Triple, 6th Order, Standard Definition Video Filter Driver

Features

- Triple 6th-Order 8MHz (SD) Filter
- Transparent Input Clamping
- 6dB Output Driver Gain
- AC- or DC-Coupled Inputs
- AC- or DC-Coupled Outputs
- DC-coupled outputs eliminate large AC-coupling capacitors
- Operates from 3.0V to 5.5V Power Supply
- Low power : 7mA/Channel
  21mA Total Supply Current
- 8kV ESD protection
- Green SOP-8 and MSOP-8 Packages

Applications

- Cable Set-Top Boxes
- Video Amplifiers
- DVD Players
- Communications Devices
- Personal Video Recorders (PVR)
- Video on Demand (VOD)
- Portable Video Recorders

General Description

The COS6143 is a low-power, triple video amplifier with integrated reconstruction filters and input clamps. It is intended to replace passive LC filters and drivers with low-cost integrated device.

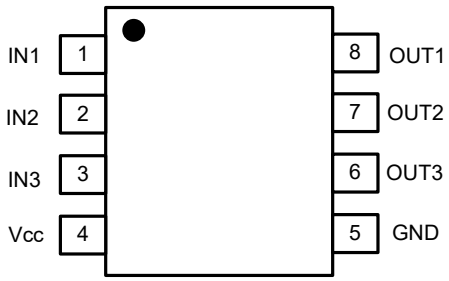
COS6143 offers 6dB Gain with rail-to-rail outputs and 6th order reconstruction filters on all three channels. It has 8MHz -3dB bandwidth and 32V/μs slew rate. COS6143 provides improved image quality compared with low order passive LC filters and discrete driver solution.

COS6143 can be DC-coupled or AC-coupled to video signals, such as DAC outputs to eliminate out-of-band noise. The outputs in COS6143 can be configured as DC or AC-coupled outputs. DC-coupling the outputs removes the need for output coupling capacitors.

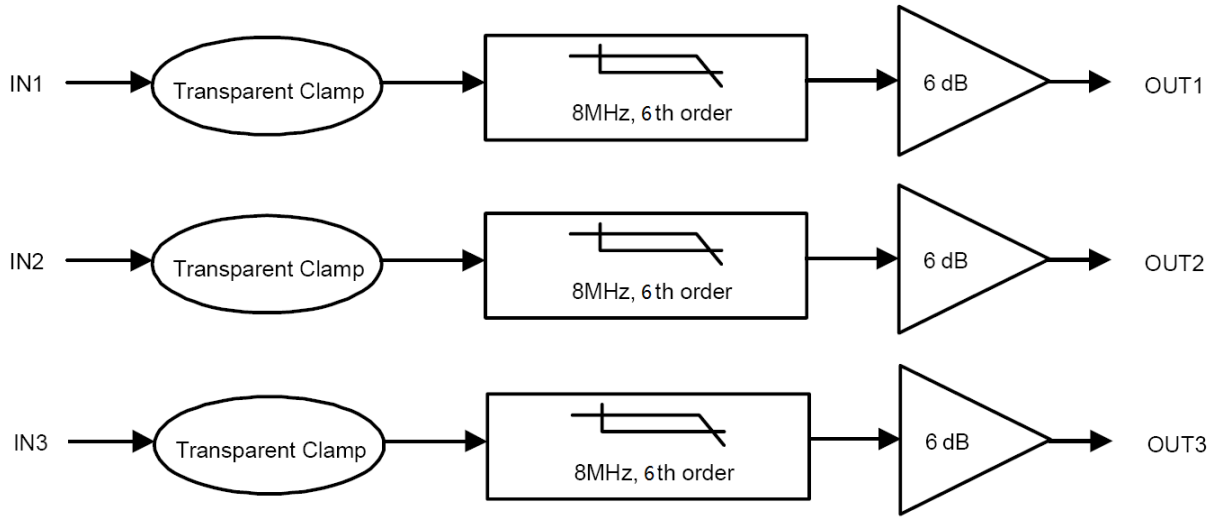
The COS6143 is available in Green SOP-8 or MSOP-8 packages. It operates over an ambient temperature range of -40℃ to +85℃.

Rev1.1

1. Pin Configuration and Functions



COS6143



Pin Functions

Pin #	Name	Type	Description
1	IN1	Input	Video input Channel 1
2	IN2	Input	Video input Channel 2
3	IN3	Input	Video input Channel 3
4	Vcc	Power	Power Supply
5	GND	Power	Ground
6	OUT3	Output	Filtered Video Output Channel 3
7	OUT2	Output	Filtered Video Output Channel 2
8	OUT1	Output	Filtered Video Output Channel 1

2. Package and Ordering Information

Order Number	Package	Package Option	Marking Information
COS6143SR	SOP-8	Tape and Reel, 2500	COS6143SR
COS6143MR	MSOP-8	Tape and Reel, 3000	COS6143MS

3. Product Specification

3.1 Absolute Maximum Ratings

Parameter	Min	Max	Units
DC Supply Voltage	-0.3	6.0	V
Analog and Digital I/O	-0.3	Vcc+0.3	V
Maximum Output Current, Do NOT Exceed		50	mA

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

3.2 Thermal Data

Parameter	Rating	Unit
Package Thermal Resistance	206 (MSOP8) 155 (SOP8)	°C/W

3.3 Electrical Characteristics

(V_{CC} = 5.0V, R_L = 150Ω connected to GND, V_{IN} = 1Vpp, and C_{IN} = 0.1μF, all outputs AC coupled with 220μF, unless otherwise noted)

PARAMETER	CONDITION	TEMP	MIN	TYP	MAX	UNITS
Input Characteristics						
Output Level Shift Voltage (VOLS)	V_{IN}=0V, no load	+25°C		386	572	mV
		-40°C to +85°C			670	
Input Voltage Clamp (VCLAMP)	I_{IN}=-3.5mA	+25°C	-220	-104		mV
		-40°C to +85°C	-300			
Voltage Gain (AV)	R_L=150Ω	+25°C	5.7	6	6.4	dB
		-40°C to +85°C	5.4		6.6	
Output Characteristics						
Output Voltage High Swing	V_{IN}=3V, R_L=150Ω to GND	+25°C	4.3	4.74		V
		-40°C to +85°C	4.2			
Power Supply						
Operating Voltage Range		+25°C	3.0		5.5	V
Power Supply Rejection Ratio (PSRR)	V_{CC} = 3.5V to 5.0V	+25°C	52	61		dB
		-40°C to +85°C	47			
Quiescent Current (IQ)	V_{IN}=0V	+25°C		21	26	mA
		-40°C to +85°C			30	
AC PERFORMANCE						
-0.1dB Bandwidth	R_L = 150Ω	+25°C		5.56		MHz
-3dB Bandwidth	R_L = 150Ω	+25°C		7.56		MHz
Filter Response (Normalized Gain)	f_{IN} = 27MHz	+25°C		46.77		dB
Slew Rate	2V Output Step, 80% to 20%	+25°C		31.5		V/us
Differential Gain (DG)	PAL DC coupled	+25°C		0.57		%
	PAL AC coupled	+25°C		0.86		%

Differential Phase (DP)	PAL DC coupled	+25°C		0.85		°
	PAL AC coupled	+25°C		1.41		°
Group Delay Variation (D/DT)	Difference between 400kHz & 6.5MHz	+25°C		31.2		ns
Crosstalk (channel - to - channel)	f = 1MHz	+25°C		-60		dB
Fall Time	2V Output Step, 80% to 20%	+25°C		38.1		ns
Rise Time	2V Output Step, 80% to 20%	+25°C		38.7		ns

4. Typical Application Circuits

The following schematic in Figure 1 is normally used for DC-coupled input from DAC which has an output voltage range from 0V to 1.4V. The AC-coupled input application schematic is shown in Figure 2. Both schematics have an AC coupled output which offer slightly lower power dissipation and high ESD protection capability.

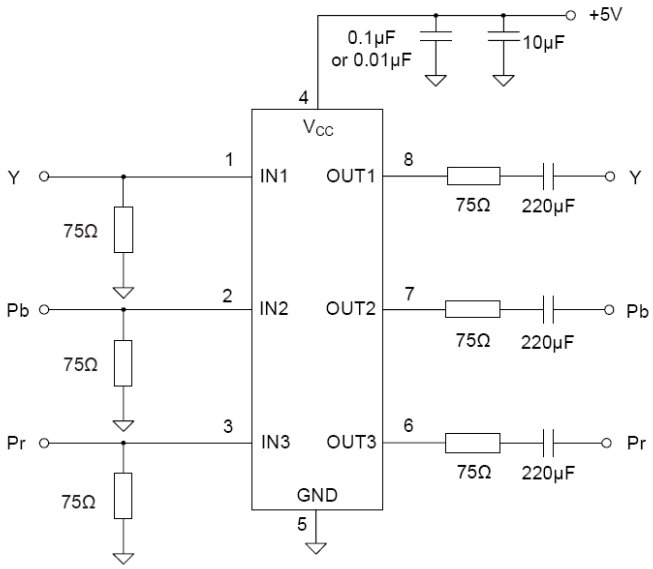


Figure 1. Input DC Coupling and Output AC Coupling Application

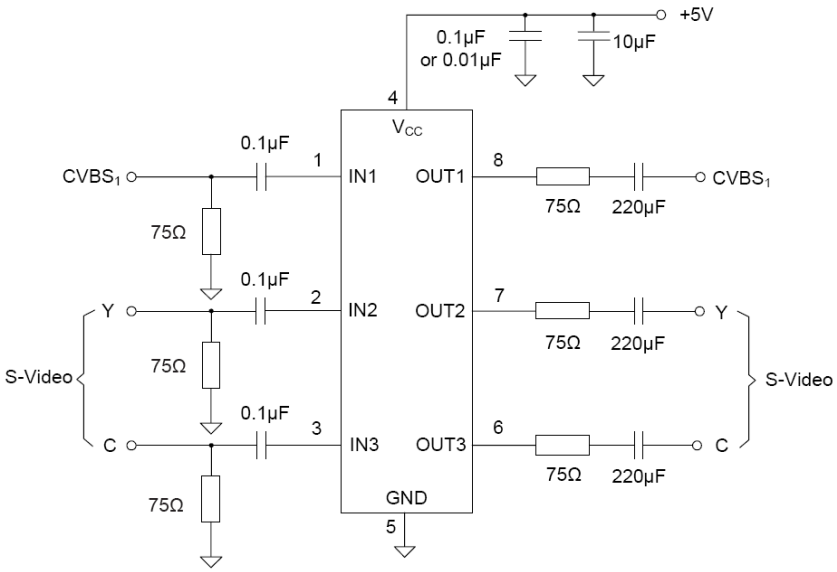
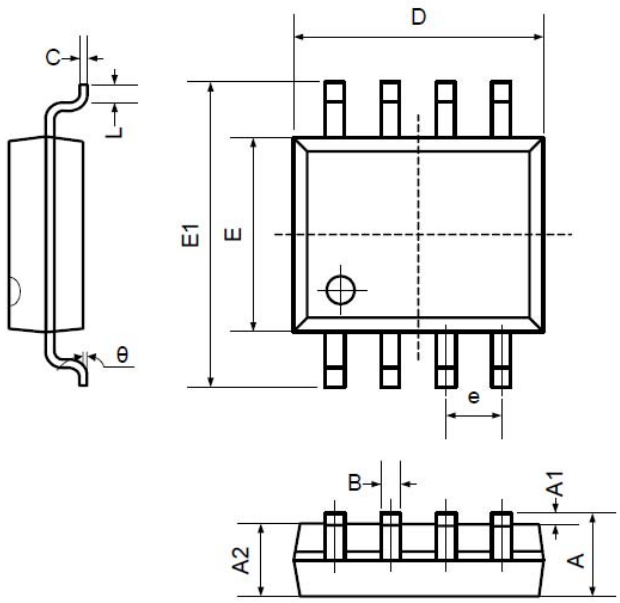


Figure 2. Both input and output are AC Coupling

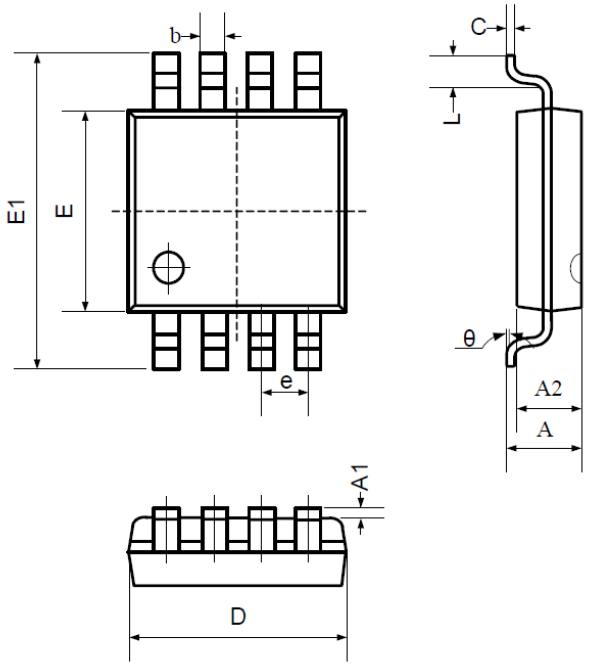
5. Package Information

5.1 SOP8 (Package Outline Dimensions)



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	1.270TYP		0.050TYP	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

5.2 MSOP8 (Package Outline Dimensions)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.800	1.200	0.031	0.047
A1	0.000	0.200	0.000	0.008
A2	0.760	0.970	0.030	0.038
b	0.30 TYP		0.012 TYP	
c	0.15 TYP		0.006 TYP	
D	2.900	3.100	0.114	0.122
e	0.65 TYP		0.026 TYP	
E	2.900	3.100	0.114	0.122
E1	4.700	5.100	0.185	0.201
L	0.410	0.650	0.016	0.026
θ	0°	6°	0°	6°