# ANALOG FUNCTION SWITCH

■ GENERAL DESCRIPTION

The NJU7311A is a hexad 2-channel and dual 1-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 based on logic operating voltage (5V) can ON and OFF of ±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.
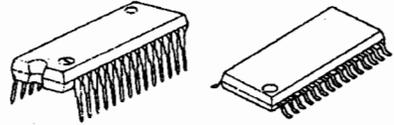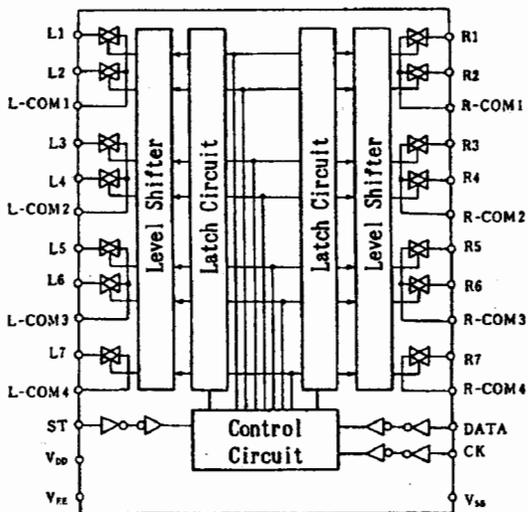
■ FEATURES

● Analog switch: hexad 2 channel and dual 1 channel.
● High Break Down Voltage ——— ±15V.
● Low Distortion ——— THD: 0.002% (typ).
● Superior Linearity of ON Resistance.
● Serial Data Control.
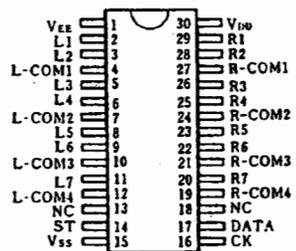● Package Outline   SDIP 28 / SDMP30
● C-MOS Technology

■ PACKAGE OUTLINE

NJU7311AL   NJU7311AM

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■ PIN CONFIGURATION
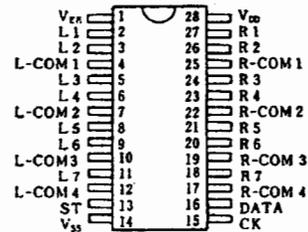
NJU7311AL

NJU7311AM

■ BLOCK DIAGRAM

■ TERMINALS DESCRIPTION

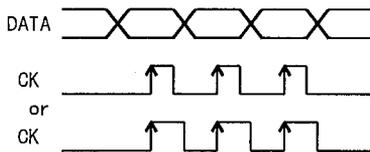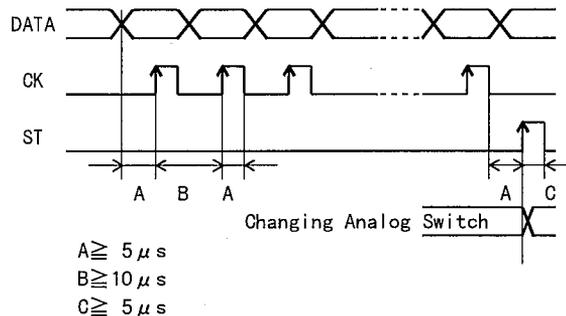| No.		SYMBOL	FUNCTIONS	No.		SYMBOL	FUNCTIONS
DIP	DMP			DIP	DMP		
1	1	V_{EE}	Negative Voltage Supply	15	16	CK	Clock input
2	2	L1	Analog switch input/output	16	17	DATA	Data input
3	3	L2		17	19	R-COM4	R7 Common
4	4	L-COM1	L1, L2 Common	18	20	R7	Analog switch input/output
5	5	L3	Analog switch input/output	19	21	R-COM3	R5, R6 Common
6	6	L4		20	22	R6	Analog switch input/output
7	7	L-COM2	L3, L4 Common	21	23	R5	
8	8	L5	Analog switch input/output	22	24	R-COM2	R3, R4 Common
9	9	L6		23	25	R4	Analog switch input/output
10	10	L-COM3	L5, L6 Common	24	26	R3	
11	11	L7	Analog switch input/output	25	27	R-COM1	R1, R2 Common
12	12	L-COM4	L7 Common	26	28	R2	Analog switch input/output
13	14	ST	Chip enable	27	29	R1	
14	15	V_{SS}	GND	28	30	V_{DD}	Positive voltage supply

■ FUNCTIONAL DESCRIPTION

(1) Timing of DATA, CK, ST

The Serial Input Data is input to internal shift register sequentially 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)

DATA   CK   or   CK

DATA   CK   ST

A   B   A   A   C

Changing Analog Switch

$A \geqq 5 \mu s$
$B \geqq 10 \mu s$
$C \geqq 5 \mu s$
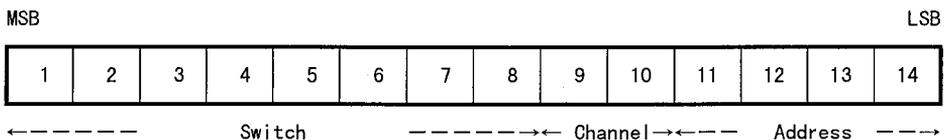
(2) Data Format

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.

MSB   LSB

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |

←————   Switch   ————→←— Channel →←—— Address ——→

(Switch)

Bit1 ~ bit7 select the analog switch ON and OFF   0: switch off
                                                      1: switch on

Bit8 is invalidity due to no correspond analog switch.

(Channel)

Bit9 and 10 select the channel.

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

(Address)

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
NJU7311A	0	0	0	0
NJU7312A	1	0	0	0
NJU7313A	0	1	0	0

(3) Supply Voltage

The power supply of NJU7311A is divided into two portions of analog switch part and control part. The analog switch part operate by dual power supply (+ and −) and control part is operated by single power supply (+) only.

The analog switch part can be also operated by single power supply.   In this case , the supply voltage should be half of dual supply operation mode.

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

Dual Power Supply (+ and −)   Single Power Supply (+)

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25℃)

P A R A M E T E R	SYMBOL	R A T I N G S	UNIT
Supply Voltage	$V_{DD}-V_{EE}$ $V_{DD}-V_{SS}$ $V_{EE}-V_{SS}$	34 +17 -17	V
Input Voltage	V_{IN}	$V_{SS}-0.3{\sim}V_{DD}+0.3$	V
Power Dissipation	P_D	300	mW
Operating Temperature	Topr	$-30 \sim +75$	℃
Storage Temperature	Tstg	$-40 \sim +125$	℃

■ ELECTRICAL CHARACTERISTICS

(V_{DD}=+16V, V_{SS}=0V, V_{EE}=-16V, Ta=25℃)

P A R A M E T E R	SYMBOL	C O N D I T I O N S	MIN	TYP	MAX	UNIT
Operating Voltage	$V_{DD}-V_{SS}$ $V_{EE}-V_{SS}$		8 -16		16 -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, 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}=20~20kHz,V_{IN}=1V$_{rms}$ Circ.3		0.002	0.005	%

■ MEASUREMENT CIRCUIT DIAGRAMS
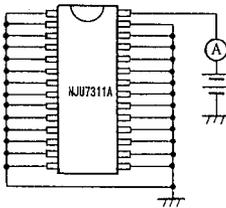
(Circ.1)   (Circ.2)   (Circ.3)
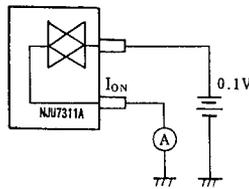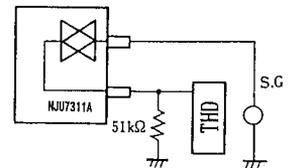
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