NIPPON PRECISION CIRCUITS INC.

SM5305A

1-channel Video Buffer with Built-in Analog LPF for Low Voltage

OVERVIEW

The SM5305A is a 75Ω terminating resistance drive video buffer with built-in analog filter. The output buffer can be selected 6dB and 12dB. The coupling capacitances can be reduced since the sag compensation circuit built-in. The device operates from 2.7 to 3.6V supply voltage. The cutoff frequency of lowpass filter is 6.75MHz.

FEATURES

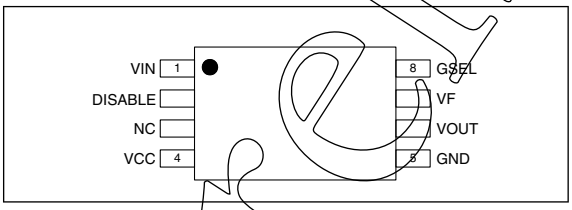
- Supply voltage: 2.7 to 3.6V
- Current consumption
  - 9.5mA when enable (V_{CC} = 3.0V)
  - < 1µA when disable
- Lowpass filter characteristics
  - 6.75MHz cutoff frequency (–3dB)
  - ≤ ± 15% cutoff frequency error
- Output buffer gain switching function: 6, 12dB
- Output gain error: ± 0.5dB (Gain = 6dB)
- ± 0.7dB (Gain = 12dB)
- Sag compensation circuit built-in
- Operating temperature range: –20 to 70°C
- Package: 8-pin VSOP (Pb free)
  8-pin PLP (Pb free)

APPLICATIONS

- Digital still camera
- Digital video camera
- Other portable equipment

PINOUT

(Top view)



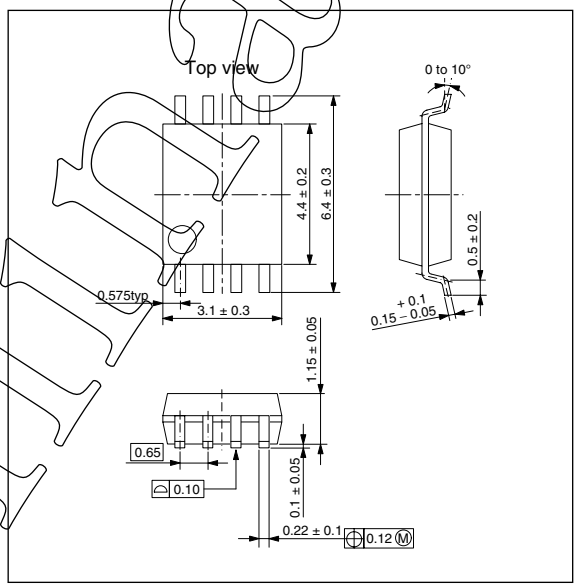
ORDERING INFORMATION

Device	Package
SM5305AV	8-pin VSOP
SM5305AD	8-pin PLP

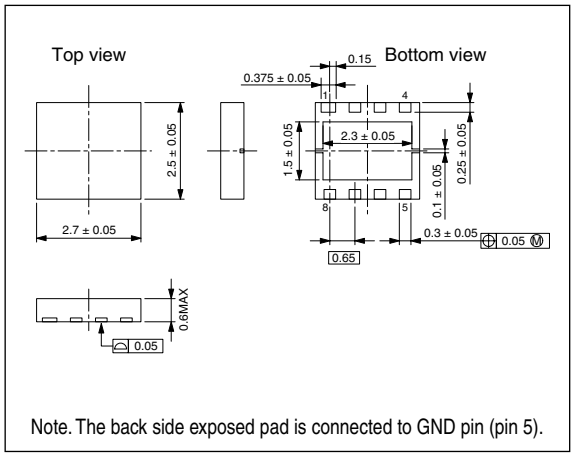
PACKAGE DIMENSIONS

(Unit: mm)

- 8-pin VSOP

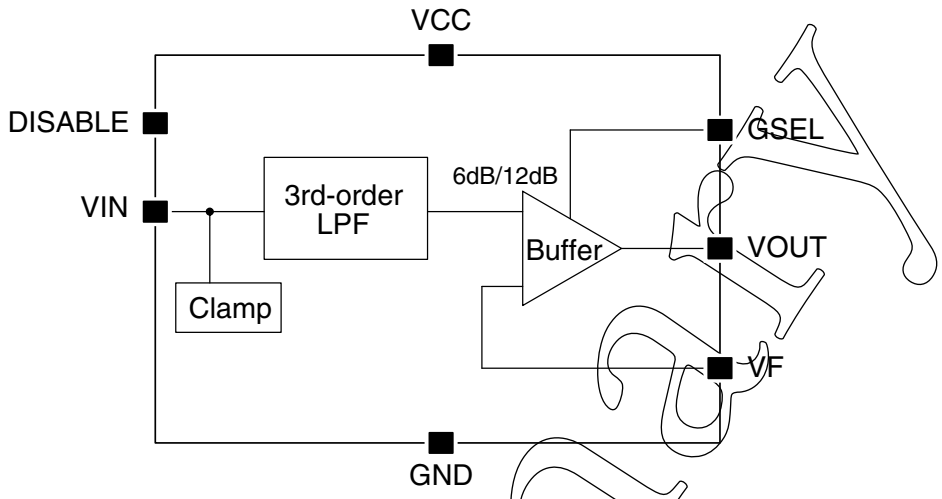


- 8-pin PLP



Note. The back side exposed pad is connected to GND pin (pin 5).

BLOCK DIAGRAM

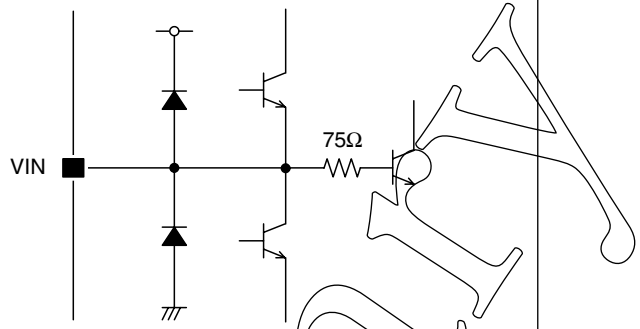
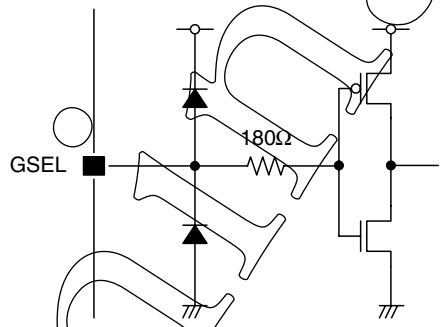
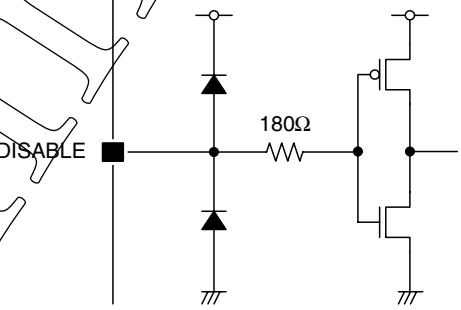
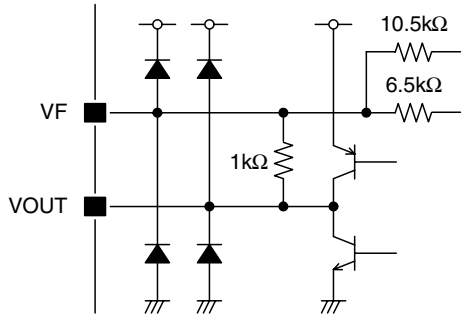


PIN DESCRIPTION

Number	Name	I/O[1]	A/D[2]	Description
1	VIN	I	A	Video signal input pin
2	DISABLE	I	D	Disable set pin (LOW: enable, HIGH: disable)
3	NC	–	–	No connection
4	VCC	–	–	Supply pin
5	GND	–	–	Ground pin
6	VOUT	O	A	Video signal output pin
7	VF	I	A	Output signal feedback pin for sag compensation circuit
8	GSEL	I	D	Gain switching set pin (LOW: 6dB, HIGH: 12dB)

1. I: input, O: output
2. A: analog, D: digital

PIN EQUIVALENT CIRCUITS

Number	Name	I/O	Equivalent circuit
1	VIN	I	
8	GSEL	I	
2	DISABLE	I	
6 7	VOUT VF	O I	

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}	GSEL, DISABLE pins	GND – 0.3 to V_{CC} + 0.3	V
Storage temperature range	T_{stg}		–55 to 125	°C
Power dissipation	P_D	VSOP package	300	mW
		PLP package	320	mW

Recommended Operating Conditions

Parameter	Symbol	Condition	Rating	Unit
Supply voltage range	V_{CC}		2.7 to 3.6	V
Operating temperature range	Ta		–20 to 70	°C

DC Characteristics (GSEL, DISABLE)

V_{CC} = 2.7 to 3.6V, Ta = –20 to 70°C, unless otherwise noted.

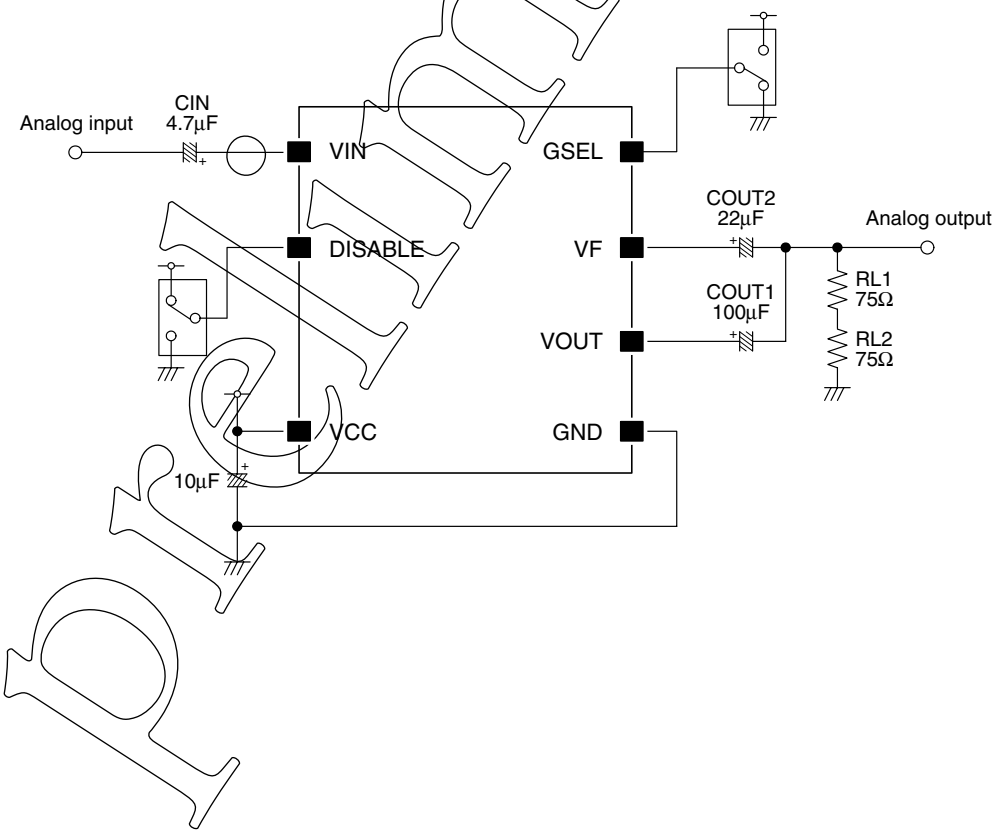
Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
HIGH-level input voltage	V_{IH}		$0.7V_{CC}$	–	–	V
LOW-level input voltage	V_{IL}		–	–	0.5	V
Input leakage current	I_{LL}	V_{IN} = 0V	–	–	1	µA
	I_{LH}	V_{IN} = V_{CC}	–	–	1	µA

Analog Characteristics

V_{CC} = 3.0V, Ta = 25°C, R_L = 150Ω, fin = 100kHz, unless otherwise noted.
Refer to "Measurement Circuit Diagram".

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Current consumption 1	I_{CC1}	V_{CC} = 2.7 to 3.6V	–	9.5	16	mA
Current consumption 2	I_{CC2}	V_{CC} = 2.7 to 3.6V when DISABLE	–	–	1	µA
Output gain 1	A_{V1}	Gain = 6dB	5.5	6.0	6.5	dB
Output gain 2	A_{V2}	Gain = 12dB	11.3	12.0	12.7	dB
Input voltage range 1	V_{AIN1}	Gain = 6dB	–	–	1.2	Vp-p
Input voltage range 2	V_{AIN2}	Gain = 12dB	–	–	0.6	Vp-p
Maximum output voltage	V_{out}	THD < 1.5%	2.0	2.4	–	Vp-p
Input clamp voltage	V_{CLMP}	VIN pin, AC-coupled input	0.8	1.0	1.2	V
Output harmonic distortion	T_{HD}	V_{OUT} = 2Vp-p	–	1.0	–	%
Frequency characteristics	4fc	fin = 27MHz/100kHz	–	–37	–33	dB
Cutoff frequency	F_C	–3dB (fin = 100kHz)	5.7	6.75	7.8	MHz
Group delay difference	ΔGD	100kHz and 5MHz group delay difference	–	15	–	ns

Measurement Circuit Diagram



FUNCTIONAL DESCRIPTION

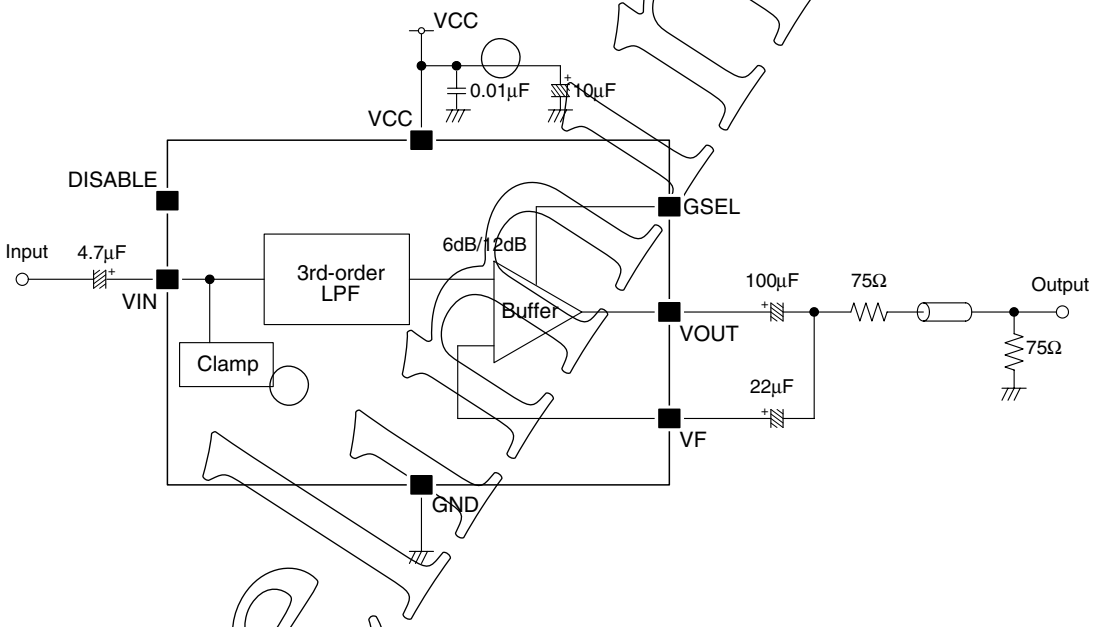
Output Gain Setting (GSEL)

GSEL pin	Output gain
LOW	6dB
HIGH	12dB

Disable Function (DISABLE)

DISABLE pin	Output
LOW	Enable
HIGH	Disable (VOUT output: High impedance)

TYPICAL CONNECTION



Note. It recommends to connect 10µF decuopling capacitor and 0.01µF capacitor between power supply pins.
The capacitance value connected to VIN, VF, and VOUT pins may not always be as this case.

TYPICAL CHARACTERISTICS

V_{CC} = 3.0V, Ta = 25°C, R_L = 150Ω, fin = 100kHz, unless otherwise noted.

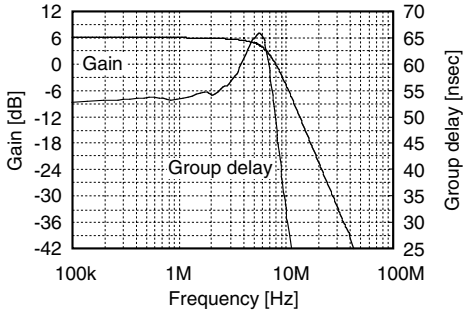


Figure 1. Filter characteristics (Gain = 6dB)

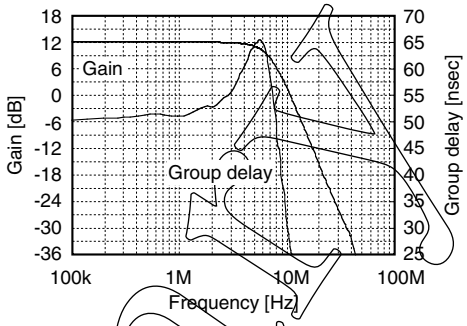


Figure 2. Filter characteristics (Gain = 12dB)

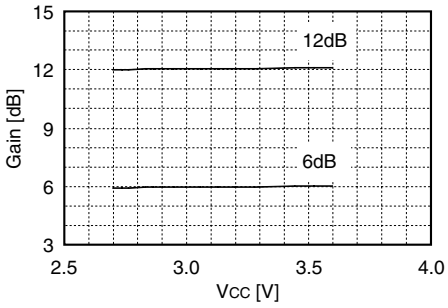


Figure 3. Gain vs. V_{CC}

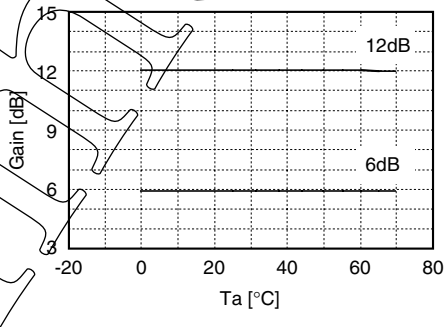


Figure 4. Gain vs. Ta

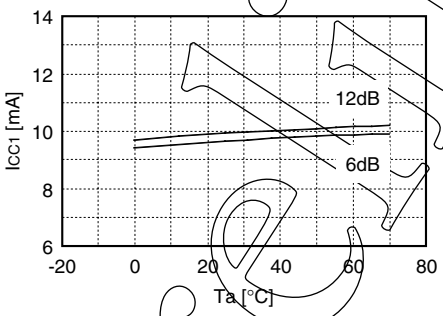


Figure 5. I_{CC1} vs. Ta

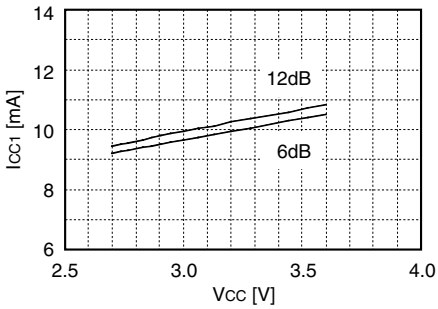


Figure 6. I_{CC1} vs. V_{CC}

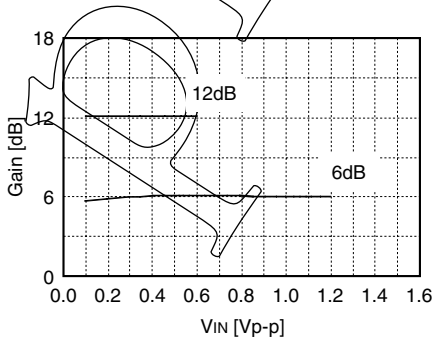


Figure 7. Gain vs. V_{IN}

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