

# MN74HC51/MN74HC51S

## Dual AND-OR Inverting Gates

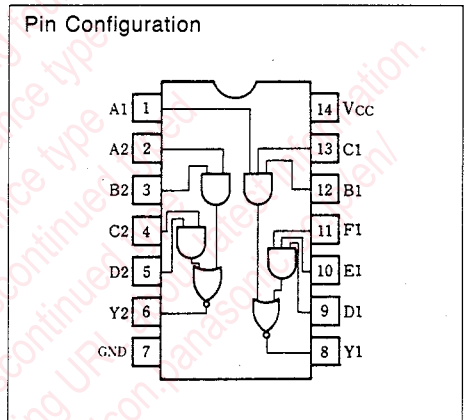
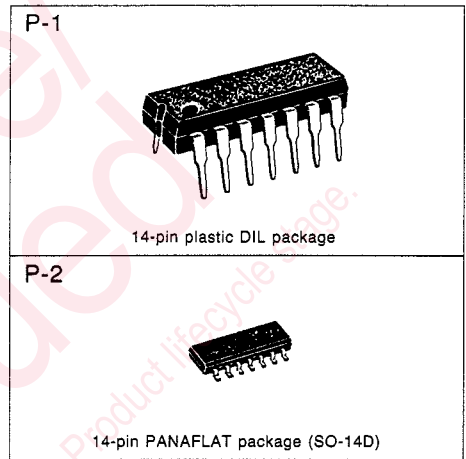
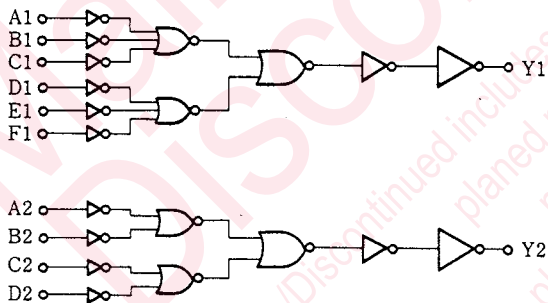
### ■ Outline

The MN74HC51/MN74HC51S is an AND-OR inverting gate having two built-in circuits in one chip.

Owing to the silicon gate CMOS process, this AND-OR inverting gate has 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. The buffer added to the gate output improves the input/output transfer characteristic and minimizes the propagation delay time fluctuation caused by the load capacity increase. The MN74HC51/MN74HC51S can directly drive ten 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.

### ■ 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	$I_O$	±25	mA	
Supply current	$I_{CC}, I_{GND}$	±50	mA	
Storage temperature	$T_{stg}$	-65~+150	°C	
Power dissipation	MN74HC51	$T_a = -40 \sim +60^\circ\text{C}$	400	mW
		$T_a = +60 \sim +85^\circ\text{C}$		
	MN74HC51S	$T_a = -40 \sim +60^\circ\text{C}$	275	mW
		$T_a = +60 \sim +85^\circ\text{C}$		

### ■ Recommended Operating Conditions

Item	Symbol	V <sub>CC</sub> (V)	Rating	Unit
Operating power supply voltage	V <sub>CC</sub>		1.4~6.0	V
Input output voltage	V <sub>I</sub> , V <sub>O</sub>		0~V <sub>CC</sub>	V
Operating temperature	T <sub>A</sub>		-40~+85	°C
Input rise, fall time	t <sub>r</sub> , t <sub>f</sub>	2.0	0~1000	ns
		4.5	0~500	ns
		6.0	0~400	ns

### ■ DC Characteristics (GND=0V)

Item	Symbol	V <sub>CC</sub> (V)	Test Condition			Temperature					Unit
			V <sub>I</sub>	I <sub>O</sub>	Unit	T <sub>a</sub> =25°C			T <sub>a</sub> =-40~+85°C		
						min.	typ.	max.	min.	max.	
Input voltage high level	V <sub>IH</sub>	2.0				1.5			1.5		V
		4.5				3.15			3.15		
		6.0				4.2			4.2		
Input voltage low level	V <sub>IL</sub>	2.0						0.3		0.3	V
		4.5						0.9		0.9	
		6.0						1.2		1.2	
Output voltage high level	V <sub>OH</sub>	2.0	V <sub>IH</sub>	-20.0	μA	1.9	2.0		1.9		V
		4.5	V <sub>IH</sub>	-20.0	μA	4.4	4.5		4.4		
		6.0	or	-20.0	μA	5.9	6.0		5.9		
		4.5	V <sub>IL</sub>	-4.0	mA	3.92			3.84		
		6.0		-5.2	mA	5.48			5.34		
Output voltage low level	V <sub>OL</sub>	2.0	V <sub>IH</sub>	20.0	μA		0.0	0.1		0.1	V
		4.5	V <sub>IH</sub>	20.0	μA		0.0	0.1		0.1	
		6.0	or	20.0	μA		0.0	0.1		0.1	
		4.5	V <sub>IL</sub>	4.0	mA			0.26		0.33	
		6.0		5.2	mA			0.26		0.33	
Input leakage current	I <sub>I</sub>	6.0	V <sub>I</sub> =V <sub>CC</sub> or GND					±0.1		±1.0	μA
Static supply current	I <sub>CC</sub>	6.0	V <sub>I</sub> =V <sub>CC</sub> or GND, I <sub>O</sub> =0					2.0		20.0	μA

### ■ AC Characteristics (GND=0V, Input transition time ≤ 6ns, C<sub>L</sub>=50pF)

Item	Symbol	V <sub>CC</sub> (V)	Test Condition	Temperature					Unit
				T <sub>a</sub> =25°C			T <sub>a</sub> =-40~+85°C		
				min.	typ.	max.	min.	max.	
Output rise time	t <sub>TLH</sub>	2.0			25	75		95	ns
		4.5			8	15		19	
		6.0			7	13		16	
Output fall time	t <sub>THL</sub>	2.0			20	75		95	ns
		4.5			7	15		19	
		6.0			6	13		16	
Propagation time (L→H)	t <sub>PLH</sub>	2.0			40	150		190	ns
		4.5			16	30		38	
		6.0			11	26		33	
Propagation time (H→L)	t <sub>PHL</sub>	2.0			39	125		155	ns
		4.5			13	25		31	
		6.0			10	21		26	

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