

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

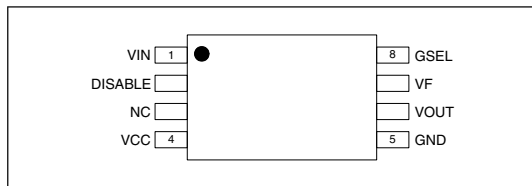
- Supply voltage: 2.7 to 3.6V
- Current consumption
 - 9.5mA when enable ($V_{CC} = 3.0V$)
 - < 1μA when disable
- Lowpass filter characteristics
 - 6.75MHz cutoff frequency (−3dB)
 - $\leq \pm 15\%$ cutoff frequency error
- Output buffer gain switching function: 6, 12dB
- Output gain error: $\pm 0.5dB$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

APPLICATIONS

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

PINOUT

(Top view)



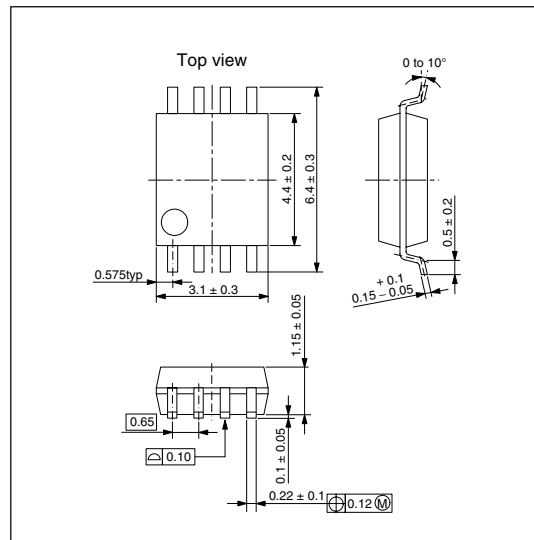
ORDERING INFORMATION

| Device | Package |
|----------|------------|
| SM5305AV | 8-pin VSOP |
| SM5305AD | 8-pin MSON |

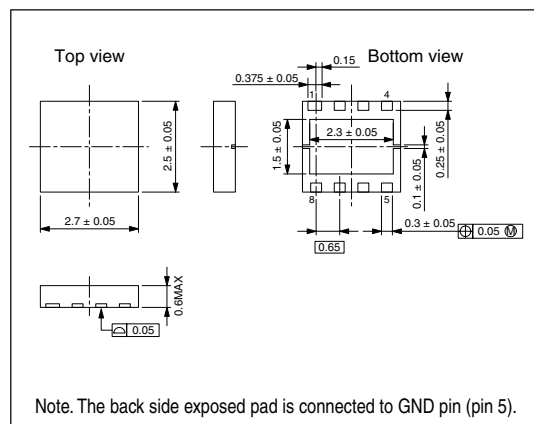
PACKAGE DIMENSIONS

(Unit: mm)

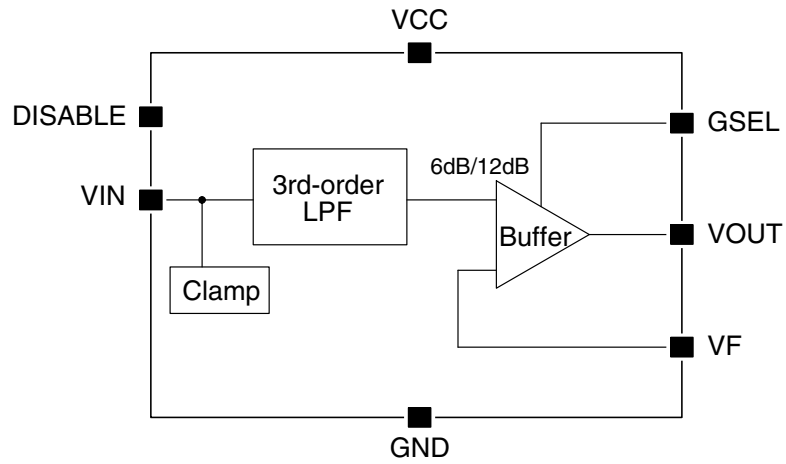
- 8-pin VSOP



- 8-pin MSON



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 | – | – | Power 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 |
| | | MSON 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 | T_a | | -20 to 70 | °C |

DC Characteristics (GSEL, DISABLE)

$V_{CC} = 2.7$ to 3.6 V, $T_a = -20$ to 70 °C, unless otherwise noted.

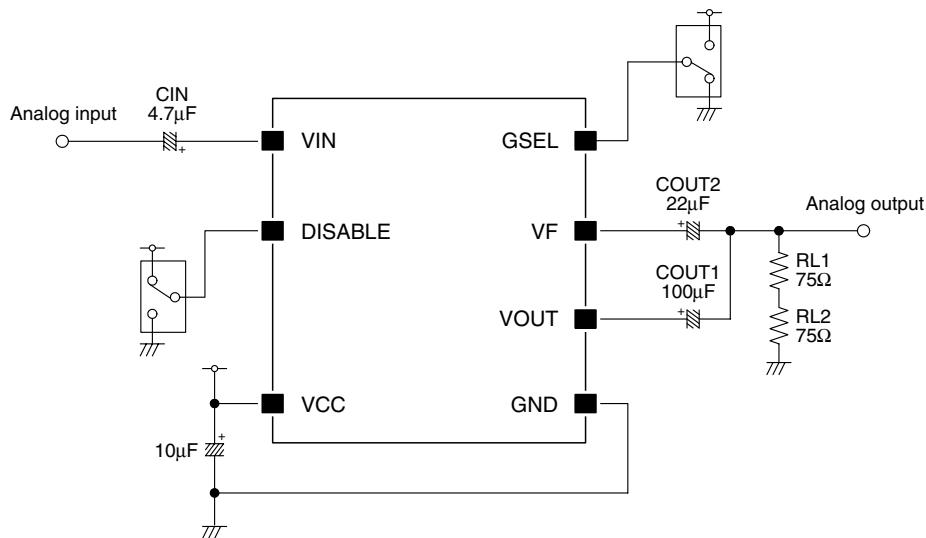
| Parameter | Symbol | Condition | Rating | | | Unit |
|--------------------------|----------|-------------------|-------------|-----|-----|------|
| | | | min | typ | max | |
| HIGH-level input voltage | V_{IH} | | $0.7V_{CC}$ | - | - | V |
| LOW-level input voltage | V_{IL} | | - | - | 0.5 | V |
|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

Analog Characteristics

$V_{CC} = 3.0V$, $T_a = 25^\circ C$, $R_L = 150\Omega$, $f_{in} = 100kHz$, 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 | $f_{in} = 27MHz/100kHz$ | – | –37 | –33 | dB |
| Cutoff frequency | F_C | –3dB ($f_{in} = 100kHz$) | 5.7 | 6.75 | 7.8 | MHz |
| Group delay difference | ΔGD | 100kHz and 5MHz group delay difference | – | 15 | – | ns |

Measurement Circuit Diagram



FUNCTIONAL DESCRIPTION

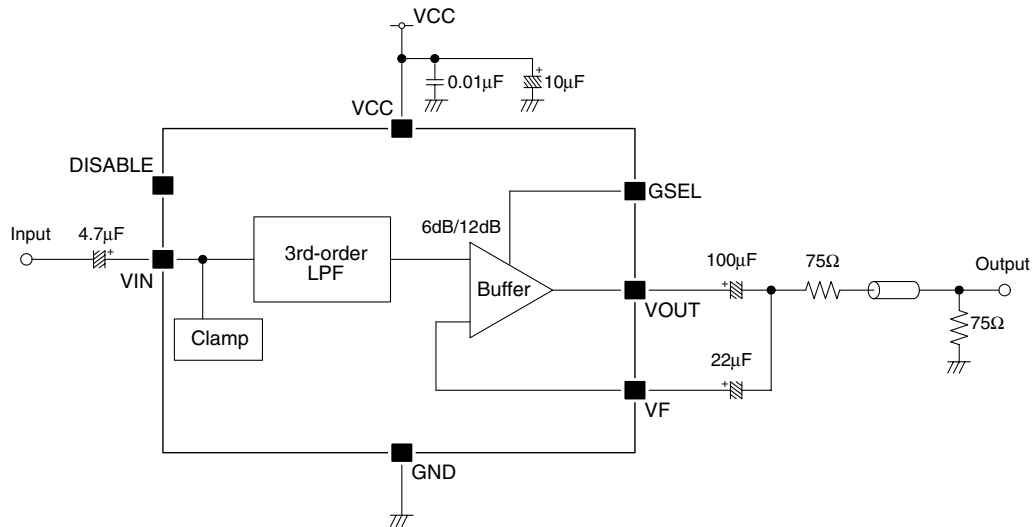
Output Gain Setting (GSEL)

| 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 decoupling 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

$V_{CC} = 3.0V$, $T_a = 25^\circ C$, $R_L = 150\Omega$, $f_{in} = 100kHz$, unless otherwise noted.

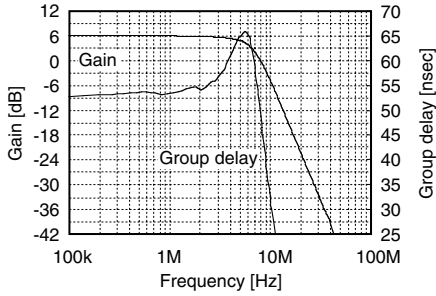


Figure 1. Filter characteristics (Gain = 6dB)

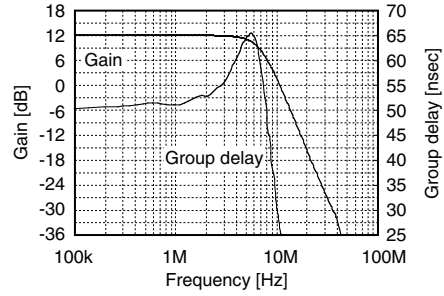


Figure 2. Filter characteristics (Gain = 12dB)

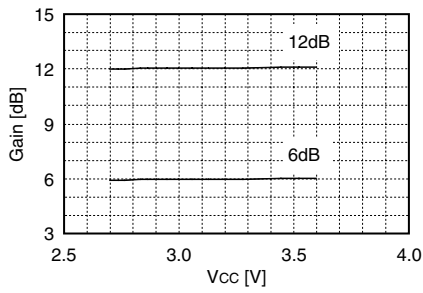


Figure 3. Gain vs. V_{CC}

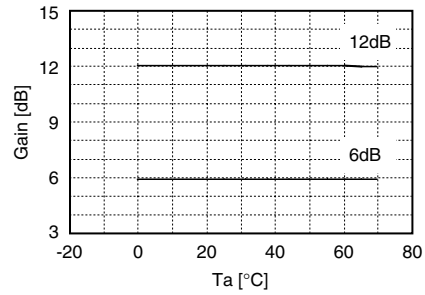


Figure 4. Gain vs. T_a

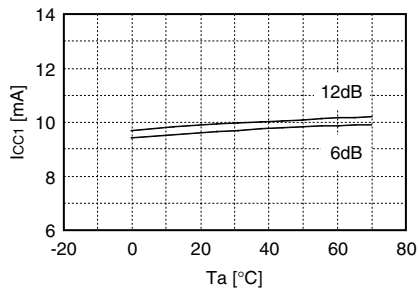


Figure 5. I_{CC1} vs. T_a

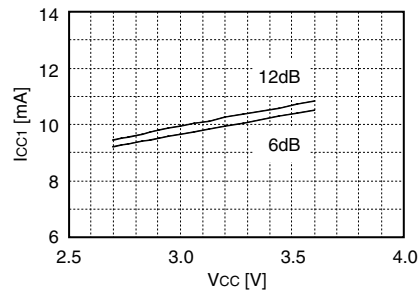


Figure 6. I_{CC1} vs. V_{CC}

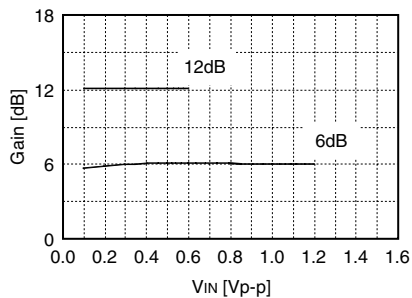


Figure 7. Gain vs. V_{IN}

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