RENESAS HD74LVCZ244A

Octal Buffers / Line Drivers with 3-state Outputs

REJ03D0371–0300 (Previous ADE-205-230A (Z)) Rev.3.00 Aug. 18, 2004

Description

The HD74LVCZ244A has eight line drivers with three state outputs in a 20 pin package. This device is a noninverting buffer and has two active low enables ($1\overline{G}$ and $2\overline{G}$). Each enable independently controls four buffers.

When V_{CC} is between 0 and 1.5 V, the device is in the high impedance state during power up or power down.

Low voltage and high-speed operation is suitable at battery drive product (note type personal computer) and low power consumption extends the life of a battery for long time operation.

Features

- $V_{CC} = 2.7$ to 5.5 V
- All inputs V_{IH} (Max) = 5.5 V (@V_{CC} = 0 to 5.5 V)
- All outputs V_0 (Max) = 5.5 V (@V_{CC} = 0 V or output off state)
- Typical V_{OL} ground bounce < 0.8 V (@V_{CC} = 3.3 V, Ta = 25°C)
- Typical V_{OH} undershoot > 2.0 V (@V_{CC} = 3.3 V, Ta = 25° C)
- High impedance state during power up and power down
- Power off disables outputs, permitting live insertion
- High output current ± 24 mA (@V_{CC} = 3.0 to 5.5 V)
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)			
HD74LVCZ244AFPEL	SOP–20 pin (JEITA)	FP–20DAV	FP	EL (2,000 pcs/reel)			
HD74LVCZ244ATELL	TSSOP-20 pin	TTP-20DAV	Т	ELL (2,000 pcs/reel)			

Function Table

Inputs

G	Α	Output Y
Н	Х	Z
L	Н	Н
L	L	L

H: High level

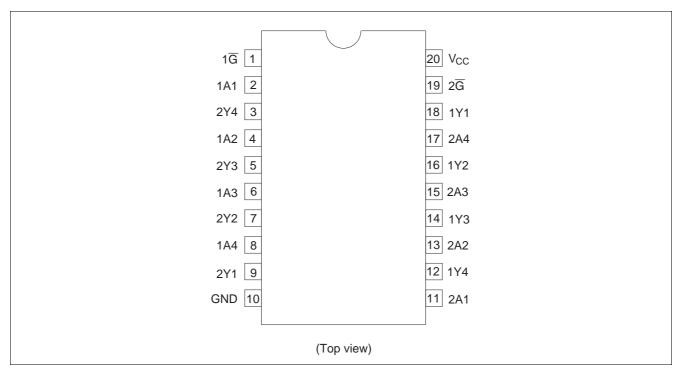
L: Low level

X: Immaterial

Z: High impedance



Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V _{CC}	–0.5 to 7.0	V	
Input voltage	VI	–0.5 to 7.0	V	
Output voltage	Vo	–0.5 to 7.0	V	Output "Z" or V _{CC} : OFF
		–0.5 to V _{CC} +0.5		Output "H" or "L"
Input diode current	I _{IK}	-50	mA	V ₁ < 0
Output diode current	Ι _{ΟΚ}	-50	mA	V ₀ < 0
Output current	lo	±50	mA	
V _{CC} , GND current	I _{CC} or I _{GND}	±100	mA	
Storage temperature	Tstg	-65 to 150	°C	

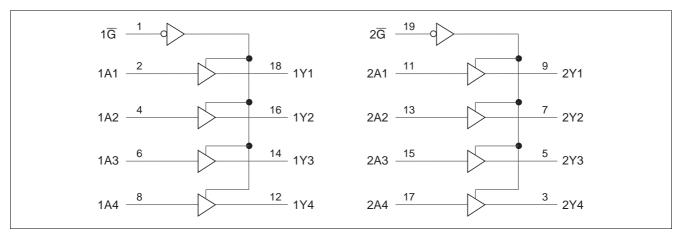
Note: The absolute maximum ratings are values, which must not individually be exceeded, and furthermore, no two of which may be realized at the same time.

Recommended Operating Conditions

Item	Symbol	Ratings	Unit	Conditions
Supply voltage	V _{CC}	2.7 to 5.5	V	At operation
Input voltage	VI	0 to 5.5	V	
Output voltage	Vo	0 to 5.5	V	Output "Z" or V _{CC} : OFF
		0 to V _{CC}		Output "H" or "L"
Output current	I _{OH}	-12	mA	$V_{CC} = 2.7 V$
		-24 ^{*1}		V_{CC} = 3.0 to 5.5 V
	I _{OL}	12	mA	$V_{CC} = 2.7 V$
		24 ^{*1}		V_{CC} = 3.0 to 5.5 V
Input rise / fall time	t _r , t _f	0 to 6	ns / V	
Operating temperature	Та	-40 to +85	°C	

Note: 1. Duty cycle $\leq 50\%$

Logic Diagram





Electrical Characteristics

							$(Ta = -40 \text{ to } 85^{\circ}C)$
Item	Symbol	V _{cc} (V)	Min	Тур	Max	Unit	Test Conditions
Input voltage	VIH	2.7 to 3.6	2.0	_	_	V	
		4.5 to 5.5	V _{CC} ×0.7	_	_	_	
	V _{IL}	2.7 to 3.6		_	0.8	V	
		4.5 to 5.5		_	V _{CC} ×0.3	_	
Output voltage	V _{OH}	2.7 to 5.5	V _{CC} -0.2	_	_	V	I _{OH} = -100 μA
		2.7	2.2	_	_	_	$I_{OH} = -12 \text{ mA}$
		3.0	2.4	_	_	_	
		3.0	2.2	_	_	_	I _{OH} = -24 mA
		4.5	3.8	_	_	_	
	V _{OL}	2.7 to 5.5	_	_	0.2	V	I _{OL} = 100 μA
		2.7	_	_	0.4	-	I _{OL} = 12 mA
		3.0	_	_	0.55	_	I _{OL} = 24 mA
		4.5	_	_	0.55	_	
Input current	I _{IN}	0 to 5.5	_	_	±5	μΑ	V _{IN} = 0 to 5.5 V
Off state output	l _{oz}	2.7 to 5.5	_	_	±5	μΑ	V _{OUT} = 0 to 5.5 V
current	IOZPU	0 to 1.5	_	_	±5	_	V _{OUT} = 0.5 to 5.5 V,
	IOZPD	1.5 to 0		_	±5	_	Output enable = don't care
Output leak current	IOFF	0		_	±5	μΑ	V_{IN} or $V_O = 5.5 V$
Quiescent supply	Icc	2.7 to 3.6		_	225	μΑ	$V_{IN} = 3.6$ to 5.5 V ^{*1} , $I_O = 0$
current		2.7 to 5.5		_	350	- '	$V_{IN} = V_{CC}$ or GND
	ΔI_{CC}	2.7 to 3.6		_	500	μΑ	V_{IN} = one input at (V _{CC} -0.6) V,
							other inputs at V _{CC} or GND
Input capacitance	CIN	3.3	_	3.4	_	pF	$V_{IN} = V_{CC}$ or GND
Output capacitance	Co	3.3		7.5	_	pF	$V_{OUT} = V_{CC}$ or GND

Note: 1. This applies in the disabled state only.

Switching Characteristics

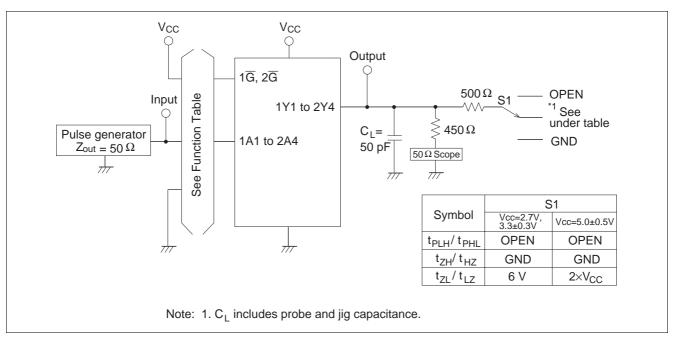
							$(Ta = -40 \text{ to } 85^{\circ}C)$	
	_						FROM	ТО
Item	Symbol	V _{cc} (V)	Min	Тур	Max	Unit	(Input)	(Output)
Propagation delay time	t _{PLH}	2.7	_	_	6.9	ns	А	Y
	t _{PHL}	3.3±0.3	1.5	_	5.9			
		5.0±0.5	_	—	4.5			
Output enable time	t _{ZH}	2.7	_	—	8.6	ns	G	Y
	t _{ZL}	3.3±0.3	1.5	—	7.6			
		5.0±0.5	_	—	6.1			
Output disable time	t _{HZ}	2.7	_	—	6.8	ns	G	Y
	t _{LZ}	3.3±0.3	1.5	—	6.5			
		5.0±0.5	_	—	5.5			
Between output pin skew *1	t _{OSLH}	2.7	_	—	_	ns		
	toshl	3.3±0.3			1.0			
		5.0±0.5	_	_	1.0			

Note: 1. This parameter is characterized but not tested.

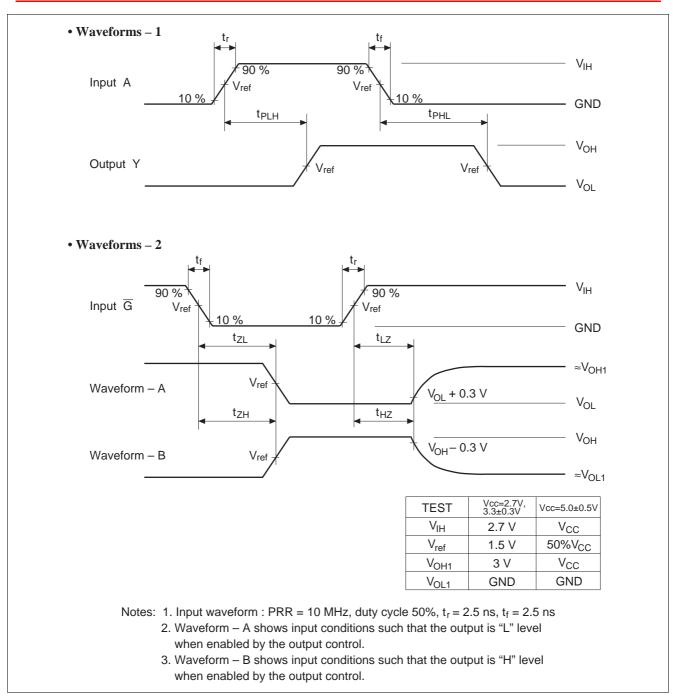
 $t_{OSLH} = |t_{PLHm} - t_{PLHn}|, t_{OSHL} = |t_{PHLm} - t_{PHLn}|$



Test Circuit

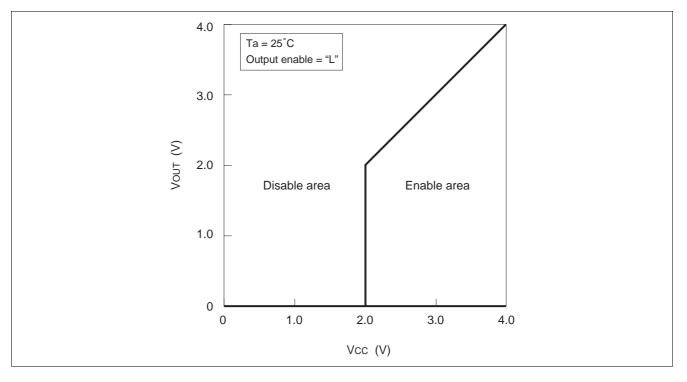






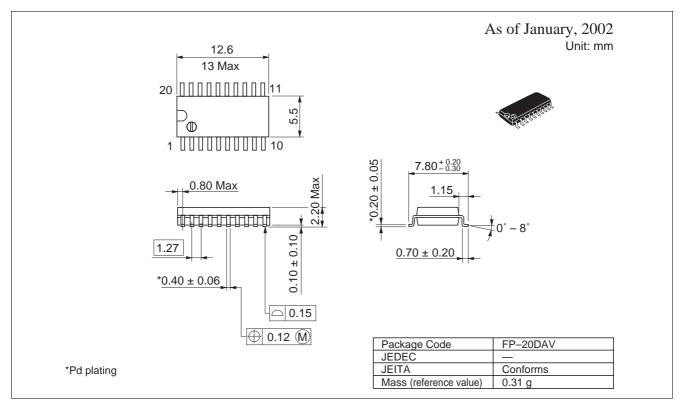


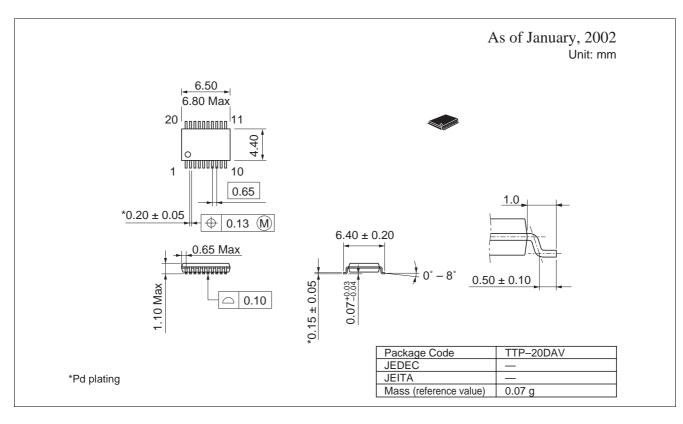
Power up / down Characteristics





Package Dimensions





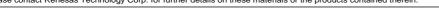
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