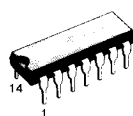
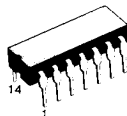


QUAD 2-INPUT SCHMITT NAND GATE

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



B1
Plastic Package



F1
Ceramic Frit Seal Package



M1
Micro Package

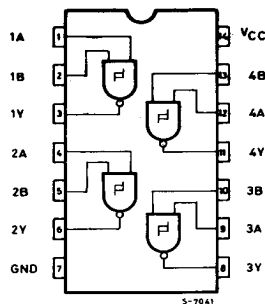


C1
Plastic Chip Carrier

ORDERING NUMBERS:

M54HC132 F1	M74HC132 C1
M74HC132 B1N	M74HC132 M1
M74HC132 F1	

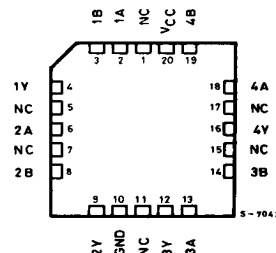
PIN CONNECTIONS (top view)



DESCRIPTION

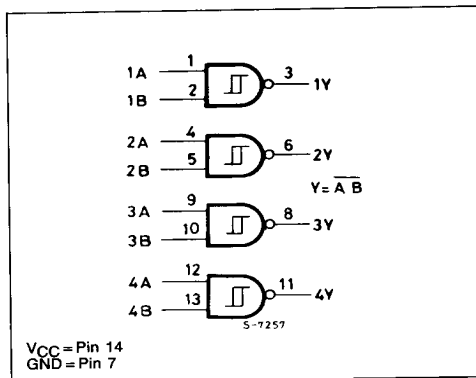
The M54/74HC132 is a high speed CMOS QUAD 2-INPUT SCHMITT NAND GATE fabricated in silicon gate CMOS technology. It has the same high speed performance of LSTTL combined with true CMOS low power consumption. Pin configuration and function are identical to those of the M54/74HC00.

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.

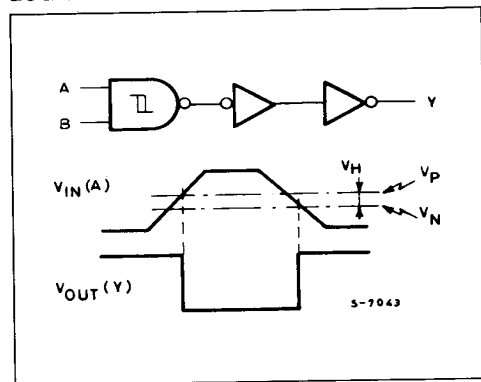


NC =
No Internal
Connection

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	°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/°C from 65°C to 85°C for plastic package
- (*) 500 mW = derate to 12 mW/°C from 100 to 125°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	°C
t_r/t_f	Input Rise fall times	- 40 to 85 - 55 to 125	ns
		NO LIMITS	

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 4.5 6.0			0.8 2.25 3.0	1.25 2.7 3.6	1.5 3.15 4.2	0.8 2.25 3.0	1.5 3.15 4.2	0.8 2.25 3.0	1.5 3.15 4.2	— V
V _N	Low Level Threshold Voltage	2.0 4.5 6.0			0.4 1.35 1.8	0.75 1.9 2.6	1.0 2.25 3.0	0.4 1.35 1.8	1.0 2.25 3.0	0.4 1.35 1.8	1.0 2.25 3.0	V
V _H	Hysteresis Voltage	2.0 4.5 6.0			0.20 0.4 0.6	0.5 0.8 1.0	1.0 1.4 1.7	0.20 0.4 0.6	1.0 1.4 1.7	0.20 0.4 0.6	1.0 1.4 1.7	V
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}	– 20 μA	4.4	4.5	—	4.4	—	4.4	—	
		6.0	V _{IL}	– 4.0 mA – 5.2 mA	5.9	6.0	—	5.9	—	5.9	—	
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	—	0.17	0.26	—	0.33	—	0.40	
		6.0		5.2 mA	—	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

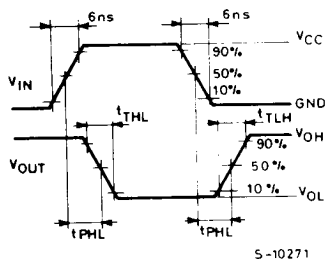
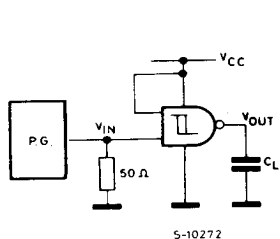
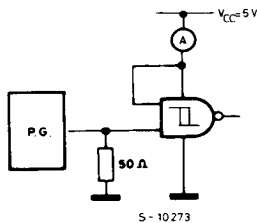
AC ELECTRICAL CHARACTERISTICS ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

Symbol	Parameter	V_{CC}	Test Condition	$T_A = 25^\circ\text{C}$ 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: $I_{CC} (\text{Opr.}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/4$ (per gate)

SWITCHING CHARACTERISTICS TEST CIRCUIT

TEST CIRCUIT $I_{CC} (\text{Opr.})$ 

INPUT WAVEFORM IS THE SAME AS THAT IN CASE OF SWITCHING CHARACTERISTICS TEST