

To our customers,

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## Old Company Name in Catalogs and Other Documents

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On April 1<sup>st</sup>, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

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

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# HD74LV1G66A

## Analog Switch

REJ03D0069-0700

Rev.7.00

Mar 21, 2008

### Description

The HD74LV1G66A has an analog switch in a 5 pin package. Switch section has its enable input control (C). High-level voltage applied to C turns on the 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.

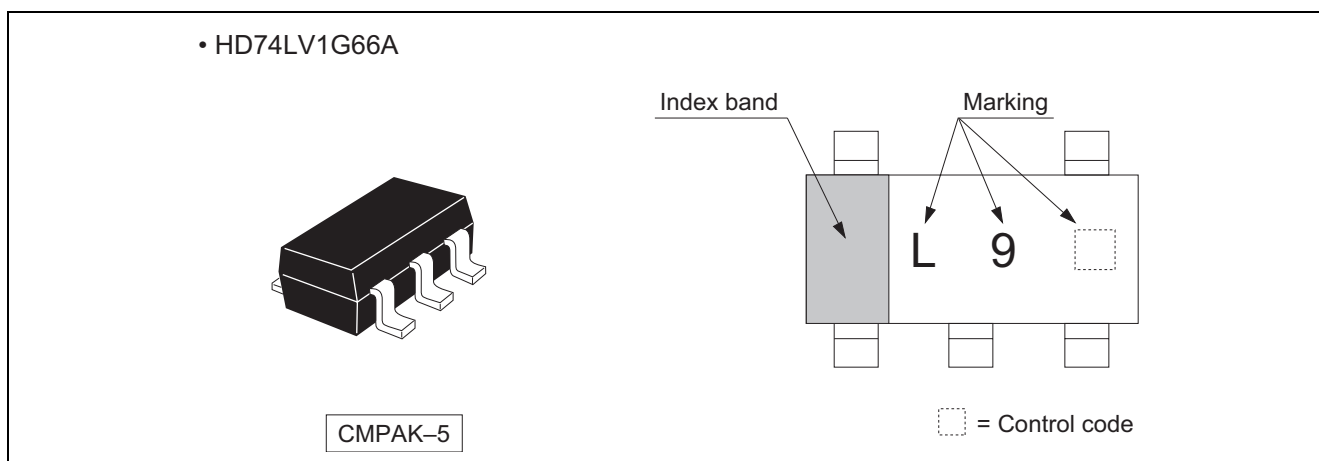
### Features

- 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

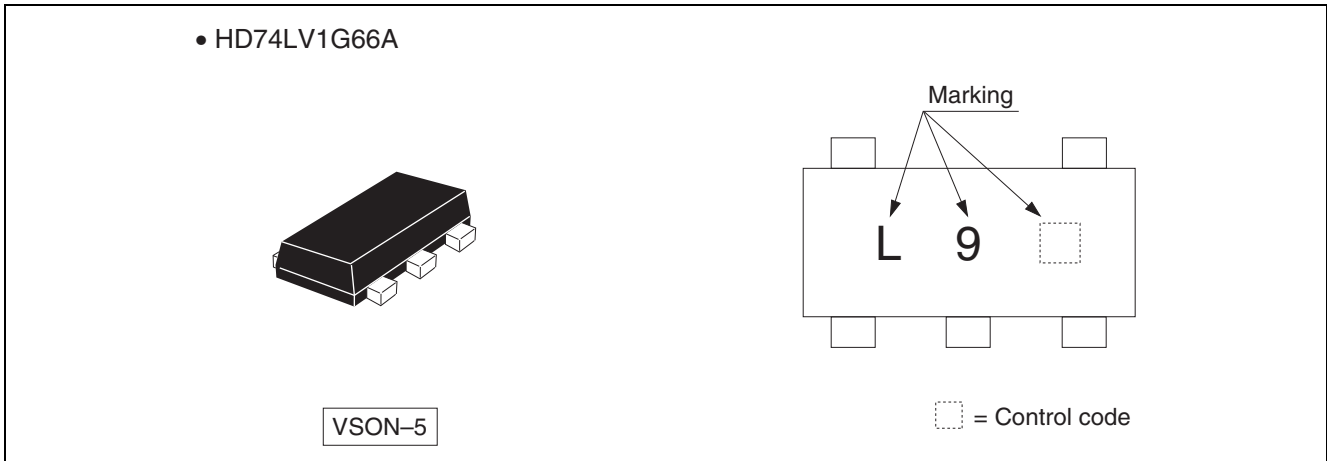
Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LV1G66ACME	CMPAK-5 pin	PTSP0005ZC-A (CMPAK-5V)	CM	E (3000 pcs/reel)
HD74LV1G66AVSE	VSON-5 pin	PUSN0005KA-A (TNP-5DV)	VS	E (3000 pcs/reel)

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

### Outline and Article Indication



### Outline and Article Indication



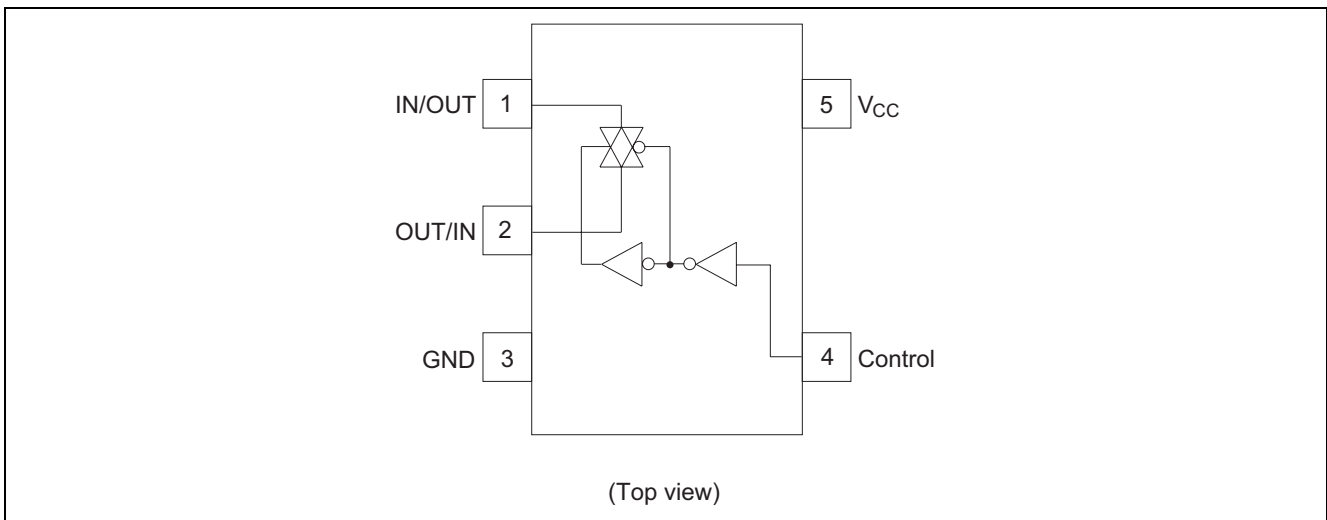
### Function Table

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 <sup>*1</sup>	$V_I$	-0.5 to 7.0	V	
Output voltage range <sup>*1, 2</sup>	$V_O$	-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	$I_{OK}$	$\pm 50$	mA	$V_O < 0$ or $V_O > V_{CC}$
Continuous output current	$I_O$	$\pm 25$	mA	$V_O = 0$ to $V_{CC}$
Continuous current through $V_{CC}$ or GND	$I_{CC}$ or $I_{GND}$	$\pm 50$	mA	
Maximum power dissipation at $T_a = 25^\circ\text{C}$ (in still air) <sup>*3</sup>	$P_T$	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	$V_{I/O}$	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	$^\circ\text{C}$	

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

## Electrical Characteristics

Item	Symbol	V <sub>CC</sub> (V)	T <sub>a</sub> = 25 °C			T <sub>a</sub> = -40 to 85 °C			Unit	Test Conditions
			Min	Typ	Max	Min	Typ	Max		
Input voltage	V <sub>IH</sub>	1.65 to 1.95	—	—	—	V <sub>CC</sub> ×0.75	—	—	V	Control input only
		2.3 to 2.7	—	—	—	V <sub>CC</sub> ×0.7	—	—		
		3.0 to 3.6	—	—	—	V <sub>CC</sub> ×0.7	—	—		
		4.5 to 5.5	—	—	—	V <sub>CC</sub> ×0.7	—	—		
	V <sub>IL</sub>	1.65 to 1.95	—	—	—	—	—	V <sub>CC</sub> ×0.25		
		2.3 to 2.7	—	—	—	—	—	V <sub>CC</sub> ×0.3		
		3.0 to 3.6	—	—	—	—	—	V <sub>CC</sub> ×0.3		
		4.5 to 5.5	—	—	—	—	—	V <sub>CC</sub> ×0.3		
Hysteresis voltage	V <sub>H</sub>	1.8	—	—	—	—	0.25	—	V	V <sub>T</sub> <sup>+</sup> - V <sub>T</sub> <sup>-</sup>
		2.5	—	—	—	—	0.30	—		
		3.3	—	—	—	—	0.35	—		
		5.0	—	—	—	—	0.45	—		
On-state switch resistance	R <sub>ON</sub>	1.65	—	120	360	—	—	450	Ω	V <sub>IN</sub> = V <sub>CC</sub> or GND V <sub>C</sub> = V <sub>IH</sub> I <sub>T</sub> = 1 mA
		2.3	—	60	180	—	—	225		
		3.0	—	50	150	—	—	190		
		4.5	—	40	75	—	—	100		
Peak on resistance	R <sub>ON(P)</sub>	1.65	—	700	1100	—	—	1400	Ω	V <sub>IN</sub> = V <sub>CC</sub> to GND V <sub>C</sub> = V <sub>IH</sub> I <sub>T</sub> = 1 mA
		2.3	—	250	500	—	—	600		
		3.0	—	100	180	—	—	225		
		4.5	—	50	100	—	—	125		
Off-state switch leakage current	I <sub>s(OFF)</sub>	5.5	—	—	±0.1	—	—	±1.0	μA	V <sub>IN</sub> = V <sub>CC</sub> , V <sub>OUT</sub> = GND or V <sub>IN</sub> = GND, V <sub>O</sub> = V <sub>CC</sub> , V <sub>C</sub> = V <sub>IL</sub>
On-state switch leakage current	I <sub>s(ON)</sub>	5.5	—	—	±0.1	—	—	±1.0	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND V <sub>C</sub> = V <sub>IH</sub>
Input current	I <sub>IN</sub>	0 to 5.5	—	—	±0.1	—	—	±1.0	μA	V <sub>IN</sub> = 5.5 V or GND
Quiescent supply current	I <sub>CC</sub>	5.5	—	—	—	—	—	10	μA	V <sub>IN</sub> = V <sub>CC</sub> or GND
Control input capacitance	C <sub>IC</sub>	—	—	3.5	—	—	—	—	pF	
Switch terminal capacitance	C <sub>IN/OUT</sub>	—	—	4.0	—	—	—	—	pF	
Feed through capacitance	C <sub>IN-OUT</sub>	—	—	0.5	—	—	—	—	pF	

### Switching Characteristics

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

Item	Symbol	Ta = 25°C			Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t <sub>PLH</sub>	—	4.0	13.0	—	19.0	ns	C <sub>L</sub> = 15 pF	IN/OUT or OUT/IN	OUT/IN or IN/OUT
	t <sub>PHL</sub>	—	11.0	23.0	—	29.0		C <sub>L</sub> = 50 pF		
Enable time	t <sub>ZH</sub>	—	11.0	24.0	—	29.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT or OUT/IN
	t <sub>ZL</sub>	—	18.0	44.0	—	51.0		C <sub>L</sub> = 50 pF		
Disable time	t <sub>HZ</sub>	—	11.0	21.0	—	29.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT or OUT/IN
	t <sub>LZ</sub>	—	18.0	46.0	—	53.0		C <sub>L</sub> = 50 pF		

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

Item	Symbol	Ta = 25°C			Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t <sub>PLH</sub>	—	2.0	10.0	—	16.0	ns	C <sub>L</sub> = 15 pF	IN/OUT or OUT/IN	OUT/IN or IN/OUT
	t <sub>PHL</sub>	—	5.0	12.0	—	18.0		C <sub>L</sub> = 50 pF		
Enable time	t <sub>ZH</sub>	—	6.0	15.0	—	20.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT or OUT/IN
	t <sub>ZL</sub>	—	8.0	25.0	—	32.0		C <sub>L</sub> = 50 pF		
Disable time	t <sub>HZ</sub>	—	7.0	15.0	—	23.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT or OUT/IN
	t <sub>LZ</sub>	—	11.0	25.0	—	32.0		C <sub>L</sub> = 50 pF		

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

Item	Symbol	Ta = 25°C			Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t <sub>PLH</sub>	—	1.5	6.0	—	10.0	ns	C <sub>L</sub> = 15 pF	IN/OUT or OUT/IN	OUT/IN or IN/OUT
	t <sub>PHL</sub>	—	4.0	9.0	—	12.0		C <sub>L</sub> = 50 pF		
Enable time	t <sub>ZH</sub>	—	4.0	11.0	—	15.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT or OUT/IN
	t <sub>ZL</sub>	—	6.0	18.0	—	22.0		C <sub>L</sub> = 50 pF		
Disable time	t <sub>HZ</sub>	—	5.0	11.0	—	15.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT or OUT/IN
	t <sub>LZ</sub>	—	8.0	18.0	—	22.0		C <sub>L</sub> = 50 pF		

### Switching Characteristics (cont)

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

Item	Symbol	Ta = 25°C			Ta = -40 to 85°C		Unit	Test Conditions	FROM (Input)	TO (Output)
		Min	Typ	Max	Min	Max				
Propagation delay time	t <sub>PLH</sub>	—	1.0	4.0	—	7.0	ns	C <sub>L</sub> = 15 pF	IN/OUT or OUT/IN	OUT/IN or IN/OUT
	t <sub>PHL</sub>	—	3.0	6.0	—	8.0		C <sub>L</sub> = 50 pF		
Enable time	t <sub>ZH</sub>	—	3.0	7.0	—	10.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT or OUT/IN
	t <sub>ZL</sub>	—	5.0	12.0	—	16.0		C <sub>L</sub> = 50 pF		
Disable time	t <sub>HZ</sub>	—	4.0	7.0	—	10.0	ns	C <sub>L</sub> = 15 pF	C	IN/OUT or OUT/IN
	t <sub>LZ</sub>	—	6.0	12.0	—	16.0		C <sub>L</sub> = 50 pF		

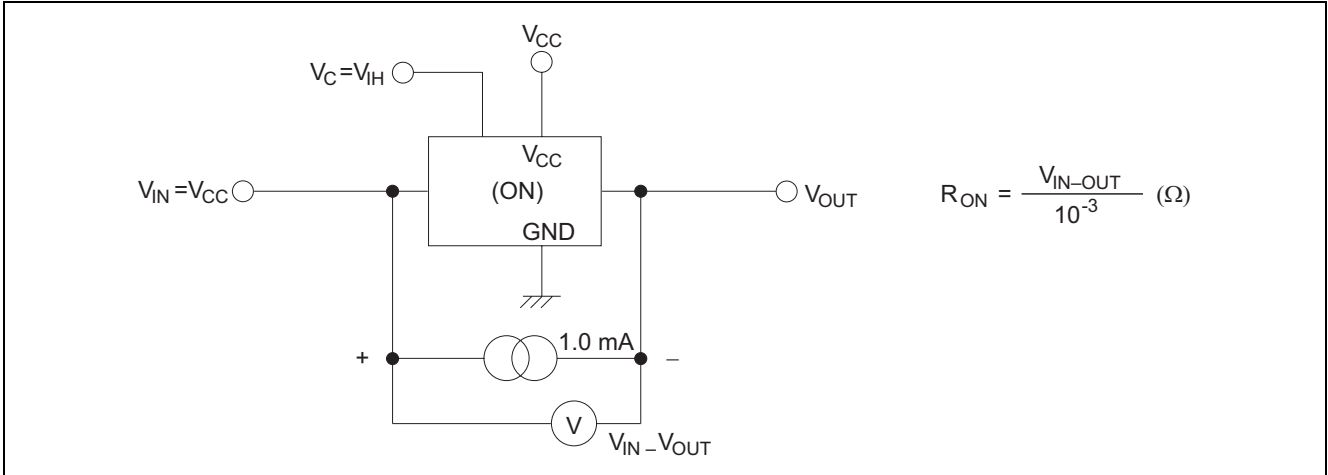
### Operating Characteristics

- C<sub>L</sub> = 50 pF

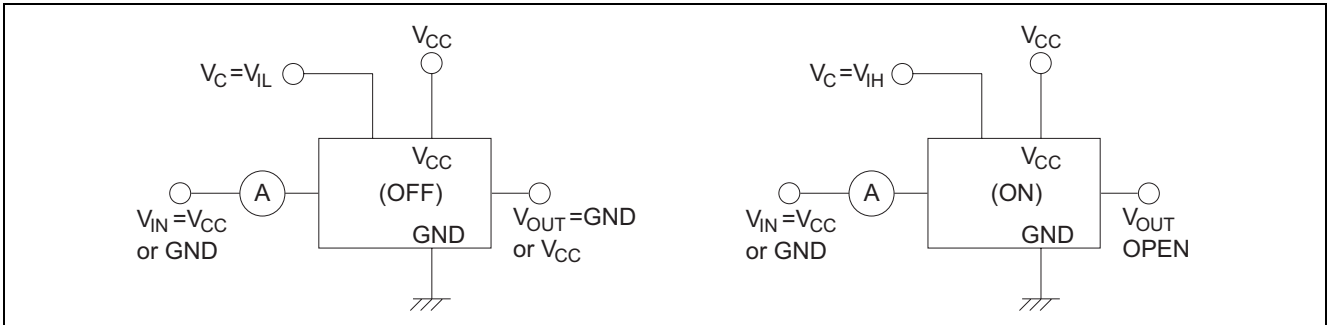
Item	Symbol	V <sub>CC</sub> (V)	Ta = 25°C			Unit	Test Conditions
			Min	Typ	Max		
Power dissipation capacitance	C <sub>PD</sub>	3.3	—	3.5	—	pF	f = 10 MHz
		5.0	—	4.0	—		

Test Circuit

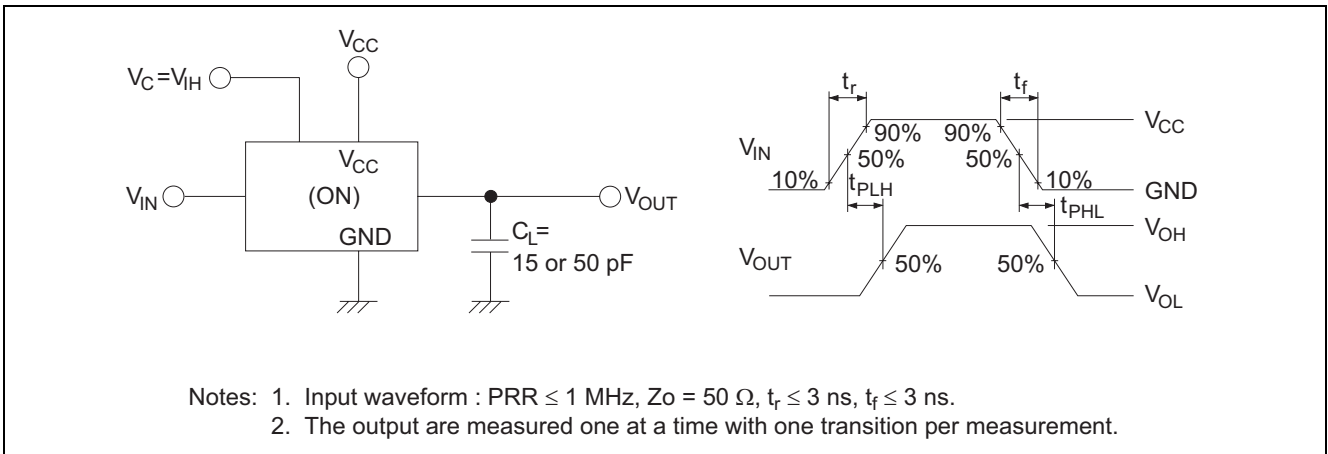
- $R_{ON}$



- $I_{S(off)}$ ,  $I_{S(on)}$

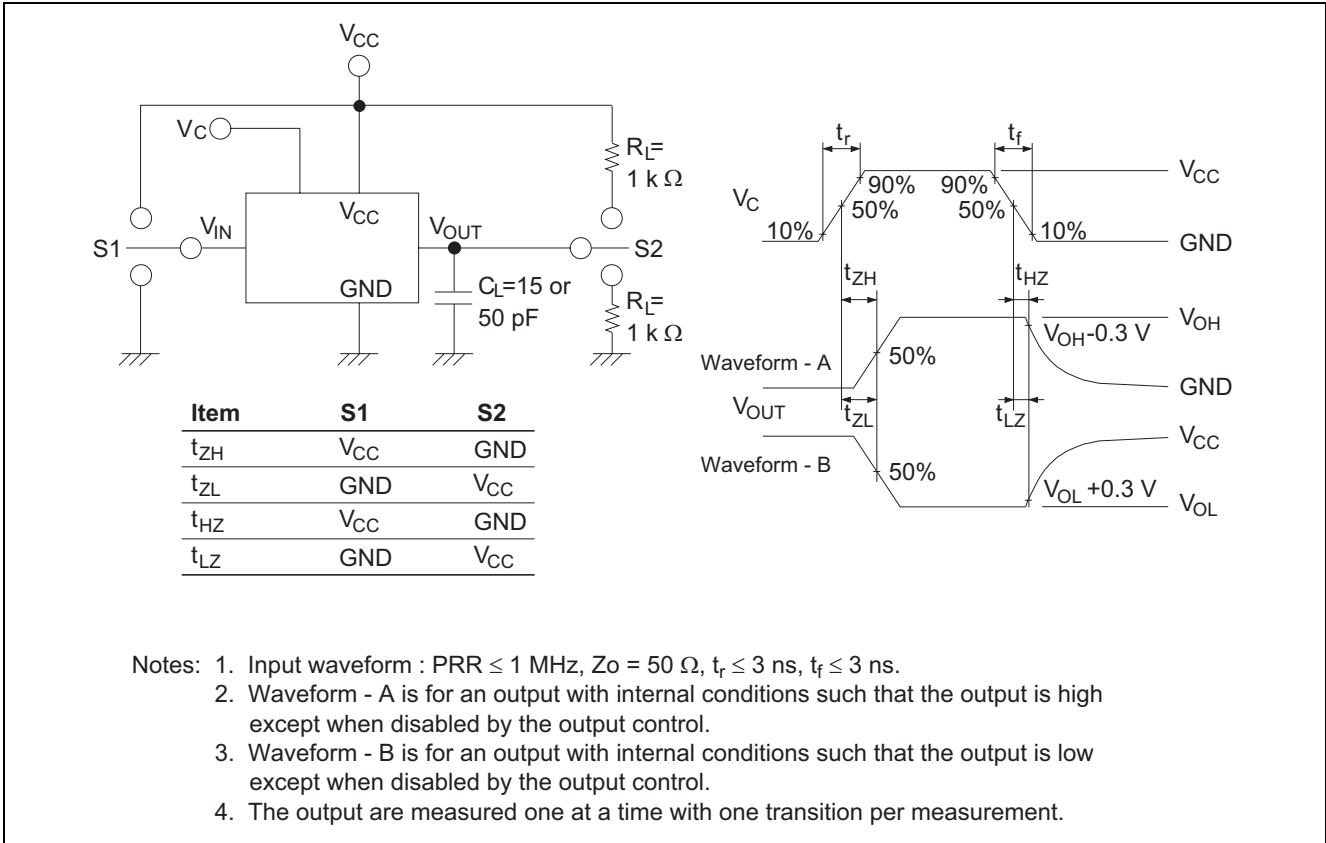


- $t_{PLH}$ ,  $t_{PHL}$

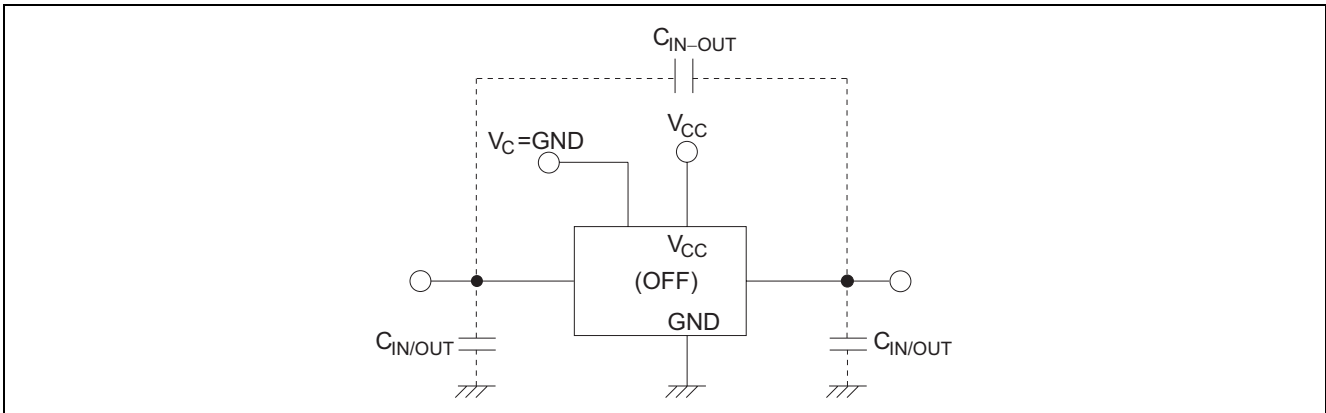




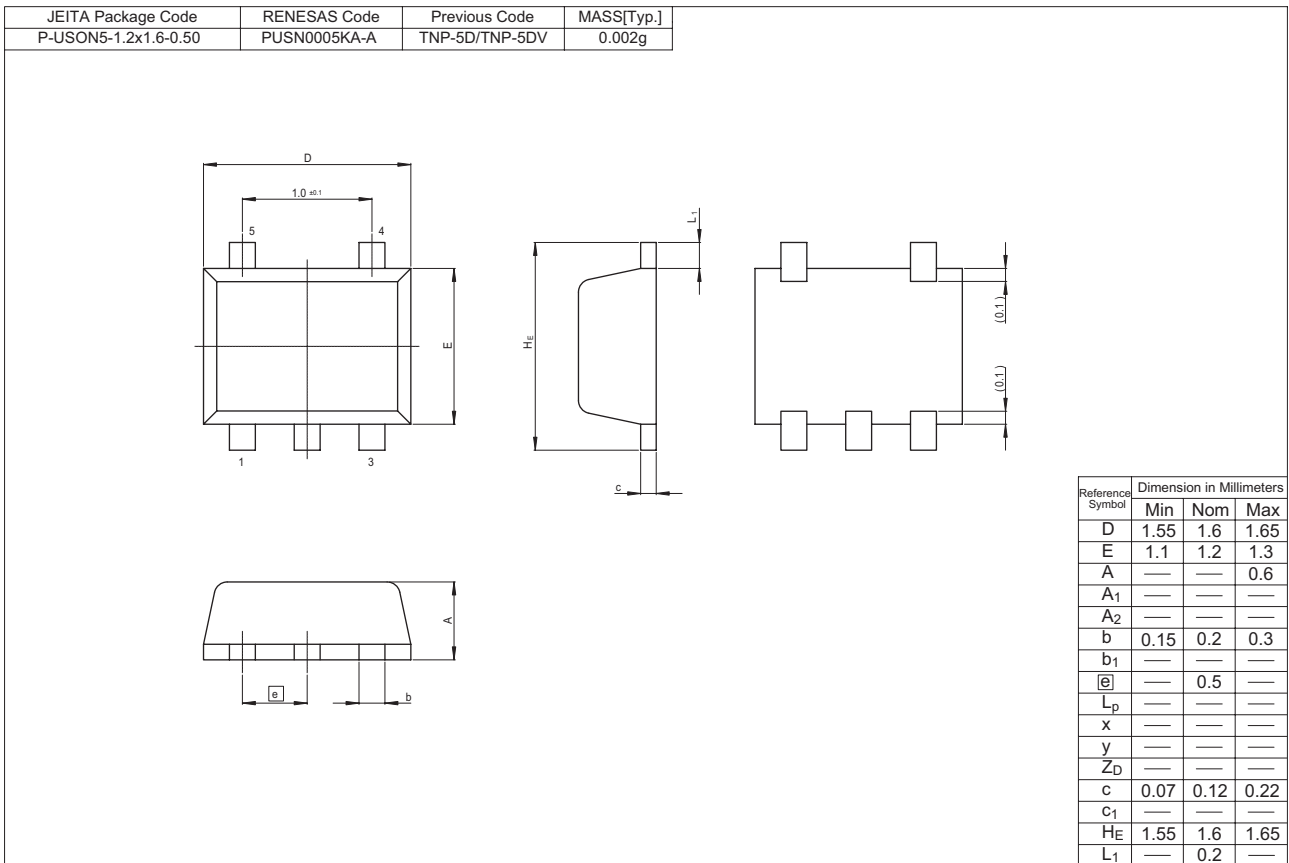
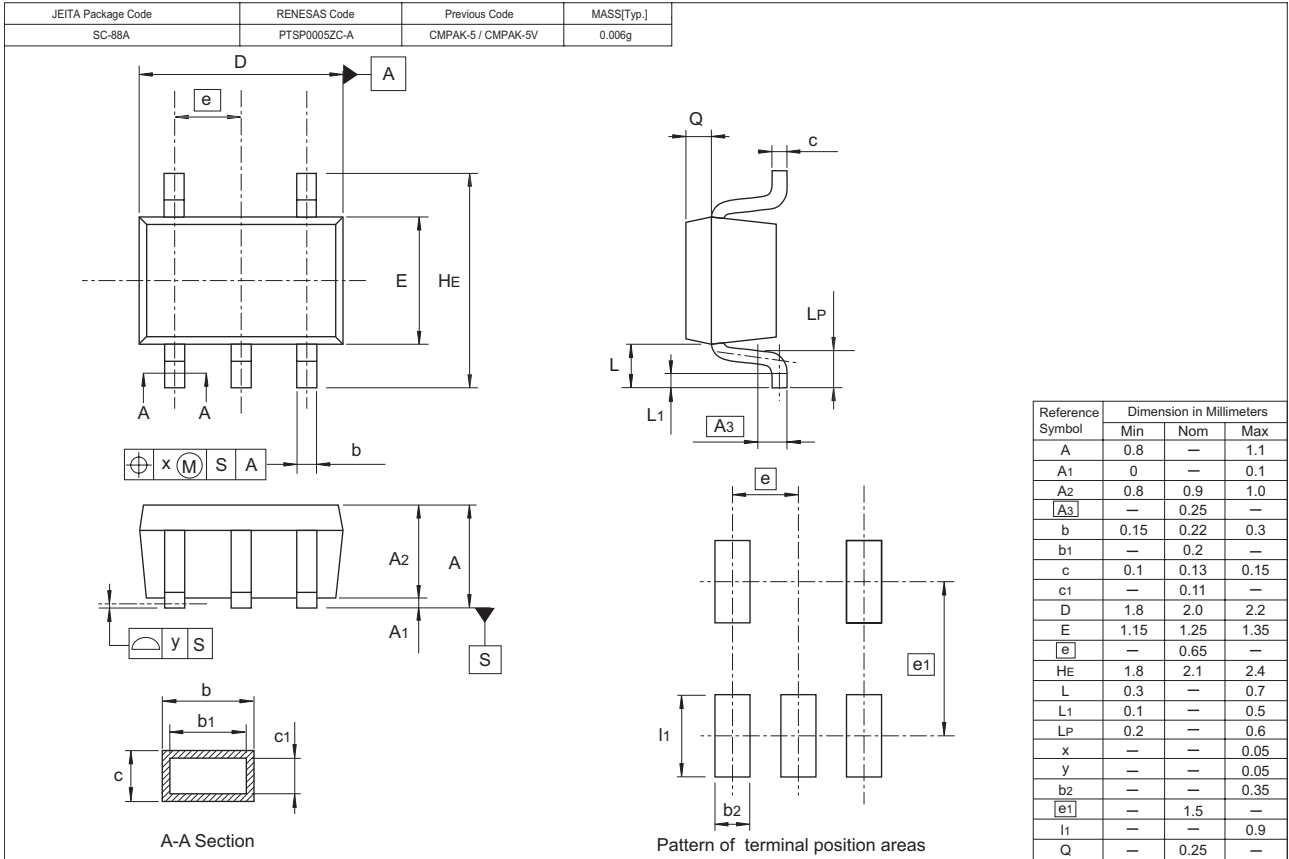
- $t_{ZH}, t_{ZL} / t_{HZ}, t_{LZ}$



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



Package Dimensions



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