To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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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HD74AC125/HD74ACT125

Quad Buffer/Line Driver with 3-State Output

REJ03D0246–0300
Rev.3.00
Nov.12.2004

Description

The HD74AC125/HD74ACT125 is an quad buffer and line driver designed to be employed as a memory address driver, clock driver and bus oriented transmitter/receiver which provides improved PC board density.

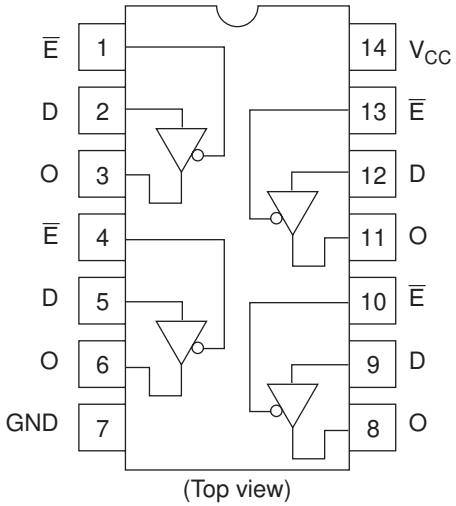
Features

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Outputs Source/Sink 24 mA
- HD74ACT125 has TTL-Compatible Inputs
- Ordering Information: Ex. HD74AC125

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74AC125P	DIP-14 pin	DP-14, -14AV	P	—
HD74AC125FPEL	SOP-14 pin (JEITA)	FP-14DAV	FP	EL (2,000 pcs/reel)
HD74AC125RPEL	SOP-14 pin (JEDEC)	FP-14DNV	RP	EL (2,500 pcs/reel)
HD74AC125TELL	TSSOP-14 pin	TTP-14DV	T	ELL (2,000 pcs/reel)

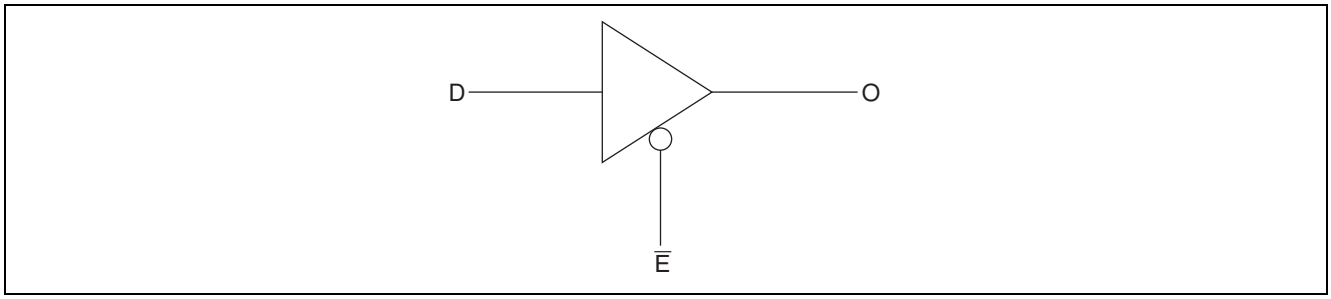
Notes: 1. Please consult the sales office for the above package availability.
2. The packages with lead-free pins are distinguished from the conventional products by adding V at the end of the package code.

Pin Arrangement



(Top view)

Logic Symbol



Pin Names

D Data Inputs
$\overline{E}$ 3-State Output Enable Inputs (Active Low)
O Outputs

Truth Table

Inputs		Output
$\overline{E}$	D	
L	L	L
L	H	H
H	X	Z

H : High Voltage Level
L : Low Voltage Level
X : Immaterial
Z : High Impedance

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 = Vcc+0.5V
DC input voltage	V_I	–0.5 to Vcc+0.5	V	
DC output diode current	I_{OK}	–50	mA	V_O = –0.5V
		50	mA	V_O = Vcc+0.5V
DC output voltage	V_O	–0.5 to Vcc+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	Tstg	–65 to +150	°C	

Recommended Operating Conditions: HD74AC125

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	Ta	–40 to +85	°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} = 4.5 V
				V_{CC} = 5.5 V

DC Characteristics: HD74AC125

Item	Sym-bol	Vcc (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 ∝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 ∝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	∝A	V_{IN} = V_{CC} or GND	
3 State current	I_{OZ}	5.5	—	—	±0.5	—	±5.0	∝A	$V_{IN(OE)}$ = V_{IL}, V_{IH} V_{IN} = V_{CC} or GND V_{OUT} = 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	—	—	8.0	—	80	∝A	V_{IN} = V_{CC} or ground	

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

Recommended Operating Conditions: HD74ACT125

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	Ta	–40 to +85	°C	
Input rise and fall time (except Schmitt inputs) V_{IN} 0.8 to 2.0 V	tr, tf	8	ns/V	V_{CC} = 4.5V V_{CC} = 5.5V

DC Characteristics: HD74ACT125

Item	Symbol	V_{CC} (V)	Ta = 25°C			Ta = –40 to +85°C		Unit	Condition	
			min.	typ.	max.	min.	max.			
Input voltage	V_{IH}	4.5	2.0	1.5	—	2.0	—	V	V_{OUT} = 0.1 V or V_{CC}–0.1 V	
		5.5	2.0	1.5	—	2.0	—			
	V_{IL}	4.5	—	1.5	0.8	—	0.8		V_{OUT} = 0.1 V or V_{CC} –0.1 V	
		5.5	—	1.5	0.8	—	0.8			
Output voltage	V_{OH}	4.5	4.4	4.49	—	4.4	—	V	V_{IN} = V_{IL} or V_{IH} I_{OUT} = –50 ∝A	
		5.5	5.4	5.49	—	5.4	—			
		4.5	3.94	—	—	3.80	—		V_{IN} = V_{IL}	I_{OH} = –24 mA
		5.5	4.94	—	—	4.80	—			I_{OH} = –24 mA
	V_{OL}	4.5	—	0.001	0.1	—	0.1		V_{IN} = V_{IL} or V_{IH} I_{OUT} = 50 ∝A	
		5.5	—	0.001	0.1	—	0.1			
		4.5	—	—	0.32	—	0.37		V_{IN} = V_{IL}	I_{OL} = 24 mA
		5.5	—	—	0.32	—	0.37			I_{OL} = 24 mA
Input current	I_{IN}	5.5	—	—	±0.1	—	±1.0	∝A	V_{IN} = V_{CC} or GND	
3 State current	I_{OZ}	5.5	—	—	±0.5	—	±5.0	∝A	V_{IN} = V_{IL}, V_{IH} V_{OUT} = V_{CC} or GND	
I_{CC}/input current	I_{CCT}	5.5	—	0.6	—	—	1.5	mA	V_{IN} = V_{CC}–2.1 V	
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	—	—	8.0	—	80	∝A	V_{IN} = V_{CC} or ground	

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

AC Characteristics: HD74AC125

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	6.5	9.0	1.0	10.0	ns
		5.0	1.0	5.5	7.0	1.0	7.5	
Propagation delay	t_{PHL}	3.3	1.0	6.5	9.0	1.0	10.0	
		5.0	1.0	5.0	7.0	1.0	7.5	
Enable time	t_{ZH}	3.3	1.0	6.0	10.5	1.0	11.0	
		5.0	1.0	5.0	7.0	1.0	8.0	
Enable time	t_{ZL}	3.3	1.0	7.5	10.0	1.0	11.0	
		5.0	1.0	5.5	8.0	1.0	8.5	
Disable time	t_{HZ}	3.3	1.0	7.0	10.0	1.0	10.5	
		5.0	1.0	6.5	9.0	1.0	9.5	
Disable time	t_{LZ}	3.3	1.0	7.5	10.5	1.0	11.5	
		5.0	1.0	6.5	9.0	1.0	9.5	

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

AC Characteristics: HD74ACT125

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}	5.0	1.0	6.5	9.0	1.0	10.0	ns
Propagation delay	t_{PHL}	5.0	1.0	7.0	9.0	1.0	10.0	
Enable time	t_{ZH}	5.0	1.0	6.0	8.5	1.0	9.5	
Enable time	t_{ZL}	5.0	1.0	7.0	9.5	1.0	10.5	
Disable time	t_{HZ}	5.0	1.0	7.0	9.5	1.0	10.5	
Disable time	t_{LZ}	5.0	1.0	7.5	10.0	1.0	10.5	

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

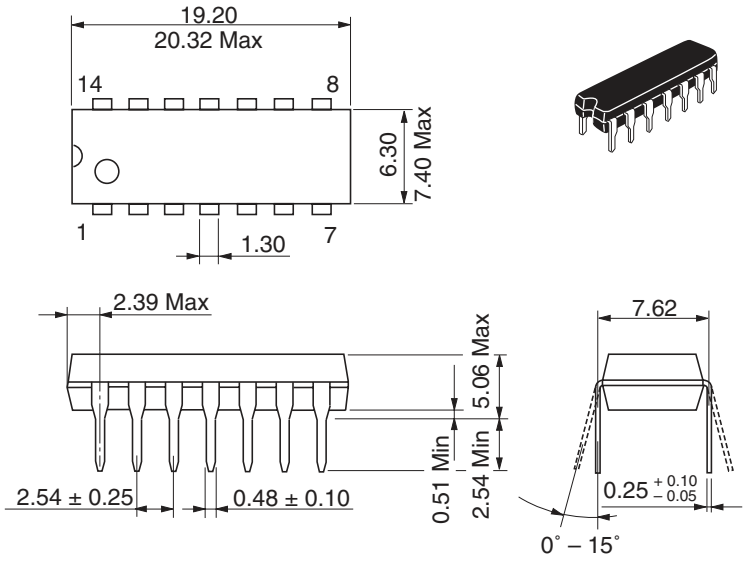
Capacitance

Item	Symbol	Typ	Unit	Condition
Input capacitance	C_{IN}	4.5	pF	V_{CC} = 5.5 V
Power dissipation capacitance	C_{PD}	45.0	pF	V_{CC} = 5.0 V

Package Dimensions

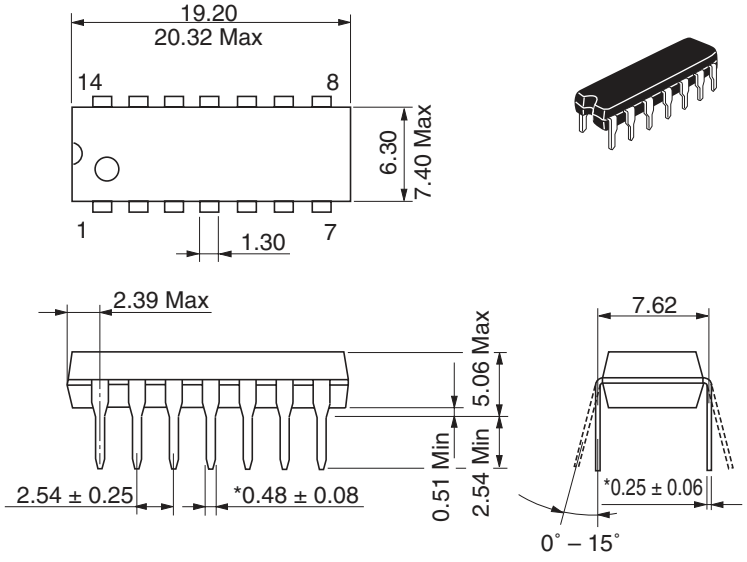
As of January, 2003

Unit: mm



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

Unit: mm

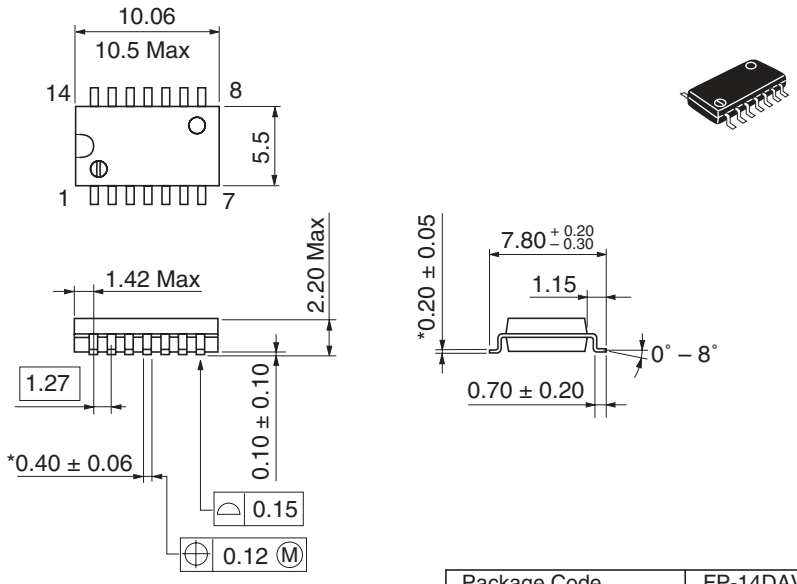


*NI/Pd/AU Plating

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

As of January, 2003

Unit: mm

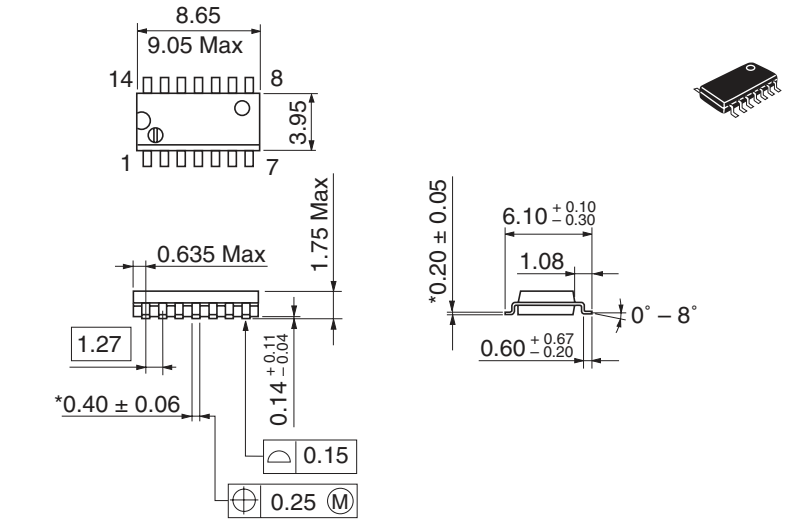


*Ni/Pd/Au plating

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

As of January, 2003

Unit: mm

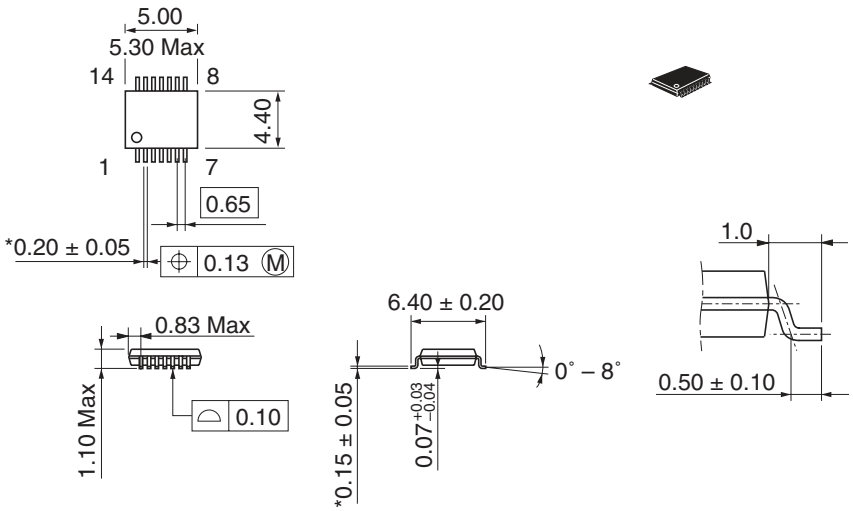


*Ni/Pd/Au plating

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

As of January, 2003

Unit: mm



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

*Ni/Pd/Au plating

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