

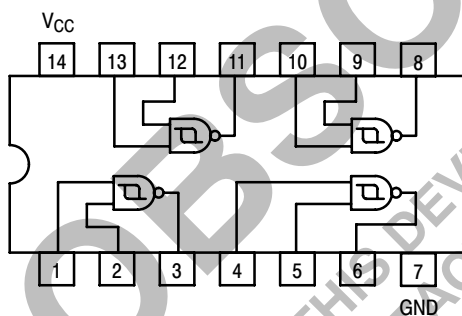
# SN74LS132

## Quad 2-Input Schmitt Trigger NAND Gate

The SN74LS132 contains four 2-Input NAND Gates which accept standard TTL input signals and provide standard TTL output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. Additionally, they have greater noise margin than conventional NAND Gates.

Each circuit contains a 2-input Schmitt trigger followed by a Darlington level shifter and a phase splitter driving a TTL totem pole output. 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 thresholds (typically 800 mV) is determined internally by resistor ratios and is essentially insensitive to temperature and supply voltage variations. As long as one input remains at a more positive voltage than  $V_{T+}$  (MAX), the gate will respond to the transitions of the other input as shown in Figure 1.

**LOGIC AND CONNECTION DIAGRAM  
DIP (TOP VIEW)**



### GUARANTEED OPERATING RANGES

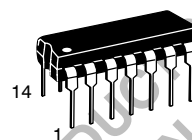
Symbol	Parameter	Min	Typ	Max	Unit
$V_{CC}$	Supply Voltage	4.75	5.0	5.25	V
$T_A$	Operating Ambient Temperature Range	0	25	70	°C
$I_{OH}$	Output Current - High			-0.4	mA
$I_{OL}$	Output Current - Low			8.0	mA



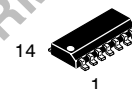
**ON Semiconductor™**

<http://onsemi.com>

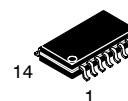
**LOW  
POWER  
SCHOTTKY**



**PLASTIC  
N SUFFIX  
CASE 646**



**SOIC  
D SUFFIX  
CASE 751A**



**SOEIAJ  
M SUFFIX  
CASE 965**

### ORDERING INFORMATION

Device	Package	Shipping
SN74LS132N	14 Pin DIP	2000 Units/Box
SN74LS132D	SOIC-14	55 Units/Rail
SN74LS132DR2	SOIC-14	2500/Tape & Reel
SN74LS132M	SOEIAJ-14	See Note 1
SN74LS132MEL	SOEIAJ-14	See Note 1

1. For ordering information on the EIAJ version of the SOIC package, please contact your local ON Semiconductor representative.

# SN74LS132

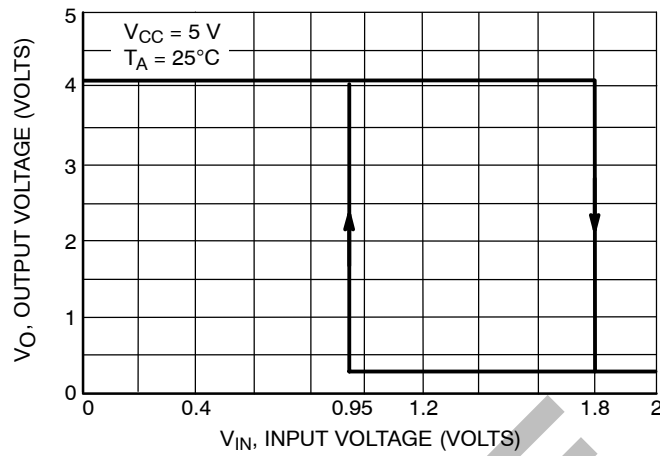


Figure 1.  $V_{IN}$  versus  $V_{OUT}$  Transfer Function

## DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter	Limits			Unit	Test Conditions
		Min	Typ	Max		
$V_{T+}$	Positive-Going Threshold Voltage	1.5		2.0	V	$V_{CC} = 5.0\text{ V}$
$V_{T-}$	Negative-Going Threshold Voltage	0.6		1.1	V	$V_{CC} = 5.0\text{ V}$
$V_{T+} - V_{T-}$	Hysteresis	0.4	0.8		V	$V_{CC} = 5.0\text{ V}$
$V_{IK}$	Input Clamp Diode Voltage		-0.65	-1.5	V	$V_{CC} = \text{MIN}, I_{IN} = -18\text{ mA}$
$V_{OH}$	Output HIGH Voltage	2.7	3.4		V	$V_{CC} = \text{MIN}, I_{OH} = -400\text{ }\mu\text{A}, V_{IN} = V_{IL}$
$V_{OL}$	Output LOW Voltage		0.25	0.4	V	$V_{CC} = \text{MIN}, I_{OL} = 4.0\text{ mA}, V_{IN} = 2.0\text{ V}$
			0.35	0.5	V	$V_{CC} = \text{MIN}, I_{OL} = 8.0\text{ mA}, V_{IN} = 2.0\text{ V}$
$I_{T+}$	Input Current at Positive-Going Threshold		-0.14		mA	$V_{CC} = 5.0\text{ V}, V_{IN} = V_{T+}$
$I_{T-}$	Input Current at Negative-Going Threshold		-0.18		mA	$V_{CC} = 5.0\text{ V}, V_{IN} = V_{T-}$
$I_{IH}$	Input HIGH Current			20	$\mu\text{A}$	$V_{CC} = \text{MAX}, V_{IN} = 2.7\text{ V}$
				0.1	mA	$V_{CC} = \text{MAX}, V_{IN} = 7.0\text{ V}$
$I_{IL}$	Input LOW Current			-0.4	mA	$V_{CC} = \text{MAX}, V_{IN} = 0.4\text{ V}$
$I_{OS}$	Output Short Circuit Current (Note 2)	-20		-100	mA	$V_{CC} = \text{MAX}, V_{OUT} = 0\text{ V}$
$I_{CC}$	Power Supply Current Total, Output HIGH		5.9	11	mA	$V_{CC} = \text{MAX}, V_{IN} = 0\text{ V}$
	Total, Output LOW		8.2	14	mA	$V_{CC} = \text{MAX}, V_{IN} = 4.5\text{ V}$

2. Not more than one output should be shorted at a time, nor for more than 1 second.

## AC CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )

Symbol	Parameter	Limits			Unit	Test Conditions
		Min	Typ	Max		
$t_{PLH}$	Turn-Off Delay, Input to Output			22	ns	$V_{CC} = 5.0\text{ V}$ $C_L = 15\text{ pF}$
$t_{PHL}$	Turn-On Delay, Input to Output			22	ns	

# SN74LS132

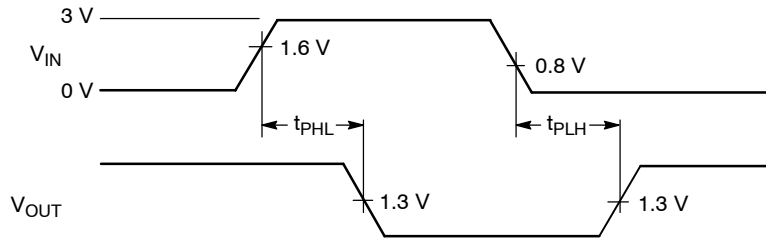


Figure 2. AC Waveforms

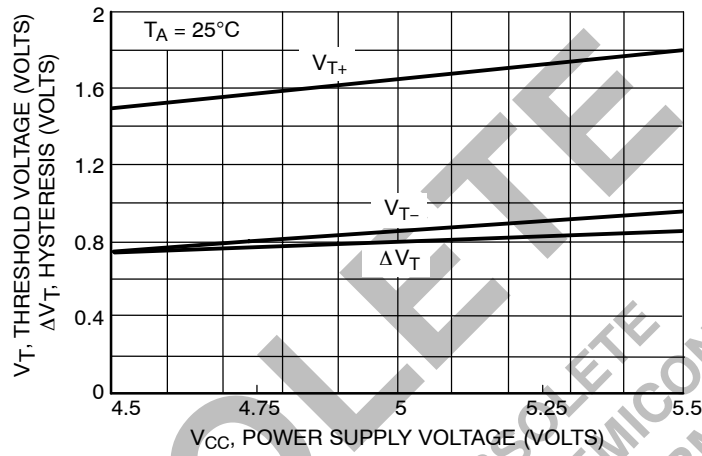


Figure 3. Threshold Voltage and Hysteresis versus Power Supply Voltage

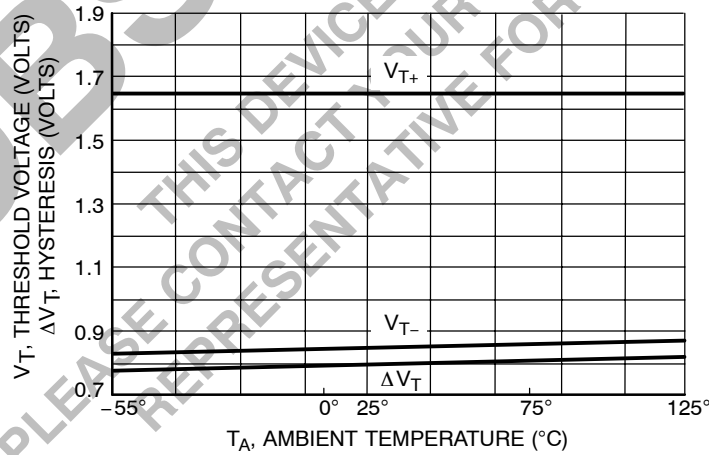
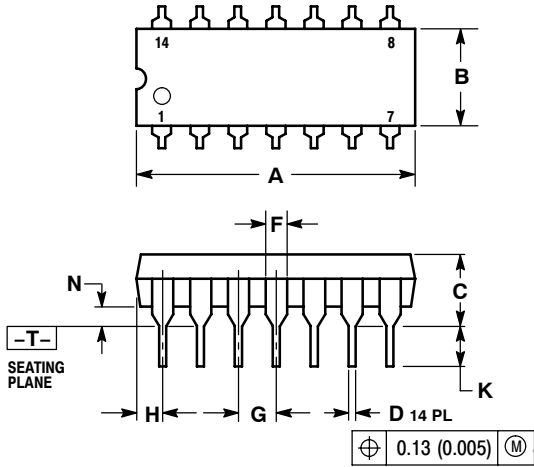


Figure 4. Threshold Voltage and Hysteresis versus Temperature

# SN74LS132

## PACKAGE DIMENSIONS

**N SUFFIX**  
**PLASTIC PACKAGE**  
 CASE 646-06  
 ISSUE M



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.715	0.770	18.16	18.80
B	0.240	0.260	6.10	6.60
C	0.145	0.185	3.69	4.69
D	0.015	0.021	0.38	0.53
F	0.040	0.070	1.02	1.78
G	0.100 BSC		2.54 BSC	
H	0.052	0.095	1.32	2.41
J	0.008	0.015	0.20	0.38
K	0.115	0.135	2.92	3.43
L	0.290	0.310	7.37	7.87
M	---	10°	---	10°
N	0.015	0.039	0.38	1.01

OBSOLETE

THIS DEVICE IS OBSOLETE

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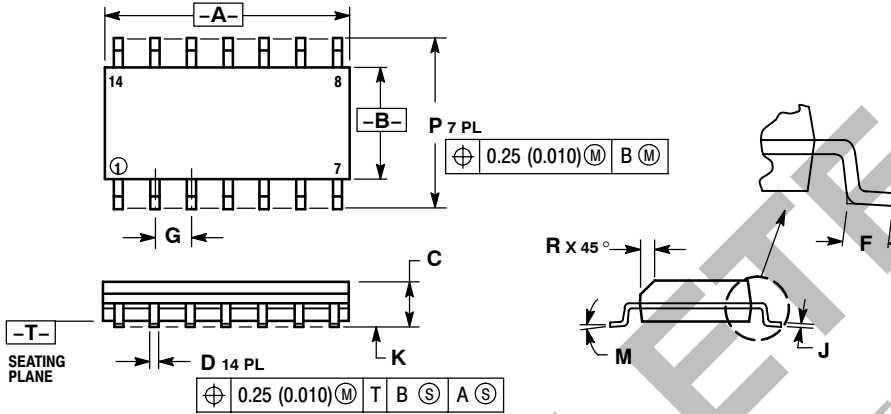
# SN74LS132

## PACKAGE DIMENSIONS

**D SUFFIX**  
**PLASTIC SOIC PACKAGE**  
 CASE 751A-03  
 ISSUE F

**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.



DIM	MILLIMETERS		INCHES	
	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

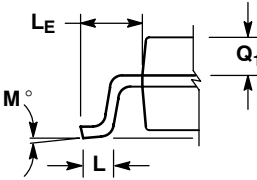
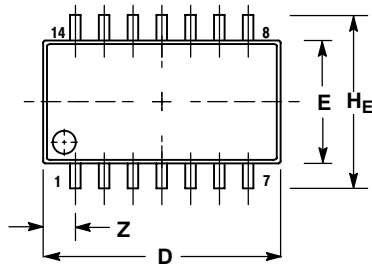
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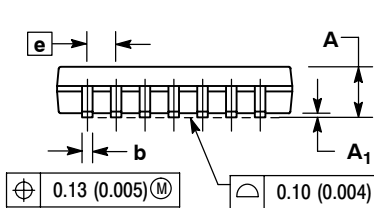
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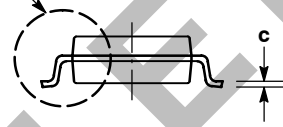
**M SUFFIX**  
**SOEIAJ PACKAGE**  
**CASE 965-01**  
**ISSUE O**



DETAIL P



VIEW P



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	---	2.05	---	0.081
A <sub>1</sub>	0.05	0.20	0.002	0.008
b	0.35	0.50	0.014	0.020
c	0.18	0.27	0.007	0.011
D	9.90	10.50	0.390	0.413
E	5.10	5.45	0.201	0.215
e	1.27 BSC		0.050 BSC	
H <sub>E</sub>	7.40	8.20	0.291	0.323
0.50	0.50	0.85	0.020	0.033
L <sub>E</sub>	1.10	1.50	0.043	0.059
M	0°	10°	0°	10°
Q <sub>1</sub>	0.70	0.90	0.028	0.035
Z	---	1.42	---	0.056

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