

To our customers,

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## Old Company Name in Catalogs and Other Documents

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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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

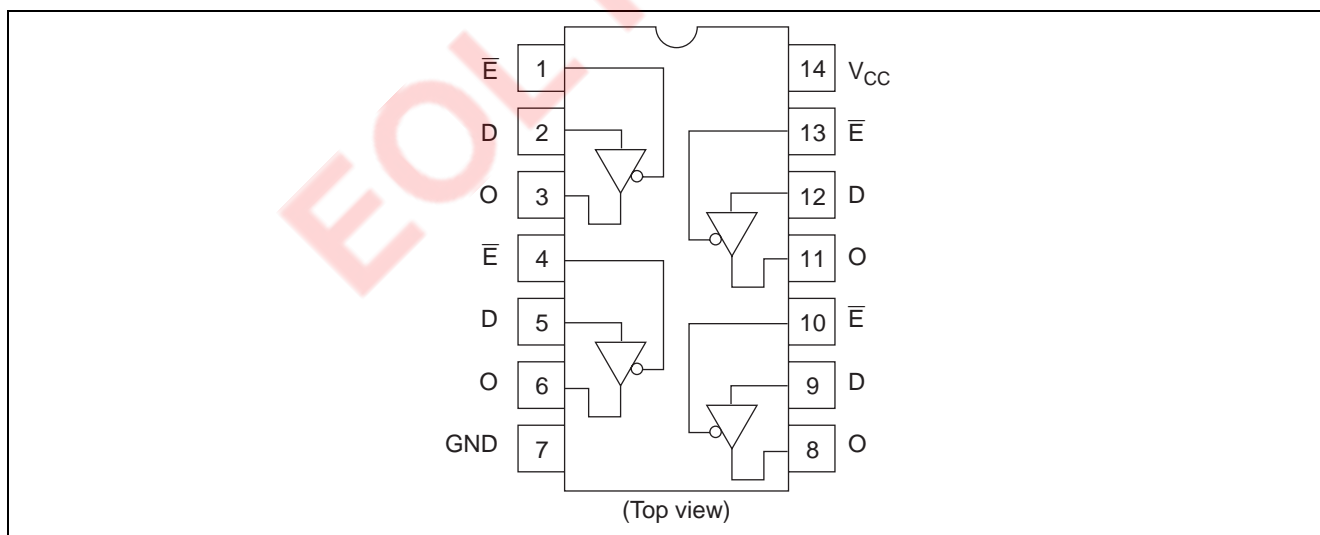
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Outputs Source/Sink 24 mA
- HD74ACT125 has TTL-Compatible Inputs
- Ordering Information: Ex. HD74AC125

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)

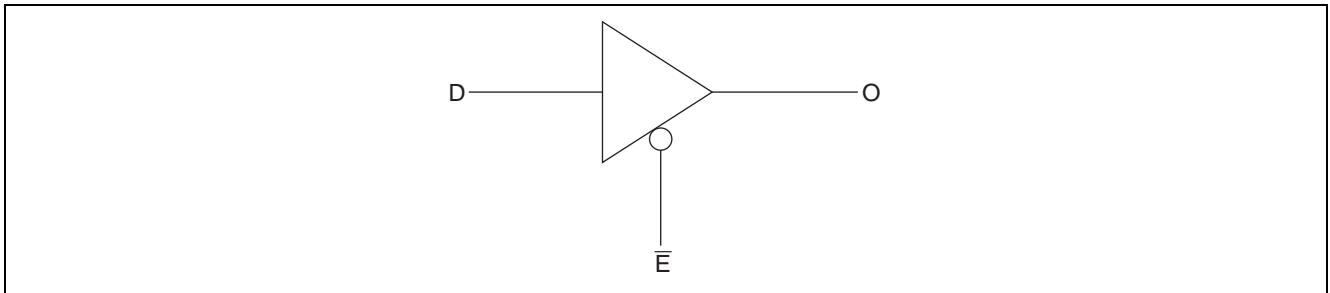
Notes: 1. Please consult the sales office for the above package availability.

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



## 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	$V_I = V_{CC}+0.5V$
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	$I_O$	$\pm 50$	mA	
DC $V_{CC}$ or ground current per output pin	$I_{CC}, I_{GND}$	$\pm 50$	mA	
Storage temperature	$T_{stg}$	-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	$T_a$	-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	$V_{CC} = 3.0V$
				$V_{CC} = 4.5 V$
				$V_{CC} = 5.5 V$

## DC Characteristics: HD74AC125

Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Condition
			min.	typ.	max.	min.	max.		
Input Voltage	V <sub>IH</sub>	3.0	2.1	1.5	—	2.1	—	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> - 0.1 V
		4.5	3.15	2.25	—	3.15	—		
		5.5	3.85	2.75	—	3.85	—		
	V <sub>IL</sub>	3.0	—	1.50	0.9	—	0.9		V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> - 0.1 V
		4.5	—	2.25	1.35	—	1.35		
		5.5	—	2.75	1.65	—	1.65		
Output voltage	V <sub>OH</sub>	3.0	2.9	2.99	—	2.9	—	V	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OUT</sub> = -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 <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OH</sub> = -12 mA
		4.5	3.94	—	—	3.80	—		
		5.5	4.94	—	—	4.80	—		
	V <sub>OL</sub>	3.0	—	0.002	0.1	—	0.1		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OUT</sub> = 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 <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OL</sub> = 12 mA
		4.5	—	—	0.32	—	0.37		
		5.5	—	—	0.32	—	0.37		
		3.0	—	—	0.32	—	0.37		I <sub>OL</sub> = 24 mA
		4.5	—	—	0.32	—	0.37		
		5.5	—	—	0.32	—	0.37		I <sub>OL</sub> = 24 mA
Input leakage current	I <sub>IN</sub>	5.5	—	—	±0.1	—	±1.0	µA	V <sub>IN</sub> = V <sub>CC</sub> or GND
3 State current	I <sub>OZ</sub>	5.5	—	—	±0.5	—	±5.0	µA	V <sub>IN(OE)</sub> = V <sub>IL</sub> , V <sub>IH</sub> V <sub>IN</sub> = V <sub>CC</sub> or GND V <sub>OUT</sub> = V <sub>CC</sub> or GND
Dynamic output current*	I <sub>OLD</sub>	5.5	—	—	—	86	—	mA	V <sub>OLD</sub> = 1.1 V
	I <sub>OHD</sub>	5.5	—	—	—	-75	—	mA	V <sub>OHD</sub> = 3.85 V
Quiescent supply current	I <sub>CC</sub>	5.5	—	—	8.0	—	80	µA	V <sub>IN</sub> = V <sub>CC</sub> 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 <sub>CC</sub>	2 to 6	V	
Input and output voltage	V <sub>I</sub> , V <sub>O</sub>	0 to V <sub>CC</sub>	V	
Operating temperature	Ta	-40 to +85	°C	
Input rise and fall time (except Schmitt inputs) V <sub>IN</sub> 0.8 to 2.0 V	tr, tf	8	ns/V	V <sub>CC</sub> = 4.5V V <sub>CC</sub> = 5.5V

## DC Characteristics: HD74ACT125

Item	Sym- bol	V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40 to +85°C		Unit	Condition	
			min.	typ.	max.	min.	max.			
Input voltage	V <sub>IH</sub>	4.5	2.0	1.5	—	2.0	—	V	V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> -0.1 V	
		5.5	2.0	1.5	—	2.0	—			
	V <sub>IL</sub>	4.5	—	1.5	0.8	—	0.8		V <sub>OUT</sub> = 0.1 V or V <sub>CC</sub> -0.1 V	
		5.5	—	1.5	0.8	—	0.8			
Output voltage	V <sub>OH</sub>	4.5	4.4	4.49	—	4.4	—	V	V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OUT</sub> = -50 μA	
		5.5	5.4	5.49	—	5.4	—			
		4.5	3.94	—	—	3.80	—		V <sub>IN</sub> = V <sub>IL</sub>	I <sub>OH</sub> = -24 mA
		5.5	4.94	—	—	4.80	—		I <sub>OH</sub> = -24 mA	
	V <sub>OL</sub>	4.5	—	0.001	0.1	—	0.1		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OUT</sub> = 50 μA	
		5.5	—	0.001	0.1	—	0.1			
		4.5	—	—	0.32	—	0.37		V <sub>IN</sub> = V <sub>IL</sub>	I <sub>OL</sub> = 24 mA
		5.5	—	—	0.32	—	0.37		I <sub>OL</sub> = 24 mA	
Input current	I <sub>IN</sub>	5.5	—	—	±0.1	—	±1.0	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND	
3 State current	I <sub>OZ</sub>	5.5	—	—	±0.5	—	±5.0	μA	V <sub>IN</sub> = V <sub>IL</sub> , V <sub>IH</sub> V <sub>OUT</sub> = V <sub>CC</sub> or GND	
I <sub>CC</sub> /input current	I <sub>CC</sub> T	5.5	—	0.6	—	—	1.5	mA	V <sub>IN</sub> = V <sub>CC</sub> -2.1 V	
Dynamic output current*	I <sub>OLD</sub>	5.5	—	—	—	86	—	mA	V <sub>OLD</sub> = 1.1 V	
	I <sub>OHD</sub>	5.5	—	—	—	-75	—	mA	V <sub>OHD</sub> = 3.85 V	
Quiescent supply current	I <sub>CC</sub>	5.5	—	—	8.0	—	80	μA	V <sub>IN</sub> = V <sub>CC</sub> or ground	

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

## AC Characteristics: HD74AC125

Item	Symbol	V <sub>CC</sub> (V)* <sup>1</sup>	Ta = +25°C C <sub>L</sub> = 50 pF			Ta = -40°C to +85°C C <sub>L</sub> = 50 pF		Unit
			Min	Typ	Max	Min	Max	
Propagation delay	t <sub>PLH</sub>	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 <sub>PHL</sub>	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 <sub>ZH</sub>	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 <sub>ZL</sub>	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 <sub>HZ</sub>	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 <sub>LZ</sub>	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 <sub>CC</sub> (V)* <sup>1</sup>	Ta = +25°C C <sub>L</sub> = 50 pF			Ta = -40°C to +85°C C <sub>L</sub> = 50 pF		Unit
			Min	Typ	Max	Min	Max	
Propagation delay	t <sub>PLH</sub>	5.0	1.0	6.5	9.0	1.0	10.0	ns
Propagation delay	t <sub>PHL</sub>	5.0	1.0	7.0	9.0	1.0	10.0	
Enable time	t <sub>ZH</sub>	5.0	1.0	6.0	8.5	1.0	9.5	
Enable time	t <sub>ZL</sub>	5.0	1.0	7.0	9.5	1.0	10.5	
Disable time	t <sub>HZ</sub>	5.0	1.0	7.0	9.5	1.0	10.5	
Disable time	t <sub>LZ</sub>	5.0	1.0	7.5	10.0	1.0	10.5	

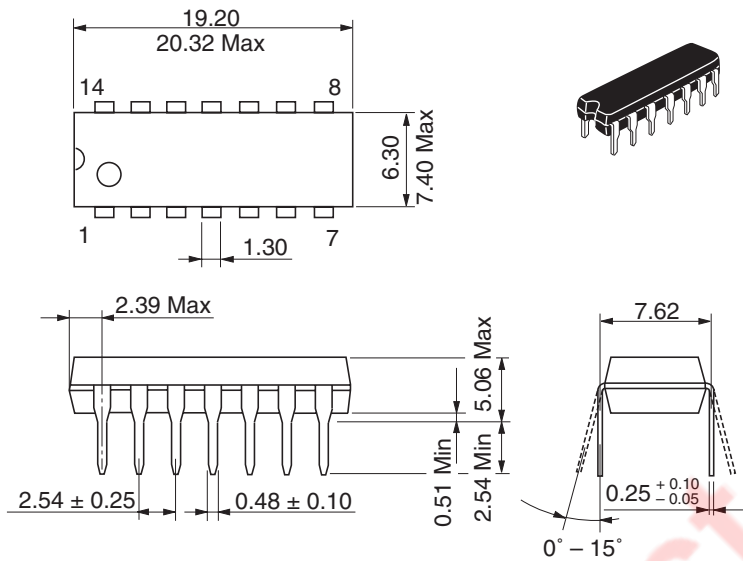
Note: 1. Voltage Range 5.0 is 5.0 V ± 0.5 V

**Capacitance**

Item	Symbol	Typ	Unit	Condition
Input capacitance	C <sub>IN</sub>	4.5	pF	V <sub>CC</sub> = 5.5 V
Power dissipation capacitance	C <sub>PD</sub>	45.0	pF	V <sub>CC</sub> = 5.0 V

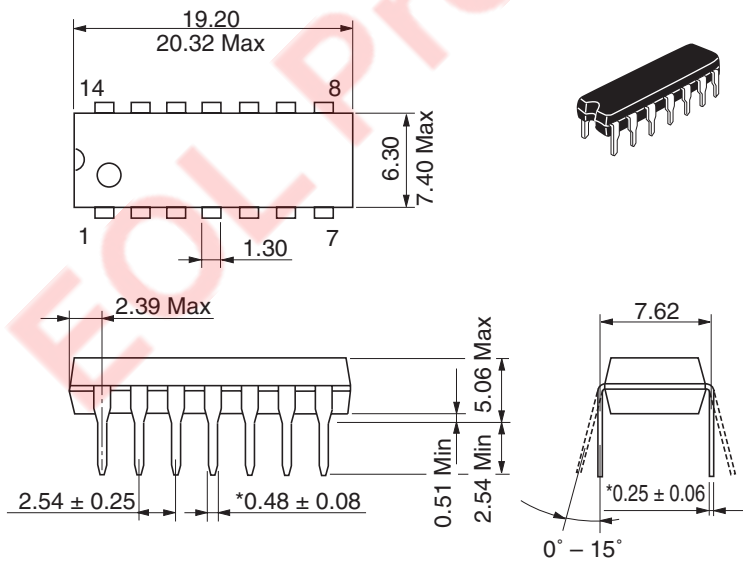
Package Dimensions

As of January, 2003  
Unit: mm



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

Unit: mm



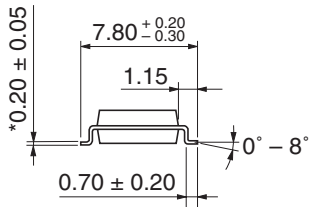
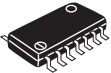
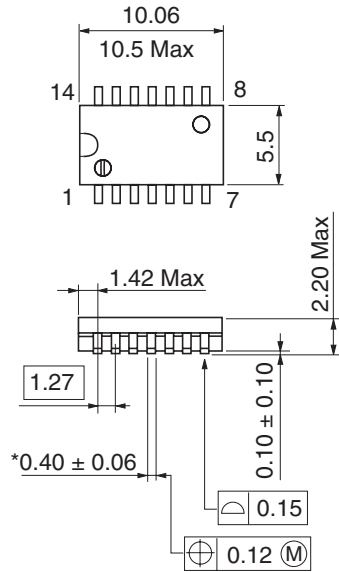
\*Ni/Pd/AU Plating

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



As of January, 2003

Unit: mm

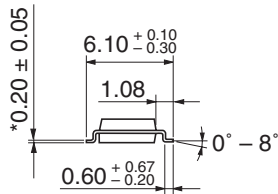
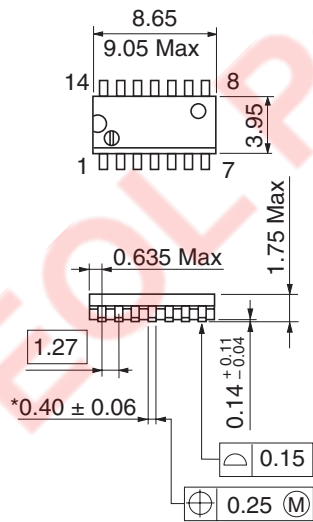


\*Ni/Pd/Au plating

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

As of January, 2003

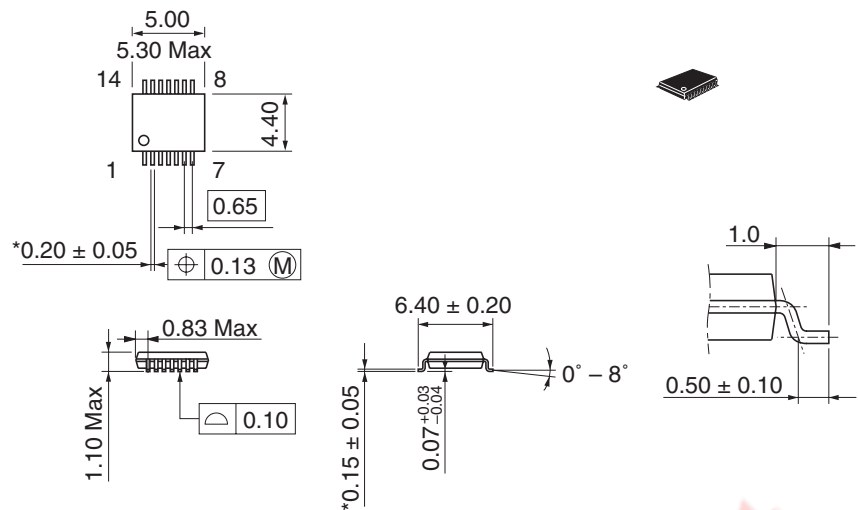
Unit: mm



\*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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