

TRIPLE 2-CHANNEL MULTIPLEXER

■ GENERAL DESCRIPTION

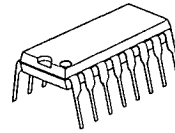
The NJU4053B is a triple 2-channel multiplexer with three independent control inputs and an inhibit input.

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

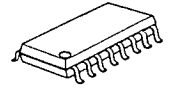
The operating voltage is as wide as 3 to 18V and the quiescent current is as low as $5\mu\text{A}$ max. (at $V_{DD}=5\text{V}$).

It is equivalent to RCA CD4053B and Motorola MC14053B.

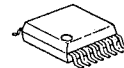
■ PACKAGE OUTLINE



NJU4053BD



NJU4053BM

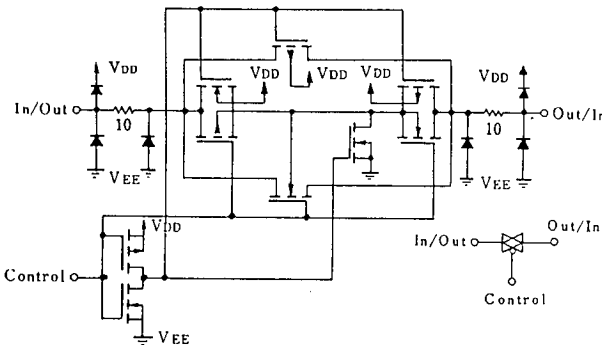


NJU4053BV

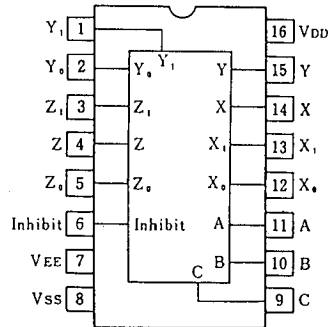
■ FEATURES

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

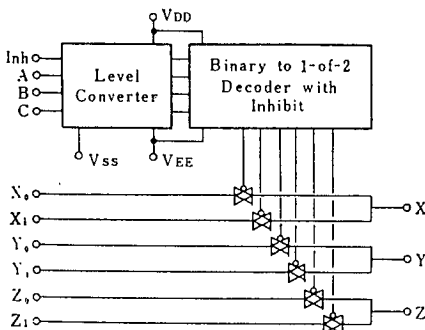
■ EQUIVALENT CIRCUIT



■ 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

(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}	± 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	°C
Storage Temperature Range	T_{stg}	- 65 ~ + 150	°C

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

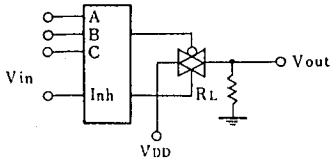
SWITCHING CHARACTERISTICS

(Ta=25°C, CL=50pF)

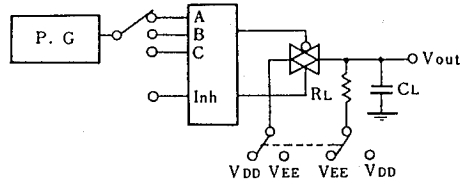
PARAMETER		SYMBOL	CONDITIONS	V _{DD} (V)	MIN	TYP	MAX	UNIT
Propagation Delay Time	SW Input to Output	t _{PLH}	R _L =10kΩ	5	15	45		ns
				10	8	30		
				15	5	20		
	CONT Input to Output	t _{PHL}		5	15	45		ns
				10	8	30		
				15	5	20		
	t _{PZH}	5	450	1000		ns		
		10	200	500				
		15	150	400				
	t _{PZL}	5	450	1000		ns		
		10	200	500				
		15	150	400				
Output Enable Time		t _{PHZ}	R _L =10kΩ	5	600	1400		ns
		t _{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 =10kΩ, f=1kHz, V _{IS} =5V _{P-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}) _{P-P}	10	3.0			MHz
	Control-Out		R _I =1kΩ, R _L =10kΩ, tr=tf=20ns CONTROL/INHIBIT	10	30			mV

MEASUREMENT CIRCUITS

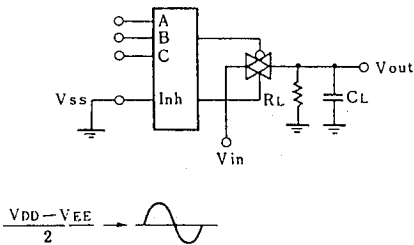
1. Noise Margin



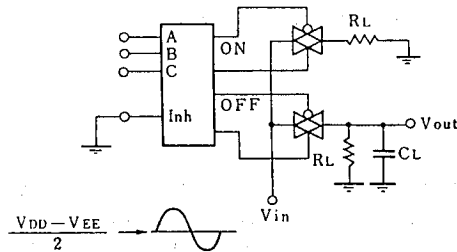
2. Propagation Delay



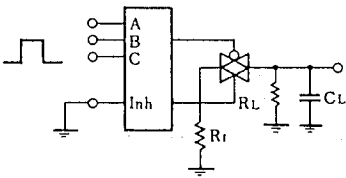
3. Feedthrough



4. Crosstalk (Switch A and B)



5. Crosstalk (Control and Out)



MEMO

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