

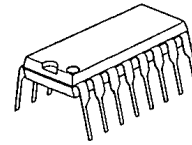
**TRIPLE 2-CHANNEL MULTIPLEXER**
**GENERAL DESCRIPTION**

The NJU4053B is a triple 2-channel multiplexer with three independent control inputs and an inhibit input.

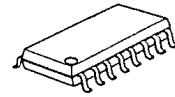
The three control input signals select 1 of a pair of channels to be turned on and connect them to the three outputs.

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

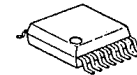
It is equivalent to RCA CD4053B and Motorola MC14053B.

**PACKAGE OUTLINE**


NJU4053BD



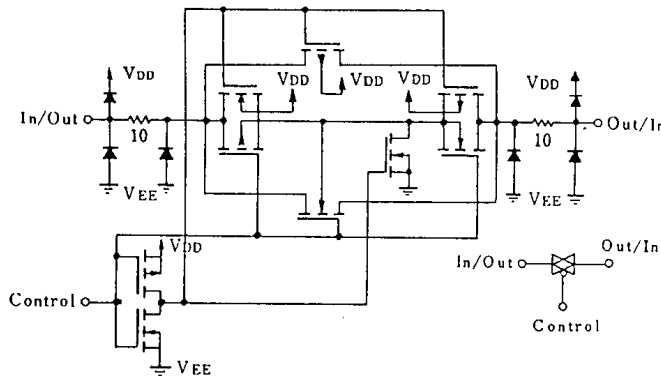
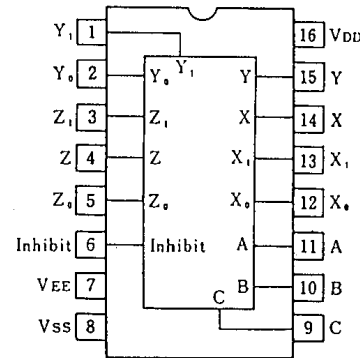
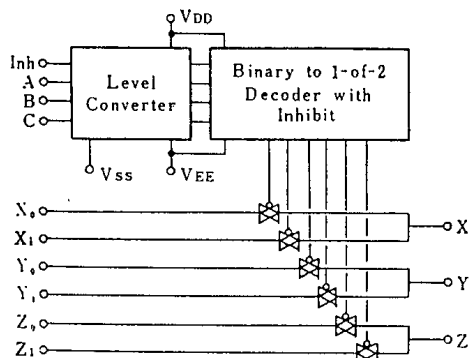
NJU4053BM



NJU4053BV

**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 --- 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

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**EQUIVALENT CIRCUIT**

**PIN CONFIGURATION**

**BLOCK DIAGRAM**

**TRUTH TABLE**

INH	C	B	A	On Switch		
0	0	0	0	Z <sub>0</sub>	Y <sub>0</sub>	X <sub>0</sub>
0	0	0	1	Z <sub>0</sub>	Y <sub>0</sub>	X <sub>1</sub>
0	0	1	0	Z <sub>0</sub>	Y <sub>1</sub>	X <sub>0</sub>
0	0	1	1	Z <sub>0</sub>	Y <sub>1</sub>	X <sub>1</sub>
0	1	0	0	Z <sub>1</sub>	Y <sub>0</sub>	X <sub>0</sub>
0	1	0	1	Z <sub>1</sub>	Y <sub>0</sub>	X <sub>1</sub>
0	1	1	0	Z <sub>1</sub>	Y <sub>1</sub>	X <sub>0</sub>
0	1	1	1	Z <sub>1</sub>	Y <sub>1</sub>	X <sub>1</sub>
1	x	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

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**■ ELECTRICAL CHARACTERISTICS**

## • DC Characteristics

 (  $V_{SS}=0V$  )

PARAMETER	SYMBOL	CONDITIONS	$V_{DD}$ (V)	$T_a=-40^\circ\text{C}$		$T_a=25^\circ\text{C}$			$T_a=85^\circ\text{C}$		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		$\mu\text{A}$	
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		$\Omega$	
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 10	7.5			pF	
Low Level Input Voltage	$V_{IL}$	$R_L=10k\Omega$ $SW=V_{DD}$ $V_{EE}=V_{SS}$	$V_o=1.0V$ $V_o=1.0V$ $V_o=1.5V$	5 10 15	1.5 3.0 4.0		1.5 3.0 4.0	1.5 3.0 4.0		V	
High Level Input Voltage	$V_{IH}$		$V_o=4.0V$ $V_o=9.0V$ $V_o=13.5V$	5 10 15	3.5 7.0 11.0		3.5 7.0 11.0	3.5 7.0 11.0		V	
Input Current	$\pm I_{IN}$		$V_{IN}=0$ or 18V	18	$\pm 0.1$		$\pm 0.1$		$\pm 1$		$\mu\text{A}$

**SWITCHING CHARACTERISTICS**

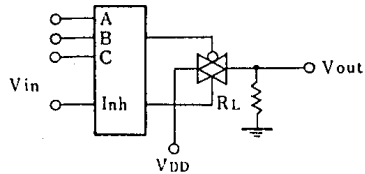
 (  $T_a=25^\circ\text{C}$ ,  $C_L=50\text{pF}$  )

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			
		$t_{PHL}$		5	15	45		
				10	8	30		
	15			5	20			
	CONT Input to Output	$t_{PHL}$	5	450	1000	ns		
			10	200	500			
		$t_{PZH}$	5	450	1000			
			10	200	500			
		$t_{PZL}$	15	150	400			
Output Enable Time		$t_{PHZ}$	$R_L=10k\Omega$	5	600	1400	ns	
		$t_{PLZ}$		10	250	700		
				15	200	500		
Output Disable Time				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		$R_1=1k\Omega$ , $R_L=10k\Omega$ , $tr=tf=20\text{ns}$ CONTROL/INHIBIT	10	30		mV	

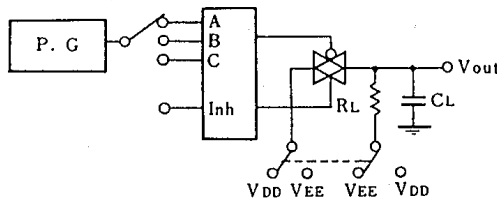
**6**

MEASUREMENT CIRCUITS

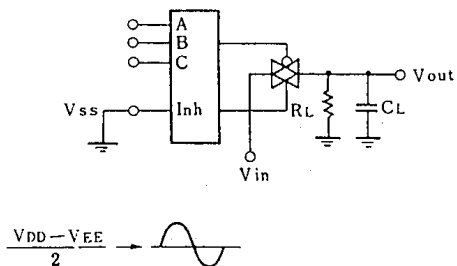
1. Noise Margin



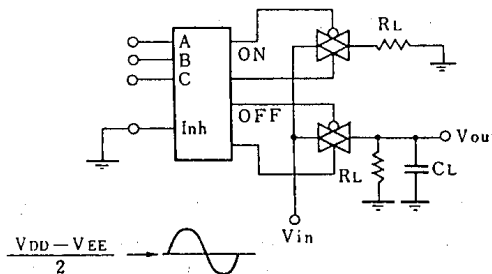
2. Propagation Delay



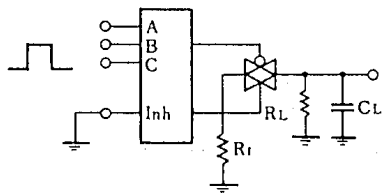
3. Feedthrough



4. Crosstalk (Switch A and B)



5. Crosstalk (Control and Out)



## MEMO

**[CAUTION]**

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