
Triple, 35MHz, 6th Order, HDTV Video Filter Driver**BL1516****Description**

The BL1516 is a video buffer which integrates triple 6dB Gain rail-to-rail output driver and triple 6th order output reconstruction filter, and it owns 35MHz -3dB bandwidth. Compared with passive LC filters and discrete drivers, BL1516 can improve image quality. And it is ideally suited for battery powered applications, because the BL1516 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 BL1516 by DC-coupled or AC-coupled ways. Internal diode clamps and bias circuitry may be used if AC-coupled inputs are required. BL1516 also integrates an internal level shift circuit which avoids sync-pulse being clipped and allows DC-coupled output. The driver in BL1516 can drive DC or AC-coupled single (150Ω) or dual (75 Ω) loads.

Features

- Triple 6th 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
- Green SOP8 Package

Applications

Cable and Satellite Set-Top Boxes

Video Amplifiers

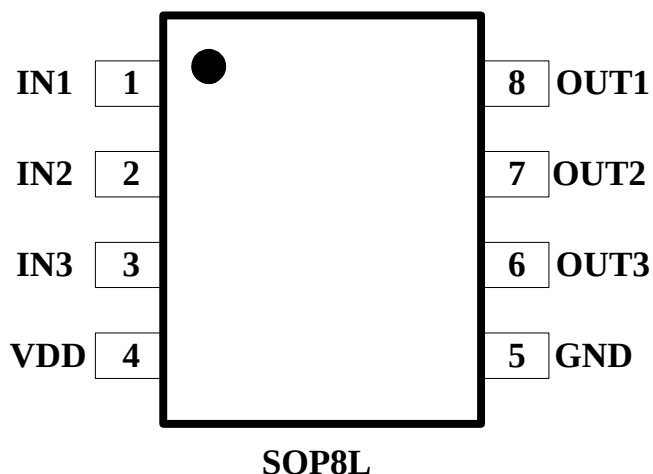
Communications Devices

Personal Video Recorders

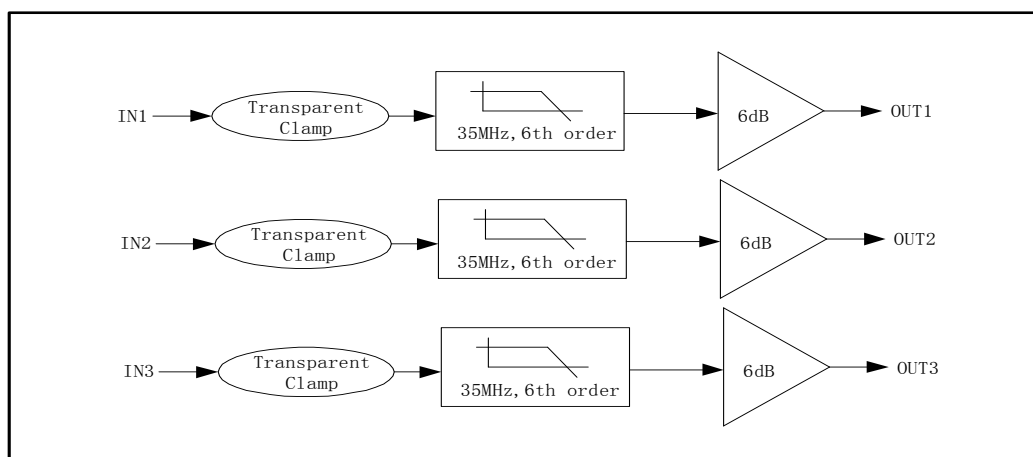
Video on Demand,

DVD Players, HDTV, Projectors

Pin Configuration



Block Diagram



Pin Description

No.	Pin Name	Description	I/O
1	IN1	Signal Input, channel 1	Input
2	IN2	Signal Input, channel 2	Input
3	IN3	Signal Input, channel 3	Input
4	VDD	The power pad of the chip	Power
5	GND	The ground pad of the chip	Ground
6	OUT3	Signal Output, channel 3	Output
7	OUT2	Signal Output, channel 2	Output
8	OUT1	Signal Output, channel 1	Output

ABSOLUTE MAXIMUM RATINGS

Parameter	Min	Max	Units
Supply Voltage V+ to V-	-0.3	6	V
Input Voltage	GND-0.3	(+Vs)+ 0.3	V
Storage Temperature Range	-65	150	°C
Work Temperature Range	-40	85	°C
Operating Temperature Range T _A	-40	85	°C

Notes:

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.

ORDERING INFORMATION

MODEL	PIN- PACKAGE	SPECIFIED TEMPERATURE RANGE	PACKAGE OPTION
BL1516	SOP8	- 40°C to +85°C	Tape and Reel, 2500

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)

DC ELECTRICAL CHARACTERISTICS						
PARAMETER	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
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			

AC ELECTRICAL CHARACTERISTICS						
PARAMETER	CONDITIONS	TEMP	MIN	TYP	MAX	UNITS
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

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 Is a kind of special application in STB .

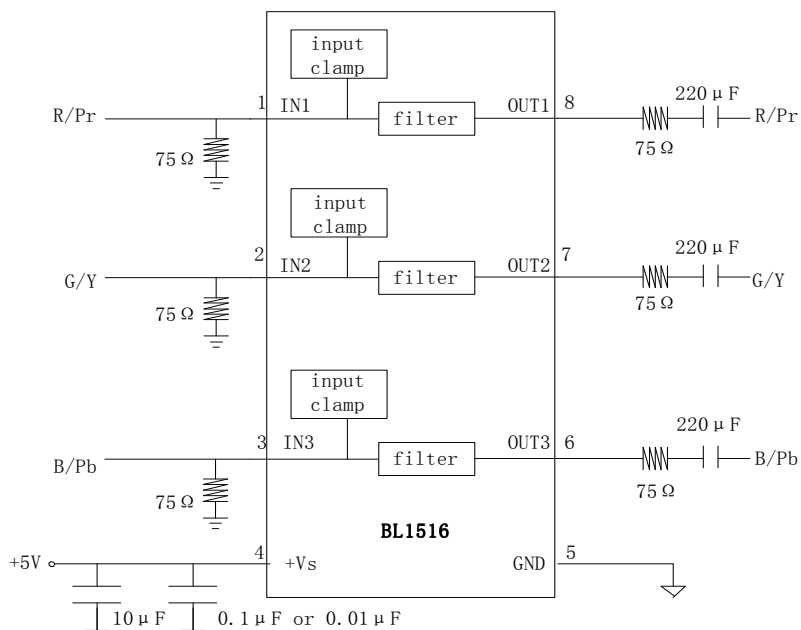


Figure 1 Input DC Coupling and Output AC Coupling Application Schematic

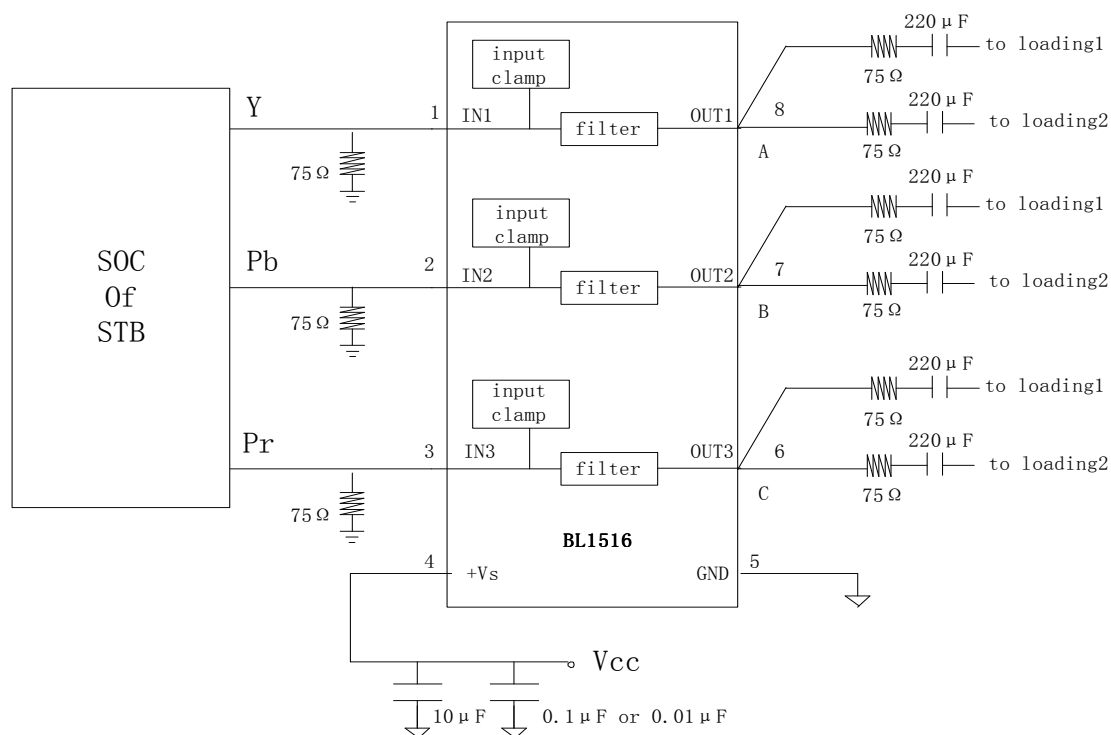


Figure 2 A kind of special application in STB

APPLICATION NOTE

Functional Description

BL1516 operates from a single 3.3V to +5.5V supply. In application, BL1516 is a fully integrated solution for filtering and buffering HDTV signals in front of video decoder or behind video encoder. For example, BL1516 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. BL1516 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 BL1516 also can be DC-coupled or AC-coupled.

Input Considerations

Besides AC coupling, the BL1516 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 BL1516 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 BL1516 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

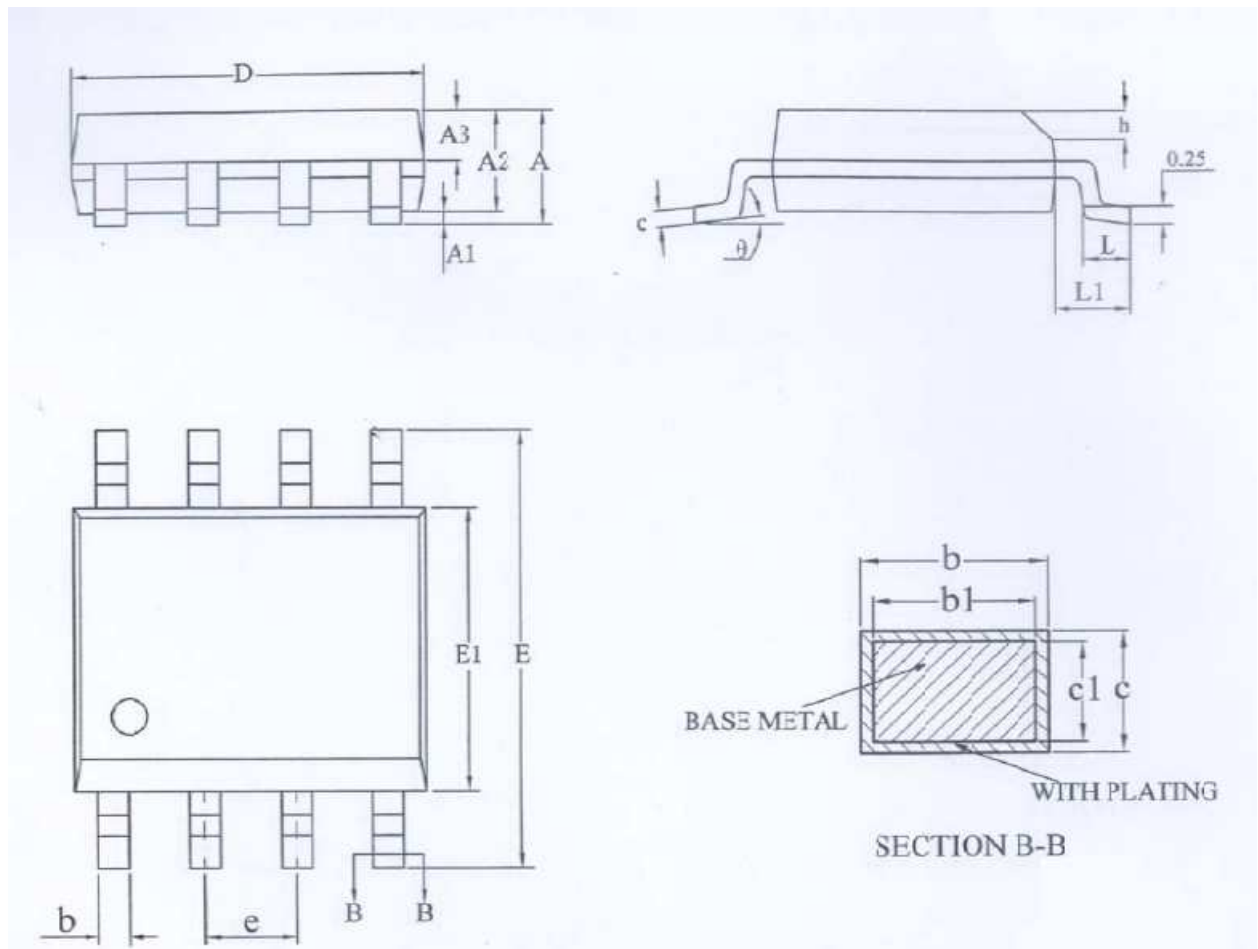
The BL1516 outputs can be DC-coupled or AC-coupled. When 0V is input, the BL1516 output voltage is 550mV typically. In DC coupling design, one 75Ω resistor is used to connect BL1516's output pin with external load directly, this serial back-termination resistor is used to match the impedance of the transmission line between BL1516 and external load to cancel the signal reflection. The BL1516 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 VCC pin of BL1516, please place these two capacitors as close to the BL1516 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 BL1516 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 BL1516 as short as possible to minimize the parasitic stray capacitance and noise pickup.

PACKAGE OUTLINE DIMENSIONS (SOP8)

SOP8L



SYMBOL	MILLIMETER		MILLIMETER
	MIN.	NOM	MAX.
A	-	-	1.75
A1	0.10	-	0.23
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	-	0.48
b1	0.38	0.41	0.44
c	0.21	-	0.26
c1	0.19	0.20	0.21
D	4.70	4.90	5.10
E	5.80	6.00	6.20
E1	3.70	3.90	4.10
e	1.27BSC		1.27BSC
h	0.25	-	0.50
L	0.50	-	0.80
L1	1.05BSC		1.05BSC
θ	0°	-	8°