2-Input 1-Output 3-Circuit Video Switch
Monolithic IC MM1231~1234

Outline

This is serial 2-input, 1-output, 3-circuit video switch IC for video / audio signal switching with and without clamp circuit.

Circuit configuration tables and block diagrams are as follows.

MM1234 is used as the representative model in this description.

MM1231~MM1234 Series Circuit Configuration Table

Model name	# of Inputs	# of Outputs	Clamp circuit	Power supply voltage
MM1231	2	1	No	4.6~13.0V
MM1232	2	1	1 input	4.6~13.0V
MM1233	2	1	2 input	4.6~13.0V
MM1234	2	1	3 input	4.6~13.0V

MM1231~MM1234 Input/Output Voltage Measurement Values (typ.)

Model name	Input / Output voltage	Power supply voltage			Unit
		5V	9V	12V	
MM1231	Input voltage	2.80	5.00	6.70	V
	Output voltage	2.01	4.30	6.00	V
MM1232	Input voltage	2.80	5.00	6.70	V
	Output voltage	2.10	4.30	6.00	V
	Input clamp	1.40	2.50	3.30	V
	Output voltage	0.70	2.20	2.90	V
MM1233	Input voltage	2.80	5.00	6.70	V
	Output voltage	2.10	4.30	6.00	V
	Input clamp	1.40	2.50	3.30	V
	Output voltage	0.70	2.20	2.90	V
MM1234	Input clamp	1.40	2.50	3.30	V
	Output voltage	0.70	2.20	2.90	V

Block Diagram (MM1231~MM1234)

MM1231
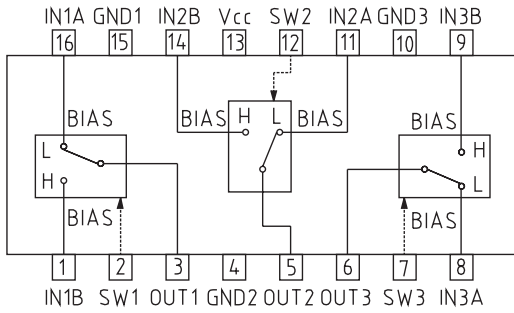
MM1232
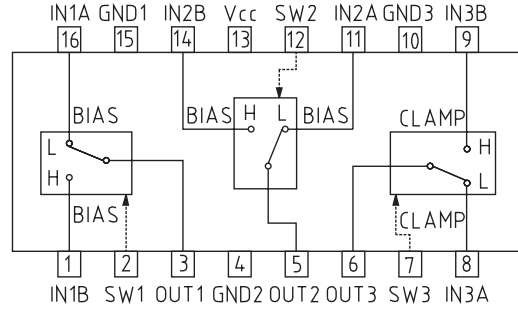
MM1233
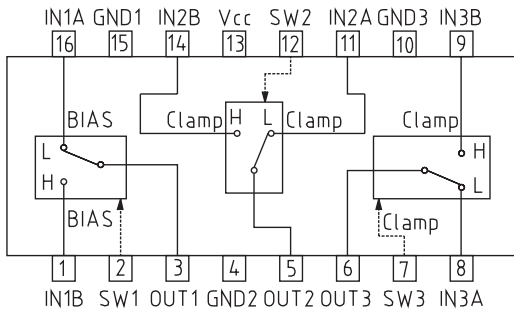
MM1234
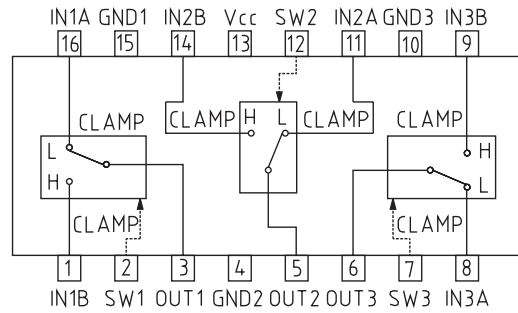
Control input truth table

SW	OUT
	IN1A
L	IN2A
	IN3A
	IN1B
H	IN2B
	IN3B

Introduction of Main Model

2-Input 1-Output 3-Circuit Video Switch
Monolithic IC MM1234

Outline

This is a video switch for video signal switching, with 2-input and 1-output circuits built in. All three circuits have a clamp function.

Features

1. 3 circuits built in, 2-input and 1-output
2. Clamp function
3. Current consumption   9.0mA typ.
4. Operating power supply voltage range   4.6~13.0V
5. Frequency response   10MHz
6. Crosstalk   70dB (at 4.43MHZ)

Package

SOP-16B
DIP-16B

Applications

1. TV
2. VCR
3. Other video equipment

Pin Description

Pin no.	Pin name	Function	Internal equivalent circuit diagram
16	IN1A	Input	
1	IN1B		
11	IN2A		
14	IN2B		
8	IN3A		
9	IN3B		
2	SW1	Switch	
12	SW2		
7	SW3		
3	OUT1	Output	
5	OUT2		
6	OUT3		
13	Vcc	Power supply	
15	GND1	Ground	
4	GND2		
10	GND3		

Absolute Maximum Ratings (Ta=25℃)

Item	Symbol	Ratings	Units
Storage temperature	T_{STG}	–40~+125	°C
Operating temperature	T_{OPR}	–20~+75	°C
Power supply voltage	V_{CC}	15	V
Allowable loss	Pd	350 (SOP-16B) 1200 (DIP-16B)	mW

Electrical Characteristics (Except where noted otherwise, Ta=25℃, Vcc=5.0V)

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Operating power supply voltage range	V_{CC}		4.6		13.0	V
Consumption current	Id	Refer to Measuring Circuit		9.0	11.7	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
Differential gain	DG	Refer to Measuring Circuit		0	±3	%
Differential phase	DP	Refer to Measuring Circuit		0	±3	deg
Output offset voltage	Voff	Refer to Measuring Circuit			±15	mV
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
Output impedance	Ro			25		Ω

Measuring Procedures (Except where noted otherwise, Vcc=5.0V, VC1=Vcc, VC2=0V)

Item	Symbol	S1	S2	S3	S4	S5	S6	S7	S8	Measuring Procedure
Consumption current	Id	2	2	2	2	2	2	2	1	Connect a DC ammeter to the Vcc pin and measure. The ammeter is shorted for use in subsequent measurements.
Voltage gain	GV	1	2	2	2	2	2	2	1	Input a 2.0Vp-p, 100kHz sine wave to SG, and obtain Gv from the following formula given TP1 voltage as V1 and TP3 voltage as V2. $Gv = 20 \, LOG \, (V2/V1) \text{ dB}$
		2	1	2	2	2	2	1	1	
		2	2	1	2	2	2	2	2	
		2	2	2	1	2	2	1	2	
		2	2	2	2	1	2	2	3	
		2	2	2	2	2	1	1	3	
Frequency characteristic	Fc	1	2	2	2	2	2	2	1	For the above Gv measurement, given TP3 voltage for 10MHz as V3, Fc is obtained from the following formula. $Fc = 20 \, LOG \, (V3/V2) \text{ dB}$
		2	1	2	2	2	2	1	1	
		2	2	1	2	2	2	2	2	
		2	2	2	1	2	2	1	2	
		2	2	2	2	1	2	2	3	
		2	2	2	2	2	1	1	3	
Differential gain	DG	1	2	2	2	2	2	2	1	Input a 2.0Vp-p staircase wave to SG, and measure differential gain at TP3. APL=10~90%
		2	1	2	2	2	2	1	1	
		2	2	1	2	2	2	2	2	
		2	2	2	1	2	2	1	2	
		2	2	2	2	1	2	2	3	
		2	2	2	2	2	1	1	3	
Differential phase	DP	1	2	2	2	2	2	2	1	Proceed as for DG, and measure differential phase.
		2	1	2	2	2	2	1	1	
		2	2	1	2	2	2	2	2	
		2	2	2	1	2	2	1	2	
		2	2	2	2	1	2	2	3	
		2	2	2	2	2	1	1	3	
Output offset voltage	Voff	2	2	2	2	2	2	2	1	Measure the DC voltage difference at TP2 for each switch for VC1 and VC2.
		2	2	2	2	2	2	1	1	
		2	2	2	2	2	2	2	2	
		2	2	2	2	2	2	1	2	
		2	2	2	2	2	2	2	3	
		2	2	2	2	2	2	1	3	
Crosstalk	CT	1	2	2	2	2	2	1	1	Assume VC1=2.1V, VC2=0.7V. Input a 2.0Vp-p, 4.43MHz sine wave to SG, and given TP1 voltage as V4 and TP3 voltage as V5, CT is obtained from the following formula. $CT = 20 \, LOG \, (V5/V4) \text{ dB}$
		2	1	2	2	2	2	2	1	
		2	2	1	2	2	2	1	2	
		2	2	2	1	2	2	2	2	
		2	2	2	2	1	2	1	3	
		2	2	2	2	2	1	2	3	
Switch input voltage H	VIH	2	2	2	2	2	2	1	1	Impress an optional DC voltage on TP5 7, 9 and TP6, 8 and 10. Gradually raise from VC1=0V. TP4 voltage when TP6, 8, 10 voltage is output on TP2 is VIH. Gradually lower from VC1=Vcc. TP4 voltage when TP5, 7, 9 voltage is output on TP2 is VIL.
		2	2	2	2	2	2	1	2	
		2	2	2	2	2	2	1	3	
Switch input voltage L	VIL	2	2	2	2	2	2	1	1	
		2	2	2	2	2	2	1	2	
		2	2	2	2	2	2	1	3	

Measuring Circuit