

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

December 7, 1998

Outline

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

The circuit configuration table and block diagram are shown below.

MM1118 is introduced as a representative model in this document.

MM1111~MM1118 Series Circuit Configuration Table

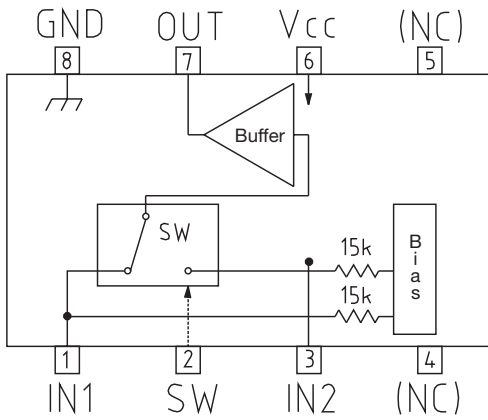
| Model name | # of Inputs | # of Outputs | 6dB amplifier | Clamp circuit | Power supply voltage |
|------------|-------------|--------------|---------------|---------------|----------------------|
| MM1111 | 2 | 1 | No | No | 4.6~13.0V |
| MM1112 | 2 | 1 | Yes | No | 8.0~13.0V |
| MM1113 | 3 | 1 | No | 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

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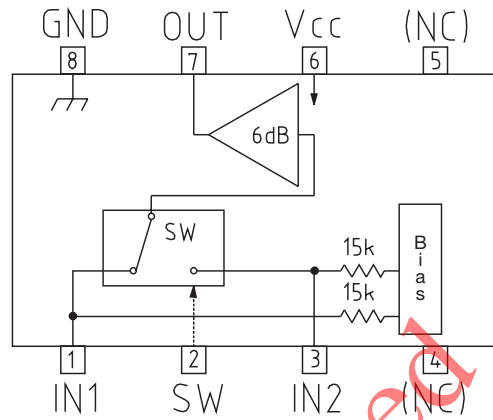


Control input truth table

| SW | OUT |
|----|-----|
| L | IN1 |
| H | IN2 |

MM1112

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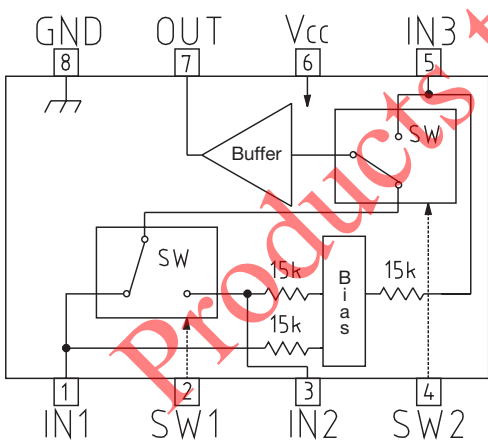


Control input truth table

| SW | OUT |
|----|-----|
| L | IN1 |
| H | IN2 |

MM1113

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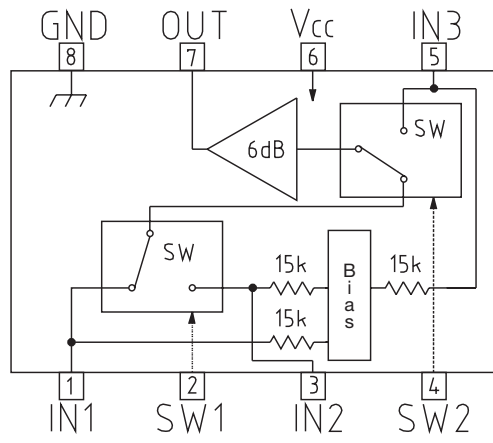


Control input truth table

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

MM1114

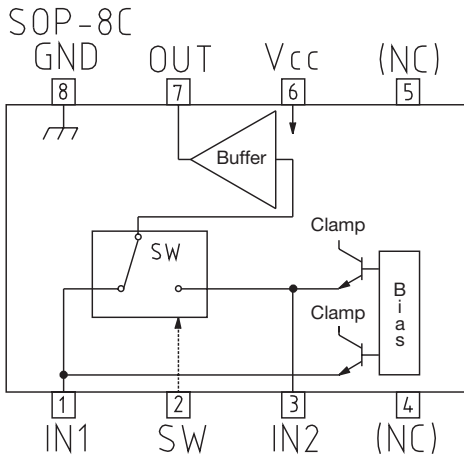
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Control input truth table

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

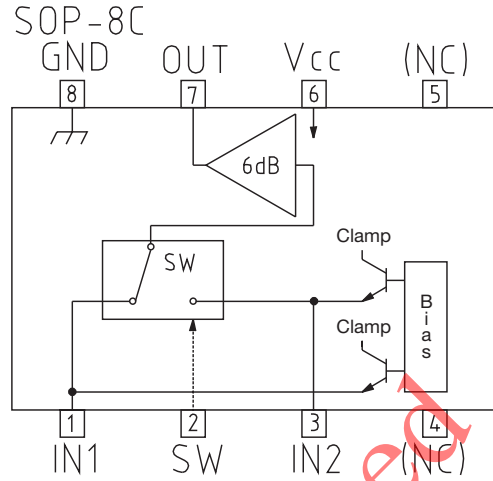
MM1115



Control input truth table

| SW | OUT |
|----|-----|
| L | IN1 |
| H | IN2 |

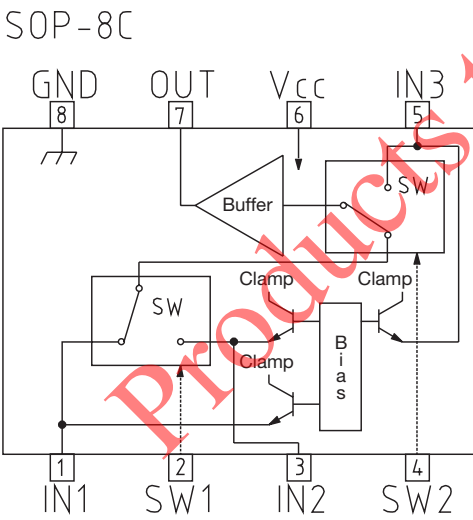
MM1116



Control input truth table

| SW | OUT |
|----|-----|
| L | IN1 |
| H | IN2 |

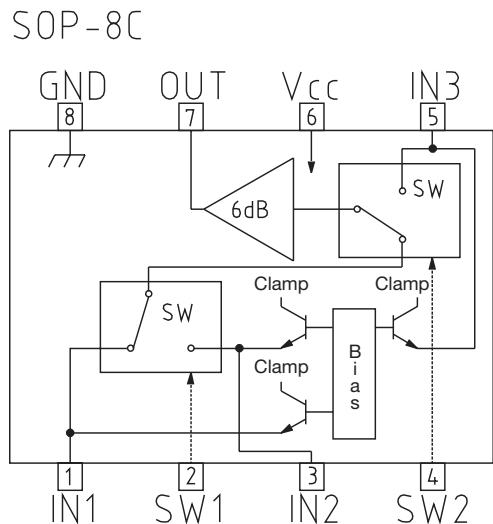
MM1117



Control input truth table

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

MM1118



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

March 15, 2002

Outline

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

Features

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

Packages

SOP-8C (MM1118XF)

Applications

1. TV
2. VCR
3. Other video equipment

Products to be discontinued

Pin Description

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

Products to be discontinued

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 | 300 | 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 | | 5.1 | 6.6 | mA |
| Voltage gain | G _v | Refer to Measuring Circuit | 5.5 | 6.0 | 6.5 | 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 | | | ±30 | mV |
| Crosstalk | C _T | Refer to Measuring Circuit | | -64 | -54 | dB |
| Switch 1 input voltage H | V _{IH1} | Refer to Measuring Circuit | 2.1 | | | V |
| Switch 1 input voltage L | V _{IL1} | Refer to Measuring Circuit | | | 0.7 | V |
| Switch 2 input voltage H | V _{IH2} | Refer to Measuring Circuit | 2.1 | | | V |
| Switch 2 input voltage L | V _{IL2} | Refer to Measuring Circuit | | | 0.7 | V |
| Output impedance | R _o | | | 25 | | Ω |

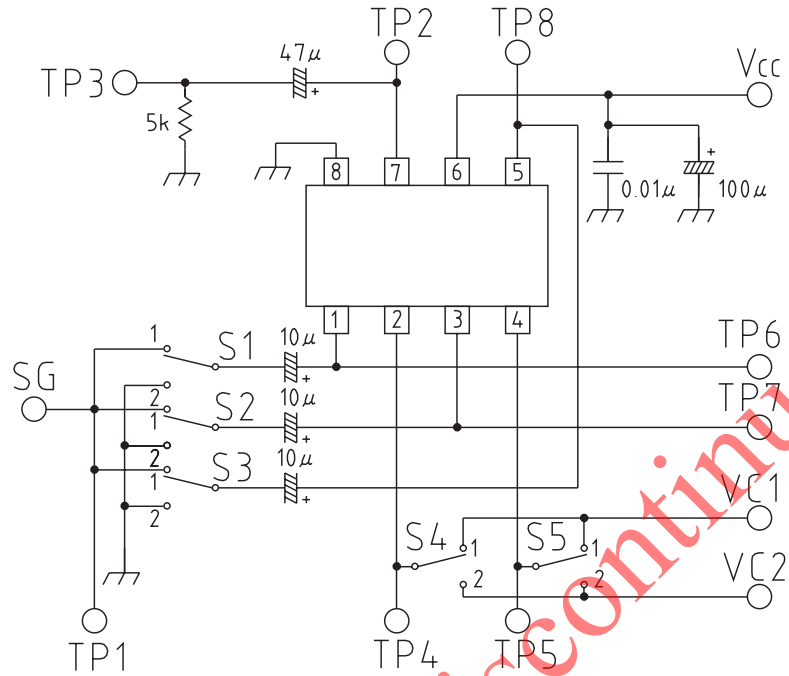
Products to be discontinued

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 _{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. $G_v = 20 \text{LOG} (V_2/V_1) \text{ dB}$ |
| | | 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 _v measurement, given TP3 voltage for 10MHz as V3, F _c 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 _{P-P} 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 _T | 1 | 2 | 2 | 1 | 2 | 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. $C_T = 20 \text{LOG} (V_5/V_4) \text{ dB}$ |
| | | 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 _{IH1} | 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 _{IH1} . Gradually lower from $VC1=V_{CC}$. TP4 voltage when TP6 voltage is output on TP2 is V _{IL1} . |
| | | | | | | | |
| Switch 1 input voltage L | V _{IL1} | | | | | | |
| Switch 2 input voltage H | V _{IH2} | 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 _{IH2} . Gradually lower from $VC1=V_{CC}$. TP5 voltage when TP6 voltage is output on TP2 is V _{IL2} . |
| Switch 2 input voltage L | V _{IL2} | | | | | | |

Measuring Circuit

SOP-8C



Products to be discontinued