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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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HD74AC04

Hex Inverter

REJ03D0241-0200Z
 (Previous ADE-205-357 (Z))
 Rev.2.00
 Jul.16.2004

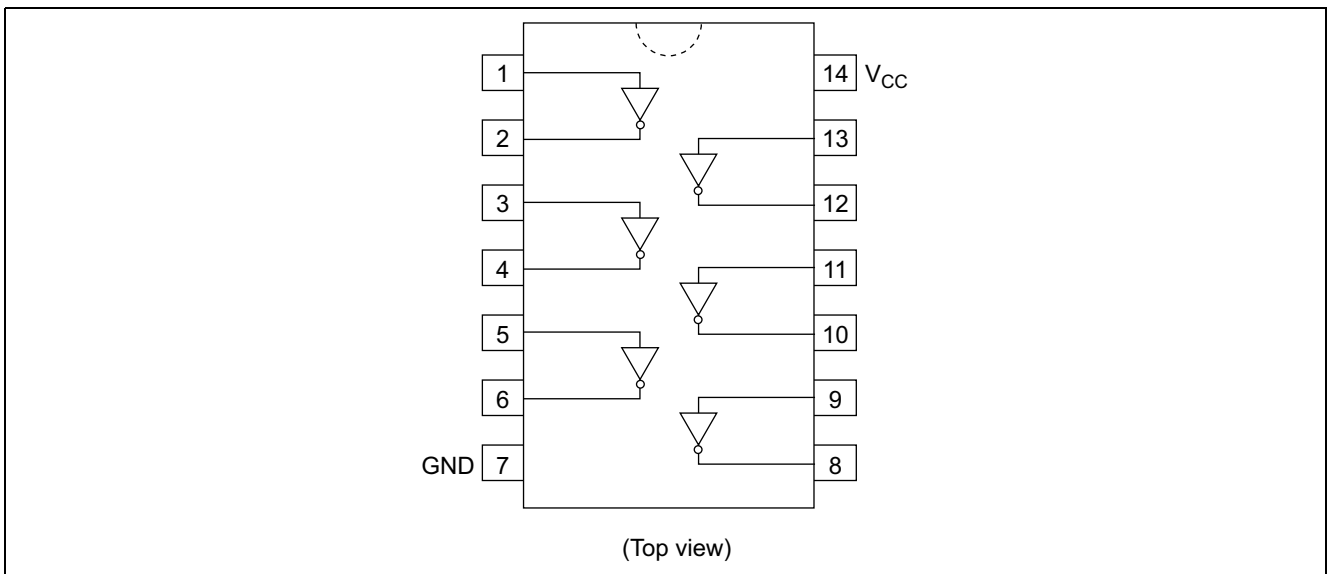
Features

- Outputs Source/Sink 24 mA
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74AC04P	DIP-14 pin	DP-14, -14AV	P	—
HD74AC04FPEL	SOP-14 pin (JEITA)	FP-14DAV	FP	EL (2,000 pcs/reel)
HD74AC04RPEL	SOP-14 pin (JEDEC)	FP-14DNV	RP	EL (2,500 pcs/reel)
HD74AC04TELL	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



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	$^{\circ}C$	

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	$^{\circ}C$	
Input rise and fall time (except Schmitt inputs) V_{IN} 30% to 70% V_{CC}	tr, tf	8	ns/V	$V_{CC} = 3.0V$
				$V_{CC} = 4.5V$
				$V_{CC} = 5.5V$

DC Characteristics

Item	Symbol	Vcc (V)	$T_a = 25^{\circ}C$			$T_a = -40$ to $+85^{\circ}C$		Unit	Condition		
			min.	typ.	max.	min.	max.				
Input Voltage	V_{IH}	3.0	2.1	1.5	—	2.1	—	V	$V_{OUT} = 0.1V$ or $V_{CC} - 0.1V$		
		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				
		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} $I_{OUT} = -50 \mu A$		
		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} $I_{OUT} = 50 \mu A$		
		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
Dynamic output current*	I_{OLD}	5.5	—	—	—	86	—	mA	$V_{OLD} = 1.1V$		
	I_{OHD}	5.5	—	—	—	-75	—	mA	$V_{OHD} = 3.85V$		
Quiescent supply current	I_{CC}	5.5	—	—	4.0	—	40	μA	$V_{IN} = V_{CC}$ or ground		

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

AC Characteristics

Item	Symbol	V _{CC} (V)*1	Ta = +25°C C _L = 50 pF			Ta = -40°C to +85°C C _L = 50 pF		Unit
			Min	Typ	Max	Min	Max	
Propagation delay	t _{PLH}	3.3	1.0	4.5	9.0	1.0	10.0	ns
		5.0	1.0	4.0	7.0	1.0	7.5	
Propagation delay	t _{PHL}	3.3	1.0	4.5	8.5	1.0	9.5	ns
		5.0	1.0	3.5	6.5	1.0	7.0	

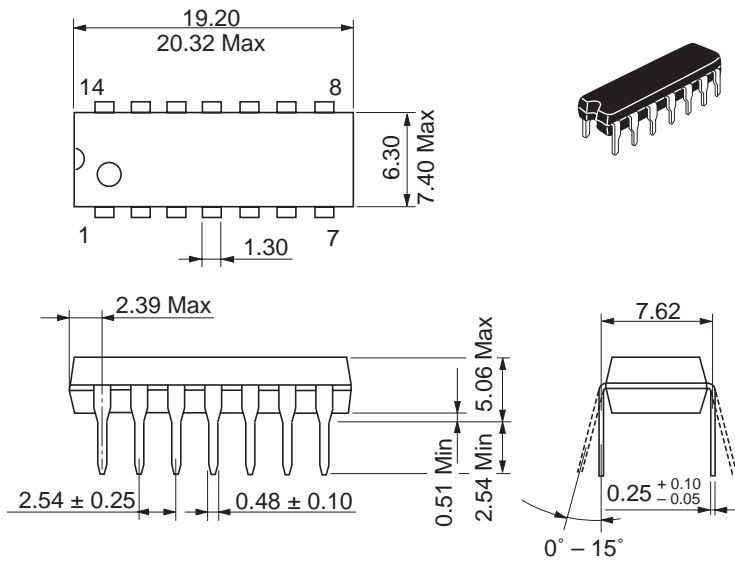
Note: 1. Voltage Range 3.3 is 3.3 V ± 0.3 V
Voltage Range 5.0 is 5.0 V ± 0.5 V

Capacitance

Item	Symbol	Typ	Unit	Condition
Input capacitance	C _{IN}	4.5	pF	V _{CC} = 5.5 V
Power dissipation capacitance	C _{PD}	30.0	pF	V _{CC} = 5.0 V

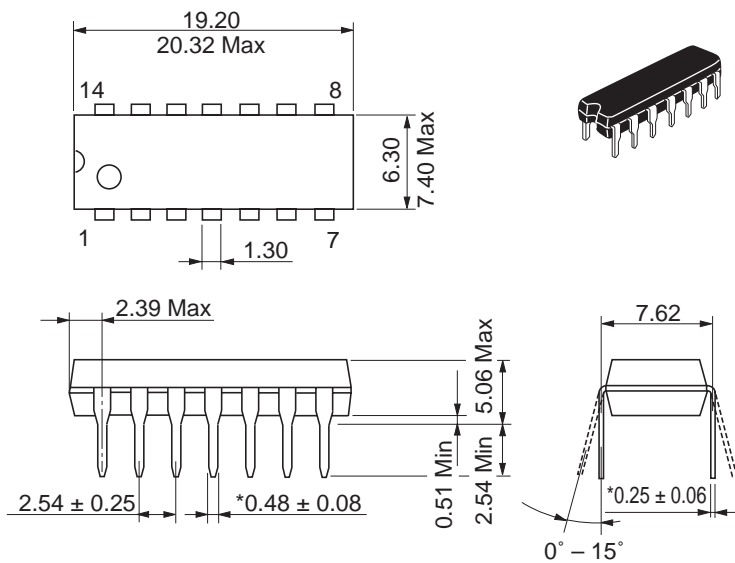
Package Dimensions

As of January, 2003
Unit: mm



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

Unit: mm

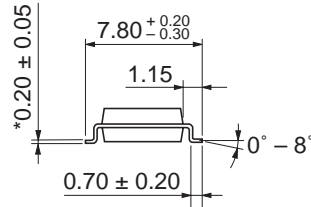
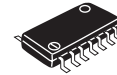
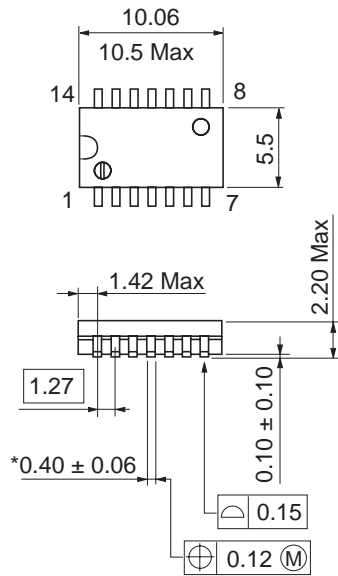


*Ni/Pd/AU Plating

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

As of January, 2003

Unit: mm

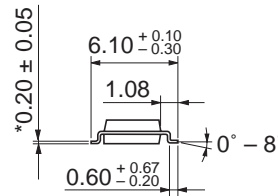
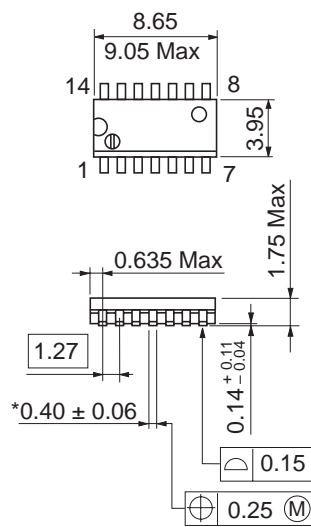


Package Code	FP-14DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.23 g

*Ni/Pd/Au plating

As of January, 2003

Unit: mm

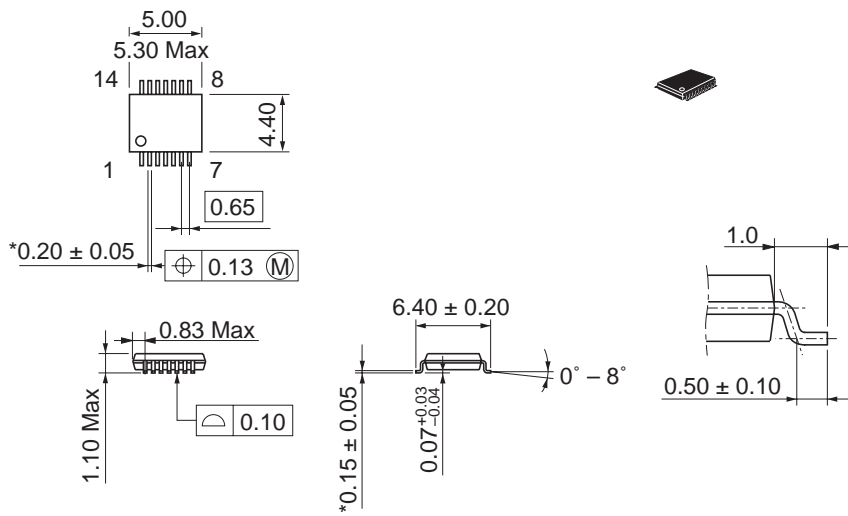


Package Code	FP-14DNV
JEDEC	Conforms
JEITA	Conforms
Mass (reference value)	0.13 g

*Ni/Pd/Au plating

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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