

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.

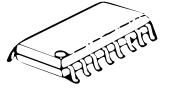
The operating voltage is as wide as 3 to 18V and the quiescent current is as low as 5μA max. (at V_{DD}=5V).

It is equivalent to RCA CD4052B and Motorola MC14052B.

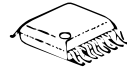
PACKAGE OUTLINE



NJU4052BD



NJU4052BM



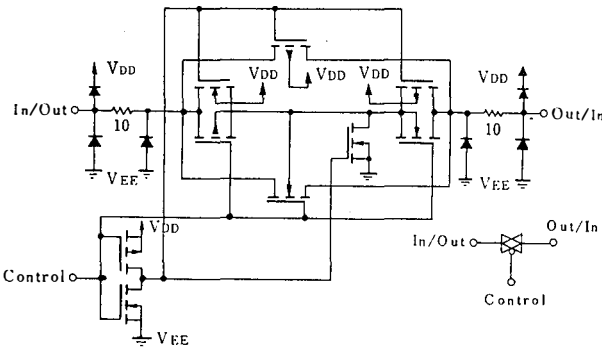
NJU4052BV

FEATURES

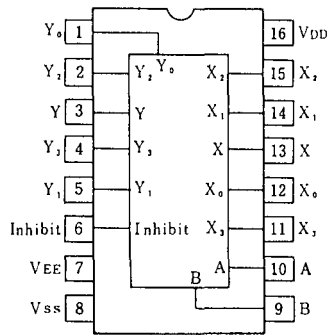
- High ON/OFF Output Voltage Ratio --- 65dB Typ.
(R_L=10kΩ)
- Low Quiescent Current --- 5μA Typ. at V_{DD}=5V
- Low Crosstalk between channels --- 80dB Typ.
- Wide Operating Voltage Range. --- 3 ~ 18V
- Linearity in the transfer characteristics.
ΔR_{ON}<60Ω (V_I=V_{DD}~V_{EE}, V_{DD}=15V)
- Package Outline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

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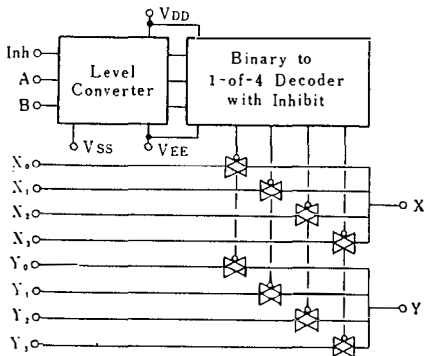
BLOCK DIAGRAM



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

■ 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	5		5		150	μA	
			10	10		10		300		
			15	20		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 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 10	7.5		pF	
Low Level Input Voltage	V_{IL}	$R_L=10k\Omega$ $SW=V_{DD}$ $V_{EE}=V_{SS}$	$V_o=1.0V$	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	3.5	V	
			$V_o=9.0V$	10	7.0	7.0	7.0	7.0		
			$V_o=13.5V$	15	11.0	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

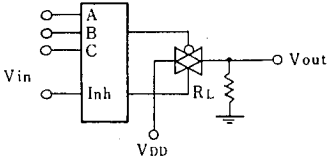
(Ta=25°C, CL=50pF)

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	
		t _{PHL}		10	8	30		
	CONT Input to Output	t _{PHL}		15	5	20		
		t _{PHL}		5	15	45		
		t _{PHL}		10	8	30		
		t _{PHL}		15	5	20		
Output Enable Time	t _{PHZ}	5	450	1000	ns			
		10	200	500				
	t _{PLZ}	15	150	400				
		5	450	1000				
Output Disable Time	t _{PHZ}	10	200	500	ns			
		15	150	400				
		5	450	1000				
Sine-Wave Distortion		R _L =10kΩ, f=1kHz, V _{IS} =5V _{P-P}	10	0.05		%		
Feedthrough (all-ch. off)		R _i =1kΩ, 20log ₁₀ V _{os} /V _{is} =-50dB	10	4.5		MHz		
Crosstalk	SW A to B	R _i =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		

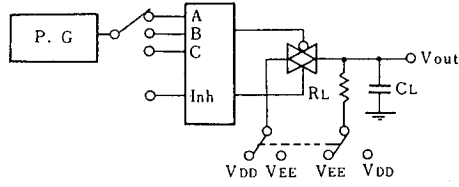
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MEASUREMENT CIRCUITS

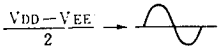
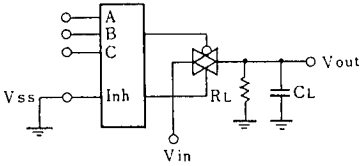
1. Noise Margin



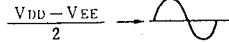
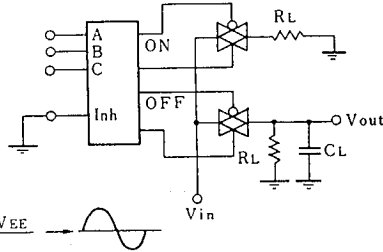
2. Propagation Delay



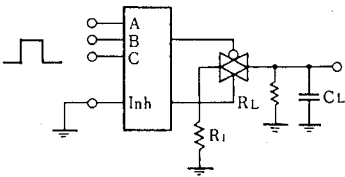
3. Feedthrough



4. Crosstalk (Switch A and B)



5. Crosstalk (Control and Out)



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