

Quad 2-input/2-output analog switch

BU9761FS/BU9761FV

The BU9761FS and BU9761FV are analog switches with four circuits each, two for input and two for output. Depending on the status of the SELECT pin, the two input signals can be switched to either of two output pins. In addition, the EN pin can be used to set the output status to high impedance.

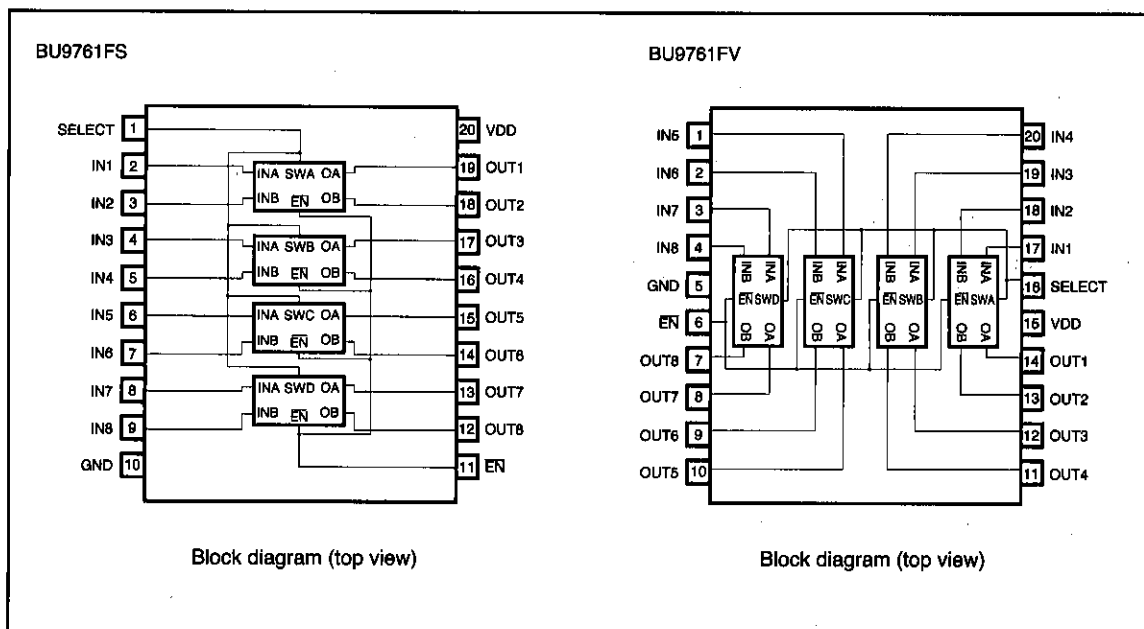
●Applications

Videos, movies, TVs, mini-component sets, radio cassette players, audio equipment, personal computers

●Features

- 1) Ultra-compact slim package. (SSOP-A20, SSOP-B20)
- 2) Low current consumption. ($I_Q = 1 \mu\text{A}$ max.)
- 3) Equipped with Output Enable terminal.
- 4) Low switching ON resistance ($R_{ON} = 130 \Omega$)
- 5) Low dispersion in switching ON resistance for the various channels. ($\Delta R_{ON} = 25 \Omega$ max.)

●Block diagram



● Absolute maximum ratings (Ta=25°C)

| Parameter | Symbol | Limits | Unit |
|-----------------------|------------------|------------|------|
| Power supply voltage | V _{DD} | -0.3 ~ 7.0 | V |
| Power dissipation | BU9761FS | Pd | mW |
| | BU9761FV | | |
| Operating temperature | T _{opr} | -25 ~ 75 | °C |
| Storage temperature | T _{stg} | -50 ~ 150 | °C |

*1 Reduced by 4.8mW for each increase in Ta of 1°C over 25°C.

*2 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 |
|----------------------|-----------------|------|------|------|------|
| Power supply voltage | V _{DD} | 4.0 | 5.0 | 6.0 | V |

● Pin truth table

• EN

| EN | H | L |
|--------|----------|---------------|
| OUT1~8 | High - Z | Output Enable |

• SELECT

| H | | L | |
|-------|--------|-------|--------|
| Input | Output | Input | Output |
| INA | OB | INA | OA |
| INB | OA | INB | OB |

●DC characteristics (unless otherwise noted, Ta=25°C, VDD=5V)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions | Measurement Circuit |
|-------------------------------|------------------|------|------|-------------|------|--|---------------------|
| High-level input voltage | V _{IH} | 3.5 | — | — | V | R _L =10kΩ | Fig.1 |
| Low-level input voltage | V _{IL} | — | — | 1.5 | V | R _L =10kΩ | Fig.1 |
| High-level input current | I _{IH} | — | — | 0.3 | μA | R _L =10kΩ | Fig.1 |
| Low-level input current | I _{IL} | — | — | 0.3 | μA | R _L =10kΩ | Fig.1 |
| ON resistance | R _{ON} | — | 135 | 150 | Ω | V _{IN} =V _{DD} / 2, R _L =1kΩ | Fig.2 |
| ON resistance deflexion | ΔR _{ON} | — | 12 | 25 | Ω | V _{IN} =V _{DD} / 2, R _L =1kΩ | Fig.2 |
| OFF - channel leakage current | I _{off} | — | — | 0.3 -0.3 | μA | V _{IN} =5V, V _{OUT} =0V V _{IN} =0V, V _{OUT} =5V | Fig.3 |
| Quiescent current | I _Q | — | — | 1.0 | μA | V _{IN} =GND | — |

●AC characteristics (unless otherwise noted, Ta=25°C, VDD=5V, C_L=50pF, R_L=10kΩ)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions | | Measurement Circuit |
|---|-------------------|------|------|------|-------------------|---------------------|--|---------------------|
| | | | | | | V _{DD} (V) | | |
| Propagation delay time IN to OUT | t _{PLH1} | — | 40 | — | ns | 5 | Output "L"→Output "H" | Fig.4 |
| | t _{PHL1} | — | 40 | — | ns | 5 | Output "H"→Output "L" | |
| Propagation delay time SELECT to OUT | t _{PLH2} | — | 50 | — | ns | 5 | Output "L"→Output "H" | Fig.5 |
| | t _{PHL2} | — | 40 | — | ns | 5 | Output "H"→Output "L" | |
| Output Enable time | t _{PHZ} | — | 200 | — | ns | 5 | Output "H"→Output "High Z" | Fig.6 Fig.7 |
| | t _{PLZ} | — | 200 | — | ns | 5 | Output "L"→Output "High Z" | |
| Output Disable time | t _{PZH} | — | 50 | — | ns | 5 | Output "High Z"→Output "H" | Fig.6 Fig.7 |
| | t _{PZL} | — | 50 | — | ns | 5 | Output "High Z"→Output "L" | |
| Input capacitance (control input) | C _c | — | 35 | — | pF | 5 | f=1MHz | — |
| Input capacitance (switch input) | C _s | — | 65 | — | pF | 5 | f=1MHz | — |
| Sine wave distortion (T.H.D.) | D | — | 0.06 | — | % | 5 | V _{IN} =2.5V _{P-P} , f=1kHz | Fig.8 |
| Max. propagation frequency | f _{max} | — | 1.15 | — | MHz | 5 | V _{IN} =2.5V _{P-P} | Fig. 8 |
| Feedthrough attenuation | FT | — | -70 | — | dB | 5 | V _{IN} =2.5V _{P-P} , f=10kHz | Fig.9 |
| Crosstalk (control/switch) | CT _c | — | 620 | — | mV _{P-P} | 5 | f=10kHz | Fig.10 |
| Crosstalk between channels | CT | — | -50 | — | dB | 5 | V _{IN} =2.5V _{P-P} , f=10kHz | Fig.11 |

● Measurement circuits

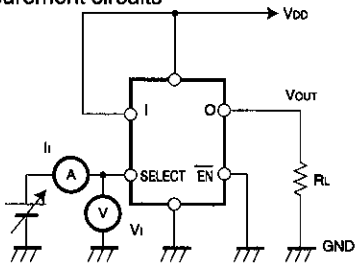


Fig. 1 Input voltage, current

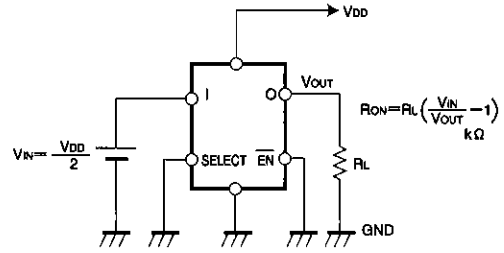


Fig. 2 ON resistance, ON resistance deviation

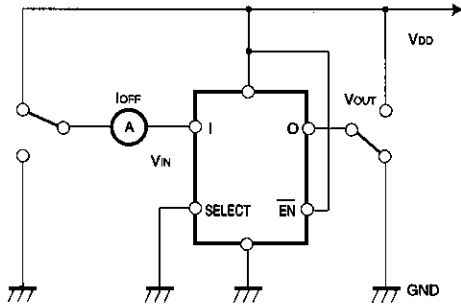


Fig. 3 OFF - channel leakage current

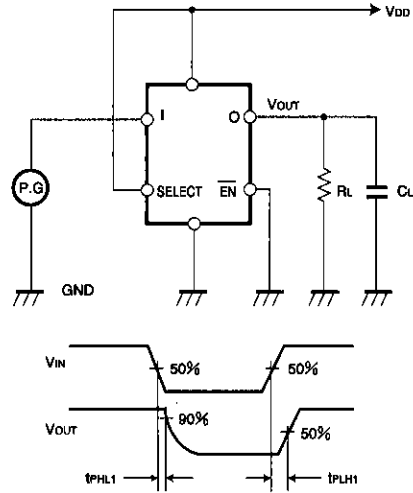


Fig. 4 Propagation delay time (IN to OUT)

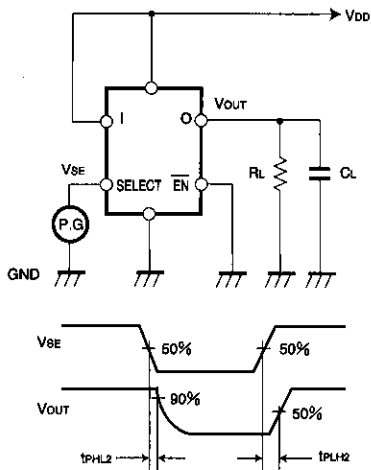


Fig. 5 Propagation delay time (SELECT to OUT)

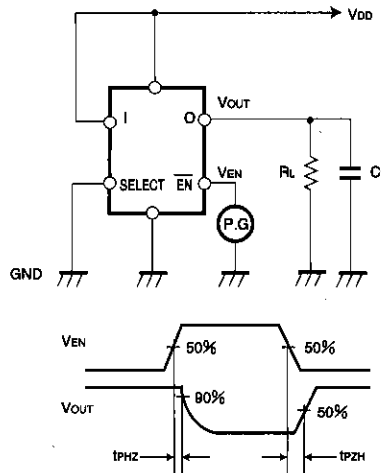


Fig. 6 Output Enable, Disable time 1

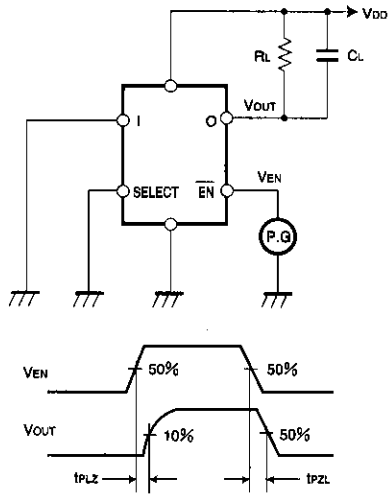


Fig. 7 Output Enable, Disable time 2

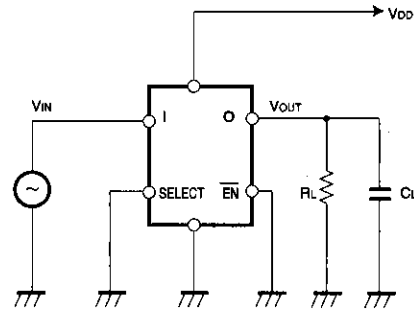


Fig. 8 Sine wave distortion, maximum propagation frequency

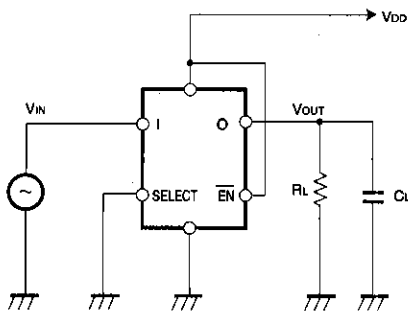


Fig. 9 Feedthrough attenuation

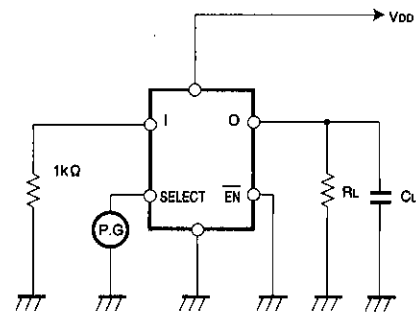


Fig. 10 Crosstalk (between control switches)

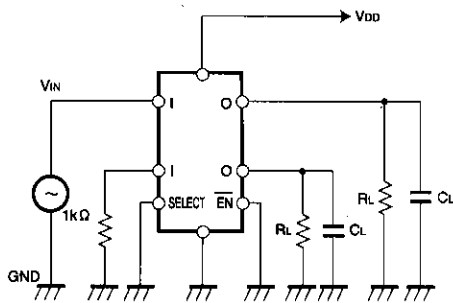


Fig. 11 Crosstalk

●Electrical characteristic curve

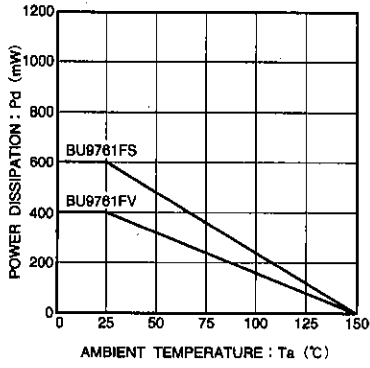
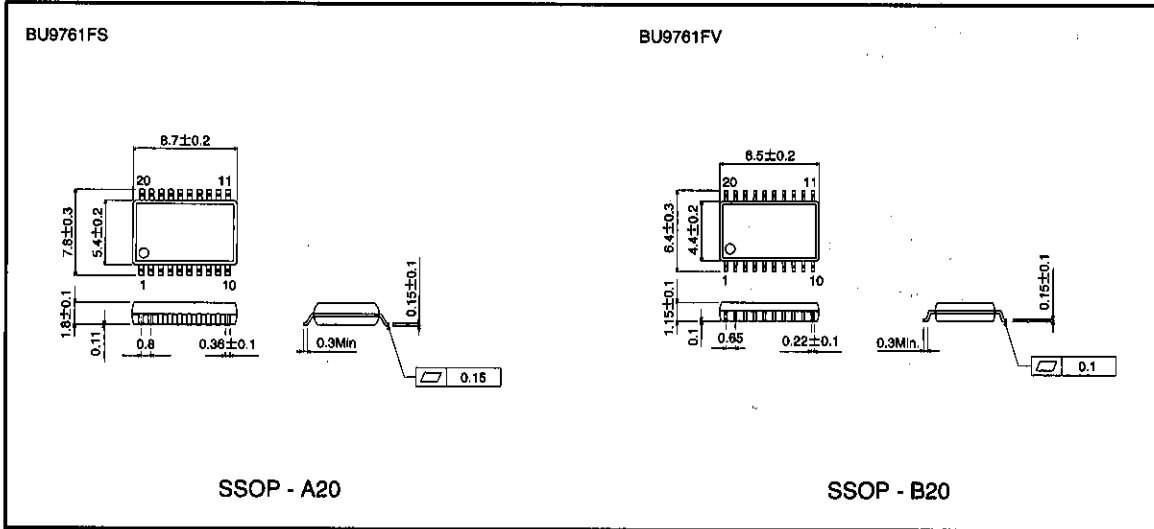


Fig. 12 Power dissipation - ambient temperature

●External dimensions (Units: mm)



Standard analog switches

CMOS logic

Series Standard

BU4000B

The BU4000 Series are CMOS ICs featuring low voltage and low power consumption. The wide range of operating power supply voltages is compatible with the general-purpose 4000B Series, and when a 5V power supply voltage is used, the LS-TTL IC can be driven directly.

These ICs are available in SOP and SSOP packages as well as the standard DIP package.

●Features

- 1) Low power consumption.
- 2) Wide range of operating power supply voltages.
- 3) High input impedance.
- 4) High fan-out.
- 5) Direct drive of 2 L-TTL inputs and 1 LS-TTL input.

●Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|----------------------|-----------------|---|------|
| Power supply voltage | V _{DD} | 18 *1 | V |
| Input voltage | V _{IN} | -0.3~V _{DD} +0.3 | V |
| Power dissipation *2 | Pd | Please refer to specifications for individual package | mW |
| Storage temperature | Tstg | -55~150 | °C |

*1 For the BU4XXXBC type, V_{DD} = 20 V.

*2 The values for the SOP and SSOP packages are the values when mounted on a glass epoxy PCB (50 mm x 50 mm x 1.6 mm).

●Recommended operating conditions (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|-----------------------|-----------------|-------------------|------|
| Power supply voltage | V _{DD} | 3~16 * | V |
| Input voltage | V _{IN} | 0~V _{DD} | V |
| Operating temperature | Topr | -40~85 | °C |

* For the BU4XXXBC type, V_{DD} = 3 to 18 V.

●Electrical characteristic curves

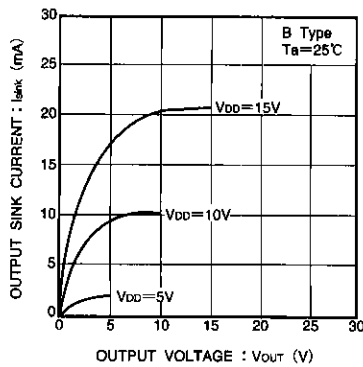


Fig.1 Output sink current - output voltage characteristic

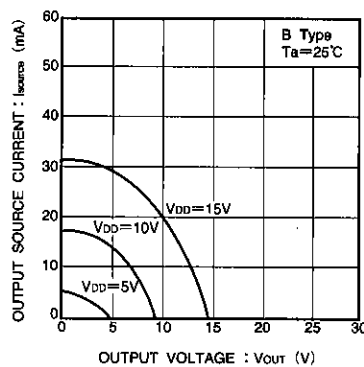


Fig.2 Output source current - output voltage characteristic

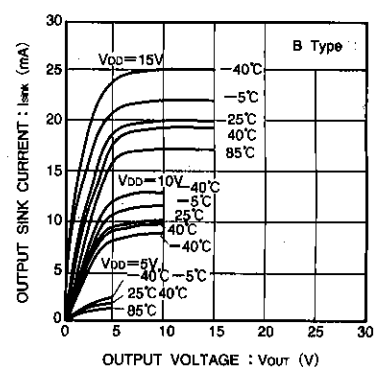


Fig.3 Output SINK current - output voltage characteristic

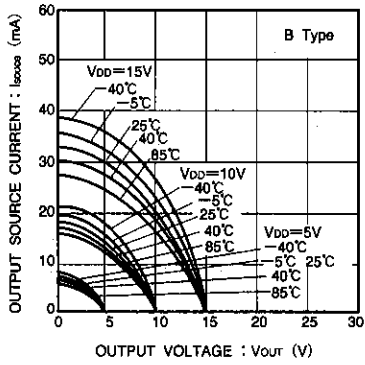


Fig.4 Output source current - output voltage characteristic

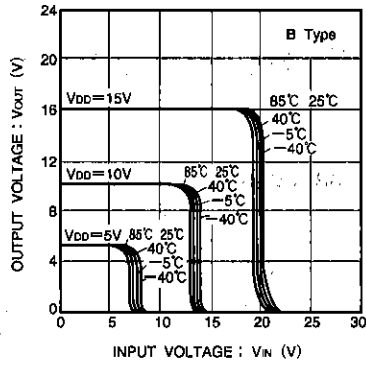


Fig.5 Output voltage - input voltage characteristic

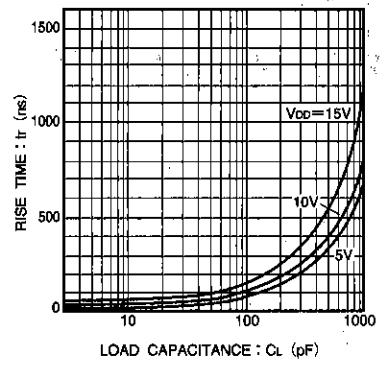


Fig.6 Rise time - load capacitance characteristic

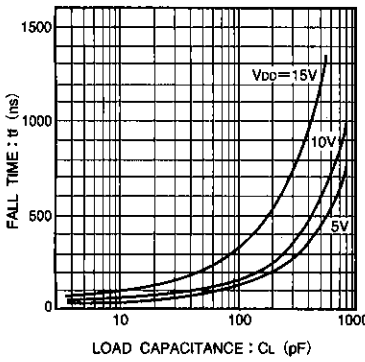


Fig.7 Fall time - load capacitance characteristic

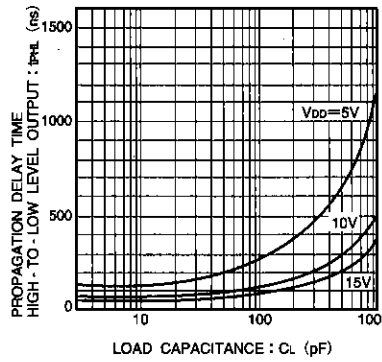


Fig.8 "H" to "L" propagation delay time - load capacitance characteristic

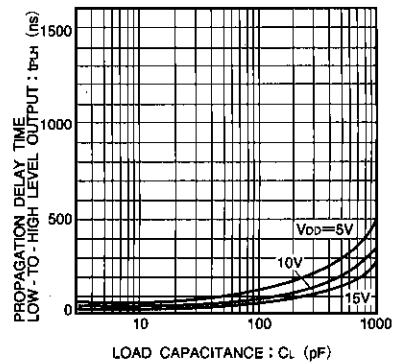


Fig.9 "L" to "H" propagation delay time - load capacitance characteristic

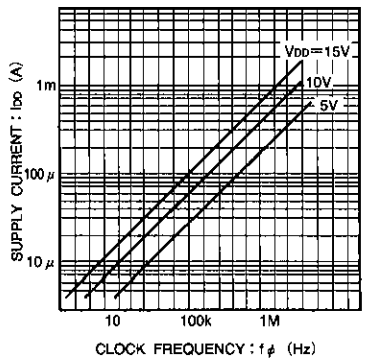


Fig.10 Supply current - clock frequency characteristic

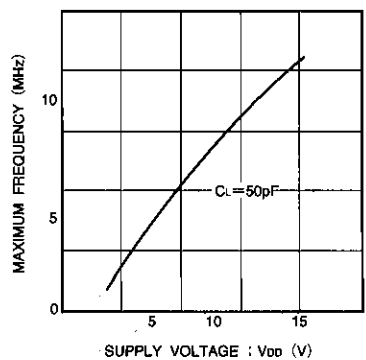


Fig.11 Maximum clock frequency - power supply voltage characteristic

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