

# MN4066B / MN4066BS

## Quad Analog Switches

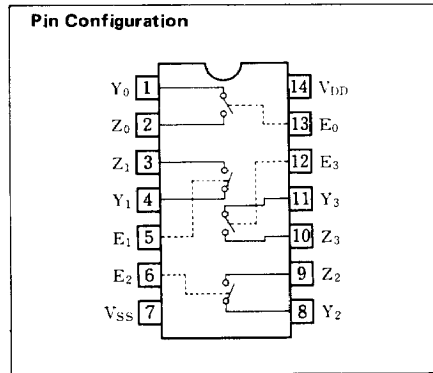
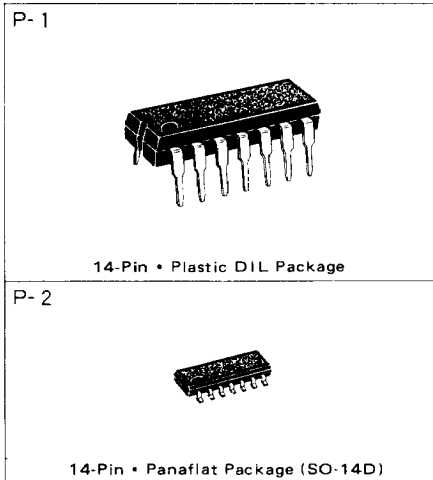
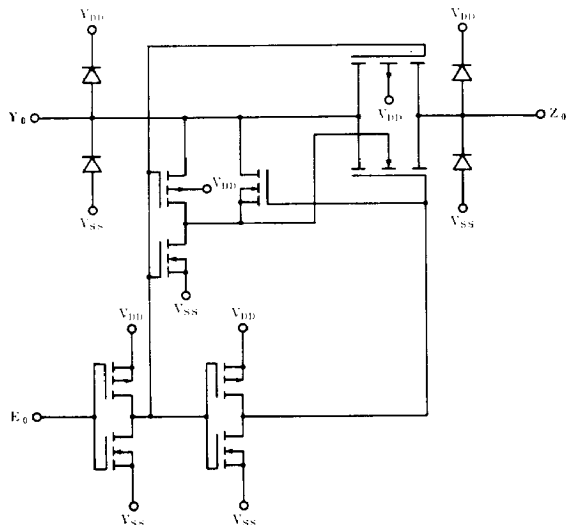
### ■ Description

The MN4066B/S have 4 independent analog switches. A High on the enable input establishes a low impedance state (ON stage) between input and output of the switch. A Low establishes a high impedance (OFF stage).

MN4066B is pin-compatible to MN4016B. But MN4066B has low  $R_{ON}$  and better transfer characteristics. So applications are for analog/digital switching and chopper modulation and demodulation.

The MN4066B/S are equivalent to MOTOROLA MC14066B and RCA CD4066B.

### ■ Schematic Diagram (1/4)



### Pin Explanation

- $E_0 \sim E_3$  : Enable input
- $Y_0 \sim Y_3$  : Analog input/output
- $Z_0 \sim Z_3$  : Analog input/output

### ■ Maximum Ratings (Ta=25°C)

Item	Symbol	Ratings	Unit
Supply Voltage	V <sub>DD</sub>	-0.5~+18	V
Input Voltage	V <sub>I</sub>	-0.5~V <sub>DD</sub> +0.5*	V
Output Voltage	V <sub>O</sub>	-0.5~V <sub>DD</sub> +0.5*	V
Peak Input · Output Current	±I <sub>I</sub>	max. 10	mA
Power Dissipation (per package)	P <sub>D</sub>	max. 400	mW
		Decrease up to 200mW rating at 8mW/°C	
Power Dissipation (peroutput terminal)	P <sub>D</sub>	max. 100	mW
Operating Ambient Temperature	T <sub>opr</sub>	-40~+85	°C
Storage Temperature	T <sub>stg</sub>	-65~+150	°C

\* V<sub>DD</sub> + 0.5V should be under 18V

### ■ DC Characteristics (V<sub>SS</sub>=0V)

Item	V <sub>DD</sub> (V)	Sym- bol	Conditions	Ta=-40°C		Ta=25°C		Ta=85°C		Unit
				min.	max.	min.	max.	min.	max.	
Quiescent Power Supply Current	5	I <sub>DD</sub>	V <sub>I</sub> =V <sub>SS</sub> or V <sub>DD</sub>	—	1	—	1	—	7.5	μA
	10			—	2	—	2	—	15	
	15			—	4	—	4	—	30	
Input Voltage Low Level	5	V <sub>IL</sub>	I <sub>O</sub>   < 1μA V <sub>O</sub> =0.5V or 4.5V	—	1.5	—	1.5	—	1.5	V
	10			—	3	—	3	—	3	
	15			—	4	—	4	—	4	
Input Voltage High Level	5	V <sub>IH</sub>	I <sub>O</sub>   < 1μA V <sub>O</sub> =0.5V or 4.5V	3.5	—	3.5	—	3.5	—	V
	10			7	—	7	—	7	—	
	15			11	—	11	—	11	—	
Input Leakage Current	15	±I <sub>I</sub>	V <sub>I</sub> =0 or 15V	—	0.3	—	0.3	—	1	μA

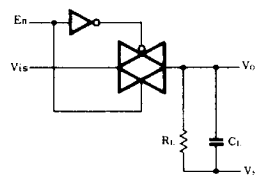
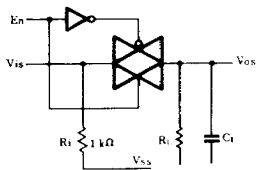
### ■ DC Characteristics (Ta=25°C, V<sub>SS</sub>=0V)

Item	V <sub>DD</sub> (V)	Symbol	Conditions	min.	typ.	max.	Unit
On Resistance	5	R <sub>ON</sub>	V <sub>SS</sub> =0V, V <sub>I</sub> =5V	—	150	450	Ω
			V <sub>SS</sub> =0V, V <sub>I</sub> =2.5V	—	380	1140	
			V <sub>SS</sub> =0V, V <sub>I</sub> =0.25V	—	150	450	
	10	R <sub>ON</sub>	V <sub>SS</sub> =0V, V <sub>I</sub> =10V	—	80	250	Ω
			V <sub>SS</sub> =0V, V <sub>I</sub> =5V	—	100	300	
			V <sub>SS</sub> =0V, V <sub>I</sub> =0.25V	—	100	300	
	15	R <sub>ON</sub>	V <sub>SS</sub> =0V, V <sub>I</sub> =15V	—	60	180	Ω
			V <sub>SS</sub> =0V, V <sub>I</sub> =7.5V	—	70	210	
			V <sub>SS</sub> =0V, V <sub>I</sub> =0.25V	—	60	180	
	5	R <sub>ON</sub>	V <sub>SS</sub> =-5V, V <sub>I</sub> =5V	—	100	300	Ω
			V <sub>SS</sub> =-5V, V <sub>I</sub> =±0.25V	—	100	300	
			V <sub>SS</sub> =-5V, V <sub>I</sub> =-5V	—	100	300	
7.5	R <sub>ON</sub>	V <sub>SS</sub> =-7.5V, V <sub>I</sub> =7.5V	—	70	210	Ω	
		V <sub>SS</sub> =-7.5V, V <sub>I</sub> =±0.25V	—	70	210		
		V <sub>SS</sub> =-7.5V, V <sub>I</sub> =-7.5V	—	70	210		
Input Output of Leakage Current	10	I <sub>OFF</sub>	V <sub>I</sub> =10V, V <sub>O</sub> =0V	—	30	125	nA
			V <sub>I</sub> =0V, V <sub>O</sub> =10V	—	30	125	
	15		V <sub>I</sub> =15V, V <sub>O</sub> =0V	—	60	250	nA
			V <sub>I</sub> =0V, V <sub>O</sub> =15V	—	60	250	

■ Switching Characteristics (Ta=25°C, VSS=0V)

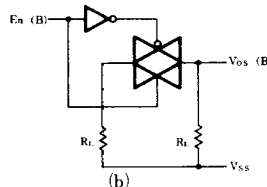
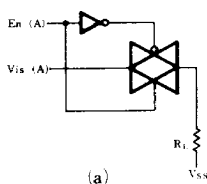
Item	VDD (V)	Symbol	Conditions	min.	typ.	max.	Unit
Propagation Delay Time (Fig. 1) Vis → Vos	5	t <sub>PHL</sub>	R <sub>L</sub> = 10kΩ C <sub>L</sub> = 50pF E <sub>n</sub> = V <sub>DD</sub>	—	10	30	ns
	10			—	5	15	
	15			—	5	15	
Propagation Delay Time (Fig. 1) Vis → Vos	5	t <sub>PLH</sub>	R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 50pF Vis = V <sub>DD</sub> , R <sub>L</sub> → V <sub>SS</sub>	—	10	30	ns
	10			—	5	15	
	15			—	5	15	
Propagation Delay Time (Fig. 1) E <sub>n</sub> → Vos	5	t <sub>PHZ</sub>	R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 50pF Vis = V <sub>DD</sub> , R <sub>L</sub> → V <sub>SS</sub>	—	80	240	ns
	10			—	65	195	
	15			—	60	180	
Propagation Delay Time (Fig. 1) E <sub>n</sub> → Vos	5	t <sub>PLZ</sub>	R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 50pF Vis = V <sub>SS</sub> , R <sub>L</sub> → V <sub>DD</sub>	—	80	240	ns
	10			—	70	210	
	15			—	70	210	
Propagation Delay Time (Fig. 1) E <sub>n</sub> → Vos	5	t <sub>PZH</sub>	R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 50pF Vis = V <sub>DD</sub> , R <sub>L</sub> → V <sub>SS</sub>	—	40	120	ns
	10			—	20	60	
	15			—	15	45	
Propagation Delay Time (Fig. 1) E <sub>n</sub> → Vos	5	t <sub>PZL</sub>	R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 50pF Vis = V <sub>SS</sub> , R <sub>L</sub> → V <sub>DD</sub>	—	45	135	ns
	10			—	20	60	
	15			—	15	45	
Sine Wave Distortion (Fig. 2)	5		R <sub>L</sub> = 10kΩ, C <sub>L</sub> = 50pF E <sub>n</sub> = V <sub>DD</sub> , f = 1 kHz Vis = ½ V <sub>DD</sub> (P-P)	—	—	—	%
	10			—	0.1	—	
	15			—	0.1	—	
Crosstalk (Fig. 3) (Between 2 Channels)	5		R <sub>L</sub> = 1 kΩ Vis = ½ V <sub>DD</sub> (P-P)	—	—	—	MHz
	10			—	1	—	
	15			—	—	—	
Crosstalk (Fig. 1) E <sub>n</sub> → V <sub>SS</sub>	5		R <sub>L</sub> = 1 kΩ, C <sub>L</sub> = 15pF E <sub>n</sub> = V <sub>DD</sub>	—	—	—	mV
	10			—	80	—	
	15			—	—	—	
Feedthrough (Fig. 2)(Note) (OFF)	5		R <sub>L</sub> = 1 kΩ, C <sub>L</sub> = 50pF E <sub>n</sub> = V <sub>SS</sub> , Vis = ½ V <sub>DD</sub> (P-P)	—	—	—	kHz
	10			—	700	—	
	15			—	—	—	
Input Capacitance		C <sub>I</sub>		—	—	7.5	pF

Fig. 1 Propagation Delay Time, Crosstalk Test Circuit      Fig. 2 Sine Wave Distortion, Feedthrough Test Circuit



(Note)  $20 \log \frac{V_{os}}{V_{is}} = -50\text{dB}$

Fig. 3 Crosstalk Test Circuit



$20 \log \frac{V_{os} (B)}{V_{is} (A)} = -50\text{dB}$