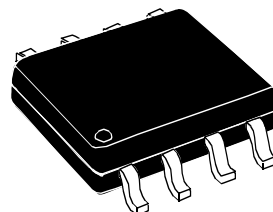


Filtered Video Buffers for STB and DVD Devices

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 distortion 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

| | | |
|------------------|-----------------------------------|----------|
| Chapter 1 | Pin Connections | 3 |
| Chapter 2 | General Information | 4 |
| Chapter 3 | Electrical Characteristics | 5 |
| 3.1 | Absolute Maximum Ratings | 5 |
| 3.2 | Thermal Data | 5 |
| 3.3 | Electrical Characteristics | 5 |
| Chapter 4 | Package Mechanical Data | 8 |
| Chapter 5 | Revision History | 9 |

1 Pin Connections

Figure 1: STV6433 Pinout

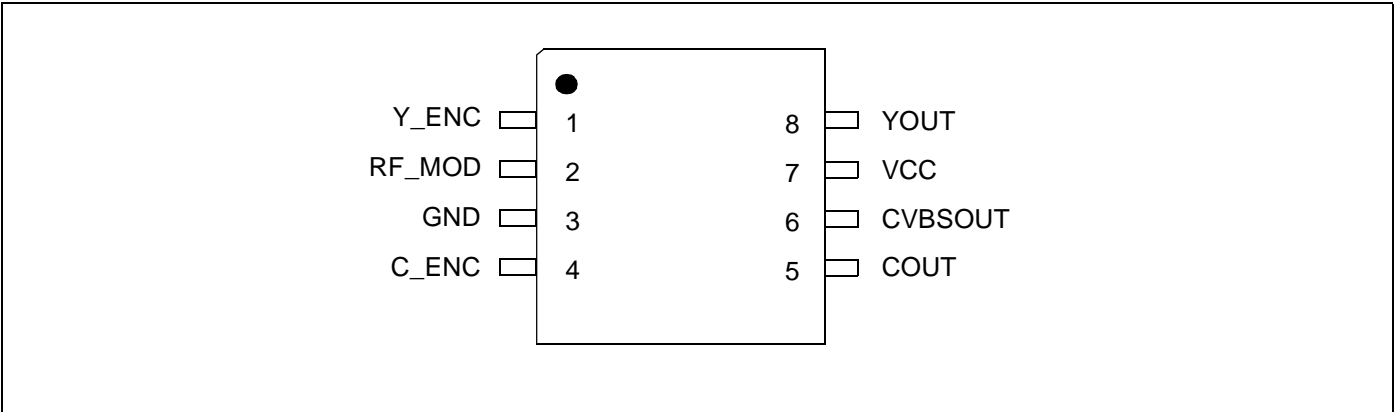
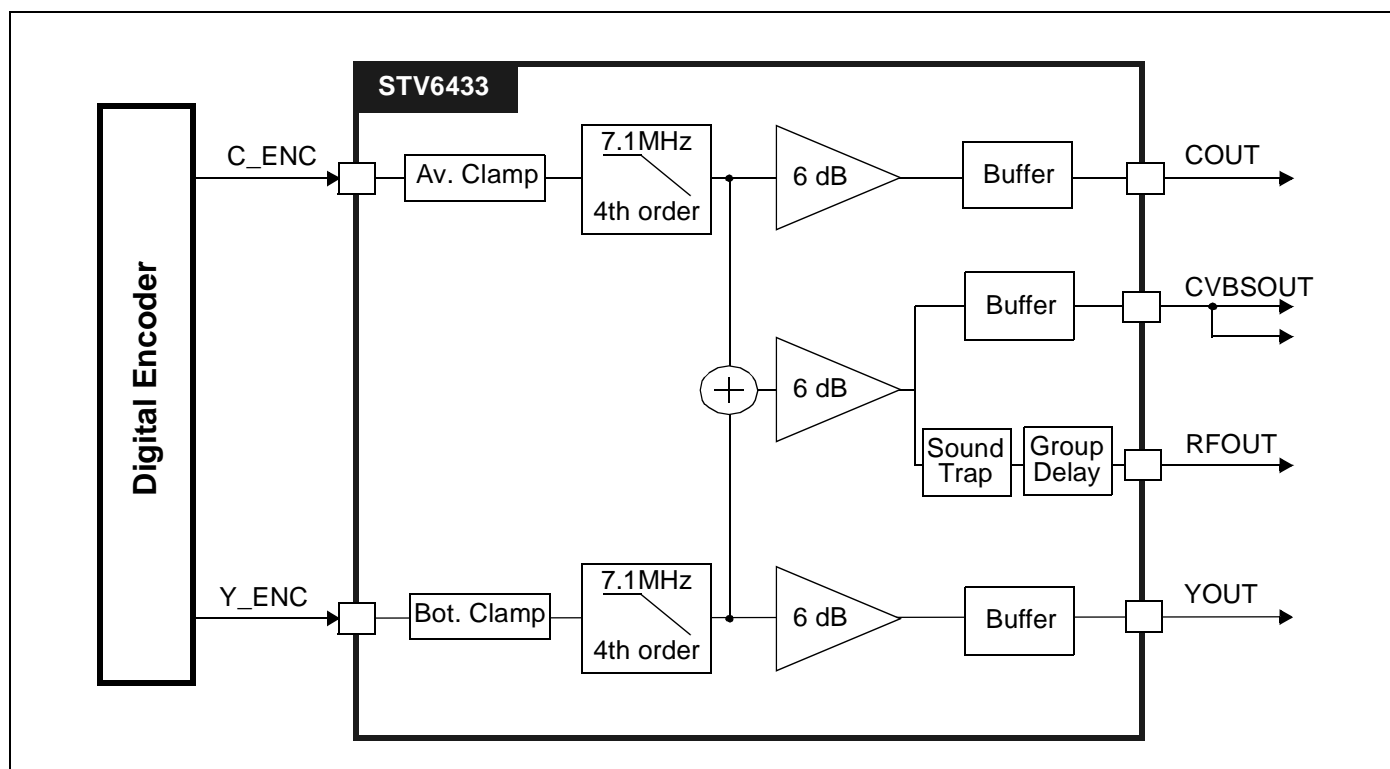


Table 1: STV6433 Pin List

| 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 Ω 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

$T_{AMB} = 25^{\circ}\text{C}$, $V_{CC} = 5\text{ V}$, $R_{GENE} = 75\Omega$, $R_{LOAD} (Y, C, CVBS) = 150\Omega$, $R_{LOAD} (RF) = 600\Omega$, 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 |
| Y and CVBS Section | | | | | | |
| V_{DCIN} | DC Input Level, Bottom Clamp Input | Bottom Level | | 2 | | V |
| I_{CLAMP} | Clamping Current, Bottom Clamp Input | at $V_{DCIN} - 400\text{ mV}$ | 1 | 2 | | mA |
| I_{LEAK} | Input Leakage Current, Bottom Clamp Input | $V_{IN} = V_{DCIN} + 1\text{ V}$ | | 1 | 10 | μA |
| 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 _{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 | $f = 3.58 \text{ MHz (ref. = 400 kHz)}$ | -205 | -170 | -135 | nS |
| T _{CLD} | Chroma / Luminance delay | $f = 3.58 \text{ MHz (ref. = 400 kHz)}$ | -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 | $f = 2 \text{ MHz}$ | | 0.5 | 0.75 | dB |
| RFOS | Peak Overshoot | $f = 3.58 \text{ MHz (ref. = 400 kHz)}$ | -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 | $f = 200 \text{ kHz to } 3 \text{ MHz}$ | -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 _{COU} | 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 MHz, | | | 20 | ns |

4 Package Mechanical Data

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

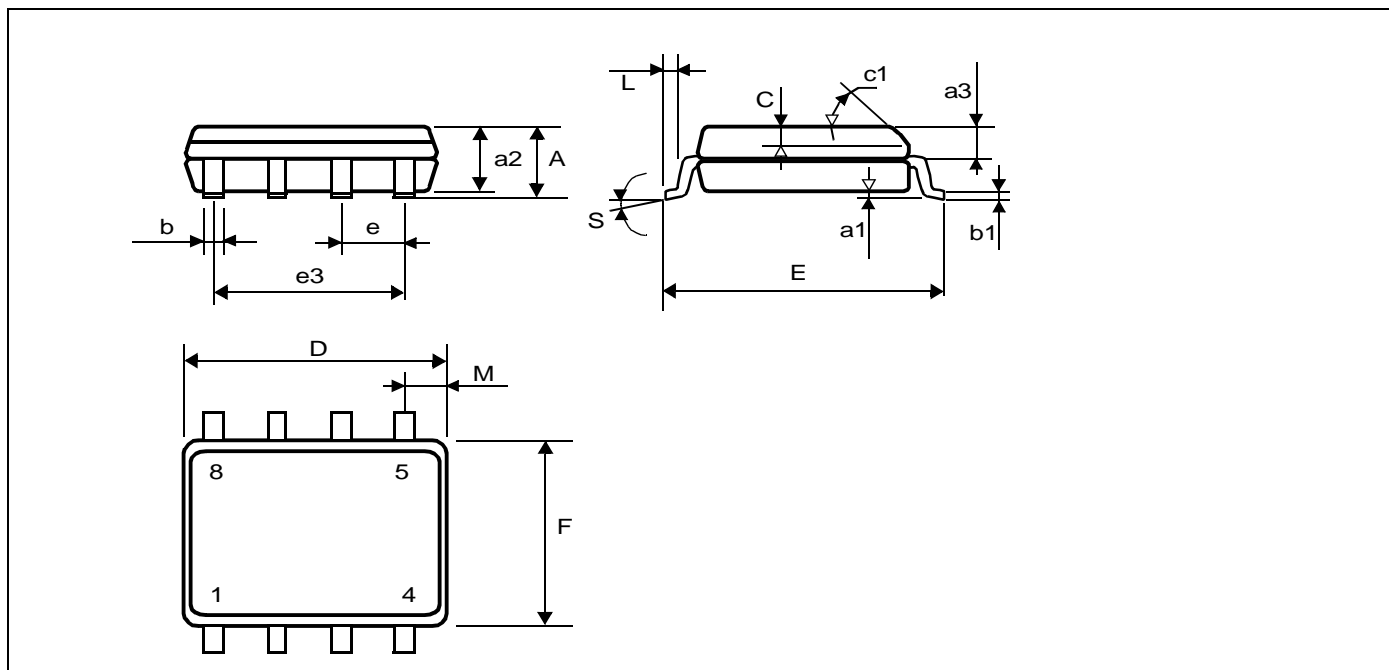


Table 2: SO8 Package Dimensions

| 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 |

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 2003 STMicroelectronics - All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan
Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

www.st.com