

# MC74AC132, MC74ACT132

## Quad 2-Input NAND Schmitt Trigger

The MC74AC/74ACT132 contains four 2-input NAND gates which are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. In addition, they have greater noise margin than conventional NAND gates.

Each circuit contains a 2-input Schmitt trigger. The Schmitt trigger uses positive feedback to effectively speed-up slow input transitions, and provide different input threshold voltages for positive and negative-going transitions. This hysteresis between the positive-going and negative-going input threshold is determined by resistor ratios and is essentially insensitive to temperature and supply voltage variations.

### Features

- Schmitt Trigger Inputs
- Outputs Source/Sink 24 mA
- 'ACT132 Has TTL Compatible Inputs
- Pb-Free Packages are Available

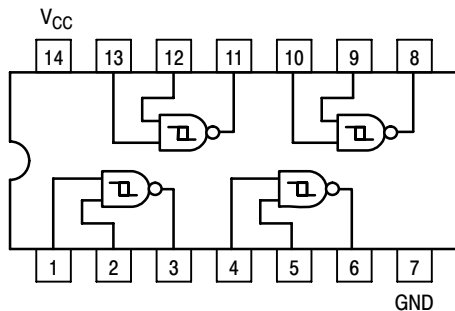


Figure 1. Pinout; 14-Lead Packages Conductors (Top View)

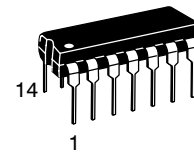
### FUNCTION TABLE

Inputs		Output
A	B	$\bar{Y}$
L	L	H
L	H	H
H	L	H
H	H	L

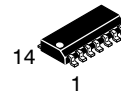
H = HIGH Voltage Level    L = LOW Voltage Level



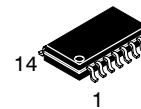
ON Semiconductor®



PDIP-14  
N SUFFIX  
CASE 646



SOIC-14  
D SUFFIX  
CASE 751A



SOEIAJ-14  
M SUFFIX  
CASE 965

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 5 of this data sheet.

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## RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Min	Typ	Max	Unit	
V <sub>CC</sub>	Supply Voltage	'AC	2.0	5.0	6.0	V
		'ACT	4.5	5.0	5.5	
V <sub>in</sub> , V <sub>out</sub>	DC Input Voltage, Output Voltage (Ref. to GND)	0	–	V <sub>CC</sub>	V	
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time (Note 1) 'AC Devices except Schmitt Inputs	V <sub>CC</sub> @ 3.0 V	–	150	–	ns/V
		V <sub>CC</sub> @ 4.5 V	–	40	–	
		V <sub>CC</sub> @ 5.5 V	–	25	–	
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time (Note 2) 'ACT Devices except Schmitt Inputs	V <sub>CC</sub> @ 4.5 V	–	10	–	ns/V
		V <sub>CC</sub> @ 5.5 V	–	8.0	–	
T <sub>J</sub>	Junction Temperature (PDIP)	–	–	140	°C	
T <sub>A</sub>	Operating Ambient Temperature Range	–40	25	85	°C	
I <sub>OH</sub>	Output Current – High	–	–	–24	mA	
I <sub>OL</sub>	Output Current – Low	–	–	24	mA	

1. V<sub>in</sub> from 30% to 70% V<sub>CC</sub>; see individual Data Sheets for devices that differ from the typical input rise and fall times.
2. V<sub>in</sub> from 0.8 V to 2.0 V; see individual Data Sheets for devices that differ from the typical input rise and fall times.

## DC CHARACTERISTICS

Symbol	Parameter	V <sub>CC</sub> (V)	74AC		74ACT		Unit	Conditions
			T <sub>A</sub> = +25°C		T <sub>A</sub> = –40°C to +85°C			
			Typ	Guaranteed Limits	Typ	Guaranteed Limits		
V <sub>OH</sub>	Minimum High Level Output Voltage	3.0	2.99	2.9	2.9	V	I <sub>OUT</sub> = –50 μA	
		4.5	4.49	4.4	4.4			
		5.5	5.49	5.4	5.4			
		3.0	–	2.56	2.46	V	*V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> –12 mA I <sub>OH</sub> –24 mA –24 mA	
		4.5	–	3.86	3.76			
		5.5	–	4.86	4.76			
V <sub>OL</sub>	Maximum Low Level Output Voltage	3.0	0.002	0.1	0.1	V	I <sub>OUT</sub> = 50 μA	
		4.5	0.001	0.1	0.1			
		5.5	0.001	0.1	0.1			
		3.0	–	0.36	0.44	V	*V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> 12 mA I <sub>OL</sub> 24 mA 24 mA	
		4.5	–	0.36	0.44			
		5.5	–	0.36	0.44			
I <sub>IN</sub>	Maximum Input Leakage Current	5.5	–	±0.1	±1.0	μA	V <sub>I</sub> = V <sub>CC</sub> , GND	
I <sub>OLD</sub>	†Minimum Dynamic Output Current	5.5	–	–	75	mA	V <sub>OLD</sub> = 1.65 V Max	
I <sub>OHD</sub>		5.5	–	–	–75	mA	V <sub>OHD</sub> = 3.85 V Min	
I <sub>CC</sub>	Maximum Quiescent Supply Current	5.5	–	4.0	40	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND	

\*All outputs loaded; thresholds on input associated with output under test.

†Maximum test duration 2.0 ms, one output loaded at a time.

NOTE: I<sub>IN</sub> and I<sub>CC</sub> @ 3.0 V are guaranteed to be less than or equal to the respective limit @ 5.5 V V<sub>CC</sub>.

# MC74AC132, MC74ACT132

## AC CHARACTERISTICS (For Figures and Waveforms – See Section 3 of the ON Semiconductor FACT Data Book, DL138/D)

Symbol	Parameter	V <sub>CC</sub> * (V)	74AC			74AC		Unit	Fig. No.
			T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF			T <sub>A</sub> = -40°C to +85°C C <sub>L</sub> = 50 pF			
			Min	Typ	Max	Min	Max		
t <sub>PLH</sub>	Propagation Delay	3.3 5.0	2.0 2.0	– –	13.0 9.0	1.5 1.5	14.0 10.0	ns	3–5
t <sub>PHL</sub>	Propagation Delay	3.3 5.0	2.0 2.0	– –	13.5 9.0	1.5 1.5	15.0 10.0	ns	3–5

\*Voltage Range 3.3 V is 3.3 V ±0.3 V.  
Voltage Range 5.0 V is 5.0 V ±0.5 V.

## DC CHARACTERISTICS

Symbol	Parameter	V <sub>CC</sub> (V)	74ACT		74ACT		Unit	Conditions
			T <sub>A</sub> = +25°C		T <sub>A</sub> = -40°C to +85°C			
			Typ	Guaranteed Limits				
V <sub>OH</sub>	Minimum High Level Output Voltage	4.5	4.49	4.4	4.4	V	I <sub>OUT</sub> = -50 μA	
		5.5	5.49	5.4	5.4			
V <sub>OL</sub>	Maximum Low Level Output Voltage	4.5	–	3.86	3.76	V	*V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> -24 mA I <sub>OH</sub> -24 mA	
		5.5	–	4.86	4.76			
V <sub>OL</sub>	Maximum Low Level Output Voltage	4.5	0.001	0.1	0.1	V	I <sub>OUT</sub> = 50 μA	
		5.5	0.001	0.1	0.1			
V <sub>OL</sub>	Maximum Low Level Output Voltage	4.5	–	0.36	0.44	V	*V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> 24 mA I <sub>OL</sub> 24 mA	
		5.5	–	0.36	0.44			
I <sub>IN</sub>	Maximum Input Leakage Current	5.5	–	±0.1	±1.0	μA	V <sub>I</sub> = V <sub>CC</sub> , GND	
ΔI <sub>CC</sub> T	Additional Max. I <sub>CC</sub> /Input	5.5	0.6	–	1.5	mA	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V	
I <sub>OLD</sub>	†Minimum Dynamic Output Current	5.5	–	–	75	mA	V <sub>OLD</sub> = 1.65 V Max	
I <sub>OHD</sub>		5.5	–	–	-75	mA	V <sub>OHD</sub> = 3.85 V Min	
I <sub>CC</sub>	Maximum Quiescent Supply Current	5.5	–	4.0	40	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND	

\*All outputs loaded; thresholds on input associated with output under test.  
†Maximum test duration 2.0 ms, one output loaded at a time.

## AC CHARACTERISTICS (For Figures and Waveforms – See Section 3 of the ON Semiconductor FACT Data Book, DL138/D)

Symbol	Parameter	V <sub>CC</sub> * (V)	74ACT			74ACT		Unit	Fig. No.
			T <sub>A</sub> = +25°C C <sub>L</sub> = 50 pF			T <sub>A</sub> = -40°C to +85°C C <sub>L</sub> = 50 pF			
			Min	Typ	Max	Min	Max		
t <sub>PLH</sub>	Propagation Delay	5.0	3.0	–	11.5	2.5	13.0	ns	3–6
t <sub>PHL</sub>	Propagation Delay	5.0	3.0	–	11.0	2.5	12.5	ns	3–5

\*Voltage Range 5.0 V is 5.0 V ±0.5 V.

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### INPUT CHARACTERISTICS (unless otherwise specified)

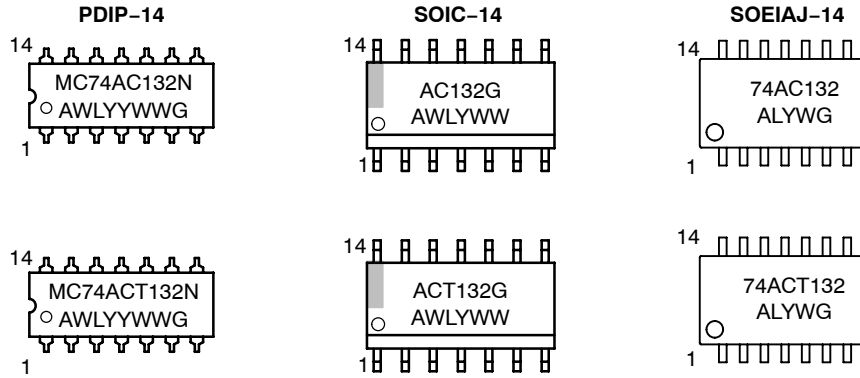
Symbol	Parameter	V <sub>CC</sub> (V)	74AC	74ACT	Unit	Test Conditions
V <sub>t+</sub>	Maximum Positive Threshold	3.0	2.2	2.0	V	T <sub>A</sub> = Worst Case
		4.5	3.2			
		5.5	3.9			
V <sub>t-</sub>	Minimum Negative Threshold	3.0	0.5	0.8	V	T <sub>A</sub> = Worst Case
		4.5	0.9			
		5.5	1.1			
V <sub>h(max)</sub>	Maximum Hysteresis	3.0	1.2	1.2	V	T <sub>A</sub> = Worst Case
		4.5	1.4			
		5.5	1.6			
V <sub>h(min)</sub>	Minimum Hysteresis	3.0	0.3	0.4	V	T <sub>A</sub> = Worst Case
		4.5	0.4			
		5.5	0.5			

### CAPACITANCE

Symbol	Parameter	Value Typ	Unit	Test Conditions
C <sub>IN</sub>	Input Capacitance	4.5	pF	V <sub>CC</sub> = 5.0 V
C <sub>PD</sub>	Power Dissipation Capacitance	30	pF	V <sub>CC</sub> = 5.0 V

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## MARKING DIAGRAMS



A = Assembly Location  
 WL, L = Wafer Lot  
 YY, Y = Year  
 WW, W = Work Week  
 G = Pb-Free Package

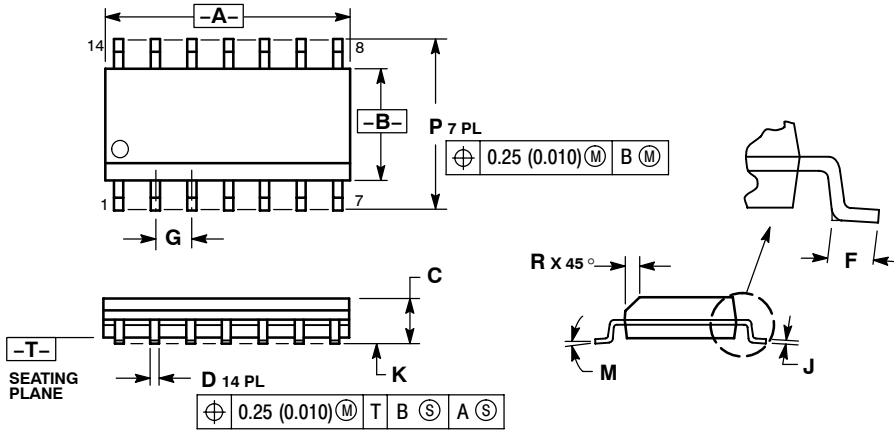
## ORDERING INFORMATION

Device	Package	Shipping <sup>†</sup>
MC74AC132N	PDIP-14	25 Units/Rail
MC74AC132NG	PDIP-14 (Pb-Free)	
MC74ACT132N	PDIP-14	
MC74ACT132NG	PDIP-14 (Pb-Free)	
MC74AC132D	SOIC-14	55 Units/Rail
MC74AC132DG	SOIC-14 (Pb-Free)	
MC74AC132DR2	SOIC-14	
MC74AC132DR2G	SOIC-14 (Pb-Free)	2500/Tape & Reel
MC74ACT132D	SOIC-14	55 Units/Rail
MC74ACT132DG	SOIC-14 (Pb-Free)	
MC74ACT132DR2	SOIC-14	
MC74ACT132DR2G	SOIC-14 (Pb-Free)	2500/Tape & Reel
MC74AC132MEL	SOEIAJ-14	2000/Tape & Reel
MC74AC132MELG	SOEIAJ-14 (Pb-Free)	
MC74ACT132MEL	SOEIAJ-14	
MC74ACT132MELG	SOEIAJ-14 (Pb-Free)	

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## PACKAGE DIMENSIONS

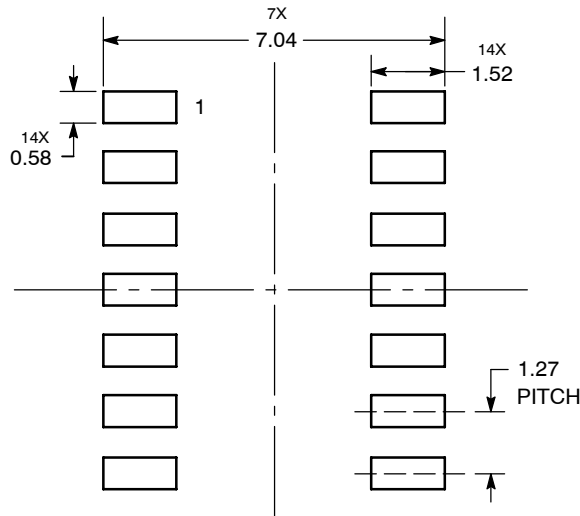
SOIC-14  
CASE 751A-03  
ISSUE H



- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
  2. CONTROLLING DIMENSION: MILLIMETER.
  3. DIMENSIONS A AND B DO NOT INCLUDE MOLD PROTRUSION.
  4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
  5. DIMENSION D DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 (0.005) TOTAL IN EXCESS OF THE D DIMENSION AT MAXIMUM MATERIAL CONDITION.

MILLIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX
A	8.55	8.75	0.337	0.344
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.228	0.244
R	0.25	0.50	0.010	0.019

### SOLDERING FOOTPRINT\*



DIMENSIONS: MILLIMETERS

\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.