# 3-channel 75Ω driver with Y / C MIX

## BA7665FS

The BA7665FS has three 75Ω driver circuits with 6dB amplifiers, and includes a Y / C MIX circuit. The IC can provide a 75Ω drive with a composite Y signal, C signal, or a Y / C MIX signal. Dual-circuit drive capacity for each load is provided, and a sag compensation function is provided to allow use of smaller coupling capacitors.
The composite Y signal input is a sync-tip clamp input, and the chroma input is a biased input.
The three channels can be simultaneously muted, or the chroma signal only (in the case of C / Y output, only Y is output), and output short circuit protection and power save circuits are also provided.

●Applications
Digital AV equipment, DVD and DVC players

●Features
1) Y / C MIX circuit.
2) Low power consumption (typ. 130mW).
3) Output mute circuit.
4) Power save circuit.
5) Output protection circuit.
6) Sag compensation circuit allows small output coupling capacitors.
7) Two-circuit drive possible for loads.
8) Compact SSOP-A 16-pin package.

●Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Power supply voltage | $V_{CC}$ | 8 | V |
| Power dissipation | Pd | 650* | mW |
| Operating temperature | Topr | – 25 ~ + 75 | °C |
| Storage temperature | Tstg | – 55 ~ + 125 | °C |

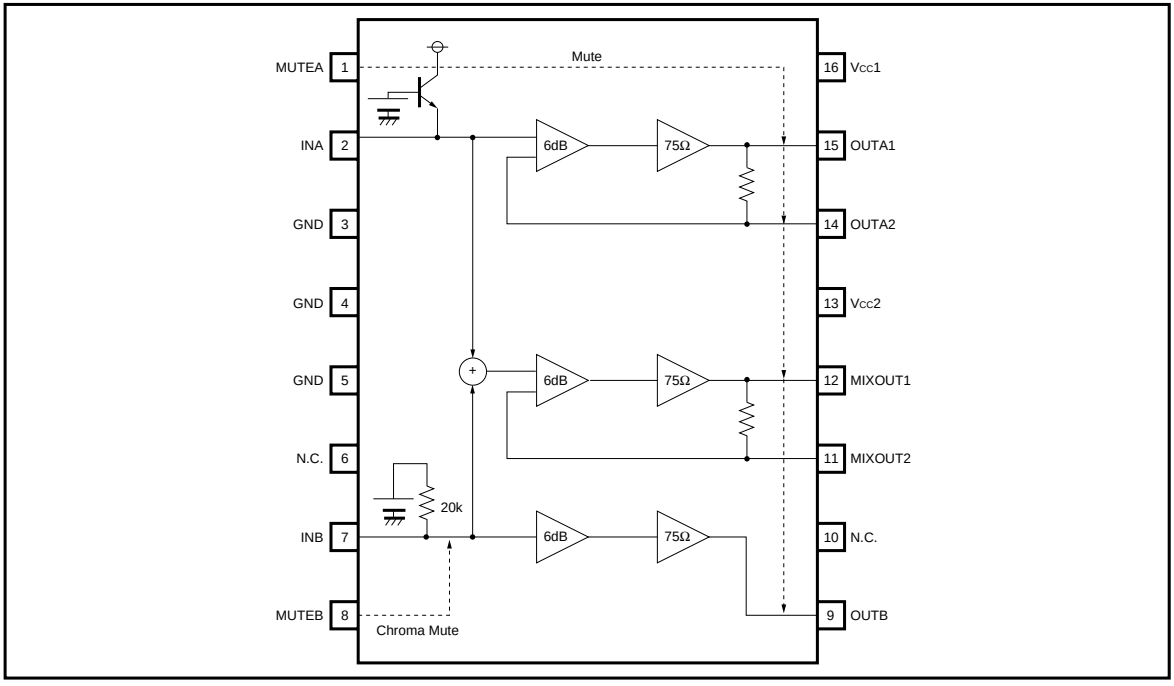
* Reduced by 6.5mW for each increase in Ta of 1°C over 25°C.

●Recommended operating conditions (Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Power supply voltage | $V_{CC}$ | 4.5 | 5.0 | 5.5 | V |

○ Not designed for radiation resistance.

●Block diagram




●Electrical characteristics (unless otherwise noted, Ta = 25°C, $V_{CC}$ = 5V)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Circuit current | $I_{CC}$ | 13.0 | 26.0 | 39.0 | mA | No signal |
| Maximum output level | $V_{om}$ | 2.6 | 3.0 | — | $V_{P-P}$ | f = 1kHz, THD = 1 % |
| Frequency characteristics | $G_f$ | – 1.0 | 0.0 | 1.0 | dB | f = 7MHz / 1MHz, $1V_{P-P}$ |
| Inter channel crosstalk | $C_T$ | — | – 60 | — | dB | f = 4.43MHz, $1V_{P-P}$ |
| Mute attenuation | $M_T$ | — | – 60 | — | dB | f = 4.43MHz, $1V_{P-P}$ |
| Mute switch high level | $V_{THH}$ | 2.5 | — | $V_{CC}$ | V | |
| Mute switch low level | $V_{THL}$ | 0 | — | 1.0 | V | |
| Input impedance | $Z_{IN}$ | 16 | 20 | 24 | kΩ | Chroma input pin (pin 7) |

●Measurement circuit

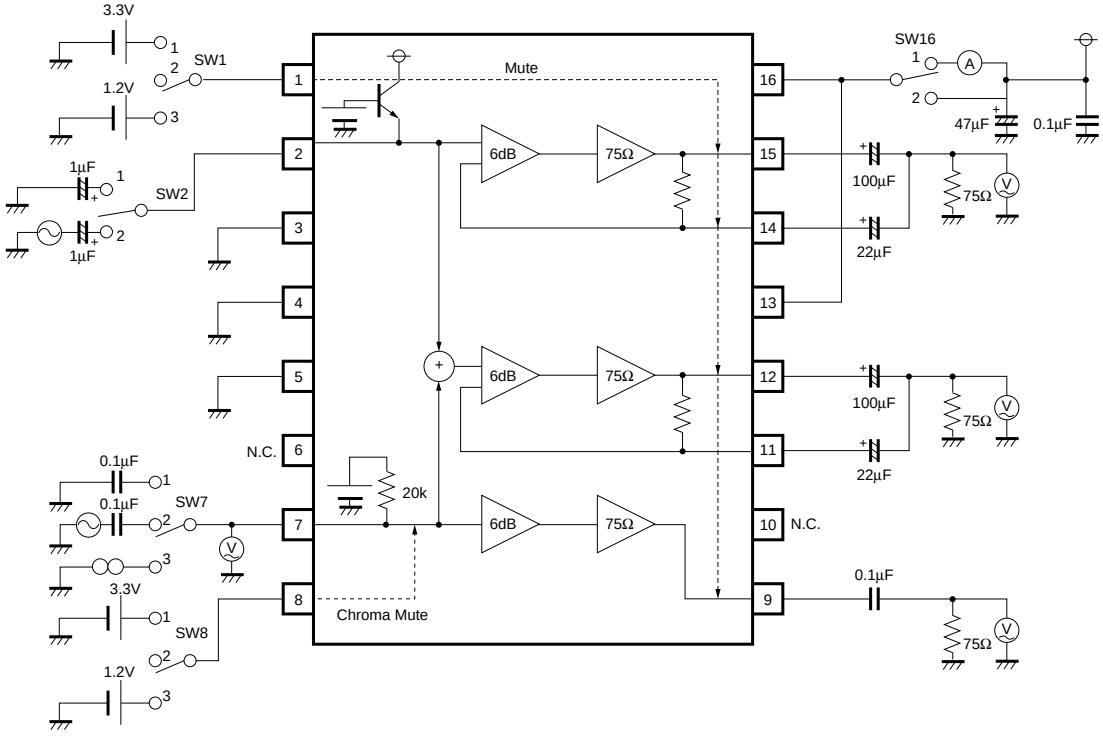



Fig.1

●Measurement conditions

| Parameter | | Symbol | Switch conditions | | | | | Measurement method |
|---|---|---|---|---|---|---|---|---|
| | | | $SW_1$ | $SW_2$ | $SW_7$ | $SW_8$ | $SW_{16}$ | |
| Circuit current | | $I_{CC}$ | 2 | 1 | 1 | 2 | 1 | Note 1 |
| Maximum output level | OUTA | $V_{OM1}$ | 3 | 2 | 1 | 3 | 2 | Note 2 |
| | MIXOUT | $V_{OM2}$ | 3 | 2 | 1 | 3 | 2 | |
| | OUTB | $V_{OM3}$ | 3 | 1 | 2 | 3 | 2 | |
| Frequency characteristics | OUTA | $G_{F1}$ | 3 | 2 | 1 | 3 | 2 | Note 3 |
| | MIXOUT | $G_{F2}$ | 3 | 2 | 1 | 3 | 2 | |
| | OUTB | $G_{F3}$ | 3 | 1 | 2 | 3 | 2 | |
| Crosstalk | OUTB→OUTA | $G_{T1}$ | 3 | 1 | 2 | 3 | 2 | Note 4 |
| | OUTA→OUTB | $G_{T2}$ | 3 | 2 | 1 | 3 | 2 | |
| Mute attenuation | OUTA | $M_{T1}$ | 1 | 2 | 1 | 3 | 2 | Note 5 |
| | MIXOUT | $M_{T2}$ | 1 | 2 | 1 | 3 | 2 | |
| | OUTB | $M_{T3}$ | 1 | 1 | 2 | 3 | 2 | |
| Chroma mute attenuation | MIXOUT | $M_{TC1}$ | 3 | 1 | 2 | 1 | 2 | Note 5 |
| | OUTB | $M_{TC2}$ | 3 | 1 | 2 | 1 | 2 | |
| Input impedance | — | $Z_{IN}$ | 3 | 1 | 3 | 3 | 2 | Note 6 |
| Voltage gain | OUTA | $G_{V1}$ | 3 | 2 | 1 | 3 | 2 | Note 7 |
| | MIXOUT | $G_{V2}$ | 3 | 2 | 1 | 3 | 2 | |
| | OUTB | $G_{V3}$ | 3 | 1 | 2 | 3 | 2 | |
| Inter-channel voltage gain differential | — | $\Delta G_{VC}$ | — | — | — | — | — | Note 8 |

∗ The mute switch level was substituted by using H = 2.4V and L = 1.1V for the above measurements.

Measurement method

Note 1: Measure the quiescent current.

Note 2: Connect a distortion meter to the output, and input a f = 1kHz sine wave.
Adjust the output level until the output distortion is 1%. The output voltage at this time is the maximum output level $V_{OM}$ [$V_{P\text{-}P}$].

Note 3: Input 1$V_{P\text{-}P}$, 7MHz and 1MHz sine waves, and measure the corresponding outputs $V_{O7}$ and $V_{O1}$. The frequency characteristic is given by
$G_F = 20 * \text{Log}\ (V_{O7} / V_{O1})$ [dB].

Note 4: Input a 1$V_{P\text{-}P}$, 4.43MHz sine wave, and measure the output Vo [$V_{P\text{-}P}$] The interchannel crosstalk is given by $C_T = 20 * \text{Log}\ (V_O / V_{IN})$ [dB].

Note 5: Input a 1$V_{P\text{-}P}$, 4.43MHz sine wave, and measure the output Vo [$V_{P\text{-}P}$] The mute attenuation is given by
$M_T = 20 * \text{Log}\ (V_O / V_{IN})$ [dB].

Note 6: Measure the input pin voltage $V_{IN}50$ when a current of DC50μA is flowing into the input pin. Measure the input pin open-circuit voltage. The input impedance is given by
$Z_{IN} = | V_{IN50} - V_{IN0} | / 50 * 10^3$ [kΩ].

Note 7: Input a 1$V_{P\text{-}P}$, 4.43MHz sine wave, and measure the output $V_O$ [$V_{P\text{-}P}$] The voltage gain is given by
$Gv = 20 * \log\ (V_O / V_{IN})$ [dB].

Note 8: $\Delta G_{VC} = | G_{V1} - G_{V2} |$ [dB]

●Guaranteed design values (unless otherwise noted, Ta = 25°C, $V_{CC}$ = 5V)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Voltage gain | $G_V$ | 5.5 | 6.0 | 6.5 | dB | f = 4.43MHz, $1V_{P-P}$ |
| Interchannel voltage gain | $\Delta G_V$ | – 0.5 | 0.0 | 0.5 | dB | f = 100kHz, $1V_{P-P}$ |

●Mute SW mode settings

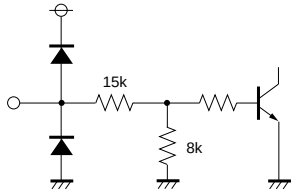
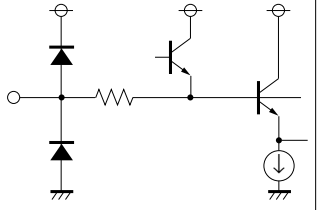
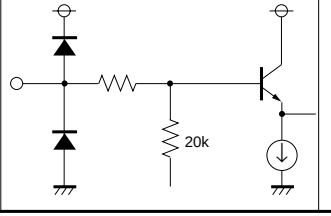
• MUTEA (1pin)

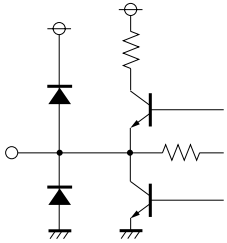
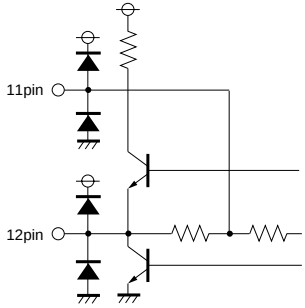
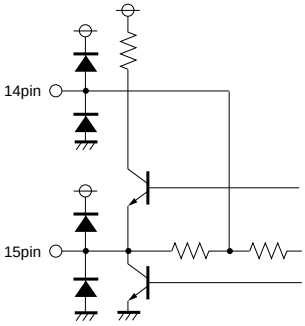
| | |
|---|---|
| H | 3ch MUTE |
| L | NORMAL |

• MUTEB (8pin)

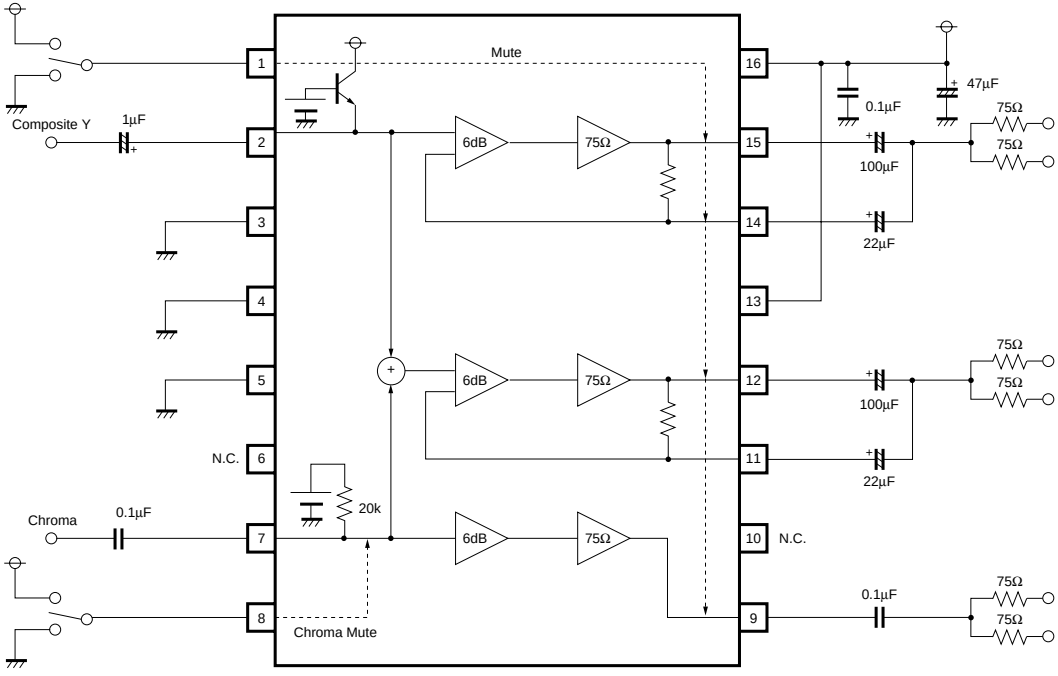
| | |
|---|---|
| H | CHROMA MUTE |
| L | NORMAL |

●Pin descriptions and equivalent I / O circuits

| Pin. No | Pin name | IN | OUT | Standard potential | Equivalent I / O circuit | Pin description |
|---|---|---|---|---|---|---|
| 1<br>8 | MUTEA<br>MUTEB | ○ | — | — |  | Mute control pin<br><br>When MUTE A (pin 1) goes high, all three channels are muted at the same time. When MUTE B (pin 8) goes high, OUTB and the MIXOUT chroma signals are muted. |
| 2 | INA | ○ | — | 2.0V |  | Signal input pin<br><br>This is the input pin for the composite Y signal (sync-tip clamp input). |
| 3<br>4<br>5 | GND | — | — | 0V |  | Ground pin |
| 7 | INB | ○ | — | 2.0V |  | Signal input pin<br><br>Bias-type input pin for the chroma signal. The input impedance is 20kΩ. |

| Pin. No | Pin name | IN | OUT | Standard voltage | Equivalent I / O circuit | Pin description |
|---|---|---|---|---|---|---|
| 9 | OUTB | — | ○ | 2.4V |  | Signal output pin<br><br>Chroma signal output pin. When this drops below 0.2V, the protection circuit operates and the IC enters power save mode. |
| 11<br>12 | MIXOUT2<br>MIXOUT1 | — | ○ | 0.9V<br>0.95V |  | Signal output pin<br><br>Y / C signal output pin. Pin 11 is the sag compensation pin. When pin 12 is taken below 0.2V, the protection circuit operates and the IC enters power save mode. |
| 14<br>15 | OUTA2<br>OUTA1 | — | ○ | 0.9V<br>0.95V |  | Signal output pin<br><br>Composite Y signal output pin. Pin 14 is the sag compensation pin. When pin 15 is taken below 0.2V, the protection circuit operates and the IC enters power save mode. |
| 13<br>16 | $V_{CC}2$<br>$V_{CC}1$ | — | — | 5.0V<br>5.0V |  | Power supply pin<br><br>$V_{CC}1$ and $V_{CC}2$ are not connected internally. Use with them connected externally. |

●Application example




When you will not use the sag compensation function

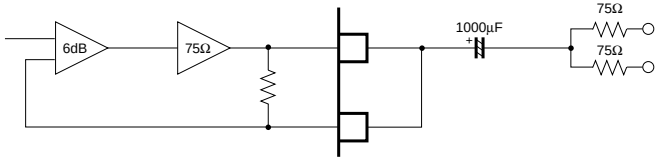
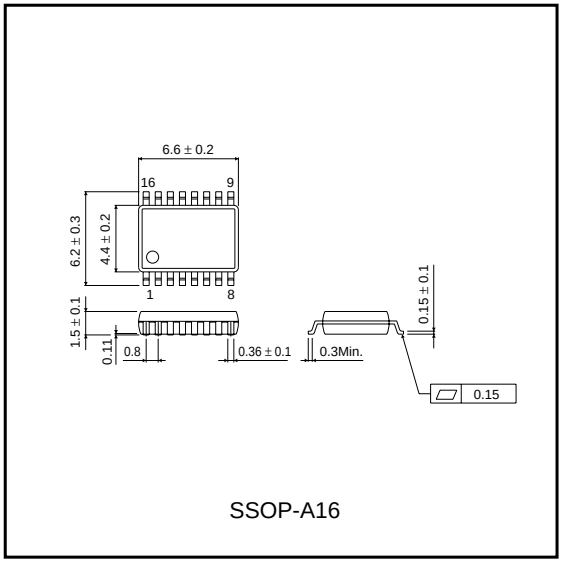



Fig.2

●External dimensions (Units: mm)




SSOP-A16