MN74HC368/MN74HC368S

Inverting Hex TRI-STATE Buffers

■ Outline

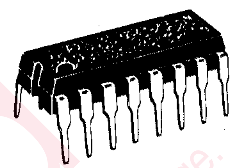
The MN74HC368/MN74HC368S consist of high speed inverting buffers having six 3-state outputs.

Because of the large current, these buffers assure high speed operation even when driving a large capacity bus line. They have two inputs $\overline{G}1$ and $\overline{G}2$ to enable the outputs when the level is "L", and the input $\overline{G}1$ controls four gates while the input $\overline{G}2$ controls two gates.

Owing to the silicon gate CMOS process, these buffers have realized low power consumption and high noise immunity equivalent to those of a standard CMOS and the operation speed as high as of an LS TTL, and can directly drive fifteen LS TTL inputs.

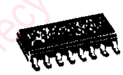
To protect the input and output against electrostatic breakdown, a resistor and a diode are used for the V_{CC} and the GND. The pin configuration and the function are the same as those of the standard 54LS/74LS logic family.

P-3



16-pin plastic DIL package

P-4



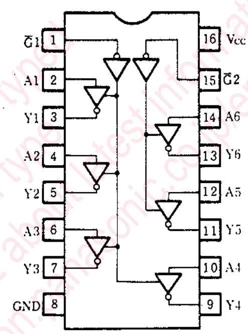
16-pin PANAFLAT package (SO-16D)

■ Truth Table

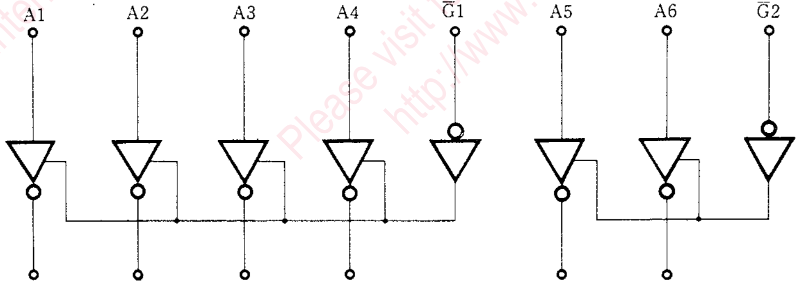
Input		Output
$\overline{G}$	A	Y
H	×	Hi-Z
L	H	L
L	L	H

Note 1. Hiz : High impedance
2. × : "H" or "L" either will do.

Pin Configuration



■ Logic Diagram



■ Absolute Maximum Ratings

Item			Symbol	Rating	Unit
Supply voltage			V_{CC}	−0.5～+7.0	V
Input output voltage			V_I, V_O	−0.5～V_{CC}+0.5	V
Input protective diode current			I_{IK}	±20	mA
Output parasitic diode current			I_{OK}	±20	mA
Output current			I_O	±35	mA
Supply current			I_{CC}, I_{GND}	±70	mA
Storage temperature			T_{stg}	−65～+150	°C
Power dissipation	MN74HC368	Ta=−40～+60°C	P_D	400	mW
		Ta=+60～+85°C		Decrease to 200mW at the rate of 8mW/°C	
	MN74HC368S	Ta=−40～+60°C	P_D	275	mW
		Ta=+60～+85°C		Decrease to 200mW at the rate of 3.8mW/°C	

■ Recommended Operating Conditions

Item	Symbol	V_{CC}(V)	Rating	Unit
Operating power supply voltage	V_{CC}		1.4～6.0	V
Input output voltage	V_I, V_O		0～V_{CC}	V
Operating temperature	T_A		−40～+85	°C
Input rise, fall time	t_r, t_f	2.0	0～1000	ns
		4.5	0～500	ns
		6.0	0～400	ns

■ DC Characteristics (GND=0V)

Item	Symbol	V_{CC} (V)	Test Condition			Temperature					Unit
			V_I	V_O		Ta=25°C			Ta=−40～+85°C		
					Unit	min.	typ.	max.	min.	max.	
Input voltage high level	V_{IH}	2.0				1.5			1.5		V
		4.5				3.15			3.15		
		6.0				4.2			4.2		
Input voltage low level	V_{IL}	2.0						0.3		0.3	V
		4.5						0.9		0.9	
		6.0						1.2		1.2	
Output voltage high level	V_{OH}	2.0		−20.0	μA	1.9	2.0		1.9		V
		4.5	V_{IH}	−20.0	μA	4.4	4.5		4.4		
		6.0	or	−20.0	μA	5.9	6.0		5.9		
		4.5	V_{IL}	−6.0	mA	3.92			3.84		
		6.0		−7.8	mA	5.48			5.34		
Output voltage low level	V_{OL}	2.0		20.0	μA		0.0	0.1		0.1	V
		4.5	V_{IH}	20.0	μA		0.0	0.1		0.1	
		6.0	or	20.0	μA		0.0	0.1		0.1	
		4.5	V_{IL}	6.0	mA			0.26		0.33	
		6.0		7.8	mA			0.26		0.33	
Input leakage current	I_I	6.0	V_I=V_{CC} or GND					±0.1		±1.0	μA
3-state output OFF leakage current	I_{OZ}	6.0	V_I=V_{IH} or V_{IL} V_O=V_{CC} or GND					±0.5		±5.0	μA
Static supply current	I_{CC}	6.0	V_I=V_{CC} or GND, I_O=0					8.0		80.0	μA

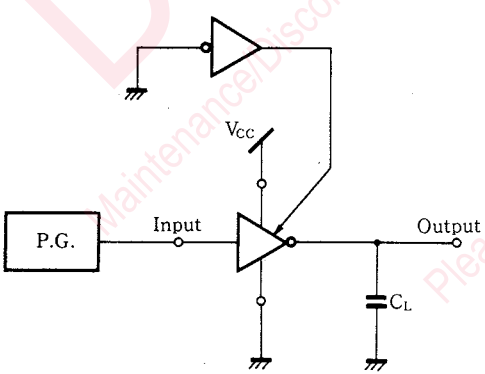
■ AC Characteristics (GND=0V, Input transition time≦6ns, C_L=50pF)

Item	Symbol	V_{CC} (V)	Test Condition	Temperature Ta=25°C min.	Ta=25°C typ.	Ta=25°C max.	Ta=−40~+85°C min.	Ta=−40~+85°C max.	Unit
Output rise time	t_{TLH}	2.0			19	75		95	ns
		4.5			7	15		19	
		6.0			6	13		16	
Output fall time	t_{THL}	2.0			10	75		95	ns
		4.5			5	15		19	
		6.0			4	13		16	
Propagation time (L→H)	t_{PLH}	2.0			18	75		95	ns
		4.5			9	15		19	
		6.0			7	13		16	
Propagation time (H→L)	t_{PHL}	2.0			15	75		95	ns
		4.5			7	15		19	
		6.0			6	13		16	
3-state propagation time (H→Z)	t_{PHZ}	2.0	R_L=1kΩ		18	125		155	ns
		4.5			13	25		31	
		6.0			12	21		26	
3-state propagation time (L→Z)	t_{PLZ}	2.0	R_L=1kΩ		18	125		155	ns
		4.5			11	25		31	
		6.0			10	21		26	
3-state propagation time (Z→H)	t_{PZH}	2.0	R_L=1kΩ		21	100		125	ns
		4.5			10	20		25	
		6.0			8	17		21	
3-state propagation time (Z→L)	t_{PZL}	2.0	R_L=1kΩ		24	100		125	ns
		4.5			10	20		25	
		6.0			8	17		21	

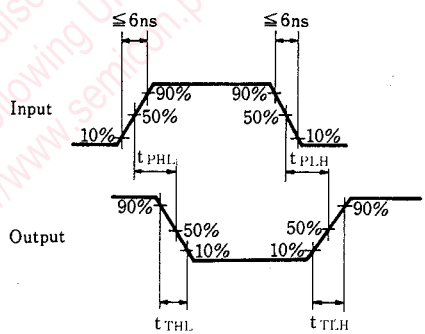
- Switching time measuring circuit and waveforms

(1) t_{TLH}, t_{THL}, t_{PLH}, t_{PHL}

1. Measuring circuit

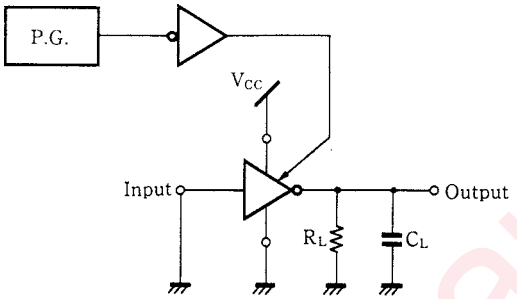


2. Switching waveforms

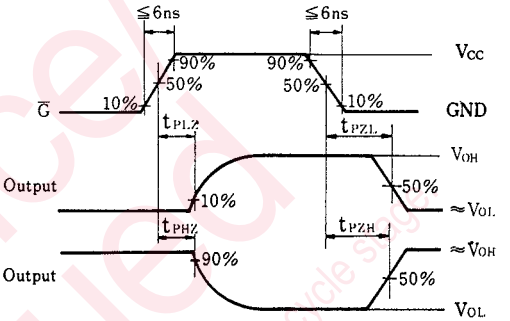


(2) t_{PHZ}, t_{PZH}

1. Measuring circuit

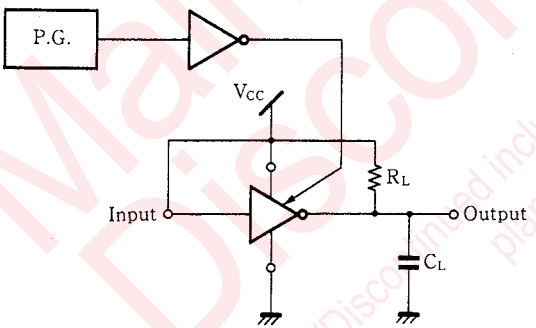


2. Switching waveforms



(3) t_{PLZ}, t_{PZL}

1. Measuring circuit



2. Switching waveforms

See above (2) 2 for waveforms.

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