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April 1st, 2010
Renesas Electronics Corporation

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

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Not recommended
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HD74LVC244A

Octal Buffers / Line Drivers with 3-state Outputs

REJ03D0352-0400Z
 (Previous ADE-205-110B (Z))
 Rev.4.00
 Jul. 27, 2004

Description

The HD74LVC244A has eight line drivers with three state outputs in a 20 pin package. This device is a non inverting buffer and has two active low enables ($\overline{1G}$ and $\overline{2G}$). Each enable independently controls four buffers. Low voltage and high-speed operation is suitable at the battery drive product (note type personal computer) and low power consumption extends the life of a battery for long time operation.

Features

- $V_{CC} = 2.0\text{ V to }5.5\text{ V}$
- All inputs $V_{IH} (\text{Max.}) = 5.5\text{ V} (@V_{CC} = 0\text{ V to }5.5\text{ V})$
- All outputs $V_{OUT} (\text{Max.}) = 5.5\text{ V} (@V_{CC} = 0\text{ V or output off state})$
- Typical V_{OL} ground bounce $< 0.8\text{ V} (@V_{CC} = 3.3\text{ V, }T_a = 25^\circ\text{C})$
- Typical V_{OH} undershoot $> 2.0\text{ V} (@V_{CC} = 3.3\text{ V, }T_a = 25^\circ\text{C})$
- High output current $\pm 24\text{ mA} (@V_{CC} = 3.0\text{ V to }5.5\text{ V})$
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LVC244AFPEL	SOP-20 pin (JEITA)	FP-20DAV	FP	EL (2,000 pcs/reel)
HD74LVC244ATELL	TSSOP-20 pin	TTP-20DAV	T	ELL (2,000 pcs/reel)

Note: Please consult the sales office for the above package availability.

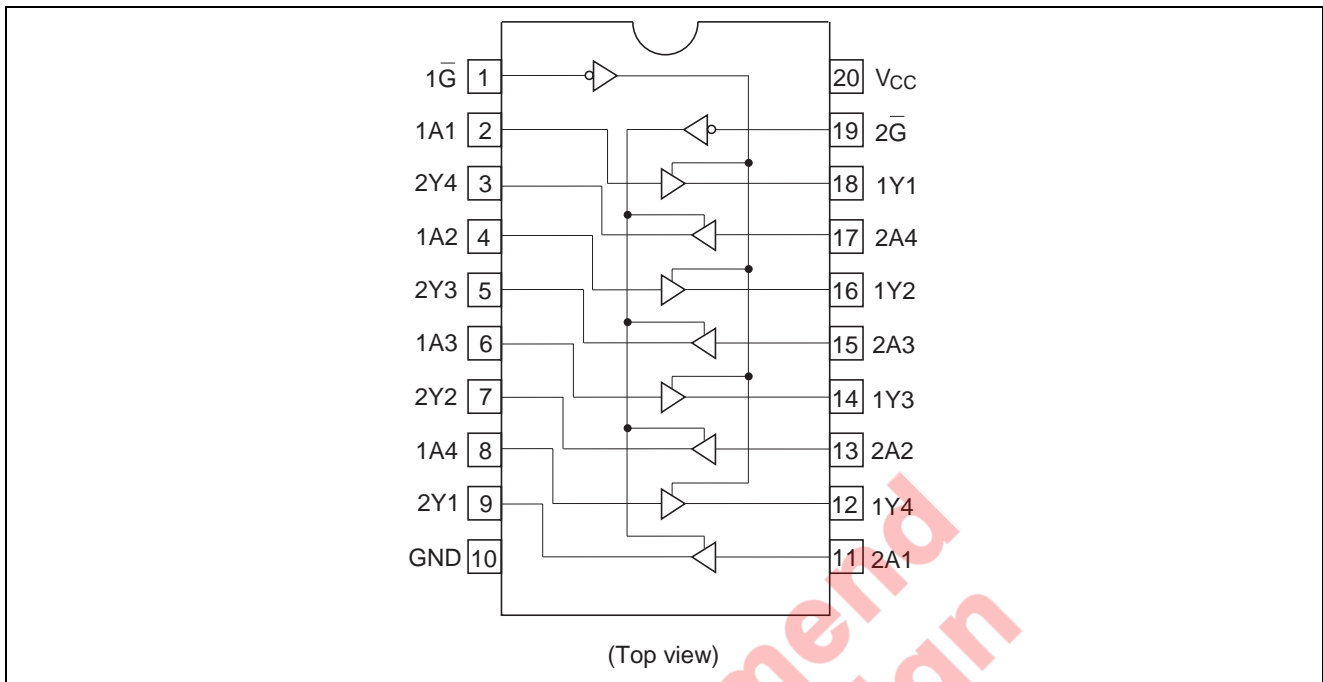
Function Table

Inputs

\overline{G}	A	Output Y
H	X	Z
L	H	H
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 6.0	V	
Input diode current	I_{IK}	-50	mA	$V_I = -0.5$ V
Input voltage	V_I	-0.5 to 6.0	V	
Output diode current	I_{OK}	-50 50	mA	$V_O = -0.5$ V $V_O = V_{CC} + 0.5$ V
Output voltage	V_O	-0.5 to $V_{CC} + 0.5$ -0.5 to 6.0	V	Output "H" or "L" Output "Z" V_{CC} :OFF
Output current	I_O	± 50	mA	
V_{CC} , GND current / pin	I_{CC} or I_{GND}	100	mA	
Storage temperature	T_{stg}	-65 to 150	$^{\circ}$ 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}	1.5 to 5.5	V	Data retention
		2.0 to 5.5		At operation
Input / output voltage	V _I	0 to 5.5	V	\bar{G} , A
	V _O	0 to V _{CC}	V	Output "H" or "L"
		0 to 5.5		Output "Z" or V _{CC} :OFF
Operating temperature	T _a	-40 to 85	°C	
Output current	I _{OH}	-12	mA	V _{CC} = 2.7 V
		-24 ^{*2}		V _{CC} = 3.0 V to 5.5 V
	I _{OL}	12	mA	V _{CC} = 2.7 V
		24 ^{*2}		V _{CC} = 3.0 V to 5.5 V
Input rise / fall time ^{*1}	t _r , t _f	10	ns/V	

- Notes: 1. This item guarantees maximum limit when one input switches.
 Waveform: Refer to test circuit of switching characteristics.
 2. Duty cycle ≤ 50%

Electrical Characteristics

Item	Symbol	V _{CC} (V)	Ta = -40 to 85°C		Unit	Test Conditions
			Min	Max		
Input voltage	V _{IH}	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 mA
		3.0	2.4	—		I _{OH} = -24 mA
		3.0	2.2	—		
		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		—
Off state output current	I _{OZ}	2.7 to 5.5	—	±5.0	μA	V _{IN} = V _{CC} , GND, V _{OUT} = 5.5 V or GND
Output leak current	I _{OFF}	0	—	20	μA	V _{IN} / V _{OUT} = 5.5 V
Quiescent supply current	I _{CC}	2.7 to 3.6	—	±10	μA	V _{IN} / V _{OUT} = 3.6 to 5.5 V
		2.7 to 5.5	—	10		V _{IN} = V _{CC} or GND
	ΔI _{CC}	3.0 to 3.6	—	500	μA	V _{IN} = one input at (V _{CC} -0.6)V, other inputs at V _{CC} or GND

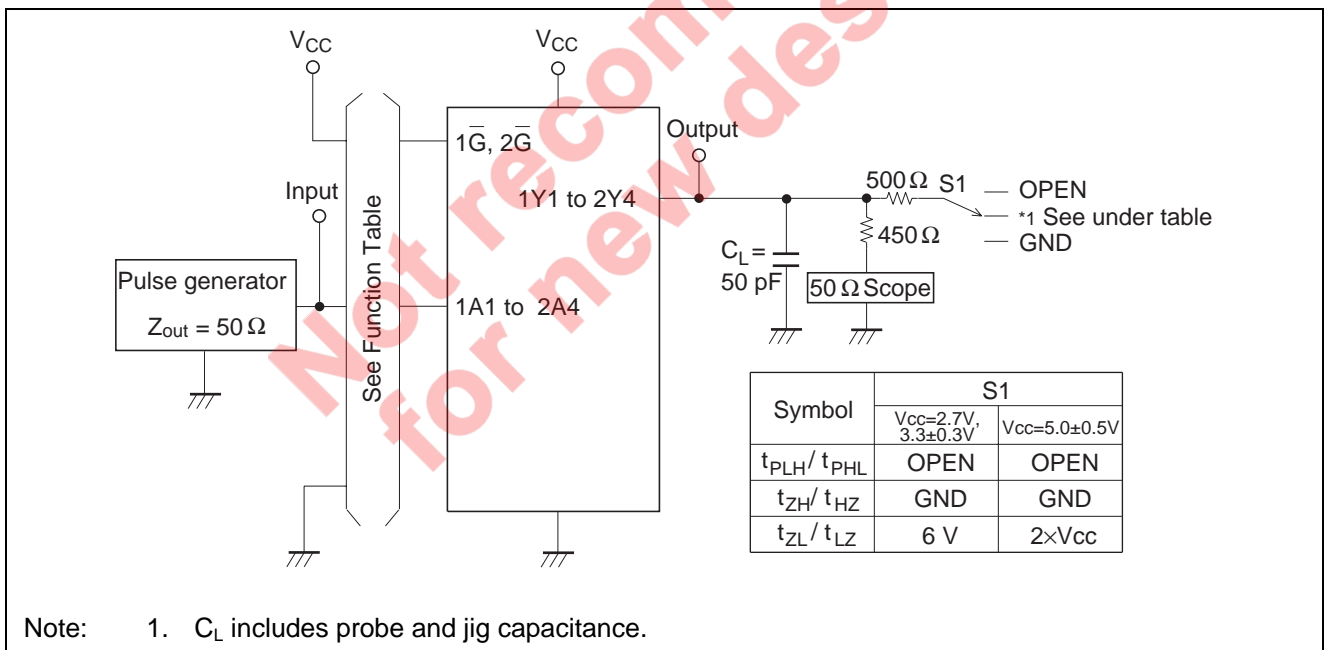
Switching Characteristics

Item	Symbol	V _{CC} (V)	Ta = -40 to 85°C			Unit	From (Input)	To (Output)
			Min	Typ	Max			
Propagation delay time	t _{PLH}	2.7	—	—	7.5	ns	A	Y
	t _{PHL}	3.3±0.3	1.5	—	6.5			
		5.0±0.5	—	—	5.0			
Output enable time	t _{ZH}	2.7	—	—	9.0	ns	G̅	Y
	t _{ZL}	3.3±0.3	1.5	—	8.0			
		5.0±0.5	—	—	6.5			
Output disable time	t _{ZH}	2.7	—	—	8.0	ns	G̅	Y
	t _{LZ}	3.3±0.3	1.5	—	7.0			
		5.0±0.5	—	—	6.0			
Between output pins skew ^{*1}	t _{OSLH}	2.7	—	—	—	ns		
	t _{OSHL}	3.3±0.3	—	—	1.0			
		5.0±0.5	—	—	1.0			
Input capacitance	C _{IN}	2.7	—	3.0	—	pF		
Output capacitance	C _O	2.7	—	15.0	—	pF		

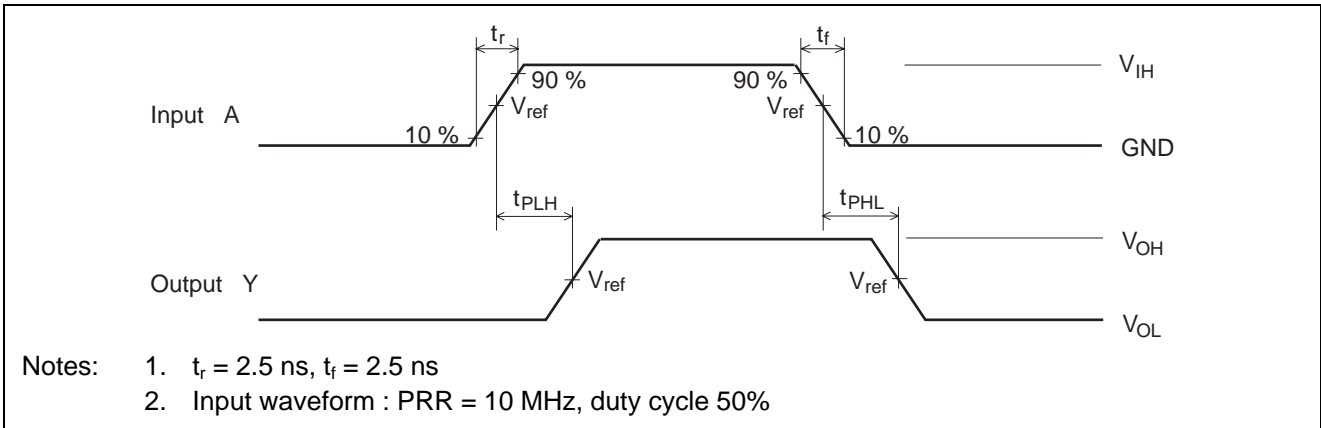
Note: 1. This parameter is characterized but not tested.

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

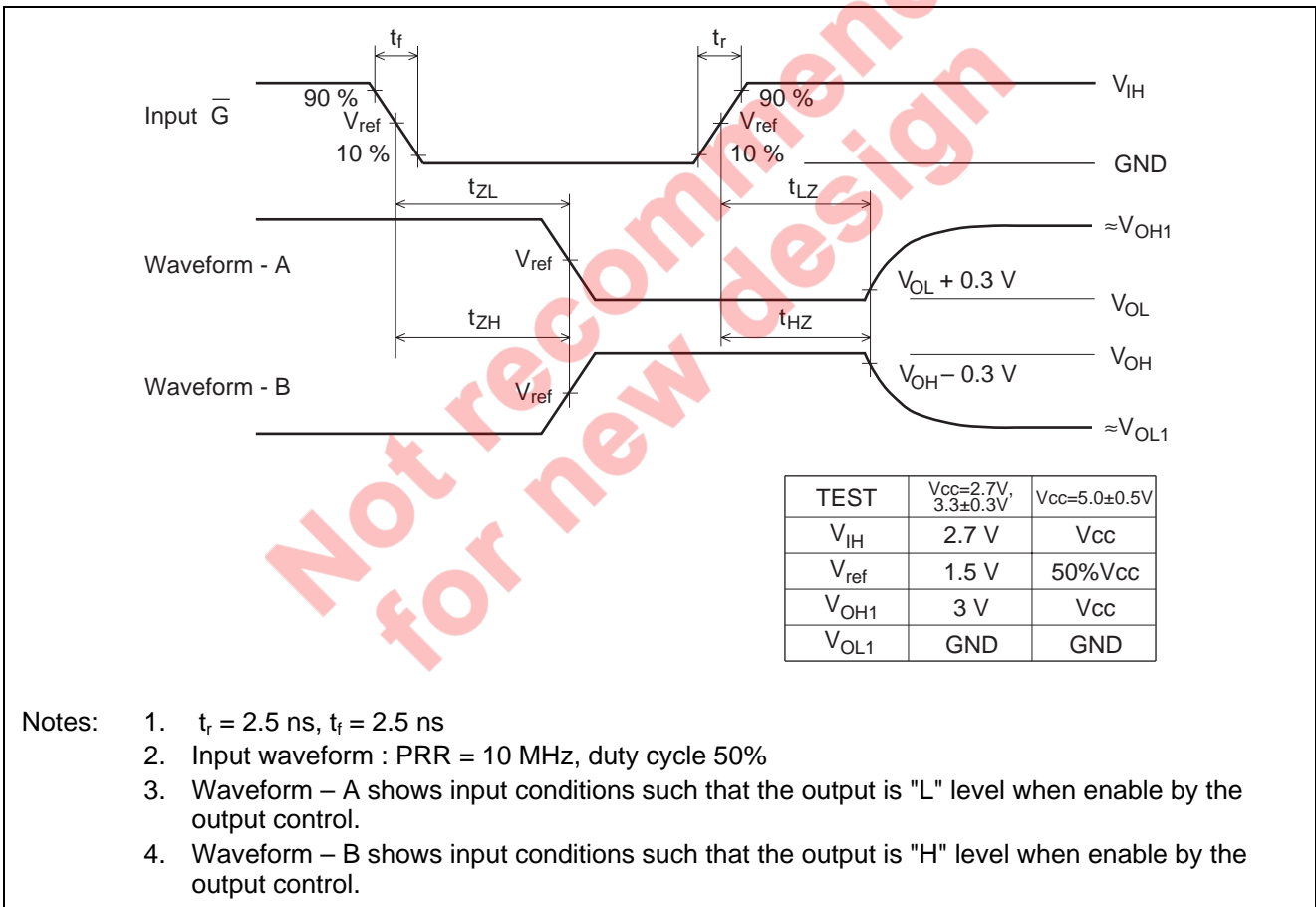
Test Circuit



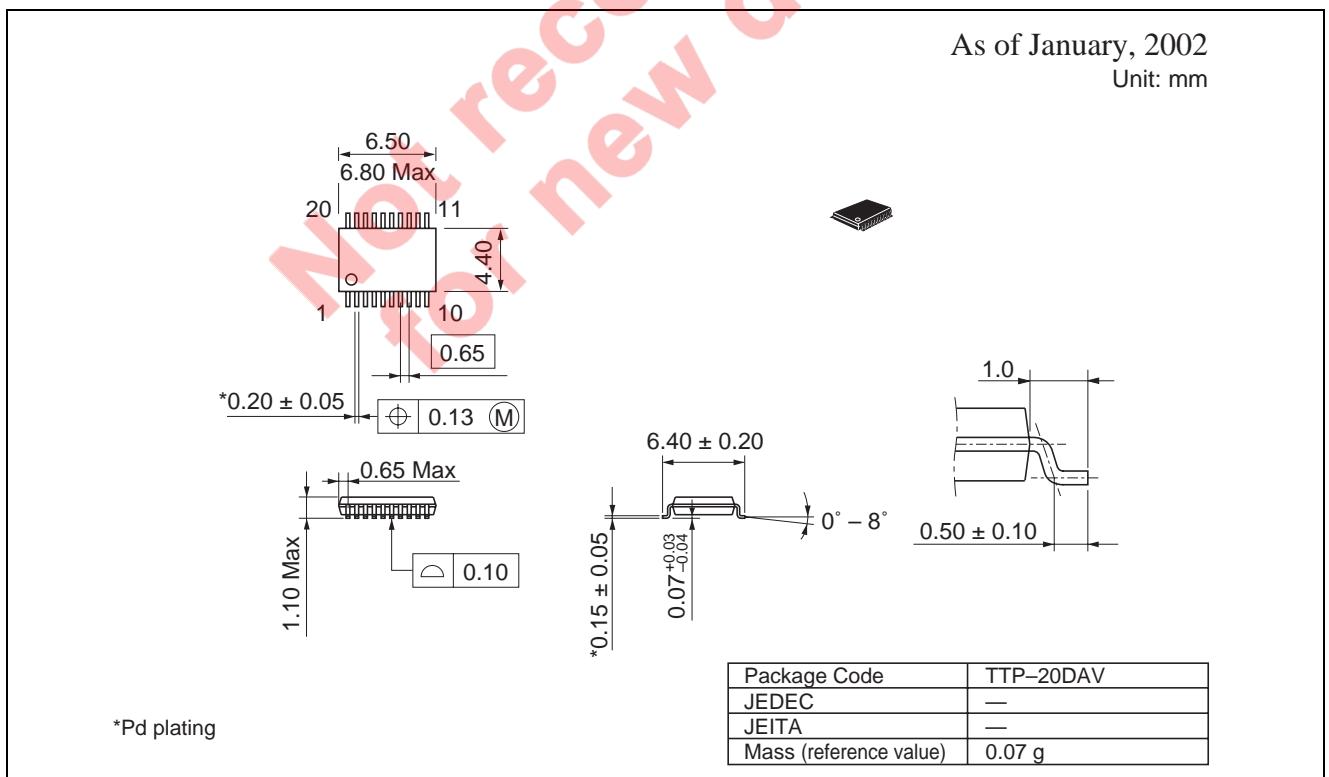
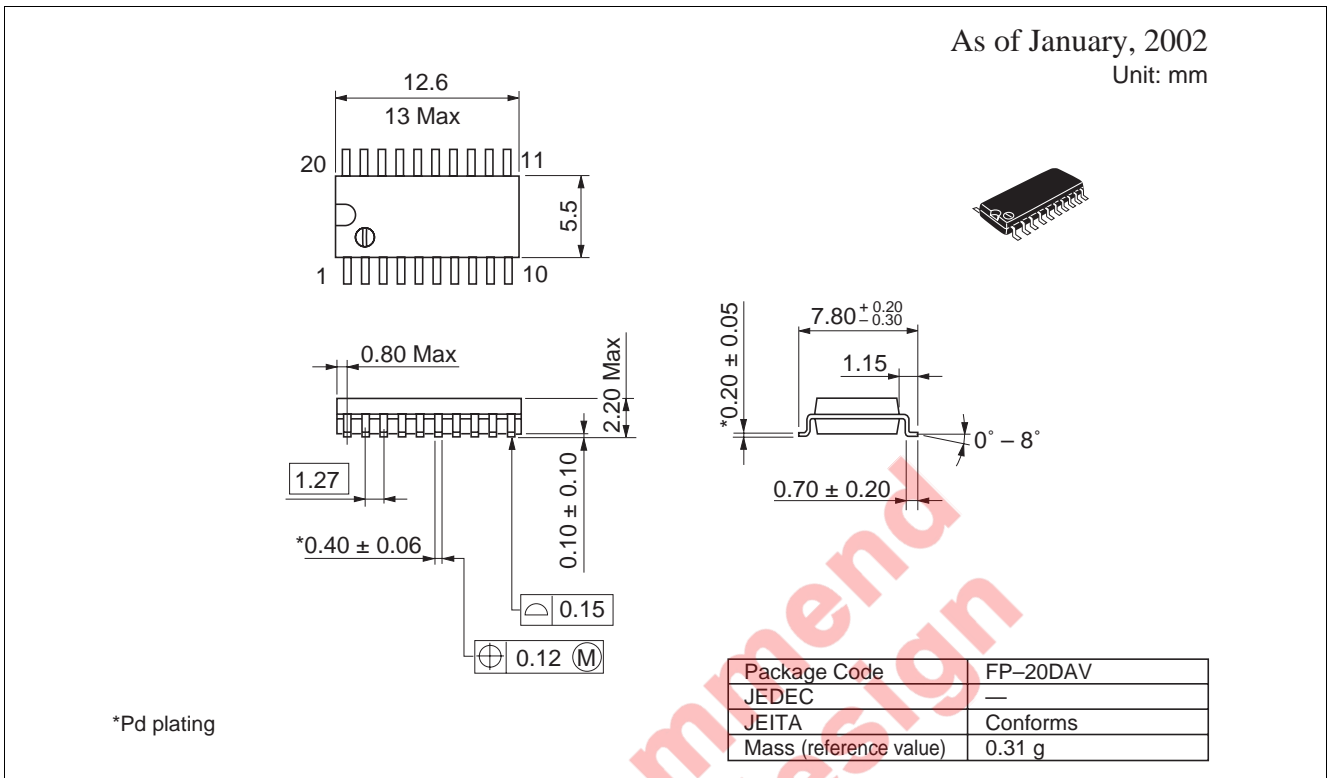
Waveforms – 1



Waveforms – 2



Package Dimensions



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