

SC6362

Low Cost 3-Channel 6th Order Standard Definition Video Driver

Features

- Three 6th Order Butterworth Filters
- -3dB Bandwidth : 8.5MHz
- -1dB Bandwidth : 6.5MHz
- 48dB Rejection at 27MHz
- Transparent Input Clamping
- DC or AC Coupled Inputs
- DC or AC Coupled Outputs
- Single Supply Voltage Range: 3.3V to 5V
- Pb-free SOIC-8 Package

Application

- Video Surveillances Device
- Set-top Boxes
- DVD Players
- Personal Video Recorders

General Descriptions

The SC6362 is a low-cost, fully integrated, 3-channel standard-definition video reconstruction filter, whose -1dB bandwidth extends to 6.5MHz and the 48dB rejection frequency is 27MHz. As an active filter, the SC6362 works at single supply with wide range from 3.3V to 5V, and is designed to replace passive LC filters in video signal processing application.

All three channels are identical and can accept not only DC but also AC coupled input signals based on the built-in clamp circuit.

A built-in level shifter puts an offset of 300mV on the output signal so that the SC6362 may drive a load of 150Ω in either DC or AC coupling configuration.

The SC6362 is available in an 8-lead SOIC package and the operating temperature range is from -40°C to 85°C.

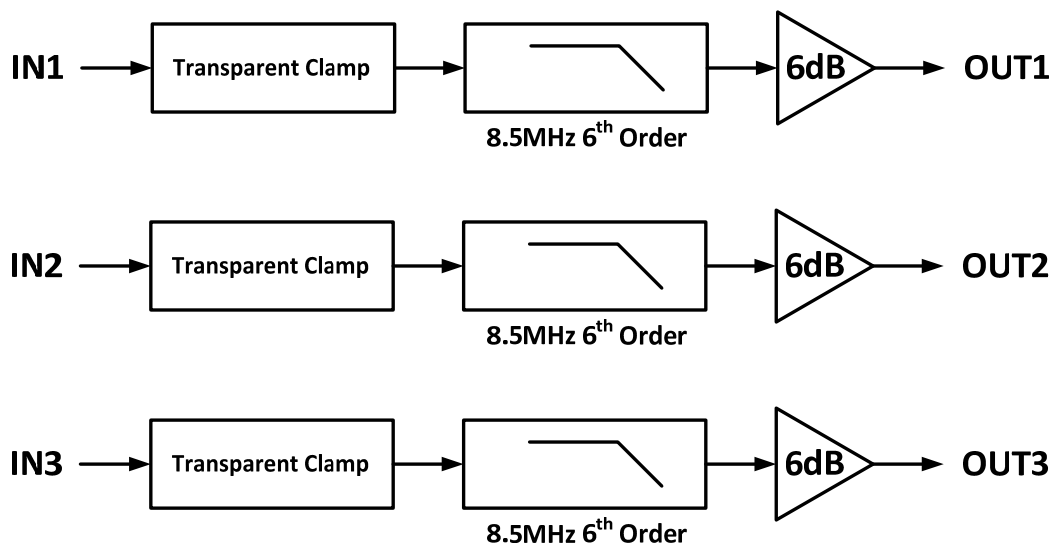


Figure1. Block Diagram

Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. Operation above the recommended operating conditions is not permitted. Extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

Parameter	Symbol	Min	Max	Unit
Power Supply Voltage	V_{CC}	-0.3	6.0	V
Input Voltage Range	V_{in}	-0.3	$V_{CC}+0.3$	V
Output Voltage Range	V_{out}	-0.3	$V_{CC}+0.3$	V
Max Output Current	I_{OUT}		50	mA
Storage Temperature Range	T_{STG}	-60	150	°C
Max Junction Temperature	T_J		150	°C

ESD Information

Parameter	Symbol	Min	Unit
Human Body Model	ESD	8	kV

Recommended Operating Conditions

The following table defines the conditions for device operation. The performance is ensured when operating in recommended conditions.

Parameter	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_A	-40		85	°C
Power Supply Voltage	V_{CC}	3.0	5	5.25	V

Electrical Characteristics

$V_{CC} = 5V$, $T_A = 25^{\circ}C$, $V_{in}=1 V_{p-p}$, inputs are AC coupled by a 0.1uF capacitor, all outputs are AC coupled by 220uF to 150 Ω load, unless otherwise noted

Table 1.

Parameter	Test Condition	Min	Typ	Max	Unit
DC Electrical Characteristics					
Operating Voltage Range		3	5	5.25	V
Power Supply Current	No Load		17		mA
AC Electrical Characteristics					
Voltage Gain	$V_{in}=1V_{p-p}$, All Channels		6.0		dB
-1dB Band Width	All Channels		6.5		MHz
-3dB Band Width	All Channels		8.5		MHz
Stopband Rejection	All Channels $f=27MHz$		48.0		dB
Total Harmonic Distortion	$V_{out}=1.8V_{p-p}$, $f_c=1MHz$		0.28		%
Crosstalk (Channel to Channel)	At 1MHz		-60		dB
Signal to Noise Ratio*	Unweighed, 100kHz to 4.2MHz		63		dB
Propagation Delay	Delay From Input to Output, 4.5MHz		77		ns
Group Delay Variation	400KHz to 6.5MHz		4.5		ns
Differential Gain(DG)	All Channels		0.28		%
Differential Phase(DP)	All Channels		0.66		°

* $SNR=20 \times \log(714mV/RMS \text{ Noise})$

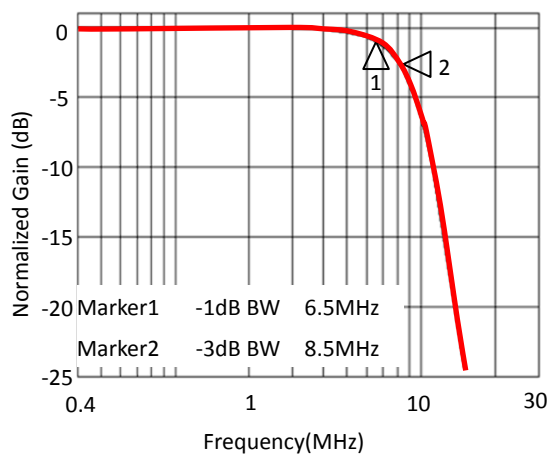


Figure2. Frequency Response

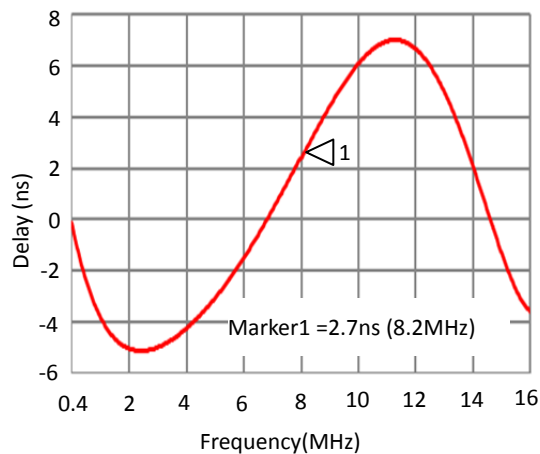


Figure3. Group Delay VS Frequency Response

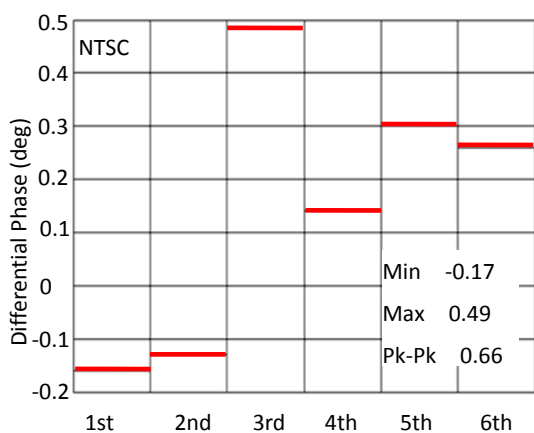


Figure4. Differential Phase

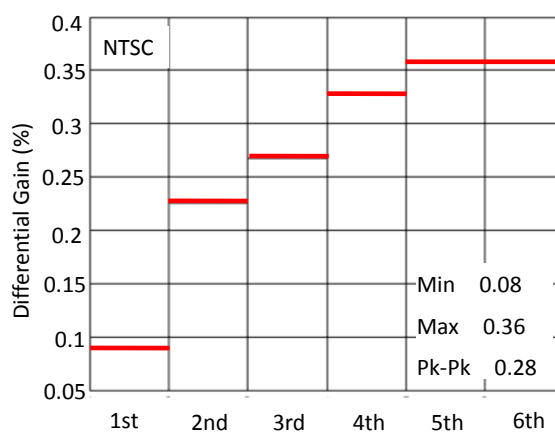


Figure5. Differential Gain

PIN Configuration and Function Description

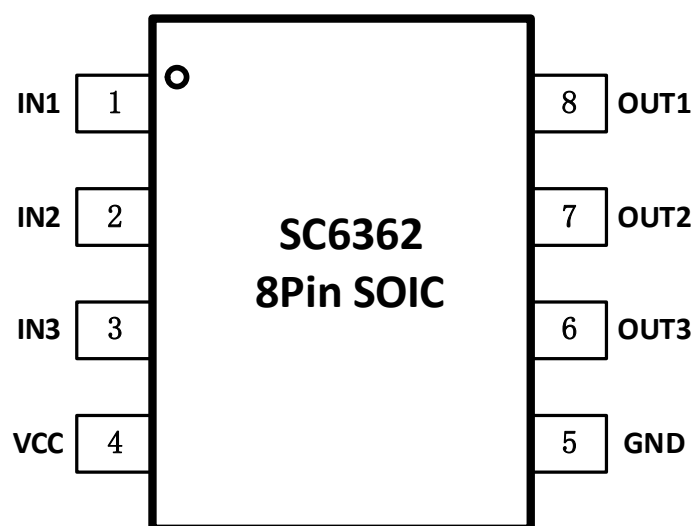


Figure 6. Pin Configuration

Table 2. Pin Function Description

Pin No	Name	Type	Description
1	IN1	Input	Input of channel 1 for Standard Definition Video Signal
2	IN2	Input	Input of channel 2 for Standard Definition Video Signal
3	IN3	Input	Input of channel 3 for Standard Definition Video Signal
4	VCC	Input	Power Supply
5	GND	Input	Ground
6	OUT3	Output	Output of Channel 3
7	OUT2	Output	Output of Channel 2
8	OUT1	Output	Output of Channel 1

Application Information

The SC6362 is a low cost, 3-channel, and 6th order SD filter. It features small group delay, great stopband attenuation and small phase distortion. Its Differential Gain and Differential Phase are 0.28%, 0.66°, respectively, and it offers over 48dB stop-band rejection in 27MHz. Moreover, a voltage gain of 6dB is added for each channel.

The SC6362 is designed to operate in a single supply with wide range from 3.3V to 5V and only consumes 6mA quiescent current per channel. This makes the SC6362 suitable for portable standard definition video applications.

The SC6362 provides an internal clamp for each channel to support AC coupling input configuration. In which case, the input signal might be negative and the clamp will be activated to avoid the sync tip to be clipped. In DC output coupling configuration, a built-in level shifter may add an offset of 300mV to make the output signal in proper voltage range for each channel. In AC coupling application, an input coupling capacitor of 0.1uF and an output coupling capacitor of 220uF are recommended, while in DC coupling application, both capacitors should be removed. For AC coupling configuration, the typical input and output voltages level are shown in Figure 7.

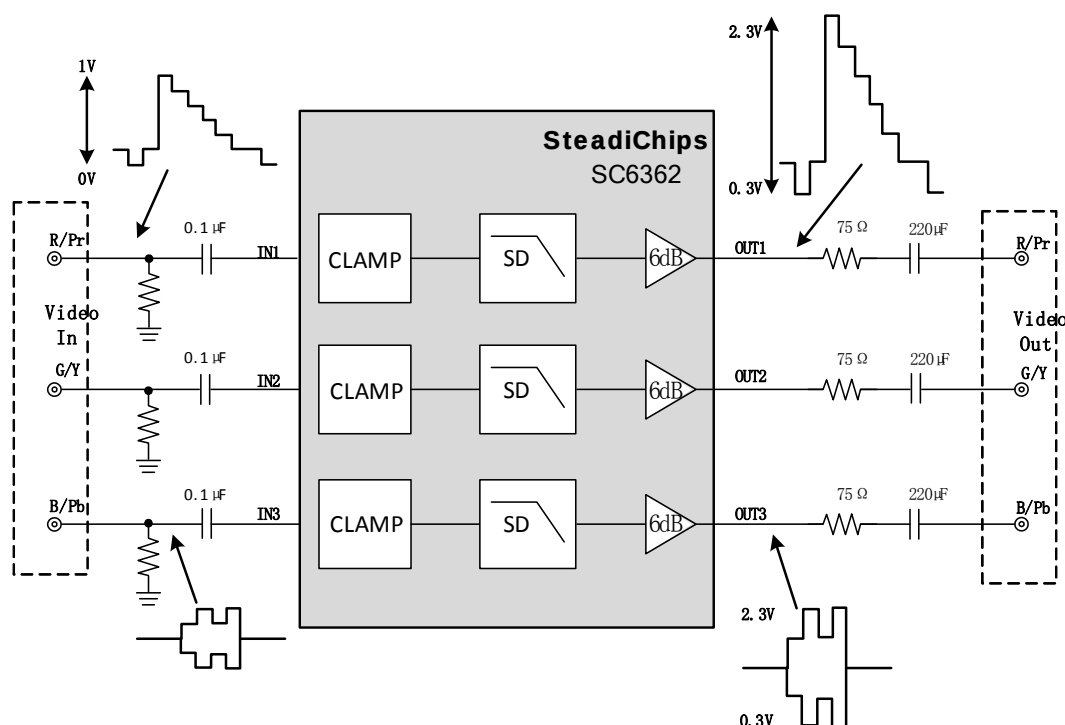


Figure 7. AC Coupled Inputs and Outputs

PACKAGE INFORMATION

SOIC-8

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
B	0.330	0.510	0.013	0.020
C	0.190	0.250	0.007	0.010
D	4.780	5.000	0.188	0.197
E	3.800	4.000	0.150	0.157
E1	5.800	6.300	0.228	0.248
e	1.270 TYP		0.050 TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

