

DUAL 4-CHANNEL MULTIPLEXER

■ GENERAL DESCRIPTION

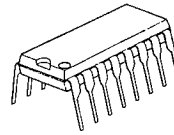
The NJU4052B is a dual 4-channel multiplexer with two binary control inputs and an inhibit input.

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

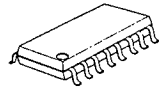
The operating voltage is as wide as 3 to 18V and the quiescent current is as low as 5μA max. (at V<sub>DD</sub>=5V).

It is equivalent to RCA CD4052B and Motorola MC14052B.

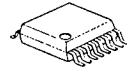
■ PACKAGE OUTLINE



NJU4052BD



NJU4052BM



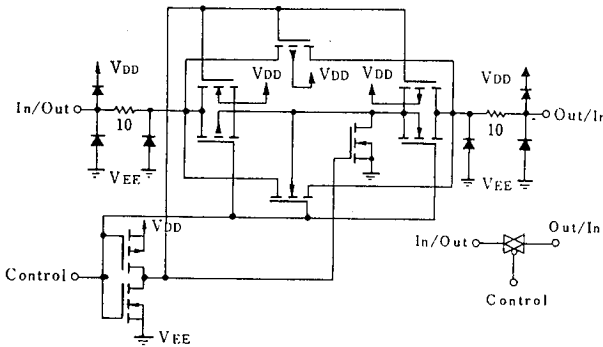
NJU4052BV

■ FEATURES

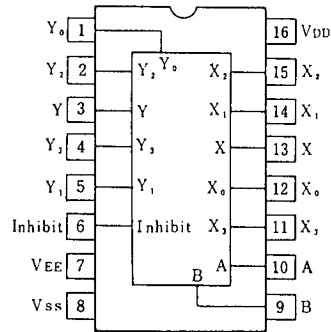
- High ON/OFF Output Voltage Ratio --- 65dB Typ.  
( R<sub>L</sub>=10kΩ )
- Low Quiescent Current --- 5μA Typ. at V<sub>DD</sub>=5V
- Low Crosstalk between channels --- 80dB Typ.
- Wide Operating Voltage Range. --- 3 ~ 18V
- Linearity in the transfer characteristics.  
ΔR<sub>ON</sub><60Ω (V<sub>IN</sub>=V<sub>DD</sub>~V<sub>EE</sub>, V<sub>DD</sub>=15V)
- Package Outline --- DIP/DMP/SSOP 16
- C-MOS Technology

6

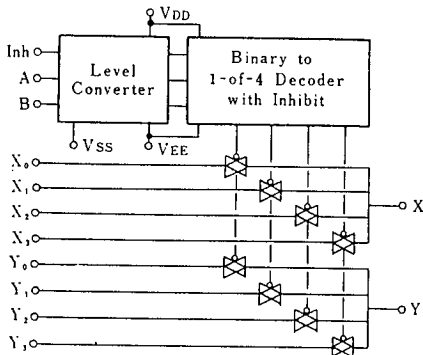
■ BLOCK DIAGRAM



■ 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	Topr	- 40 ~ + 85	°C
Storage Temperature Range	Tstg	- 65 ~ + 150	°C

6

## ■ ELECTRICAL CHARACTERISTICS

• DC Characteristics

 (  $V_{SS}=0V$  )

PARAMETER	SYMBOL	CONDITIONS	$V_{DD}$ (V)	Ta=-40°C		Ta=25°C		Ta=85°C		UNIT
				MIN	MAX	MIN	TYP	MAX	MIN	
Quiescent Current	$I_{DD}$	No signal Per Package	5						150	$\mu A$
			10					10	300	
			15					20	600	
			20	100			100	3000		
On-State Resistance	$R_{ON}$	$0 \leq V_{IS} \leq V_{DD}$ $V_{EE}=V_{SS}=0V$	5	500	220	600	800		$\Omega$	
			10	210	100	250	300			
			15	140	60	160	200			
On-State Resistance Deviation	$\Delta R_{ON}$	Between 2 channels $V_{EE}=V_{SS}=0V$	5 10 15		15 10 5			$\Omega$		
Off-Channel Leakage Current		Each channel $V_{EE}=V_{SS}=0V$	18	$\pm 1000$	$\pm 10$	$\pm 100$	$\pm 1000$	nA		
Input Capacitance	$C_{IN}$	$V_{IN}=0V$ Control Inhibit Switch			5.0	7.5		pF		
Low Level Input Voltage	$V_{IL}$	$R_L=10k\Omega$ $SW=V_{DD}$ $V_{EE}=V_{SS}$	$V_o=1.0V$	5	1.5		1.5	1.5	V	
			$V_o=1.0V$	10	3.0		3.0	3.0		
			$V_o=1.5V$	15	4.0		4.0	4.0		
High Level Input Voltage	$V_{IH}$	$R_L=10k\Omega$ $SW=V_{DD}$ $V_{EE}=V_{SS}$	$V_o=4.0V$	5	3.5	3.5		3.5	V	
			$V_o=9.0V$	10	7.0	7.0		7.0		
			$V_o=13.5V$	15	11.0	11.0		11.0		
Input Current	$\pm I_{IN}$	$V_{IN}=0$ or 18V	18	$\pm 0.1$		$\pm 0.1$	$\pm 1$	$\mu A$		

## ■ SWITCHING CHARACTERISTICS

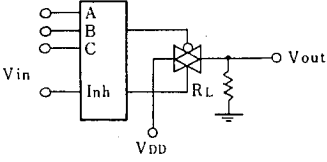
 (  $T_a=25^\circ\text{C}$ ,  $C_L=50\text{pF}$  )

PARAMETER		SYMBOL	CONDITIONS	$V_{DD}(V)$	MIN	TYP	MAX	UNIT
Propagation Delay Time	SW Input to Output	$t_{PLH}$	$R_L=10k\Omega$	5	15	45	ns	
				10	8	30		
				15	5	20		
	CONT Input to Output	$t_{PHL}$		5	15	45		
				10	8	30		
				15	5	20		
	$t_{PZH}$	5	450	1000	ns			
		10	200	500				
		15	150	400				
Output Enable Time	$t_{PHZ}$	$R_L=10k\Omega$	5	600		1400	ns	
			10	250		700		
			15	200		500		
Output Disable Time	$t_{PLZ}$		5	600	1400	ns		
			10	250	700			
			15	200	500			
Sine-Wave Distortion			$R_L=10k\Omega$ , $f=1\text{kHz}$ , $V_{IS}=5V_{P-P}$	10	0.05		%	
Feedthrough (all-ch. off)			$R_L=1k\Omega$ , $20\log_{10}V_{os}/V_{IS}=-50\text{dB}$	10	4.5		MHz	
Crosstalk	SW A to B		$R_L=1k\Omega$ , $V_{IS}=1/2(V_{DD}-V_{SS})_{P-P}$	10	3.0		MHz	
	Control-Out		$R_i=1k\Omega$ , $R_L=10k\Omega$ , $t_r=t_f=20\text{ns}$ CONTROL/INHIBIT	10	30		mV	

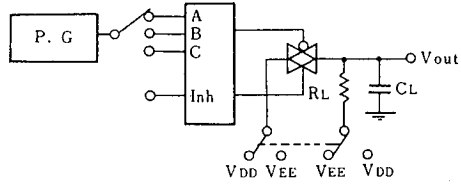
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MEASUREMENT CIRCUITS

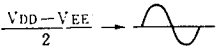
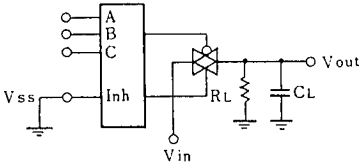
1. Noise Margin



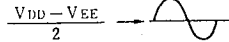
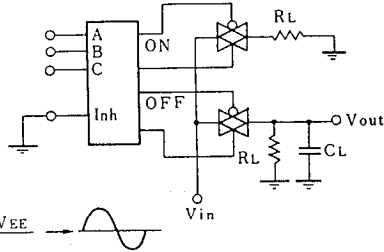
2. Propagation Delay



3. Feedthrough



4. Crosstalk (Switch A and B)



5. Crosstalk (Control and Out)

