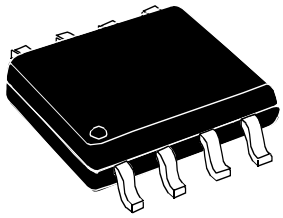
STV6433

Filtered Video Buffers for STB and DVD Devices

TARGET SPECIFICATION

FEATURES

- **Y, C Inputs with 7.1 MHz filters**
- **40 dB Stop Band Attenuation at 27 MHz**
- **RF Signal with 14 dB Notch Filter at 4.5 MHz for Sound Trap**
- **RF Signal with -170 ns Differential Group Delay between 400 kHz and 3.58 MHz**
- **6 dB Gain**
- **Capabilities of Integrated Output Buffers: Double-adapted Loads (75Ω) on CVBS Output, Single-adapted Loads on Y and C Outputs**
- **AC-coupled Inputs**
- **DC-coupled Outputs for Y, CVBS and RFOUT**
- **DC- or AC-coupled Output for COUT**
- **Bottom Clamp on Y, Bias Clamp on C**
- **Crosstalk: 55 dB (typical)**



SO8

Order Code: STV6433

DESCRIPTION

The STV6433 is a filtered video output interface for DVD, Satellite and Cable Set-Top Box applications.

After removing D/A conversion noise using integrated low pass filters, the STV6433 adapts the Y and C signals coming from the digital decoder in amplitude and impedance for transmission to the TV set and an auxiliary device (VCR, DVD recorders, etc.) via adapted 75-ohm cables.

A Y+C adder with buffer for providing a CVBS signal to external loads and a pre-processing of a CVBS signal for RF modulator (RFOUT) are included in STV6433.

This pre-processing is a notch filtering at 4.5 MHz (before the addition of the audio signal in the RF modulator) and a 170 ns Y/C delay (to compensate the nominal distorsion in the TV IF filter).

The STV6433 is powered by a 5V voltage supply and is fully-compatible with STi55xx digital encoders.

Table of Contents

1 Pin Connections

Figure 1: STV6433 Pinout

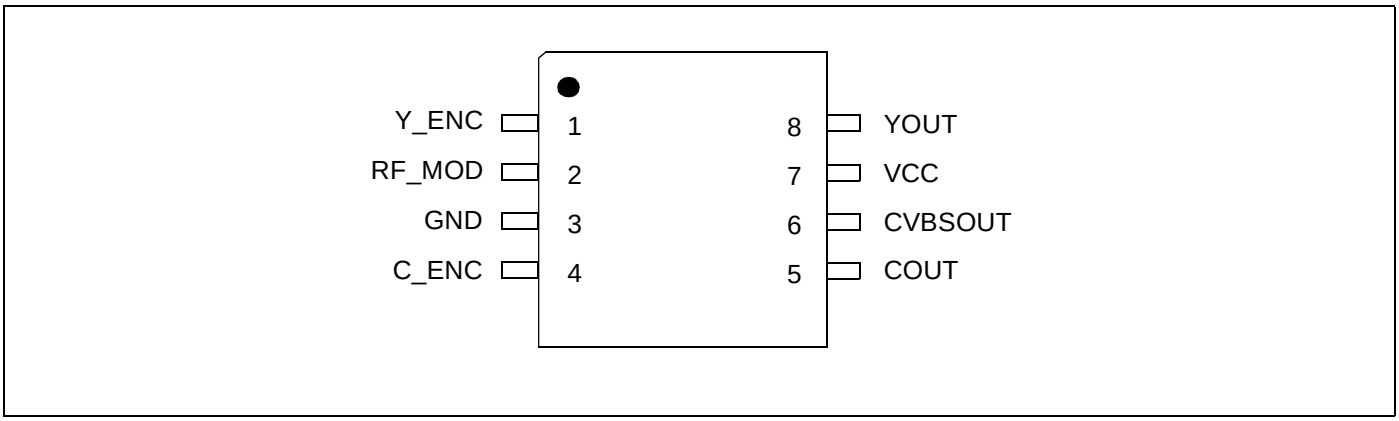
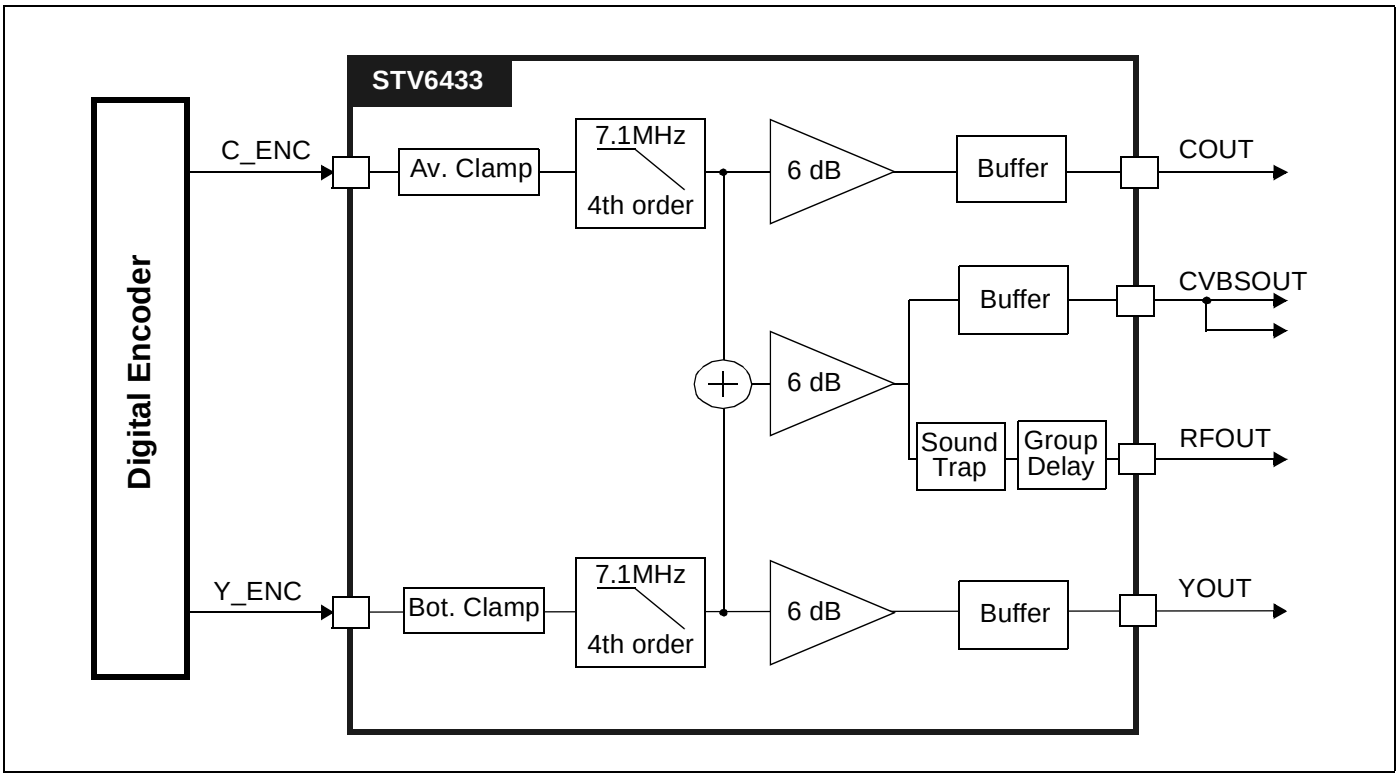


Table 1: STV6433 Pin List

Pin No.	Name	Description
1	Y_ENC	Y Input from Encoder
2	RF_MOD	CVBS Output for RF modulator
3	GND	
4	C_ENC	Chroma Input from Encoder
5	COUT	Chroma Output
6	CVBSOUT	CVBS Output
7	VCC	+5 V Supply
8	YOUT	Y Output

2 General Information

Figure 2: STV6433 Block Diagram



3 Electrical Characteristics

3.1 Absolute Maximum Ratings

Symbol	Parameter	Value	Unit
V_{CC}	Powering	6	V
V_i	Voltage at Pin i to GND	-0.6, V_{CC}	V
V_{ESD}	Maximum ESD voltage allowed. 100 pF capacitor discharged through 1.5 kΩ serial resistor (Human Body Model)	±4	k
T_{OPER}	Ambient Operating Temperature	0, +70	°C
T_{STG}	Storage Temperature	-55, +150	°C

3.2 Thermal Data

Symbol	Parameter	Value	Unit
R_{thJA}	Thermal Resistance (Junction-to-Ambient)	140	°C/W

3.3 Electrical Characteristics

T_{AMB} = 25°C, V_{CC} = 5 V, R_{GENE} = 75Ω, R_{LOAD} (Y, C, CVBS) = 150Ω, R_{LOAD} (RF) = 600Ω, unless otherwise specified.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{CC}	Operating Supply Voltage		4.75	5	5.25	V
I_{CC}	Supply Current (V_{CC})	No Load		30	40	mA
Y and CVBS Section						
V_{DCIN}	DC Input Level, Bottom Clamp Input	Bottom Level		2		V
I_{CLAMP}	Clamping Current, Bottom Clamp Input	at V_{DCIN} - 400 mV	1	2		mA
I_{LEAK}	Input Leakage Current, Bottom Clamp Input	V_{IN} = V_{DCIN} +1 V		1	10	µA
C_{IN}	Input Capacitance			2		pF
V_{IN}	Maximum Input Signal	V_{CCV} = 5 V			1.5	V_{PP}
DYN	Dynamic Output Signal	V_{CCV} = 5 V			3	V_{PP}
YF1	-1 dB Bandwidth (Flatness) of Y1 and CVBS	1H Signal	4.0	4.5		MHz
YF3	-3 dB Bandwidth of Y1 and CVBS	1H Signal		7.1		MHz
YSBR	Stopband Rejection	27 MHz / 100 kHz		- 40		dB
YOS	Peak Overshoot	2 Vpp Output pulse		5		%

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
Flatness	Spread of Gain in Video Bands	V_{IN} = 1 V_{PP} Band = 15kHz -5MHz for Y and CVBS			+/-0.5	dB
VCTo	Crosstalk Isolation of Y or CVBS from C	V_{IN} = 0.5 V_{PP} at 3.58 MHz, on C_ENC, R_{LOAD} = 150Ω		55		dB
R_{OUT}	Output Resistance			5	10	W
GY	Gain on Y1, Y2 and CVBS channels	V_{IN} = 1 V_{PP}	5.5	6	6.5	dB
DC_{YOUT}	DC Output Voltage (Y and CVBS)	Bottom sync pulse, at IC output pins		0.6		V
DPHI	Differential Phase	V_{IN} = 1 V_{PP} at 3.58 MHz		0.2	3	deg.
DG	Differential Gain	V_{IN} = 1 V_{PP} at 3.58 MHz		0.3	3	%
LNL	Luminance non-linearity			0.5	3	%
VSN	Video S/N Ratio: Y and CVBS channels	NTC-7 weighting 4.4 MHz lowpass		70		dB
Dtpd	Group delay variation from Flatness			9		nS
RFOUT Section						
Tpd	Group Delay RFOUT	f = 3.58 MHz (ref. = 400 kHz)	-205	-170	-135	nS
T_{CLD}	Chroma / Luminance delay	f = 3.58 MHz (ref. = 400 kHz)	-205	-170	-135	nS
DPHIRF	Differential Phase RFOUT	$V_{IN\ Y,C}$ = 1 V_{PP} at 3.58 MHz		1	3	deg.
DGRF	Differential Gain RFOUT	$V_{IN\ Y,C}$ = 1 V_{PP} at 3.58 MHz		1.5	3	%
pK	Gain Peaking	f = 2 MHz		0.5	0.75	dB
RFOS	Peak Overshoot	f = 3.58 MHz (ref. = 400 kHz)	-0.5		0.75	dB
AV45	Notch Attenuation	from 4.4 to 4.63 MHz (ref. = 400kHz)	-14			dB
AV42	Notch Attenuation	at 4.2 MHz (ref. = 400 kHz)			-8	dB
RFSN	Video S/N Ratio: RF channel	NTC-7 weighting 4.4 MHz lowpass		60		dB
TPASS	Pass Delay, RFOUT	f = 200 kHz to 3 MHz	-50		+50	nS
Chroma Section						
V_{DCIN}	DC Input Level			3		V
R_{IN}	Input Resistance		30	50		kΩ
C_{IN}	Input Capacitance			2		pF
V_{IN}	Max Input Signal				1	V_{PP}
DYN	Dynamic Output Signal				2	V_{PP}
DC_{COUT}	DC Output Voltage (COUT)	Without signal		1.6		V
CF1	-1 dB Bandwidth (Flatness)		4	4.5		MHz
CF3	-3 dB Bandwidth			7.1		MHz

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
CSBR	Stopband Rejection	f = 27 MHz to 100 MHz		- 40		dB
COS	Peak Overshoot	2Vpp Output pulse		4		%
CCTo	Crosstalk Isolation of C from Y and CVBS Channels	V_{IN} = 1 V_{PP} at 3.58 MHz, on Y or CVBS inputs, R_{LOAD} = 150Ω		55		dB
R_{OUT}	Output Resistance			5	10	W
GC	Gain on C Channel	V_{IN} = 1 V_{PP}	5.5	6	6.5	dB
CToYdel	Chroma to Luma Delay, Y/C Source	V_{IN} = 1 V_{PP} @ 3.58 MHz,			20	ns

4 Package Mechanical Data

Figure 3: 8-Pin Small Outline Package (SO8)

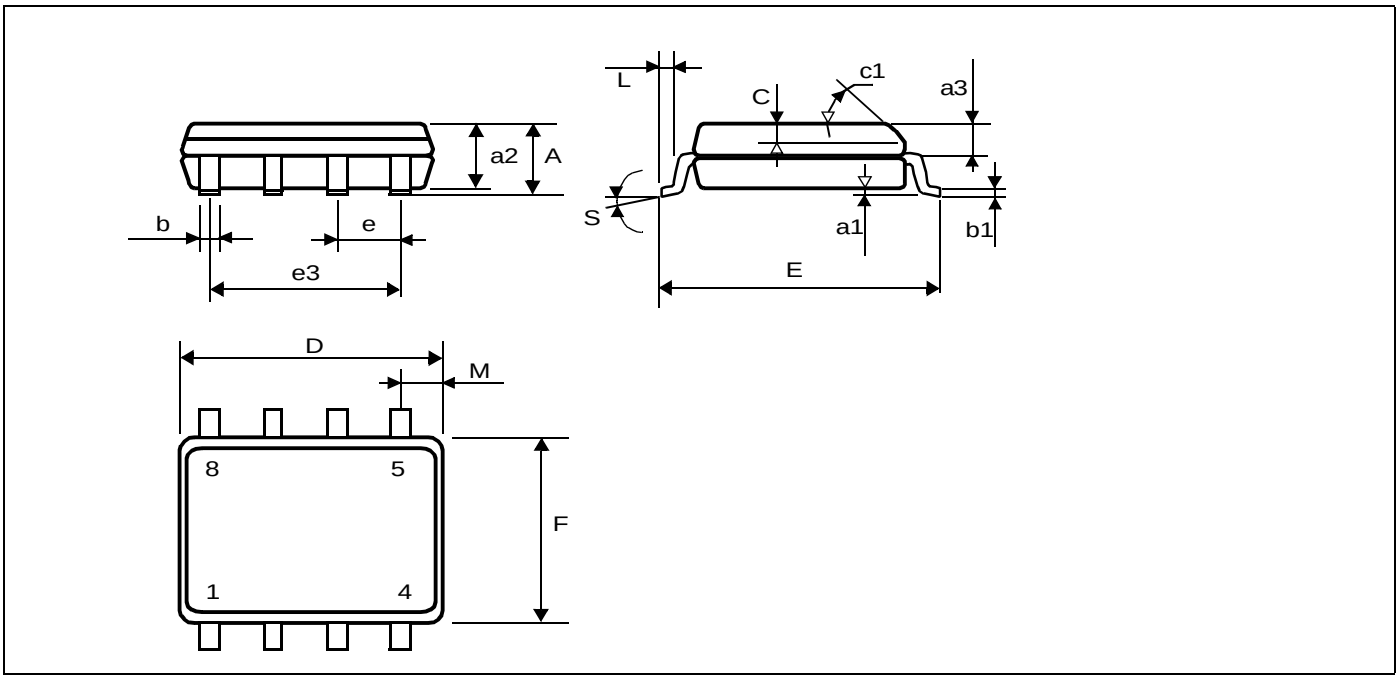


Table 2: SO8 Package Dimensions

Dim.	mm			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		1.75				0.069
a1	0.1		0.25	0.004		0.010
a2			1.65			0.065
a3	0.65		0.85	0.026		0.033
b	0.35		0.48	0.014		0.019
b1	0.19		0.25	0.007		0.010
C	0.25		0.50	0.010		0.020
c1		45°			45°	
D	4.8		5.0	0.189		0.197
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		3.81			0.150	
F	3.8		4.0	0.15		0.157
L	0.40		1.27	0.016		0.050
M			0.60			0.024
S			8°			8°

5 Revision History

Table 3: Summary of Modifications

Revision	Main Changes	Date
1.0	First Issue	March 2002
1.1	Edit of FEATURES on page 1.	January 2003