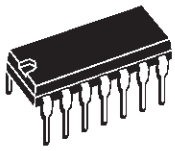
M74HCT132

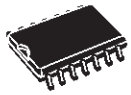
QUAD 2-INPUT SCHMITT NAND GATE

PRELIMINARY DATA

- HIGH SPEED: t_{PD} = 20 ns (TYP.) at V_{CC} = 4.5V
- LOW POWER DISSIPATION: I_{CC} = 1 µA (MAX.) at T_A = 25 °C
- OUTPUT DRIVE CAPABILITY 10 LSTTL LOADS
- HIGH NOISE IMMUNITY V_H (TYP.) = 0.71V AT V_{CC} = 4.5V
- SYMMETRICAL OUTPUT IMPEDANCE: $|I_{OH}| = I_{OL}$ = 4 mA (MIN)
- BALANCED PROPAGATION DELAYS: $t_{PLH} \cong t_{PHL}$
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 132



B1R
(Plastic Package)



M1R
(Micro Package)

ORDER CODES :

M74HCT132B1R M74HCT132M1R

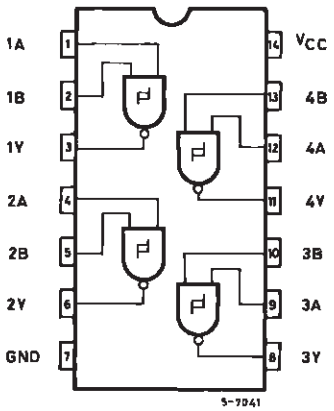
DESCRIPTION

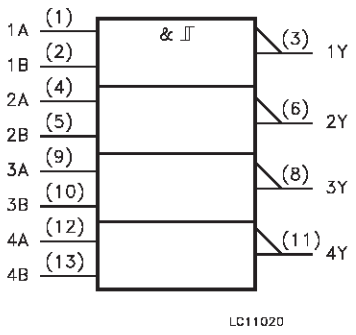
The M74HCT132 is a high speed CMOS QUAD 2-INPUT SCHMITT NAND GATE fabricated in silicon gate C^2MOS tecnology. It has the same high speed performance of LSTTL combined with true COMS low power consumption. Pin configuration and function are identical to those of the M74HCT00.

The hysteresis characteristics (around 15% V_{CC}) of all inputs allow slowly charging input signals to be transformed into sharply defined jitter-free output signals.

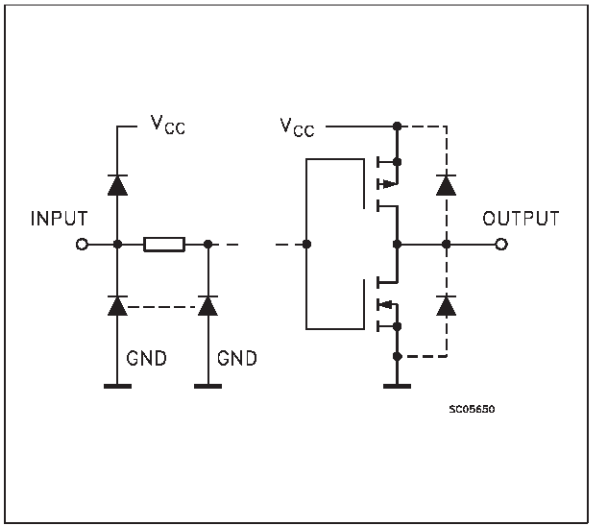
All inputs are equipped with protection circuits against static discharge and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS





INPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1, 4, 9, 12	1A to 4A	Data Inputs
2, 5, 10, 13	1B to 4B	Data Inputs
3, 6, 8, 11	1Y to 4Y	Data Outputs
7	GND	Ground (0V)
14	V_{CC}	Positive Supply Voltage

TRUTH TABLE

A	B	Y
L	L	H
L	H	H
H	L	H
H	H	L

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +7.0	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	± 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
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 condition is not implied.
(*) 500 mW: ≅ 65 °C derate 300 mW by 10 mW/°C: 65 °C to 80 °C

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	4.5 to 5.5	V
V_I	Input Voltage	0 to V_{CC}	V
V_O	Output Voltage	0 to V_{CC}	V
T_{op}	Operating Temperature	-40 to +85	°C

DC SPECIFICATIONS

Symbol	Parameter	Test Conditions			Value					Unit
		V_{CC} (V)			T_A = 25 °C			-40 to 85 °C		
					Min.	Typ.	Max.	Min.	Max.	
V_{t+}	High Level Threshold Voltage	4.5			1.2	1.55	1.9	1.2	1.9	V
		5.5			1.4	1.75	2.1	1.4	2.1	
V_{t-}	Low Level Threshold Voltage	4.5			0.5	0.85	1.2	0.5	1.2	V
		5.5			0.6	1.1	1.4	0.6	1.4	
V_h	Hysteresis Voltage	4.5			0.4	0.7	1.4	0.4	1.4	V
		5.5			0.4	0.7	1.5	0.4	1.5	
V_{OH}	High Level Output Voltage	4.5	V_I(*) = V_{IL} or V_{IH}	I_O=-50 µA	4.4	4.5		4.4		V
		4.5		I_O=-8 mA	4.18	4.31		4.13		
V_{OL}	Low Level Output Voltage	4.5	V_I(*) = V_{IH}	I_O=50 µA		0.0	0.1		0.1	V
		4.5		I_O=8 mA		0.17	0.26		0.33	
I_I	Input Leakage Current	5.5	V_I = 5.5V or GND				±0.1		±1.0	µA
I_{CC}	Quiescent Supply Current	5.5	V_I = V_{CC} or GND				1		10	µA

(*) All outputs loaded.

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

Symbol	Parameter	Test Condition		Value					Unit
		V_{CC} (V)		T_A = 25 °C			-40 to 85 °C		
				Min.	Typ.	Max.	Min.	Max.	
t_{TLH} t_{THL}	Output Transition Time	4.5			7.0	15.0		19.0	ns
t_{PLH} t_{PHL}	Propagation Delay Time	4.5			20.0	33.0		41.0	ns

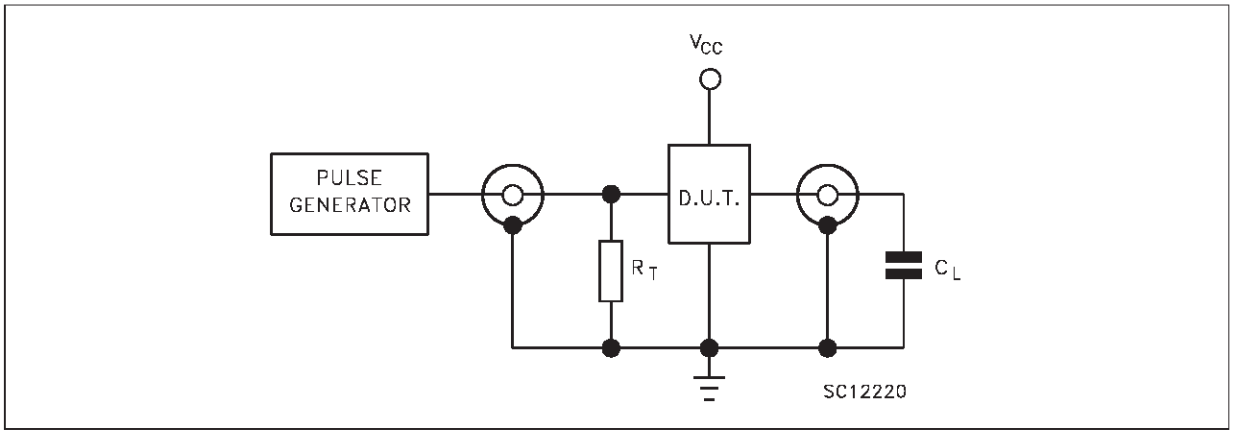
(*) Voltage range is 3.3V ± 0.3V
(**) Voltage range is 5V ± 0.5V

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Conditions	Value					Unit
			T_A = 25 °C			-40 to 85 °C		
			Min.	Typ.	Max.	Min.	Max.	
C_{IN}	Input Capacitance			3.5				pF
C_{PD}	Power Dissipation Capacitance (note 1)			20				pF

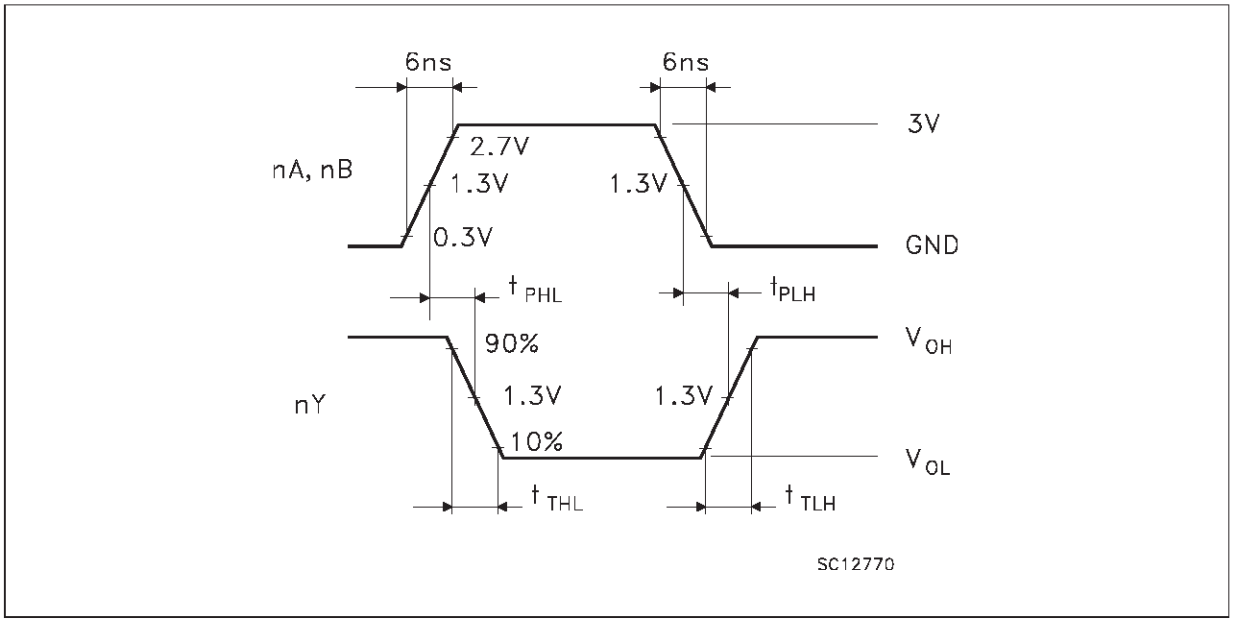
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC}(opr) = C_{PD} \bullet V_{CC} \bullet f_{IN} + I_{CC}/4$ (per Gate)

TEST CIRCUIT



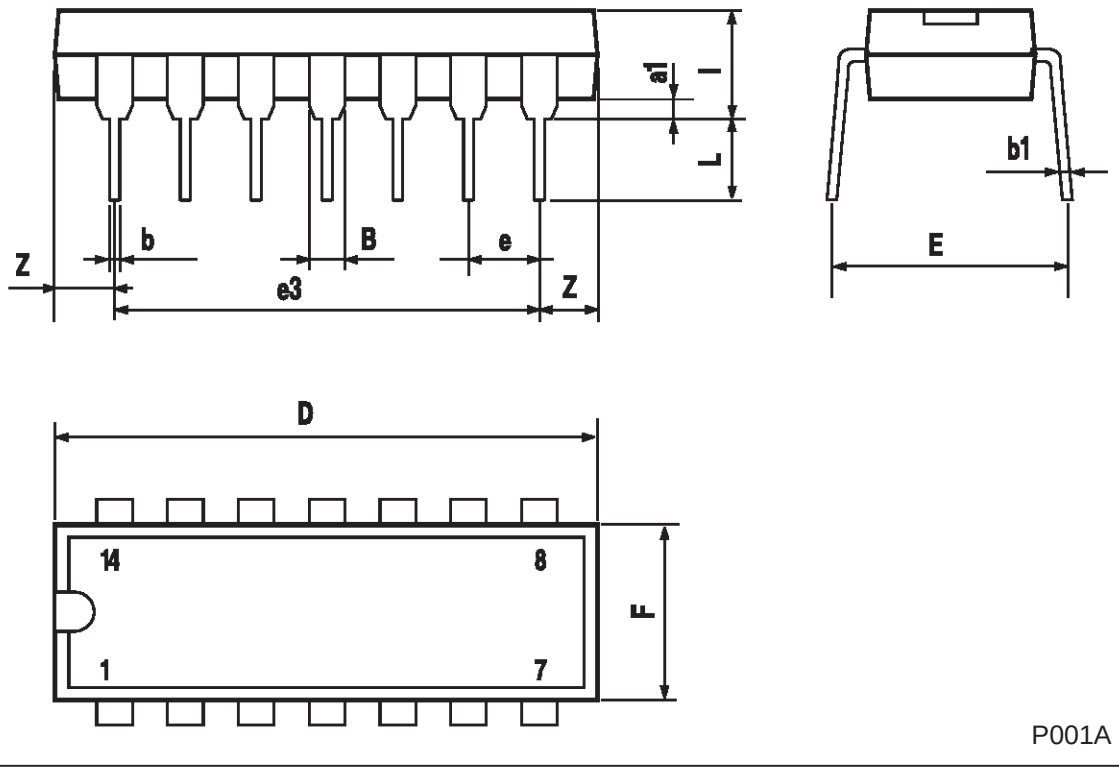
C_L = 15/50 pF or equivalent (includes jig and probe capacitance)
R_T = Z_{OUT} of pulse generator (typically 50Ω)

WAVEFORM: PROPAGATION DELAYS (f=1MHz; 50% duty cycle)



Plastic DIP-14 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
a1	0.51			0.020		
B	1.39		1.65	0.055		0.065
b		0.5			0.020	
b1		0.25			0.010	
D			20			0.787
E		8.5			0.335	
e		2.54			0.100	
e3		15.24			0.600	
F			7.1			0.280
I			5.1			0.201
L		3.3			0.130	
Z	1.27		2.54	0.050		0.100



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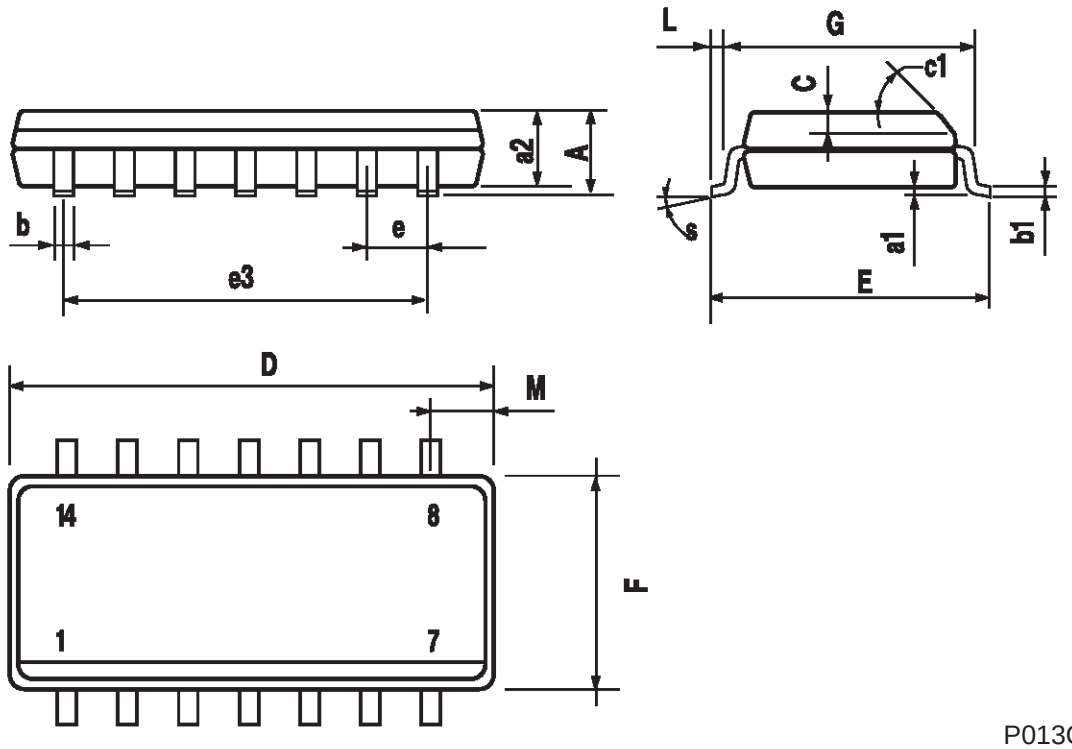
SO-14 MECHANICAL DATA

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.003		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45 (typ.)					
D	8.55		8.75	0.336		0.344
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		7.62			0.300	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.68			0.026
S	8 (max.)					



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