



TRIPLE 2-CHANNEL MULTIPLEXER

■ GENERAL DESCRIPTION

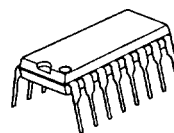
The NJU4053B is a triple 2-channel multiplexer with three independent control inputs and an inhibit input.

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

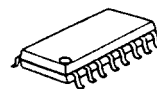
The operating voltage is as wide as 3 to 18V and the quiescent current is as low as 5 μ A max. (at $V_{DD}=5V$).

It is equivalent to RCA CD4053B and Motorola MC14053B.

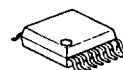
■ PACKAGE OUTLINE



NJU4053BD



NJU4053BM

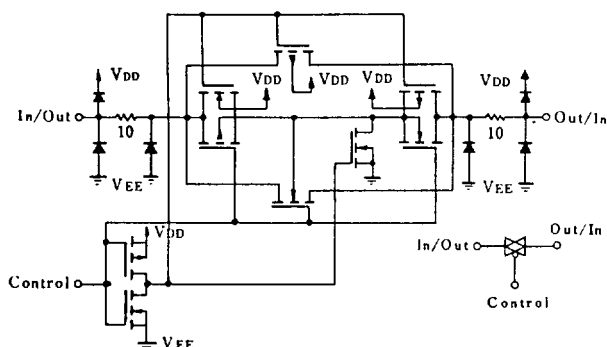


NJU4053BV

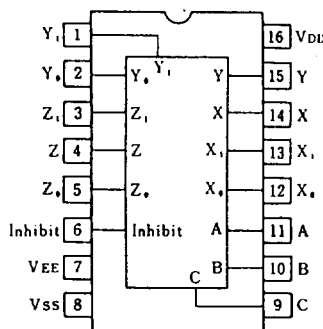
■ FEATURES

- High ON/OFF Output Voltage Ratio
--- 65dB Typ. ($R_L=10k\Omega$)
- Low Quiescent Current
--- 5 μ 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

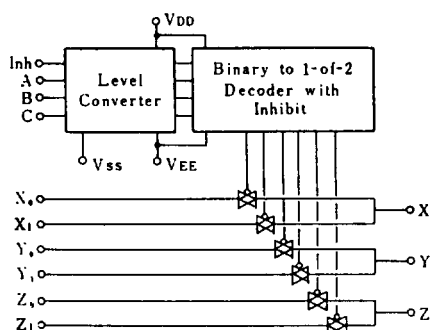
■ EQUIVALENT CIRCUIT



■ PIN CONFIGURATION



■ BLOCK DIAGRAM



■ TRUTH TABLE

INH	C	B	A	On Switch		
0	0	0	0	Z ₀	Y ₀	X ₀
0	0	0	1	Z ₀	Y ₀	X ₁
0	0	1	0	Z ₀	Y ₁	X ₀
0	0	1	1	Z ₀	Y ₁	X ₁
0	1	0	0	Z ₁	Y ₀	X ₀
0	1	0	1	Z ₁	Y ₀	X ₁
0	1	1	0	Z ₁	Y ₁	X ₀
0	1	1	1	Z ₁	Y ₁	X ₁
1	X	X	X	None		

x: Don't Care


■ ABSOLUTE MAXIMUM RATINGS

 ($T_a=25^{\circ}\text{C}$)

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}	± 10	mA
Output Current	I_{OUT}	± 10	mA
Power Dissipation	P_D	500 (DIP) 200 (DMP) 300 (SSOP)	mW
Operating Temperature Range	T_{opr}	- 40 ~ + 85	$^{\circ}\text{C}$
Storage Temperature Range	T_{stg}	- 65 ~ + 150	$^{\circ}\text{C}$

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■ ELECTRICAL CHARACTERISTICS

• DC Characteristics

 ($V_{SS}=0\text{V}$)

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		μA
On-State Resistance	R_{ON}	$0 \leq V_{IS} \leq V_{DD}$ $V_{EE}=V_{SS}=0\text{V}$	5 10 15		500 210 140		220 100 60	600 250 160	800 300 200		Ω
On-State Resistance Deviation	ΔR_{ON}	Between 2 channels $V_{EE}=V_{SS}=0\text{V}$	5 10 15				15 10 5				Ω
Off-Channel Leakage Current		Each channel $V_{EE}=V_{SS}=0\text{V}$	18		± 1000		± 10	± 100	± 1000		nA
Input Capacitance	C_{IN}	$V_{IN}=0\text{V}$ Control Inhibit Switch					5.0 10	7.5			pF
Low Level Input Voltage	V_{IL}	$R_L=10\text{k}\Omega$ $SW=V_{DD}$ $V_{EE}=V_{SS}$	$V_O=1.0\text{V}$ $V_O=1.0\text{V}$ $V_O=1.5\text{V}$	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}		$V_O=4.0\text{V}$ $V_O=9.0\text{V}$ $V_O=13.5\text{V}$	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	± 0.1			± 0.1	± 1		μA



SWITCHING CHARACTERISTICS

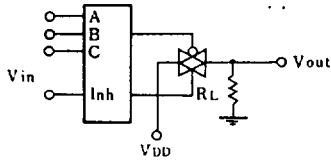
(Ta=25°C, CL=50pF)

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

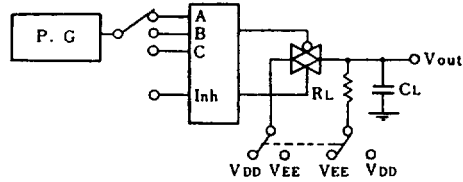


MEASUREMENT CIRCUITS

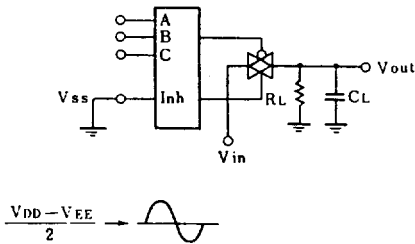
1. Noise Margin



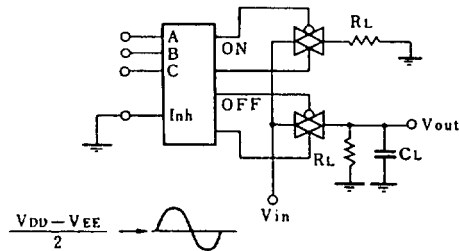
2. Propagation Delay



3. Feedthrough



4. Crosstalk (Switch A and B)



5. Crosstalk (Control and Out)

