

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

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

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# HD74AC244/HD74ACT244

## Octal Buffer/Line Driver with 3-State Output

REJ03D0262-0200Z  
 (Previous ADE-205-383 (Z))  
 Rev.2.00  
 Jul.16.2004

### Description

The HD74AC244/HD74ACT244 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus-oriented transmitter/receive which provides improved PC board density.

### Features

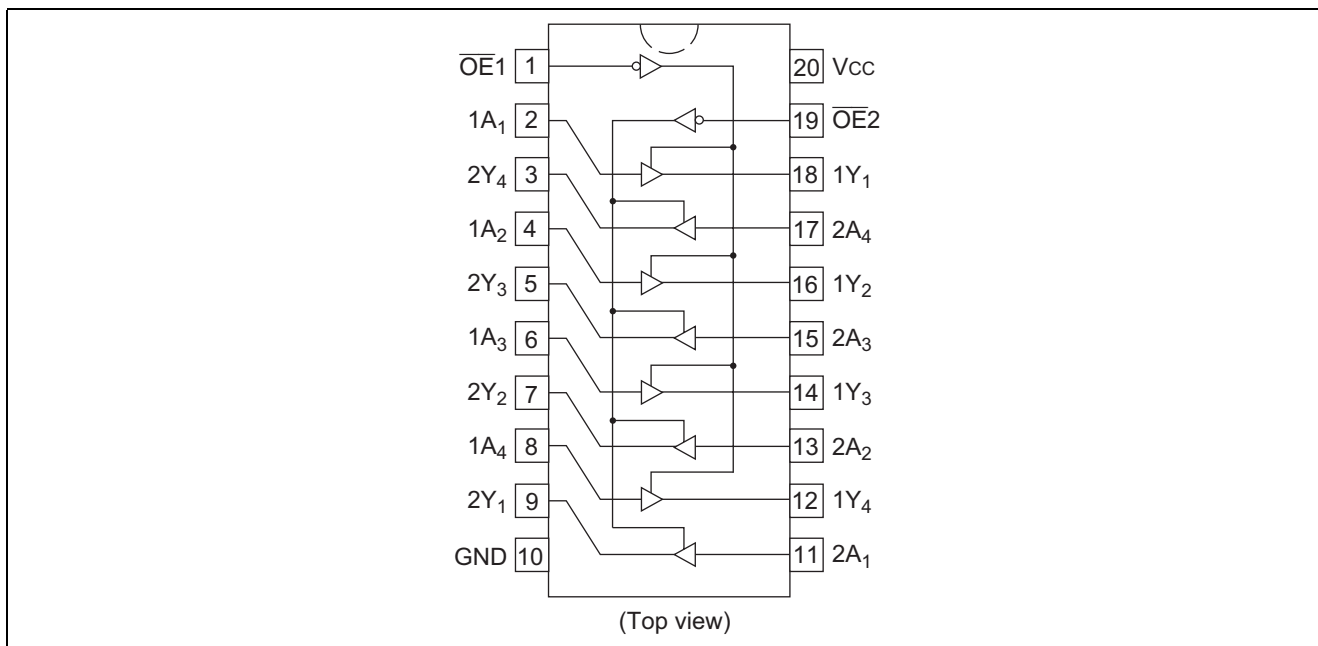
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Outputs Source/Sink 24 mA
- HD74ACT244 has TTL-Compatible Inputs
- Ordering Information: Ex. HD74AC244

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74AC244P	DIP-20 pin	DP-20N, -20NEV	P	—
HD74AC244FPEL	SOP-20 pin (JEITA)	FP-20DAV	FP	EL (2,000 pcs/reel)
HD74AC244RPEL	SOP-20 pin (JEDEC)	FP-20DBV	RP	EL (1,000 pcs/reel)
HD74AC244TELL	TSSOP-20 pin	TTP-20DAV	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



**Truth Tables**

Inputs		Outputs (Pins 12, 14, 16, 18)	
$\overline{OE}_1$	A	Y	
L	L	L	L
L	H	H	H
H	X	Z	Z

Inputs		Outputs (Pins 3, 5, 7, 9)	
$\overline{OE}_2$	A	Y	
L	L	L	L
L	H	H	H
H	X	Z	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: HD74AC244**

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: HD74AC244**

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	—				I <sub>OH</sub> = -24 mA
		5.5	4.94	—	—	4.80	—				I <sub>OH</sub> = -24 mA
	V <sub>OL</sub>	3.0	—	0.002	0.1	—	0.1	V	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				I <sub>OL</sub> = 24 mA
		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: HD74ACT244**

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: HD74ACT244**

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>	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>CCT</sub>	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: HD74AC244**

Item	Symbol	V <sub>CC</sub> (V)*1	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 Data to output	t <sub>PLH</sub>	3.3	1.0	6.5	9.0	1.0	10.0	ns
		5.0	1.0	5.0	7.0	1.0	7.5	
Propagation delay Data to output	t <sub>PHL</sub>	3.3	1.0	6.5	9.0	1.0	10.0	ns
		5.0	1.0	5.0	7.0	1.0	7.5	
Output enable time	t <sub>ZH</sub>	3.3	1.0	6.0	10.5	1.0	11.0	ns
		5.0	1.0	5.0	7.0	1.0	8.0	
Output enable time	t <sub>ZL</sub>	3.3	1.0	7.5	10.0	1.0	11.0	ns
		5.0	1.0	5.5	8.0	1.0	8.5	
Output disable time	t <sub>HZ</sub>	3.3	1.0	7.0	10.0	1.0	10.5	ns
		5.0	1.0	6.5	9.0	1.0	9.5	
Output disable time	t <sub>LZ</sub>	3.3	1.0	7.5	10.5	1.0	11.5	ns
		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: HD74ACT244**

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 Data to output	$t_{PLH}$	5.0	1.0	6.5	9.0	1.0	10.0	ns
Propagation delay Data to output	$t_{PHL}$	5.0	1.0	7.0	9.0	1.0	10.0	ns
Output enable time	$t_{ZH}$	5.0	1.0	6.0	8.5	1.0	9.5	ns
Output enable time	$t_{ZL}$	5.0	1.0	7.0	9.5	1.0	10.5	ns
Output disable time	$t_{HZ}$	5.0	1.0	7.0	9.5	1.0	10.5	ns
Output disable time	$t_{LZ}$	5.0	1.0	7.5	10.0	1.0	10.5	ns

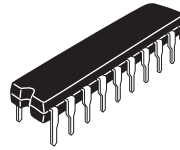
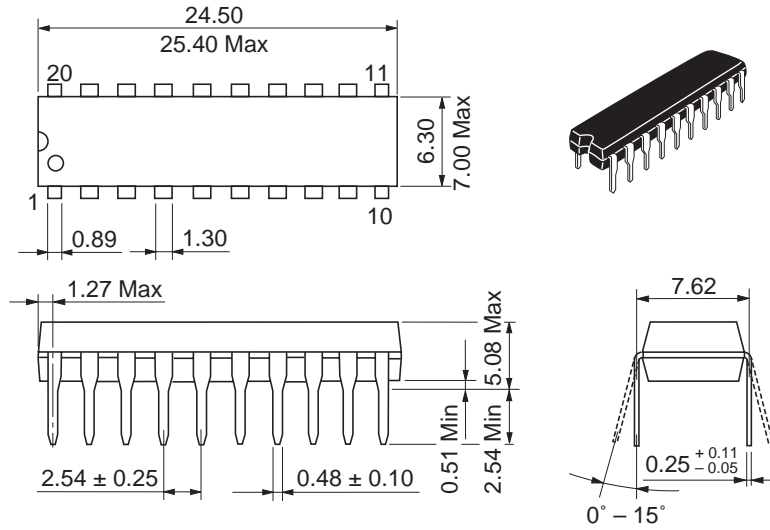
Note: 1. Voltage Range 5.0 is 5.0 V  $\pm$  0.5 V

**Capacitance**

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

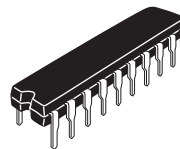
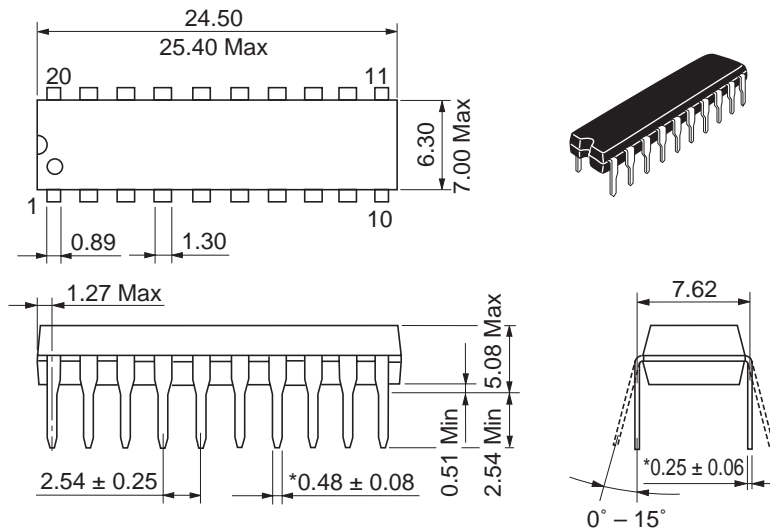
Package Dimensions

As of January, 2003  
Unit: mm



Package Code	DP-20N
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.26 g

Unit: mm



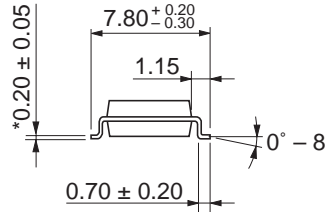
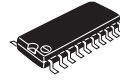
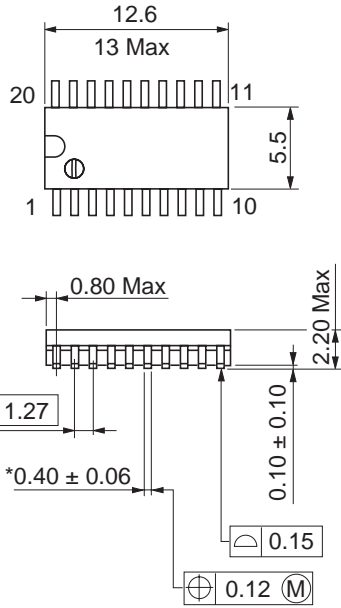
\*Ni/Pd/AU Plating

Package Code	DP-20NEV
JEDEC	—
JEITA	Conforms
Mass (reference value)	1.26 g



As of January, 2003

Unit: mm

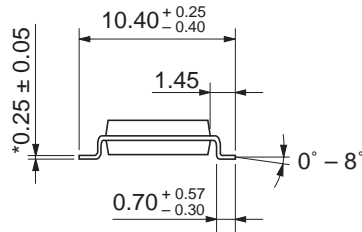
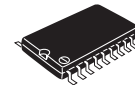
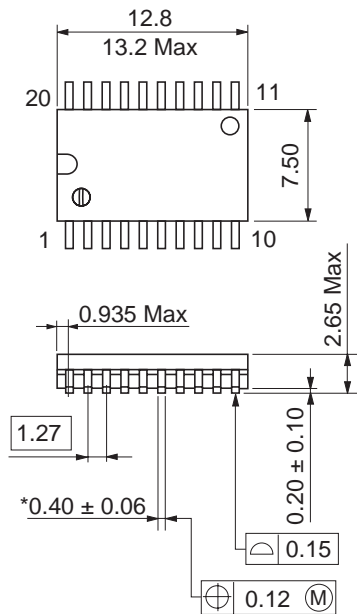


\*Ni/Pd/Au plating

Package Code	FP-20DAV
JEDEC	—
JEITA	Conforms
Mass (reference value)	0.31 g

As of January, 2003

Unit: mm

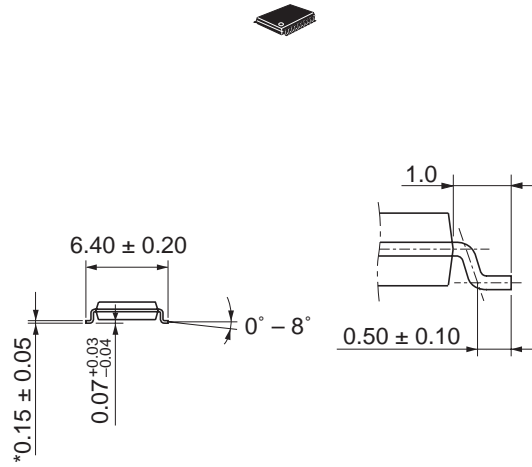
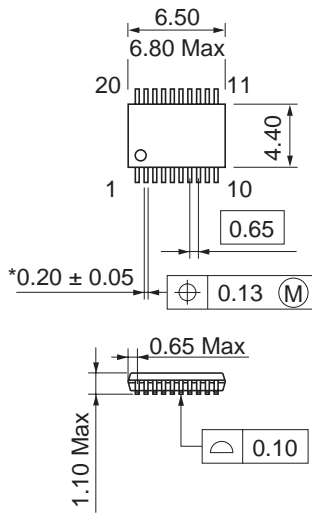


\*Ni/Pd/Au plating

Package Code	FP-20DBV
JEDEC	Conforms
JEITA	—
Mass (reference value)	0.52 g

As of January, 2003

Unit: mm



\*Ni/Pd/Au plating

Package Code	TTP-20DAV
JEDEC	—
JEITA	—
Mass (reference value)	0.07 g

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Tel: <44> (1628) 585 100, Fax: <44> (1628) 585 900

**Renesas Technology Europe GmbH**

Dornacher Str. 3, D-85622 Feldkirchen, Germany  
Tel: <49> (89) 380 70 0, Fax: <49> (89) 929 30 11

**Renesas Technology Hong Kong Ltd.**

7/F., North Tower, World Finance Centre, Harbour City, Canton Road, Hong Kong  
Tel: <852> 2265-6688, Fax: <852> 2375-6836

**Renesas Technology Taiwan Co., Ltd.**

FL 10, #99, Fu-Hsing N. Rd., Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

**Renesas Technology (Shanghai) Co., Ltd.**

26/F., Ruijin Building, No.205 Maoming Road (S), Shanghai 200020, China  
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

**Renesas Technology Singapore Pte. Ltd.**

1, Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: <65> 6213-0200, Fax: <65> 6278-8001