

# **ANALOG FUNCTION SWITCH**

## **■ GENERAL DESCRIPTION**

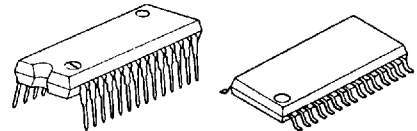
The NJU7313 is a dual 4-channel and quad 2-channel analog function switch especially suitable for input selector of audio equipments.

The high break down voltage analog switch controlled by 14-bit serial data of logic operating voltage(5V) can ON and OFF of  $\pm 15V$  signal.

The analog switch is realized superior linearity of on resistance in all voltage range, low distortion and wide dynamic range.

Furthermore, the both of single and dual power supply application provides easy designing.

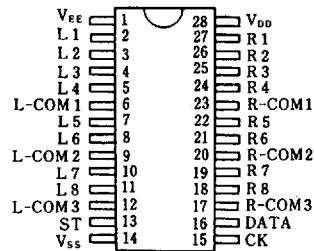
## **■ PACKAGE OUTLINE**


**NJU7313L**
**NJU7313M**

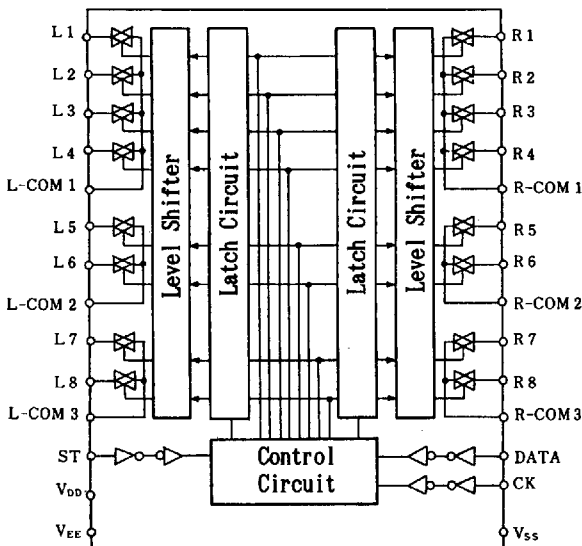
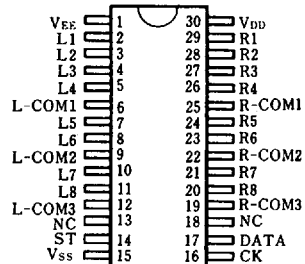
## **■ FEATURES**

- Analog switch: dual 3 channel and quad 2 channel.
- High Break Down Voltage -----  $\pm 15V$ .
- Low Distortion ----- THD: 0.002% (typ).
- Superior Linearity of ON Resistance.
- Serial Data Control.
- Package Outline SDIP 28 / DMP 30
- C-MOS Technology

## **■ PIN CONFIGURATION**



## **■ BLOCK DIAGRAM**


**NJU7311L**

**NJU7311M**

■ TERMINALS DESCRIPTION

| NO. | SYMBOL          | F U N C T I O N S          | NO. | SYMBOL | F U N C T I O N S          |
|-----|-----------------|----------------------------|-----|--------|----------------------------|
| 1   | V <sub>EE</sub> | Negative voltage supply    | 15  | CK     | Clock input                |
| 2   | L1              | Analog switch input/output | 16  | DATA   | Data input                 |
| 3   | L2              |                            | 17  | R-COM3 | R7, R8 Common              |
| 4   | L3              |                            | 18  | R8     | Analog switch input/output |
| 5   | L4              |                            | 19  | R7     |                            |
| 6   | L-COM1          | L1, L2, L3, L4 Common      | 20  | R-COM2 | R5, R6 Common              |
| 7   | L5              | Analog switch input/output | 21  | R-COM2 | Analog switch input/output |
| 8   | L6              |                            | 22  | R5     |                            |
| 9   | L-COM2          | L5, L6 Common              | 23  | R-COM1 | R1, R2, R3, R4 Common      |
| 10  | L7              | Analog switch input        | 24  | R4     | Analog switch input/output |
| 11  | L8              |                            | 25  | R3     |                            |
| 12  | L-COM3          | L7, L8 Common              | 26  | R2     |                            |
| 13  | ST              | Chip enable                | 27  | R1     |                            |
| 14  | VSS             | GND                        | 28  | VDD    | Positive voltage supply    |

■ FUNCTIONAL DESCRIPTION

(1) Timing of DATA, CK, ST

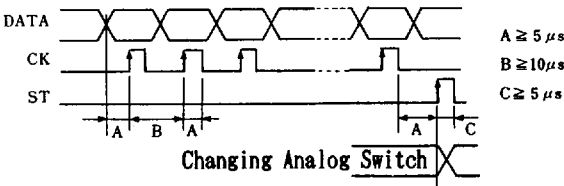
The Serial Input Data is input to internal shift register sequently synchronized by clock signal rising edge input from CK terminal(100 kHz max.).

The Serial Input Data in the shift register is transferred to latch circuit and renew by synchronized rising edge of Chip enable signal input from ST terminal.

(Timing Chart)

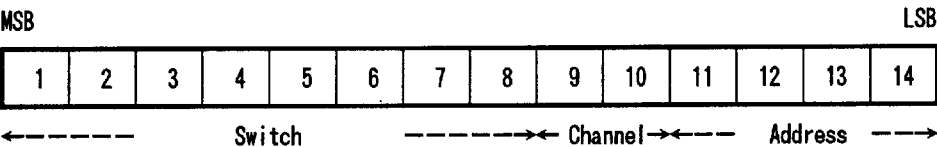


(Detailed Timing)



(2) Data Format

The 14-bit serial data strings format from MSB to LSB are 8-bit analog switch control data, 2-bit right and left channel selection data and 4-bit address data.



[illegible]

Bit9 and 10 select the channel.

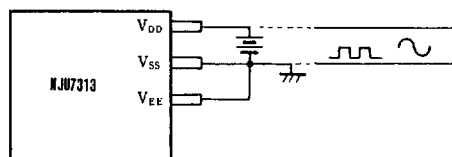
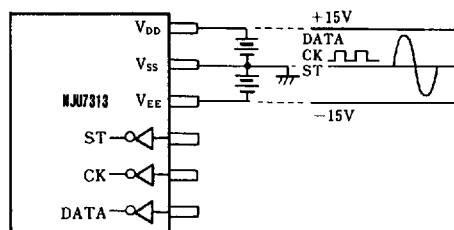
| bit9 | bit10 | CHANNEL |
|------|-------|---------|
| 1    | 1     | L and R |
| 1    | 0     | R only  |
| 0    | 1     | L only  |

Bit11 to 14 select the address. This address select is used for chip selection when this LSI is connected to the common bus line.

| Type No. | bit11 | bit12 | bit13 | bit14 |
|----------|-------|-------|-------|-------|
| NJU7311  | 0     | 0     | 0     | 0     |
| NJU7312  | 1     | 0     | 0     | 0     |
| NJU7313  | 0     | 1     | 0     | 0     |

Furthermore, the CK, DATA and ST terminals can direct interface with 5V operated family, because of its input threshold level is adjusted.

Single Power Supply (+)



# ABSOLUTE MAXIMUM RATINGS

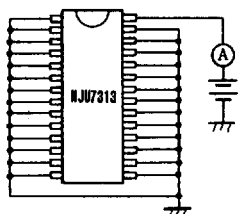
| PARAMETER             | SYMBOL                                                      | RATINGS                      | UNIT |
|-----------------------|-------------------------------------------------------------|------------------------------|------|
| Supply Voltage        | $V_{DD} - V_{EE}$<br>$V_{DD} - V_{SS}$<br>$V_{EE} - V_{SS}$ | 34<br>+17<br>-17             | V    |
| Input Voltage         | $V_{IN}$                                                    | $V_{SS}-0.3 \sim V_{DD}+0.3$ | V    |
| Power Dissipation     | $P_D$                                                       | 300                          | mW   |
| Operating Temperature | $T_{opr}$                                                   | -30 ~ +75                    | °C   |
| Storage Temperature   | $T_{stg}$                                                   | -40 ~ +125                   | °C   |

# ELECTRICAL CHARACTERISTICS

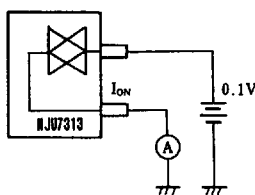
 $(V_{DD}=+16V, V_{SS}=0V, V_{EE}=-16V, T_a=25^\circ C)$ 

| PARAMETER                  | SYMBOL                             | CONDITIONS                                        | MIN      | TYP   | MAX      | UNIT |
|----------------------------|------------------------------------|---------------------------------------------------|----------|-------|----------|------|
| Operating Voltage          | $V_{DD}-V_{SS}$<br>$V_{EE}-V_{SS}$ |                                                   | 8<br>-16 |       | 16<br>-8 | V    |
| Operating Current          | $I_{DD}$                           | $V_{DD}=+16V, V_{EE}=-16V, V_{SS}=0V$             |          |       | 3        | mA   |
| Back-Up Voltage            | $V_B$                              |                                                   | 4        |       | 16       | V    |
| Back-Up Current            | $I_B$                              | $V_{DD}=+4V, V_{SS}=V_{EE}=0V, \text{Circ.1}$     |          |       | 10       | μA   |
| High-Level Input Voltage   | $V_{IH}$                           | CK, DATA, ST Terminals                            | 4        |       | 16       | V    |
| Low-Level Input Voltage    | $V_{IL}$                           | CK, CATA, ST Terminals                            | 0        |       | 1        | V    |
| Min. Operating Pulse Width | $t_{MIN}$                          |                                                   | 5        |       |          | μS   |
| Switch ON Resistance       | $R_{ON}$                           | Circ.2                                            |          | 100   | 200      | Ω    |
| Total Harmonic Distortion  | THD                                | $f_{IN}=20 \sim 20kHz, V_{IN}=1V_{rms}$<br>Circ.3 |          | 0.002 | 0.005    | %    |

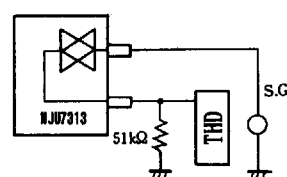
# MEASUREMENT CIRCUIT DIAGRAMS



(Circ.1)



(Circ.2)



(Circ.3)