

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/ μ s slew rate. COS6143 provides improved image quality compared with low order passive LC filters and discrete driver solution.

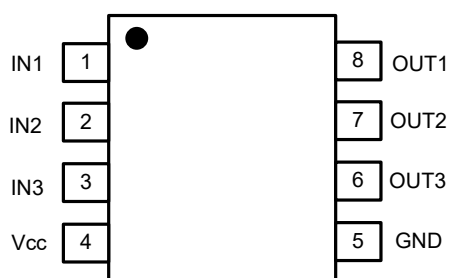
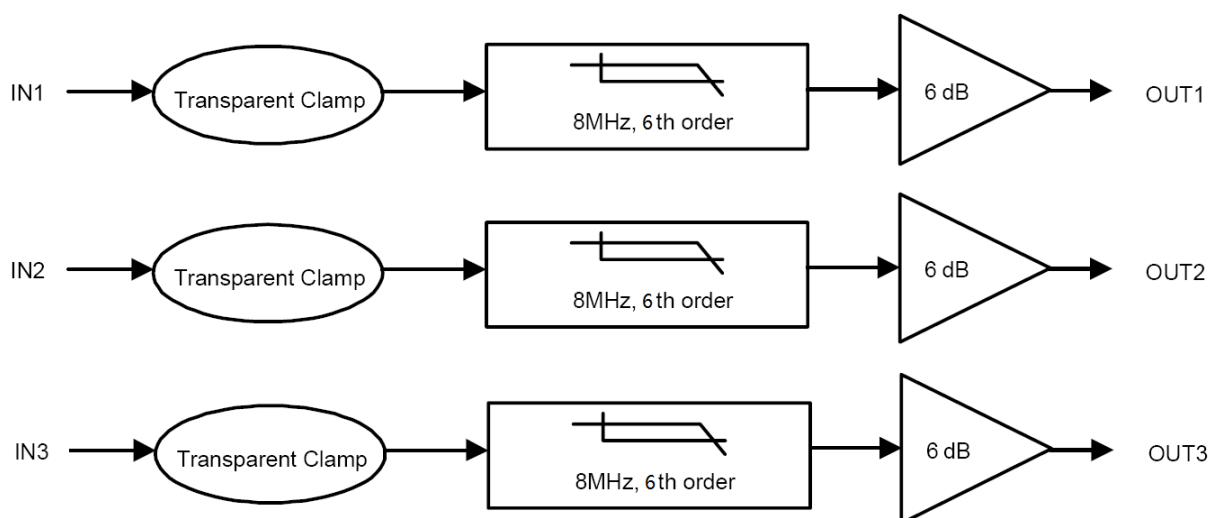
COS6143 can be DC-coupled or AC-coupled to video signals, such as DAC outputs to eliminate out-of-band noise. The outputs in COS6143 can be configured as DC or AC-coupled outputs. DC-coupling the outputs removes the need for output coupling capacitors.

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

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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 | V _{CC} +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

($V_{CC} = 5.0V$, $R_L = 150\Omega$ connected to GND, $V_{IN} = 1V_{pp}$, and $C_{IN} = 0.1\mu F$, all outputs AC coupled with $220\mu F$, 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) | $R_L=150\Omega$ | +25°C | 5.7 | 6 | 6.4 | dB |
| | | -40°C to +85°C | 5.4 | | 6.6 | |
| Output Characteristics | | | | | | |
| Output Voltage High Swing | $V_{IN}=3V$, $R_L=150\Omega$ 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 | $R_L = 150\Omega$ | +25°C | | 5.56 | | MHz |
| -3dB Bandwidth | $R_L = 150\Omega$ | +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.

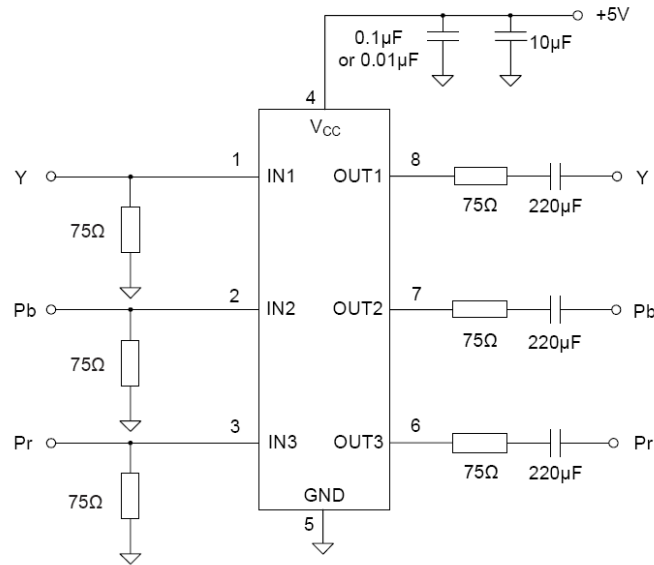


Figure 1. Input DC Coupling and Output AC Coupling Application

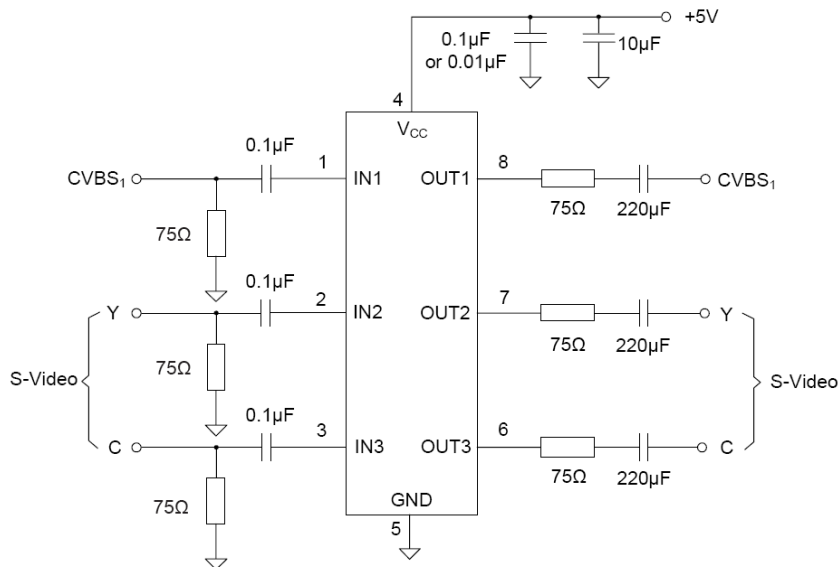
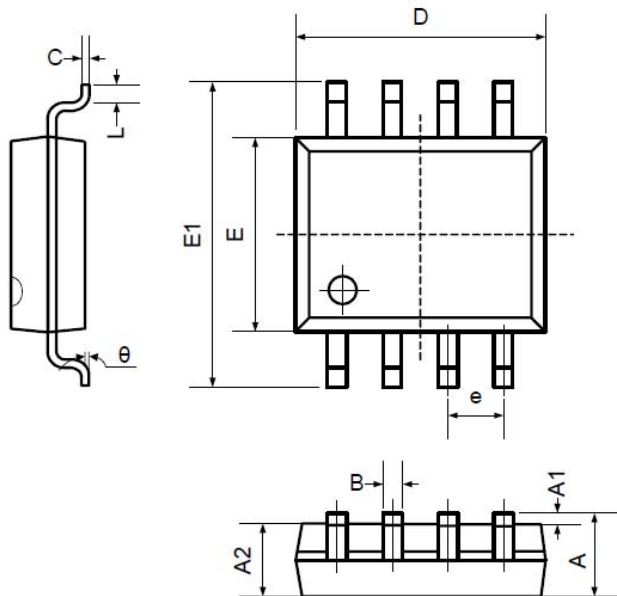


Figure 2. Both input and output are AC Coupling

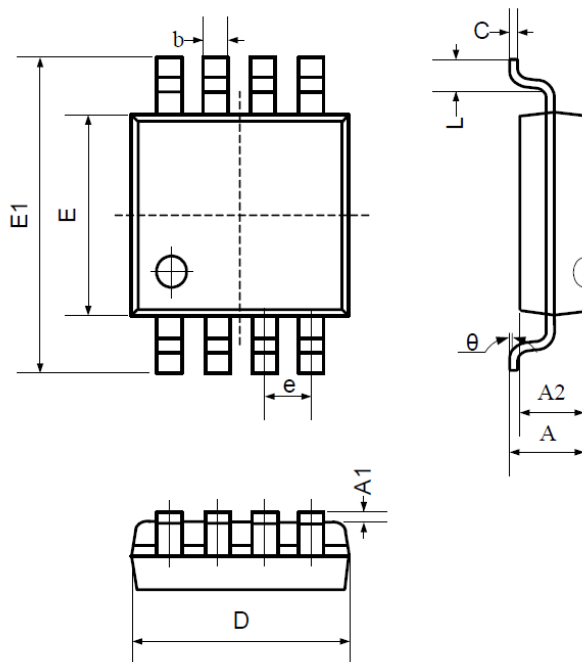
5. Package Information

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 |
| theta | 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 |
| theta | 0° | 6° | 0° | 6° |

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