

## DUAL 4-CHANNEL MULTIPLEXER

### ■ GENERAL DESCRIPTION

The NJU4052B is a dual 4-channel multiplexer with two binary control inputs and an inhibit input.

The two binary control input signals select 1 of 4 pairs of channels to be turned on and connect them to the two outputs.

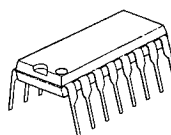
The operating voltage is as wide as 3 to 18V and the quiescent current is as low as 5 $\mu$ A max. (at  $V_{DD}=5V$ ).

It is equivalent to RCA CD4052B and Motorola MC14052B.

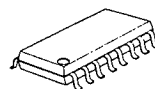
### ■ FEATURES

- High ON/OFF Output Voltage Ratio --- 65dB Typ.  
( $R_L=10k\Omega$ )
- Low Quiescent Current --- 5 $\mu$ A Typ. at  $V_{DD}=5V$
- Low Crosstalk between channels --- 80dB Typ.
- Wide Operating Voltage Range. --- 3 ~ 18V
- Linearity in the transfer characteristics.  
 $\Delta R_{ON} < 60\Omega$  ( $V_{IN}=V_{DD} \sim V_{EE}$ ,  $V_{DD}=15V$ )
- Package Outline --- DIP/DMP/SSOP 16
- C-MOS Technology

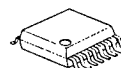
### ■ PACKAGE OUTLINE



NJU4052BD

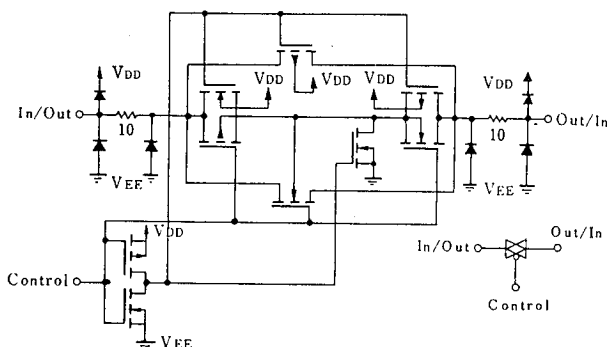


NJU4052BM

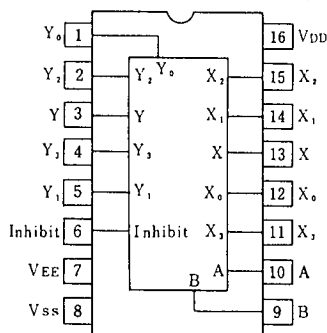


NJU4052BV

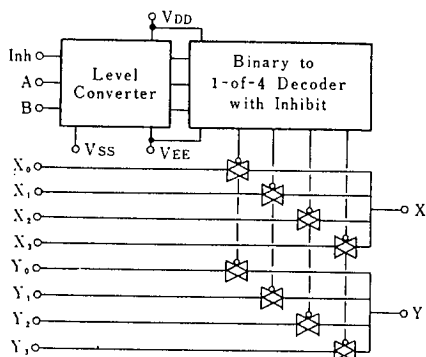
### ■ BLOCK DIAGRAM



### ■ PIN CONFIGURATION



### ■ EQUIVALENT CIRCUIT



### ■ TRUTH TABLE

INH	B	A	On Switch	
0	0	0	Y <sub>0</sub>	X <sub>0</sub>
0	0	1	Y <sub>1</sub>	X <sub>1</sub>
0	1	0	Y <sub>2</sub>	X <sub>2</sub>
0	1	1	Y <sub>3</sub>	X <sub>3</sub>
1	x	x	None	

x: Don't Care

# ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	$V_{DD} - V_{EE}$	- 0.5 ~ + 20	V
Input Voltage(Control Signal)	$V_{IN}$	$V_{SS}-0.5 \sim V_{DD}+0.5$	V
Input Voltage(Analog Signal)	$V_{SIG}$	$V_{EE}-0.5 \sim V_{DD}+0.5$	V
Input Current	$I_{IN}$	$\pm 10$	mA
Output Current	$I_{OUT}$	$\pm 10$	mA
Power Dissipation	$P_D$	500 (DIP) 200 (DMP) 300 (SSOP)	mW
Operating Temperature Range	$T_{opr}$	- 40 ~ + 85	°C
Storage Temperature Range	$T_{stg}$	- 65 ~ + 150	°C

6

# ELECTRICAL CHARACTERISTICS

• DC Characteristics

(V<sub>SS</sub>=0V)

PARAMETER	SYMBOL	CONDITIONS	V <sub>DD</sub> (V)	Ta=-40°C		Ta=25°C		Ta=85°C		UNIT
				MIN	MAX	MIN	TYP	MAX	MIN	MAX
Quiescent Current	$I_{DD}$	No signal Per Package	5 10 15 20		5 10 20 100			5 10 20 100		150 300 600 3000
On-State Resistance	$R_{ON}$	$0 \leq V_{IS} \leq V_{DD}$ $V_{EE}=V_{SS}=0V$	5 10 15		500 210 140		220 100 60	600 250 160		800 300 200
On-State Resistance Deviation	$\Delta R_{ON}$	Between 2 channels $V_{EE}=V_{SS}=0V$	5 10 15				15 10 5			
Off-Channel Leakage Current		Each channel $V_{EE}=V_{SS}=0V$	18		$\pm 1000$		$\pm 10$	$\pm 100$		$\pm 1000$
Input Capacitance	$C_{IN}$	$V_{IN}=0V$ Control Inhibit Switch					5.0 10	7.5		
Low Level Input Voltage	$V_{IL}$	$R_L=10k\Omega$ $SW=V_{DD}$ $V_{EE}=V_{SS}$	5 10 15		1.5 3.0 4.0			1.5 3.0 4.0		1.5 3.0 4.0
High Level Input Voltage	$V_{IH}$	$R_L=10k\Omega$ $SW=V_{DD}$ $V_{EE}=V_{SS}$	5 10 15		3.5 7.0 11.0		3.5 7.0 11.0			3.5 7.0 11.0
Input Current	$\pm I_{IN}$	$V_{IN}=0$ or 18V	18		$\pm 0.1$			$\pm 0.1$		$\pm 1$

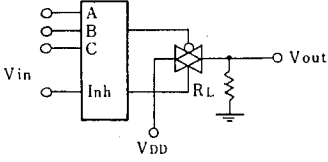
# SWITCHING CHARACTERISTICS

( Ta=25°C, CL=50pF )

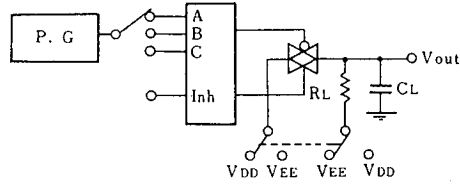
PARAMETER		SYMBOL	CONDITIONS	V <sub>DD</sub> (V)	MIN	TYP	MAX	UNIT
Propagation Delay Time	SW Input to Output	t <sub>PLH</sub>	R <sub>L</sub> =10kΩ	5	15	45	ns	
				10	8	30		
				15	5	20		
	CONT Input to Output	t <sub>PHL</sub>		5	15	45	ns	
				10	8	30		
				15	5	20		
	t <sub>PZH</sub>	5	450	1000	ns			
		10	200	500				
		15	150	400				
Output Enable Time	t <sub>PHZ</sub>	R <sub>L</sub> =10kΩ	5	600	1400	ns		
			10	250	700			
			15	200	500			
Output Disable Time	t <sub>PLZ</sub>		5	600	1400	ns		
			10	250	700			
			15	200	500			
Sine-Wave Distortion			R <sub>L</sub> =10kΩ, f=1kHz, V <sub>IS</sub> =5V <sub>P-P</sub>	10	0.05		%	
Feedthrough (all-ch. off)			R <sub>I</sub> =1kΩ, 20log <sub>10</sub> V <sub>OS</sub> /V <sub>IS</sub> =-50dB	10	4.5		MHz	
Crosstalk	SW A to B		R <sub>L</sub> =1kΩ, V <sub>IS</sub> =1/2(V <sub>DD</sub> -V <sub>SS</sub> ) <sub>P-P</sub>	10	3.0		MHz	
	Control-Out		R <sub>I</sub> =1kΩ, R <sub>L</sub> =10kΩ, tr=tf=20ns CONTROL/INHIBIT	10	30		mV	

## MEASUREMENT CIRCUITS

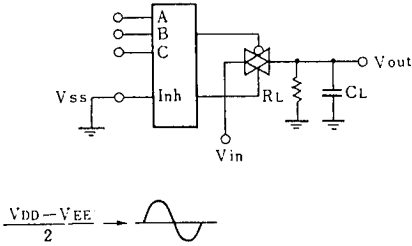
### 1. Noise Margin



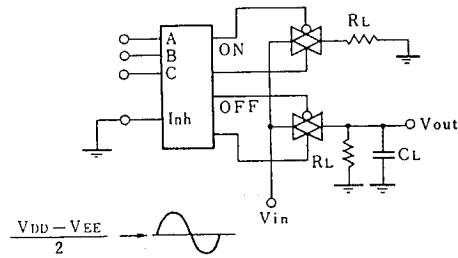
### 2. Propagation Delay



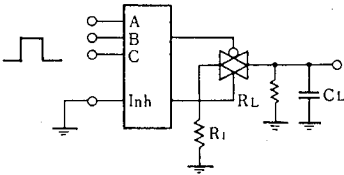
### 3. Feedthrough



### 4. Crosstalk (Switch A and B)



### 5. Crosstalk (Control and Out)



## MEMO

**[CAUTION]**

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.