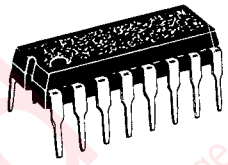
MN4050B/MN4050BS

Hex Non-Inverting Buffer

■ Outline

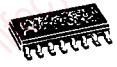
The MN4050B/S is a non-inversion type buffer having six circuits, and usable for logical level conversion.
Because of the large output current, it can directly drive TTL and DTL, and is also usable as an interface form CMOS to TTL since it can drive two standard TTL circuits.
The circuits structurally constituting a 2-stage inverter assure excellent switching characteristics.
This hex non-inverting buffer is equivalent to Motorola's MC14050B and RCA's CD4050B.

P-3



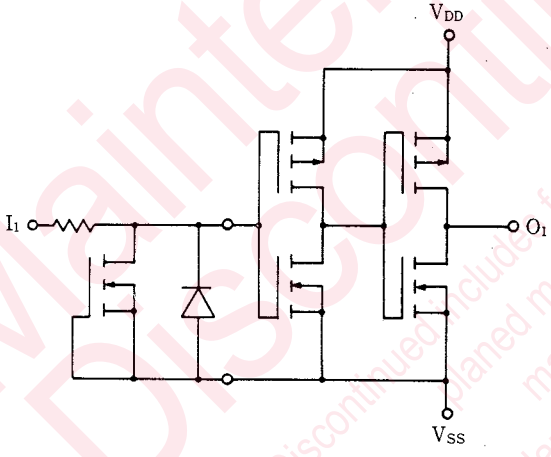
16-pin plastic DIL package

P-4

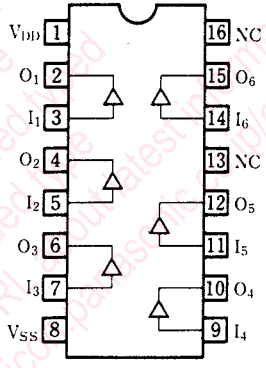


16-pin PANAFLAT package (SO-16D)

■ Schematic Diagram (1/6) & Input Protection Circuit



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. 10	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.

■ Guaranteed Fan-Out for Logic Circuit Series

Driving IC	Guaranteed fan-out
Standard TTL	2
74LS	9
74L	16

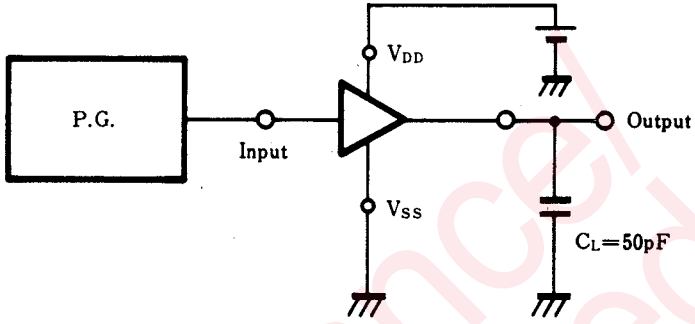
■ DC Characteristics (V_{SS}=0V)

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}		—	0.05	—	0.05	—	0.05	V
	10		$\|I_O\|$<1μA		—	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}		4.95	—	4.95	—	4.95	—	V
	10		$\|I_O\|$<1μA		9.95	—	9.95	—	9.95	—	
	15				14.95	—	14.95	—	14.95	—	
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	—	
Output current low level	4.75	I_{OL}	V_O=0.4V,		3.5	—	2.9	—	2.3	—	mA
	10		V_O=0.5V, V_I=0 or 10V		12	—	10	—	8	—	
	15		V_O=1.5V, V_I=0 or 15V		24	—	20	—	16	—	
Output current high level	5	$-I_{OH}$	V_O=4.6V, V_I=0 or 5V		0.52	—	0.44	—	0.36	—	mA
	10		V_O=9.5V, V_I=0 or 10V		1.3	—	1.1	—	0.9	—	
	15		V_O=13.5V, V_I=0 or 15V		3.6	—	3	—	2.4	—	
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

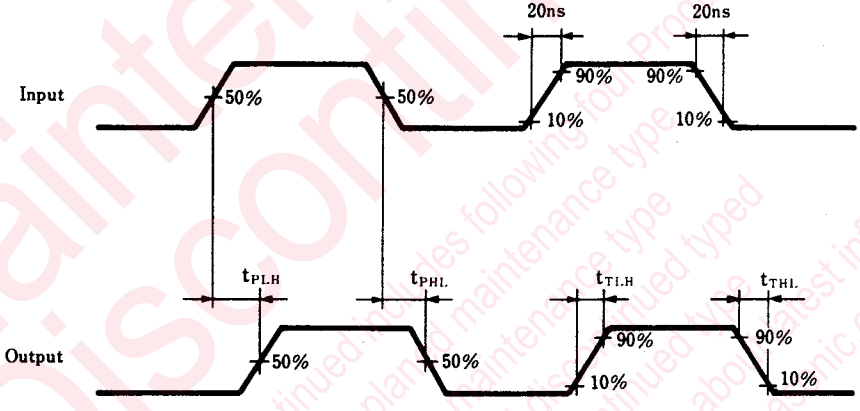
■ Switching Characteristics (Ta=25°C, V_{SS}=0V, C_L=50pF)

Item	V_{DD}(V)	Symbol	min.	typ.	max.	Unit
Output rise time	5	t_{TLH}	—	60	180	ns
	10		—	30	90	
	15		—	20	60	
Output fall time	5	t_{THL}	—	25	75	ns
	10		—	10	30	
	15		—	7	21	
Propagation time	5	t_{PLH}	—	55	165	ns
	10		—	25	75	
	15		—	20	60	
Propagation time	5	t_{PHL}	—	35	105	ns
	10		—	20	60	
	15		—	15	45	
Input capacitance		C_I	—	—	7.5	pF

1. Switching time measuring circuit



2. Switching waveforms



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