

# NTSC/PAL color signal generator

## BU2841AFS/BU2762AL

The BU2841AFS and BU2762AL generate color signals and test patterns in NTSC and PAL formats. The generated signal output can be switched between composite and chroma and is compatible with Y/C separation output. A built-in analog switch is provided for switching between the internally-generated signal and an input video signal. The packages for the ICs are 18 pin ZIP and 20 pin SSOP-A.

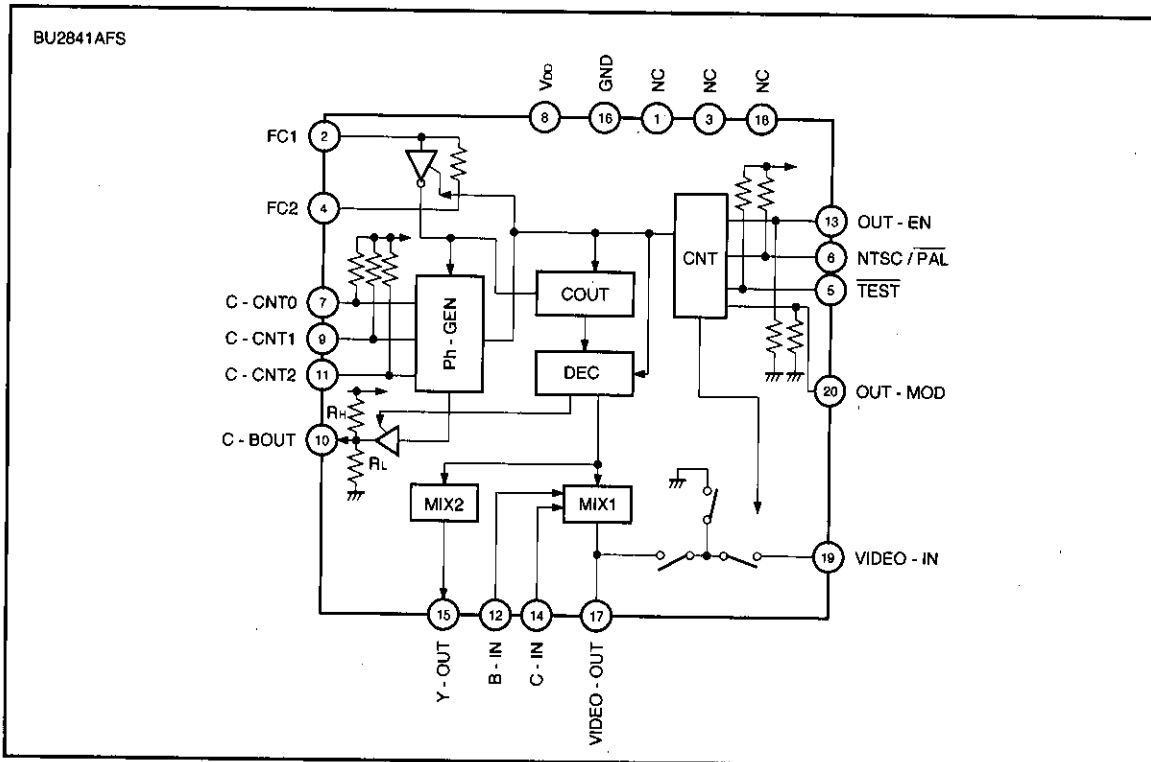
### ●Applications

Video cassette recorders

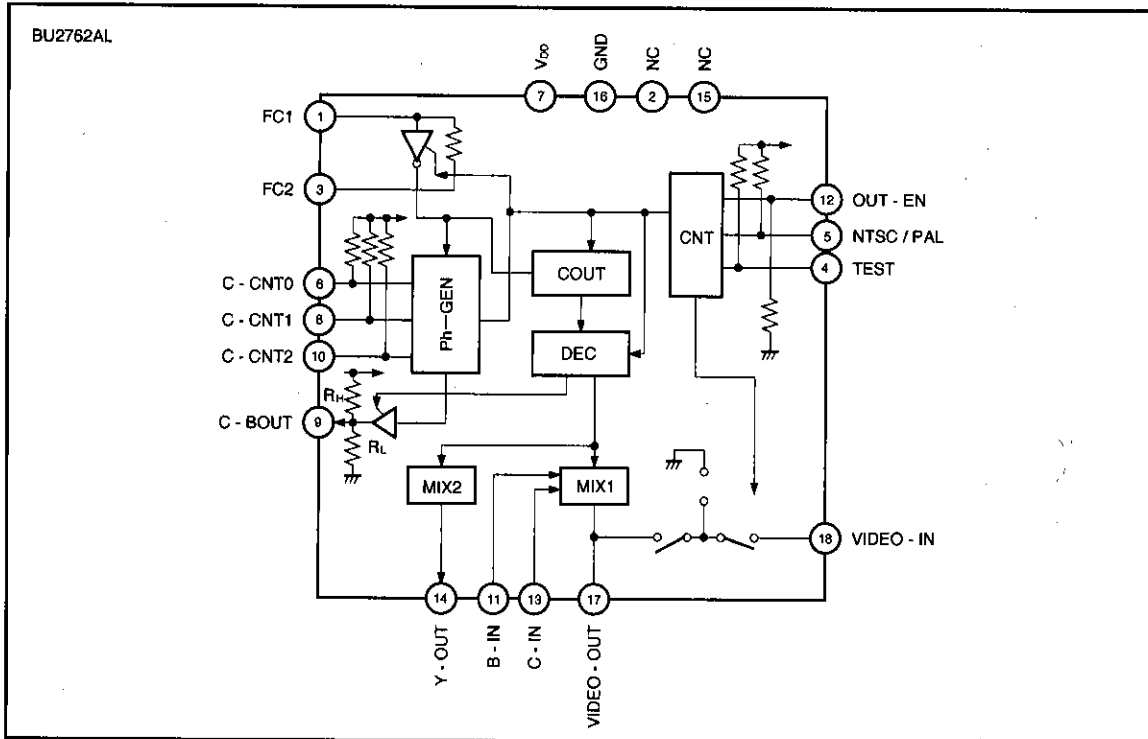
### ●Features

- 1) Produces composite synchronous NTSC (seven colors + test pattern) and PAL (five colors + test pattern) signals.
- 2) Video output can be switched between chroma and composite (2V<sub>P-P</sub> output).
- 3) Output terminal provided for Y-signal output during signal generation.
- 4) Built-in analog switch for switching video signals.
- 5) Fabricated using a CMOS process for low-power consumption. Oscillation is stopped when an external video signal is input.
- 6) Available in ZIP 18pin, and SSOP-A 20pin packages.

### ●Block diagram



●Block diagram



Blue back ground

VCR components

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>DD</sub>	-0.3~7.0	V
Input voltage	V <sub>i</sub>	-0.3~V <sub>DD</sub> +0.3	V
Power dissipation	P <sub>d</sub>	BU2841AFS	500 <sup>*1</sup>
		BU2762AL	400 <sup>*2</sup>
Operating temperature	T <sub>opr</sub>	-20~75	°C
Storage temperature	T <sub>stg</sub>	-50~150	°C

\* Reduced by 10mW for each increase in Ta of 1°C over 25°C.  
 \* Reduced by 3.2mW for each increase in Ta of 1°C over 25°C.

## ● Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Power supply voltage	V <sub>DD</sub>	4.5	5.0	5.5	V	
"H" level input voltage 1	V <sub>IH1</sub>	3.55	—	—	V	Pin 2, 13
"L" level input voltage 1	V <sub>IL1</sub>	—	—	1.45	V	Pin 2, 13
"H" level input voltage 2	V <sub>IH2</sub>	4.0	—	—	V	Pin 5, 7, 9, 11, 20
"L" level input voltage 2	V <sub>IL2</sub>	—	—	1.0	V	Pin 5, 7, 9, 11, 20
"H" level input voltage 3	V <sub>IH3</sub>	4.8	—	—	V	Pin 6
"L" level input voltage 3	V <sub>IL3</sub>	—	—	0.2	V	Pin 6
Oscillation frequency 1	f <sub>SC1</sub>	—	14.31818	—	MHz	NTSC用
Oscillation frequency 2	f <sub>SC2</sub>	—	17.73447	—	MHz	PAL用
"H" level output current	I <sub>OH</sub>	-1.0	—	—	mA	V <sub>OH</sub> =4.6V
"L" level output current	I <sub>OL</sub>	1.0	—	—	mA	V <sub>OL</sub> =0.4V
"H" level input current	I <sub>IH</sub>	—	—	-300	μA	V <sub>IH</sub> =5.0V
"L" level input current	I <sub>IL</sub>	—	—	300	μA	V <sub>IL</sub> =0.0V
Output load resistance H	R <sub>H</sub>	4.1	5.9	7.7	kΩ	
Output load resistance L	R <sub>L</sub>	4.1	5.9	7.7	kΩ	
MIX internal resistance	R <sub>D</sub>	3.1	4.5	5.9	kΩ	
Quiescent current	I <sub>QD</sub>	—	—	1.5	mA	
Analog switch-on resistance L	R <sub>ONL</sub>	—	—	150	Ω	V <sub>IN</sub> =1.5V
Analog switch-on resistance M	R <sub>ONM</sub>	—	—	150	Ω	V <sub>IN</sub> =2.5V
Analog switch-on resistance H	R <sub>ONH</sub>	—	—	150	Ω	V <sub>IN</sub> =3.5V

Note: Affix pin 6 (the NTSC/PAL pin) to either V<sub>DD</sub> or the GND pin, prior to use.

©Not designed for radiation resistance.

## ● Pin descriptions

Pin NO. BU2762AL	Pin NO. BU2841AFS	Pin name	Name	Function																																																		
1	2	FC1	Oscillator terminal	For connection of crystal circuit for the oscillator. Refer to the clock-generator circuit																																																		
3	4	FC2																																																				
6	7	C - CNT0	Chroma signal output switch	<table border="1"> <thead> <tr> <th colspan="3">Input</th> <th colspan="2">Chroma output</th> </tr> <tr> <th>C - CNT 0</th> <th>C - CNT 1</th> <th>C - CNT 2</th> <th>NTSC chroma</th> <th>PAL chroma</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>Test pattern 1</td> <td>Test pattern 3</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>N8</td> <td>P2</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>N1</td> <td>Test pattern 2</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>N3</td> <td>P6</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>N4</td> <td>Test pattern 1</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>N6</td> <td>P3</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>N2</td> <td>P8</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>N5</td> <td>P5</td> </tr> </tbody> </table> <p>For both NTSC and PAL black and white are not output. Refer to the burst and chroma signal vector diagram.</p>	Input			Chroma output		C - CNT 0	C - CNT 1	C - CNT 2	NTSC chroma	PAL chroma	0	0	0	Test pattern 1	Test pattern 3	1	0	0	N8	P2	0	1	0	N1	Test pattern 2	1	1	0	N3	P6	0	0	1	N4	Test pattern 1	1	0	1	N6	P3	0	1	1	N2	P8	1	1	1	N5	P5
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5	6	NTSC / PAL	NTSC/PAL switch	NTSC / PAL = "High" → NTSC, NTSC / PAL = "Low" → PAL																																																		
4	5	TEST	Test mode switch	When TEST = "L", test mode*																																																		
7	8	V <sub>DD</sub>	Power supply																																																			
12	13	OUT - EN	Output/enable	When the blue background signal is "H", oscillator is stopped and video through output is "L".																																																		
9	10	C - BOUT	Chroma output	Burst and chroma signal output, refer to application example circuit.																																																		
14	15	Y - OUT	Y-signal output																																																			
11	12	B - IN	Burst input	Burst and chroma signal MIX input, refer to application example circuit.																																																		
13	14	C - IN	Chroma input	Burst and chroma signal MIX input, refer to application example circuit.																																																		
18	19	VIDEO - IN	Video input	External video signal input (2V <sub>P-P</sub> )																																																		
17	17	VIDEO - OUT	Video output	Video signal output (2V <sub>P-P</sub> )																																																		
16	16	GND	Ground																																																			
-	20	OUT - MOD	Output mode switch	OUT-MOD = "H" → chroma, OUT-MOD = "L" → composite.																																																		

Pins 1, 3, and 18 of the BU2841AFS are unused.

Pins 2 and 15 of the BU2762AL are unused.

\* Test mode is the mode used to test the IC at the factory.

Blue back ground

VCR components

●Circuit operation

The BU2841AFS and BU2762AL generate NTSC and PAL composite video signals. By generating a 4X-sub-carrier frequency signal internally or using external input, it is possible to generate a variety of color signals and black-and-white test patterns using the output pattern control inputs C-CNT0, C-CNT1 and C-CNT2. To ensure suitability for use with the blue background function of VCRs, the ICs also incorporate analog switches to switch between external VCR signals and the composite signals generated by the ICs. The analog switch is also used as the enable terminal for the IC. When an external video signal is going through the analog switch, the IC is switched off to suppress noise.

The output of the BU2841AFS can be switched between composite and chroma for S-VHS compatibility.

Output pattern setting

Setting for the color of the output signal is done based on the burst/chroma signal vector (Fig. 1) and the output pattern control pin settings.

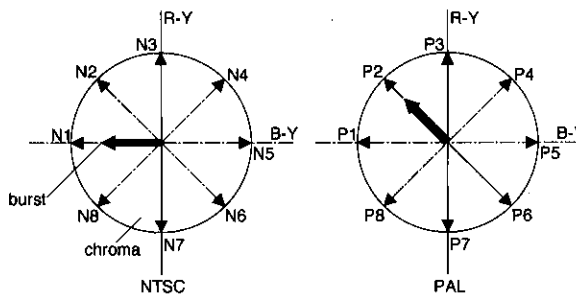


Fig. 1 Burst/chroma signal vector diagram

●Output pattern control pin settings

Input			Chroma output	
C-CNT0	C-CNT1	C-CNT2	NTSC chroma	PAL chroma
0	0	0	Test pattern 1	Test pattern 3
1	0	0	N8	P2
0	1	0	N1	Test pattern 2
1	1	0	N3	P6
0	0	1	N4	Test pattern 1
1	0	1	N6	P3
0	1	1	N2	P8
1	1	1	N5	P5

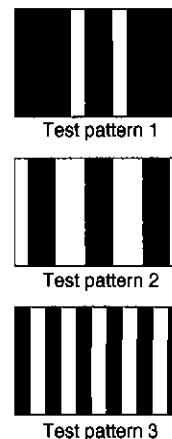


Fig. 2 Test patterns

●Application example

(BA2762AL)

\* Values in parentheses are for PAL mode.

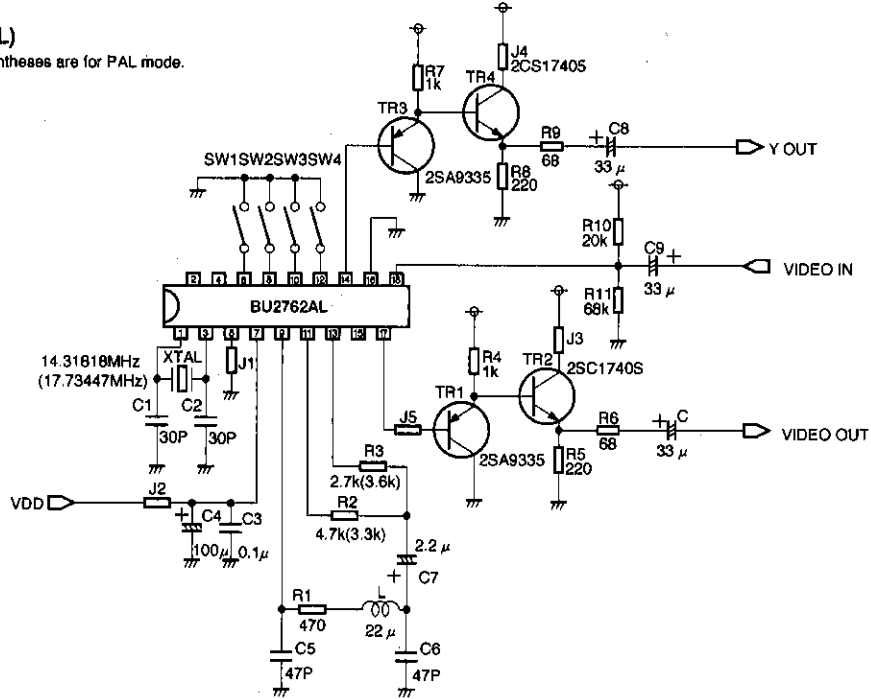


Fig. 3 BU2762AL application example

(BA2841AFS)

\* Values in parentheses are for PAL mode.

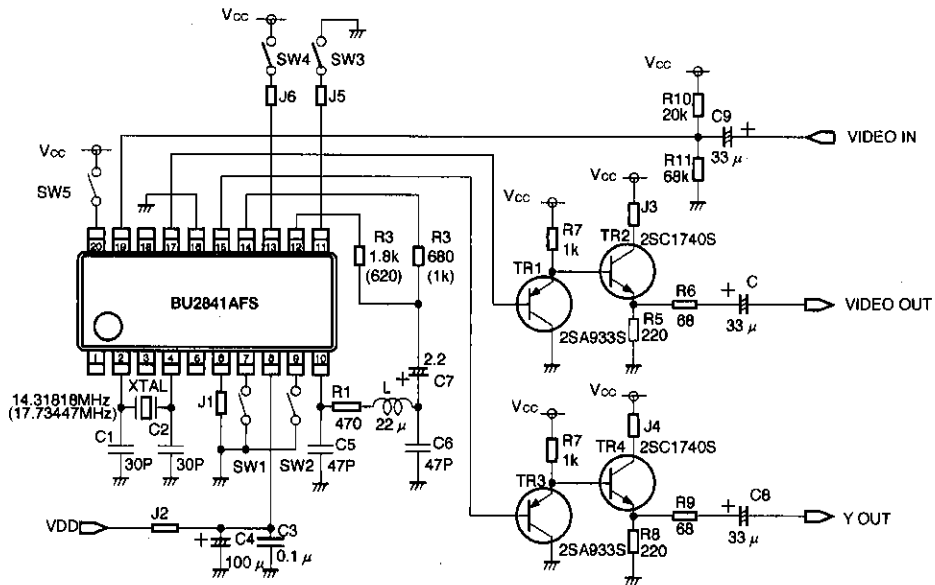


Fig. 4 BU2841AFS application example

Blue back ground

VCR components

●Timing chart

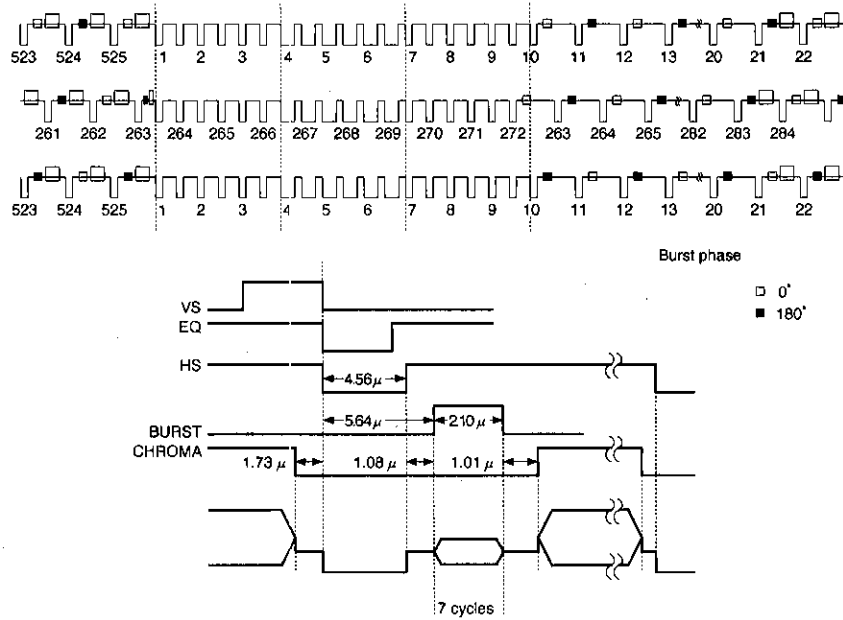


Fig. 5 BU2762AL timing chart 1 (NTSC synchronous signal)

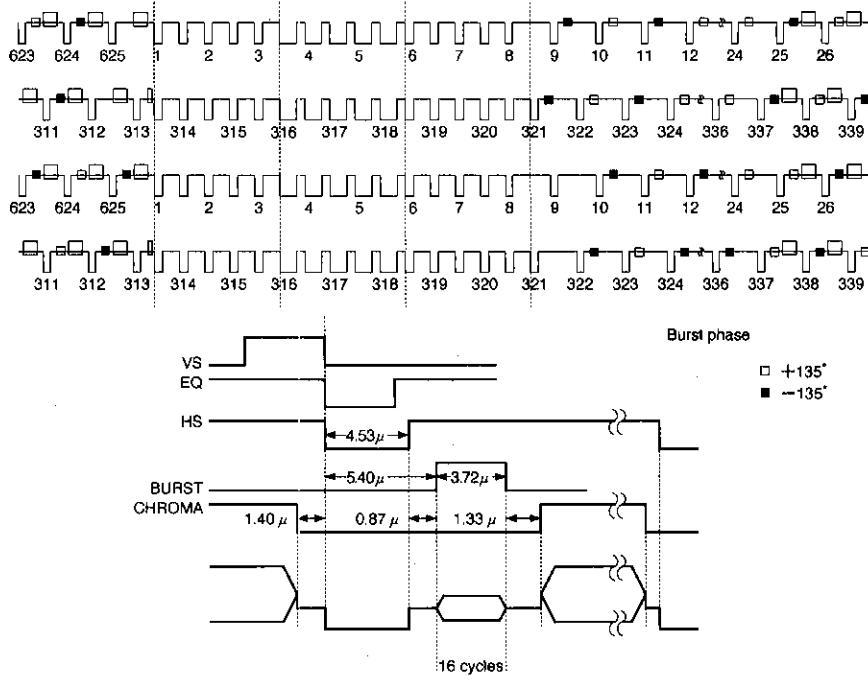


Fig. 6 BU2762AL timing chart 2 (PAL synchronous signal)

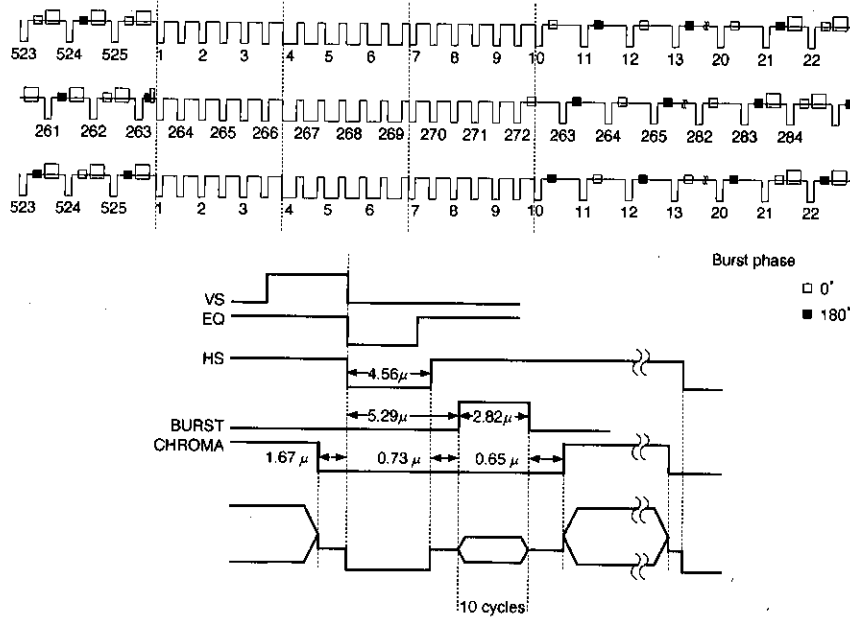


Fig. 7 BU2841AFS timing chart 1 (NTSC synchronous signal)

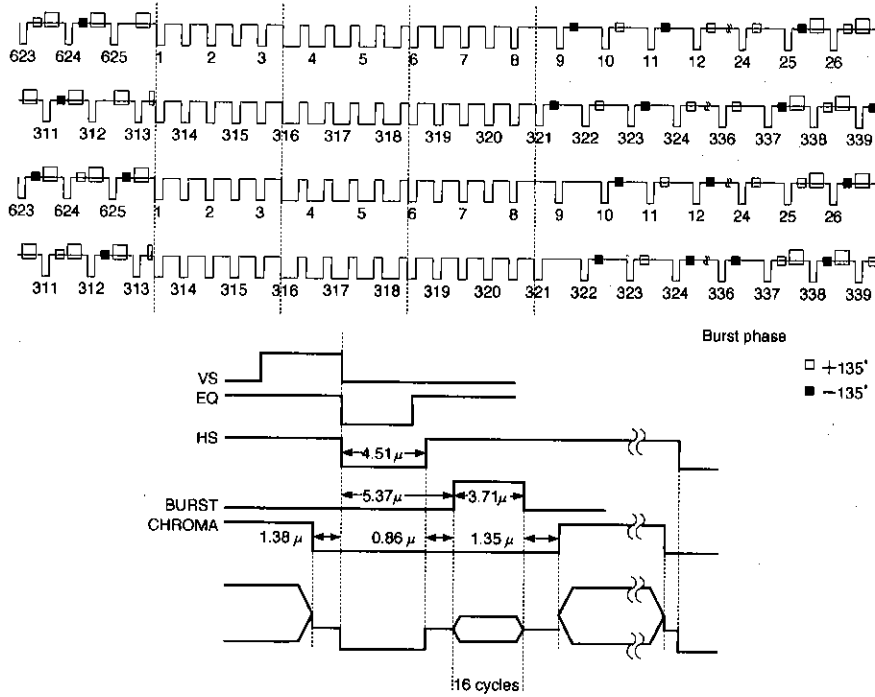


Fig. 8 BU2841AFS timing chart 2 (PAL synchronous signal)

Blue back ground

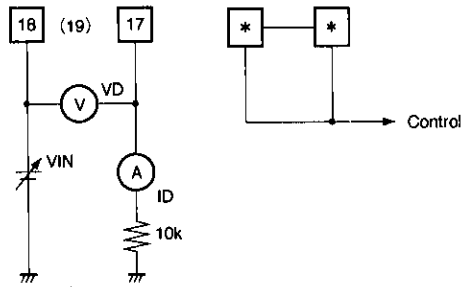
VCR components



● Measurement data

Analog switch-on resistance

Pin numbers in parentheses are for the BU2841AFS.



$$R_{on} = \frac{V_O}{I_O}$$

\* Pins 4, 5, 6, 8, 10, and 12  
(pins 5, 6, 7, 9, 11, and 13) open.

\* : 12 pin "H"  
(12 pin "L" )

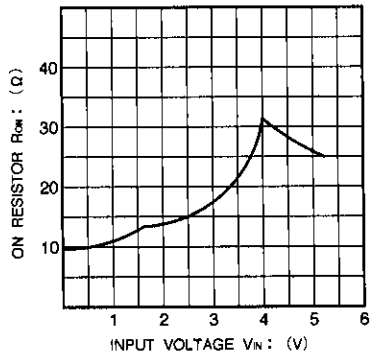
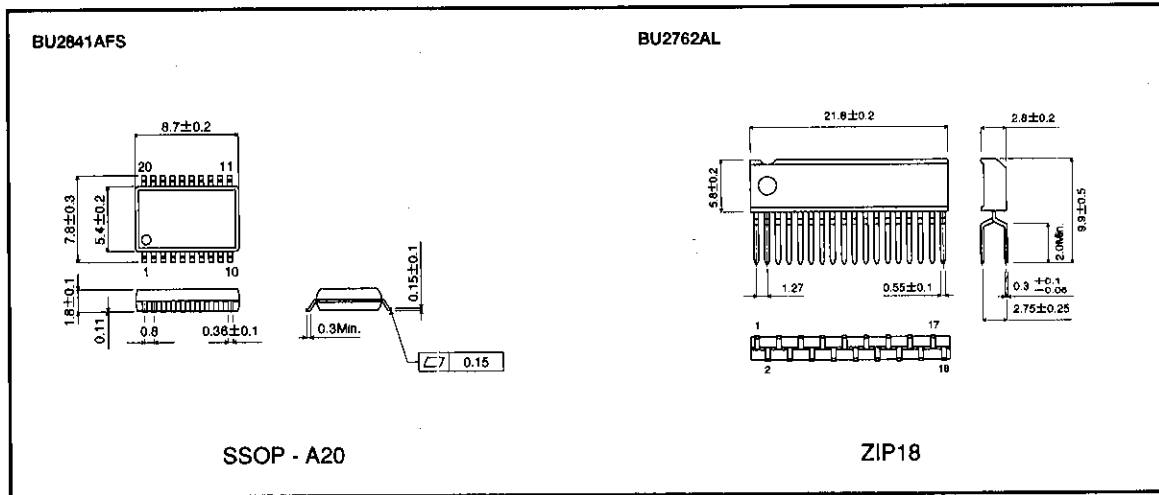


Fig. 9 Switch-on resistance vs. Input voltage characteristic

● External dimensions (Units: mm)



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