

DUAL 4-CHANNEL MULTIPLEXER

■ GENERAL DESCRIPTION

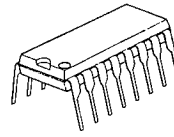
The NJU4052B is a dual 4-channel multiplexer with two binary control inputs and an inhibit input.

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

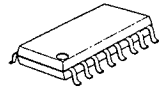
The operating voltage is as wide as 3 to 18V and the quiescent current is as low as 5μA max. (at V_{DD}=5V).

It is equivalent to RCA CD4052B and Motorola MC14052B.

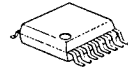
■ PACKAGE OUTLINE



NJU4052BD



NJU4052BM



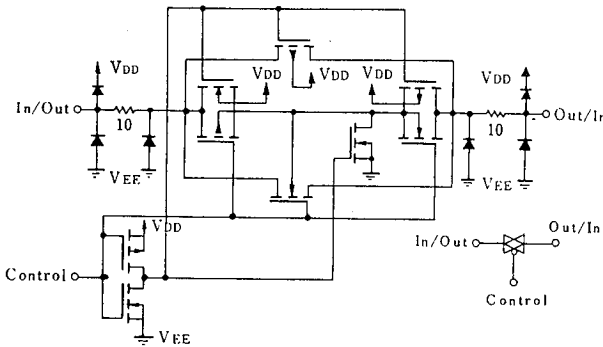
NJU4052BV

■ FEATURES

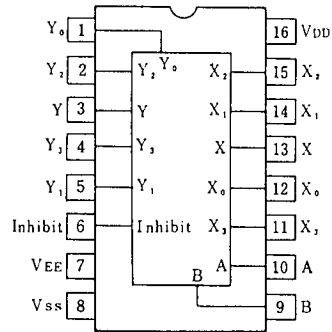
- High ON/OFF Output Voltage Ratio --- 65dB Typ.
(R_L=10kΩ)
- Low Quiescent Current --- 5μA Typ. at V_{DD}=5V
- Low Crosstalk between channels --- 80dB Typ.
- Wide Operating Voltage Range. --- 3 ~ 18V
- Linearity in the transfer characteristics.
ΔR_{ON}<60Ω (V_{IN}=V_{DD}~V_{EE}, V_{DD}=15V)
- Package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

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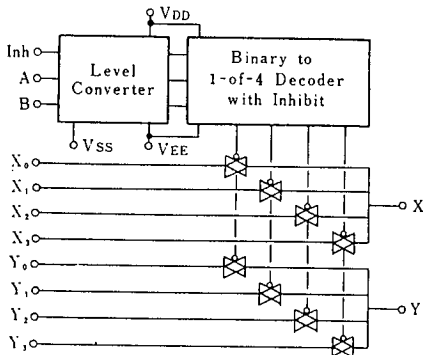
■ BLOCK DIAGRAM



■ PIN CONFIGURATION



■ EQUIVALENT CIRCUIT



■ TRUTH TABLE

INH	B	A	On Switch	
0	0	0	Y ₀	X ₀
0	0	1	Y ₁	X ₁
0	1	0	Y ₂	X ₂
0	1	1	Y ₃	X ₃
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}	± 10	mA
Output Current	I_{OUT}	± 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

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■ 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	μA
			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		Ω	
			10	210	100	250	300			
			15	140	60	160	200			
On-State Resistance Deviation	ΔR_{ON}	Between 2 channels $V_{EE}=V_{SS}=0V$	5		15				Ω	
			10		10					
			15		5					
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			pF	
Low Level Input Voltage	V_{IL}	$R_L=10k\Omega$ $SW=V_{DD}$ $V_{EE}=V_{SS}$	Vo=1.0V	5	1.5		1.5	1.5	V	
			Vo=1.0V	10	3.0		3.0	3.0		
			Vo=1.5V	15	4.0		4.0	4.0		
High Level Input Voltage	V_{IH}	$R_L=10k\Omega$ $SW=V_{DD}$ $V_{EE}=V_{SS}$	Vo=4.0V	5	3.5	3.5		3.5	V	
			Vo=9.0V	10	7.0	7.0		7.0		
			Vo=13.5V	15	11.0	11.0		11.0		
Input Current	$\pm I_{IN}$	$V_{IN}=0$ or 18V	18	± 0.1		± 0.1	± 1	μA		

■ SWITCHING CHARACTERISTICS

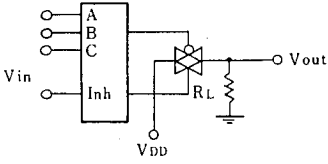
 ($T_a=25^\circ\text{C}$, $C_L=50\text{pF}$)

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	

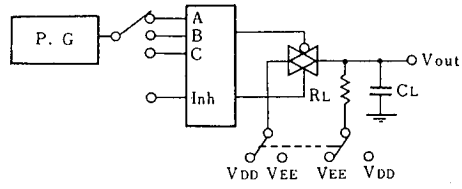
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MEASUREMENT CIRCUITS

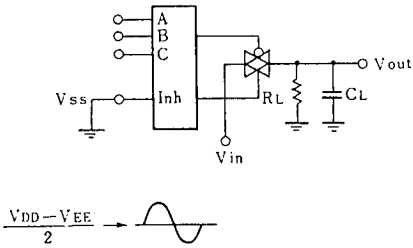
1. Noise Margin



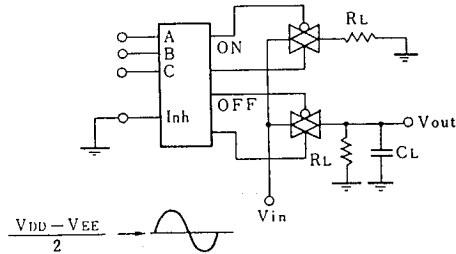
2. Propagation Delay



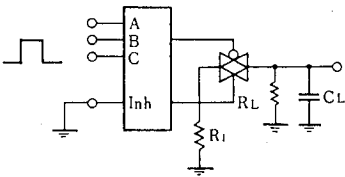
3. Feedthrough



4. Crosstalk (Switch A and B)



5. Crosstalk (Control and Out)



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MEMO

[CAUTION]

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