



## DESCRIPTION

The A4786 is a video buffer which integrates triple 6dB Gain rail-to-rail output driver and triple 6<sup>th</sup> order output reconstruction filter, and it owns 35MHz -3dB bandwidth. Compared with passive LC filters and discrete drivers, A4786 can improve image quality. And it is ideally suited for battery powered applications, because the A4786 can operate under the environment with single supplies ranging from +3.3V to +5.5V and sinking an ultra-low 36mA quiescent current.

Video signal, such as the output of DAC, can be input in the A4786 by DC-coupled or AC-coupled ways. Internal diode clamps and bias circuitry may be used if AC-coupled inputs are required. A4786 also integrates an internal level shift circuit which avoids sync-pulse being clipped and allows DC coupled output. The driver in A4786 can drive DC or AC-coupled single (150Ω) or dual (75Ω) loads.

The A4786 is available in SOP8 package.

## ORDERING INFORMATION

Package Type	Part Number	
SOP8	M8	A4786M8R
		A4786M8VR
Note	V: Halogen free Package R: Tape & Reel	
AiT provides all RoHS products Suffix " V " means Halogen free Package		

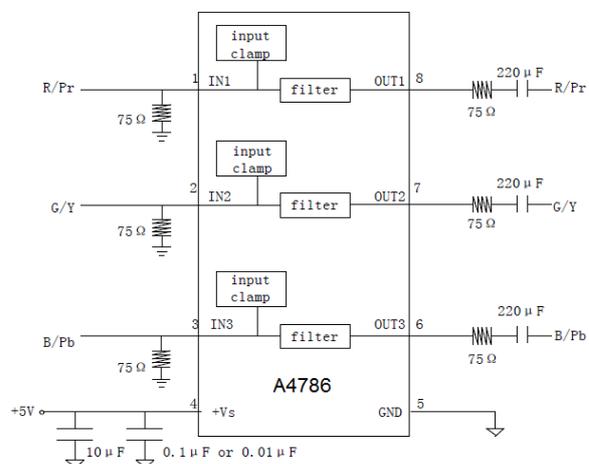
## FEATURES

- Triple 6<sup>th</sup> Order 35MHz (HD) Filters
- Transparent Input Clamping
- 6dB Output Driver Gain and Drive Dual Video Load
- Rail-to-Rail Output
- Input Voltage Range Includes Ground
- AC or DC Coupled Inputs/Outputs
- Operates from 3.3V to 5.5V Single Power Supply
- Low Power  
36mA Total Supply Current
- Available in SOP8 Package

## APPLICATION

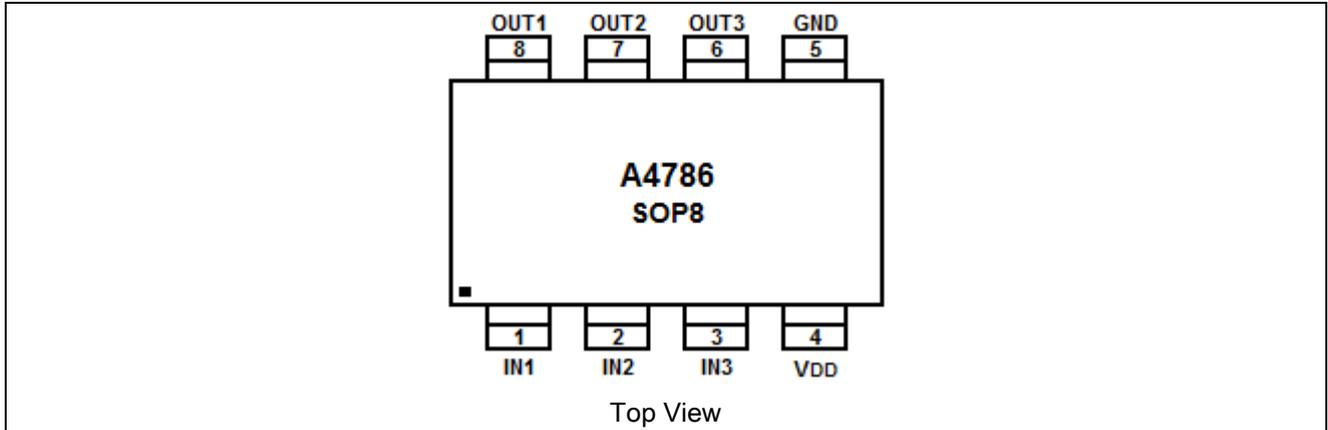
- Cable and Satellite Set-Top Boxes
- Video Amplifiers
- Communications Devices
- Personal Video Recorders
- Video on Demand
- DVD Players, HDTV, Projectors

## TYPICAL APPLICATION





## PIN DESCRIPTION



Pin #	Symbol	I/O	Function
1	IN1	Input	Signal Input, channel 1
2	IN2	Input	Signal Input, channel 2
3	IN3	Input	Signal Input, channel 3
4	V <sub>DD</sub>	Power	The power pad of the chip
5	GND	Ground	The ground pad of the chip
6	OUT3	Output	Signal Output, channel 3
7	OUT2	Output	Signal Output, channel 2
8	OUT1	Output	Signal Output, channel 1



## ABSOLUTE MAXIMUM RATINGS

Supply Voltage V+ to V-	-0.3V to 6V
Input Voltage	GND-0.3V~(+V <sub>S</sub> )+0.3V
Storage Temperature Range	-65°C~150°C
Work Temperature Range	-40°C~85°C
T <sub>A</sub> , Operating Temperature Range	-40°C~85°C

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.



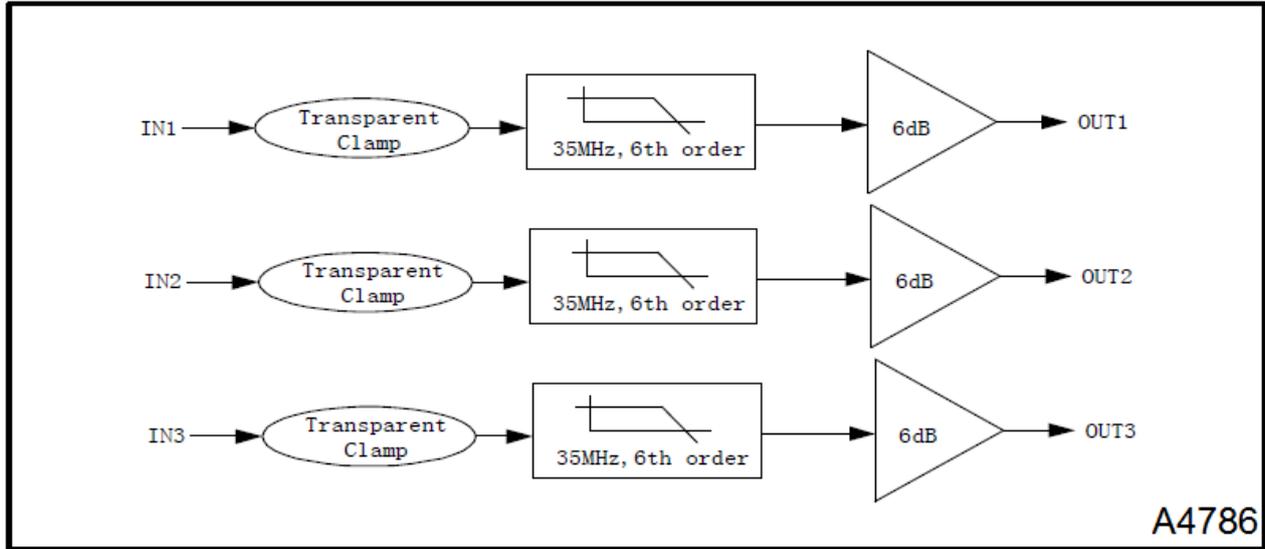
## ELECTRICAL CHARACTERISTICS

At  $V_S=5V$ ,  $R_L=150\Omega$  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	Conditions	Min.	Typ.	Max.	Unit	
<b>DC ELECTRICAL CHARACTERISTICS</b>						
$I_Q$	$V_{IN}=0V$	+25°C		36	48	mA
		-40 to +85°C			62	
$V_{OLS}$	$V_{IN}=0V$ , No Load	+25°C		550	638	mV
		-40 to +85°C			785	
Input Voltage $V_{CLAMP}$ ( $V_{CLAMP}$ )	$I_{IN}=-3.5mA$	+25°C	-180	-105		mV
		-40 to +85°C	-261			
Clamp Charge Current	$V_{IN}=V_{CLAMP}-100mV$	+25°C	-6	-5.1		mA
		-40 to +85°C	-6.6			
PSRR	DC	+25°C	48	60		dB
		-40 to +85°C	43			
Output Voltage High Swing	$V_{IN}=3V$ , $R_L=150\Omega$ connected to GND	+25°C	4.73	4.85		V
		-40 to +85°C	4.71			
<b>AC ELECTRICAL CHARACTERISTICS</b>						
GAIN ( $A_v$ )	$R_L=150\Omega$ to GND	+25°C	5.89	6	6.36	dB
		-40 to +85°C	5.56		6.52	
BW (-0.1dB)	$R_L=150\Omega$ to GND	+25°C		30		MHz
BW (-3dB)	$R_L=150\Omega$ to GND	+25°C		35		MHz
Filter response	$f_{IN}=74.25MHz$	+25°C		-45		dB
D/DT	difference from 400KHz to 20MHz	+25°C		4		nS
CROSSTALK	At 1MHz	+25°C		70		dB



**BLOCK DIAGRAM**





## DETAILED INFORMATION

### Typical Application Diagram

The following schematic in Figure 1 is normally used for AC coupled output and DC coupled input with DAC which has an output voltage range of 0V to 1.4V. AC coupled output offer slightly lower power dissipation and high ESD protection ability. Figure 2 is a kind of special application in STB .

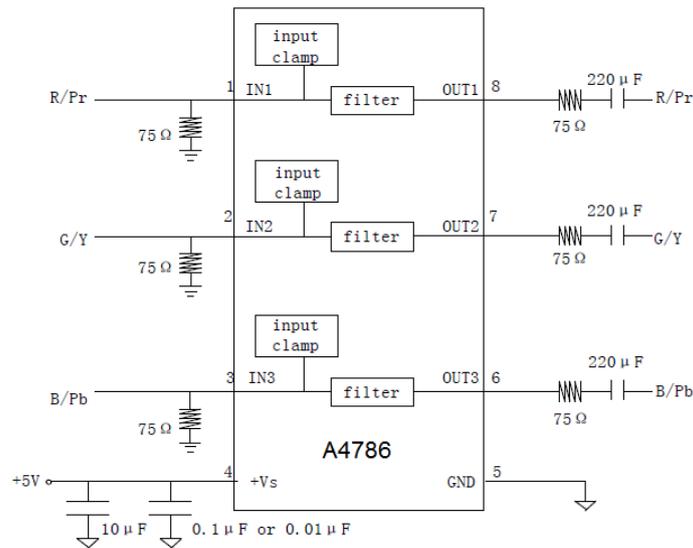


Figure 1. Input DC Coupling and Output AC Coupling Application Schematic

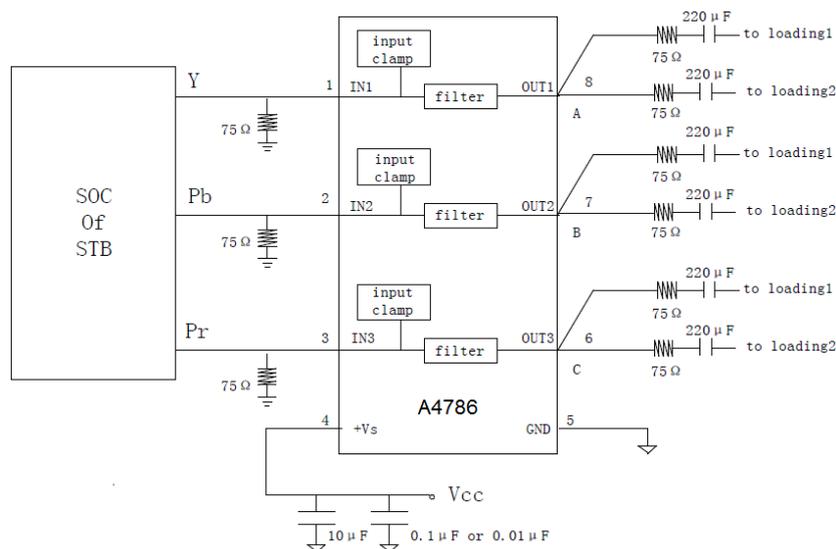


Figure 2. A kind of special application in STB



## Application Note

### Functional Description

A4786 operates from a single 3.3V to +5.5V supply. In application, A4786 is a fully integrated solution for filtering and buffering HDTV signals in front of video decoder or behind video encoder. For example, A4786 can replace three passive LC filter and one amplifier driver at R\G\B and Y\Pb\Pr output side in set-top box and DVD player, this solution can help you save PCB size and production cost, it also improves video signal performance comparing with traditional design using discrete components.

A4786 features a DC-coupled input buffer, 6-pole low-pass filter to eliminate out-of-band noise of video encoder, and a gain of +6dB in the output amplifier to drive 75Ω load. The AC or DC-coupled input buffer eliminates sync crush, droop, and field tilt. The output of A4786 also can be DC-coupled or AC-coupled.

### Input Considerations

Besides AC coupling, the A4786 inputs also can be DC-coupled. In DC coupling application, No input coupling capacitors are needed because the amplitude of input video signal from DAC includes ground and extends up to 1.4V, then A4786 can be directly connected to the output of a single-supply, current output DAC without any external bias network. Some time, if DAC's output level exceeds the range of 0V to 1.4V, or A4786 is driven by an unknown external source or a SCART switch which has its own clamping circuit, AC coupling is needed in such applications.

### Output Considerations

The A4786 outputs can be DC-coupled or AC-coupled. When 0V is input, the A4786 output voltage is 550mV typically. In DC coupling design, one 75Ω resistor is used to connect A4786's output pin with external load directly, this serial back-termination resistor is used to match the impedance of the transmission line between A4786 and external load to cancel the signal reflection. The A4786 outputs can sink and source current allowing the device to be AC-coupled with external load, in AC coupling, 220μF at least capacitor will be used in order to eliminate field tilt.

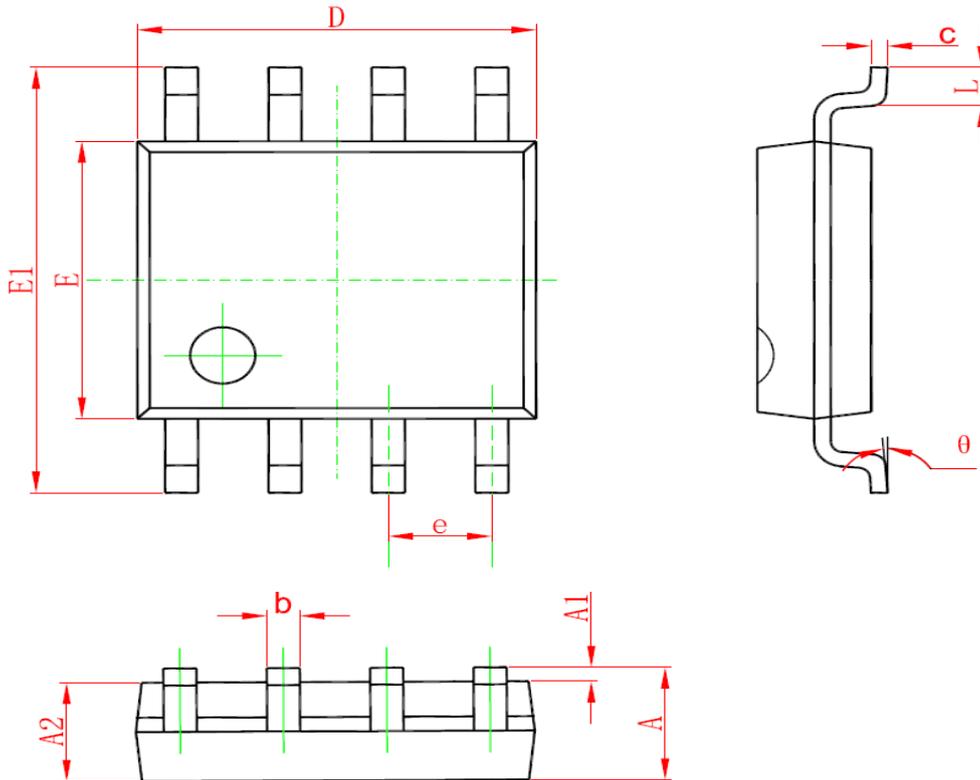
### Power-Supply Bypassing and Layout

Correct power supply bypassing is very important for optimizing video performance in design. One 0.1μF and one 10μF capacitors are always used to Bypass V<sub>CC</sub> pin of A4786, please place these two capacitors as close to the A4786 output pin as possible, a large ground plane is also needed to ensure optimum performance. The input and output termination resistors should be placed as close to the related pin of A4786 as possible to avoid performance degradation. The PCB traces at the output side should have 75Ω characteristic impedance in order to match the 75Ω characteristic impedance cable connecting external load. In design, please keep the board trace at the inputs and outputs of the A4786 as short as possible to minimize the parasitic stray capacitance and noise pickup.



## PACKAGE INFORMATION

Dimension in SOP8 (Unit: mm)



Symbol	Min	Max
A	-	1.750
A1	0.100	0.230
A2	1.300	1.500
b	0.390	0.480
c	0.210	0.260
D	4.700	5.100
E	3.700	4.100
E1	5.800	6.200
e	1.270(BSC)	
L	0.500	0.800
$\theta$	0°	8°



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