

HD74LVC245A

Octal Bidirectional Transceivers with 3-state Outputs

REJ03D0353-0400Z
 (Previous ADE-205-111B (Z))
 Rev.4.00
 Jul. 27, 2004

Description

The HD74LVC245A has eight buffers with three state outputs in a 20 pin package. When (T / \bar{R}) is high, data flows from the A inputs to the B outputs, and when (T / \bar{R}) is low, data flows from the B inputs to the A outputs. A and B bus are separated by making enable input (OE) high level. 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 input outputs $V_{IO} (\text{Max.}) = 5.5\text{ V} (@V_{CC} = 0\text{ V or output off state})$
- 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)
HD74LVC245AFPEL	SOP-20 pin (JEITA)	FP-20DAV	FP	EL (2,000 pcs/reel)
HD74LVC245ATELL	TSSOP-20 pin	TTP-20DAV	T	ELL (2,000 pcs/reel)

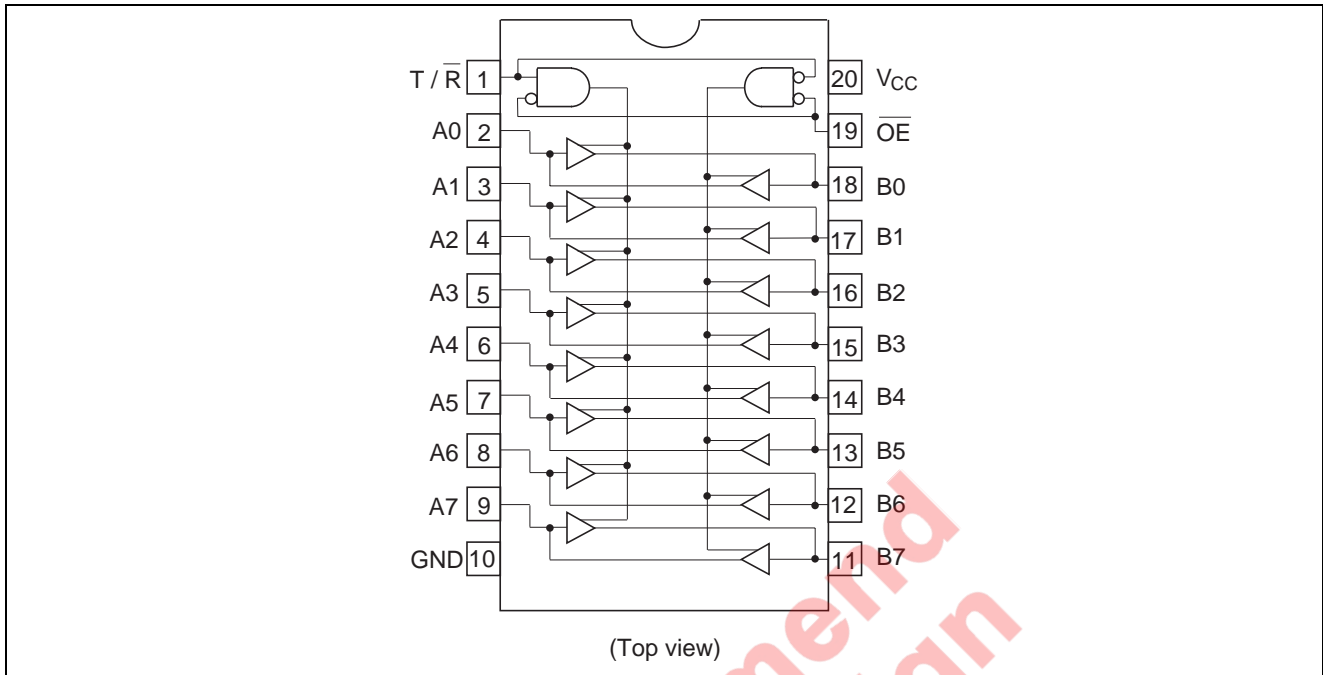
Note: Please consult the sales office for the above package availability.

Function Table

Inputs		T / \bar{R}	Operation
\overline{OE}			
L	L	L	B data to A bus
L	L	H	A data to B bus
H	H	X	Z

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	$T / \bar{R}, \overline{OE}$
Output diode current	I_{OK}	-50	mA	$V_O = -0.5$ V
		50		$V_O = V_{CC} + 0.5$ V
Input / output voltage	V_{IO}	-0.5 to $V_{CC} + 0.5$	V	Output "H" or "L"
		-0.5 to 6.0		Output "Z" or 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	T / R, \overline{OE}
	V_{IO}	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)	$T_a = -40$ 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	$V_{CC} \times 0.7$	—		
	V_{IL}	2.7 to 3.6	—	0.8	V	
		4.5 to 5.5	—	$V_{CC} \times 0.3$		
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	—	±5.0	μA	$V_{IN} = 5.5$ V or GND
Off state output current	I_{OZ}	2.7 to 5.5	—	±5.0	μA	$V_{IN} = V_{CC}, \text{GND},$ $V_{OUT} = 5.5$ 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		$V_{IN} = V_{OUT}$ 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

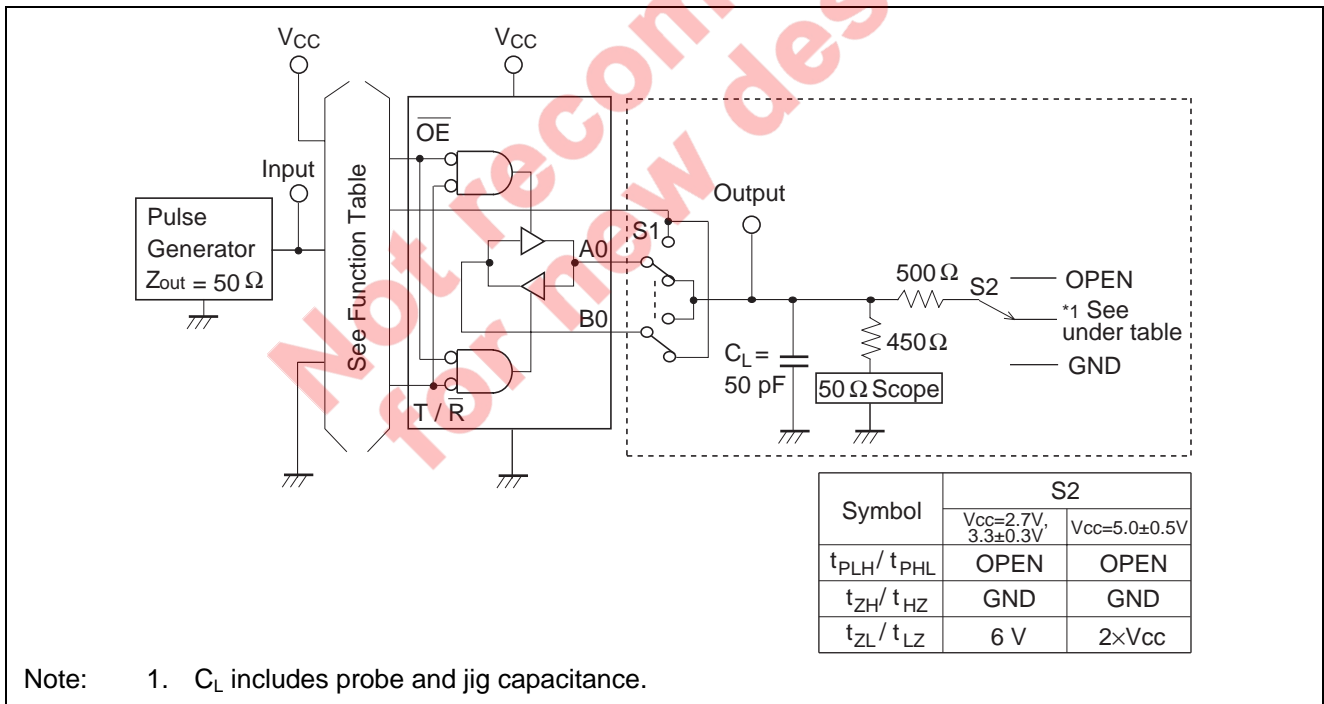
Switching Characteristics

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	—	—	8.0	ns	A or B	B or A
	t _{PHL}	3.3±0.3	1.5	—	7.0			
		5.0±0.5	—	—	5.5			
Output enable time	t _{ZH}	2.7	—	—	9.5	ns	OE	A or B
	t _{ZL}	3.3±0.3	1.5	—	8.5			
		5.0±0.5	—	—	7.0			
Output disable time	t _{ZH}	2.7	—	—	8.5	ns	OE	A or B
	t _{LZ}	3.3±0.3	1.5	—	7.5			
		5.0±0.5	—	—	6.5			
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.

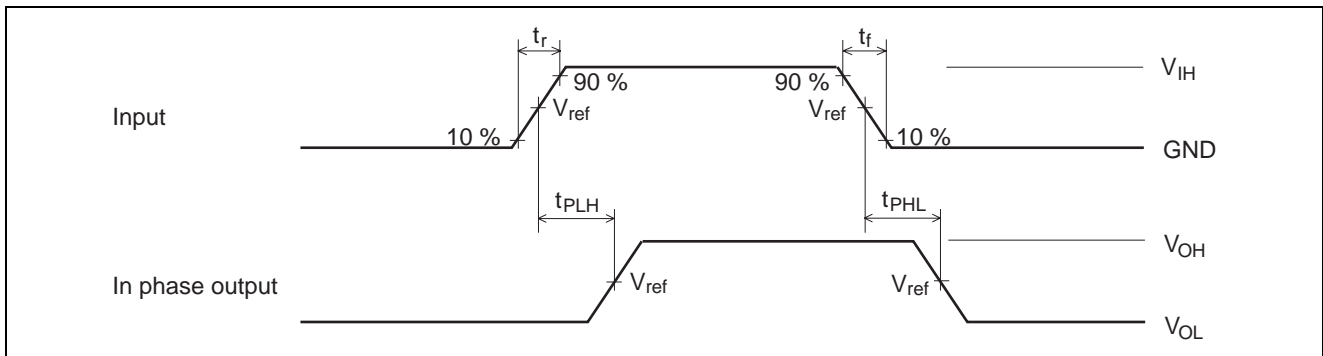
$$t_{OSLH} = |t_{PLHm} - t_{PLHn}|, t_{OSHL} = |t_{PHLm} - t_{PHLn}|$$

Test Circuit

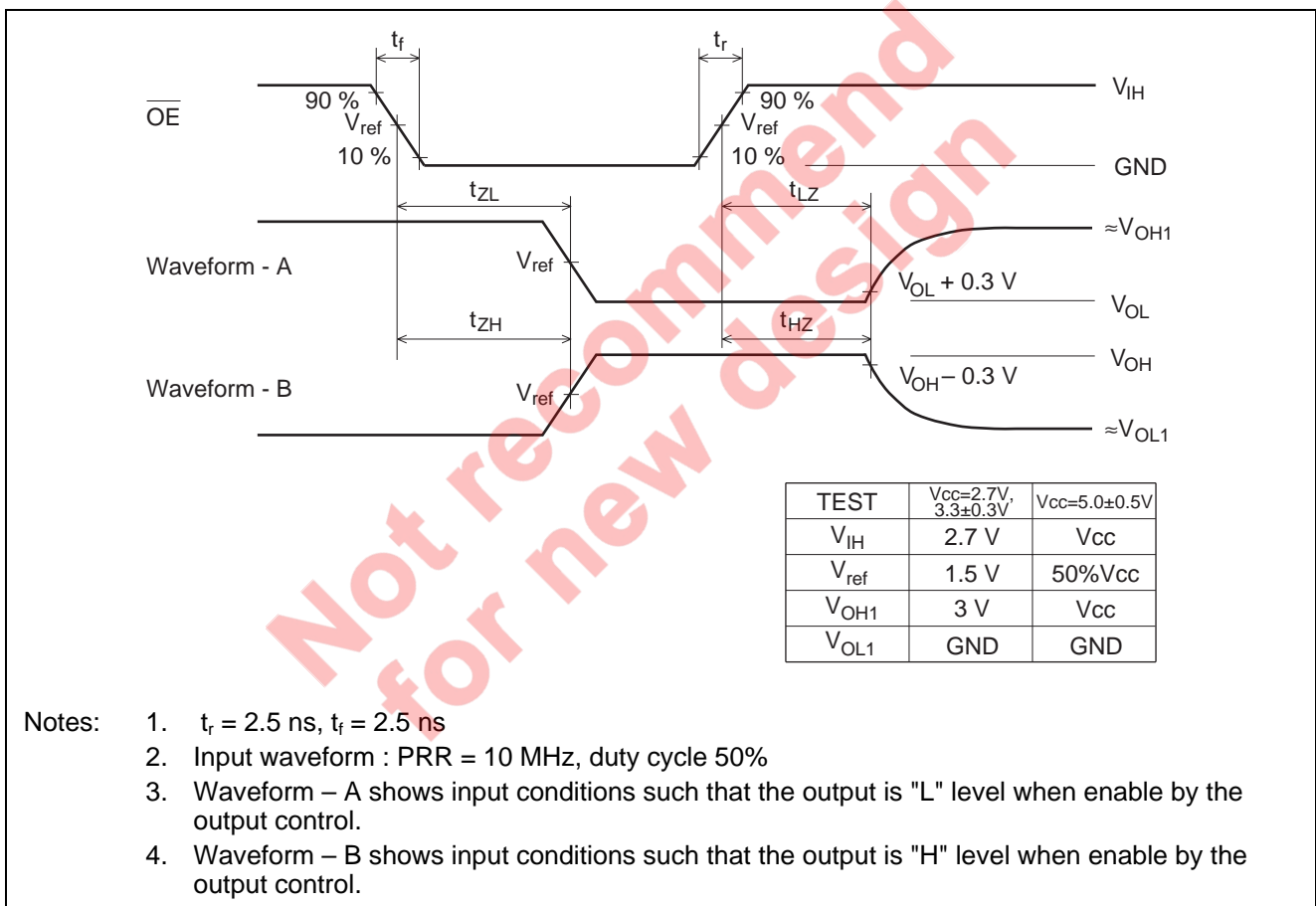


Note: 1. C_L includes probe and jig capacitance.

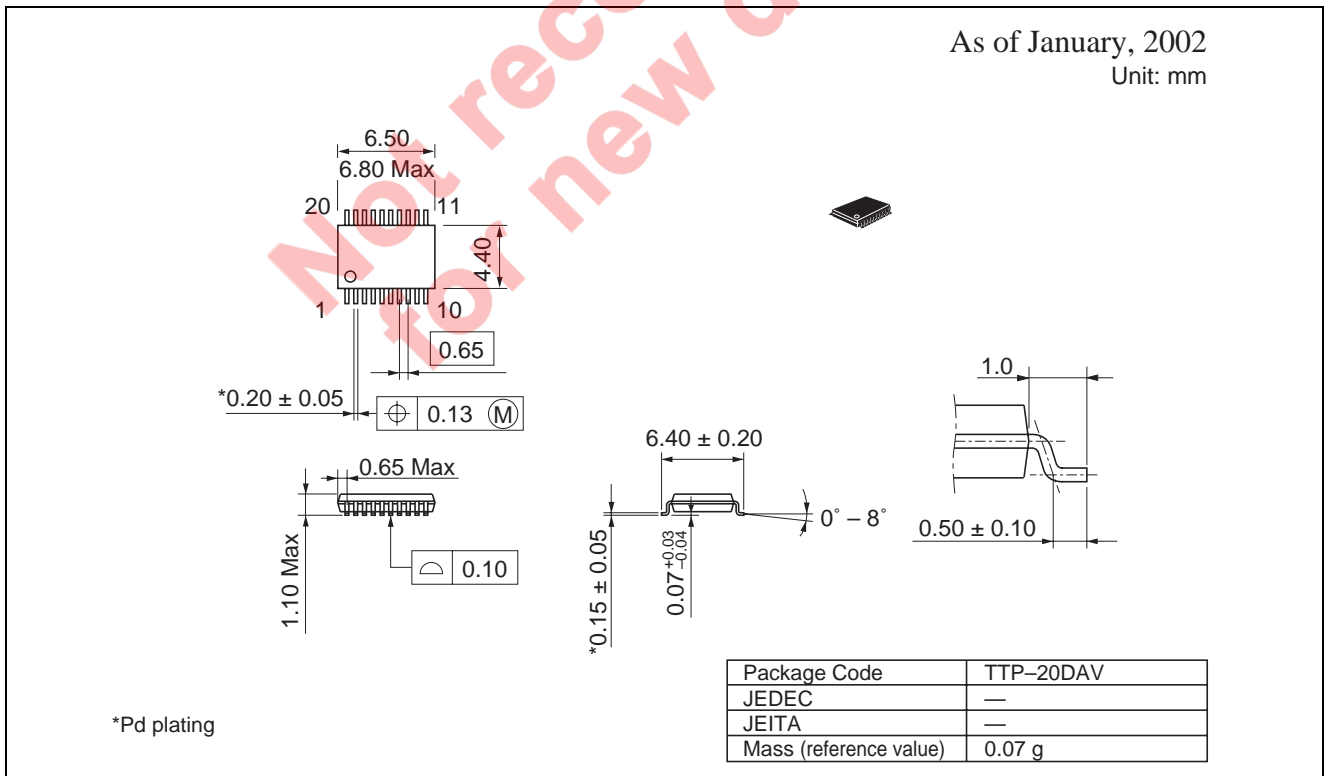
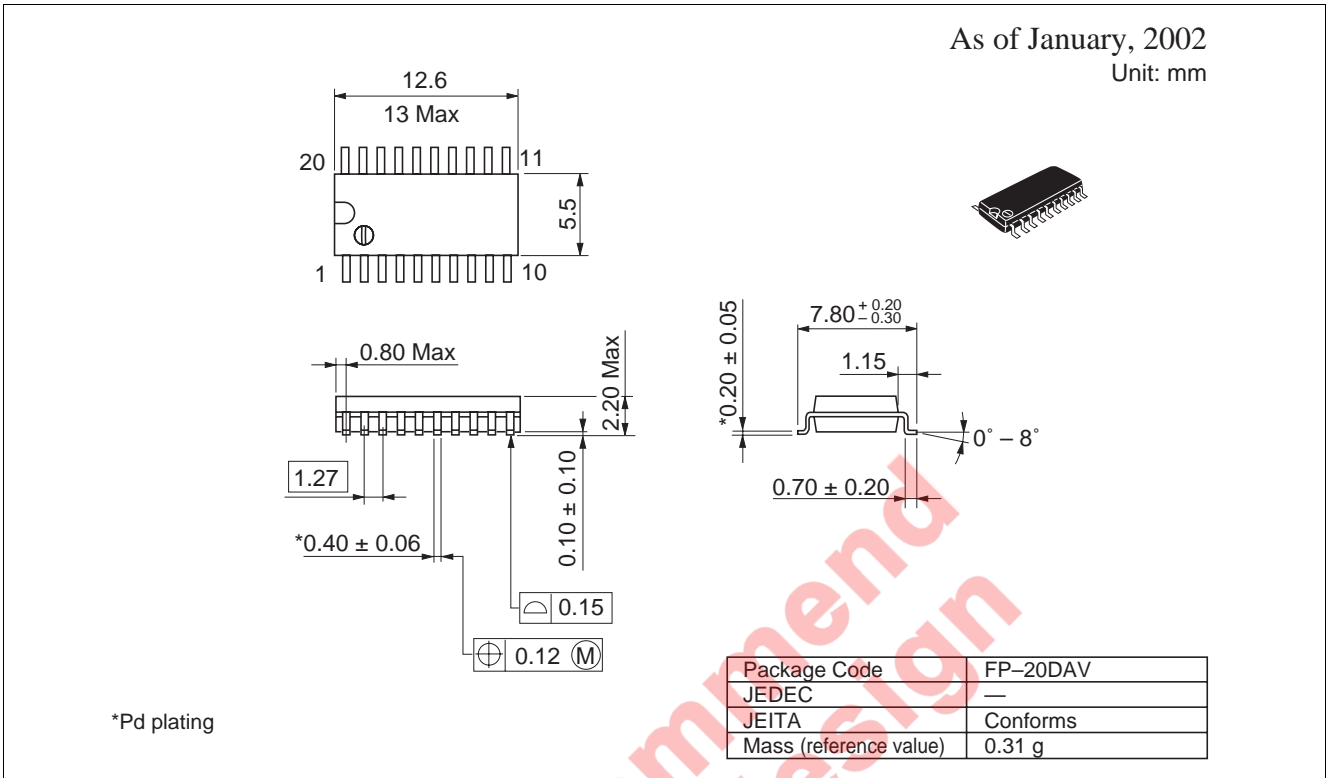
Waveforms – 1



Waveforms – 2



Package Dimensions



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