

# Video switch for CANAL-Plus decoder

## BA7631 / BA7631F

The BA7631 and BA7631F are audio-switching ICs for decoders for scrambled pay channels used in France and other countries. The ICs include a five-input multiplexer, a four-input multiplexer and a two-input multiplexer, and allow decoder audio switching to be done with a single IC. When used in combination with the BA7630S common logic control can be used for audio and video switching.

### ●Applications

Video cassette recorders

### ●Features

- 1) All the audio-switching functions required for SECAM CANAL -plus decoder integrated onto one chip.
- 2) Inputs terminated with 65k $\Omega$  resistors.
- 3) Built-in output buffer.
- 4) Wide supply voltage range (4.5V to 13.0V).
- 5) Low total harmonic distortion (0.005% Typ.).
- 6) Wide dynamic range (3.6Vrms, V<sub>CC</sub> = 12V).
- 7) Same control logic as for the BA7630S can be used.

### ●Absolute maximum ratings

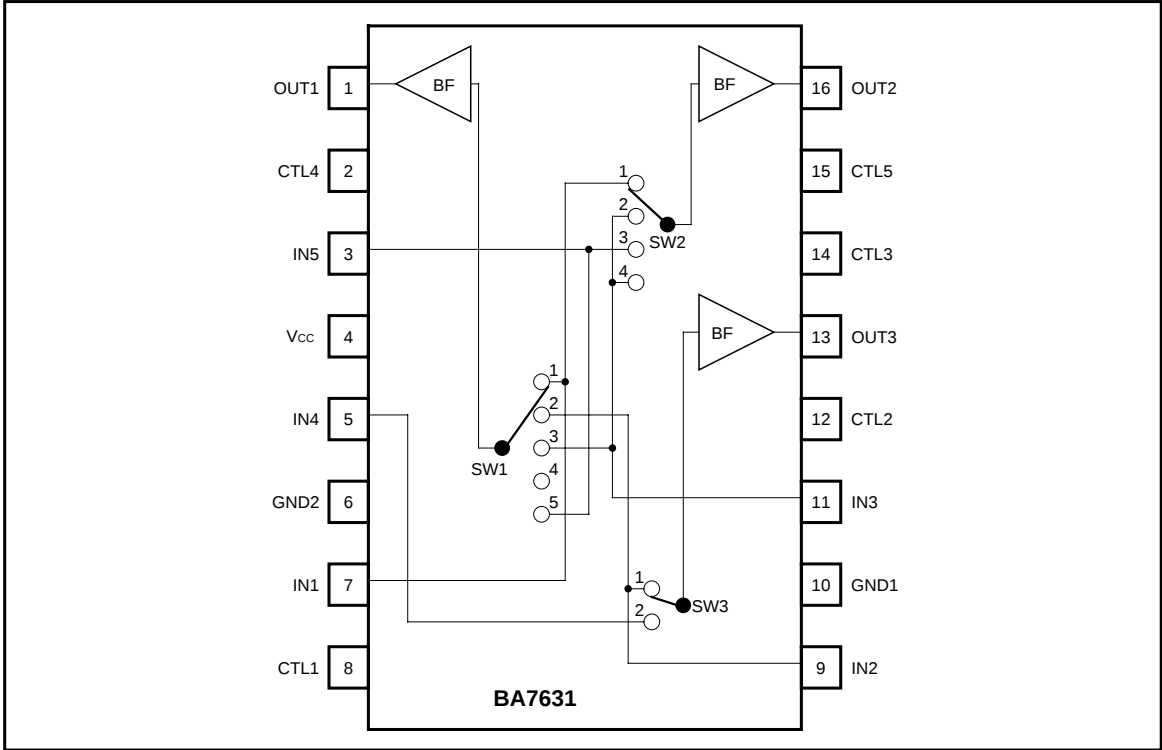
| Parameter             | Symbol           | Limits                    | Unit |
|-----------------------|------------------|---------------------------|------|
| Applied voltage       | V <sub>CC</sub>  | 13.5                      | V    |
| Power dissipation     | P <sub>d</sub>   | 1100* (DIP)<br>500* (SOP) | mW   |
| Operating temperature | T <sub>opr</sub> | – 25 ~ + 70               | °C   |
| Storage temperature   | T <sub>stg</sub> | – 55 ~ + 125              | °C   |

\* Reduced by 11mW (DIP) or 5mW (SOP) for each increase in T<sub>a</sub> of 1°C over 25°C.

### ●Recommended operating conditions (T<sub>a</sub> = 25°C)

| Parameter            | Symbol          | Limits     | Unit |
|----------------------|-----------------|------------|------|
| Power supply voltage | V <sub>CC</sub> | 4.5 ~ 13.0 | V    |

●Block diagram



## ● Truth table

## OUT1 SW1 block

| CTL1 | CTL2 | CTL5 | SELECT |
|------|------|------|--------|
| L    | L    | L    | IN1    |
| L    | H    | L    | IN2    |
| H    | L    | L    | IN3    |
| H    | H    | L    | MUTE   |
| *    | *    | H    | IN5    |

\* Don't care

## OUT2 SW2 block

| CTL3 | CTL5 | SELECT |
|------|------|--------|
| L    | L    | IN1    |
| H    | L    | IN3    |
| L    | H    | IN5    |
| H    | H    | IN3    |

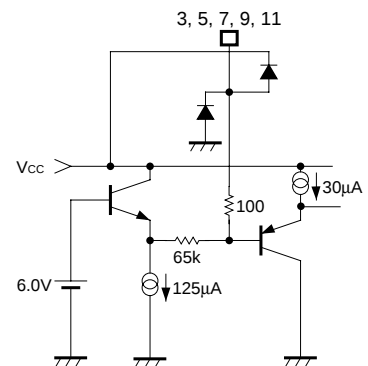
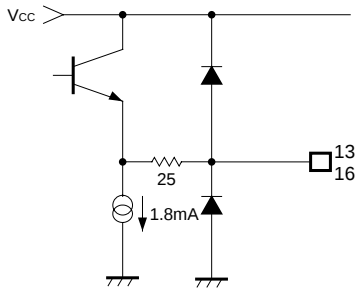
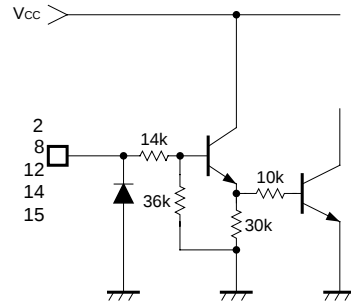
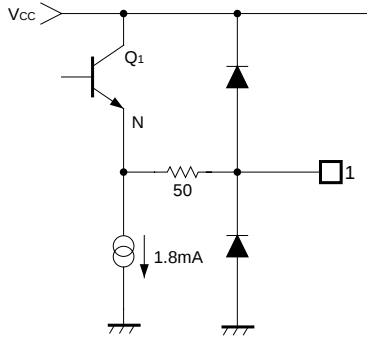
## OUT3 SW3 block

| CTL4 | SELECT |
|------|--------|
| L    | IN2    |
| H    | IN4    |

## ● Pin descriptions

| Pin No. | Pin name        | Function          |
|---------|-----------------|-------------------|
| 1       | OUT1            | Output 1          |
| 2       | CTL4            | Control 4         |
| 3       | IN5             | Input 5           |
| 4       | V <sub>CC</sub> | Power supply      |
| 5       | IN4             | Input 4           |
| 6       | GND2            | GND (GND1 common) |
| 7       | IN1             | Input 1           |
| 8       | CTL1            | Control 1         |
| 9       | IN2             | Input 2           |
| 10      | GND1            | GND (GND2 common) |
| 11      | IN3             | Input 3           |
| 12      | CTL2            | Control 2         |
| 13      | OUT3            | Output 3          |
| 14      | CTL3            | Control 3         |
| 15      | CTL5            | Control 5         |
| 16      | OUT2            | Output 2          |

## ● Input / output circuits



●Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$  and  $V_{CC} = 12\text{V}$ )

| Parameter                      | Symbol     | Min. | Typ.  | Max. | Unit             | Conditions                                    |
|--------------------------------|------------|------|-------|------|------------------|-----------------------------------------------|
| Recommended operating voltage  | $V_{CC}$   | 4.5  | 12.0  | 13.0 | V                | —                                             |
| Circuit current                | $I_{CC}$   | —    | 14.9  | 24.0 | mA               | —                                             |
| Maximum output level           | $V_{om}$   | 3.1  | 3.6   | —    | $V_{rms}$        | $f = 1\text{MHz}$ , $\text{THD} = 0.5\%$      |
| Voltage gain                   | $G_v$      | -0.5 | 0     | 0.5  | dB               | $f = 1\text{kHz}$ , $V_{IN} = 3.0\text{dBm}$  |
| Total harmonic distortion      | THD        | —    | 0.005 | 0.1  | %                | $f = 1\text{kHz}$ , $V_{IN} = 3.0\text{dBm}$  |
| Interchannel crosstalk         | $C_{TM}$   | —    | -75   | -60  | dB               | $f = 10\text{kHz}$ , $V_{IN} = 3.0\text{dBm}$ |
| Input conversion noise voltage | $V_{Min.}$ | —    | 20.0  | 40.0 | $\mu V_{rms}$    | 30kHz LPF, $R_g = 2.2\text{k}\Omega$          |
| CTL switch level               | $V_{TH}$   | 1.0  | 2.0   | 3.0  | V                | —                                             |
| Input impedance                | $Z_{IN}$   | 48.5 | 65    | 80.5 | $\text{k}\Omega$ | —                                             |

○Not designed for radiation resistance.

●Circuit operation

The BA7631 and BA7631F make it easy to construct a decoder for the scrambled pay channels. They have been designed specifically for audio signal decoding. As shown in the application examples in Figs. 1 and 2, there are inputs for TV, VCR, decoder, and AUX, to cover a wide range of applications. When the AUX input is not used, by setting CTL5 to "L", the system construction becomes the same as that of the BA7630S, and the BA7630S switching logic can be used as is.

●Application example

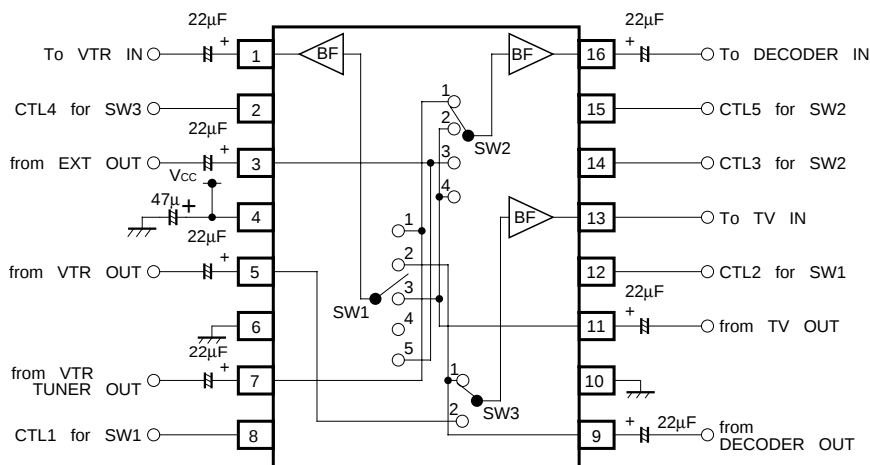


Fig.1

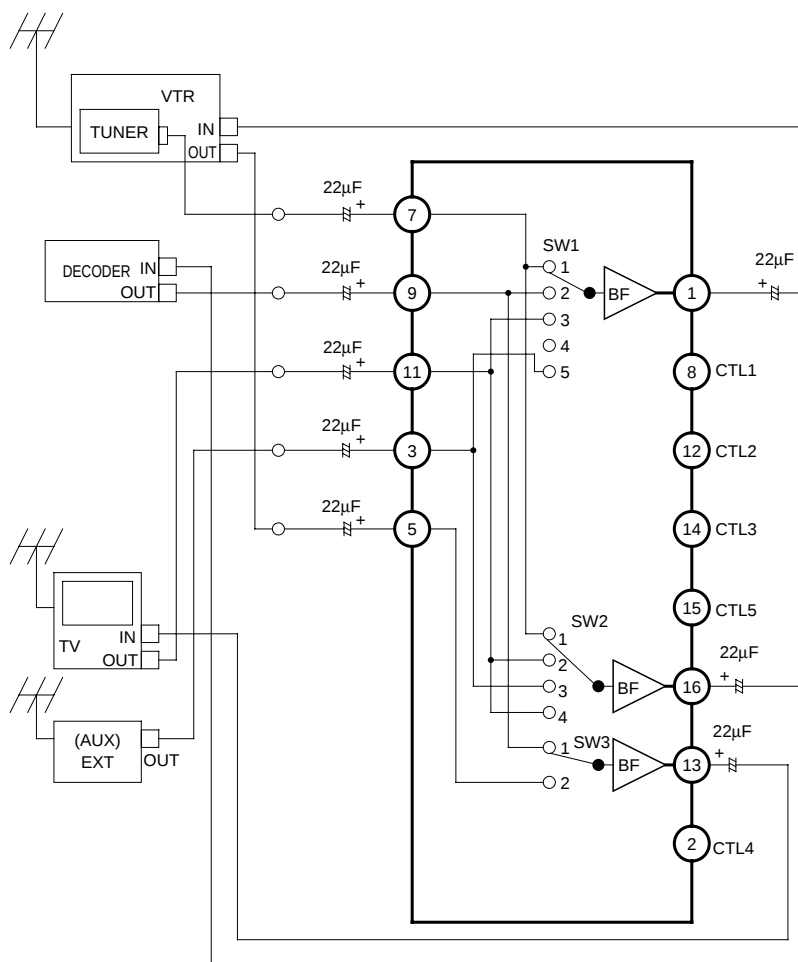


Fig.2

● Electrical characteristic curves

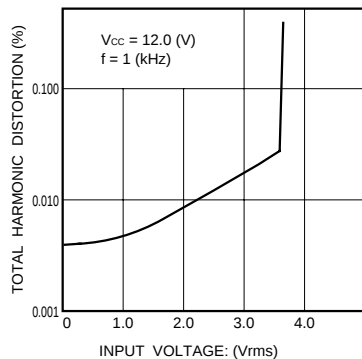


Fig. 3 Distortion characteristics

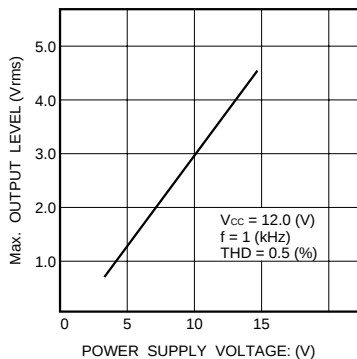


Fig. 4 Power supply voltage vs. dynamic range characteristics

● External dimensions (Units: mm)

