

MM74HC132

Quad 2-Input NAND Schmitt Trigger

General Description

The MM74HC132 utilizes advanced silicon-gate CMOS technology to achieve the low power dissipation and high noise immunity of standard CMOS, as well as the capability to drive 10 LS-TTL loads.

The 74HC logic family is functionally and pinout compatible with the standard 54LS/74LS logic family. All inputs are protected from damage due to static discharge by internal diode clamps to V_{CC} and ground.

Features

- Typical propagation delay: 12 ns
- Wide power supply range: 2V–6V
- Low quiescent current: 20 μ A maximum (74HC Series)
- Low input current: 1 μ A maximum
- Fanout of 10 LS-TTL loads
- Typical hysteresis voltage: 0.9V at $V_{CC}=4.5V$

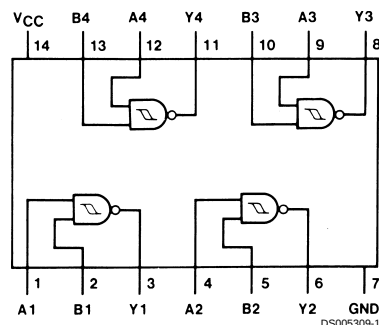
Ordering Code:

Commercial	Package Number	Package Description
MM74HC132N	N14A	14-Lead Molded Dual In-Line (0.300" Wide)
MM74HC132M (Note 1)	M14A	14-Lead Molded Small Outline (0.150" Wide), JEDEC
MM74HC132MTC (Note 1)	MTC14	14-Lead Molded Thin Shrink Small Outline Package, JEDEC

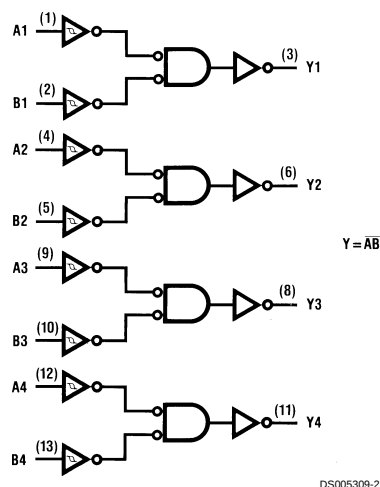
Note 1: Devices also available in 13" Tape and Reel. Use suffix MX and MTCX.

Connection and Logic Diagrams

Pin Assignment for DIP, SOIC, and TSSOP



Top View
Order Number MM74HC132



Absolute Maximum Ratings (Notes 3, 2)

Supply Voltage (V_{CC})	-0.5 to +7.0V
DC Input Voltage (V_{IN})	-1.5 to $V_{CC}+1.5V$
DC Output Voltage (V_{OUT})	-0.5 to $V_{CC}+0.5V$
Clamp Diode Current (I_{IK} , I_{OK})	± 20 mA
DC Output Current, per pin (I_{OUT})	± 25 mA
DC V_{CC} or GND Current, per pin (I_{CC})	± 50 mA
Storage Temperature Range (T_{STG})	-65°C to +150°C
Power Dissipation (P_D)	
(Note 4)	600 mW
S.O. Package only	500 mW

Lead Temperature (T_L)
(Soldering 10 seconds)

260°C

Operating Conditions

	Min	Max	Units
Supply Voltage (V_{CC})	2	6	V
DC Input or Output Voltage (V_{IN} , V_{OUT})	0	V_{CC}	V
Operating Temp. Range (T_A) MM74HC	-40	+125	°C

DC Electrical Characteristics (Note 5)

Symbol	Parameter	Conditions		V _{CC}	T _A =25°C		74HC TA = -40 to 85°C	54HC TA = -40 to 125°C	Units
					Typ	Guaranteed Limits			
V _{T+}	Positive Going Threshold Voltage		Min	2.0V		1.0	1.0	1.0	V
				4.5V		2.0	2.0	2.0	V
				6.0V		3.0	3.0	3.0	V
			Max	2.0V		1.5	1.5	1.5	V
				4.5V		3.15	3.15	3.15	V
				6.0V		4.2	4.2	4.2	V
V _{T-}	Negative Going Threshold Voltage		Min	2.0V		0.3	0.3	0.3	V
				4.5V		0.9	0.9	0.9	V
				6.0V		1.2	1.2	1.2	V
			Max	2.0V		1.0	1.0	1.0	V
				4.5V		2.2	2.2	2.2	V
				6.0V		3.0	3.0	3.0	V
V _H	Hysteresis Voltage		Min	2.0V		0.2	0.2	0.2	V
				4.5V		0.4	0.4	0.4	V
				6.0V		0.5	0.5	0.5	V
			Max	2.0V		1.0	1.0	1.0	V
				4.5V		1.4	1.4	1.4	V
				6.0V		1.5	1.5	1.5	V
V _{OH}	Minimum High Level Output Voltage	V _{IN} =V _{IH} or V _{IL} I _{OUT} ≤20 μA	2.0V	2.0	1.9	1.9	1.9	V	
			4.5V	4.5	4.4	4.4	4.4	V	
			6.0V	6.0	5.9	5.9	5.9	V	
			4.5V	4.2	3.98	3.84	3.7	V	
			6.0V	5.7	5.48	5.34	5.2	V	
V _{OL}	Maximum Low Level Output Voltage	V _{IN} =V _{IH} or V _{IL} I _{OUT} ≤20 μA	2.0V	0	0.1	0.1	0.1	V	
			4.5V	0	0.1	0.1	0.1	V	
			6.0V	0	0.1	0.1	0.1	V	
			4.5V	0.2	0.26	0.33	0.4	V	
			6.0V	0.2	0.26	0.33	0.4	V	
I _{IN}	Maximum Input Current	V _{IN} =V _{CC} or GND	6.0V		±0.1	±1.0	±1.0	μA	
I _{CC}	Maximum Quiescent Supply Current	V _{IN} =V _{CC} or GND I _{OUT} =0 μA	6.0V		2.0	20	40	μA	

Note 2: Absolute Maximum Ratings are those values beyond which damage to the device may occur.

DC Electrical Characteristics (Note 5) (Continued)

Note 3: Unless otherwise specified all voltages are referenced to ground.

Note 4: Power Dissipation temperature derating — plastic "N" package: -12 mW/°C from 65°C to 85°C.

Note 5: For a power supply of 5V ±10% the worst case output voltages (V_{OH} , and V_{OL}) occur for HC at 4.5V. Thus the 4.5V values should be used when designing with this supply. Worst case V_{IH} and V_{IL} occur at V_{CC} =5.5V and 4.5V respectively. (The V_{IH} value at 5.5V is 3.85V.) The worst case leakage current (I_{IN} , I_{CC} , and I_{OZ}) occur for CMOS at the higher voltage and so the 6.0V values should be used.

AC Electrical Characteristics

V_{CC} =5V, T_A =25°C, C_L =15 pF, t_r = t_f =6 ns

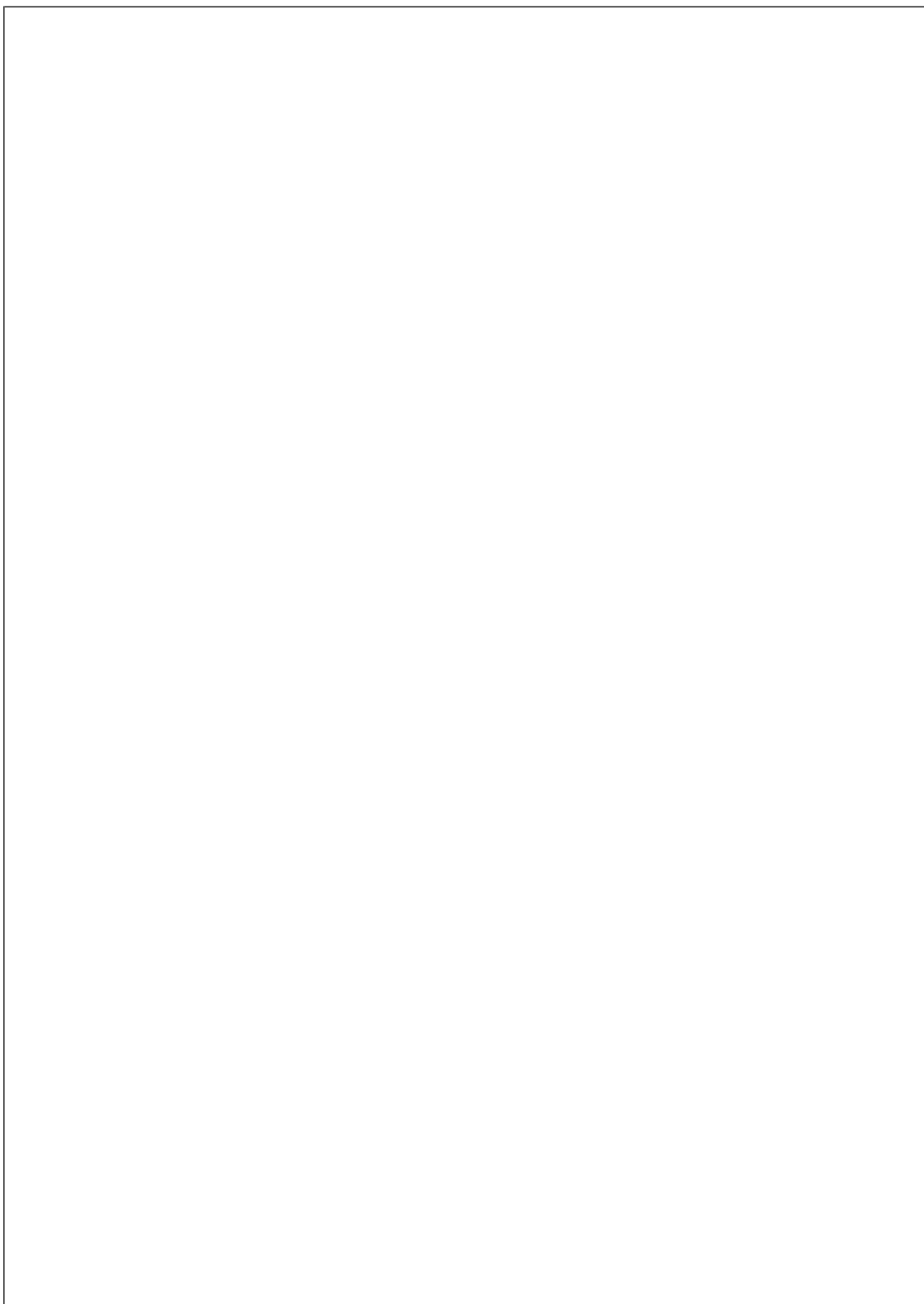
Symbol	Parameter	Conditions	Typ	Guaranteed Limit	Units
t_{PHL} , t_{PLH}	Maximum Propagation Delay		12	20	ns

AC Electrical Characteristics

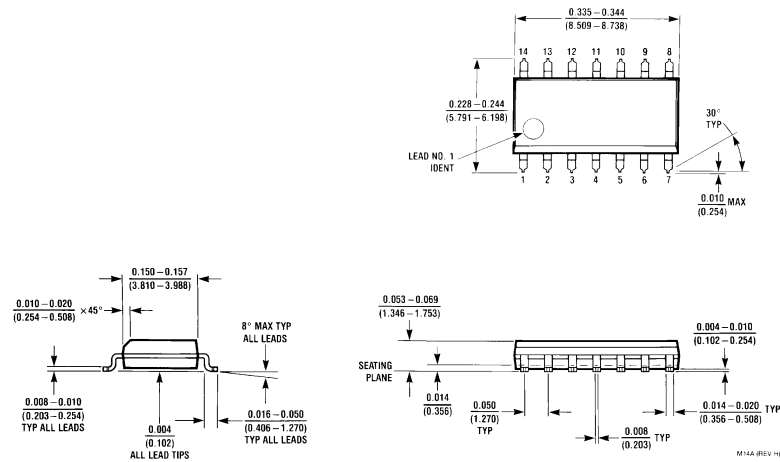
V_{CC} =2.0V to 6.0V, C_L =50 pF, t_r = t_f =6 ns (unless otherwise specified)

Symbol	Parameter	Conditions	V_{CC}	$T_A = 25^\circ\text{C}$		74HC	54HC	Units
						$T_A = -40 \text{ to } 85^\circ\text{C}$	$T_A = -55 \text{ to } 125^\circ\text{C}$	
				Typ	Guaranteed Limits			
t_{PHL} , t_{PLH}	Maximum Propagation Delay		2.0V	63	125	158	186	ns
			4.5V	13	25	32	37	ns
			6.0V	11	21	27	32	ns
t_{TLH} , t_{THL}	Maximum Output Rise and Fall Time		2.0V	30	75	95	110	ns
			4.5V	8	15	19	22	ns
			6.0V	7	13	16	19	ns
C_{PD}	Power Dissipation Capacitance (Note 6)	(per gate)		130				pF
C_{IN}	Maximum Input Capacitance				5	10	10	pF

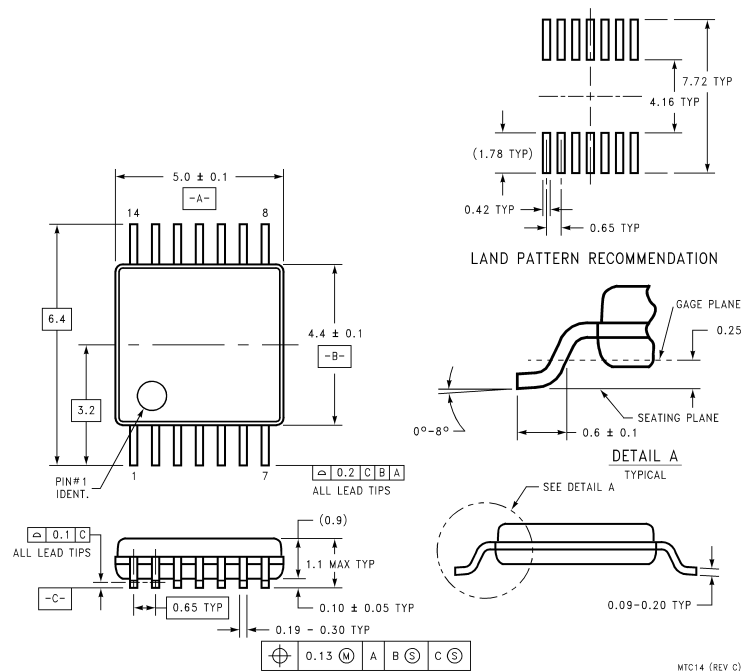
Note 6: C_{PD} determines the no load dynamic power consumption, $P_D = C_{PD} V_{CC}^2 f + I_{CC} V_{CC}$, and the no load dynamic current consumption, $I_S = C_{PD} V_{CC} f + I_{CC}$.



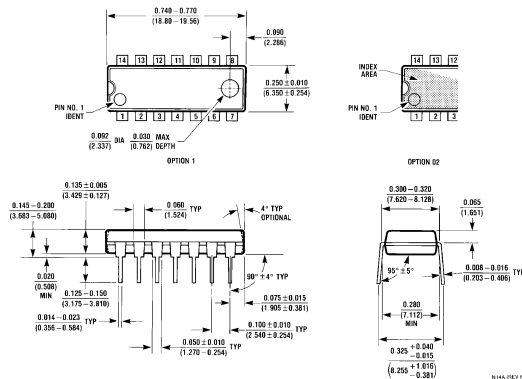
Physical Dimensions inches (millimeters) unless otherwise noted



14-Lead Molded Small Outline Package
Order Number MM74HC132M
Package M14A



14-Lead Molded Thin Shrink Small Outline Package
Order Number MM74HC132MTC
Package MTC14

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)**LIFE SUPPORT POLICY**

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