# 6-Input 1-Output Video Switch

## Monolithic IC MM1140

#### **Outline**

This is a 6-input, 1-output high performance video switch for TV/BS signal switching. It is ideal for use when multiple input circuits are needed on 1 chip.

#### **Features**

1. Built-in mute function (mute pin: input possible)

2. Crosstalk –70dB (at 4.43MHz)

3. Power supply voltage4. Frequency response5~13V10MHz

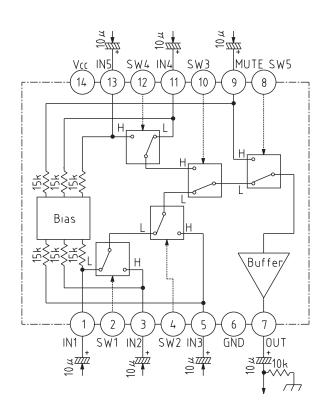
#### **Package**

SOP-14B (MM1140XF)

#### **Applications**

- 1. TV
- 2. VCR
- 3. Other video equipment

#### Block Diagram



### Pin Description

Pin no.	Pin name	Internal equivalent circuit diagram	Pin no.	Pin name	Internal equivalent circuit diagram
1	IN1	VCC 220 \$ 15k	8	SW5	10k
		9.1k \$	9	MUTE	VCC 220 \$ 15k
2	SW1	10k			9.1k \$
3	IN2	VCC 220 \$ 15k	10	SW3	10k
		9.1k \$	11	IN4	VCC 220 \$ 15k
4	SW2	10k			9.1k \$
5	IN3	VCC 220 \$ 15k	12	SW4	10k
		9.1k \$	13	IN5	VCC 220 \$ 15k
6	GND				9.1k \$
7	OUT	VCC 1.5k 50			
		1.3k 100	14	Vcc	

### Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Units	
Storage temperature	Tstg	-40~+125	°C	
Operating temperature	Topr	-20~+75	°C	
Power supply voltage	Vcc	15	V	
Allowable loss	Pd	350	mW	

### Electrical Characteristics (Except where noted otherwise, Ta=25°C, Vcc=5.0V)

Item		Symbol	Measurement conditions	Min.	Тур.	Max.	Units
Operating power supply voltage	e range	Vcc		4.75	5.0	13.0	V
Consumption current		Id	Refer to Measuring Circuit		9.0	13.0	mA
Voltage gain		Gv	Refer to Measuring Circuit	-0.5	0	+0.5	dB
Frequency characteristic	;	Fc	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
Crosstalk		Ст	Refer to Measuring Circuit		-70	-60	dB
Total harmonic distortion	1	THD	Refer to Measuring Circuit		0.01	0.3	%
Output offset voltage		Voff	Refer to Measuring Circuit			±30	mV
Switch input voltage H		Vih	Refer to Measuring Circuit	2.1			V
		VIL	Refer to Measuring Circuit			0.7	V
Input impedance		Ri			15		kΩ
Output impedance		Ro			25		Ω

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

Item		Symbol	Switch state	Measuring Procedure
Consumption cu	rrent	Id	1	Connect a DC ammeter to the Vcc pin and measure. Vcc is 5V and
•			_	the ammeter is shorted for use in subsequent measurements.
				Input a 2.0V <sub>P-P</sub> , 100kHz sine wave to SG, and obtain Gv from the
Voltage gain	Voltage gain		2	following formula given TP12 voltage as V1 and TP14 voltage as V2.
				Gv=20LOG (V2/V1) dB
Frequency				For the above Gv measurement, given TP14 voltage for 10MHz as
characteristic	•	Fc	2	V3, Fc is obtained from the following formula.
Characteristic	,			Fc=20LOG (V3/V2) dB
Differential go	in	DG	2	Input a 2.0V <sub>P-P</sub> staircase wave to SG, and measure differential gain at TP14.
Differential ga	111	DG	4	APL=10~90%
Differential pha	ise	DP	2	Proceed as for DG, and measure differential phase.
Total harmon	ic	TID	0	Input a 2.5V <sub>P-P</sub> , 1kHz sine wave to SG, connect a distortion meter to
distortion		THD	2	TP14 and measure.
Output offset vol	tage	Voff	3	Measure the DC voltage difference of each switch status at TP13.
				Assume VC1=2.1V, VC2=0.7V.
			9	Input a 2.0V <sub>P-P</sub> , 4.43MHz sine wave to SG, and given TP12 voltage as V4
Crosstalk		Ст		and TP14 voltage as V5, C <sub>T</sub> is obtained from the following formula.
				C <sub>T</sub> =20LOG (V5/V4) dB
		37 1	- 4	Impress different optional DC voltages on TP6 and TP7. Gradually
Switch 1	Н	V <sub>IH</sub> 1		raise from VC3=0V. TP1 voltage when TP7 voltage is output on TP13
input voltage		VIL1		is V <sub>IH</sub> 1. Gradually lower from VC3=V <sub>CC</sub> . TP1 voltage when TP6
	L			voltage is output on TP13 is V <sub>IL</sub> 1.
	Н	V <sub>IH</sub> 2	_	Impress different optional DC voltages on TP6 and TP8. Gradually
Switch 2				raise from VC3=0V. TP2 voltage when TP8 voltage is output on TP13
input voltage		77.0	- 5	is V <sub>IH</sub> 2. Gradually lower from VC3=Vcc. TP2 voltage when TP6
	L	Vil2		voltage is output on TP13 is V <sub>II</sub> 2.
		TT 0		Impress different optional DC voltages on TP6 and TP9. Gradually
Switch 3	Н	Vih3		raise from VC3=0V. TP3 voltage when TP9 voltage is output on TP13
input voltage			6	is V <sub>H</sub> 3. Gradually lower from VC3=Vcc. TP3 voltage when TP6
	L	Vil3		voltage is output on TP13 is VII.3.
		77 4		Impress different optional DC voltages on TP9 and TP10. Gradually
Switch 4	Н	Vih4	7	raise from VC3=0V. TP4 voltage when TP10 voltage is output on
input voltage		T		TP13 is ViH4. Gradually lower from VC3=Vcc. TP4 voltage when TP9
	L	VIL4		voltage is output on TP13 is VII.4.
	_	V <sub>IH</sub> 5		Impress different optional DC voltages on TP6 and TP11. Gradually
Switch 5	Н			raise from VC3=0V. TP5 voltage when TP11 voltage is output on
input voltage		Vil.5	8	TP13 is Vih5. Gradually lower from VC3=Vcc. TP5 voltage when TP6
	L			voltage is output on TP13 is VIL5.
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### Switch Conditions Table

	SW										
Conditions		Con	trol switc	hing		Input switching					
	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11
1	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	1	0	0	0	0	0
	1	0	0	0	0	0	1	0	0	0	0
	1	1	0	0	0	0	0	1	0	0	0
	1	1	1	0	0	0	0	0	1	0	0
	1	1	1	1	0	0	0	0	0	1	0
	1	1	1	1	1	0	0	0	0	0	1
3	Conditions 2					0	0	0	0	0	0
4	2	0	0	0	0	0	0	0	0	0	0
5	0	2	0	0	0	0	0	0	0	0	0
6	0	0	2	0	0	0	0	0	0	0	0
7	0	0	1	2	0	0	0	0	0	0	0
8	0	0	0	0	2	0	0	0	0	0	0
9	Combination of all control switching and input switching when no signal is output to TP14.										

### Control Input-Output Table

		OUT			
1	2	3	4	5	001
L	L	L	_	L	IN1
Н	L	L	_	L	IN2
_	Н	L	_	L	IN3
_	_	Н	L	L	IN4
_	_	Н	Н	L	IN5
_	_	_	_	Н	MUTE

#### Measuring Circuit

