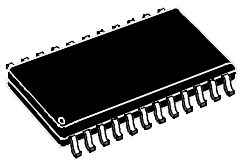
STV6435

Filtered Video Buffers for STB and DVD Devices

TARGET SPECIFICATION

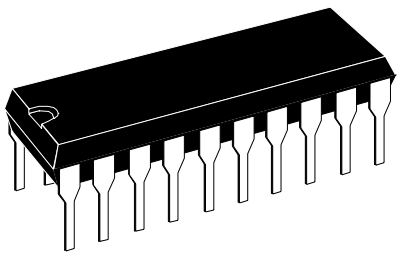
FEATURES

- **Y, C, CVBS and RGB Inputs with 7 MHz Filters**
- **6 dB Gains**
- **Capabilities of Integrated Output Buffers: Single Load (150Ω) for RGB signals Double Load (75Ω) for Y, C and CVBS signals**
- **DC Coupled Outputs for CVBS and RGB signals, DC or AC coupled output for Chroma signal**
- **Bottom Clamp on RGB, Y and CVBS, Bias Clamp on C**
- **Crosstalk: 55 dB (typ.)**
- **Separate Stand-by Modes on Y/C/CVBS and on RGB signals**
- **Switchable Y+C Adder for Decoders without CVBS Outputs**



SO24

Order Code: STV6435S



PDIP20

Order Code: STV6435D

DESCRIPTION

The STV6435 is a filtered video output interface for STB and DVD applications.

After removing D/A conversion noises using integrated low pass filters, the STV6435 adapts in amplitude and impedance the video signals coming from the digital decoder for transmission, via 75Ω adapted cables, to the TV set, VCR and auxiliary devices.

The STV6435 is powered by a 5V supply.

The STV6435 is fully compatible with STi55xx Digital Decoders.

The STV6435 is mounted in a SO24 package (STV6435S) or in a DIP package (STV6435D).

This is preliminary information on a new product forseen to be developed. Details are subject to change without notice.

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1 General Information

Figure 1: STV6435S Pinout

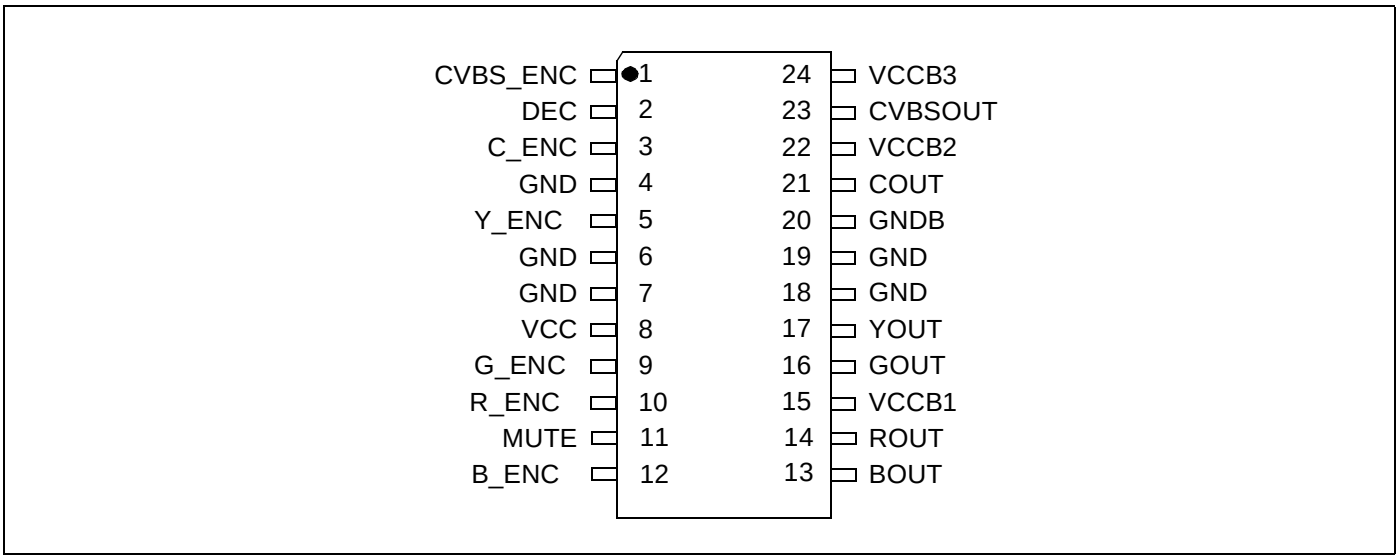
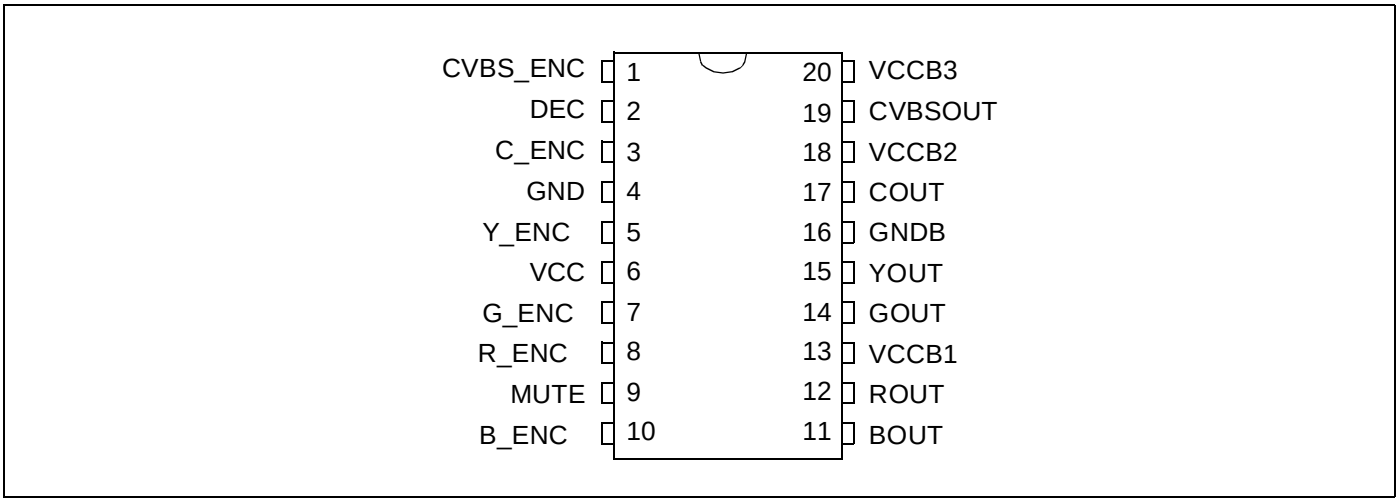


Figure 2: STV6435D Pinout



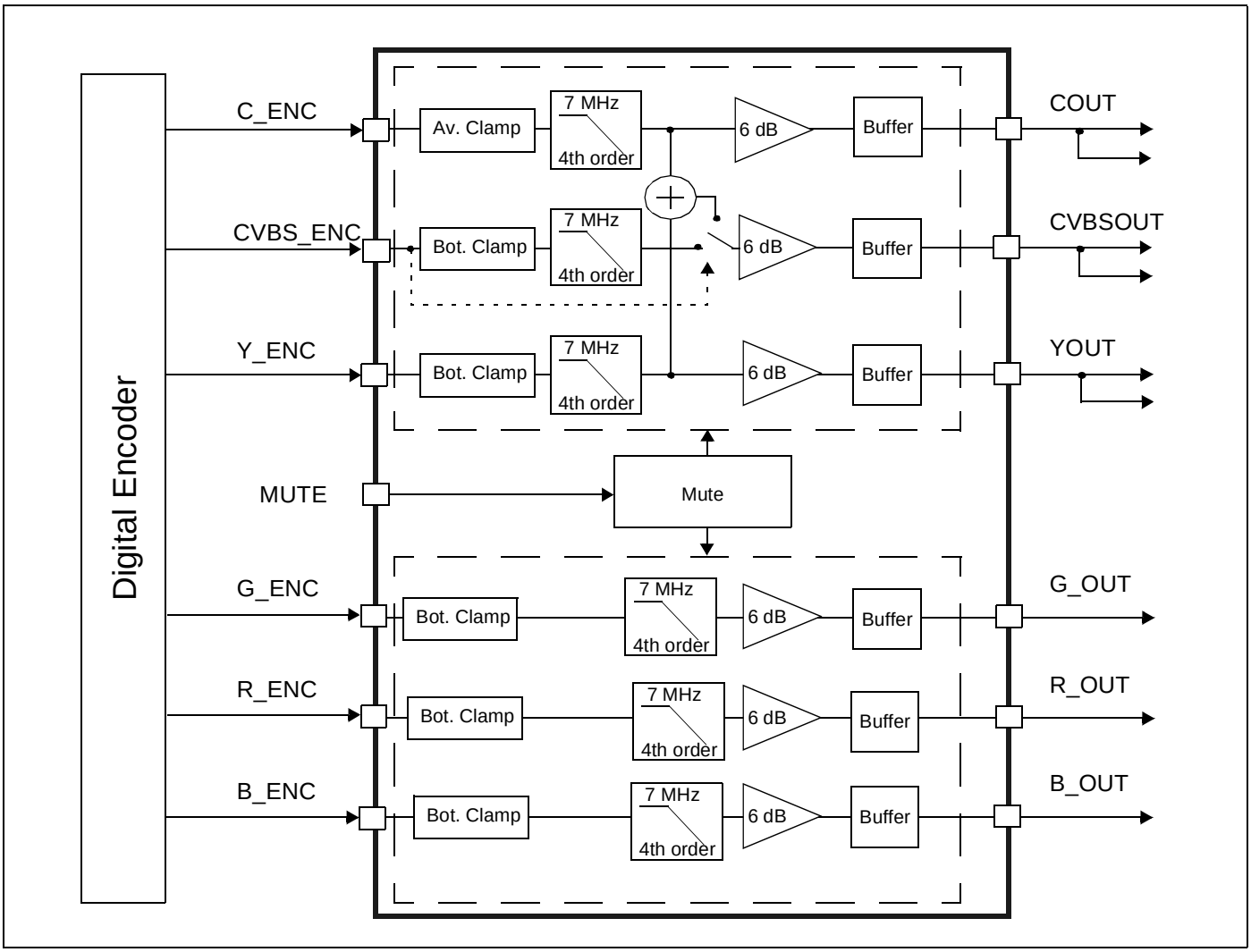
Note: The three RGB channels are identical and their pin assignments may be interchanged in an application if needed. In this case, verify that the outputs correspond to the inputs; for example, the pin 7 input must correspond to the pin 14 output.

1.1 I/O Pin Description

Table 1: Pin Description

STV6435S	STV6435D	Name	Function
1	1	CVBS_ENC	CVBS Input from Encoder command internal CVBS switch
2	2	DEC	Decoupling Capacitor
3	3	C_ENC	Chroma Input from Encoder
4	4	GND	Ground
5	5	Y_ENC	Y Input from Encoder
6		GND	Ground
7		GND	Ground
8	6	VCC	+5 V Supply
9	7	G_ENC	Large-band Y Input from Encoder
10	8	R_ENC	Large-band R Input from Encoder
11	9	MUTE	4-State command for Mute
12	10	B_ENC	Large-band B Input from Encoder
13	11	BOUT	B Output
14	12	ROUT	R Output
15	13	VCCB1	+5 V Supply for Output Buffers
16	14	GOUT	G Output
17	15	YOUT	Y Output
18		GND	Ground
19		GND	Ground
20	16	GNDB	Ground for Buffers
21	17	COUT	Chroma Output
22	18	VCCB2	+5 V Supply for Output Buffers
23	19	CVBSOUT	CVBS Output
24	20	VCCB3	+5 V Supply for Output Buffers

Figure 3: STV6435 Block Diagram



2 Electrical Characteristics

2.1 Absolute Maximum Ratings

Symbol	Parameter		Value	Unit
V_{CC}, V_{CCB}	Supply Voltage		6	V
V	Voltage at all pins to Ground		-0.6 to V_{CC}	V
V_{ESD}	ESD Susceptibility	Human Body Model: 100 pF discharged through 1.5 kΩ serial resistor	±4	kV

2.2 Thermal Data

Symbol	Parameter		Value	Unit
R_{thJA}	Junction-to-Ambient Thermal Resistance	STV6435S STV6435D	70 65	°C/W
T_J	Maximum Recommended Junction Temperature	STV6435S STV6435D	130	°C
T_{OPER}	Operating Ambient Temperature		0 to +70	°C
T_{STG}	Storage Temperature		-55 to +150	°C

2.3 Electrical Characteristics

Test conditions: T_{AMB} = 25°C, V_{CC} = 5 V; V_{CCB} = 5 V; $R_{GENERATOR}$ = 75 Ω, R_{LOUT} = 75 Ω for YOUT, CVBSOUT and COUT R_{LOUT} = 150 Ω for GOUT, BOUT and ROUT, unless otherwise specified.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{CC}	Operating Supply Voltage		4.75	5.00	5.25	V
V_{CCB}	Buffer Supply Voltage		4.75	5.00	5.25	V
Active (Channels ON)						
I_{CC1}	Supply Current (V_{CC} + V_{CCB})	No Load, MUTE pin to VCC pin (5 V) All channels active		50	65	mA
I_{CC2}	Supply Current (V_{CC} + V_{CCB})	No Load, MUTE pin = 1.5 V (not connected) Y/C/CVBS active		30		mA
I_{CC3}	Supply Current (V_{CC} + V_{CCB})	No Load, MUTE pin = 3 V RGB active		30		mA
Standby (All Channels OFF)						
I_{CCSTB}	Total Supply Current	No Load, MUTE pin to 0 V		4		mA

2.3.1 Video Section (Y and CVBS Signals)

Test conditions: T_{AMB} = 25°C, V_{CC} = 5 V; V_{CCB} = 5 V; $R_{GENERATOR}$ = 75 Ω, R_{LOUT} = 75 Ω for Y and CVBS outputs and R_{LOUT} = 150 Ω for G output, unless otherwise specified.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{DCIN}	DC Input Level, Bottom Clamp input	Bottom level, Y and CVBS inputs		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 Y and CVBS	1H signal	4.0	4.5		MHz
YF3	-3 dB Bandwidth of Y and CVBS	1H signal		7		MHz
YSBR	Stopband Rejection	27 MHz versus 100 kHz		- 40		dB
Flatness	Spread of Gain in Video Bands	V_{IN} = 1 V_{PP}, Band = 15 kHz to 5 MHz for Y and CVBS			±0.5	dB
VCTo	Crosstalk Isolation of Y (or CVBS) from C and RGB channels	V_{IN} = 0.5 V_{PP} at f = 3.58 MHz, on either CIN_ENC, RIN_ENC, BIN_ENC or GIN_ENC inputs, R_{LOAD} = 150Ω		55		dB
R_{OUT}	Output Resistance			5	10	Ω
GY	Gain on Y and CVBS channels	V_{IN} = 1 V_{PP} at f = 1 MHz	5.5	6	6.5	dB
DC_{YOUT}	DC Output Voltage (Y)	Video signal bottom sync pulse at IC output pins		0.5		V
$DC_{CVBSOUT}$	DC Output Voltage (CVBS)	Video signal bottom sync pulse at IC output pin		1.0		V
DPHI	Differential Phase	V_{IN} = 1 V_{PP} at f = 3.58 MHz		0.2	3	deg.
DG	Differential Gain	V_{IN} = 1 V_{PP} at f = 3.58 MHz		0.3	3	%
LNL	Luminance non-linearity			0.5	3	%
VSN7	Video S/N Ratio: Y, C, CVBS and RGB channels (7 MHz filter)	NTC-7 weighting 4.2 MHz Lowpass		70		dB
Dtpd7	Group delay variation from flatness	7 MHz filter		20		nS

2.3.2 Chroma Section

Test conditions: T_{AMB} = 25°C, V_{CC} = 5 V; V_{CCB} = 5 V; $R_{GENERATOR}$ = 75 Ω and R_{LOUT} = 75 Ω unless otherwise specified.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
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		1.5		V
CF1	-1 dB Bandwidth (Flatness)		4	4.5		MHz
CF3	-3 dB Bandwidth			7		MHz
CSBR	Stopband Rejection	27 MHz versus 100 kHz		- 40		dB
Flatness	Spread of Gain in Video Bands	V_{IN} = 1 V_{PP}, Band = 15 kHz to 5 MHz for Y and CVBS			±0.5	dB
CCTo	Crosstalk Isolation of C from Y, RGB and CVBS Channels	V_{IN} = 1 V_{PP} at f = 3.58 MHz, on Y or CVBS inputs, R_{LOAD} = 150Ω		55		dB
R_{OUT}	Output Resistance			5	10	Ω
GC	Gain on C channel	V_{IN} = 1 V_{PP} at f = 1 MHz	5.5	6	6.5	dB
CToYdel	Chroma to Luma Delay, source Y/C	V_{IN} = 1 V_{PP} at f = 3.58 MHz			20	ns
YCadd	Voltage to be applied at CVBS_ENC input for Y+C adder selection			V_{CC}	V_{CC}	V

2.3.3 RGB Section

Test conditions: T_{AMB} = 25°C, V_{CC} = 5 V; V_{CCB} = 5 V; $R_{GENERATOR}$ = 75 Ω and R_{LOUT} = 150 Ω, unless otherwise specified.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{DCIN}	DC Input Level, Bottom Clamp input			2.0		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}	Max Input Signal				1.5	V_{PP}
DYN	Dynamic Output Signal				3	V_{PP}
DC_{RGBOUT}	DC Output Voltage	Video signal bottom sync at IC output pin		0.5		V
PF1	-1 dB Bandwidth (Flatness)		4	4.5		MHz
PF3	-3 dB Bandwidth			7.0		MHz
PSBR	Stopband Rejection	27 MHz versus 100 kHz		- 40		dB
Flatness	Spread of Gain in Video Bands	V_{IN} = 1 V_{PP}, Band = 15 kHz to 5 MHz			±0.5	dB
PCTo	Crosstalk Isolation of RGB from Y, C and CVBS Channels	V_{IN} = 1 V_{PP} at f = 3.58 MHz, on Y, C or CVBS input, R_{LOAD} = 150Ω		55		dB
R_{OUT}	Output Resistance			5	10	Ω
GP	Gain on RGB channels	V_{IN} = 1 V_{PP} at f = 1 MHz	5.5	6	6.5	dB

2.3.4 Mute Section

Test conditions: T_{AMB} = 25°C, V_{CC} = 5 V; V_{CCB} = 5 V; $R_{GENERATOR}$ = 75 Ω and R_{LOUT} = 75 Ω unless otherwise specified.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V_{00}	MUTE Voltage for Y/C/CVBS muted and RGB muted	Pin MUTE to GND or logical 0	0		1.1	V
V_{01}	MUTE Voltage for Y/C/CVBS active and RGB muted	Pin MUTE opened (not connected) See Note 1.	1.3		1.7	V
V_{10}	MUTE Voltage for Y/C/CVBS muted and RGB active	Pin MUTE connected by 22 kΩ to VCC or at 3.3V (I_{IN} < 140 µA)	1.9		4	V
V_{11}	MUTE Voltage for Y/C/CVBS active and RGB active	Pin MUTE to VCC (5V)	4.2		Vcc	V

Note: 1 When the MUTE pin is left open, its voltage is defined by an internal voltage divider performed by a 42 kΩ resistor to Vcc and 18 kΩ resistor to GND.

3 Input/Output Groups

Figure 4: Bottom Clamped Video Input (Y_ENC, R_ENC, G_ENC and B_ENC)

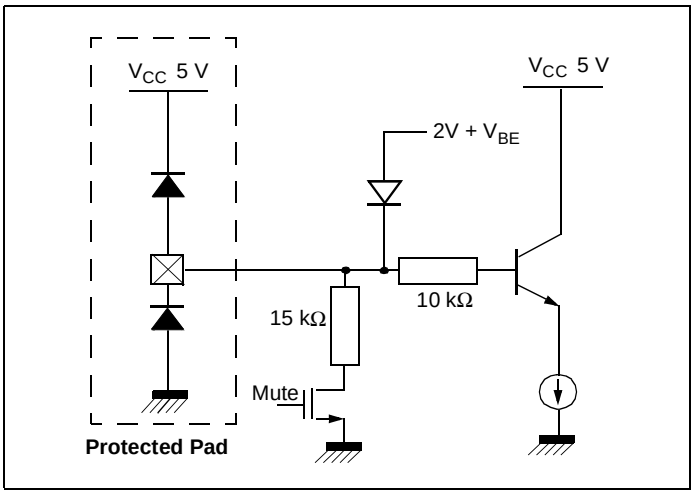


Figure 5: Average Clamped Video Input (C_ENC)

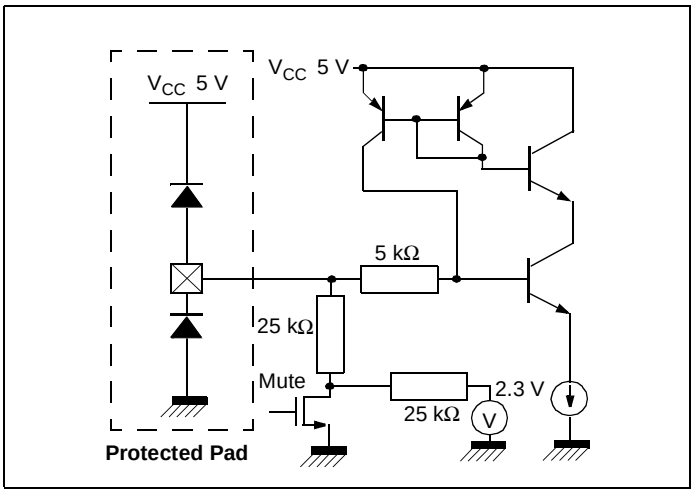


Figure 6: Video Outputs (CVBSOUT, YOUT, GOUT, ROUT and BOUT)

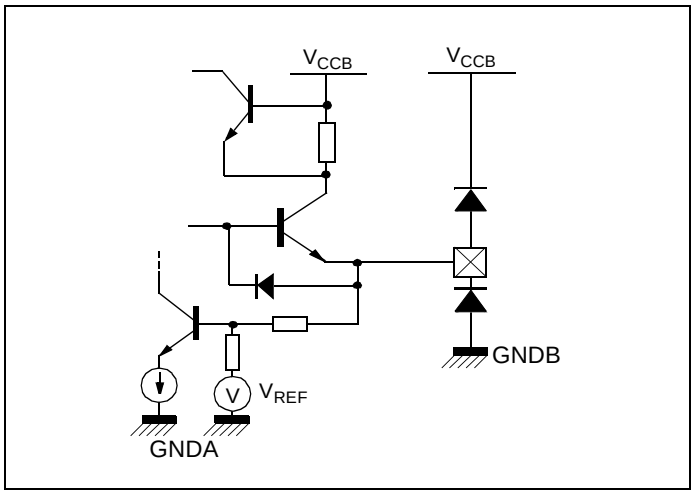


Figure 7: C Video Output (COUT)

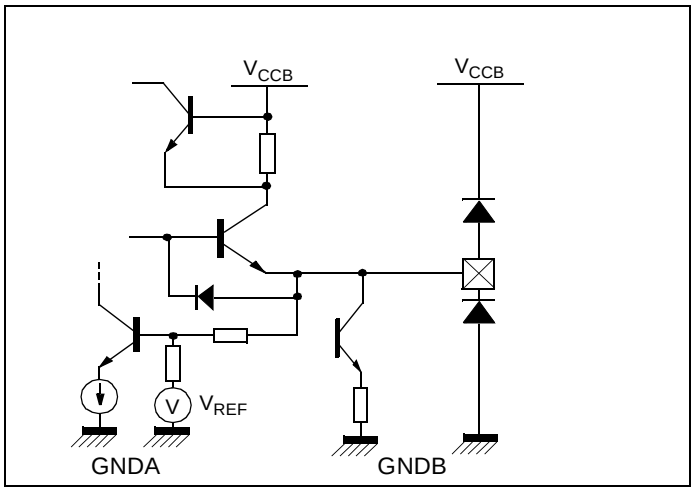


Figure 8: Decoupling Capacitor (DEC)

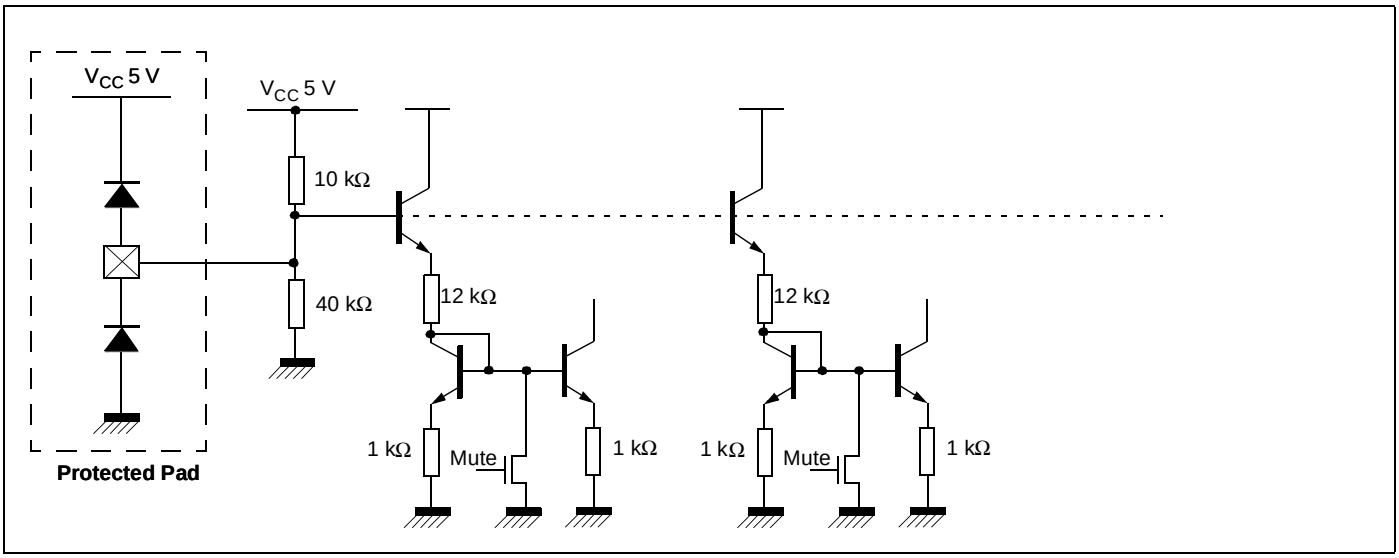


Figure 9: Mute (MUTE)

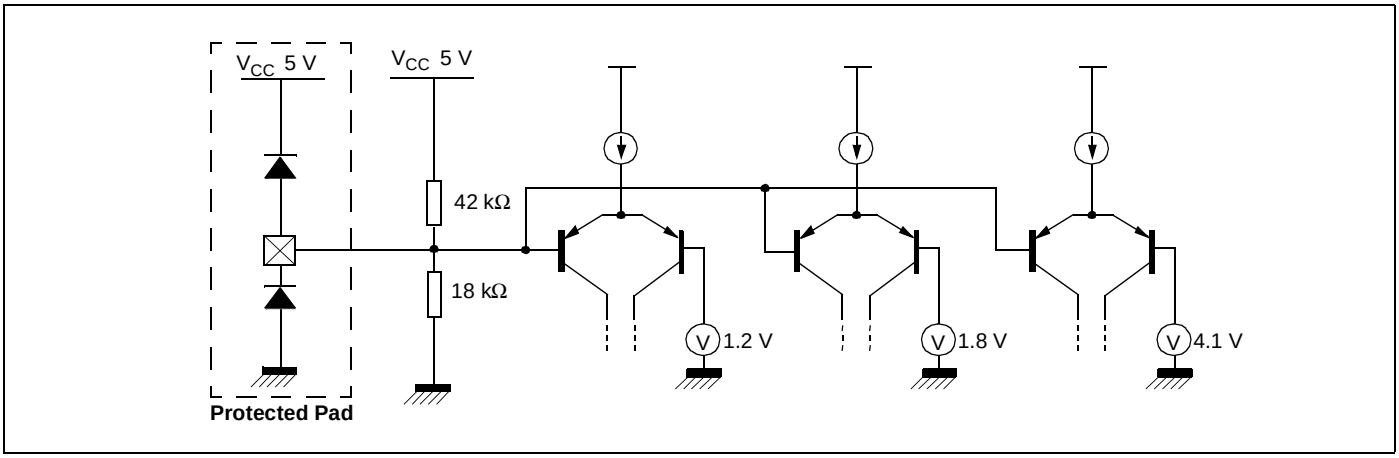


Figure 10: CVBS Input (CVBS_ENC)

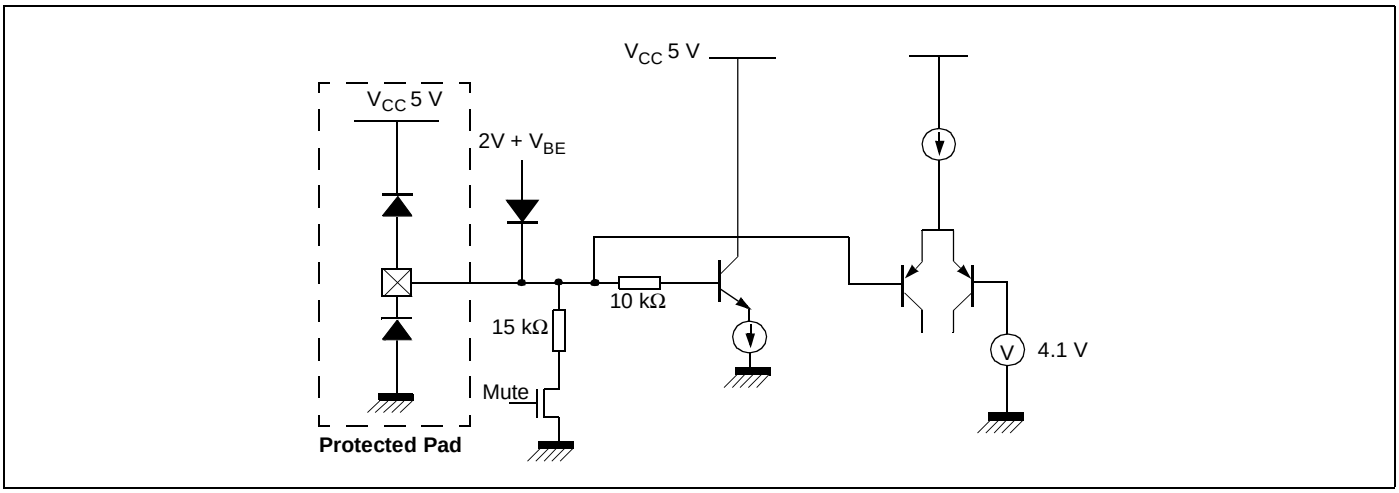
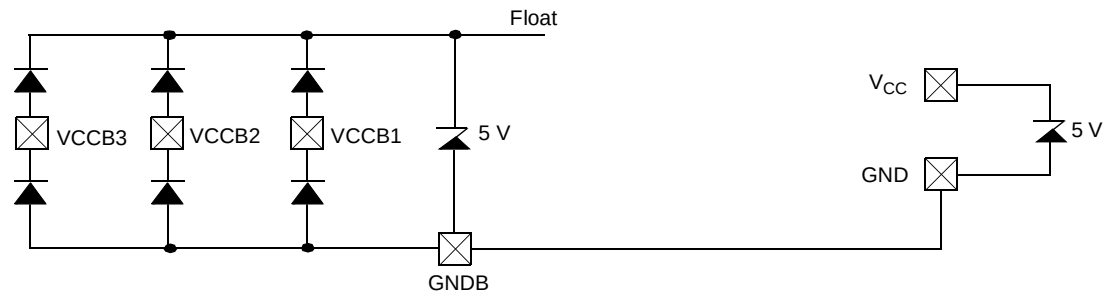
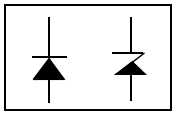


Figure 11: Power Supply Connection





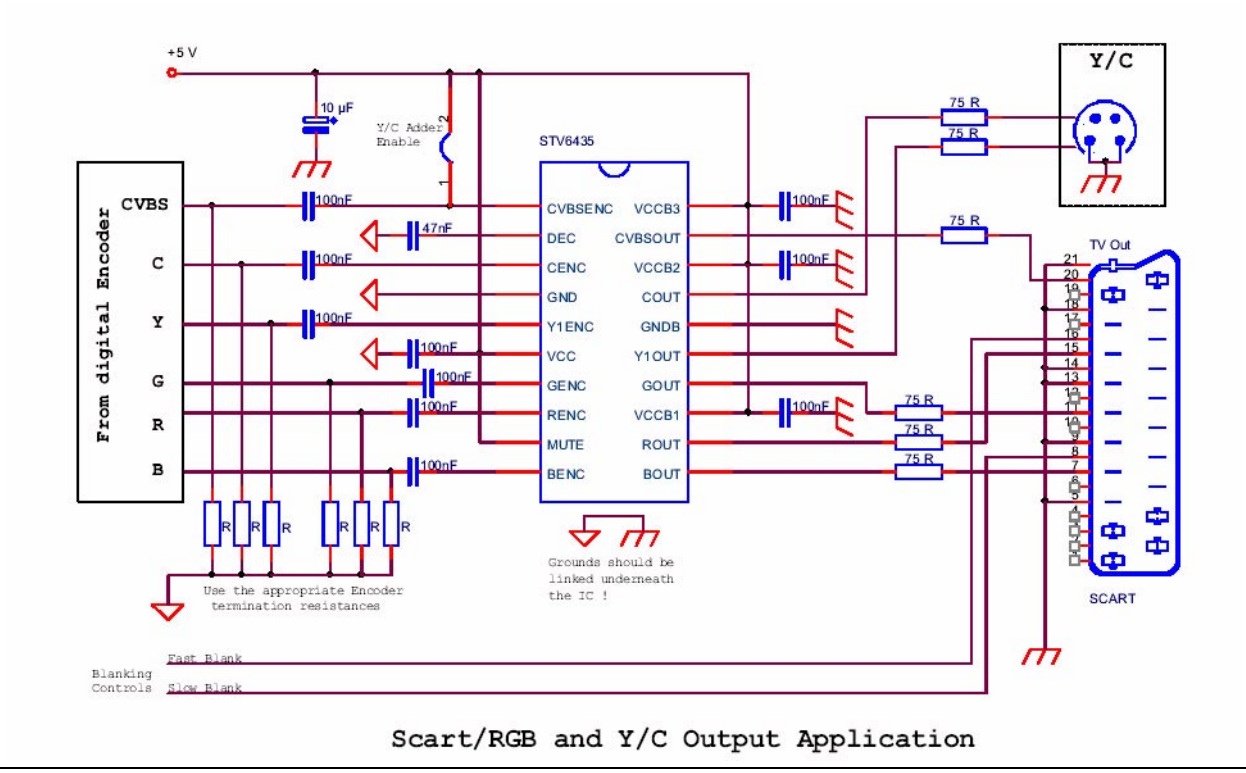
These symbols represent some huge diode and Zener-like components used for ESD Protection of the device.
They are not supposed to be paths for any current in normal operation mode.

Table 2: Power Supply Connections

Supply	Description
VCCB1	GOUT, ROUT and BOUT Supply
VCCB2	YOUT and COUT Supply
VCCB3	CVBSOUT Supply
GNDB	Output Buffer Ground
VCC	Input Stages, Filters and 6-dB Amplifier Supply
GND	Input Stages, Filters and 6-dB Amplifier Ground

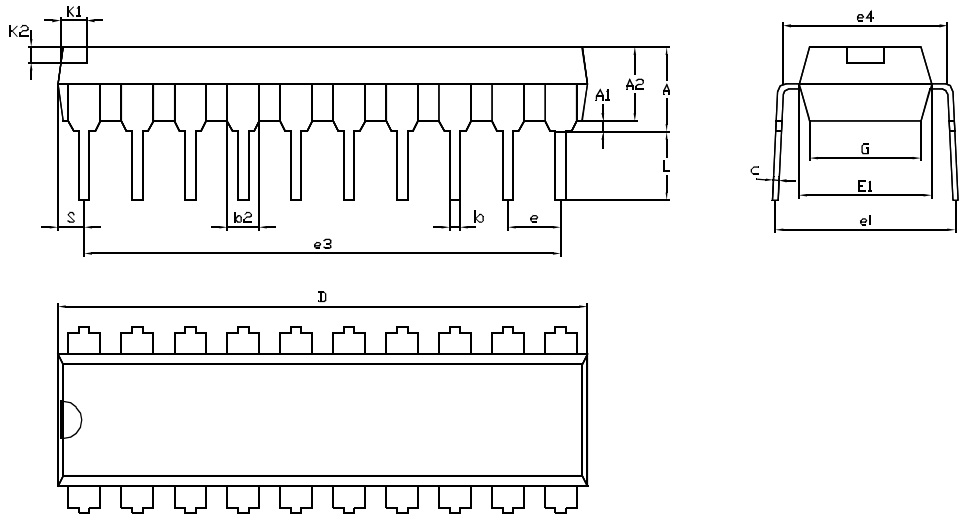
4 Application Diagram

Figure 12: Typical STV6435 Application Diagram



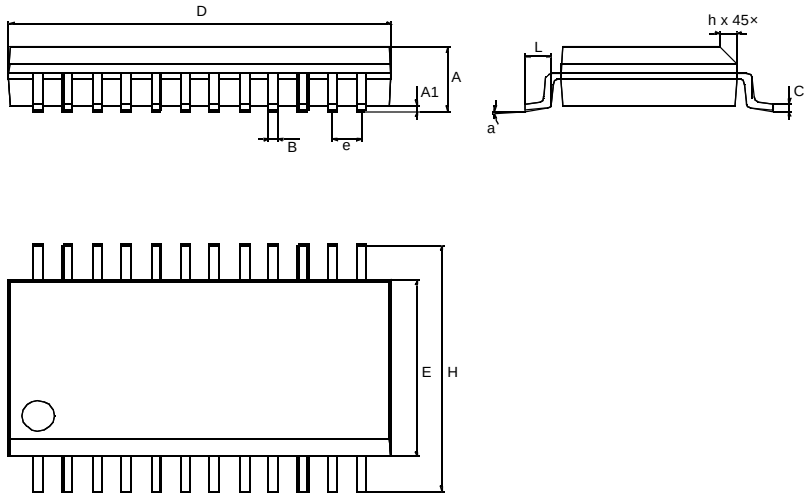
5 Package Mechanical Data

Figure 13: 20-Pin Plastic Single in Line Package (PDIP20)



Dim.	mm			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A			5.33			0.210
A1	0.38			0.015		
A2	2.92	3.30	4.95	0.115	0.130	0.195
b	0.36	0.46	0.56	0.014	0.018	0.022
b2	1.14	1.52	1.78	0.045	0.060	0.070
c	0.20	0.25	0.36	0.008	0.010	0.014
D	24.89		26.92	0.980		1.060
e		2.54			0.100	
E1	6.10	6.35	7.11	0.240	0.250	0.280
L	2.92	3.30	3.81	0.115	0.130	0.150

Figure 14: 24-Pin Plastic Small Outline Package (SO24)



Dim.	mm			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	2.35		2.65	0.093		0.104
A1	0.10		0.30	0.004		0.012
B	0.33		0.51	0.013		0.020
C	0.23		0.32	0.009		0.013
D	15.20		15.60	0.599		0.614
E	7.40		7.60	0.291		0.299
e		1.27			0.050	
H	10.00		10.65	0.394		0.419
h	0.25		0.75	0.010		0.030
α	0°		8°	0°		8°
L	0.40		1.27	0.016		0.050

6 Revision History

Revision	Main Changes	Date
0.1	First Issue.	28 May 2002
0.2	Addition of Figure 12, Modification of Figure 3, RGB Bottom Clamp, RGB parameters in Chapter 2: Electrical Characteristics and diagrams Chapter 3: Input/Output Groups.	14 June 2002
1.0	Modification of Figure 3: STV6435 Block Diagram and Active Channel and Mute values in Section 2.3: Electrical Characteristics.	21 June 2002

NOTES:

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