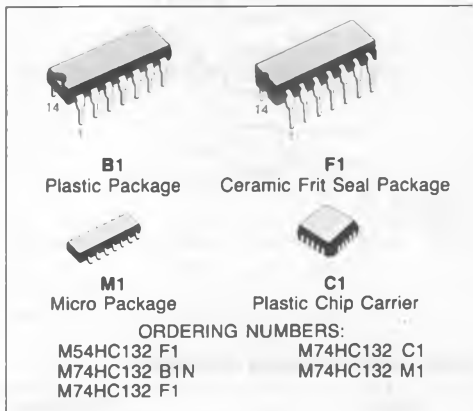
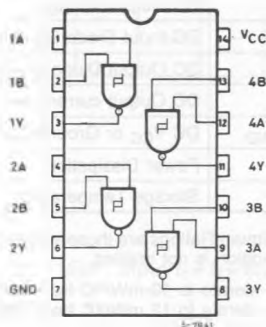


QUAD 2-INPUT SCHMITT NAND GATE

- **HIGH SPEED**
 $t_{PD} = 21 \text{ ns (TYP.)}$ at $V_{CC} = 5\text{V}$
- **LOW POWER DISSIPATION**
 $I_{CC} = 1 \mu\text{A (MAX.)}$ at $T_A = 25^\circ\text{C}$
- **OUTPUT DRIVE CAPABILITY**
 10 LSTTL LOADS
- **HIGH NOISE IMMUNITY**
 $V_H (\text{TYP.}) = 0.9\text{V}$ at $V_{CC} = 5$
- **BALANCED PROPAGATION DELAYS**
 $t_{PLH} = t_{PHL}$
- **WIDE OPERATING VOLTAGE RANGE**
 $V_{CC} (\text{OPR}) = 2\text{V to } 6\text{V}$
- **PIN AND FUNCTION COMPATIBLE**
 WITH 54/74LS132



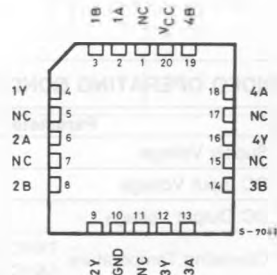
PIN CONNECTIONS (top view)



DESCRIPTION

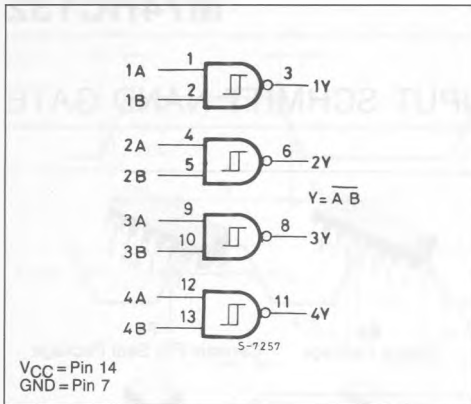
The M54/74HC132 is a high speed CMOS QUAD 2-INPUT SCHMITT NAND GATE fabricated in silicon gate C²MOS technology. It has the same high speed performance of LSTTL combined with true CMOS low power consumption. Pin configuration and function are identical to those of the M54/74HC00.

The hysteresis characteristics (around 20% V_{CC}) of all inputs allow slowly changing input signals to be transformed into sharply defined jitter-free output signals. All inputs are equipped with protection circuits against static discharge and transient excess voltage.

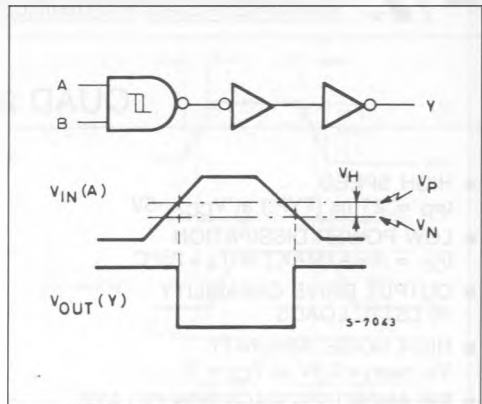


NC =
No Internal
Connection

BLOCK DIAGRAM



LOGIC DIAGRAM/WAVEFORM



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 current per pin	± 25	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 50	mA
P_D	Power Dissipation	500 (*)	mW
T_{stg}	Storage Temperature	-65 to 150	$^{\circ}\text{C}$

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

(*) 500 mW = derate to 10 mW/ $^{\circ}\text{C}$ from 65 $^{\circ}\text{C}$ to 85 $^{\circ}\text{C}$ for plastic package

(*) 500 mW = derate to 12 mW/ $^{\circ}\text{C}$ from 100 to 125 $^{\circ}\text{C}$ for frit-seal package

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit	
V_{CC}	Supply Voltage	2 to 6	V	
V_I	DC Input Voltage	0 to V_{CC}	V	
V_O	DC Output Voltage	0 to V_{CC}	V	
T_A	Operating Temperature	74HC Series 54HC Series	-40 to 85 -55 to 125	$^{\circ}\text{C}$
t_r/t_f	Input Rise fall times	NO LIMITS	ns	

DC SPECIFICATIONS

Symbol	Parameter	V _{CC}	Test Condition	T _A = 25°C 54HC and 74HC			- 40 to 85°C 74HC		- 55 to 125°C 54HC		Unit	
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.		
V _P	High Level Threshold Voltage	2.0		0.8	1.25	1.5	0.8	1.5	0.8	1.5	V	
		4.5		2.25	2.7	3.15	2.25	3.15	2.25	3.15		
		6.0		3.0	3.6	4.2	3.0	4.2	3.0	4.2		
V _N	Low Level Threshold Voltage	2.0		0.4	0.75	1.0	0.4	1.0	0.4	1.0	V	
		4.5		1.35	1.9	2.25	1.35	2.25	1.35	2.25		
		6.0		1.8	2.6	3.0	1.8	3.0	1.8	3.0		
V _H	Hysteresis Voltage	2.0		0.20	0.5	1.0	0.20	1.0	0.20	1.0	V	
		4.5		0.4	0.8	1.4	0.4	1.4	0.4	1.4		
		6.0		0.6	1.0	1.7	0.6	1.7	0.6	1.7		
V _{OH}	High Level Output Voltage	2.0	V _I	I _O	1.9	2.0	—	1.9	—	1.9	—	V
		4.5	V _{IH} or V _{IL}	- 20 μA	4.4	4.5	—	4.4	—	4.4	—	
		6.0			5.9	6.0	—	5.9	—	5.9	—	
		4.5	- 4.0 mA - 5.2 mA	4.18	4.31	—	4.13	—	4.10	—		
6.0	5.68	5.8		—	5.63	—	5.60	—				
V _{OL}	Low Level Output Voltage	2.0	V _{IH} or V _{IL}	20 μA	—	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			4.0 mA 5.2 mA	—	0.17	0.26	—	0.33	—	
6.0	—	0.18	0.26	—		0.33	—	0.40				
I _I	Input Leakage Current	6.0	V _I = V _{CC} or GND	—	—	±0.1	—	±1.0	—	±1.0	μA	
I _{CC}	Quiescent Supply Current	6.0	V _I = V _{CC} or GND	—	—	1	—	10	—	20	μA	

AC ELECTRICAL CHARACTERISTICS (V_{CC} = 5V, T_A = 25°C, C_L = 15pF, Input t_r = t_f = 6ns)

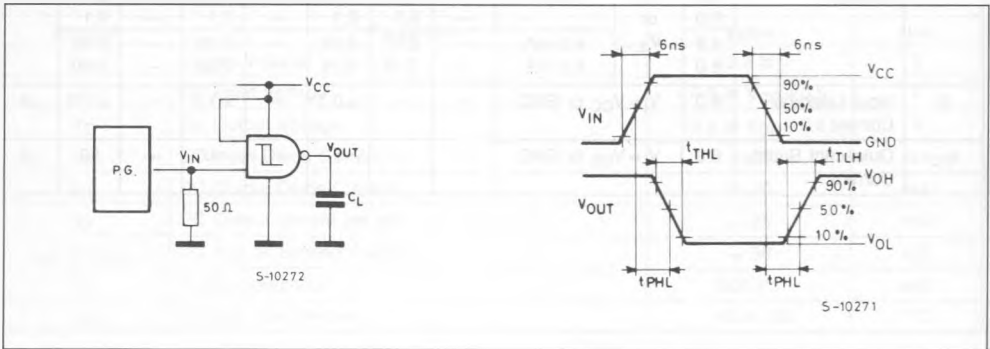
Symbol	Parameter	54HC and 74HC			Unit
		Min.	Typ.	Max.	
t _{TLH} t _{THL}	Output Transition Time		4	8	ns
t _{PLH} t _{PHL}	Propagation Delay Time		13	21	ns

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

Symbol	Parameter	V _{CC}	Test Condition	T _A = 25°C 54HC and 74HC			- 40 to 85°C 74HC		- 55 to 125°C 54HC		Unit
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t _{TLH} t _{THL}	Output Transition Time	2.0 4.5 6.0		— — —	30 8 7	75 15 13	— — —	95 19 16	— — —	110 22 19	ns
t _{PLH} t _{PHL}	Propagation Delay Time	2.0 4.5 6.0		— — —	64 16 14	125 25 21	— — —	155 31 26	— — —	190 38 32	ns
C _{IN}	Input Capacitance			—	5	10	—	10	—	10	pF
C _{PD} (*)	Power Dissipation Capacitance			—	34	—	—	—	—	—	pF

Note (*) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load.
Average operating current is: I_{CC} (Opr.) = C_{PD} · V_{CC} · f_{IN} + I_{CC}/4 (per gate)

SWITCHING CHARACTERISTICS TEST CIRCUIT



TEST CIRCUIT I_{CC} (Opr.)

