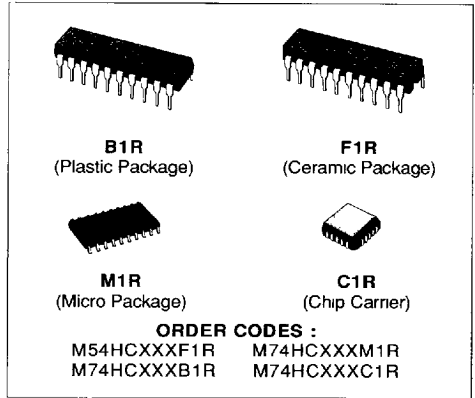


OCTAL BUS BUFFER WITH 3 STATE OUTPUTS
HC540: INVERTED - HC541 NON INVERTED

- HIGH SPEED
t_{PD} = 10 ns (TYP.) at V_{CC} = 5V
- LOW POWER DISSIPATION
I_{CC} = 4 μA (MAX.) at T_A = 25 °C
- HIGH NOISE IMMUNITY
V_{NIH} = V_{NIL} = 28 % V_{CC} (MIN.)
- OUTPUT DRIVE CAPABILITY
15 LSTTL LOADS
- SYMMETRICAL OUTPUT IMPEDANCE
|I_{OH}| = I_{OL} = 6 mA (MIN)
- BALANCED PROPAGATION DELAYS
t_{PLH} = t_{PHL}
- WIDE OPERATING VOLTAGE RANGE
V_{CC} (OPR) = 2V to 6V
- PIN AND FUNCTION COMPATIBLE
WITH 54/74LS540/541



DESCRIPTION

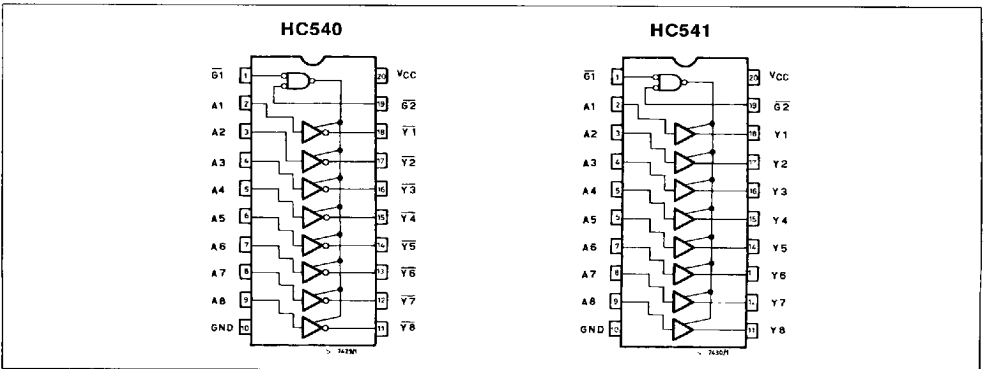
The M54/74HC540 and HC541 are high speed CMOS OCTAL BUS BUFFERS (3-STATE) fabricated in silicon gate C²MOS technology. They have the same high speed performance of LSTTL combined with true CMOS low power consumption. The HC540 is an inverting buffer and HC541 is a non inverting buffer.

The 3 STATE control gate operates as a two input AND such that if either G1 and G2 are high, all eight output are in the high impedance state. In order to

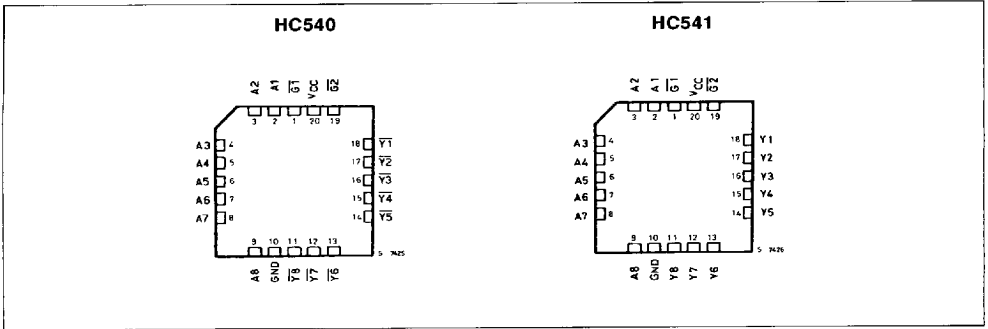
enhance PC board layout, the HC540 and HC541 offers a pinout having inputs and outputs on opposite sides of the package.

All inputs are equipped with protection circuits against static discharge and transient excess voltage.

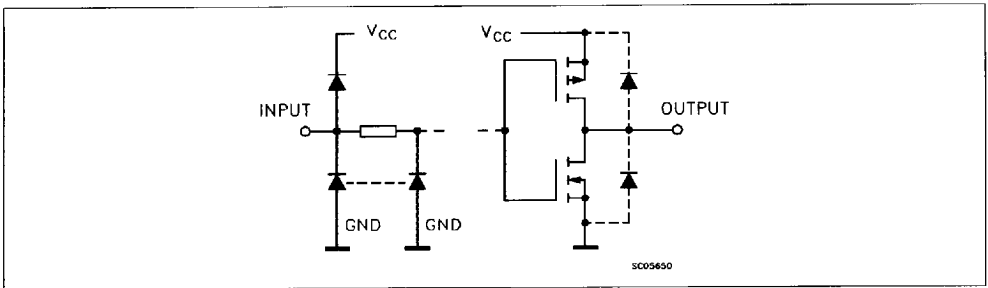
PIN CONNECTION (top view)



CHIP CARRIER



INPUT AND OUTPUT EQUIVALENT CIRCUIT



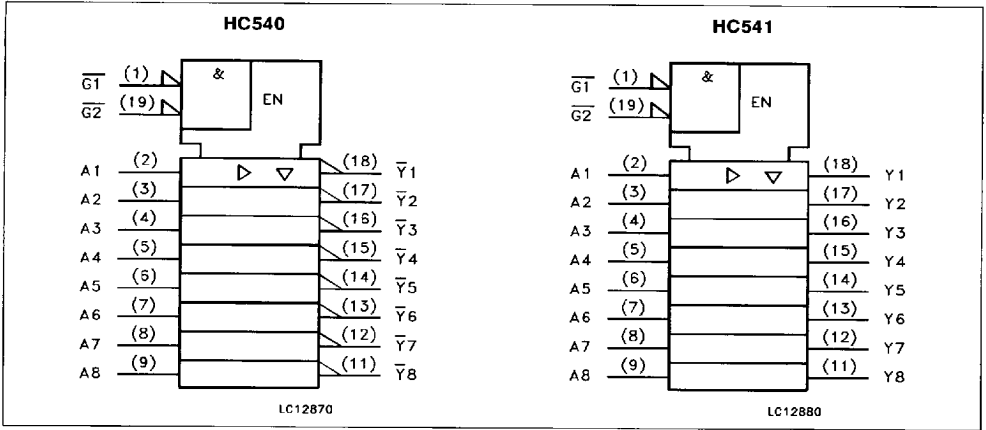
PIN DESCRIPTION (HC540)

PIN No	SYMBOL	NAME AND FUNCTION
1, 19	1G, G2	Output Enable Inputs
2, 3, 4, 5, 6, 7, 8, 9	A1 to A8	Data Inputs
18, 17, 16, 15, 14, 13, 12, 11	Y1 to Y8	Bus Outputs
10	GND	Ground (0V)
20	Vcc	Positive Supply Voltage

PIN DESCRIPTION (HC541)

PIN No	SYMBOL	NAME AND FUNCTION
1, 19	1G, G2	Output Enable Inputs
2, 3, 4, 5, 6, 7, 8, 9	A1 to A8	Data Inputs
18, 17, 16, 15, 14, 13, 12, 11	Y1 to Y8	Bus Outputs
10	GND	Ground (0V)
20	Vcc	Positive Supply Voltage

IEC LOGIC SYMBOLS

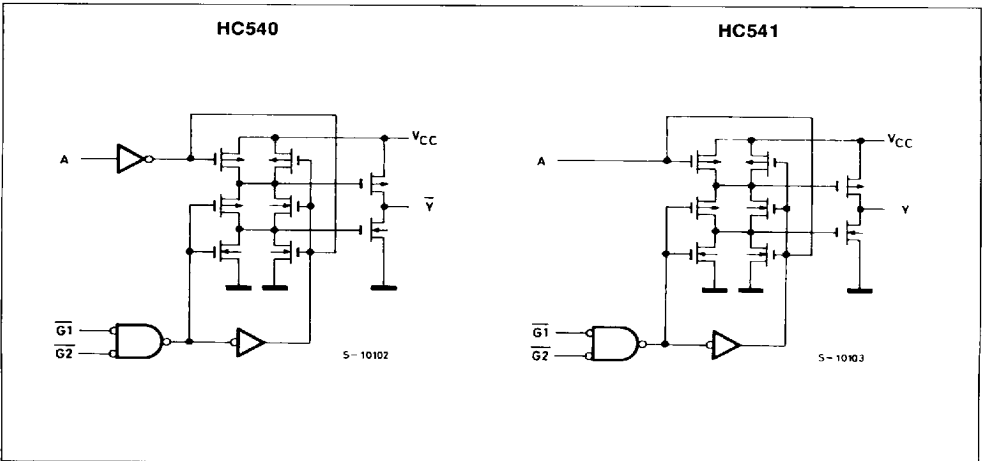


TRUTH TABLE

G1	INPUT		OUTPUT	
	G2	An	Yn (HC540)	Yn (HC541)
H	X	X	Z	Z
X	H	X	Z	Z
L	L	H	L	H
L	L	L	H	L

X "H" or "L"
Z High impedance

CIRCUIT SCHEMATIC (Per Circuit)



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ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	-0.5 to +7	V
V _I	DC Input Voltage	-0.5 to V _{CC} + 0.5	V
V _O	DC Output Voltage	-0.5 to V _{CC} + 0.5	V
I _{IK}	DC Input Diode Current	± 20	mA
I _{OK}	DC Output Diode Current	± 20	mA
I _O	DC Output Source Sink Current Per Output Pin	± 35	mA
I _{CC} or I _{GND}	DC V _{CC} or Ground Current	± 70	mA
P _D	Power Dissipation	500 (*)	mW
T _{stg}	Storage Temperature	-65 to +150	°C
T _L	Lead Temperature (10 sec)	300	°C

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.
 (*) 500 mW ≅ 65 °C derate to 300 mW by 10mW/°C 65 °C to 85 °C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit	
V _{CC}	Supply Voltage	2 to 6	V	
V _I	Input Voltage	0 to V _{CC}	V	
V _O	Output Voltage	0 to V _{CC}	V	
T _{op}	Operating Temperature: M54HC Series	-55 to +125	°C	
	M74HC Series	-40 to +85	°C	
t _r , t _f	Input Rise and Fall Time	V _{CC} = 2 V V _{CC} = 4.5 V V _{CC} = 6 V	0 to 1000 0 to 500 0 to 400	ns

DC SPECIFICATIONS

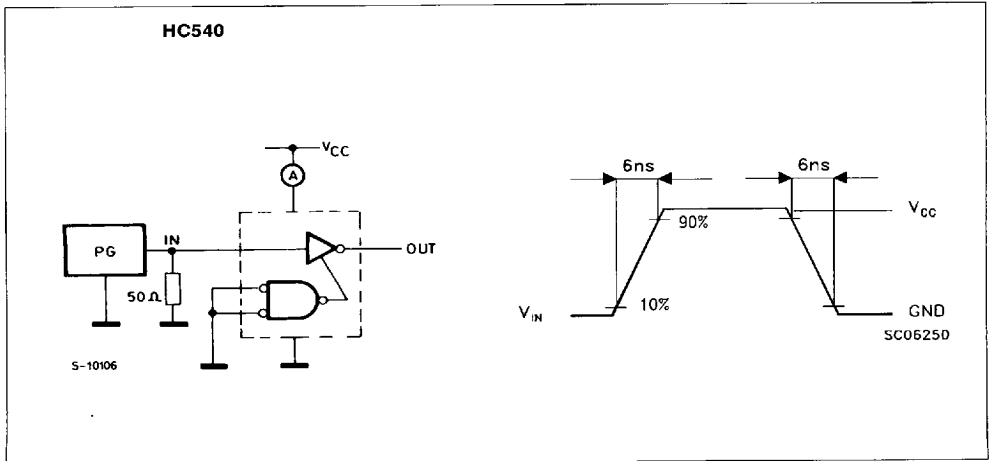
Symbol	Parameter	Test Conditions		Value						Unit	
				T _A = 25 °C 54HC and 74HC			-40 to 85 °C 74HC		-55 to 125 °C 54HC		
				Min.	Typ.	Max.	Min.	Max.	Min.		Max.
V _{IH}	High Level Input Voltage	V _{CC} (V)	2.0								V
			4.5								
			6.0								
V _{IL}	Low Level Input Voltage	V _{CC} (V)	2.0			0.5		0.5		0.5	V
			4.5			1.35		1.35		1.35	
			6.0			1.8		1.8		1.8	
V _{OH}	High Level Output Voltage	V _i = V _{IH} or V _{IL}	2.0							1.9	V
			4.5							4.4	
			6.0							5.9	
			4.5							4.13	
			6.0							5.63	
V _{OL}	Low Level Output Voltage	V _i = V _{IH} or V _{IL}	2.0			0.0	0.1		0.1	0.1	V
			4.5			0.0	0.1		0.1	0.1	
			6.0			0.0	0.1		0.1	0.1	
			4.5			0.17	0.26		0.33	0.40	
			6.0			0.18	0.26		0.33	0.40	
I _I	Input Leakage Current	V _i = V _{CC} or GND	6.0			±0.1		±1		±1	µA
I _{OZ}	3 State Output Off State Current	V _I = V _{IH} or V _{IL} V _O = V _{CC} or GND	6.0			±0.5		±5		±10	µA
I _{CC}	Quiescent Supply Current	V _i = V _{CC} or GND	6.0			4		40		80	µA

AC ELECTRICAL CHARACTERISTICS (C_L = 50 pF, Input t_r = t_f = 6 ns)

Symbol	Parameter	Test Conditions			Value						Unit	
		V _{CC} (V)	C _L (pF)	R _L (KΩ)	T _A = 25 °C 54HC and 74HC			-40 to 85 °C 74HC		-55 to 125 °C 54HC		
					Min.	Typ.	Max.	Min.	Max.	Min.		Max.
t _{TLH} t _{THL}	Output Transition Time	2.0	50			25	60		75		90	ns
		4.5				7	12		19		18	
		6.0				6	10		13		15	
t _{PLH} t _{PHL}	Propagation Delay Time	2.0	50			40	85		105		130	ns
		4.5				10	17		21		26	
		6.0				9	14		18		22	
		2.0	150			56	115		145		175	ns
		4.5				14	23		29		35	
		6.0				12	20		25		30	
t _{PZL} t _{PZH}	Output Enable Time	2.0	50	R _L = 1KΩ		47	110		140		165	ns
		4.5				13	22		28		33	
		6.0				11	19		24		28	
		2.0	150	R _L = 1KΩ		61	135		170		205	ns
		4.5				17	27		34		41	
		6.0				14	23		29		35	
t _{PLZ} t _{PHZ}	Output Disable Time	2.0	50	R _L = 1KΩ		52	110		140		165	ns
		4.5				15	22		28		33	
		6.0				13	19		24		28	
C _{IN}	Input Capacitance					5	10		10		10	pF
C _{PD} (*)	Power Dissipation Capacitance					31						pF

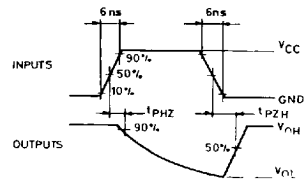
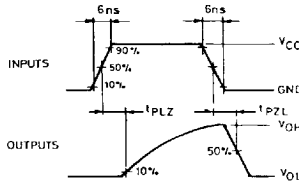
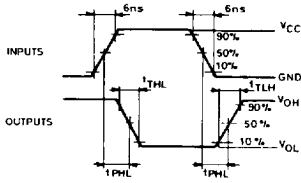
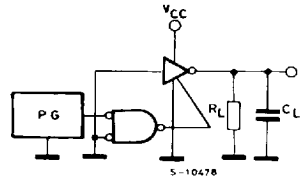
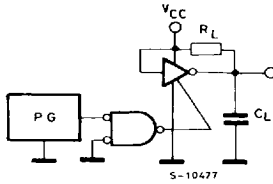
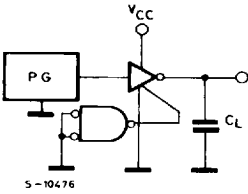
(*) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load (Refer to Test Circuit) Average operating current can be obtained by the following equation. I_{CC(OPR)} = C_{PD} • V_{CC} • f_{IN} + I_{CC(0)} (per gate)

TEST CIRCUIT I_{CC} (Opr.)

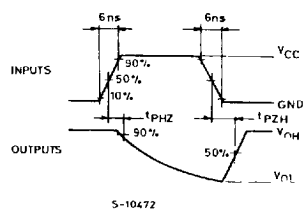
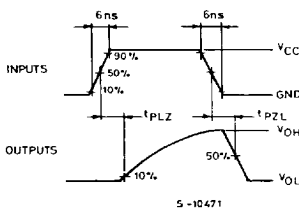
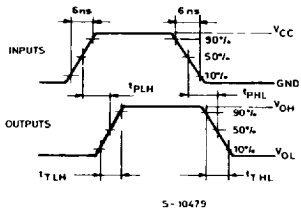
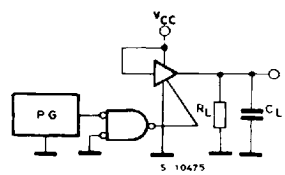
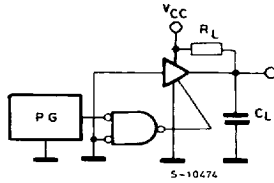
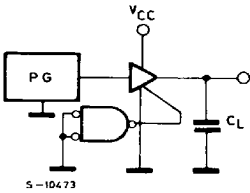


SWITCHING CHARACTERISTICS TEST CIRCUIT

HC540



HC541



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