MN4051B/MN4051BS

8-Channel Analog Multiplexers

■ Description

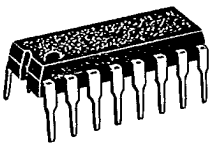
The MN4051B/S are analog multiplexer which control 8-channel analog switching by 3-input digital signals.
ON/OFF output voltage ratio is high and cross-talk between analog switches is low.
The MN4051B/S are equivalent to MOTOROLA MC14051B and RCA CD4051B.

■ Truth Table

Input				Channel
$\overline{E}$	A_2	A_1	A_0	ON
L	L	L	L	Y_0-Z
L	L	L	H	Y_1-Z
L	L	H	L	Y_2-Z
L	L	H	H	Y_3-Z
L	H	L	L	Y_4-Z
L	H	L	H	Y_5-Z
L	H	H	L	Y_6-Z
L	H	H	H	Y_7-Z
H	×	×	×	All OFF

Note) × : don't care

P-3

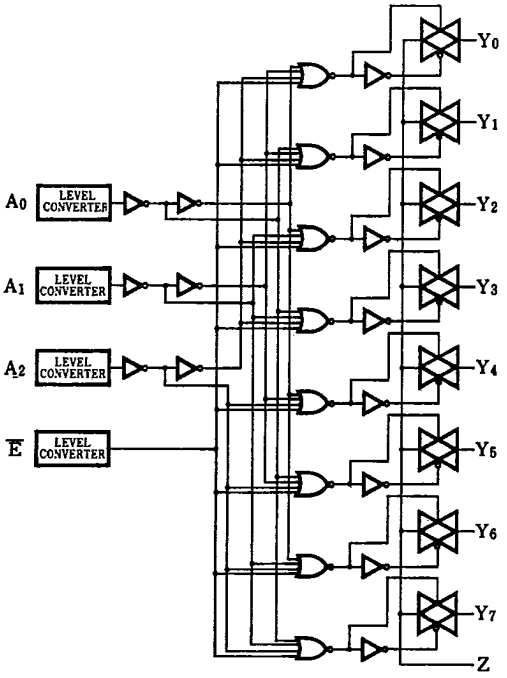


16-Pin • Plastic DIL Package

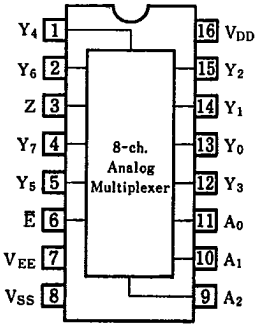
P-4

16-Pin • Panaflat Package (SO-16D)

■ Logic Diagram



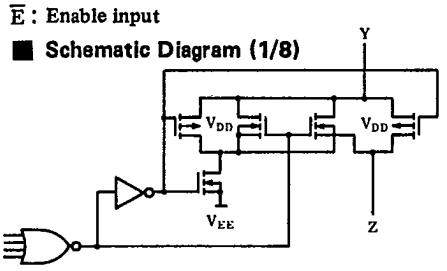
Pin Configuration



Pin Explanation

$Y_0 \sim Y_7$: Analog input/output
$A_0 \sim A_2$: Address input
Z : Common input/output
$\overline{E}$: Enable input

■ Schematic Diagram (1/8)



■ Maximum Ratings (Ta=25℃)

Item		Symbol	Ratings	Unit
Supply Voltage		V_{DD}	−0.5～+18	V
Input Voltage		V_I	−0.5～V_{DD}+0.5*	V
Output Voltage		V_O	−0.5～V_{DD}+0.5*	V
Peak Input · Output Current		$\pm I_I$	max. 10	mA
Power Dissipation (per package)	Ta=−40～+60℃	P_D	max. 400	mW
	Ta=+60～+85℃		Decrease up to 200mW rating at 8mW/°C	
Power Dissipation (per output terminal)		P_D	max. 100	mW
Operating Ambient Temperature		Topr	−40～+85	℃
Storage Temperature		Tstg	−65～+150	℃

* V_{DD} + 0.5V should be under 18V

■ DC Characteristics (V_{SS}=0V)

Item	V_{DD} (V)	Symbol	Conditions		Ta=−40℃ min.	Ta=−40℃ max.	Ta=25℃ min.	Ta=25℃ max.	Ta=85℃ min.	Ta=85℃ max.	Unit
Quiescent Power Supply Current	5	I_{DD}	V_I=V_{SS} or V_{DD}		—	20	—	20	—	150	μA
	10				—	40	—	40	—	300	
	15				—	80	—	80	—	600	
Input Voltage Low Level	5	V_{IL}	$\|I_O\|$<1μA	V_O=0.5V or 4.5V	—	1.5	—	1.5	—	1.5	V
	10			V_O=1V or 9V	—	3	—	3	—	3	
	15			V_O=1.5V or 13.5V	—	4	—	4	—	4	
Input Voltage High Level	5	V_{IH}	$\|I_O\|$<1μA	V_O=0.5V or 4.5V	3.5	—	3.5	—	3.5	—	V
	10			V_O=1V or 9V	7	—	7	—	7	—	
	15			V_O=1.5V or 13.5V	11	—	11	—	11	—	
Input Leakage Current	15	$\pm I_I$	V_I=0 or 15V		—	0.3	—	0.3	—	1	μA

■ DC Characteristics (Ta=25℃, V_{SS}=0V)

Item	V_{DD}−V_{EE} (V)	Symbol	Conditions	min.	typ.	max.	Unit
On Resistance	5	R_{ON}	V_I=5V	—	200	800	Ω
			V_I=2.5V	—	550	1300	
			V_I=0.25V	—	200	800	
On Resistance	10	R_{ON}	V_I=10V	—	80	300	Ω
			V_I=5V	—	100	350	
			V_I=0.25V	—	80	300	
On Resistance	15	R_{ON}	V_I=15V	—	60	200	Ω
			V_I=7.5V	—	80	250	
			V_I=0.25V	—	60	200	

■ **Switching Characteristics** ($Ta=25℃$, $V_{SS}=0V$)

Item	V_{DD} (V)	Symbol	Conditions	min.	typ.	max.	Unit
Propagation Delay Time (Fig. 1) Vis→Vos (H→L)	5	t_{PHL}	$R_L=10k\Omega$, $C_L=50pF$, $\overline{E}=V_{SS}$	—	15	45	ns
	10			—	5	15	
	15			—	5	15	
Propagation Delay Time (Fig. 1) Vis→Vos (L→H)	5	t_{PLH}		—	15	45	ns
	10			—	5	15	
	15			—	5	15	
Propagation Delay Time (Fig. 1) An→Vos (H→L)	5	t_{PHL}	$R_L=10k\Omega$, $C_L=50pF$, $\overline{E}=V_{SS}$	—	170	510	ns
	10			—	65	195	
	15			—	50	150	
Propagation Delay Time (Fig. 1) An→Vos (L→H)	5	t_{PLH}		—	160	480	ns
	10			—	65	195	
	15			—	45	135	
Output Disable Time (Fig. 1) $\overline{E}$→Vos (H)	5	t_{PHZ}	$R_L=10k\Omega$, $C_L=50pF$, $\overline{E}=V_{DD}$	—	125	375	ns
	10			—	90	270	
	15			—	85	255	
Output Disable Time (Fig. 1) $\overline{E}$→Vos (L)	5	t_{PLZ}		—	155	465	ns
	10			—	120	360	
	15			—	115	345	
Output Enable Time (Fig. 1) $\overline{E}$→Vos (H)	5	t_{PZH}	$R_L=10k\Omega$, $C_L=50pF$, $\overline{E}=V_{DD}$	—	190	570	ns
	10			—	75	225	
	15			—	50	150	
Output Enable Time (Fig. 1) $\overline{E}$→Vos (L)	5	t_{PZL}		—	195	585	ns
	10			—	75	225	
	15			—	50	150	
Sine Wave Distortion (Fig. 2)	5		$R_L=10k\Omega$, $C_L=15pF$, fis = 1 kHz, Vis = $\frac{1}{2}V_{DD(P-P)}$	—	0.25	—	%
	10			—	0.04	—	
	15			—	0.04	—	
Crosstalk (Fig. 3) (Between 2 Channels)	5		$R_L=1k\Omega$, Vis = $\frac{1}{2}V_{DD(P-P)}$	—	—	—	MHz
	10			—	1	—	
	15			—	—	—	
Crosstalk (Fig. 1) (Address Input→Output)	5		$R_L=10k\Omega$, $C_L=15pF$, $\overline{E}$ or An = V_{DD}	—	—	—	mV
	10			—	50	—	
	15			—	—	—	
Feedthrough (Fig. 2) (Note. 1) (OFF)	5		$R_L=1k\Omega$, $C_L=5pF$, Vis = $\frac{1}{2}V_{DD(P-P)}$	—	—	—	MHz
	10			—	1	—	
	15			—	—	—	
Propagation (Fig. 2) (Note. 2) Frequency	5		$R_L=1k\Omega$, $C_L=5pF$, Vis = $\frac{1}{2}V_{DD(P-P)}$	—	13	—	MHz
	10			—	40	—	
	15			—	70	—	
Input Capacitance (Control)		C_I		—	—	7.5	pF
Input Capacitance (Switch)		C_I		—	10	—	pF

Fig. 1 Propagation Delay Time, Output Disable/Enable Time, Crosstalk Test Circuit

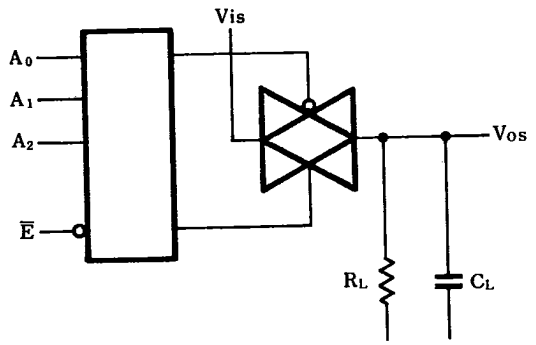
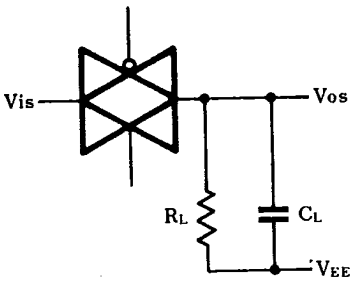


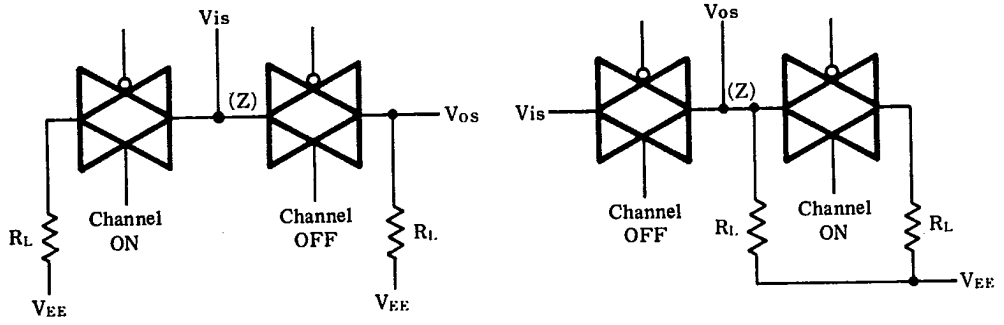
Fig. 2 Sine Wave Distortion, Feedthrough, Frequency Response, Test Circuit



(注1) $20 \log \frac{Vos}{Vis} = -50dB$

(注2) $20 \log \frac{Vos}{Vis} = -3\,dB$

Fig. 3 Crosstalk Test Circuit



$20 \log \frac{Vos}{Vis} = -50\,dB$