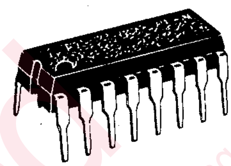
MN4503B/MN4503BS

Hex Non-Inverting 3-State Buffer

■ Outline

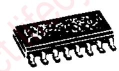
The MN4503B/S is a non-inverting 3-state buffer to accept a large source current and a large sink current. It has two output enable inputs ($\overline{EO}_2$, $\overline{EO}_4$) which can respectively control two circuits and four circuits independently. When the level of $\overline{EO}_4$ is set to "H", the outputs of the buffers 1~4 become the high impedance state, and when the level of $\overline{EO}_2$ was set to "H", the outputs of the buffer 5~6 become the high impedance state.
This non-inverting 3-state buffer is equivalent to Motorola's MC14503B.

P-3



16-pin plastic DIL package

P-4



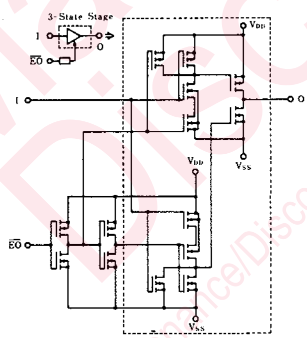
16-pin PANAFLAT package (SO-16D)

■ Truth Table

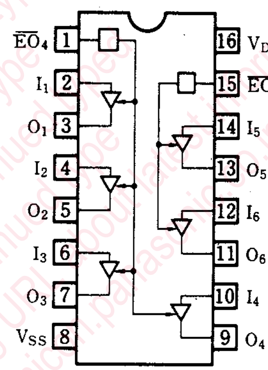
Input		Output
I	$\overline{EO}$	O
L	L	L
H	L	H
×	H	Z

Note) × : don't care Z : High impedance (OFF state)

■ Schematic Diagram



Pin Configuration



■ Absolute Maximum Ratings (Ta=25°C)

Item		Symbol	Rating	Unit
Supply voltage		V_{DD}	−0.5~+18	V
Input voltage		V_I	−0.5~V_{DD}+0.5*	V
Output pin voltage		V_O	−0.5~V_{DD}+0.5*	V
Peak input · output pin current		$\pm I_I$	max. 25	mA
Power dissipation (per package)	Ta=−40~+60°C	P_D	max. 400	mW
	Ta=+60~+80°C		Decrease to 200mW at the rate of 8mW/°C	
Power dissipation (per output pin)		P_D	max. 100	mW
Operating ambient temperature		T_{opr}	−40~+85	°C
Storage temperature		T_{stg}	−65~+150	°C

* V_{DD}+0.5V should be lower than 18V.

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■ DC Characteristics (V_{SS}=0V)

Item		V_{DD} (V)	Symbol	Condition		Ta=−40°C min.	Ta=−40°C max.	Ta=25°C min.	Ta=25°C max.	Ta=85°C min.	Ta=85°C max.	Unit
Static supply current		5	I_{DD}	$V_I=V_{SS}$ or V_{DD}		—	4	—	4	—	30	μA
		10				—	8	—	8	—	60	
		15				—	16	—	16	—	120	
Output voltage low level		5	V_{OL}	$V_I=V_{SS}$ or V_{DD}, $\lvert I_O \rvert<1\mu A$		—	0.05	—	0.05	—	0.05	V
		10				—	0.05	—	0.05	—	0.05	
		15				—	0.05	—	0.05	—	0.05	
Output voltage high level		5	V_{OH}	$V_I=V_{SS}$ or V_{DD}, $\lvert I_O \rvert<1\mu A$		4.95	—	4.95	—	4.95	—	V
		10				9.95	—	9.95	—	9.95	—	
		15				14.95	—	14.95	—	14.95	—	
Input voltage low level		5	V_{IL}	$\lvert I_O \rvert<1\mu A$	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}	$\lvert I_O \rvert<1\mu A$	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	—	
Output current low level		4.75	I_{OL}	V_O=0.4V, V_I=0 or 5V		1.7	—	1.4	—	1.1	—	mA
		10		V_O=0.5V, V_I=0 or 10V		4.8	—	4	—	3.2	—	
		15		V_O=1.5V, V_I=0 or 15V		12	—	10	—	8	—	
Output current high level		5	$-I_{OH}$	V_O=4.6V, V_I=0 or 5V		1	—	0.88	—	0.7	—	mA
		10		V_O=9.5V, V_I=0 or 10V		2.4	—	2.2	—	1.8	—	
		15		V_O=13.5V, V_I=0 or 15V		6.6	—	6	—	4.8	—	
Output current high level		5	$-I_{OH}$	V_O=2.5V, V_I=0 or 5V		1.7	—	1.4	—	1.1	—	mA
Input leakage current		15	$\pm I_I$	V_I=0 or 15V		—	0.3	—	0.3	—	1	μA
3-state output pin	Leakage current high level	15	I_{OZH}	$V_O=V_{DD}$		—	1.6	—	1.6	—	12	μA
	Leakage current low level	15	$-I_{OZL}$	$V_O=V_{SS}$		—	1.6	—	1.6	—	12	

■ Switching Characteristics (Ta=25°C, V_{SS}=0V, C_L=50pF)

Item	V_{DD}(V)	Symbol	min.	typ.	max.	Unit
Output rise time (Fig. 1)	5	t_{TLH}	—	35	105	ns
	10		—	20	60	
	15		—	15	45	
Output fall time (Fig. 1)	5	t_{THL}	—	30	90	ns
	10		—	15	45	
	15		—	10	30	
Propagation time (Fig. 1)	5	t_{PLH}	—	60	180	ns
	10		—	25	75	
	15		—	20	60	
Propagation time (Fig. 1)	5	t_{PHL}	—	70	210	ns
	10		—	30	90	
	15		—	25	75	
3-state propagation time (Fig. 2) O(H)→High impedance	5	t_{PHz}	—	45	135	ns
	10		—	35	105	
	15		—	30	90	
3-state propagation time O(L)→High impedance	5	t_{PLZ}	—	60	180	ns
	10		—	35	105	
	15		—	25	75	

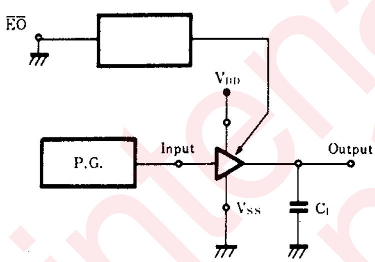
■ Switching Characteristics (cont.)

Item	V_{DD}(V)	Symbol	min.	typ.	max.	Unit
3-state propagation time (Fig. 2) High impedance→O(H)	5	t_{PZH}	—	75	225	ns
	10		—	35	105	
	15		—	30	90	
3-state propagation time (Fig. 2) High impedance→O(L)	5	t_{PZL}	—	95	285	ns
	10		—	40	120	
	15		—	30	90	
Input capacitance		C_I	—	—	7.5	pF

● Switching time measuring circuit and waveforms

Fig. 1 t_{TLH}, t_{THL}, t_{PLH}, t_{PHL}

1. Switching time measuring circuit



2. Switching waveforms

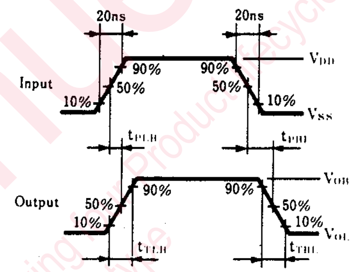
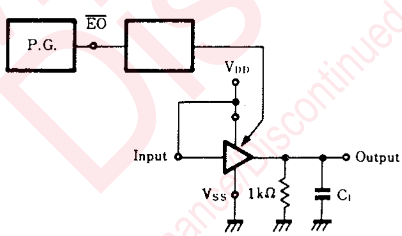


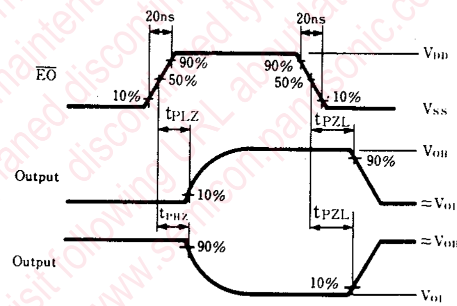
Fig. 2 t_{PHZ}, t_{PZH}, t_{PLZ}, t_{PZL}

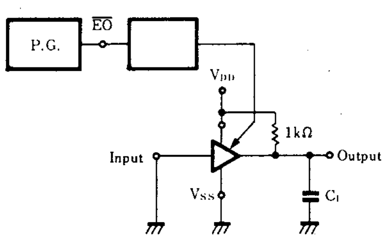
1. Switching time measuring circuit



(t_{PHZ}, t_{PZH})

2. Switching waveforms





(t_{PLZ}, t_{PZL})

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