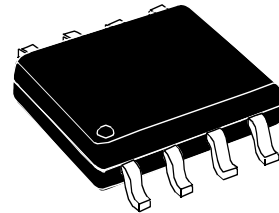


## Filtered Video Buffers for STB and DVD Devices

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 ( $75\Omega$ ) 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)



S08

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 distortion in the TV IF filter).

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

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# 1 Pin Connections

Figure 1: STV6433 Pinout

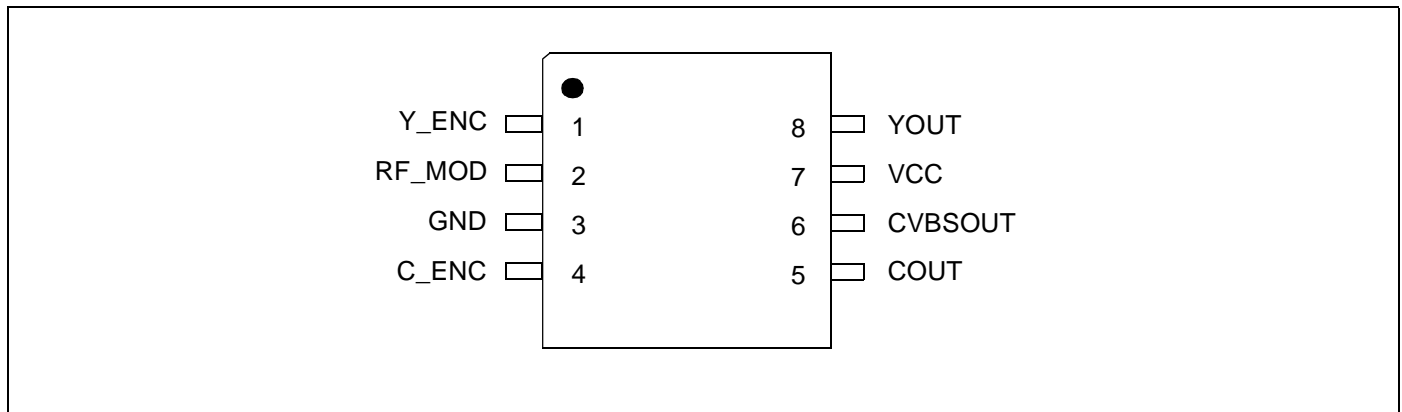
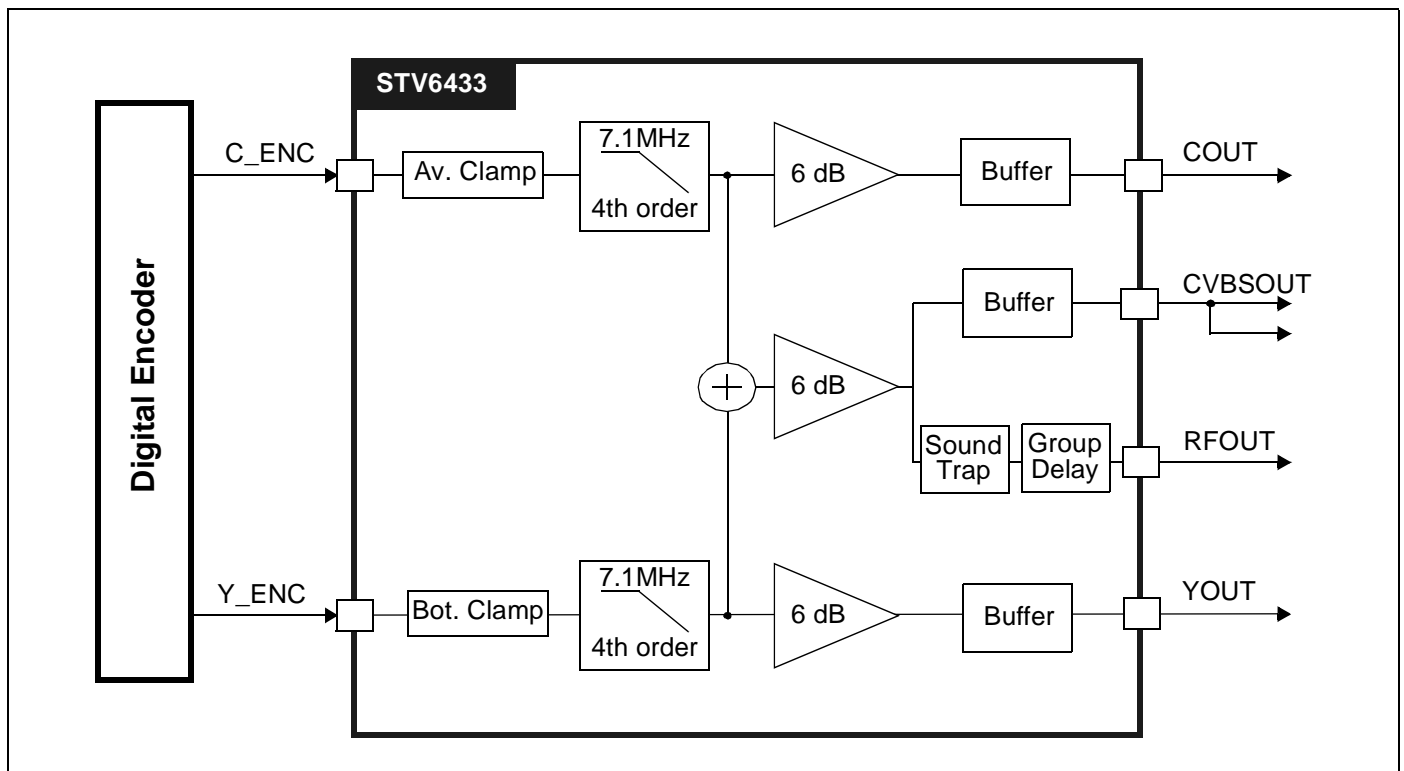


Table 1: STV6433 Pin List

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 k $\Omega$ serial resistor (Human Body Model)	$\pm 4$	k
$T_{OPER}$	Ambient Operating Temperature	0, +70	$^{\circ}\text{C}$
$T_{STG}$	Storage Temperature	-55, +150	$^{\circ}\text{C}$

### 3.2 Thermal Data

Symbol	Parameter	Value	Unit
$R_{thJA}$	Thermal Resistance (Junction-to-Ambient)	140	$^{\circ}\text{C}/\text{W}$

### 3.3 Electrical Characteristics

$T_{AMB} = 25^{\circ}\text{C}$ ,  $V_{CC} = 5\text{ V}$ ,  $R_{GENE} = 75\Omega$ ,  $R_{LOAD} (Y, C, CVBS) = 150\Omega$ ,  $R_{LOAD} (RF) = 600\Omega$ , 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
<b>Y and CVBS Section</b>						
$V_{DCIN}$	DC Input Level, Bottom Clamp Input	Bottom Level		2		V
$I_{CLAMP}$	Clamping Current, Bottom Clamp Input	at $V_{DCIN} - 400\text{ mV}$	1	2		mA
$I_{LEAK}$	Input Leakage Current, Bottom Clamp Input	$V_{IN} = V_{DCIN} + 1\text{ V}$		1	10	$\mu\text{A}$
$C_{IN}$	Input Capacitance			2		pF
$V_{IN}$	Maximum Input Signal	$V_{CCV} = 5\text{ V}$			1.5	$V_{PP}$
DYN	Dynamic Output Signal	$V_{CCV} = 5\text{ V}$			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, $R_{LOAD} = 150\Omega$		55		dB
R <sub>OUT</sub>	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 <sub>YOUT</sub>	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
<b>RFOUT Section</b>						
Tpd	Group Delay RFOUT	f = 3.58 MHz (ref. = 400 kHz)	-205	-170	-135	nS
T <sub>CLD</sub>	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
<b>Chroma Section</b>						
V <sub>DCIN</sub>	DC Input Level			3		V
R <sub>IN</sub>	Input Resistance		30	50		kΩ
C <sub>IN</sub>	Input Capacitance			2		pF
V <sub>IN</sub>	Max Input Signal				1	V <sub>PP</sub>
DYN	Dynamic Output Signal				2	V <sub>PP</sub>
DC <sub>COUT</sub>	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	$f = 27 \text{ MHz to } 100 \text{ MHz}$		- 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, $R_{LOAD} = 150\Omega$		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	$V_{IN} = 1 V_{PP} @ 3.58 \text{ MHz},$			20	ns

## 4 Package Mechanical Data

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

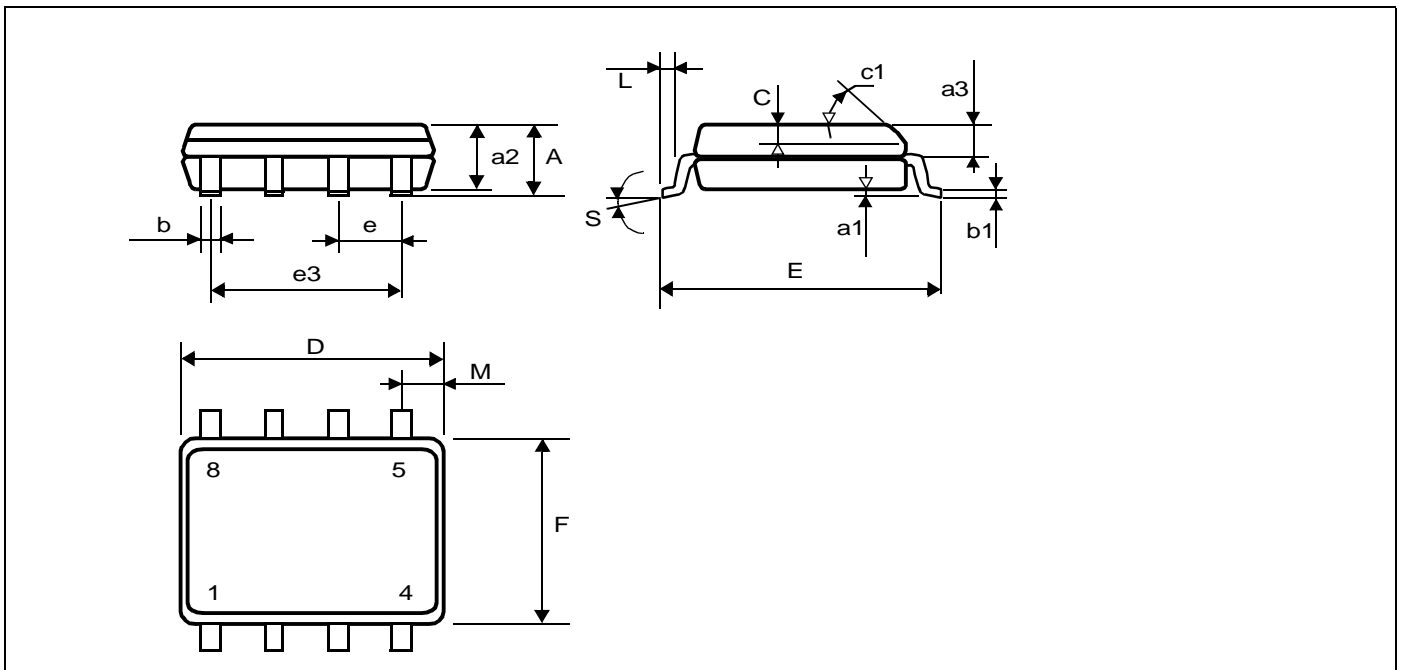


Table 2: SO8 Package Dimensions

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

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