# 3-channel 75Ω driver
## BA7660FS

The BA7660FS is a 75Ω driver with a 6dB amplifier and three internal circuits, and provides 75Ω drive of composite Y signals and C signals, as well as RGB signals. Each load is capable of driving two circuits, and a sag correction function reduces the capacitance of the output coupling capacitor.

The input voltage is within a range of 0V to 1.5V, enabling direct connection of ordinary D / A converter output. An internal power-saving circuit is also included which provides simultaneous muting on all three channels, and output pin shorting protection.

●Applications
DVDs, set top boxes and other digital video devices

●Features
1) Can be coupled directly to D / A converter output.
2) Operates at a low power consumption (115mW typ.).
3) Internal output muting circuit.
4) Internal power-saving circuit.
5) Internal output protection circuit.

6) An internal sag correction function makes it possible to reduce the capacitance of the output coupling capacitor.
7) Each load is capable of driving two circuits.
8) The compact 16-pin SSOP-A package is used.

●Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Power supply voltage | Vcc | 8 | V |
| Power dissipation | Pd | 650 | mW |
| Operating temperature | Topr | − 25 ~ + 75 | °C |
| Storage temperature | Tstg | − 55 ~ + 125 | °C |

●Recommended operating conditions (Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Operating power supply voltage | Vcc | 4.5 | 5.0 | 5.5 | V |

●Block diagram



| MUTE (1pin) | |
|---|---|
| H | 3ch MUTE |
| L | NORMAL |
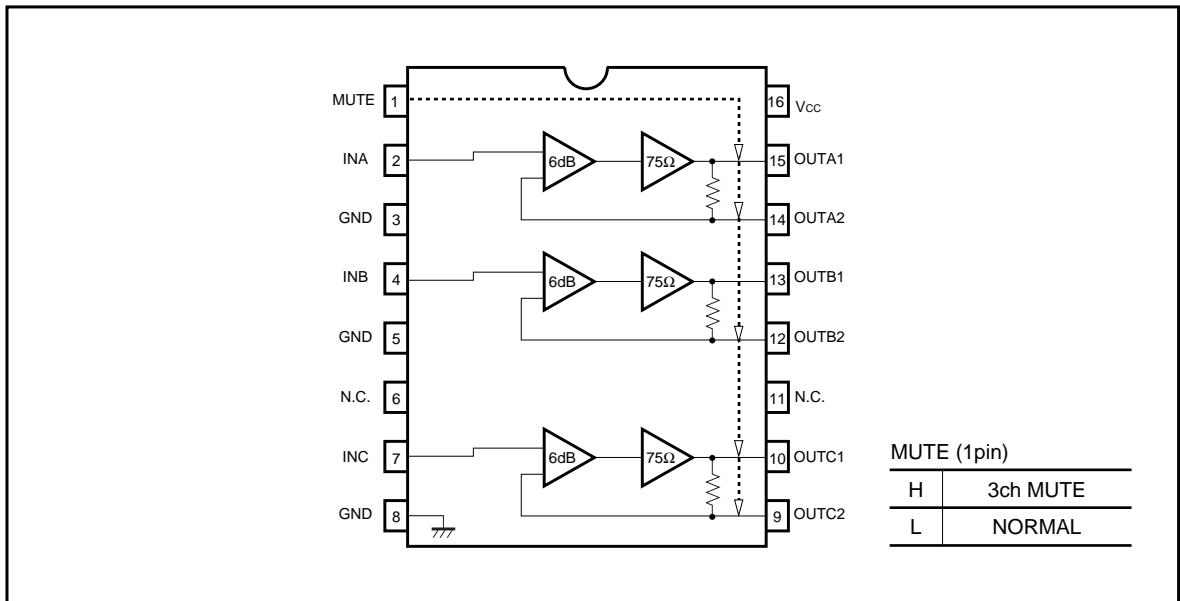
●Pin descriptions and input / output circuits

| Pin. No | Pin name | IN | OUT | Reference voltage | Equivalent circuit | Function |
|---------|----------|----|----|-------------------|--------------------|----------|
| 1 | MUTE | ○ | — | — | | Muting control<br><br>If MUTE (pin 1) is set to HIGH, muting is carried out simultaneously on all three channels. |
| 2<br>4<br>7 | INA<br>INB<br>INC | ○ | — | — | | Signal input<br><br>Input signals consist of composite video signals, Y signals, C signals, RGB, and others. The input level is within a range of 0 to 1.3 (min.) to 1.5 (typ.). |
| 3<br>5<br>8 | GND | — | — | 0V | | Ground |
| 14<br>12<br>9<br><br>15<br>13<br>10 | OUTA2<br>OUTB2<br>OUTC2<br><br>OUTA1<br>OUTB1<br>OUTC1 | — | ○ | 0.9V<br><br><br>0.95V | | Signal output<br><br>The signal output level is (0.9 + 2 × input voltage [V]). Pins 9, 12, and 14 are the pins for sag correction. If pins 10, 13, and 15 are set to 0.2V or less, the protective circuit is triggered and the power-saving mode is accessed. |
| 16 | Vcc | — | — | 5.0V | | Power supply |
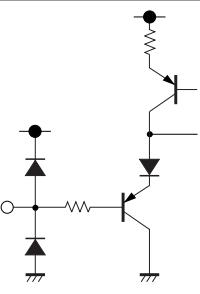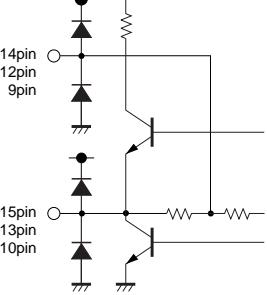
●Electrical characteristics (unless otherwise noted, Ta = 25°C, Vcc = 5V)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Circuit current | Icc | 11.4 | 22.8 | 34.2 | mA | With no signal |
| Maximum output level | Vom | 2.6 | 3.0 | — | VP-P | f = 1kHz,THD = 1% |
| Voltage gain | Gv | 5.5 | 6.0 | 6.5 | dB | f = 4.43MHz,1VP-P |
| Frequency characteristic | Gf | – 1.0 | 0.0 | 1.0 | dB | f = 7MHz / 1MHz,1VP-P |
| Muting attenuation | MT | — | – 60 | — | dB | f = 4.43MHz,1VP-P |
| Muting switching level HIGH | VTHH | 3.5 | — | Vcc | V | — |
| Muting switching level LOW | VTHL | 0 | — | 1.0 | V | — |

●Guaranteed design parameters (unless otherwise noted, Ta = 25°C, Vcc = 5V)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Differential gain | DG | — | 0.5 | 1.5 | % | 1.0VP-P reference staircase signal |
| Differential phase | DP | — | 0.5 | 1.5 | deg | 1.0VP-P reference staircase signal |
| Interchannel crosstalk | CT | — | – 60 | – 55 | dB | f = 4.43MHz,1VP-P |
| Interchannel voltage gain differential | ΔGv | – 0.5 | 0.0 | 0.5 | dB | f = 4.43MHz,1VP-P |

●Measurement circuit
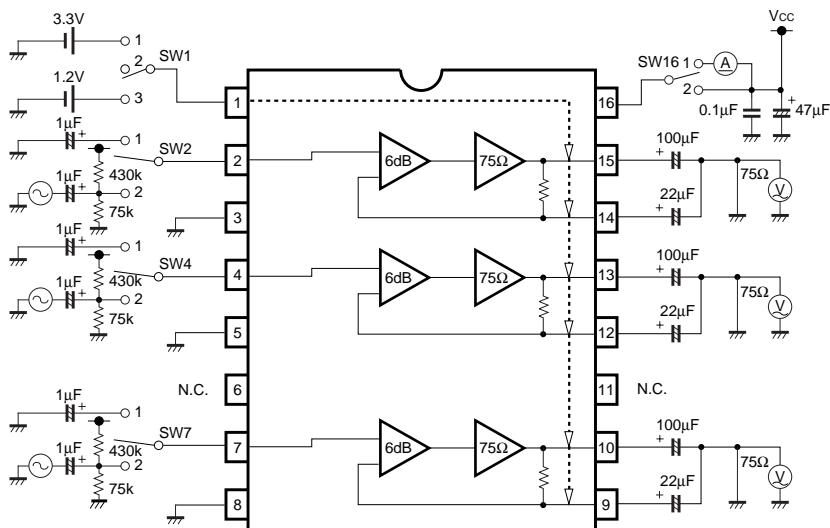
●Measurement condition settings table

| Item | | Symbol | Switch conditions | | | | | Measurement method |
|------|---|--------|-----|-----|-----|-----|------|--------|
| | | | $SW_1$ | $SW_2$ | $SW_4$ | $SW_7$ | $SW_{16}$ | |
| Circuit current | | $I_{CC}$ | 2 | 1 | 1 | 1 | 1 | Note 1 |
| Maximum output level | OUTA | $V_{OM1}$ | 3 | 2 | 1 | 1 | 2 | Note 2 |
| | OUTB | $V_{OM2}$ | 3 | 1 | 2 | 1 | 2 | |
| | OUTC | $V_{OM3}$ | 3 | 1 | 1 | 2 | 2 | |
| Voltage gain | OUTA | $G_{V1}$ | 3 | 2 | 1 | 1 | 2 | Note 3 |
| | OUTB | $G_{V2}$ | 3 | 1 | 2 | 1 | 2 | |
| | OUTC | $G_{V3}$ | 3 | 1 | 1 | 2 | 2 | |
| Frequency characteristics | OUTA | $G_{F1}$ | 3 | 2 | 1 | 1 | 2 | Note 4 |
| | OUTB | $G_{F2}$ | 3 | 1 | 2 | 1 | 2 | |
| | OUTC | $G_{F3}$ | 3 | 1 | 1 | 2 | 2 | |
| Crosstalk between channels | OUTA→OUTB | $C_{T1}$ | 3 | 2 | 1 | 1 | 2 | Note 5 |
| | OUTA→OUTC | $C_{T2}$ | 3 | 2 | 1 | 1 | 2 | |
| | OUTB→OUTA | $C_{T3}$ | 3 | 1 | 2 | 1 | 2 | |
| | OUTB→OUTC | $C_{T4}$ | 3 | 1 | 2 | 1 | 2 | |
| | OUTC→OUTA | $C_{T5}$ | 3 | 1 | 1 | 2 | 2 | |
| | OUTC→OUTB | $C_{T6}$ | 3 | 1 | 1 | 2 | 2 | |
| Muting attenuation | OUTA | $M_{T1}$ | 1 | 2 | 1 | 1 | 2 | Note 6 |
| | OUTB | $M_{T2}$ | 1 | 1 | 2 | 1 | 2 | |
| | OUTC | $M_{T3}$ | 1 | 1 | 1 | 2 | 2 | |

＊ The muting switching level is substituted by carrying out the above measurement at High = 3.3V, Low = 1.2V.

Note 1: Measure the circuit current when no signal is present.

Note 2: Apply a sine wave of f = 1kHz to the input, and adjust the input level so that the output distortion is 1%. At this time, set the output voltage to the maximum output level of $V_{OM}$ [VP-P].

Note 3: Measure the output $V_O$ [VP-P] with a sine wave of f = 4.43MHz, 1VP-P applied to the input. Voltage gain $G_V$ is:
$$G_V = 20 \text{ Log } (V_O / V_{IN}) \text{ [dB]}$$

Note 4: Measure the outputs $V_O7$ and $V_O1$ [VP-P] each with sine waves of f = 7MHz, 1VP-P and f = 1MHz, 1VP-P applied to the input. Voltage frequency $G_F$ is:
$$G_F = 20 \text{ Log } (V_O7 / V_O1) \text{ [dB]}$$

Note 5: Measure the output $V_O$ [VP-P] with a sine wave of f = 4.43MHz, 1VP-P applied to the input. Interchannel crosstalk $C_T$ is:
$$C_T = 20 \text{ Log } (V_O / V_{IN}) \text{ [dB]}$$

Note 6: Measure the output $V_O$ [VP-P] with a sine wave of f = 4.43MHz, 1VP-P applied to the input. The muting attenuation $M_T$ is:
$$M_T = 20 ＊ \text{Log } (V_O / V_{IN}) \text{ [dB]}$$

●Application example



When the sag correction function is used.
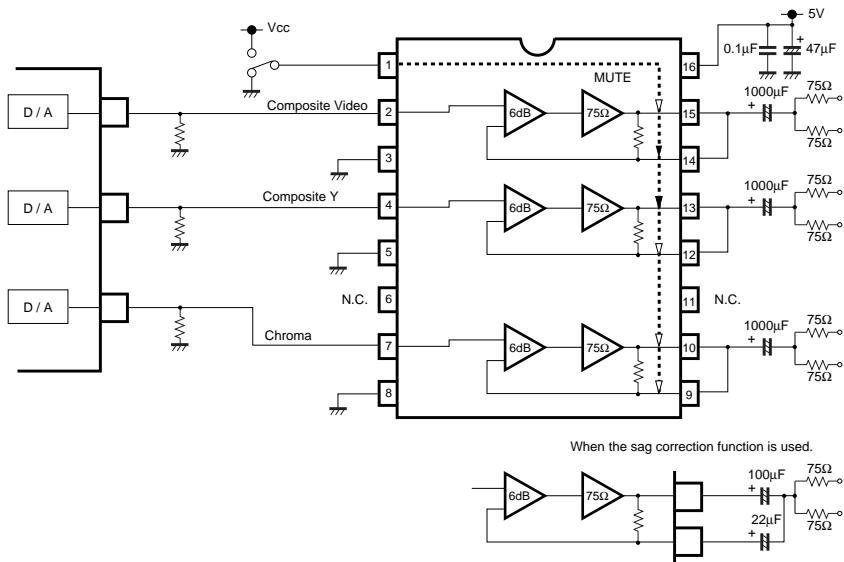
●External dimensions (Units: mm)



SSOP-A16