

Hex Inverters With Schmitt Trigger Inputs

Features

- Wide Supply Voltage Range from 2.0V to 5.5 V
- Outputs Sink or Source 8mA at VCC = 4.5V
- CMOS Low Power Consumption
- Schmitt Trigger Action at All Inputs
- Typical hysteresis of 1V allows for transformation of slow changing input signals to sharply defined, fast transition output signals.
- Inputs can be driven by 3.3V or 5.5V allowing for voltage translation applications.
- ESD Protection Exceeds JESD 22
200-V Machine Model (A115-A)
2000-V Human Body Model (A114-A)
Exceeds 1000-V Charged Device Model (C101C)
- Latch-Up Exceeds 250mA per JESD 78, Class II
- Package available in SOIC-14 and TSSOP-14

General Description

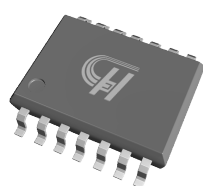
The HCR74AHC14 provides provides six independent Schmitt trigger input inverters with standard push-pull outputs. The device is designed for operation with a power supply range of 2.0V to 5.5V. The inputs are tolerant to 5.5V allowing this device to be used in a mixed voltage environment.

The gates perform the Boolean function:

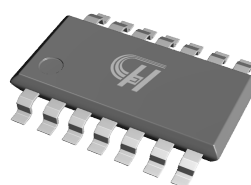
$$Y = \overline{A}$$

Applications

- General Purpose Logic
- Wide array of products such as:
 - PCs, Networking, Notebooks, Netbooks
 - Computer Peripherals, Hard Drives, DVD ROM
 - TV, DVD, DVR, Set Top Box



TSSOP-14



SOIC-14

Figure 1. Package Type of HCR74AHC14

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Pin Configuration

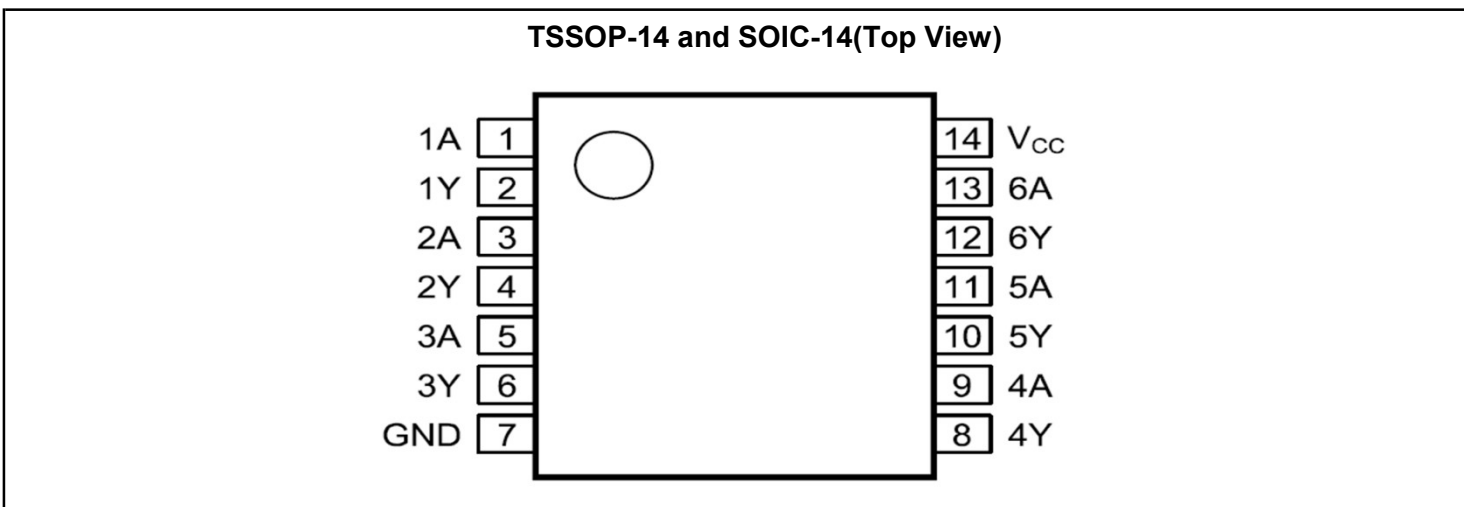


Figure 2. Pin Configuration of HCR74AHC14 (Top View)

Pin Function Table

Pin	NAME	FUNCTION
TSSOP-14 SOIC-8		
1	1A	Data Input
2	1Y	Data Output
3	2A	Data Input
4	2Y	Data Output
5	3A	Data Input
6	3Y	Data Output
7	GND	Ground (0V).
8	4Y	Data Output
9	4A	Data Input
10	5Y	Data Output
11	5A	Data Input
12	6Y	Data Output
13	6A	Data Input
14	Vcc	Supply voltage

Hex Inverters With Schmitt Trigger Inputs

Logic Diagram

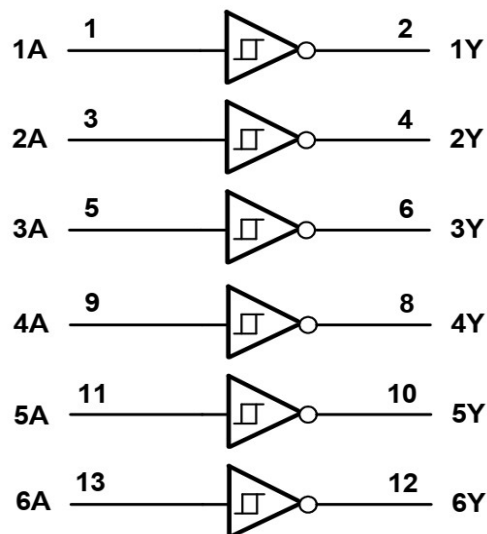


Figure 3. Logic Diagram

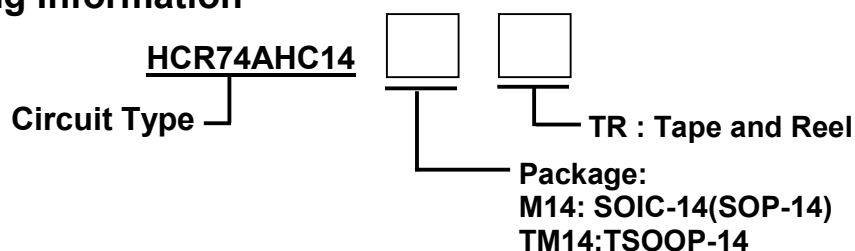
Functional Table

Input	Output
A	Y
L	H
H	L

Note: H=HIGH Voltage Level;

L=LOW Voltage Level.

Ordering Information



Ordering Code

Part Number	Marking ^{note1}	Temperature Range	Package	Quantity per Reel
HCR74AHC14M14TR	HCR74AHC14xx	-40'C to +85'C	SOIC-14 (SOP-14)	4000pcs,tape & Reel
HCR74AHC14TM14TR	HCR74AHC14xx	-40'C to +85'C	TSSOP-14	4000pcs,tape & Reel

note 1. the "xx" is date code.

Hex Inverters With Schmitt Trigger Inputs

ELECTRICAL PARAMETER

Absolute Maximum Ratings

(Voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Test Condition	Min	Type	Max	Unit
Supply Voltage Range	V _{CC}	-	-0.5	-	+7.0	V
Input Voltage Range	V _I	-	-0.5	-	+7.0	V
Input Clamping Current	I _{IK}	V _I < -0.5V	-	-	-20	mA
Output Clamping Current	I _{OK}	V _O < -0.5V	-	-	-20	mA
Continuous Output Current	I _O	-0.5V < V _O < V _{CC} +0.5V	-	-	±25	mA
Continuous Current through VCC	I _{CC}	-	-	-	+75	mA
Continuous Current through GND	I _{GND}	-	-75	-	-	mA
Total Power Dissipation	P _{tot}	T _{amb} = -40 to +125°C	-	-	500	mW
Operating Junction temperature	T _J		-40	-	+150	°C
Storage temperature	T _{STG}		-65	-	+150	°C
Soldering Temperature	T _L	10S	-	-	260	°C
Human Body Model ESD Protection	HBM	-	-	-	2	KV
Charged Device Model ESD Protection	CDM	-	-	-	1	KV
Machine Model ESD Protection	MM		-	-	200	V

Note 4: For SOP-14 packages: above 70°C derate linearly with 8mW/K.

For TSSOP-14 packages: above 60°C derate linearly with 5.5mW/K.

Recommended Operating Conditions(note 5)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	UNIT
Supply Voltage	V _{CC}		2.0	-	5.5	V
Input Voltage	V _I		0	-	5.5	V
Output Voltage	V _O		0	-	V _{CC}	V
Operating Free-Air Temperature	T _A		-40	-	+125	°C

Note 5, Unused inputs should be held at VCC or Ground.

Hex Inverters With Schmitt Trigger Inputs

ELECTRICAL CHARACTERISTICS

(Tamb= +25°C, Voltages are referenced to GND(ground=0V), unless otherwise specified.)

Parameter	Symbol	Test Condition		-40°C to 85°C		-40°C to 125°C		Unit
		Other	Vcc(V)	Min	Max	Min	Max	Unit
Positive-Going Input Threshold Voltage	VT+		3.0	-	2.2	-	2.2	V
			4.5	-	3.15	-	3.15	
			5.5	-	3.85	-	3.85	
Negative-Going Input Threshold Voltage	VT-		3.0	0.9	-	0.9	-	V
			4.5	1.35	-	1.35	-	
			5.5	1.65	-	1.65	-	
Hysteresis (VT+ - VT-)	ΔVT		3.0	0.3	1.2	0.25	1.2	V
			4.5	0.4	1.4	0.35	1.4	
			5.5	0.5	1.6	0.45	1.6	
High Level Output Voltage	VOH	IOH= -50uA	2.0	1.9	-	1.9	-	V
		IOH= -50uA	3.0	2.9	-	2.9	-	
		IOH= -50uA	4.5	4.4	-	4.4	-	
		IOH= -4mA	3.0	2.48	-	2.40	-	
		IOH= -8mA	4.5	3.80	-	3.70	-	
Low-Level Output Voltage	VOL	IOH= 50uA	2.0	-	0.1	-	0.1	V
		IOH= 50uA	3.0	-	0.1	-	0.1	
		IOH= 50uA	4.5	-	0.1	-	0.1	
		IOH= 4mA	3.0	-	0.44	-	0.55	
		IOH= 8mA	4.5	-	0.44	-	0.55	
Input Current	II	VI=Vcc to 5.5V	3.6	-	±1.0		±2.0	uA
Supply Current	ICC	VI=Vcc or GND; Io=0	3.6	-	20		40	uA

Hex Inverters With Schmitt Trigger Inputs

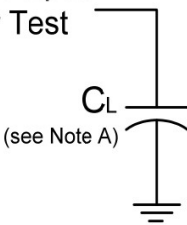
Operating Characteristics

Parameter	Symbol	Test Condition	VCC=2.0V	VCC=3.3V	VCC=5V	Unit
			Typ.	Typ.	Typ.	
Power Dissipation Capacitance per Gate	C _{pd}	f=1MHz	10.4	12.3	13	pF
Input Capacitance	C _i	V _i =V _{cc} -or GND	4.0	4.0	4.0	pF

Switching Characteristics

Parameter	Symbol	Test Condition	VCC	TA=25°C			-40°C to +85°C		-40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
Propagation Delay A _n to Y _n	t _{PD}	Figure 4 CL=15pF	3.0V to 3.6V	0.5	4.3	12.8	0.5	15.0	0.5	16.0	ns
			4.5V to 5.5V	0.5	3.2	8.6	0.5	10.0	0.5	11.0	
		Figure 4 CL=50pF	3.0V to 3.6V	0.5	5.8	16.3	0.5	18.0	0.5	20.5	
			4.5V to 5.5V	0.5	4.2	10.6	0.5	12.0	0.5	13.5	

Parameter Measurement Information

From Output Under Test  C_L (see Note A)				
VCC	Inputs		V _M	C _L
	V _I	t _r /t _f		
3.3V ~ 3.6V	VCC	3ns	VCC/2	15pF, 50pF
4.5V ~ 5.5V	VCC	3ns	VCC/2	15pF, 50pF

Hex Inverters With Schmitt Trigger Inputs

Parameter Measurement Information(con.)

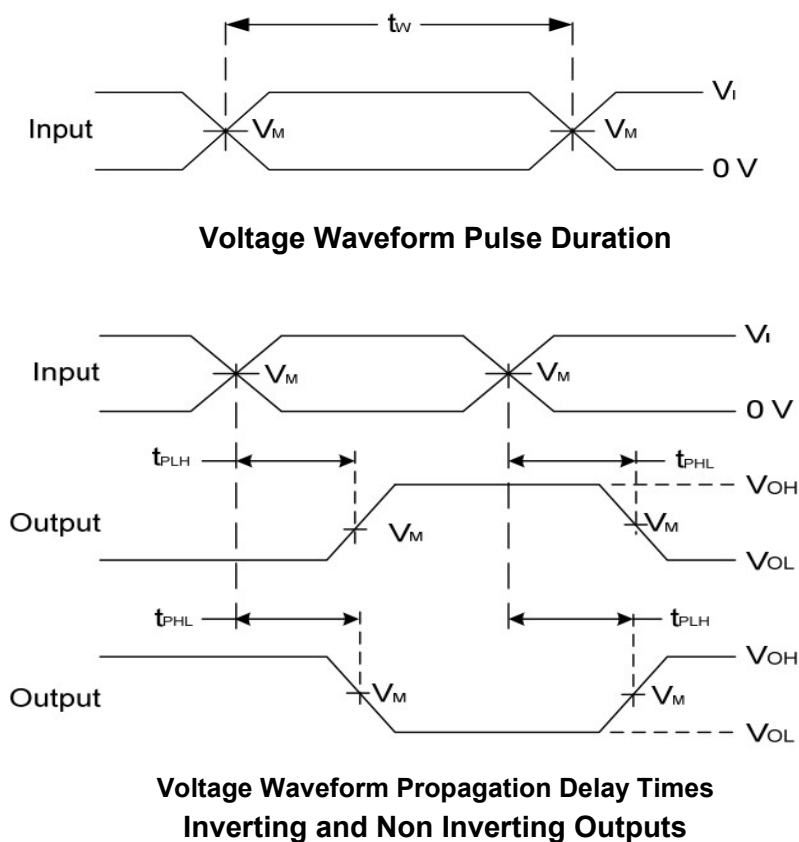


Figure 4 Load Circuit and Voltage Waveforms

Note A. Includes test lead and test apparatus capacitance.

B. All pulses are supplied at pulse repetition rate ≤ 1 MHz.

C. Inputs are measured separately one transition per measurement.

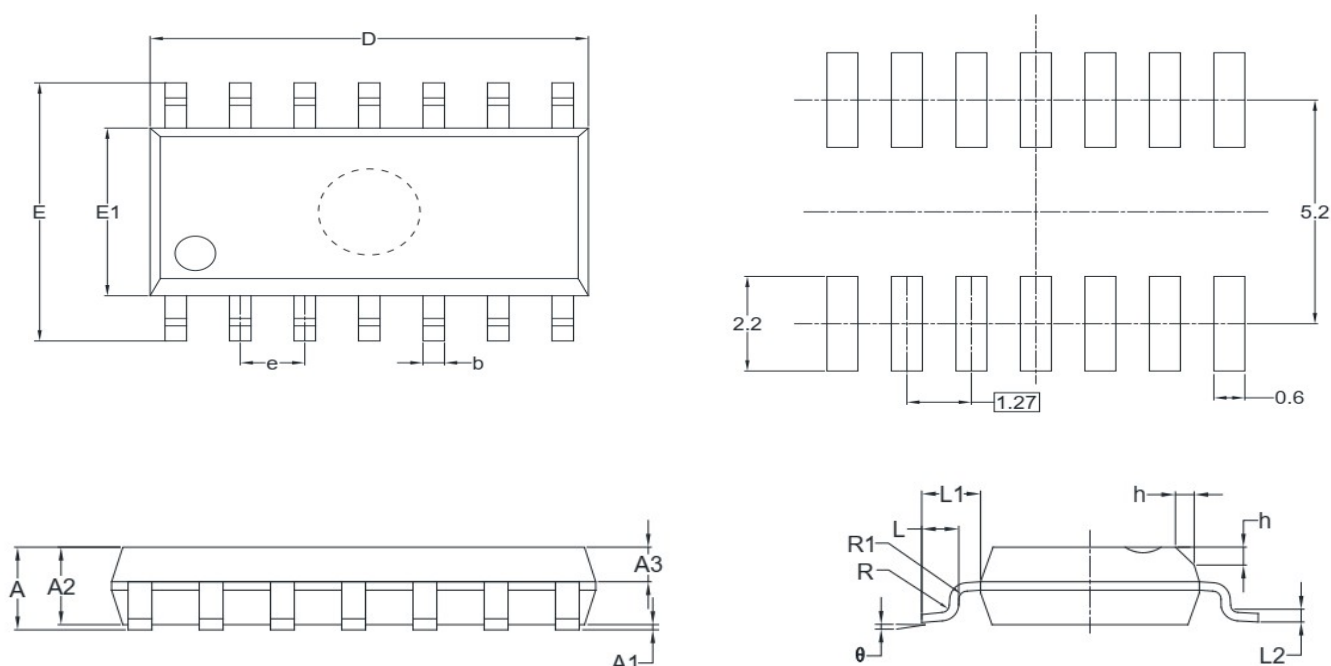
D. t_{PLH} and t_{PHL} are the same as t_{PD} .

Hex Inverters With Schmitt Trigger Inputs

MECHANICAL DIMENSIONS.

M14 PKG: SOIC-14(SOP-14)

Unit:mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	1.35	1.75	0.053	0.069
A1	0.10	0.25	0.004	0.010
A2	1.25	1.65	0.049	0.065
A3	0.55	0.75	0.022	0.030
b	0.36	0.49	0.014	0.019
D	8.53	8.73	0.336	0.344
E	5.80	6.20	0.228	0.244
E1	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
L	0.45	0.80	0.018	0.032
L1	1.04 REF		0.040 REF	
L2	0.25 BSC		0.01 BSC	
R	0.07		0.003	
R1	0.07		0.003	
h	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°

NOTES:

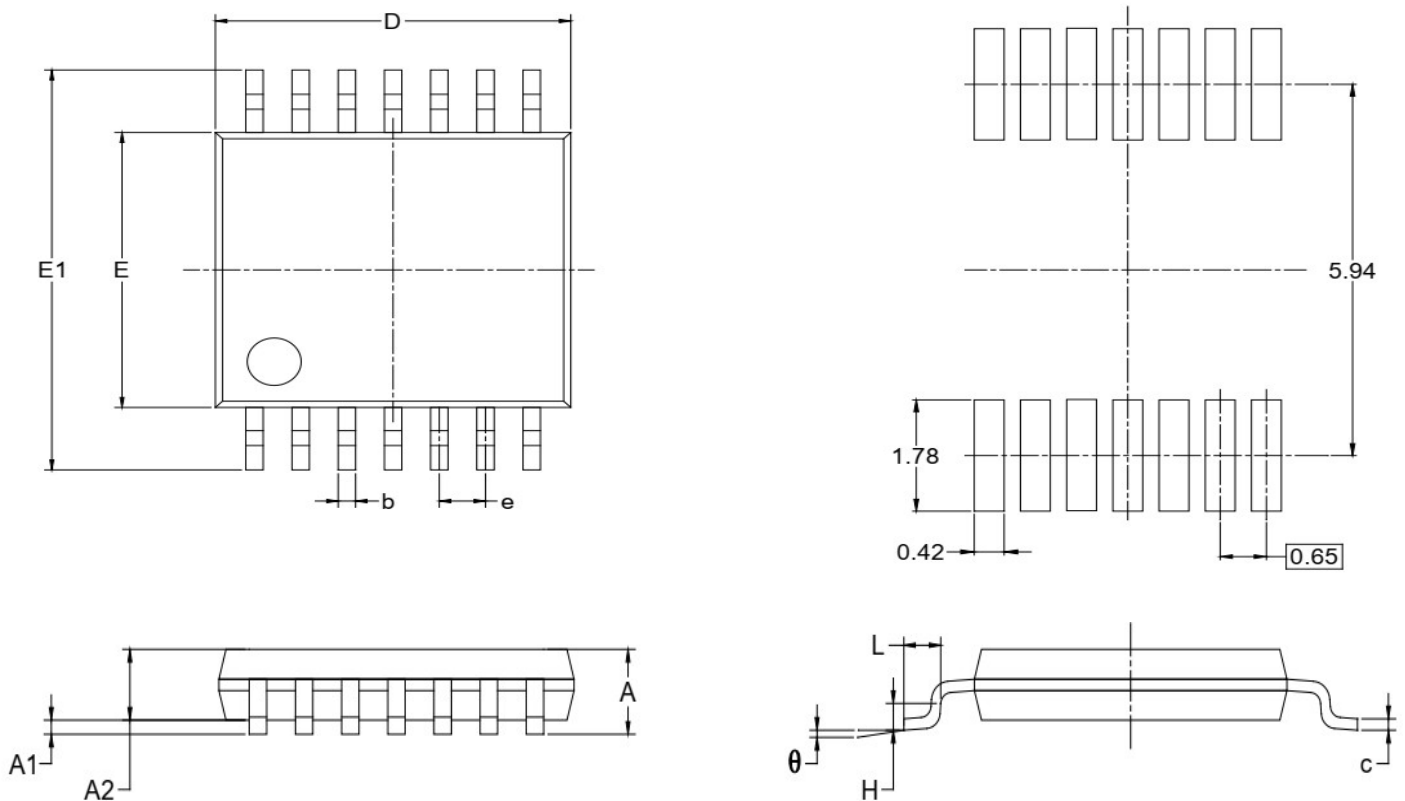
1. Body dimensions do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

Hex Inverters With Schmitt Trigger Inputs

MECHANICAL DIMENSIONS(con.)

TM14 PKG: TSSOP-14

Unit:mm



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A		1.200		0.047
A1	0.050	0.150	0.002	0.006
A2	0.800	1.050	0.031	0.041
b	0.190	0.300	0.007	0.012
c	0.090	0.200	0.004	0.008
D	4.860	5.100	0.191	0.201
E	4.300	4.500	0.169	0.177
E1	6.250	6.550	0.246	0.258
e	0.650 BSC		0.026 BSC	
L	0.500	0.700	0.02	0.028
H	0.25 TYP		0.01 TYP	
θ	1°	7°	1°	7°

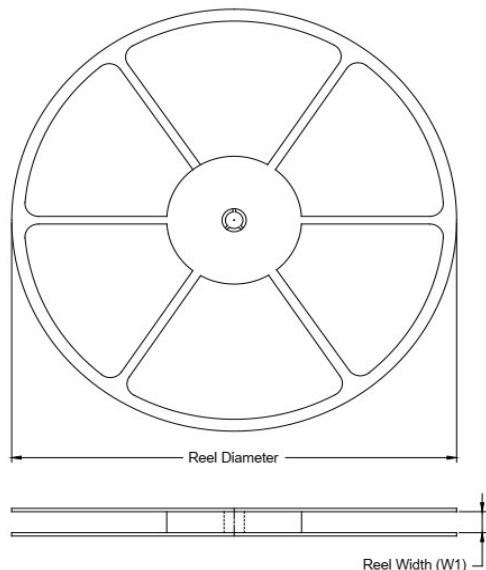
NOTES:

1. Body dimensions do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

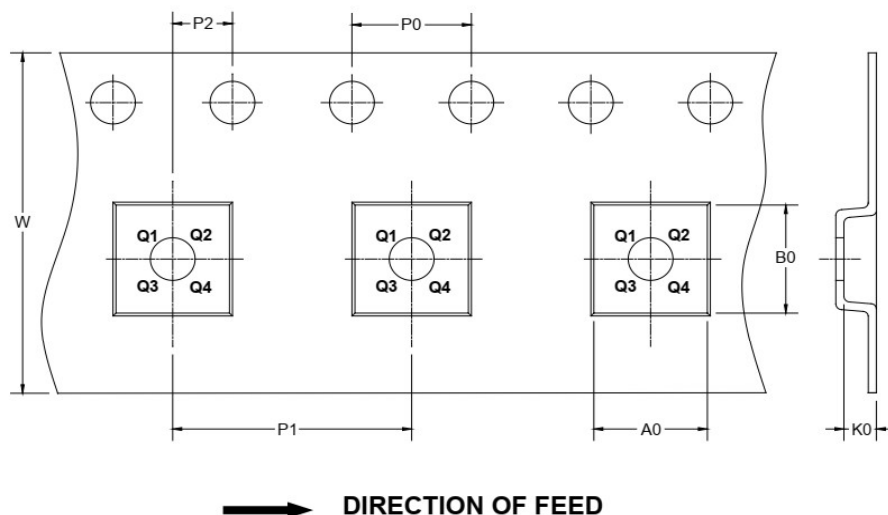
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TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



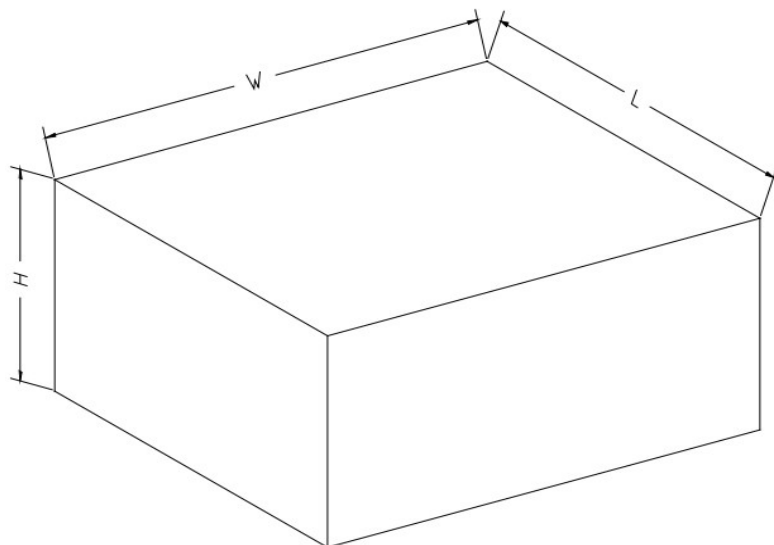
NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF TAPE AND REEL

Package Type	Reel Diameter	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
SOIC-14	13"	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1
TSSOP-14	13"	12.4	6.80	5.40	1.50	4.0	8.0	2.0	12.0	Q1

Hex Inverters With Schmitt Trigger Inputs

CARTON BOX DIMENSIONS



NOTE: The picture is only for reference. Please make the object as the standard.

KEY PARAMETER LIST OF CARTON BOX

Reel Type	Length (mm)	Width (mm)	Height (mm)	Pizza/Carton
13"	386	280	370	5