

HD74LV2G66A

2-channel Analog Switch

REJ03D0095-0400Z
(Previous ADE-205-566C (Z))
Rev.4.00
Sep.30 2003

Description

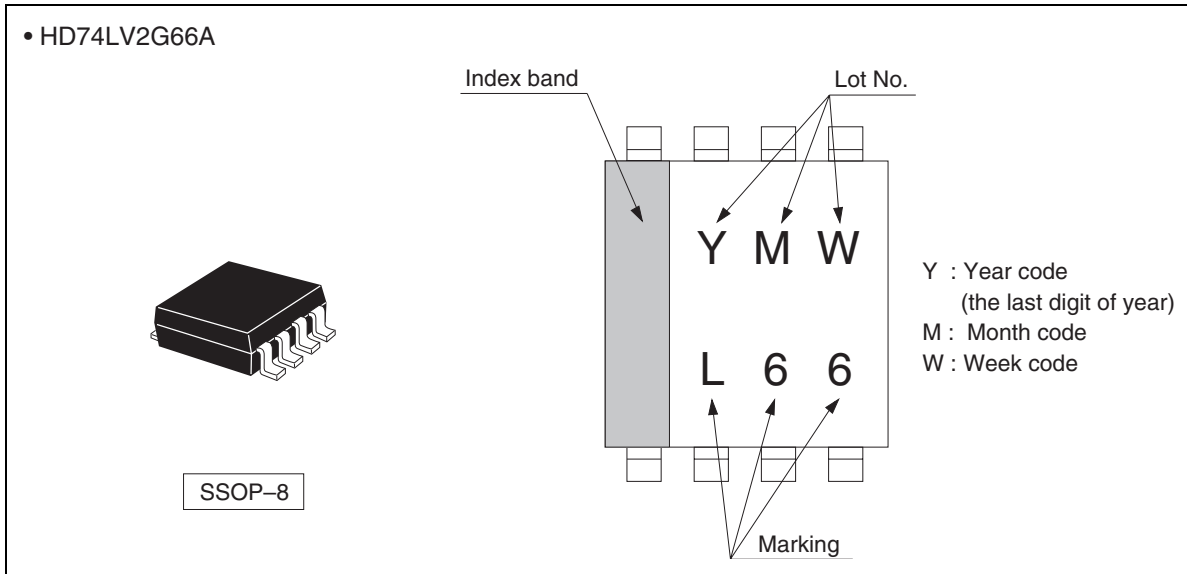
The HD74LV2G66A has 2-channel analog switch in an 8 pin package. Each switch section has its own enable input control (C). High-level voltage applied to C turns on the associated switch section. Applications include signal gating, chopping, modulation, or demodulation (modem), and signal multiplexing for analog to digital and digital to analog conversion systems. Low voltage and high-speed operation is suitable for the battery powered products (e.g., notebook computers), and the low power consumption extends the battery life.

Features

- The basic gate function is lined up as Renesas uni logic series.
- Supplied on emboss taping for high-speed automatic mounting.
- Electrical characteristics equivalent to the HD74LV4066A
Supply voltage range : 1.65 to 5.5 V
Operating temperature range : -40 to +85°C
- Control inputs V_{IH} (Max.) = 5.5 V (@ V_{CC} = 0 V to 5.5 V)
- Control inputs has hysteresis voltage for the slow transition.
- Ordering Information

Part Name	Package Type	Package Code	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV2G66AUSE	SSOP-8 pin	TTP-8DBV	US	E (3,000 pcs/reel)

Outline and Article Indication

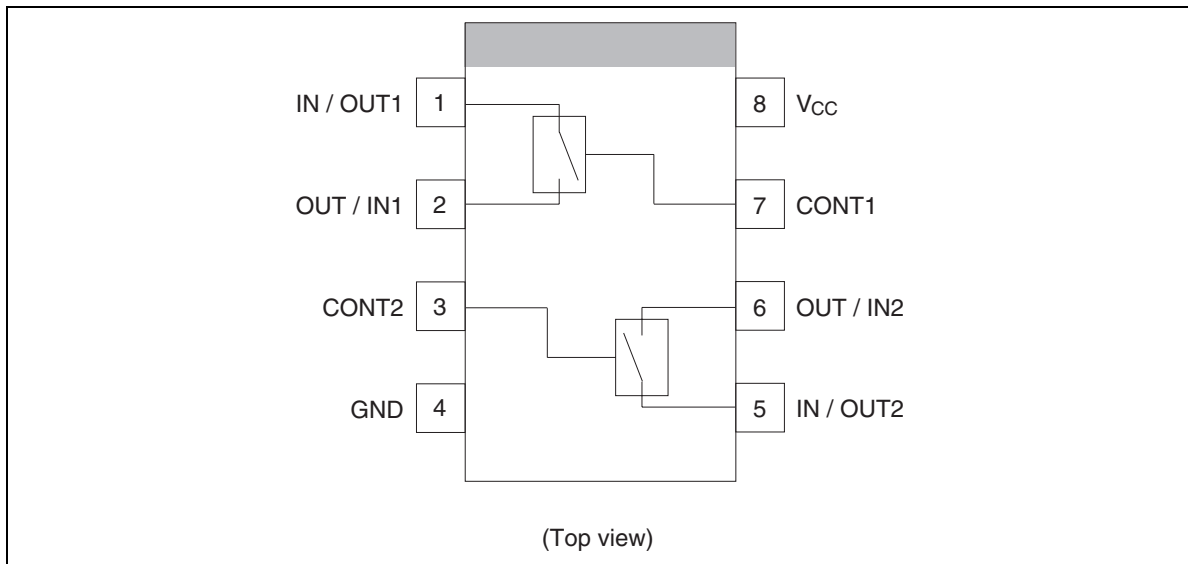


Function Table

Control	Switch
L	OFF
H	ON

H : High level
L : Low level

Pin Arrangement



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit	Test Conditions
Supply voltage range	V_{CC}	-0.5 to 7.0	V	
Input voltage range ^{*1}	V_I	-0.5 to 7.0	V	
Output voltage range ^{*1, 2}	V_O	-0.5 to $V_{CC} + 0.5$	V	Output : H or L
Input clamp current	I_{IK}	-20	mA	$V_I < 0$
Output clamp current	I_{OK}	± 50	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	I_O	± 25	mA	$V_O = 0$ to V_{CC}
Continuous current through V_{CC} or GND	I_{CC} or I_{GND}	± 50	mA	
Maximum power dissipation at $T_a = 25^\circ\text{C}$ (in still air) ^{*3}	P_T	200	mW	
Storage temperature	T_{stg}	-65 to 150	$^\circ\text{C}$	

- Notes: 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.
1. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
 2. This value is limited to 5.5 V maximum.
 3. The maximum package power dissipation was calculated using a junction temperature of 150 $^\circ\text{C}$.

Recommended Operating Conditions

Item	Symbol	Min	Max	Unit	Conditions
Supply voltage range	V_{CC}	1.65	5.5	V	
Input voltage range	V_I	0	5.5	V	
Input / output voltage range	V_{IO}	0	V_{CC}	V	
Input transition rise or fall rate	$\Delta t / \Delta v$	0	300	ns / V	$V_{CC} = 1.65$ to 1.95 V
		0	200		$V_{CC} = 2.3$ to 2.7 V
		0	100		$V_{CC} = 3.0$ to 3.6 V
		0	20		$V_{CC} = 4.5$ to 5.5 V
Operating free-air temperature	T_a	-40	85	°C	

Note: Unused or floating control inputs must be held high or low.

Electrical Characteristic

Item	Symbol	VCC (V)	Ta = 25°C			Ta = -40 to 85°C			Unit	Test Conditions
			Min	Typ	Max	Min	Typ	Max		
Input voltage	V _{IH}	1.65 to 1.95	—	—	—	V _{CC} ×0.75	—	—	V	Control input only
		2.3 to 2.7	—	—	—	V _{CC} ×0.7	—	—		
		3.0 to 3.6	—	—	—	V _{CC} ×0.7	—	—		
		4.5 to 5.5	—	—	—	V _{CC} ×0.7	—	—		
	V _{IL}	1.65 to 1.95	—	—	—	—	—	V _{CC} ×0.25		
		2.3 to 2.7	—	—	—	—	—	V _{CC} ×0.3		
		3.0 to 3.6	—	—	—	—	—	V _{CC} ×0.3		
		4.5 to 5.5	—	—	—	—	—	V _{CC} ×0.3		
Hysteresis voltage	V _H	1.8	—	—	—	—	0.25	—	V	V _T ⁺ - V _T ⁻
		2.5	—	—	—	—	0.30	—		
		3.3	—	—	—	—	0.35	—		
		5.0	—	—	—	—	0.45	—		
On-state switch resistance	R _{ON}	1.65	—	120	360	—	—	450	Ω	V _{IN} = V _{CC} or GND V _C = V _{IH} I _T = 1 mA
		2.3	—	60	180	—	—	225		
		3.0	—	50	150	—	—	190		
		4.5	—	40	75	—	—	100		
Peak on resistance	R _{ON(P)}	1.65	—	400	1100	—	—	1400	Ω	V _{IN} = V _{CC} to GND V _C = V _{IH} I _T = 1 mA
		2.3	—	200	500	—	—	600		
		3.0	—	90	180	—	—	225		
		4.5	—	50	100	—	—	125		
Difference of on-state resistance between switches	ΔR _{ON}	1.65	—	40	120	—	—	160	Ω	V _{IN} = V _{CC} to GND V _C = V _{IH} I _T = 1 mA
		2.3	—	20	30	—	—	40		
		3.0	—	10	20	—	—	30		
		4.5	—	7	15	—	—	20		
Off-state switch leakage current	I _{S(OFF)}	5.5	—	—	±0.1	—	—	±1.0	μA	V _{IN} = V _{CC} , V _{OUT} = GND or V _{IN} = GND, V _O = V _{CC} , V _C = V _{IL}
On-state switch leakage current	I _{S(ON)}	5.5	—	—	±0.1	—	—	±1.0	μA	V _{IN} = V _{CC} or GND V _C = V _{IH}
Input current	I _{IN}	0 to 5.5	—	—	±0.1	—	—	±1.0	μA	V _{IN} = 5.5 V or GND
Quiescent supply current	I _{CC}	5.5	—	—	—	—	—	10	μA	V _{IN} = V _{CC} or GND
Control input capacitance	C _{IC}	—	—	3.5	—	—	—	—	pF	
Switch terminal capacitance	C _{IN/OUT}	—	—	4.0	—	—	—	—	pF	
Feed through capacitance	C _{IN-OUT}	—	—	0.5	—	—	—	—	pF	

Switching Characteristics

- $V_{CC} = 1.8 \pm 0.15 \text{ V}$

Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	4.0	13.0	—	19.0	ns	$C_L = 15 \text{ pF}$	IN/OUT or OUT/IN	OUT/IN or IN/OUT
	t_{PHL}	—	11.0	23.0	—	29.0		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	11.0	24.0	—	29.0	ns	$C_L = 15 \text{ pF}$	C	IN/OUT or OUT/IN
	t_{ZL}	—	18.0	44.0	—	51.0		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	11.0	21.0	—	29.0	ns	$C_L = 15 \text{ pF}$	C	IN/OUT or OUT/IN
	t_{LZ}	—	18.0	46.0	—	53.0		$C_L = 50 \text{ pF}$		

- $V_{CC} = 2.5 \pm 0.2 \text{ V}$

Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	2.0	10.0	—	16.0	ns	$C_L = 15 \text{ pF}$	IN/OUT or OUT/IN	OUT/IN or IN/OUT
	t_{PHL}	—	5.0	12.0	—	18.0		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	6.0	15.0	—	20.0	ns	$C_L = 15 \text{ pF}$	C	IN/OUT or OUT/IN
	t_{ZL}	—	8.0	25.0	—	32.0		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	7.0	15.0	—	23.0	ns	$C_L = 15 \text{ pF}$	C	IN/OUT or OUT/IN
	t_{LZ}	—	11.0	25.0	—	32.0		$C_L = 50 \text{ pF}$		

- $V_{CC} = 3.3 \pm 0.3 \text{ V}$

Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	1.5	6.0	—	10.0	ns	$C_L = 15 \text{ pF}$	IN/OUT or OUT/IN	OUT/IN or IN/OUT
	t_{PHL}	—	4.0	9.0	—	12.0		$C_L = 50 \text{ pF}$		
Enable time	t_{ZH}	—	4.0	11.0	—	15.0	ns	$C_L = 15 \text{ pF}$	C	IN/OUT or OUT/IN
	t_{ZL}	—	6.0	18.0	—	22.0		$C_L = 50 \text{ pF}$		
Disable time	t_{HZ}	—	5.0	11.0	—	15.0	ns	$C_L = 15 \text{ pF}$	C	IN/OUT or OUT/IN
	t_{LZ}	—	8.0	18.0	—	22.0		$C_L = 50 \text{ pF}$		

Switching Characteristics (cont)

- $V_{CC} = 5.0 \pm 0.5$ V

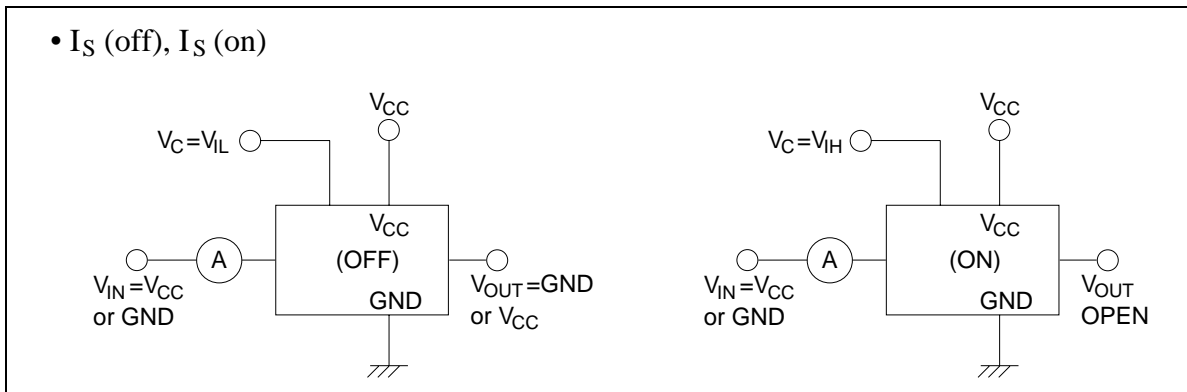
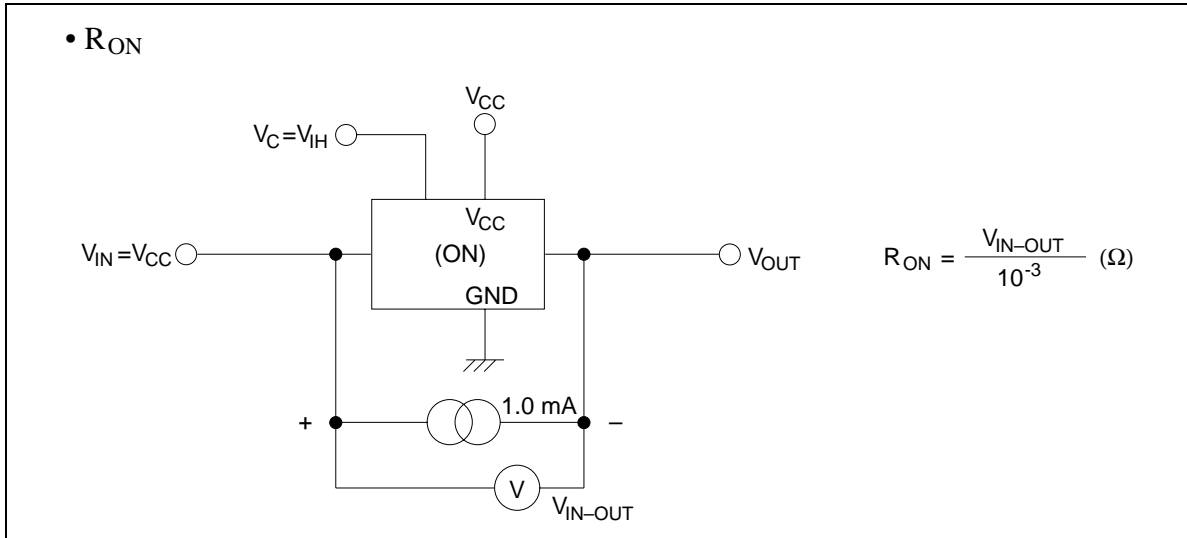
Item	Symbol	$T_a = 25^\circ\text{C}$			$T_a = -40$ to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t_{PLH}	—	1.0	4.0	—	7.0	ns	$C_L = 15$ pF	IN/OUT or OUT/IN	OUT/IN or IN/OUT
	t_{PHL}	—	3.0	6.0	—	8.0		$C_L = 50$ pF		
Enable time	t_{ZH}	—	3.0	7.0	—	10.0	ns	$C_L = 15$ pF	C	IN/OUT or OUT/IN
	t_{ZL}	—	5.0	12.0	—	16.0		$C_L = 50$ pF		
Disable time	t_{HZ}	—	4.0	7.0	—	10.0	ns	$C_L = 15$ pF	C	IN/OUT or OUT/IN
	t_{LZ}	—	6.0	12.0	—	16.0		$C_L = 50$ pF		

Operating Characteristics

- $C_L = 50$ pF

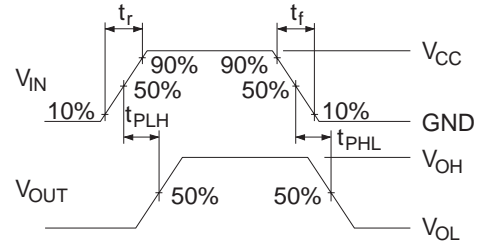
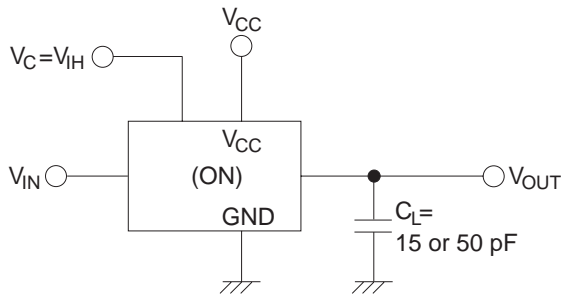
Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C_{PD}	3.3	—	3.5	—	pF	$f = 10$ MHz
			5.0	—	4.0		

Test Circuit



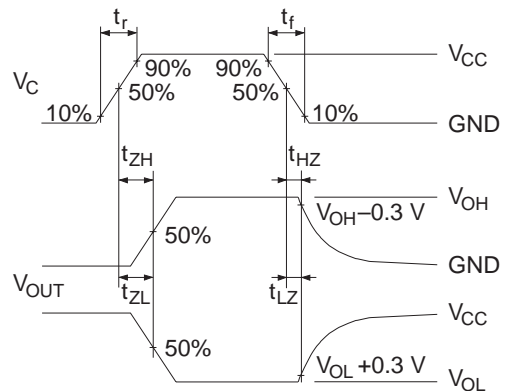
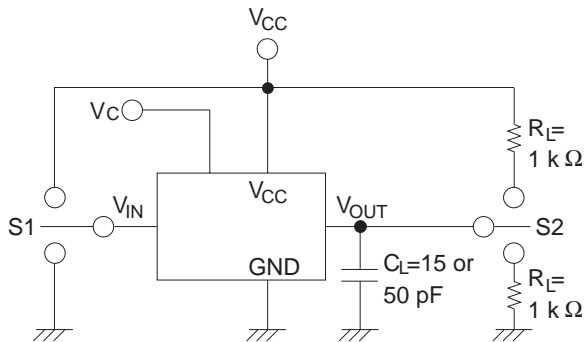
HD74LV2G66A

• t_{PLH}, t_{PHL}



- Notes: 1. Input waveform : $PRR \leq 1 \text{ MHz}$, $Z_o = 50 \Omega$, $t_r \leq 3 \text{ ns}$, $t_f \leq 3 \text{ ns}$.
 2. The output are measured one at a time with one transition per measurement.

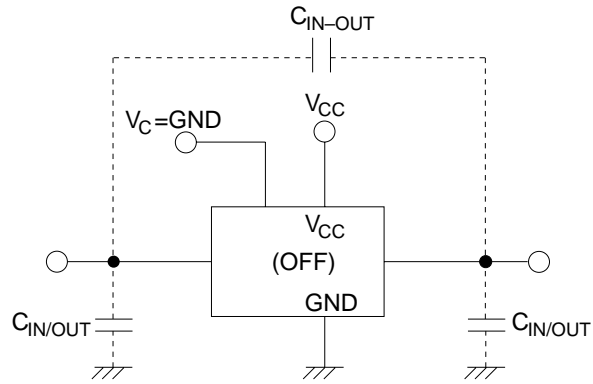
• $t_{ZH}, t_{ZL} / t_{HZ}, t_{LZ}$



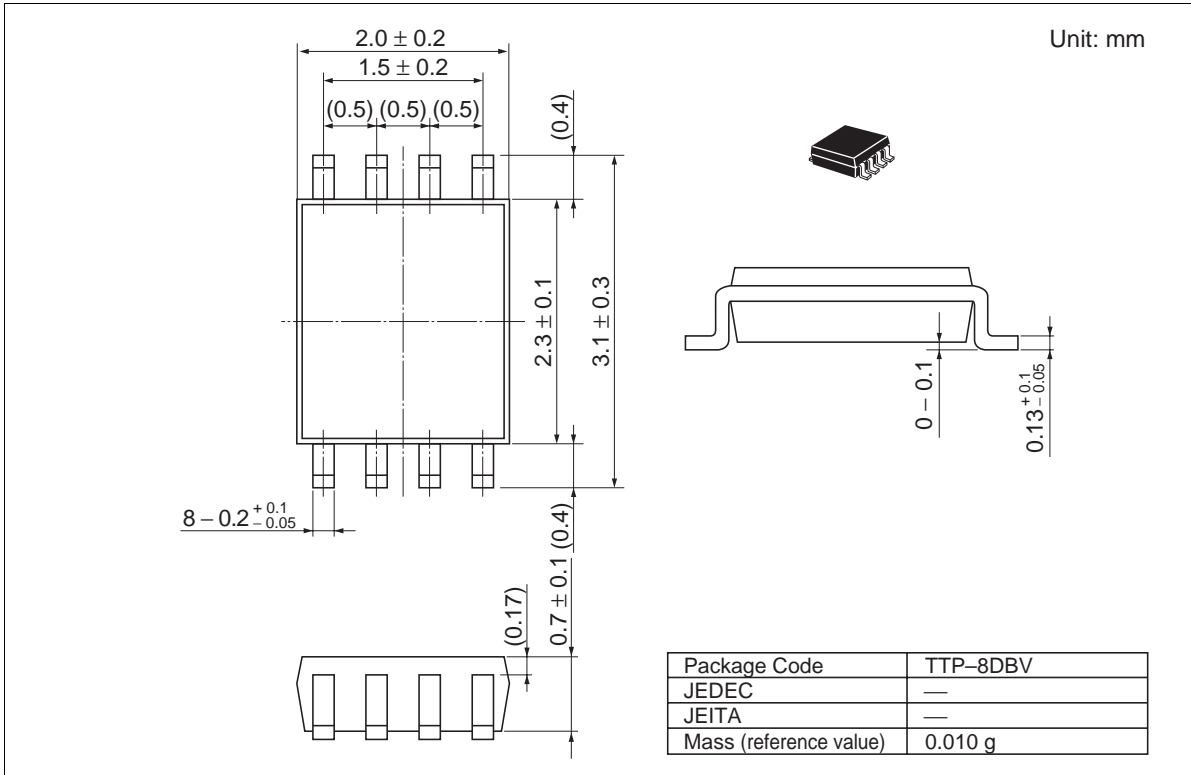
Item	S1	S2
t_{ZH}	V_{CC}	GND
t_{ZL}	GND	V_{CC}
t_{HZ}	V_{CC}	GND
t_{LZ}	GND	V_{CC}

- Notes: 1. Input waveform : $PRR \leq 1 \text{ MHz}$, $Z_o = 50 \Omega$, $t_r \leq 3 \text{ ns}$, $t_f \leq 3 \text{ ns}$.
 2. Waveform – A is for an output with internal conditions such that the output is low except when disabled by the output control.
 3. Waveform – B is for an output with internal conditions such that the output is high except when disabled by the output control.
 4. The output are measured one at a time with one transition per measurement.

- $C_{IN/OUT}$, C_{IN-OUT}



Package Dimensions



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