

# 2-Input 1-Output Video Switch / 3-Input 1-Output Video Switch Monolithic IC MM1111~MM1118

## Outline

These ICs are video switches for video / audio signal switching, with 2-input 1-output or 3-input 1-output. The series includes those with and without built-in clamp and 6dB amp circuits.

Circuit configuration tables and block diagrams are as follows.

MM1118 is used as the representative model in this description.

## MM1111~MM1118 Series Circuit Configuration Table

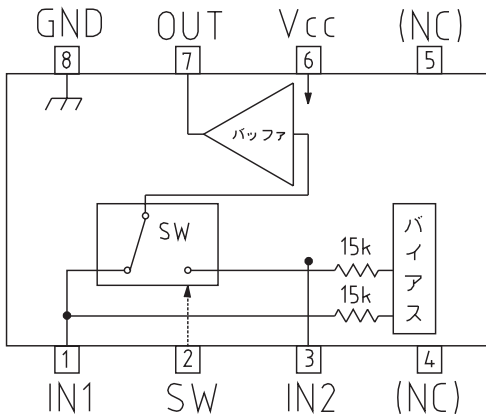
Model name	# of Inputs	# of Outputs	6dB amplifier	Clamp circuit	Power supply voltage
MM1111	2	1	No	No	4.6~13.0V
MM1112	2	1	Yes	No	8.0~13.0V
MM1113	3	1	No	No	4.6~13.0V
MM1114	3	1	Yes	No	8.0~13.0V
MM1115	2	1	No	Yes	4.6~13.0V
MM1116	2	1	Yes	Yes	4.6~13.0V
MM1117	3	1	No	Yes	4.6~13.0V
MM1118	3	1	Yes	Yes	4.6~13.0V

## MM1111~MM1118 Input/Output Voltage Measurement Values (typ.)

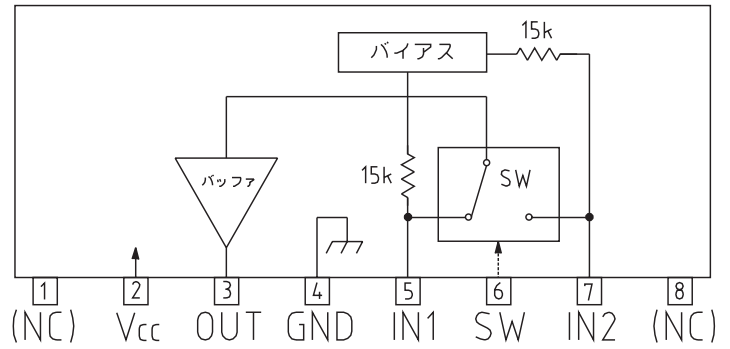
Model name	Input / Output voltage	Power supply voltage			Unit
		5V	9V	12V	
MM1111	Input voltage	2.77	5.02	6.71	V
	Output voltage	2.01	4.26	5.96	V
MM1112	Input voltage		4.06	5.45	V
	Output voltage		4.30	5.57	V
MM1113	Input voltage	2.77	5.02	6.71	V
	Output voltage	2.01	4.26	5.96	V
MM1114	Input voltage		4.06	5.45	V
	Output voltage		4.30	5.57	V
MM1115	Input voltage	1.35	2.40	3.20	V
	Output voltage	0.59	1.65	2.45	V
MM1116	Input voltage	1.29	2.30	3.05	V
	Output voltage	1.06	1.76	2.30	V
MM1117	Input voltage	1.35	2.40	3.20	V
	Output voltage	0.59	1.65	2.45	V
MM1118	Input voltage	1.29	2.30	3.05	V
	Output voltage	1.06	1.76	2.30	V

MM1111

SOP-8C



SIP-8A

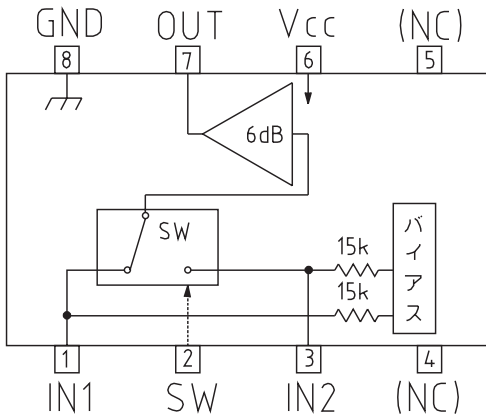


Control input truth table

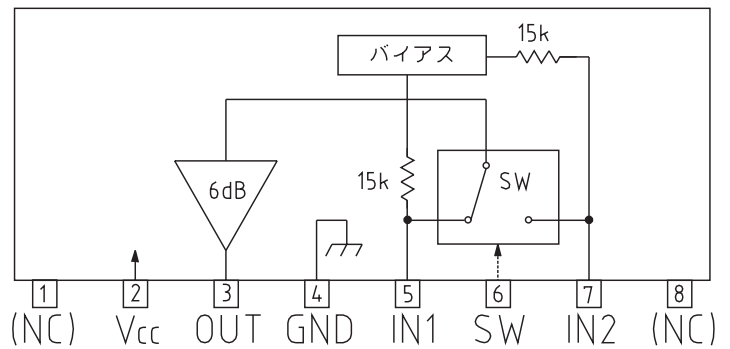
SW	OUT
L	IN1
H	IN2

MM1112

SOP-8C



SIP-8A

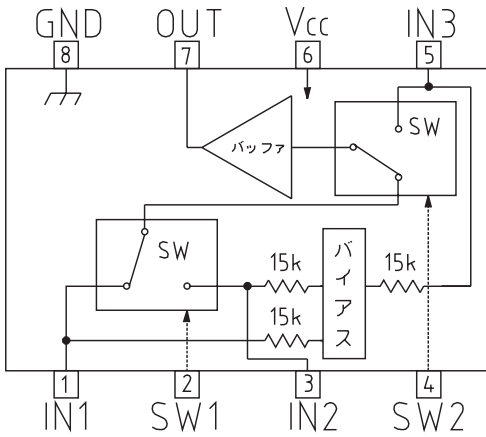


Control input truth table

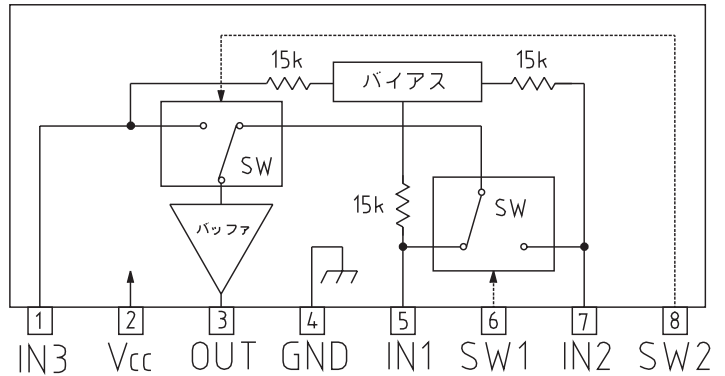
SW	OUT
L	IN1
H	IN2

MM1113

SOP-8C



SIP-8A

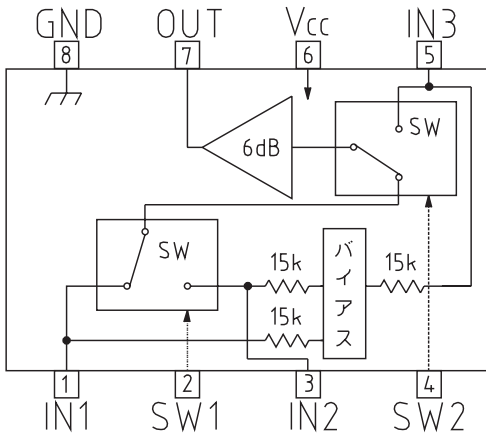


Control input truth table

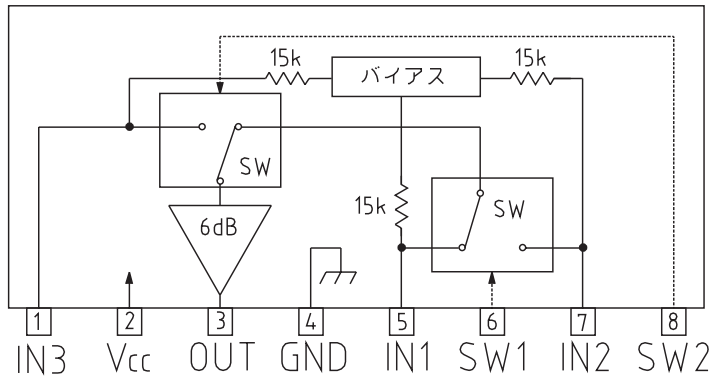
SW1	SW2	OUT
L	L	IN1
H	L	IN2
-	H	IN3

MM1114

SOP-8C



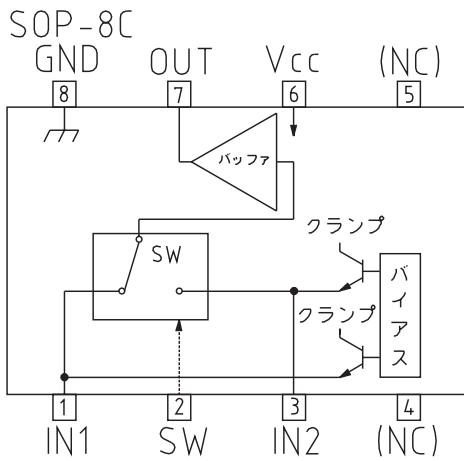
SIP-8A



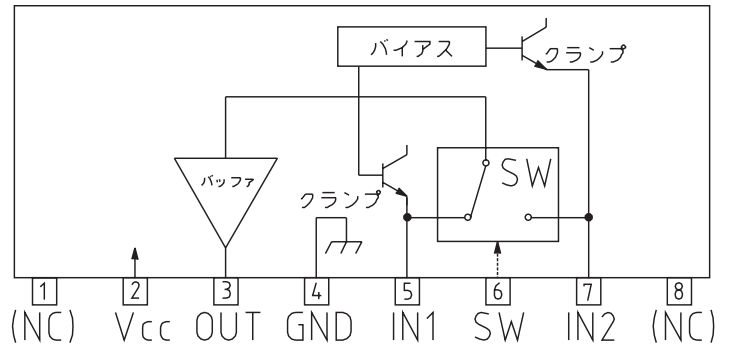
Control input truth table

SW1	SW2	OUT
L	L	IN1
H	L	IN2
-	H	IN3

MM1115



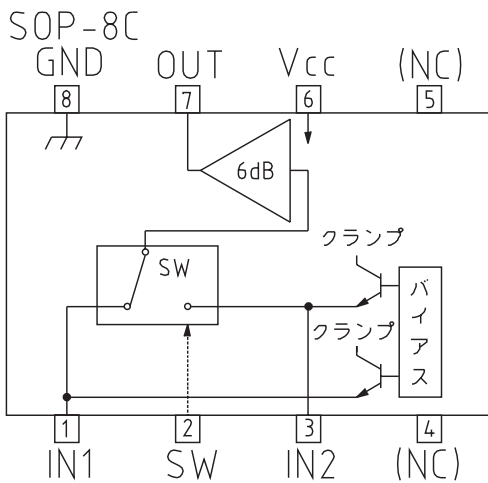
SIP-8A



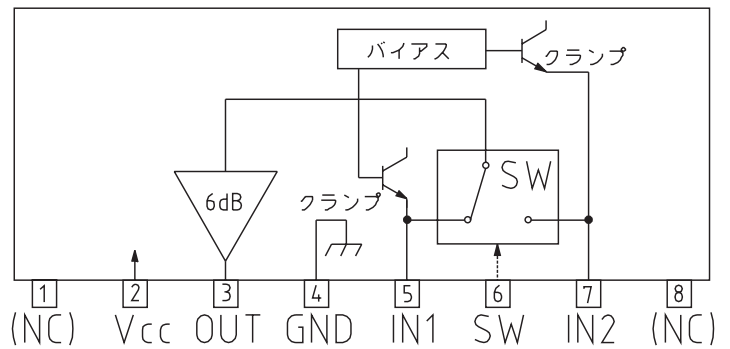
Control input truth table

SW	OUT
L	IN1
H	IN2

MM1116



SIP-8A

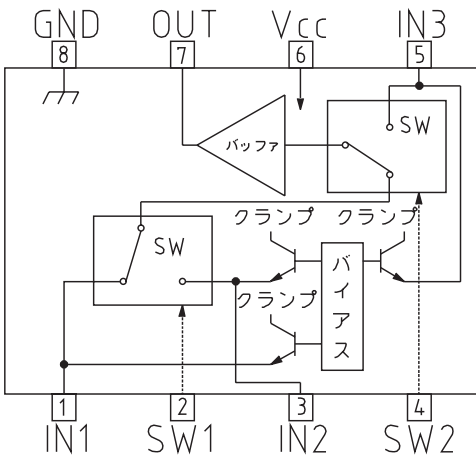


Control input truth table

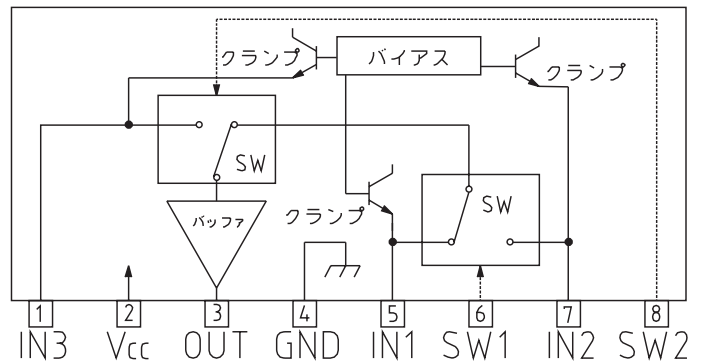
SW	OUT
L	IN1
H	IN2

MM1117

SOP-8C



SIP-8A

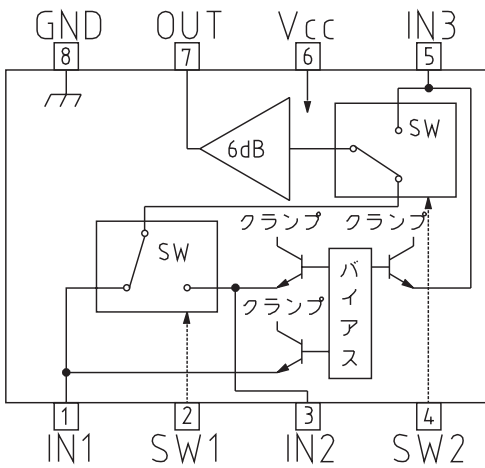


Control input truth table

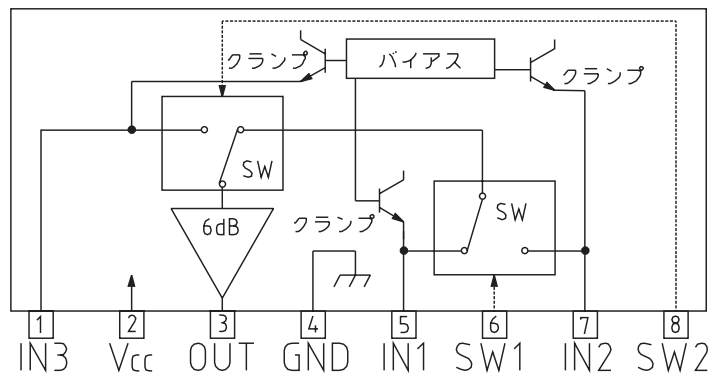
SW1	SW2	OUT
L	L	IN1
H	L	IN2
-	H	IN3

MM1118

SOP-8C



SIP-8A



Control input truth table

SW1	SW2	OUT
L	L	IN1
H	L	IN2
-	H	IN3

## Introduction of Main Model

# 3-Input 1-Output Video Switch (with 6dB amp) Monolithic IC MM1118

## Outline

This is a 3-input, 1-output video switch IC with a clamp function and built-in 6dB amp, for video signal switching. One of the inputs also has a mute function.

## Features

- |   |                   |
|---|-------------------|
| 1. Built-in 6dB amp                     |                   |
| 2. Clamp function                       |                   |
| 3. Mute function                        |                   |
| 4. Current consumption                  | 5.1mA typ.        |
| 5. Operating power supply voltage range | 4.6~13.0V         |
| 6. Frequency response                   | 10MHz             |
| 7. Crosstalk                            | 64dB (at 4.43MHz) |

## Package

SOP-8C (MM1118XF)  
SIP-8A (MM1118XS)

## Applications

1. TV
2. VCR
3. Other video equipment

Pin Description

Pin no.		Pin name	Function	Internal equivalent circuit diagram
SOP-8C	SIP-8A			
1	5	IN1	Input 1	
3	7	IN2	Input 2	
5	1	IN3	Input 3	
2	6	SW1	Switch 1	
4	8	SW2	Switch 2	
6	2	Vcc	Power supply	
7	3	OUT	Output	
8	4	GND	Ground	

**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>	-20~+75	°C
Power supply voltage	V <sub>CC</sub>	15	V
Allowable loss	P <sub>d</sub>	300 (SOP-8C) 1000 (SIP-8A)	mW

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

Item	Symbol	Measurement conditions	Min.	Typ.	Max.	Units
Operating power supply voltage range	V <sub>CC</sub>		4.6		13.0	V
Consumption current	I <sub>d</sub>	Refer to Measuring Circuit		5.1	6.6	mA
Voltage gain	G <sub>v</sub>	Refer to Measuring Circuit	5.5	6.0	6.5	dB
Frequency characteristic	F <sub>c</sub>	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 <sub>off</sub>	Refer to Measuring Circuit			±30	mV
Crosstalk	C <sub>T</sub>	Refer to Measuring Circuit		-64	-54	dB
Switch 1 input voltage H	V <sub>IH1</sub>	Refer to Measuring Circuit	2.1			V
Switch 1 input voltage L	V <sub>IL1</sub>	Refer to Measuring Circuit			0.7	V
Switch 2 input voltage H	V <sub>IH2</sub>	Refer to Measuring Circuit	2.1			V
Switch 2 input voltage L	V <sub>IL2</sub>	Refer to Measuring Circuit			0.7	V
Output impedance	R <sub>o</sub>			25		Ω

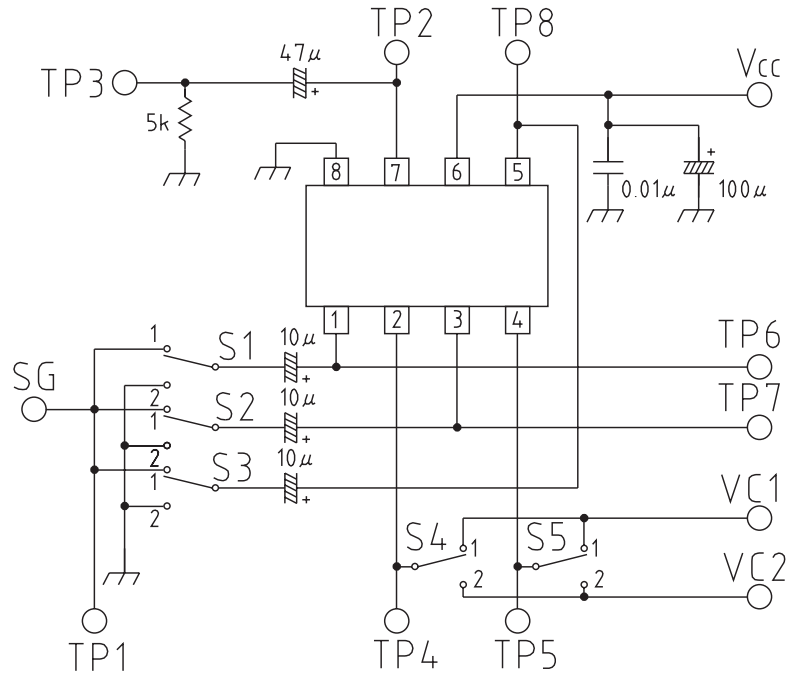


**Measuring Procedures** (Except where noted otherwise,  $V_{CC}=5.0V$ ,  $VC1=V_{CC}$ ,  $VC2=0V$ )

Item	Symbol	Switch state					Measuring Procedure
		S1	S2	S3	S4	S5	
Consumption current	Id	2	2	2	2	2	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	Input a 1.0V <sub>P-P</sub> , 100kHz sine wave to SG, and obtain G <sub>v</sub> 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	1	2	
		2	2	1	1	1	
		2	2	1	2	1	
Frequency characteristic	Fc	1	2	2	2	2	For the above G <sub>v</sub> measurement, given TP3 voltage for 10MHz as V3, F <sub>c</sub> is obtained from the following formula. $F_c = 20 \text{LOG} (V_3/V_2) \text{ dB}$
		2	1	2	1	2	
		2	2	1	1	1	
		2	2	1	2	1	
Differential gain	DG	1	2	2	2	2	Input a 1.0V <sub>P-P</sub> staircase wave to SG, and measure differential gain at TP3. $APL=10\sim90\%$
		2	1	2	1	2	
		2	2	1	1	1	
		2	2	1	2	1	
Differential phase	DP	1	2	2	2	2	Proceed as for DG, and measure differential phase.
		2	1	2	1	2	
		2	2	1	1	1	
		2	2	1	2	1	
Output offset voltage	Voff	2	2	2	2	2	Measure the DC voltage difference of each switch status at TP2.
		2	2	2	1	2	
		2	2	2	1	1	
Crosstalk	C <sub>T</sub>	1	2	2	1	2	Assume $VC1=2.1V$ , $VC2=0.7V$ . Input a 2.0V <sub>P-P</sub> , 4.43MHz sine wave to SG, and given TP1 voltage as V4 and TP3 voltage as V5, C <sub>T</sub> is obtained from the following formula. $C_T = 20 \text{LOG} (V_5/V_4) \text{ dB}$
		1	2	2	2	1	
		1	2	2	1	1	
		2	1	2	2	2	
		2	1	2	2	1	
		2	1	2	1	1	
		2	2	1	2	2	
Switch 1 input voltage H	V <sub>IH1</sub>	2	2	2	1	2	Impress an optional DC voltage on TP6 and TP7. Gradually raise from $VC1=0V$ . TP4 voltage when TP7 voltage is output on TP2 is V <sub>IH1</sub> . Gradually lower from $VC1=V_{CC}$ . TP4 voltage when TP6 voltage is output on TP2 is V <sub>IL1</sub> .
Switch 1 input voltage L	V <sub>IL1</sub>						
Switch 2 input voltage H	V <sub>IH2</sub>	2	2	2	2	1	Impress an optional DC voltage on TP6 and TP8. Gradually raise from $VC1=0V$ . TP5 voltage when TP8 voltage is output on TP2 is V <sub>IH2</sub> . Gradually lower from $VC1=V_{CC}$ . TP5 voltage when TP6 voltage is output on TP2 is V <sub>IL2</sub> .
Switch 2 input voltage L	V <sub>IL2</sub>						

Measuring Circuit

SOP-8C



SIP-8A

