

Video Signal Driver for DVD Players

Monolithic IC MM1567

July 10, 2002

Outline

This IC is a video signal driver IC that supports 6-ch interlace video developed for DVD players. It includes a low-pass filter that attenuates the noise element during DA conversion, and a 3-channel 6dB amp with 75Ω driver.

In addition, external ESD protection diodes can be reduced by a sag correction pin for reducing output coupling capacitance, and enhancement of the ESD protection element for the output pins.

Features

1. Includes a SAG correction pin
2. Enabled to drive a 3-channel 6dB amp with 75Ω driver
3. Includes a 4th-order low-pass filter
Frequency response: 6.75MHz ± 1dB / 27MHz - 27dB min.
4. Includes a 6dB amp
5. Includes a power save function
6. S/N=80dB typ. (Y/C mix:74dB typ.)
7. ESD strength (aerial discharge) of ±15kV (IEC standard)
8. The component circuitry can support RGB signals with the control pin.

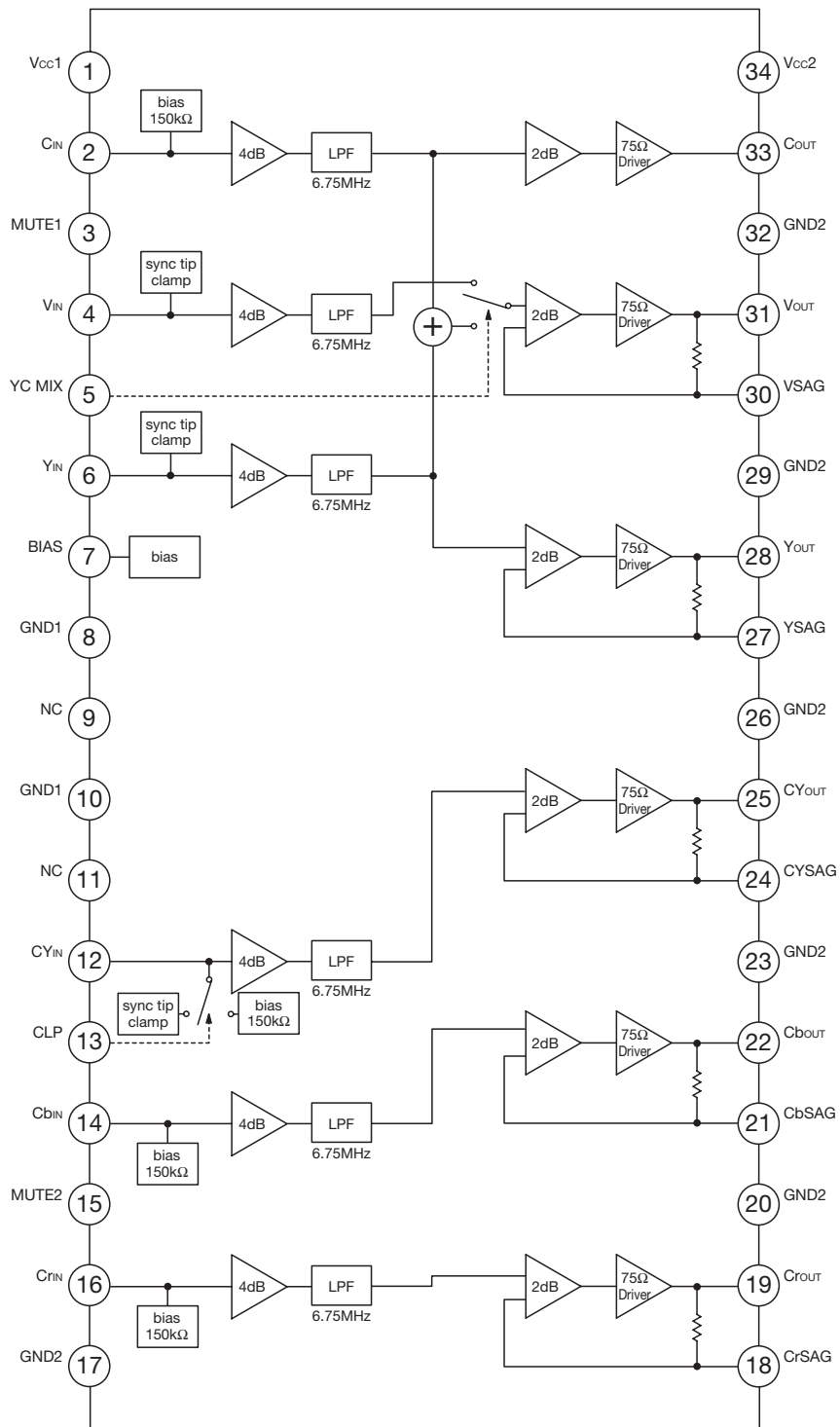
Package

SSOP-34A

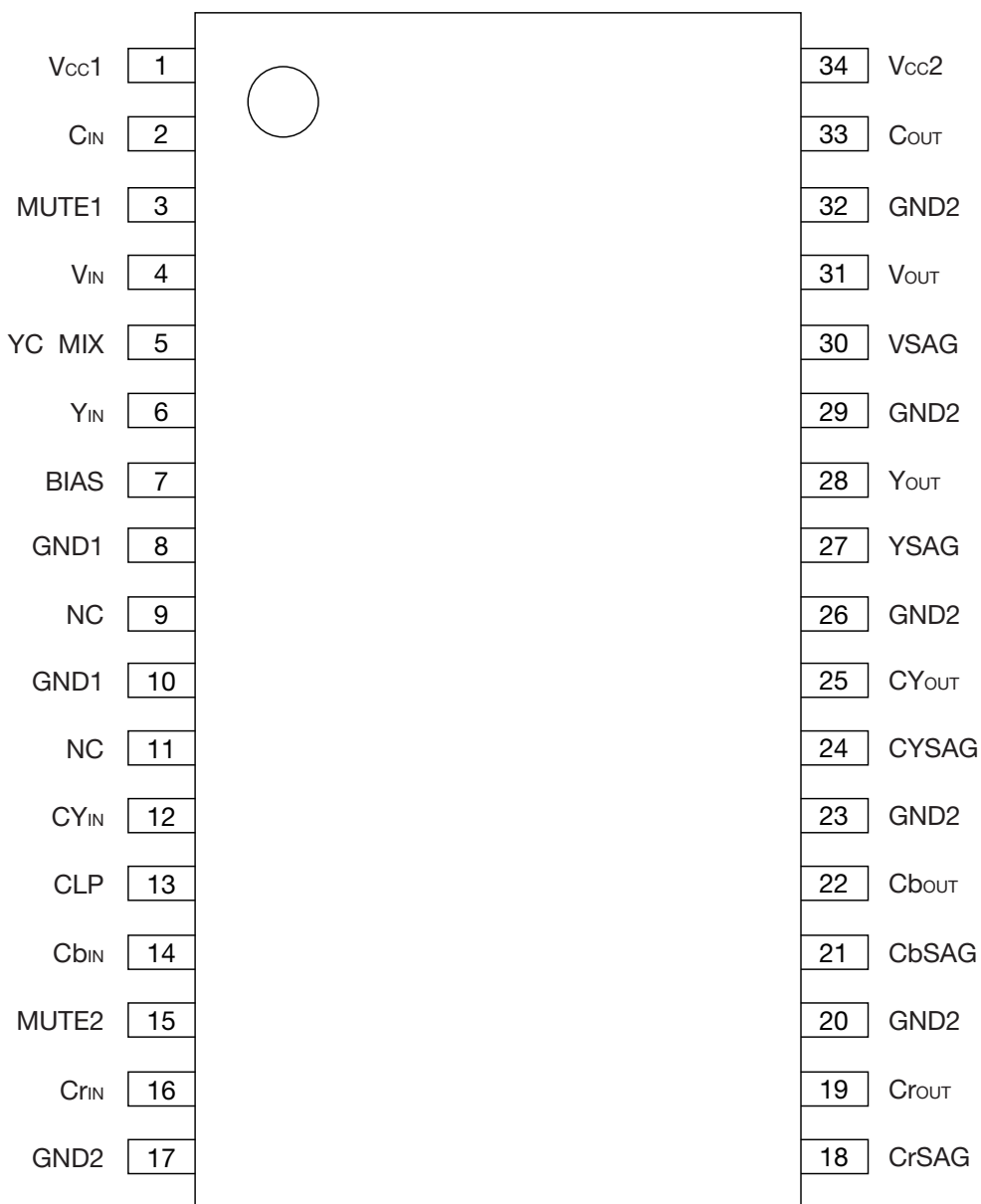
Applications

1. DVD players
2. Digital STB
3. Other digital video equipment

Block diagram



Pin Assignment



SSOP-34A

1	Vcc1	18	CrSAG
2	C _{IN}	19	Cr _{OUT}
3	MUTE1	20	GND2
4	V _{IN}	21	CbSAG
5	YC MIX	22	Cb _{OUT}
6	Y _{IN}	23	GND2
7	BIAS	24	CYSAG
8	GND1	25	CY _{OUT}
9	NC	26	GND2
10	GND1	27	YSAG
11	NC	28	Yo _{UT}
12	CY _{IN}	29	GND2
13	CLP	30	VSAG
14	Cb _{IN}	31	Vo _{UT}
15	MUTE2	32	GND2
16	Cr _{IN}	33	Co _{UT}
17	GND2	34	Vcc2

Pin Description

Pin No.	Pin name	Function	Internal equivalent circuit diagram
1 34	V _{CC1} V _{CC2}	V _{CC}	
2	C _{IN}	Croma input	
3 15	MUTE1 MUTE2	Mute Select Using of Mute and POWER-SAVING	
4 6	V _{IN} Y _{IN}	Video input (Composite or Y) Input clamp: Sync tip	
5	YC MIX	YC MIX select	

Pin Description

Pin No.	Pin name	Function	Internal equivalent circuit diagram
7	BIAS	Bias	
8	GND1	GND	
10	GND1		
17	GND2		
20	GND2		
23	GND2		
26	GND2		
29	GND2		
32	GND2		
9	NC	NC	
11	NC	NC	
12	CY _{IN}	Luminance input The input can select Sync tip clamp or Bias.	
13	CLP	Input clamp select	
14	Cb _{IN}	Component input	
16	Cr _{IN}		

Pin Description

Pin No.	Pin name	Function	Internal equivalent circuit diagram	
18 21 24 27 30	Crout Cbout CYout Yout Vout	Signal output		
19 22 25 28 31	CrSAG CbSAG CYSAG YSAG VSAG	SAG correction		
33	Cout	Croma output		

Absolute Maximam Ratings (Ta=25°C)

Item	Symbol	Rating	Unit
Storage temparature	T _{STG}	-65 ~ +150	°C
Operating temperature	T _{OPR}	-40 ~ +85	°C
Supply Voltage	V _{CC max.}	7	V
Power dissipation *1	P _d	1.4	W

note *1 Board mounting power dissipation. Board size 100mmX100mmX1.6mm

Recommended Operating Conditions

Item	Symbol	Rating	Unit
Operating temperature	T _{OPR}	-40 ~ +85	°C
Operating Voltage	V _{CCOP}	4.5 ~ 5.5	V

Electrical Characteristics (Unless otherwise specified, Ta=25°C, Vcc=5V)

Item	Symbol	Measurement Conditions	Min.	Typ.	Max.	Unit
Consumption current 1	I _{CC1}	No signal	74	97	126	mA
Consumption current 2	I _{CC2}	No signal Mute1:ON	36	51	66	mA
Consumption current 3	I _{CC3}	No signal Mute2:ON	39	55	71	mA
Consumption current 4	I _{CC4}	No signal Mute1 and Mute2:ON	1	3	5	mA
Croma input	V _{CIN}	2PIN	1.9	2.4	2.9	V
Composite video input	V _{VIN}	4PIN	1.15	1.4	1.65	V
Luminance input	V _{YIN, CYIN}	6,12PIN	1.15	1.4	1.65	V
Component input	V _{CbIN, CrIN}	14,16PIN	1.9	2.4	2.9	V
Croma outoutput	V _{COUt}	33PIN		2.4		V
Composite video output	V _{VOUt}	31PIN		1.1		V
Luminance output	V _{YOut, CYOut}	25, 28PIN		1.1		V
Component output	V _{CbOut, CrOut}	19, 22PIN		2.4		V
Control terminal Input current	H	I _{IHm} *2	3, 5, 13, 15PIN V _H =4.5V		350	μA
	L	I _{ILm} *2	3, 5, 13, 15PIN V _L =0.4V		35	μA
Control terminal input voltage	H	V _{thHm} *2	2.1			V
	L	V _{thLm} *2			0.7	V
Input impedance	Z _{CIN, CbIN, CrIN}	2, 14, 16PIN	100	150	200	kΩ
Voltage gain 1	G _{1,2,3,5,6} *3	S _{IN} wave:1V f=100kHz	5.7	6.0	6.3	dB
Voltage gain 2	G _{2,1,4,7,8} *3	S _{IN} wave:1V f=100kHz	5.7	6.0	6.3	dB
Frequency characteristic 1	f _{1n} *3	S _{IN} wave:1V 6.75MHz/100kHz	-1.0	0	1.0	dB
Frequency characteristic 2	f _{2n} *3	S _{IN} wave:1V 27MHz/100kHz		-40	-27	dB
Differential gain	DG _{1~3} *3	Staircase signal 1V		0.6	1.0	%
Differential phase	DP _{1~3} *3	Staircase signal 1V		0.6	1.0	°
Output dynamic range	DR _n *3	S _{IN} wave:100kHz THD=1.0%	2.6	3.0		V
Crosstalk	CT _n *3	f=4.43MHz, 1V		-60	-55	dB
S/N 1	SN _{1,4~8} *3	BW:100k ~ 6MHz		-80		dB
S/N 2	SN _{2,1~3} *3	BW:100k ~ 6MHz at MIX OUT		-74		dB
Group delay	t _{GDn} *3	at 100kHz		50		ns
Group delay deviation	Δt _{GDn} *3	to 3.58MHz		4		ns
		to 4.43MHz		7		ns
		to 6MHz		12		ns

note *2 The subscript number "m" is the terminal of right table.

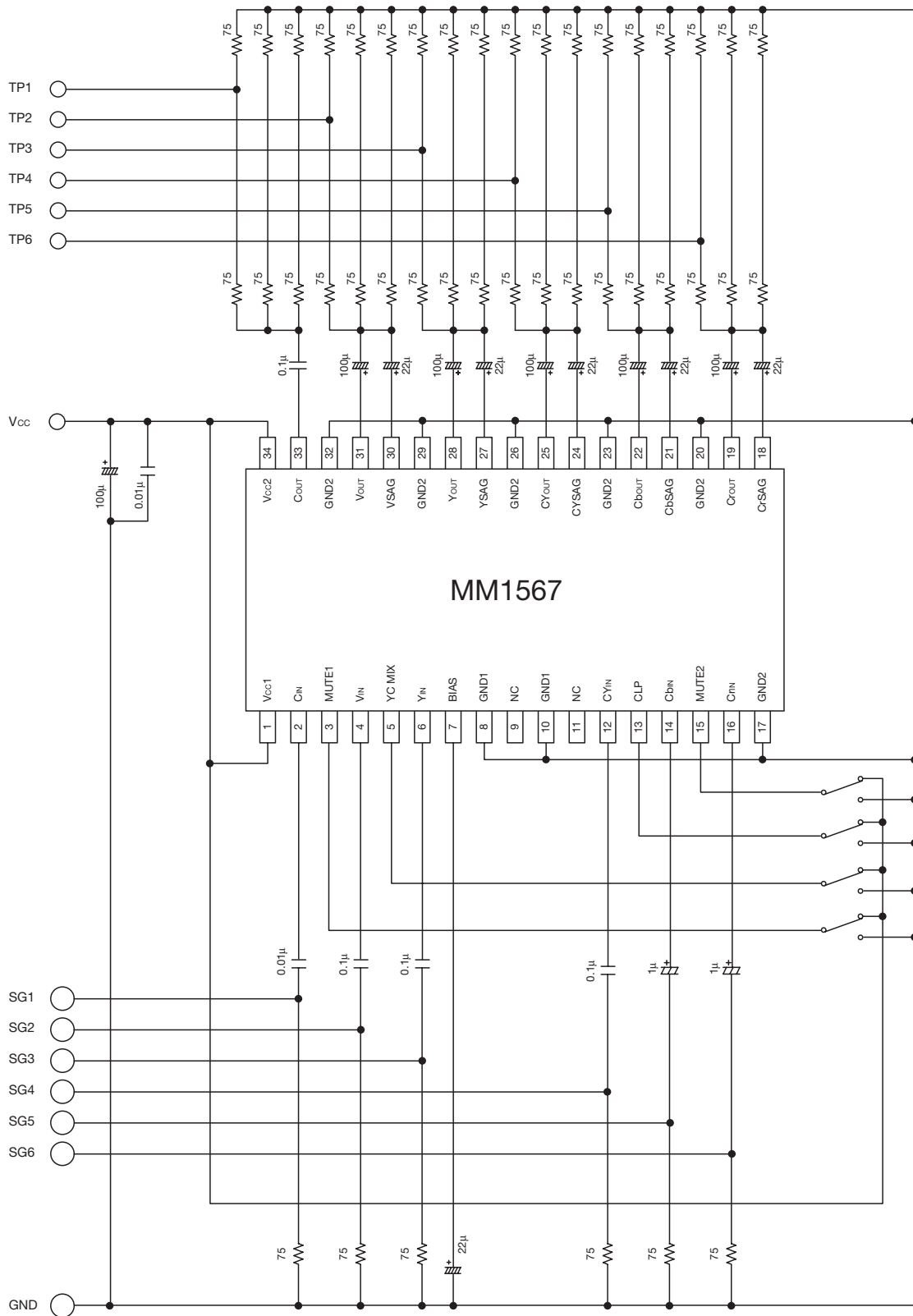
m	Terminal
1	MUTE1
2	MUTE2
3	YC MIX
4	CLP

note *3 The subscript number "n" is the combination of under table.

n	input	output
1	C _{IN}	V _{OUT}
2	V _{IN}	
3	Y _{IN}	
4	C _{IN}	C _{OUT}

n	input	output
5	Y _{IN}	Y _{OUT}
6	CY _{IN}	CY _{OUT}
7	Cb _{IN}	Cb _{OUT}
8	Cr _{IN}	Cr _{OUT}

Test Circuit

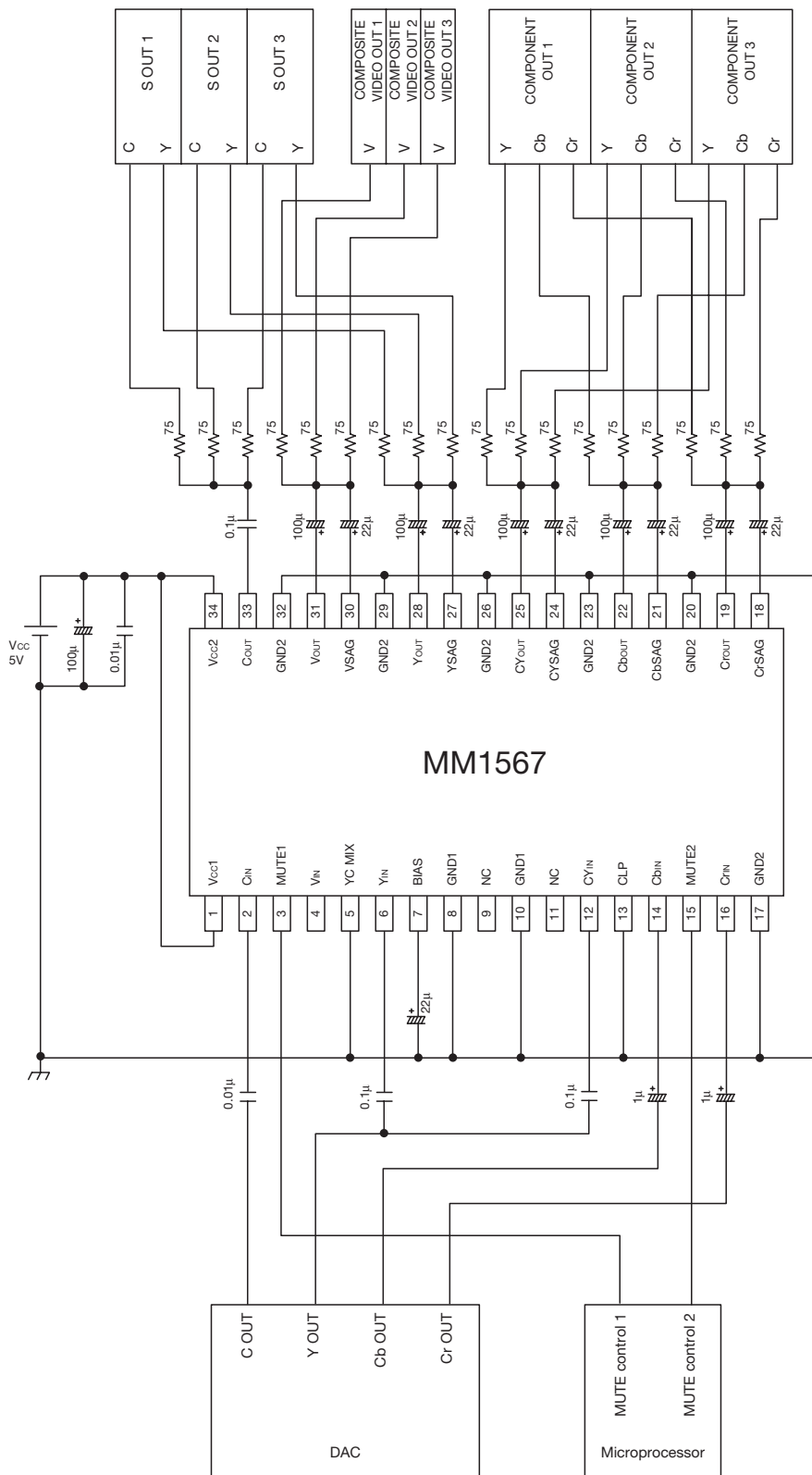


Switch Control Table

Input Select	Output Terminal	Control Terminal			
		MUTE1	YC MIX	MUTE2	CLP
MUTE	C _{OUT}	Low	*	*	*
C _{IN}		High	*	*	*
MUTE	V _{OUT}	Low	*	*	*
Y _{IN} +C _{IN}		High	Low	*	*
V _{IN}			High	*	*
MUTE	Y _{OUT}	Low	*	*	*
Y _{IN}		High	*	*	*
MUTE	CY _{OUT}	*	*	Low	*
CY _{IN} (clamp)		*	*	High	Low
CY _{IN} (Bias)		*	*		High
MUTE	Cb _{OUT}	*	*	Low	*
Cb _{IN}		*	*	High	*
MUTE	Cr _{OUT}	*	*	Low	*
Cr _{IN}		*	*	High	*

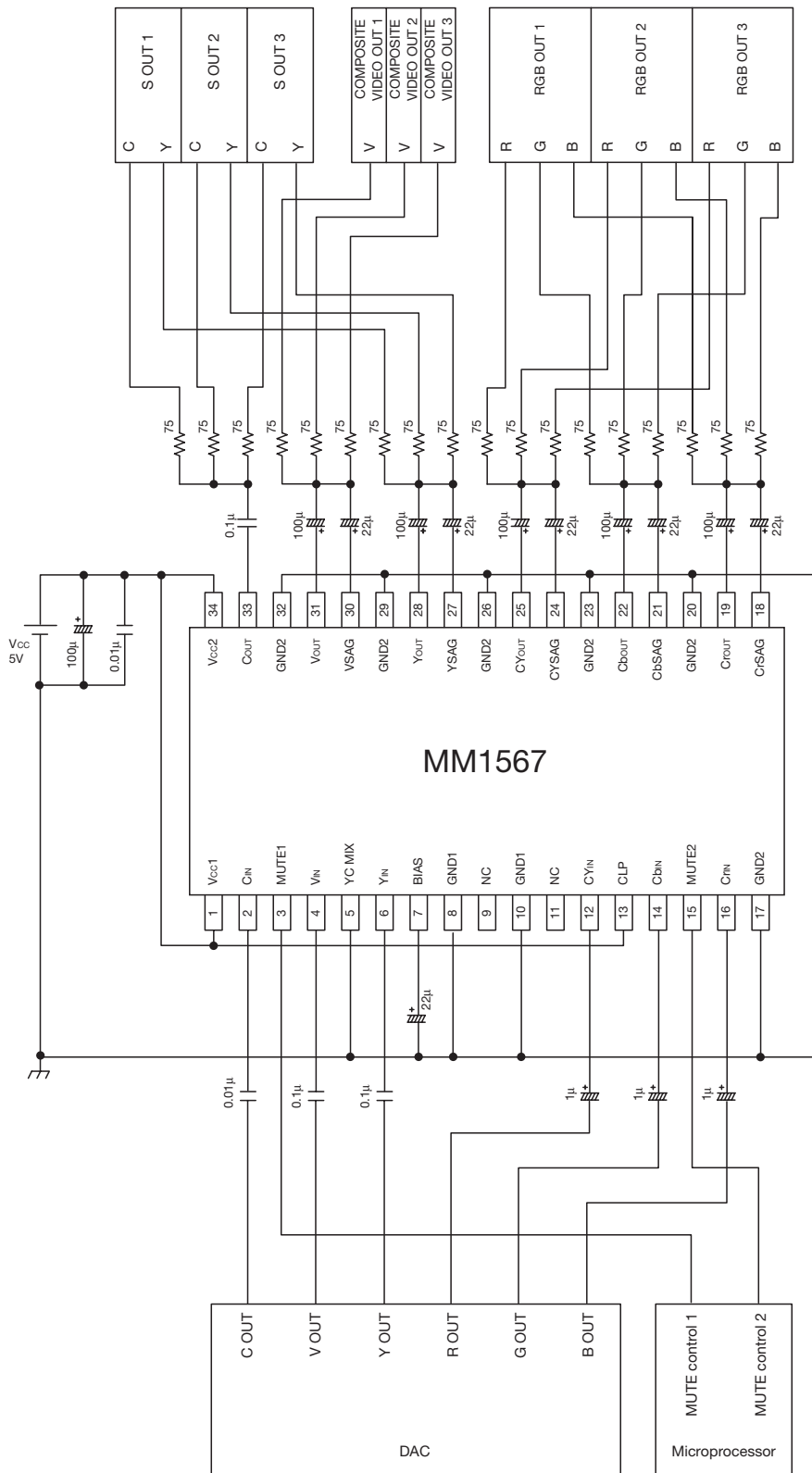
* : Don't care

Application Circuit 1



(note) : Please arrange power supply bypass capacitor near the Vcc2 terminal (34PIN).

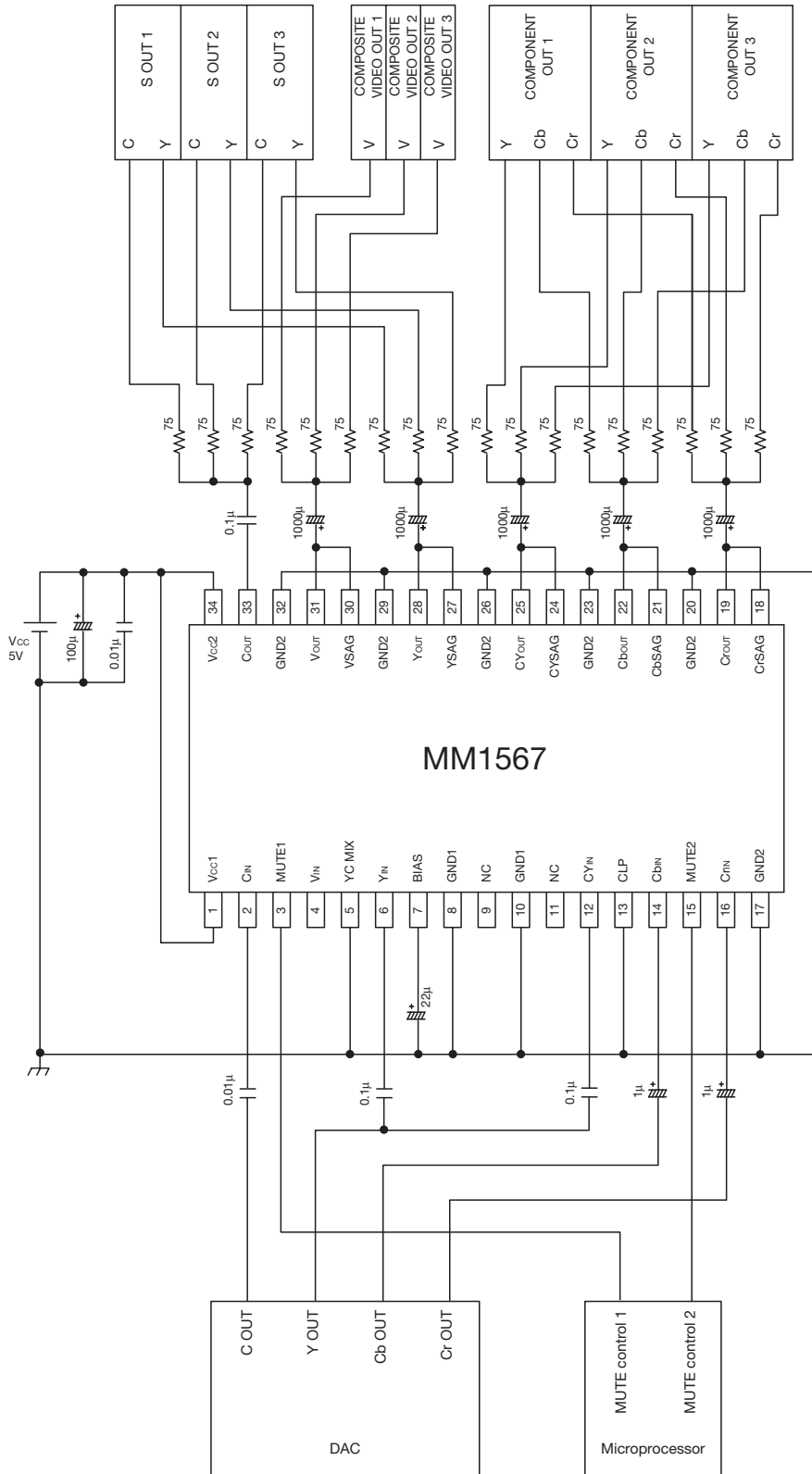
Application Circuit 2



(note) : Please arrange power supply bypass capacitor near the Vcc2 terminal (34PIN).

Application Circuit 3

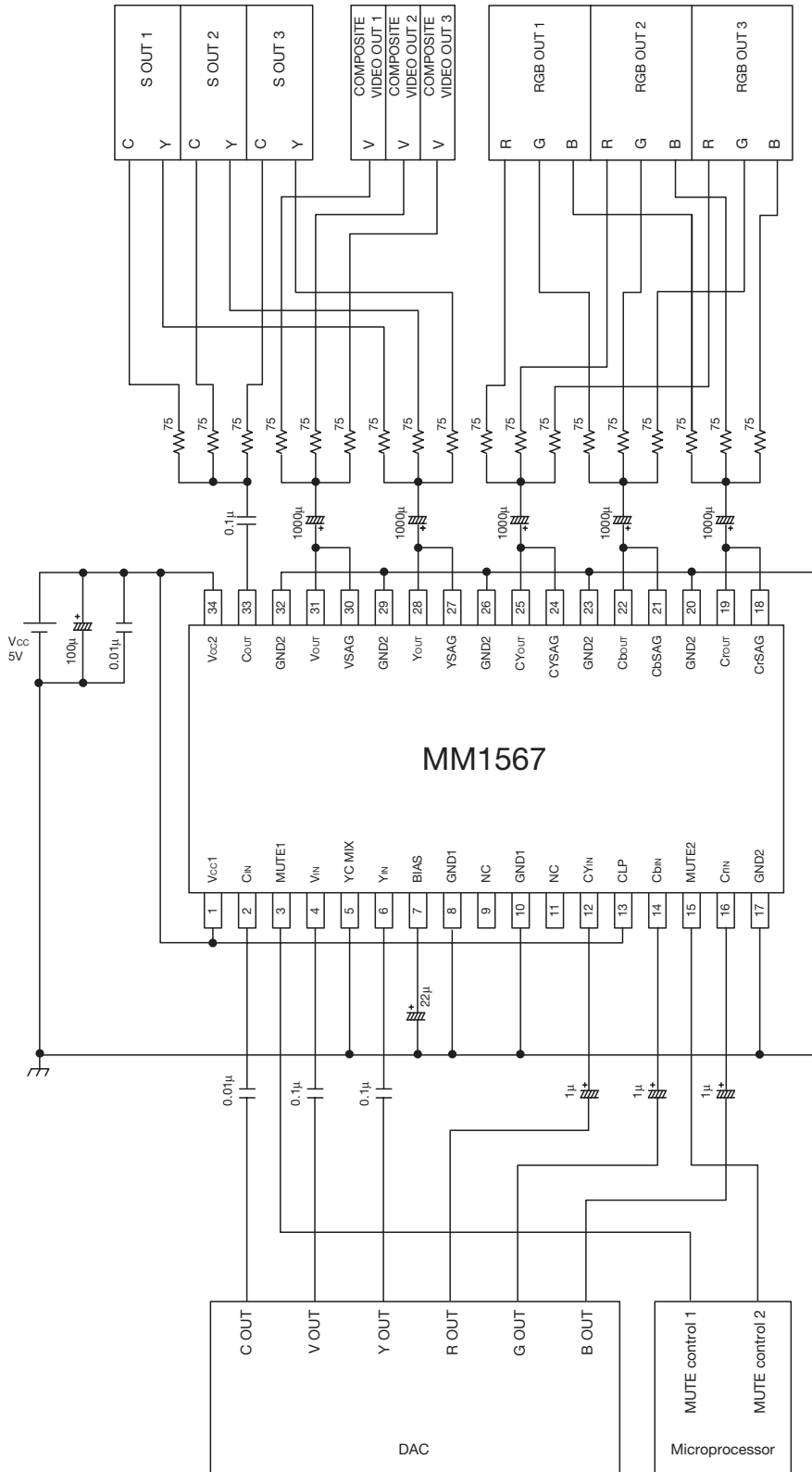
■ At unused the SAG correction function



(note) : Please arrange power supply bypass capacitor near the Vcc2 terminal (34PIN).

Application Circuit 4

■ At unused the SAG correction function



(note) : Please arrange power supply bypass capacitor near the Vcc2 terminal (34PIN).