

HD74AC14

Hex Inverter Schmitt Trigger

REJ03D0250-0200Z
(Previous ADE-205-359 (Z))
Rev.2.00
Jul.16.2004

Description

The HD74AC14 contains six logic inverters which accept standard CMOS input signals and provide standard CMOS output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. In addition, they have a greater noise margin than conventional inverters.

The HD74AC14 has hysteresis between the positive-going and negative-going input thresholds (typically 1.0 V) which is determined internally by transistor ratios and is essentially insensitive to temperature and supply voltage variations.

Features

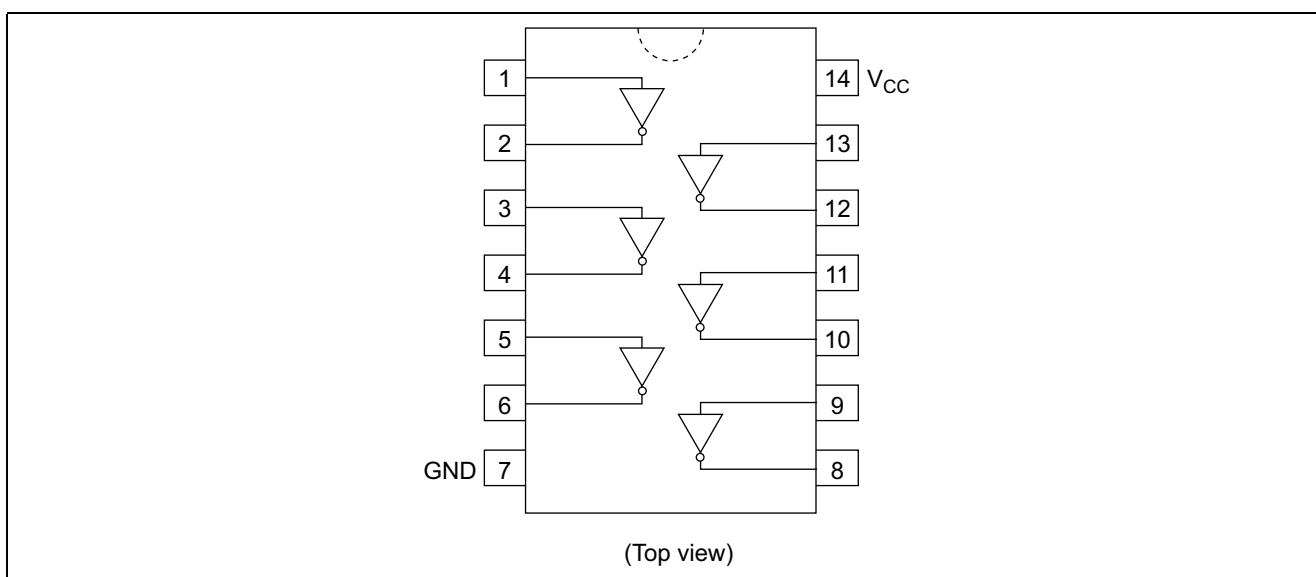
- Outputs Source/Sink 24 mA
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74AC14P	DIP-14 pin	DP-14, -14AV	P	—
HD74AC14FPEL	SOP-14 pin (JEITA)	FP-14DAV	FP	EL (2,000 pcs/reel)
HD74AC14RPEL	SOP-14 pin (JEDEC)	FP-14DNV	RP	EL (2,500 pcs/reel)
HD74AC14TELL	TSSOP-14 pin	TTP-14DV	T	ELL (2,000 pcs/reel)

Notes: 1. Please consult the sales office for the above package availability.

2. The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code.

Pin Arrangement



Function Table

Input	Output
A	O
L	H
H	L

Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Condition
Supply voltage	V_{CC}	-0.5 to 7	V	
DC input diode current	I_{IK}	-20	mA	$V_I = -0.5V$
		20	mA	$V_I = V_{CC}+0.5V$
DC input voltage	V_I	-0.5 to $V_{CC}+0.5$	V	
DC output diode current	I_{OK}	-50	mA	$V_O = -0.5V$
		50	mA	$V_O = V_{CC}+0.5V$
DC output voltage	V_O	-0.5 to $V_{CC}+0.5$	V	
DC output source or sink current	I_O	± 50	mA	
DC V_{CC} or ground current per output pin	I_{CC}, I_{GND}	± 50	mA	
Storage temperature	T_{stg}	-65 to +150	°C	

Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Condition
Supply voltage	V_{CC}	2 to 6	V	
Input and output voltage	V_I, V_O	0 to V_{CC}	V	
Operating temperature	T_a	-40 to +85	°C	
Input rise and fall time (except Schmitt inputs) V_{IN} 30% to 70% V_{CC}	t_r, t_f	8	ns/V	$V_{CC} = 3.0V$
				$V_{CC} = 4.5V$
				$V_{CC} = 5.5V$

DC Characteristics

Item	Sym- bol	V _{CC} (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Condition	
			min.	typ.	max.	min.	max.			
Input Voltage	V _{IH}	3.0	2.1	1.5	—	2.1	—	V	V _{OUT} = 0.1 V or V _{CC} - 0.1 V	
		4.5	3.15	2.25	—	3.15	—			
		5.5	3.85	2.75	—	3.85	—			
	V _{IL}	3.0	—	1.50	0.9	—	0.9		V _{OUT} = 0.1 V or V _{CC} - 0.1 V	
		4.5	—	2.25	1.35	—	1.35			
		5.5	—	2.75	1.65	—	1.65			
Output voltage	V _{OH}	3.0	2.9	2.99	—	2.9	—	V	V _{IN} = V _{IL} or V _{IH} I _{OUT} = -50 μA	
		4.5	4.4	4.49	—	4.4	—			
		5.5	5.4	5.49	—	5.4	—			
		3.0	2.58	—	—	2.48	—		V _{IN} = V _{IL} or V _{IH}	I _{OH} = -12 mA
		4.5	3.94	—	—	3.80	—			I _{OH} = -24 mA
		5.5	4.94	—	—	4.80	—			I _{OH} = -24 mA
	V _{OL}	3.0	—	0.002	0.1	—	0.1		V _{IN} = V _{IL} or V _{IH} I _{OUT} = 50 μA	
		4.5	—	0.001	0.1	—	0.1			
		5.5	—	0.001	0.1	—	0.1			
		3.0	—	—	0.32	—	0.37		V _{IN} = V _{IL} or V _{IH}	I _{OL} = 12 mA
		4.5	—	—	0.32	—	0.37			I _{OL} = 24 mA
		5.5	—	—	0.32	—	0.37			I _{OL} = 24 mA
Input leakage current	I _{IN}	5.5	—	—	±0.1	—	±1.0	μA	V _{IN} = V _{CC} or GND	
Dynamic output current*	I _{OLD}	5.5	—	—	—	86	—	mA	V _{OLD} = 1.1 V	
	I _{OHD}	5.5	—	—	—	-75	—	mA	V _{OHD} = 3.85 V	
Quiescent supply current	I _{CC}	5.5	—	—	4.0	—	40.0	μA	V _{IN} = V _{CC} or GND	
Positive threshold voltage	V _T ⁺	3.0	—	—	2.2	—	2.2	V		
		4.5	—	—	3.2	—	3.2			
		5.5	—	—	3.9	—	3.9			
	V _T ⁻	3.0	0.5	—	—	0.5	—	V		
		4.5	0.9	—	—	0.9	—			
		5.5	1.1	—	—	1.1	—			
Hysteresis voltage	V _H (max)	3.0	—	—	1.2	—	1.2	V		
		4.5	—	—	1.4	—	1.4			
		5.5	—	—	1.6	—	1.6			
	V _H (min)	3.0	0.3	—	—	0.3	—	V		
		4.5	0.4	—	—	0.4	—			
		5.5	0.5	—	—	0.5	—			

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

AC Characteristics

Item	Symbol	V_{CC} (V)* ¹	Ta = +25°C CL = 50 pF			Ta = -40°C to +85°C CL = 50 pF		Unit
			Min	Typ	Max	Min	Max	
Propagation delay	t_{PLH}	3.3	1.0	9.5	13.5	1.0	15.0	ns
		5.0	1.0	7.0	10.0	1.0	11.0	
Propagation delay	t_{PHL}	3.3	1.0	7.5	11.5	1.0	13.0	ns
		5.0	1.0	6.0	8.5	1.0	9.5	

Note: 1. Voltage Range 3.3 is 3.3 V $\pm$ 0.3 V
Voltage Range 5.0 is 5.0 V $\pm$ 0.5 V

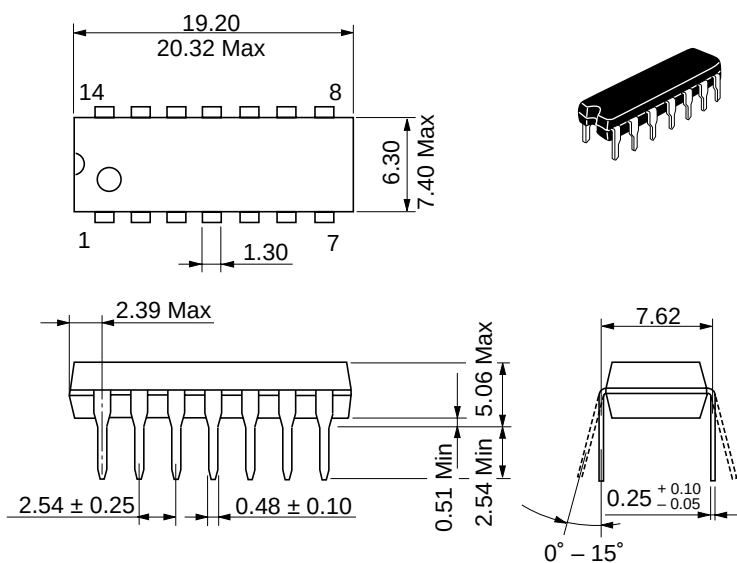
Capacitance

Item	Symbol	Typ	Unit	Condition
Input capacitance	C_{IN}	4.5	pF	$V_{CC} = 5.5$ V
Power dissipation capacitance	C_{PD}	25.0	pF	$V_{CC} = 5.0$ V

Package Dimensions

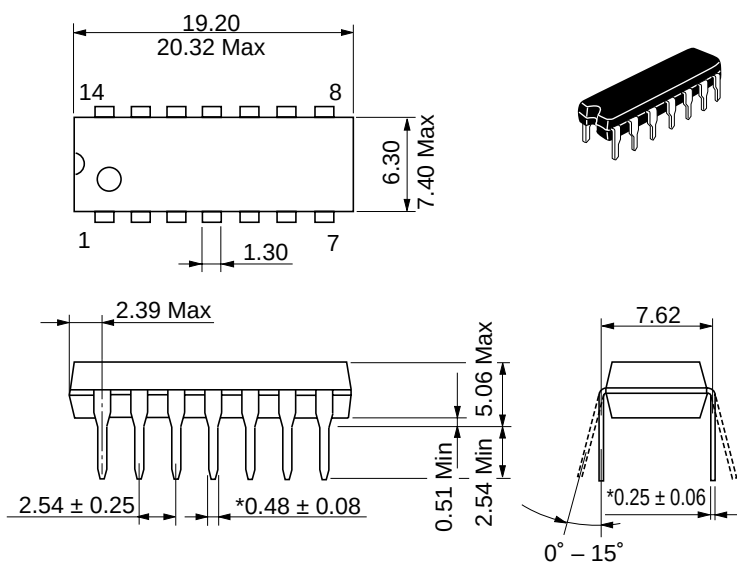
As of January, 2003

Unit: mm



Package Code	DP-14
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.97 g

Unit: mm

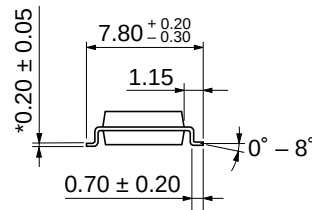
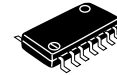
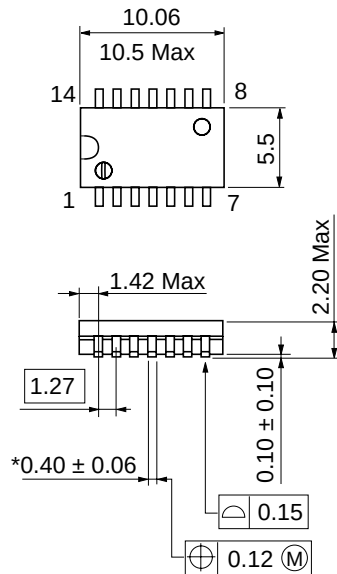


*Ni/Pd/AU Plating

Package Code	DP-14AV
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.97 g

As of January, 2003

Unit: mm

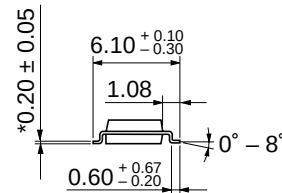
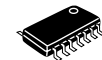
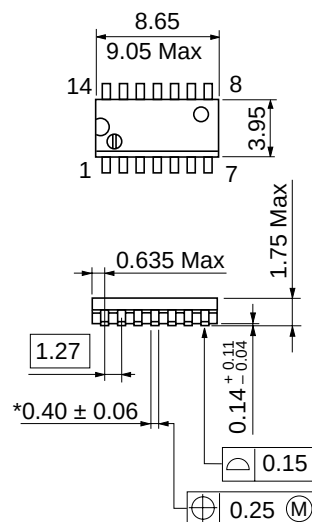


*Ni/Pd/Au plating

Package Code	FP-14DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.23 g

As of January, 2003

Unit: mm

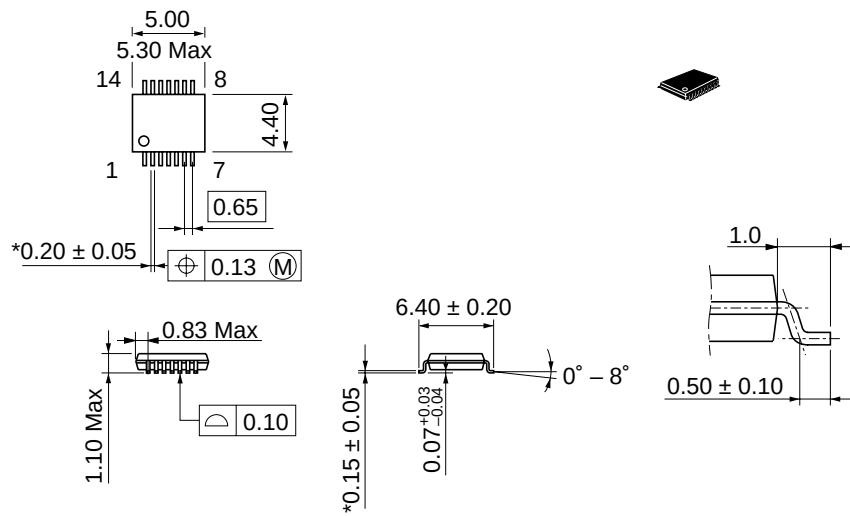


*Ni/Pd/Au plating

Package Code	FP-14DNV
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.13 g

As of January, 2003

Unit: mm



*Ni/Pd/Au plating

Package Code	TTP-14DV
JEDEC	—
JEITA	—
Mass (reference value)	0.05 g

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