

OVERVIEW

The SM5318A is a 2-channel video buffer with built-in 3rd-order lowpass filters. The SM5318A outputs Y and C signals at the same time. Any channels drive maximum 2 loads.

FEATURES

- Supply voltage: $5V \pm 10\%$
- Output gain: $6.0 \pm 0.5\text{dB}$
- Filter passband ($\pm 1.5\text{dB}$): 6MHz
- Output drive capability: maximum 2 loads at 75Ω terminated
- Sag compensation circuit built-in (Y)
- Disable function implemented
- Group delay deviation (100kHz to 5MHz): 10ns (typ)
- Package: 8-pin VSOP

APPLICATIONS

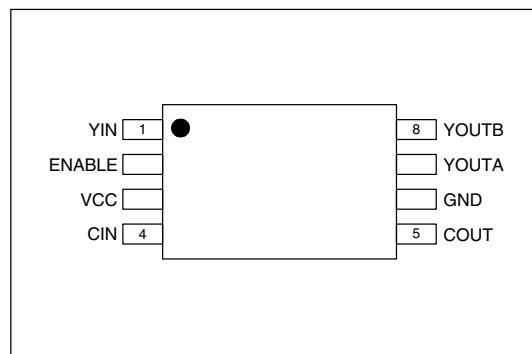
- Set top boxes
- LCD TVs
- PDPs
- Camcorders
- DVD players/recorders

ORDERING INFORMATION

Device	Package
SM5318AV	8-pin VSOP

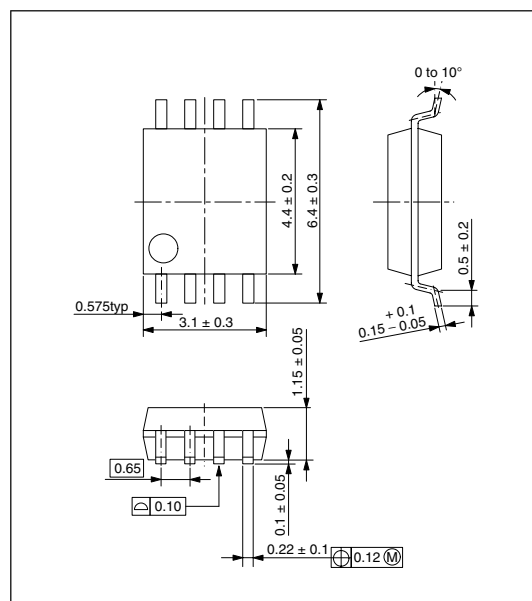
PINOUT

(Top view)

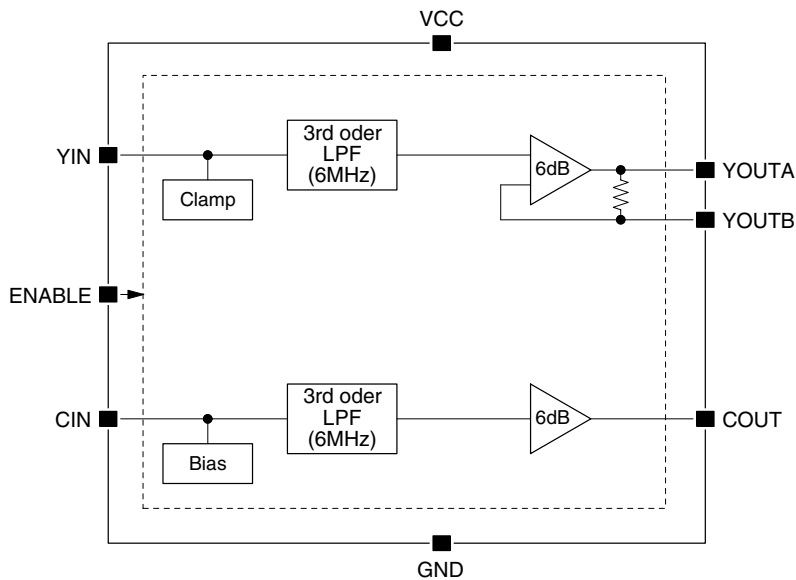


PACKAGE DIMENSIONS

(Unit: mm)



BLOCK DIAGRAM

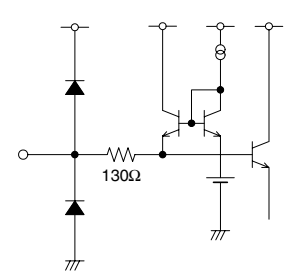
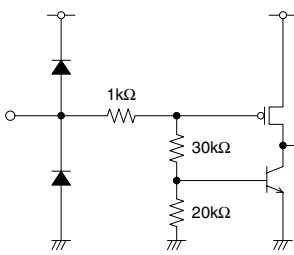
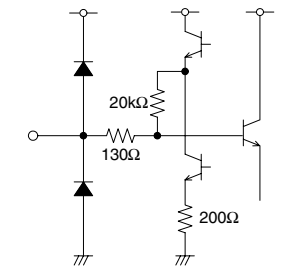
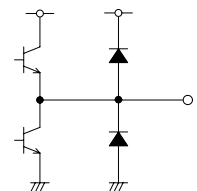
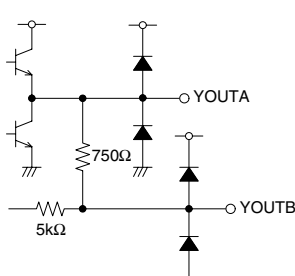


PIN DESCRIPTION

Number	Name	I/O ^{*1}	Description
1	YIN	I	Y signal input
2	ENABLE	I _p	Y, C-blocks enable signal input (pull-down resistor built-in) H: Enable, L: Disable
3	VCC	–	Power supply
4	CIN	I	C signal input
5	COUT	O	C signal output
6	GND	–	Ground
7	YOUTA	O	Y signal output (A)
8	YOUTB	O	Y signal output (B)

*1. I: input, I_p: input with pull-down resistor, O: output

PIN EQUIVALENT CIRCUITS

Number	Name	I/O ^{*1}	Equivalent circuit
1	YIN	I	
2	ENABLE	Ip	
4	CIN	I	
5	COUT	O	
7 8	YOUTA YOUTB	O	

*1. I: input, Ip: input with pull-down resistor, O: output

Note. Resistance values indicate design values.

SPECIFICATIONS

Absolute Maximum Ratings

$V_{CC} = V_{CC}$, $GND = 0V$

Parameter	Symbol	Condition	Rating	Unit
Supply voltage range	V_{CC}		- 0.3 to 7.0	V
Input voltage range	V_{IN}	YIN, CIN, ENABLE pins	$GND - 0.3$ to $V_{CC} + 0.3$	V
Storage temperature range	T_{STG}		- 55 to 125	°C
Power dissipation ^{*1}	P_D		366	mW

*1. $T_a = 80^\circ\text{C}$, when mounted on NPC's regulation substrate (132 × 80 × 1.6mm double layer glass-epoxy substrate with 150% wiring factor), $\theta_{ja} = 123^\circ\text{C/W}$

Recommended Operating Conditions

Parameter	Symbol	Condition	Rating	Unit
Supply voltage	V_{CC}		4.5 to 5.5	V
Operating ambient temperature	T_a		- 20 to 70	°C

Electrical Characteristics

$V_{CC} = 5.0V$, $T_a = 25^\circ\text{C}$, $f_{in} = 100\text{kHz}$, $V_{IN} = 1.0V_{p-p}$, $R_L = 75\Omega$, unless otherwise noted.
Refer to "MEASUREMENT CIRCUIT".

Parameter	Symbol	Condition	Rating			Unit	Test level
			min	typ	max		
Supply voltage 1	I_{CC1}	No input, ENABLE = HIGH	-	25	35	mA	I
Supply voltage 2	I_{CC2}	No input, ENABLE = LOW	-	0.5	1.0	mA	I
Output gain	A_V		5.5	6.0	6.5	dB	I
Maximum output amplitude (Y)	V_{out1}	THD ≤ 1.5%, YOUT	-	2.8	-	V _{p-p}	I
Maximum output amplitude (C)	V_{out2}	THD ≤ 1.5%, COUT	-	2.0	-	V _{p-p}	I
Input amplitude (Y) ^{*1}	V_{I1}	AC-coupled inputs, THD ≤ 1.5%, YIN	-	-	1.4	V _{p-p}	I
Input amplitude (C) ^{*1}	V_{I2}	AC-coupled inputs, THD ≤ 1.5%, CIN	-	-	1.0	V _{p-p}	I
Input clamp voltage	V_{CLMP}	No input, YIN	1.1	1.3	1.5	V	I
Input bias voltage	V_{BIAS}	No input, CIN	1.9	2.1	2.3	V	I
Output drive capability	R_L	One load unit = 150Ω, THD ≤ 1.5%	-	-	2	load	I
Logic HIGH-level input voltage	V_{IH}	ENABLE	2.5	-	-	V	I
Logic LOW-level input voltage	V_{IL}	ENABLE	-	-	1.0	V	I
Logic HIGH-level input current	I_{IH}	ENABLE, $V_{IN} = V_{CC}$	-	120	200	μA	I

*1. This item shows the maximum value of input amplitude which meets the output distortion ratio shown in the condition column. When the signal amplitude that exceeds this specification value is input, the output distortion ratio increases. When using this device, the input signal level should be set to amplitude below specification value (max).

Filter Electrical Characteristics

$V_{CC} = 5.0V$, $T_a = 25^\circ C$, $f_{in} = 100kHz$, $V_{IN} = 1.0V_{p-p}$, $R_L = 75\Omega$, unless otherwise noted.
Refer to "MEASUREMENT CIRCUIT".

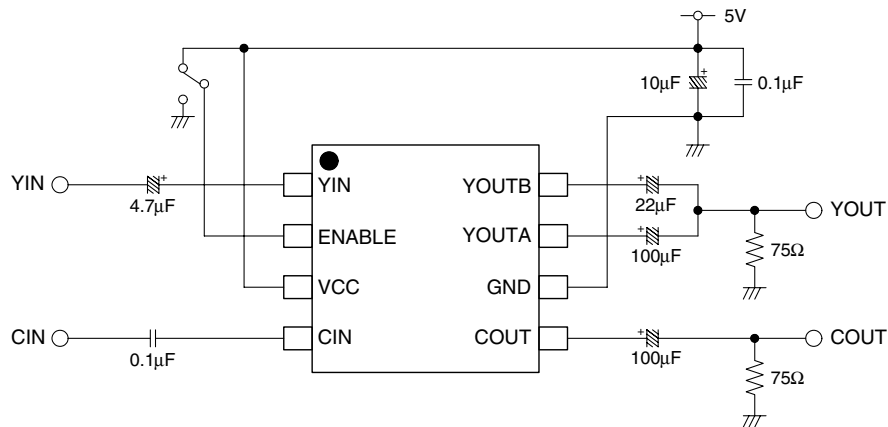
Parameter	Symbol	Condition	Rating			Unit	Test level
			Min	Typ	Max		
Passband attenuation (6MHz passband)	F_{PB6}	$f_{in} = 6MHz/100kHz$	-1.5	0	1.5	dB	I
Stopband attenuation (6MHz passband)	F_{SB6}	$f_{in} = 27MHz/100kHz$	20	30	-	dB	II
Crosstalk (between Y and C)	X_{TALK}	$V_{IN} = 0.5V_{p-p}$, $f_{in} = 1MHz$, between YOUT and COUT	-	-50	-	dB	II
Group delay deviation	ΔT_{GD}	100kHz to 5MHz	-	10	-	nsec	II

Test level

I : 100% of products tested at $T_a = +25^\circ C$.

II : Guaranteed as result of design and characteristics evaluation.

MEASUREMENT CIRCUIT



FUNCTIONAL DESCRIPTION

Enable Function

Pin number	Name	Setting	Function
2	ENABLE	H	Y, C enable
		L	Y, C disable (The outputs are in high-impedance state when disabled.)

Sag Compensation Circuit

The Y output has built-in sag compensation circuits. When using a sag compensation circuit, external capacitors should be connected as shown in figure 1. If the sag compensation circuit is used, the sag is suppressed even when using a smaller external capacitance compared to the capacitance when not using the sag compensation circuit. (In figure 1, capacitance values of $100\mu\text{F}$ and $22\mu\text{F}$ are recommended). If the sag compensation circuit is not used, the sag compensation circuit does not function when the YOUTA and YOUTB are short-circuited (figure 2).

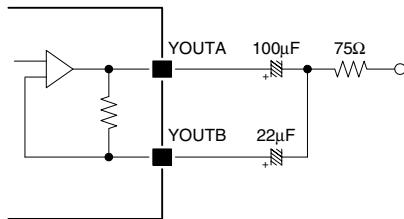


Figure 1. Sag compensation circuit capacitor connection

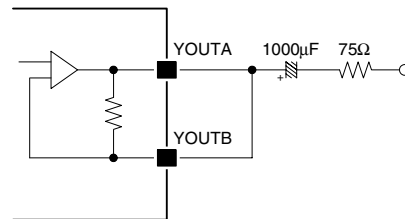
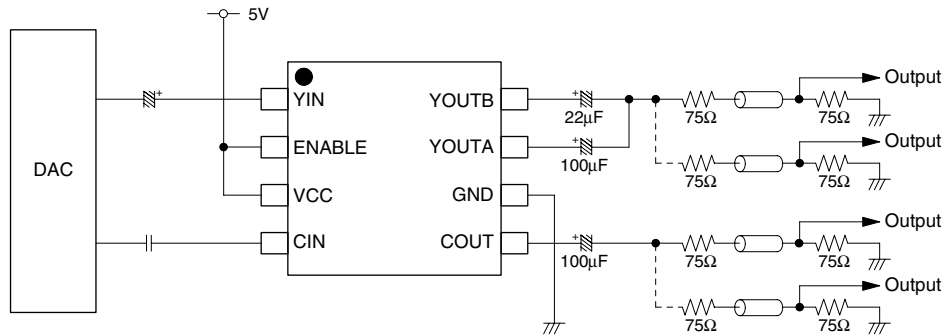


Figure 2. Capacitor connection without using the sag compensation circuit

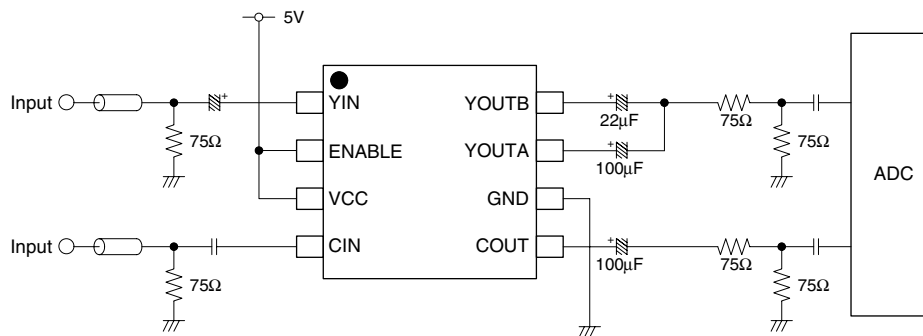
TYPICAL APPLICATION CIRCUIT

On Output Side Using



- Note. 1. Decoupling capacitors between supply pins are not shown in this diagram.
 2. For actual use, the decoupling capacitors of suitable capacitance value should be connected between supply pins.
 3. The capacitance values (100µF, 22µF) in this diagram are recommended.
 4. A capacitor (0.1µF recommended) should be connected between the unused input terminals and GND.

On Input Side Using



- Note. 1. Decoupling capacitors between supply pins are not shown in this diagram.
 2. For actual use, the decoupling capacitors of suitable capacitance value should be connected between supply pins.
 3. The capacitance values (100µF, 22µF) in this diagram are recommended.
 4. A capacitor (0.1µF recommended) should be connected between the unused input terminals and GND.

TYPICAL CHARACTERISTICS

$V_{CC} = 5.0V$, $T_a = 25^{\circ}C$, $f_{in} = 100kHz$, $V_{IN} = 1.0V_{p-p}$, $R_L = 75\Omega$, unless otherwise noted.
 Refer to "MEASUREMENT CIRCUIT".

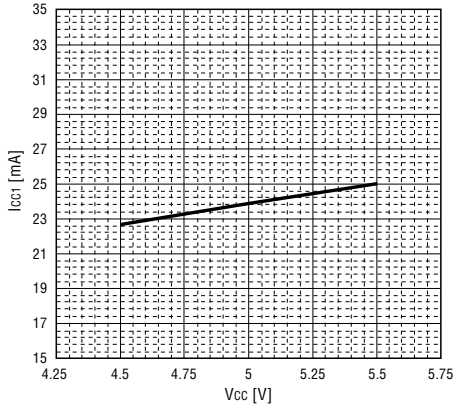


Figure 3. I_{CC1} vs. V_{CC}

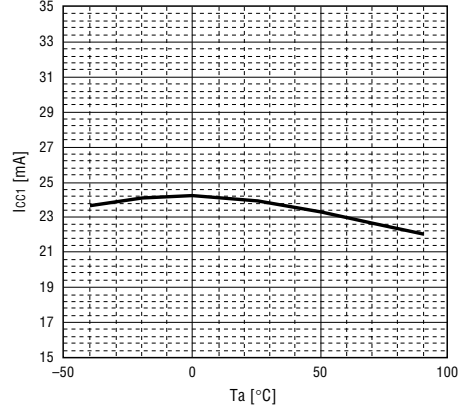


Figure 4. I_{CC1} vs. T_a

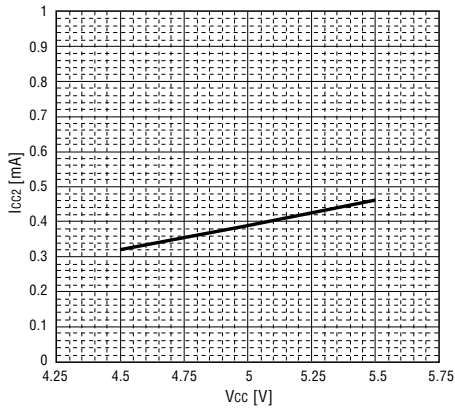


Figure 5. I_{CC2} vs. V_{CC}

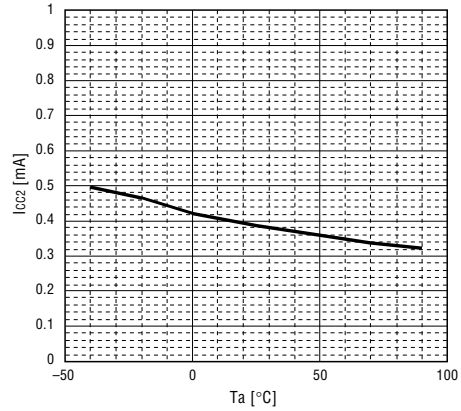


Figure 6. I_{CC2} vs. T_a

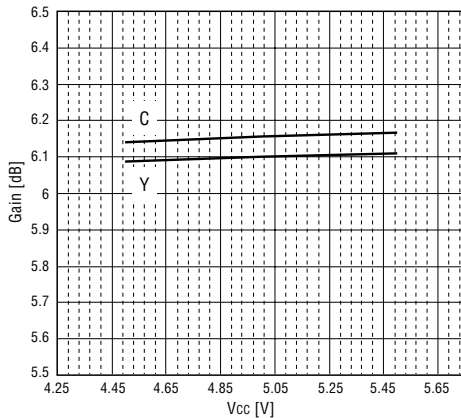


Figure 7. A_V vs. V_{CC}

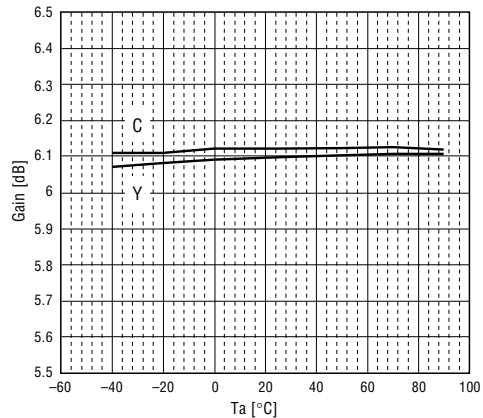


Figure 8. A_V vs. T_a

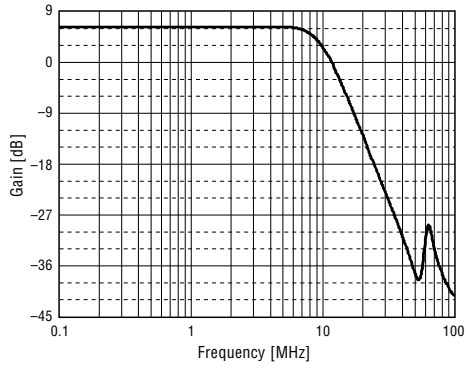


Figure 9. Frequency characteristics

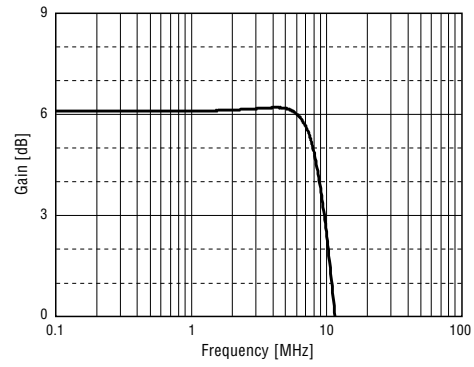


Figure 10. Frequency characteristics (0dB to 9dB)

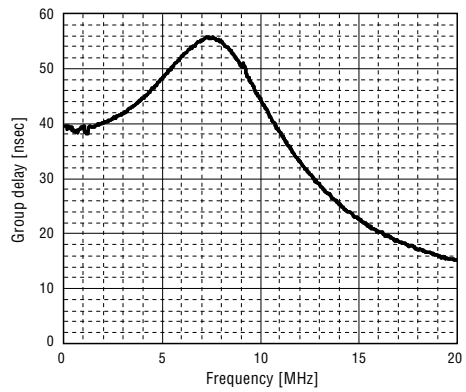


Figure 11. Group delay

Please pay your attention to the following points at time of using the products shown in this document.

The products shown in this document (hereinafter "Products") are not intended to be used for the apparatus that exerts harmful influence on human lives due to the defects, failure or malfunction of the Products. Customers are requested to obtain prior written agreement for such use from SEIKO NPC CORPORATION (hereinafter "NPC"). Customers shall be solely responsible for, and indemnify and hold NPC free and harmless from, any and all claims, damages, losses, expenses or lawsuits, due to such use without such agreement. NPC reserves the right to change the specifications of the Products in order to improve the characteristic or reliability thereof. NPC makes no claim or warranty that the contents described in this document dose not infringe any intellectual property right or other similar right owned by third parties. Therefore, NPC shall not be responsible for such problems, even if the use is in accordance with the descriptions provided in this document. Any descriptions including applications, circuits, and the parameters of the Products in this document are for reference to use the Products, and shall not be guaranteed free from defect, inapplicability to the design for the mass-production products without further testing or modification. Customers are requested not to export or re-export, directly or indirectly, the Products to any country or any entity not in compliance with or in violation of the national export administration laws, treaties, orders and regulations. Customers are requested appropriately take steps to obtain required permissions or approvals from appropriate government agencies.

The logo for NPC (Seiko NPC Corporation) consists of the letters 'NPC' in a bold, black, sans-serif font. The 'N' and 'P' are connected at the top, and the 'C' is positioned to the right of the 'P'.

SEIKO NPC CORPORATION

15-6, Nihombashi-kabutocho, Chuo-ku,
Tokyo 103-0026, Japan
Telephone: +81-3-6667-6601
Facsimile: +81-3-6667-6611
<http://www.npc.co.jp/>
Email: sales@npc.co.jp

NC0509AE 2006.06