OVERVIEW

The SM5306A is a 3-channel low-voltage video buffer IC that can drive a 75Ω termination resistance load. The output buffer gain can be switched between 0dB and 6dB. A built-in sag compensation circuit enables a lower output coupling capacitance to be used. The device operates from a 3.0 to 5.5V supply.

FEATURES

- Supply voltage: 3.0 to 5.5V
- Current consumption: 24mA (V_{CC} = 3.3V)
- Output gain switching: 0dB (GSEL = LOW)
  6dB (GSEL = HIGH)
- Gain error: ± 0.5dB
- Maximum passband frequency: over 20MHz
- Maximum output voltage: min. 2.0Vp-p (gain = 6dB)
- Sag compensation circuit built-in
- Synctip clamp input
- Operating ambient temperature range: 0 to 70°C
- Package: 16-pin VSOP (Pb free)

APPLICATIONS

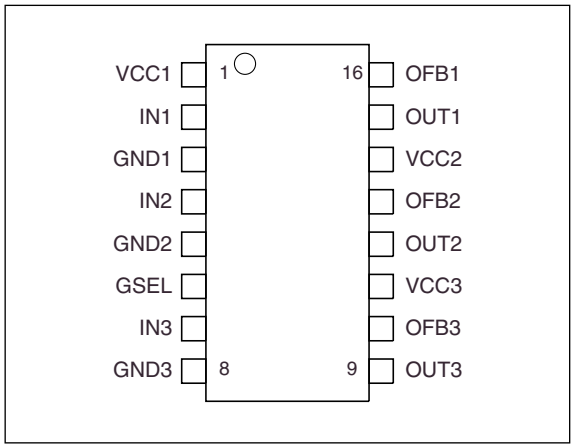
- LCD monitor

ORDERING INFORMATION

Device	Package
SM5306AV	16-pin VSOP

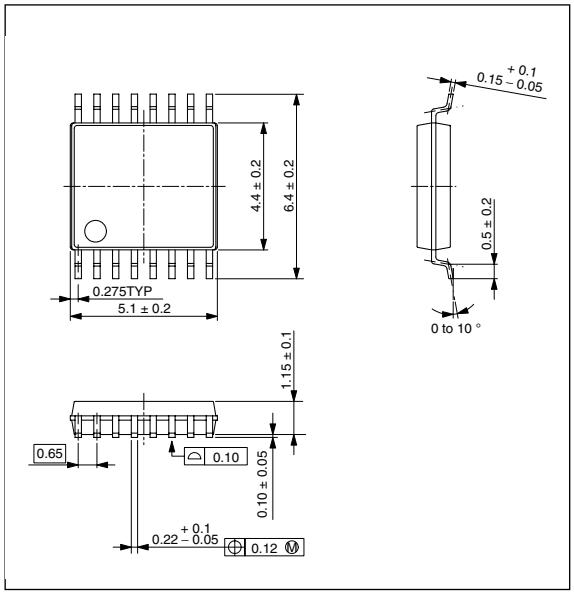
PINOUT

(Top view)

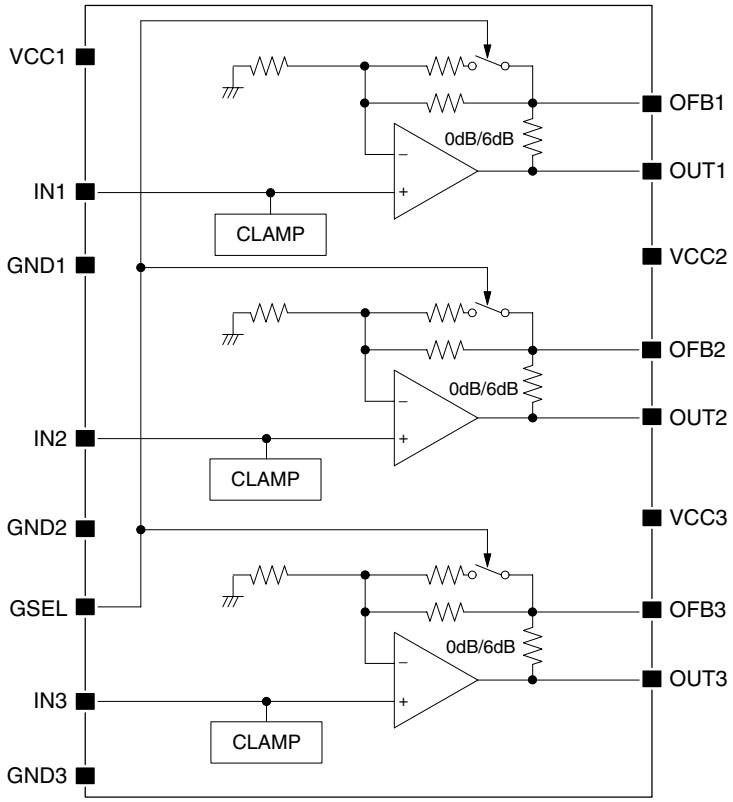


PACKAGE DIMENSIONS

(Unit: mm)



BLOCK DIAGRAM

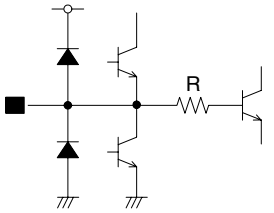
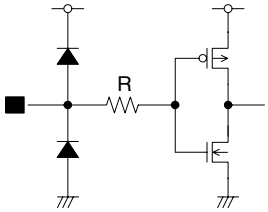
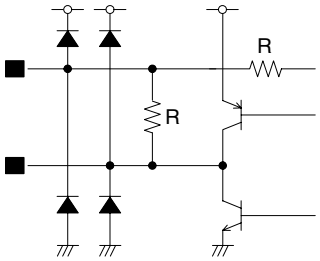


PIN DESCRIPTION

Number	Name	I/O[1]	Description
1	VCC1	–	Supply voltage 1
2	IN1	I	Video signal input 1
3	GND1	–	Ground 1
4	IN2	I	Video signal input 2
5	GND2	–	Ground 2
6	GSEL	I	Gain select (LOW: 0dB, HIGH: + 6dB)
7	IN3	I	Video signal input 3
8	GND3	–	Ground 3
9	OUT3	O	Video signal output 3
10	OFB3	O	Output feedback 3 (for sag compensation circuit)
11	VCC3	–	Supply voltage 3
12	OUT2	O	Video signal output 2
13	OFB2	O	Output feedback 2 (for sag compensation circuit)
14	VCC2	–	Supply voltage 2
15	OUT1	O	Video signal output 1
16	OFB1	O	Output feedback 1 (for sag compensation circuit)

1. I: input, O: output

PIN EQUIVALENT CIRCUIT

Number	Name	Equivalent circuit
2 4 7	IN1 IN2 IN3	
6	GSEL	
16 13 10 15 12 9	OFB1 OFB2 OFB3 OUT1 OUT2 OUT3	

SPECIFICATIONS

Absolute Maximum Ratings

VCC1 = VCC2 = VCC3 = V_{CC}, GND = 0V, unless otherwise noted

Parameter	Symbol	Condition	Rating	Unit
Supply voltage range	V_{CC}		– 0.3 to 7.0	V
Input voltage range	V_{IN}	GSEL pin	GND – 0.3 to V_{CC} + 0.3	V
Storage temperature range	T_{STG}		– 55 to + 125	°C
Power dissipation	P_D		250	mW

Recommended Operating Conditions

Parameter	Symbol	Condition	Rating	Unit
Supply voltage	V_{CC}		3.0 to 5.5	V
Operating ambient temperature range	Ta		0 to 70	°C

DC Characteristics (GSEL)

V_{CC} = 3.0 to 5.5V, Ta = 0 to 70°C, unless otherwise noted

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
HIGH-level input voltage	V_{IH}		V_{CC} – 0.5	–	–	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

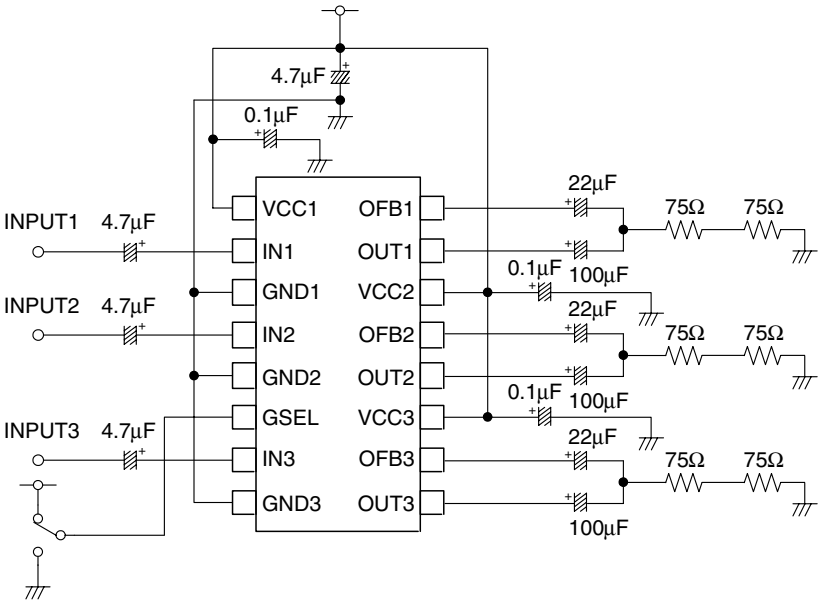
Analog Characteristics

V_{CC} = 3.3V, Ta = 25°C, R_L = 150Ω, fin = 100kHz, V_{IN}= 1.0Vp-p, unless otherwise noted

See “Measurement Circuit Diagram”

Parameter	Symbol	Condition	Rating			Unit
			min	typ	max	
Current consumption 1	I_{CC1}	Gain = 6dB, no signal input	–	24	30	mA
Current consumption 2	I_{CC2}	V_{CC} = 5.5V, Gain = 6dB, no signal input	–	26	35	mA
Output gain 1	A_{V1}	Gain = 0dB	– 0.5	0	0.5	dB
Output gain 2	A_{V2}	Gain = 6dB	5.5	6.0	6.5	dB
Channel gain error	dA_V	Gain = 0dB, 6dB	–	–	± 0.3	dB
Channel crosstalk	C_T	Gain = 6dB, ratio with V_{OUT} = 2Vp-p	–	– 65	–	dB
Maximum passband frequency 1	F_{PB1}	–1dB, gain = 0dB	20	49	–	MHz
Maximum passband frequency 2	F_{PB2}	–1dB, gain = 6dB	20	23	–	MHz
Input voltage	V_{AIN1}	AC-coupled input, Gain = 0dB, 6dB	–	–	1.0	Vp-p
Maximum output voltage 1	V_{OUT1}	Gain = 0dB, THD = 1%	1.0	–	–	Vp-p
Maximum output voltage 2	V_{OUT2}	Gain = 6dB, THD = 1%	2.0	–	–	Vp-p
Input clamp voltage	V_{CLMP}	No signal input	1.15	1.35	1.55	V
Output distortion ratio	T_{HD}	Gain = 6dB	–	–	1	%

Measurement Circuit Diagram



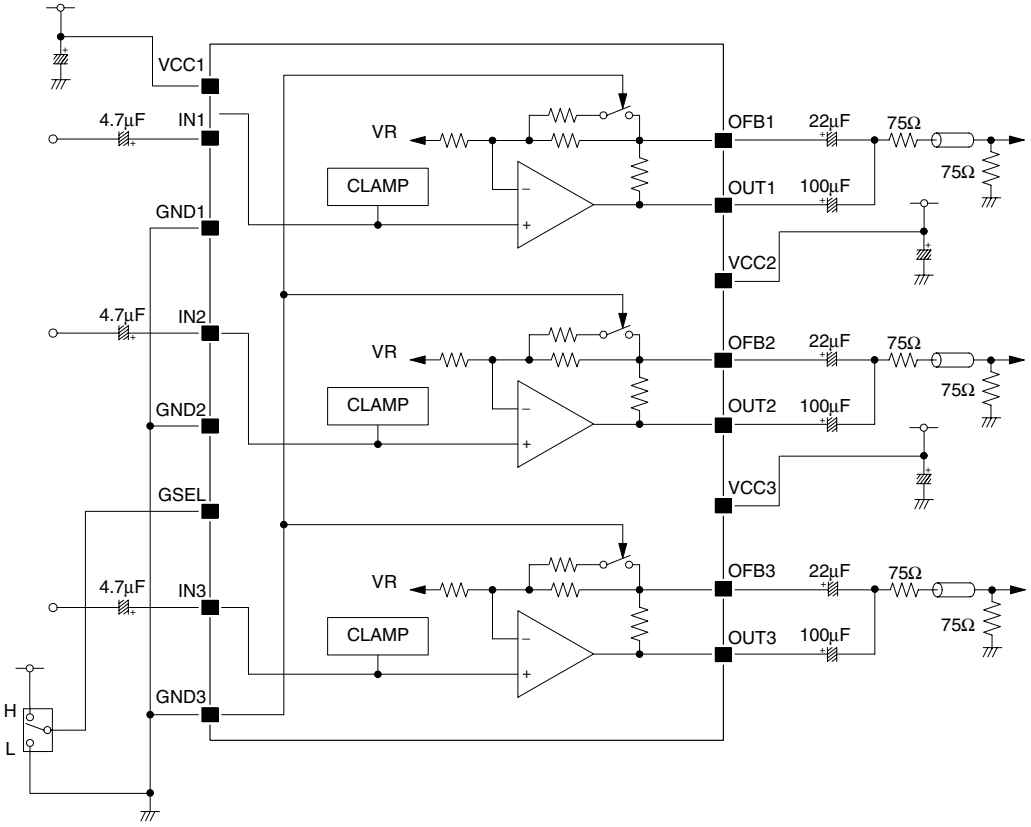
FUNCTIONAL DESCRIPTION

Output Gain Setting (GSEL)

GSEL pin	Output gain
LOW	0dB
HIGH	6dB

TYPICAL APPLICATION CIRCUIT

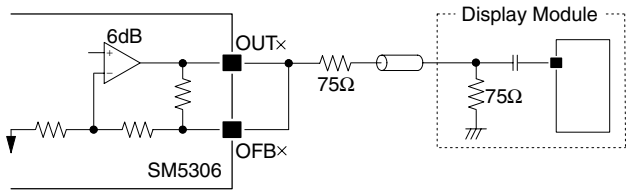
Application Circuit 1 (standard connection)



Note. Capacitance does not restrict to this value.

Application Circuit 2 (capacitively-coupled display module connection)

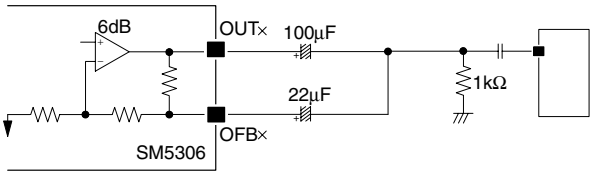
- Capacitor connections to the SM5306A output pins are not required.
- Short circuit OUT× pins to OFB× pins. In this mode, the sag compensation circuit does not function.



Note. Only output connection is shown.

Application Circuit 3 (input connection to next stage on same printed circuit board)

- A gain of 0dB is suitable, since matching resistors are not required. In this case, it is recommended that a 1kΩ resistor be connected to ground.



Note. Only output connection is shown.

TYPICAL CHARACTERISTICS

V_{CC} = 3.3V, Ta = 25°C, R_L = 150Ω, fin = 100kHz, V_{IN}= 1.0Vp-p, unless otherwise noted
See "Measurement Circuit Diagram"

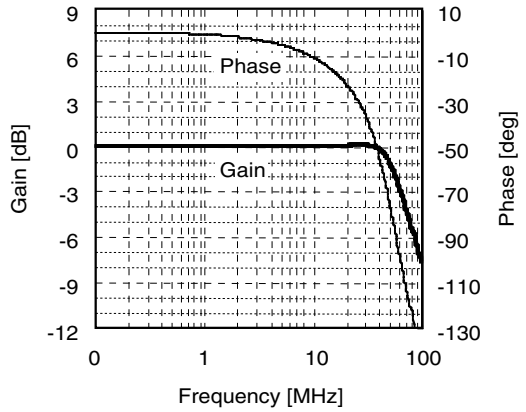


Figure 1. Frequency response (Gain = 0dB)

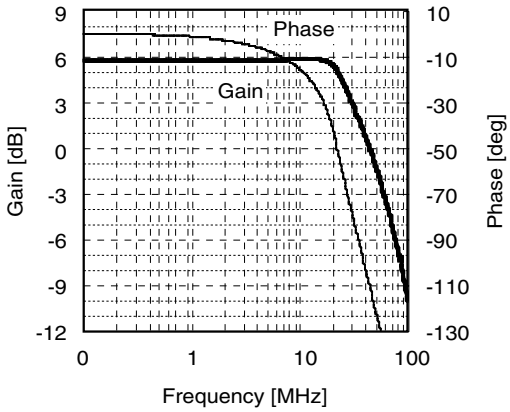


Figure 2. Frequency response (Gain = 6dB)

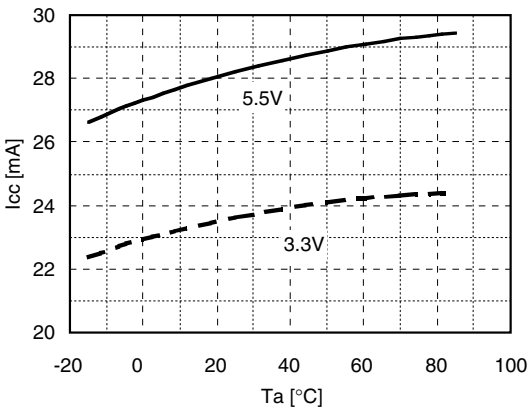


Figure 3. I_{CC} vs. Ta (no signal input)

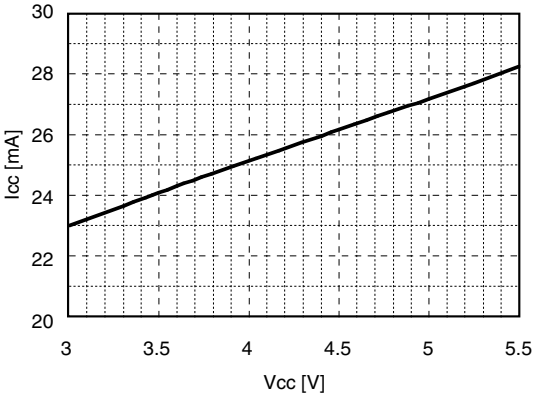


Figure 4. I_{CC} vs. V_{CC} (no signal input)

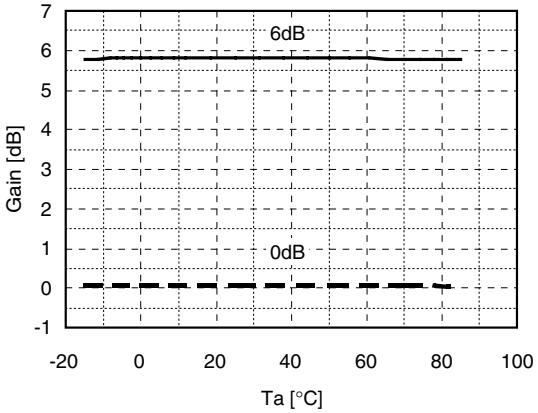


Figure 5. Gain vs. Ta

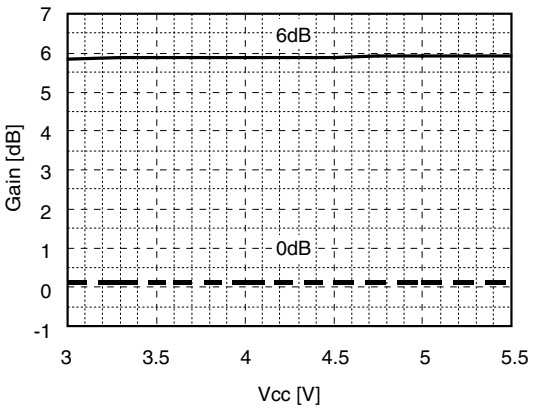


Figure 6. Gain vs. V_{CC}

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NC0307BE 2006.04