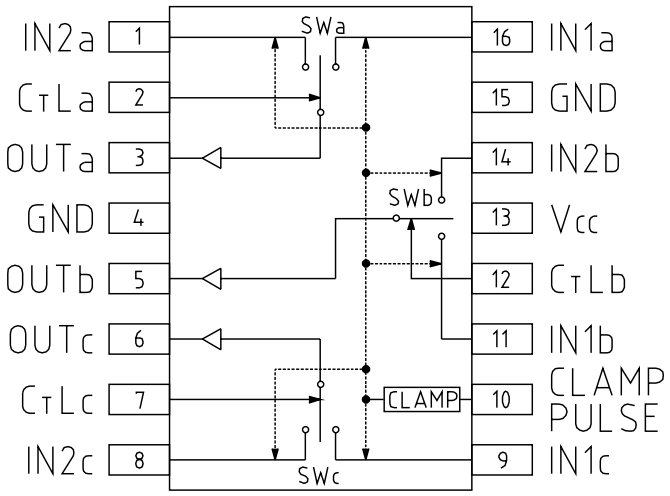
Package

SOP-16B (MM1389XF)

Applications

1. TV
2. VCR
3. Other video equipment

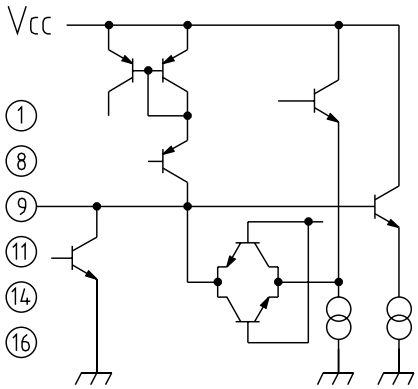
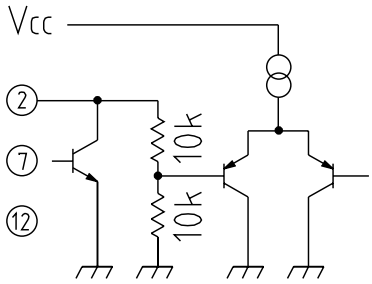
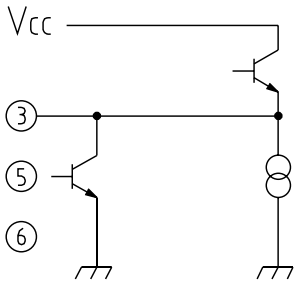
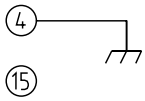
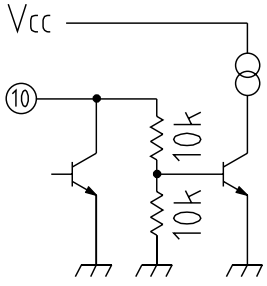
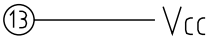
Block Diagram



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	CTLa CTLb CTLc	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	Vcc	Power supply voltage pin	

Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Units
Storage temperature	T_{STG}	–40~+125	°C
Operating temperature	T_{OPR}	–25~+75	°C
Power supply voltage	V_{CC} max.	15	V
Allowable loss	Pd	350	mW

Recommended Operating Conditions

Item	Symbol	Ratings	Units
Operating temperature	T_{OPR}	–25~+75	°C
Operating voltage	V_{OP}	4.5~12.0	V

Electrical Characteristics (Except where noted therwise, Ta=25°C, V_{CC}=5.0V)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Consumption current	I_D	Refer to Measuring Circuit		12.0	17.0	mA
Voltage gain	G_V	Refer to Measuring Circuit	–0.5	0	+0.5	dB
Frequency characteristic	F_C	Refer to Measuring Circuit	–1	0	+1	dB
Dynamic range 1	V_{D1}	Refer to Measuring Circuit	1.40	1.65		V_{P-P}
Dynamic range 2	V_{D2}	Refer to Measuring Circuit	0.80	0.95		V_{P-P}
Crosstalk	C_T	Refer to Measuring Circuit		–70	–60	dB
Switch input voltage H	V_{IH}	Refer to Measuring Circuit	2.1			V
Switch input voltage L	V_{IL}	Refer to Measuring Circuit			0.7	V
Clamp pin input voltage H	V_{CTH}	Refer to Measuring Circuit	2.1			V
Clamp pin input voltage L	V_{CTL}	Refer to Measuring Circuit			0.7	V

V_{D1} : Positive dynamic range (from clamp level)

V_{D2} : Negative dynamic range (from clamp level)

Measuring Procedures

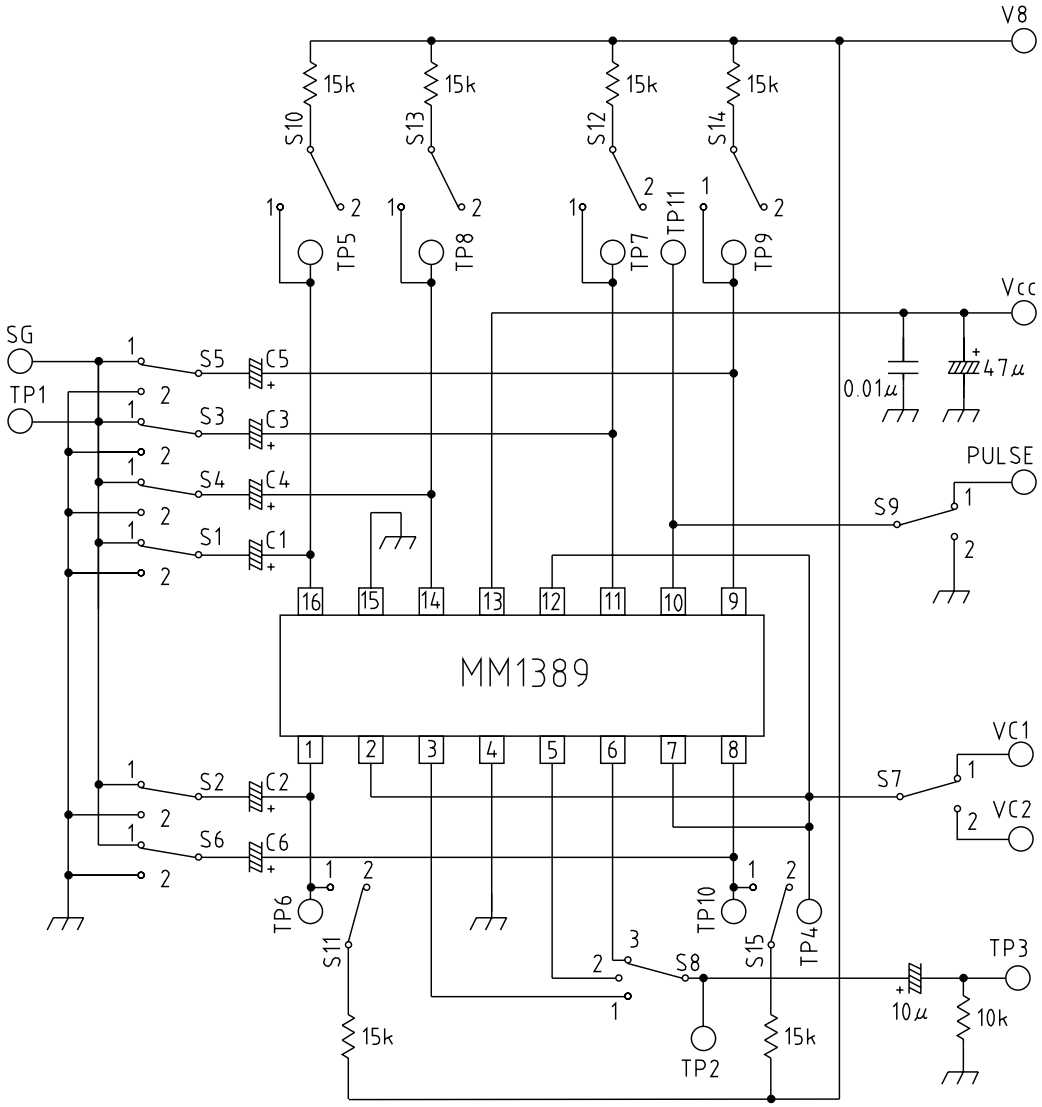
(Except where noted otherwise, V_{CC}=5.0V, V_{C1}=V_{CC}, V_{C2}=0V, PULSE=V_{CC}, C1~C6=0.1μF, impress V_B=3.5V when S9 is 2)

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~C6=0.1μF, 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 V1 and TP3 voltage as V2. G_V=20Log (V2/V1) dB	f=100kHz V=2.0V_{P-P}
Frequency characteristic	F_C	For the above G_V measurement, given TP3 voltage for 10MHz as V3, F_C is obtained from the following formula. F_C=20Log (V3/V2) 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} : 20Log (V_{D1OUT}/V_{D1IN}) ≦ V_{D1IN} for−1dB V_{D2} : 20Log (V_{D2OUT}/V_{D2IN}) ≦ V_{D2IN} for−1dB	
Crosstalk	C_T	Input a 2.0V_{P-P}, 4.43MHz sine wave to SG, and given TP1 voltage as V4 and TP3 voltage as V5, C_T is obtained from the following formula. C_T=20Log (V5/V4) dB	f=4.43MHz 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 VIN. 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 VB 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