

OVERVIEW

The SM5319A/B is a 3-channel video buffer with built-in 5th-order lowpass filters. The SM5319A/B outputs Y, C, and composite signals at the same time. Composite signal output is outputted mixing Y and C signals.

FEATURES

- Supply voltage: $5V \pm 10\%$
- Output gain: $6.0 \pm 0.5\text{dB}$ (SM5319A)
 $9.1 \pm 0.5\text{dB}$ (SM5319B)
- Filter passband ($\pm 1.5\text{dB}$): 6.75MHz
- Output drive capability: 300Ω
- Mixer built-in for output composite signal (YCMIX)
- Disable function implemented
- Group delay deviation (100kHz to 5MHz): 10ns (typ)
- Package: 8-pin VSOP

APPLICATIONS

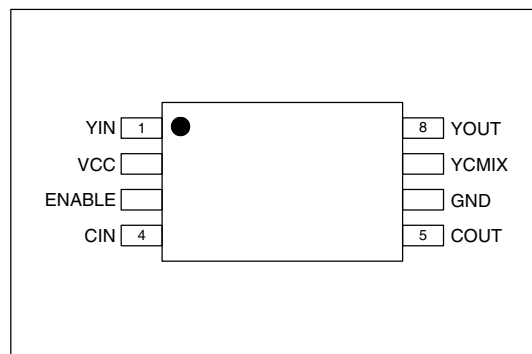
- Set top boxes
- LCD TVs
- PDPs
- Camcorders
- DVD players/recorders

ORDERING INFORMATION

Device	Package
SM5319AV	8-pin VSOP
SM5319BV	

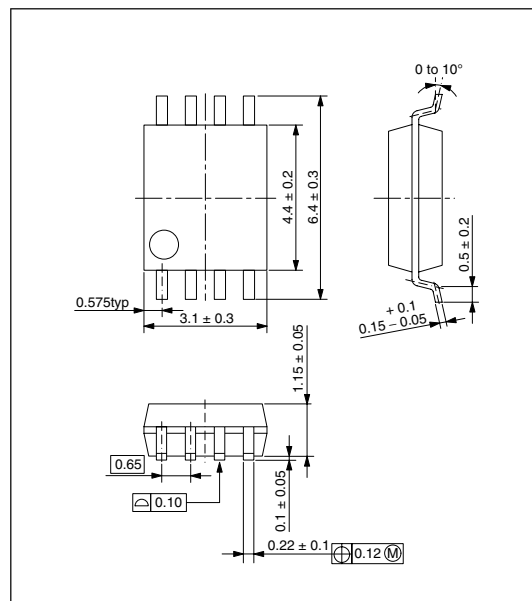
PINOUT

(Top view)

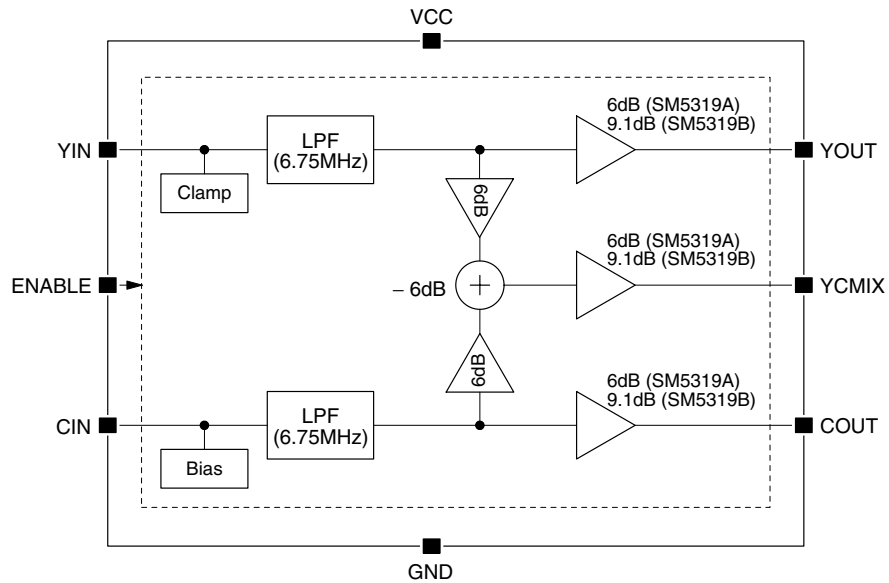


PACKAGE DIMENSIONS

(Unit: mm)



BLOCK DIAGRAM



PIN DESCRIPTION

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

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

PIN EQUIVALENT CIRCUITS

Number	Name	I/O ^{*1}	Equivalent circuit
1	YIN	I	
3	ENABLE	Ip	
4	CIN	I	
5 7 8	COUT YCMIX YOUT	O	

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

Note. Resistance values indicate design values.

SPECIFICATIONS

Absolute Maximum Ratings

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		- 25 to 80	°C

Electrical Characteristics

SM5319A: $V_{CC} = 5.0\text{V}$, $T_a = 25^\circ\text{C}$, $f_{in} = 100\text{kHz}$, $V_{IN} = 1.0\text{V}_{p-p}$, $R_L = 300\Omega$, unless otherwise noted.

SM5319B: $V_{CC} = 5.0\text{V}$, $T_a = 25^\circ\text{C}$, $f_{in} = 100\text{kHz}$, $V_{IN} = 0.7\text{V}_{p-p}$, $R_L = 300\Omega$, 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	-	35	45	mA	I	
Supply voltage 2	I_{CC2}	No input, ENABLE = LOW	-	0.5	1.5	mA	I	
Output gain	A_V	SM5319A	5.5	6.0	6.5	dB	I	
		SM5319B	8.6	9.1	9.6	dB	I	
Maximum output amplitude (Y)	V_{out1}	$R_L = 300\Omega$, THD $\leq 1.5\%$, YOUT, YCMIX	-	2.8	-	V _{p-p}	I	
Maximum output amplitude (C)	V_{out2}	$R_L = 300\Omega$, THD $\leq 1.5\%$, COUT	-	2.0	-	V _{p-p}	I	
Input amplitude (Y) ^{*1}	V_{I1}	AC-coupled inputs, THD $\leq 1.5\%$, YIN	SM5319A	-	-	1.4	V _{p-p}	I
			SM5319B	-	-	0.98	V _{p-p}	I
Input amplitude (C) ^{*1}	V_{I2}	AC-coupled inputs, THD $\leq 1.5\%$, CIN	SM5319A	-	-	1.0	V _{p-p}	I
			SM5319B	-	-	0.7	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 = 300Ω, THD $\leq 1.5\%$	-	-	1	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

SM5319A: $V_{CC} = 5.0V$, $T_a = 25^\circ C$, $f_{in} = 100kHz$, $V_{IN} = 1.0V_{p-p}$, $R_L = 300\Omega$, unless otherwise noted.
 SM5319B: $V_{CC} = 5.0V$, $T_a = 25^\circ C$, $f_{in} = 100kHz$, $V_{IN} = 0.7V_{p-p}$, $R_L = 300\Omega$, unless otherwise noted.
 Refer to “MEASUREMENT CIRCUIT”.

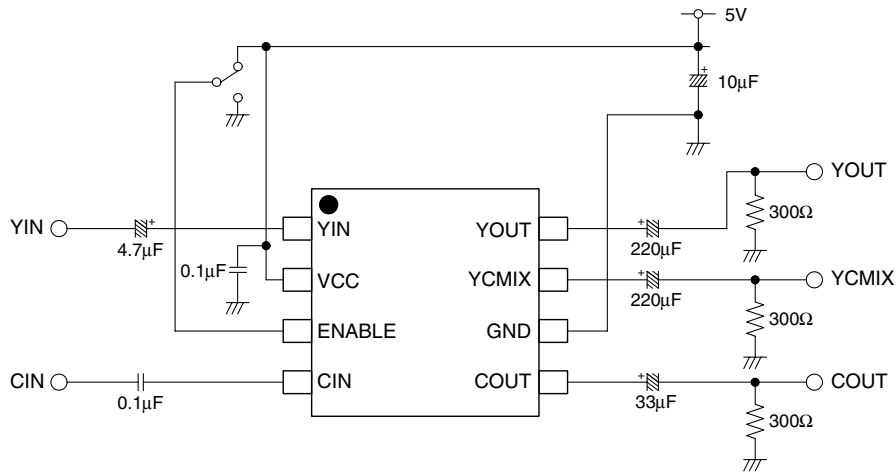
Parameter	Symbol	Condition	Rating			Unit	Test level	
			Min	Typ	Max			
Passband attenuation	F_{PB}	$f_{in} = 6.75MHz/100kHz$	-1.5	0	1.5	dB	I	
Stopband attenuation	F_{SB}	$f_{in} = 27MHz/100kHz$	30	40	-	dB	II	
Crosstalk (between Y and C)	X_{TALK}	$f_{in} = 1MHz$, between YOUT and COUT	SM5319A $V_{IN} = 0.5V_{p-p}$	-	-50	-	dB	II
			SM5319B $V_{IN} = 0.35V_{p-p}$	-	-50	-	dB	II
Group delay deviation	ΔT_{GD}	100kHz to 5MHz	-	10	-	ns	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



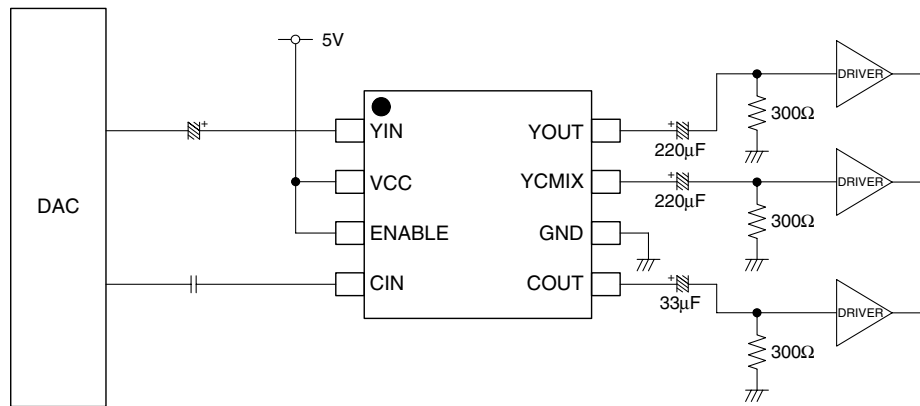
FUNCTIONAL DESCRIPTION

Enable Function

Pin number	Name	Setting	Function
3	ENABLE	H	Enable
		L	Disable (The outputs are in high-impedance state when disabled.)

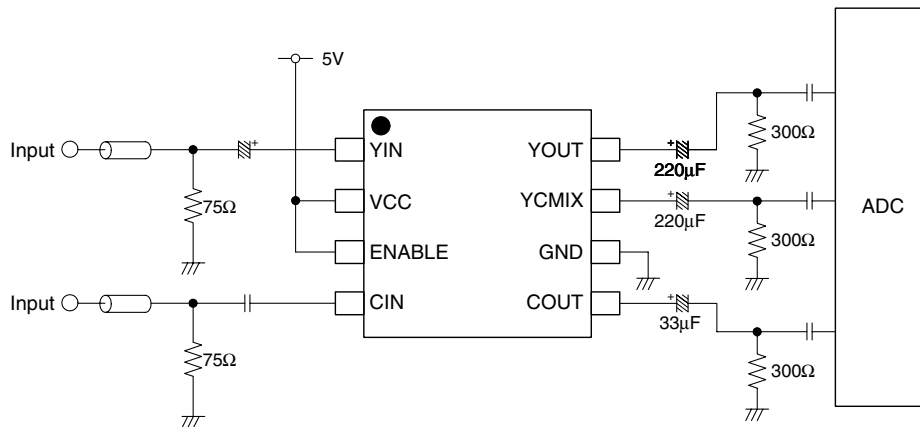
TYPICAL APPLICATION CIRCUIT

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 (220µF, 33µF) 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 (220µF, 33µF) in this diagram are recommended.
 4. A capacitor (0.1µF recommended) should be connected between the unused input terminals and GND.

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

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The logo for NPC (Seiko NPC Corporation) consists of the letters 'NPC' in a bold, stylized, sans-serif font. The 'N' and 'P' are connected at the top, and the 'C' is a simple, rounded shape.

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