

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

November 2, 2001

Outline

These ICs are video switch ICs incorporating three 2-input 1-output circuits for video/audio signal switching. The series includes those with a clamp circuit. The circuit configuration table and block diagram are shown below. MM1234 is introduced as a representative model in this document.

MM1231~MM1234 Series Circuit Configuration Table

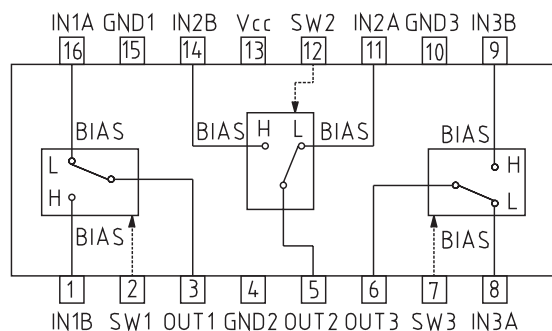
Model name	# of Inputs	# of Outputs	Clamp circuit	Power supply voltage
MM1231	2	1	No	4.6~13.0V
MM1232	2	1	1 input	4.6~13.0V
MM1233	2	1	2 input	4.6~13.0V
MM1234	2	1	3 input	4.6~13.0V

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

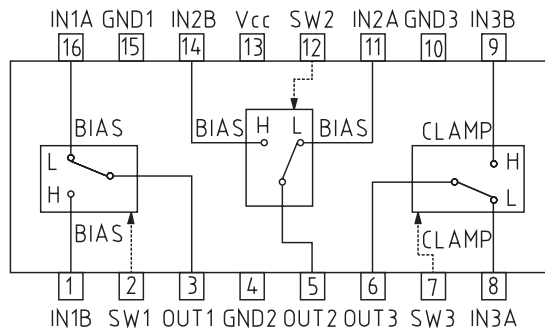
Model name	Input / Output voltage	Power supply voltage			Unit
		5V	9V	12V	
MM1231	Input voltage	2.80	5.00	6.70	V
	Output voltage	2.01	4.30	6.00	V
MM1232	Input voltage	2.80	5.00	6.70	V
	Output voltage	2.10	4.30	6.00	V
	Input clamp	1.40	2.50	3.30	V
	Output voltage	0.70	2.20	2.90	V
MM1233	Input voltage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

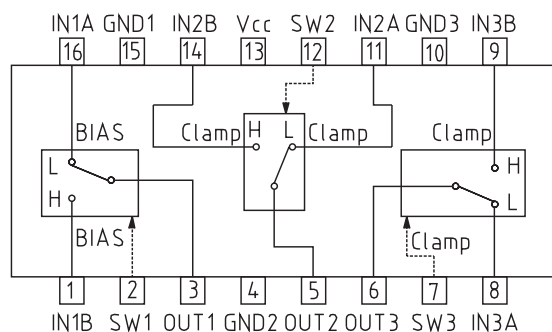
MM1231



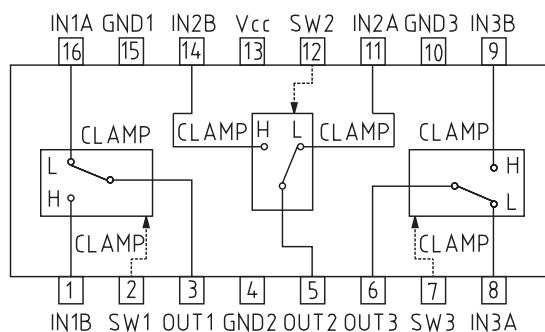
MM1232



MM1233



MM1234



Control input truth table

SW	OUT
L	IN1A
	IN2A
	IN3A
H	IN1B
	IN2B
	IN3B

Introduction of Main Model

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

November 10, 1993

Outline

This IC is a video switch IC for video/audio signal switching incorporating three 2-input 1-output video switch circuit. These three circuits includes a clamp function.

Features

- | | |
|--|-------------------|
| 1. Incorporates three 2-input 1-output video switch circuits | |
| 2. Clamp function included | |
| 3. Current consumption | 9.0mA typ. |
| 4. Operating supply voltage range | 4.6~13.0V |
| 5. Frequency response | 10MHz |
| 6. Crosstalk | 70dB (at 4.43MHZ) |

Packages

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 1 11 14 8 9	IN1A IN1B IN2A IN2B IN3A IN3B	Input	
2 12 7	SW1 SW2 SW3	Switch	
3 5 6	OUT1 OUT2 OUT3	Output	
13	Vcc	Power supply	
15 4 10	GND1 GND2 GND3	Ground	

Absolute Maximum Ratings (Ta=25°C)

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	P _d	350 (SOP-16B) 1200 (DIP-16B)	mW

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

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Operating power supply voltage range	V _{CC}		4.6		13.0	V
Consumption current	I _d	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	V _{off}	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	R _o			25		Ω

Measuring Procedures (Except where noted otherwise, $V_{CC}=5.0V$, $VC1=V_{CC}$, $VC2=0V$)

Item	Symbol	Switch state								Measuring Procedure
		S1	S2	S3	S4	S5	S6	S7	S8	
Consumption current	Id	2	2	2	2	2	2	2	1	Connect a DC ammeter to the V_{CC} 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 $2.0V_{P-P}$, 100kHz sine wave to SG, and obtain Gv from the following formula given TP1 voltage as V1 and TP3 voltage as V2. $G_V=20\text{LOG} (V_2/V_1) \text{ dB}$
		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. $F_C=20\text{LOG} (V_3/V_2) \text{ dB}$
		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 $2.0V_{P-P}$ staircase wave to SG, and measure differential gain at TP3. $APL=10\sim 90\%$
		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 $2.0V_{P-P}$, 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. $C_T=20\text{LOG} (V_5/V_4) \text{ dB}$
		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	V _{IH}	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 V _{IH} . Gradually lower from $VC1=V_{CC}$. TP4 voltage when TP5, 7, 9 voltage is output on TP2 is V _{IL} .
		2	2	2	2	2	2	1	2	
		2	2	2	2	2	2	1	3	
Switch input voltage L	V _{IL}	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

