

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

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# HD74HCT125, HD74HCT126

## Quad. Bus Buffer Gates (with 3-state outputs)

REJ03D0657-0300

Rev.3.00

May 07, 2009

### Description

The HD74HCT125, HD74HCT126 require the 3-state control input C to be taken high to put the output into the high impedance condition, whereas the HD74HCT125, HD74HCT126 requires the control input to be low to put the output into high impedance.

### Features

- LSTTL Output Logic Level Compatibility as well as CMOS Output Compatibility
- High Speed Operation:  $t_{pd}$  (A to Y) = 12 ns typ ( $C_L = 50$  pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage:  $V_{CC} = 4.5$  to 5.5 V
- Low Input Current: 1  $\mu$ A max
- Low Quiescent Supply Current:  $I_{CC}$  (static) = 4  $\mu$ A max ( $T_a = 25^\circ\text{C}$ )
- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74HCT125P	DILP-14 pin	PRDP0014AB-B (DP-14AV)	P	—
HD74HCT125FPEL HD74HCT126FPEL	SOP-14 pin (JEITA)	PRSP0014DF-B (FP-14DAV)	FP	EL (2,000 pcs/reel)
HD74HCT125RPEL	SOP-14 pin (JEDEC)	PRSP0014DE-A (FP-14DNV)	RP	EL (2,500 pcs/reel)
HD74HCT125TELL HD74HCT126TELL	TSSOP-14 pin	PTSP0014JA-B (TTP-14DV)	T	ELL (2,000 pcs/reel)

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

### Function Table

Inputs			Output	
C		A	Y	
HCT125	HCT126		HCT125	HCT126
H	L	X	Z	Z
L	H	L	L	L
L	H	H	H	H

H : High level

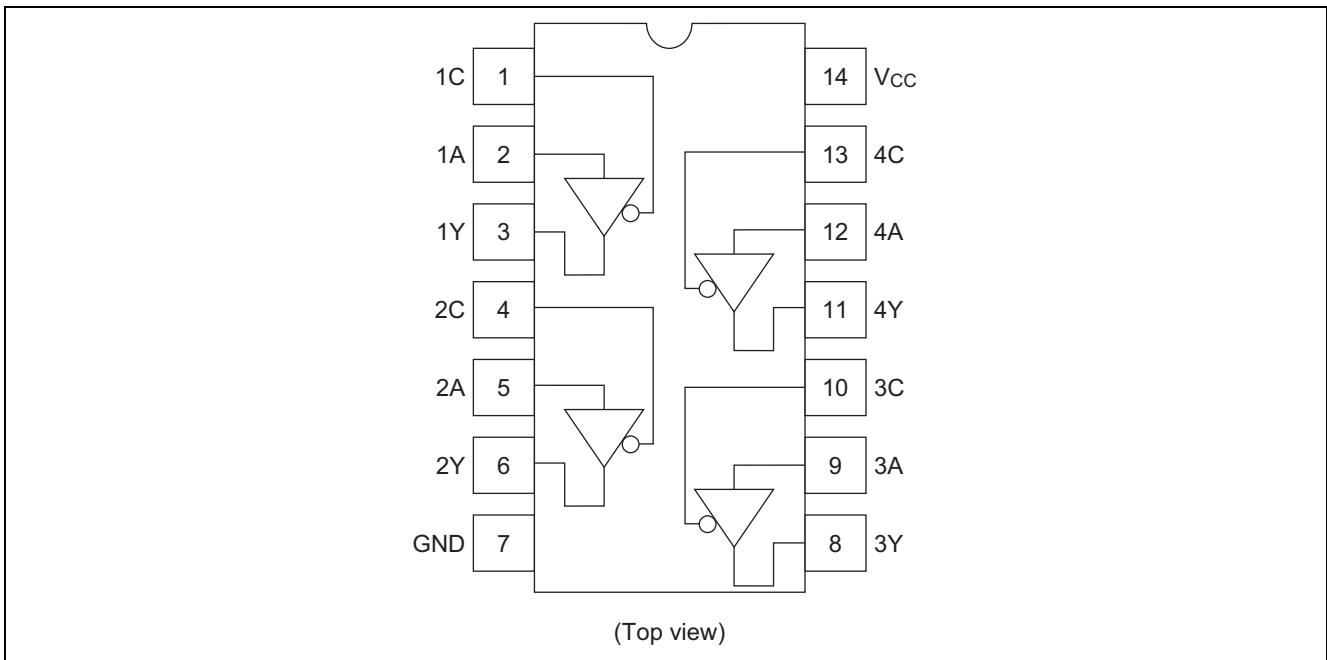
L : Low level

X : Irrelevant

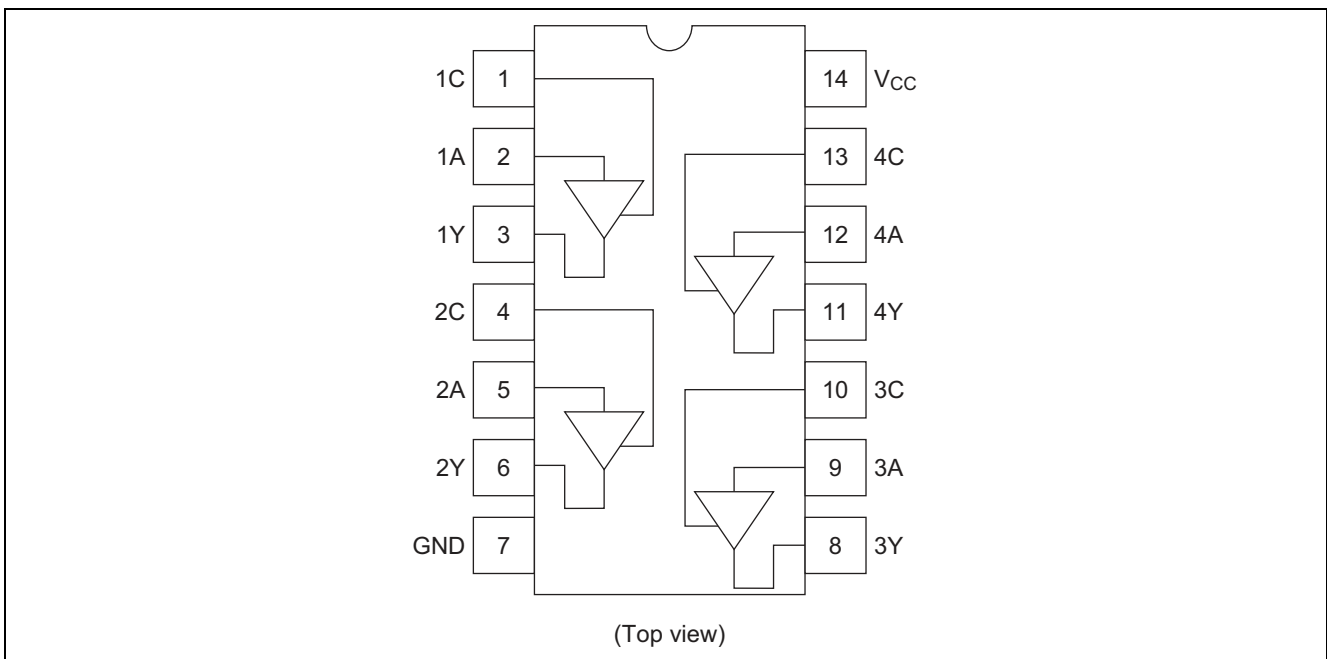
Z : Off (high-impedance) state of a 3-state output.

## Pin Arrangement

- HD74HCT125



- HD74HCT126



## Absolute Maximum Ratings

Item	Symbol	Rating	Unit
Supply voltage range	$V_{CC}$	-0.5 to +7.0	V
Input voltage	$V_{IN}$	-0.5 to $V_{CC} + 0.5$	V
Output voltage	$V_{OUT}$	-0.5 to $V_{CC} + 0.5$	V
Output current	$I_{OUT}$	$\pm 35$	mA
DC current drain per $V_{CC}$ , GND	$I_{CC}$ , $I_{GND}$	$\pm 75$	mA
DC input diode current	$I_{IK}$	$\pm 20$	mA
DC output diode current	$I_{OK}$	$\pm 20$	mA
Power dissipation per package	$P_T$	500	mW
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	$V_{CC}$	4.5 to 5.5	V	
Input / Output voltage	$V_{IN}$ , $V_{OUT}$	0 to $V_{CC}$	V	
Operating temperature	$T_a$	-40 to 85	$^{\circ}C$	
Input rise / fall time <sup>*1</sup>	$t_r$ , $t_f$	0 to 500	ns	$V_{CC} = 4.5 V$

Notes: 1. This item guarantees maximum limit when one input switches.

Waveform: Refer to test circuit of switching characteristics.

## Electrical Characteristics

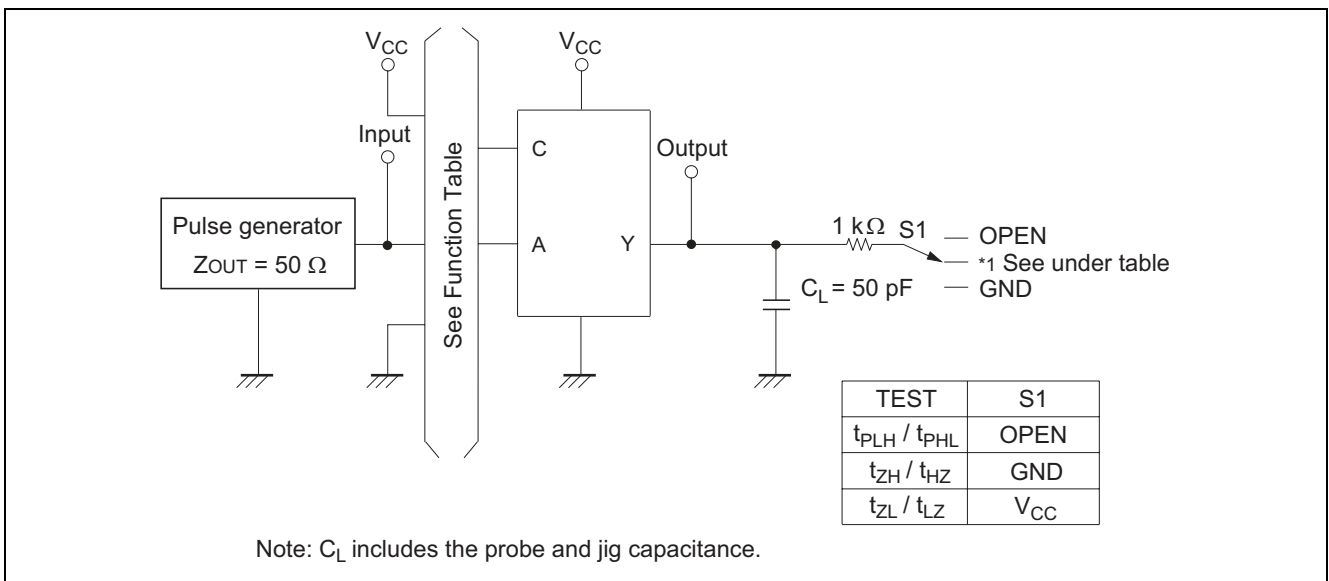
Item	Symbol	$V_{CC}$ (V)	$T_a = 25^{\circ}C$			$T_a = -40 \text{ to } +85^{\circ}C$		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	$V_{IH}$	4.5 to 5.5	2.0	—	—	2.0	—	V		
	$V_{IL}$	4.5 to 5.5	—	—	0.8	—	0.8	V		
Output voltage	$V_{OH}$	4.5	4.4	—	—	4.4	—	V	$V_{in} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -20 \infty A$
		4.5	4.18	—	—	4.13	—	V		$I_{OH} = -6 \text{ mA}$
	$V_{OL}$	4.5	—	—	0.1	—	0.1	V	$V_{in} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 20 \infty A$
		4.5	—	—	0.26	—	0.33	V		$I_{OL} = 6 \text{ mA}$
Off-state output current	$I_{OZ}$	5.5	—	—	$\pm 0.5$	—	$\pm 5.0$	$\mu A$	$V_{in} = V_{IH} \text{ or } V_{IL}$ , $V_{out} = V_{CC} \text{ or } GND$	
Input current	$I_{in}$	5.5	—	—	$\pm 0.1$	—	$\pm 1.0$	$\mu A$	$V_{in} = V_{CC} \text{ or } GND$	
Quiescent supply current	$I_{CC}$	5.5	—	—	4.0	—	40	$\mu A$	$V_{in} = V_{CC} \text{ or } GND$ , $I_{out} = 0 \infty A$	

### Switching Characteristics

( $C_L = 50 \text{ pF}$ , Input  $t_r = t_f = 6 \text{ ns}$ )

Item	Symbol	$V_{CC}$ (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		Unit	Test Conditions
			Min	Typ	Max	Min	Max		
Propagation delay time	$t_{PHL}$	4.5	—	12	20	—	25	ns	
	$t_{PLH}$	4.5	—	12	20	—	25		
Output enable time	$t_{ZL}$	4.5	—	12	30	—	38	ns	
	$t_{ZH}$	4.5	—	12	30	—	38		
Output disable time	$t_{LZ}$	4.5	—	15	30	—	38	ns	
	$t_{HZ}$	4.5	—	15	30	—	38		
Output rise/fall time	$t_{TLH}$	4.5	—	4	12	—	15	ns	
	$t_{THL}$	4.5	—	4	12	—	15		
Input capacitance	$C_{in}$	—	—	5	10	—	10	pF	

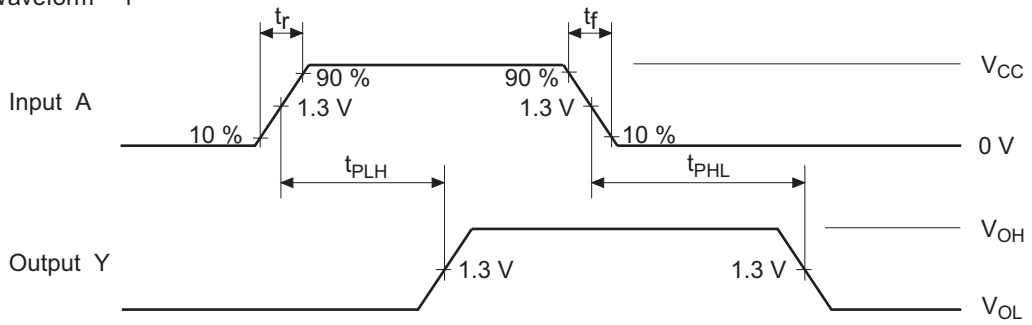
### Test Circuit



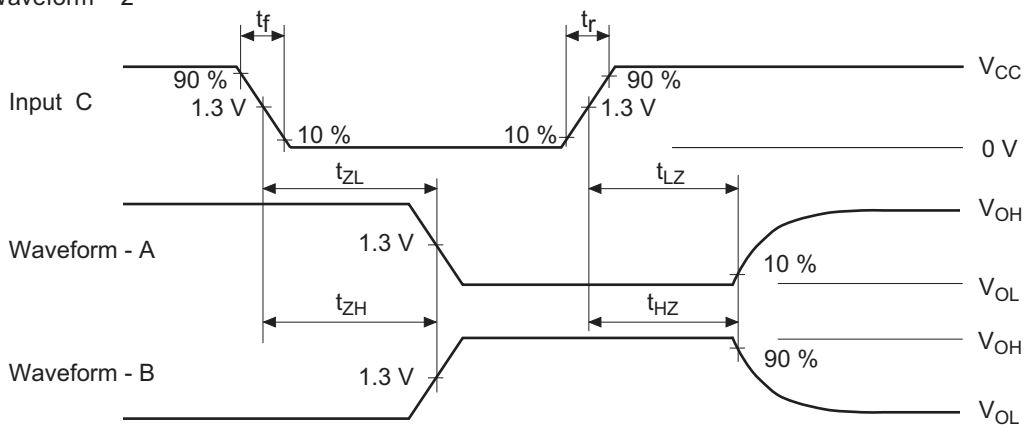
Waveforms

- HD74HCT125

• Waveform – 1



• Waveform – 2

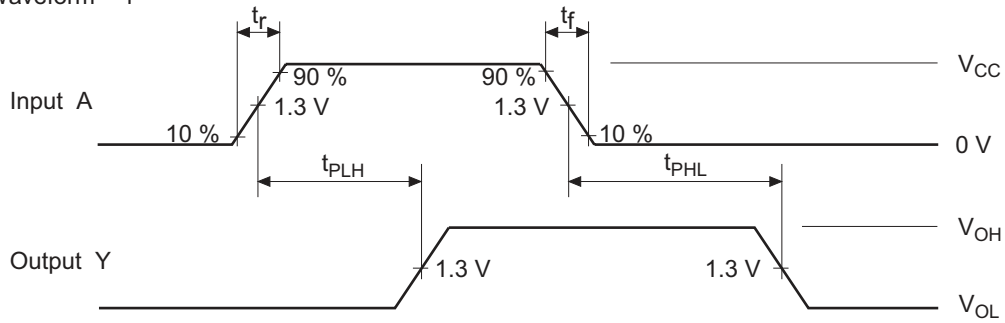


- Notes :
1.  $t_r \leq 6 \text{ ns}$ ,  $t_f \leq 6 \text{ ns}$
  2. Input waveform :  $\text{PRR} \leq 1 \text{ MHz}$ , duty cycle 50%
  3. Waveform– A is for an output with internal conditions such that the output is low except when disabled by the output control.
  4. Waveform– B is for an output with internal conditions such that the output is high except when disabled by the output control.

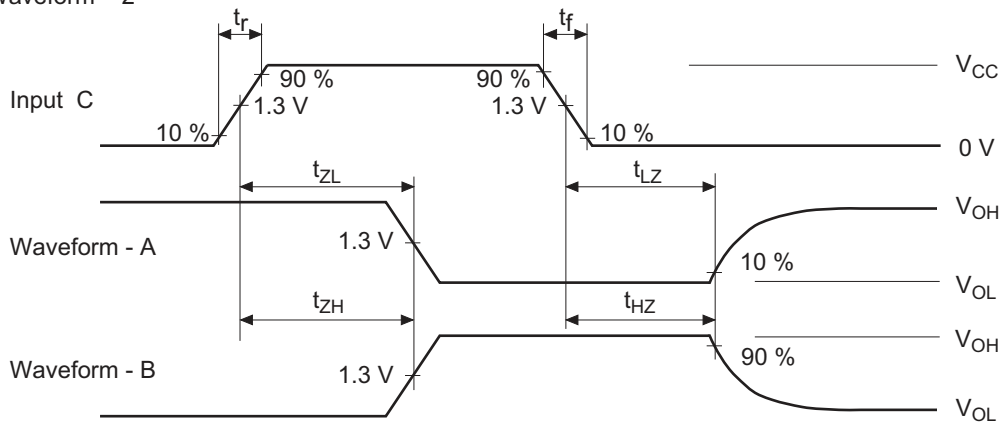
Waveforms

- HD74HCT126

• Waveform – 1



• Waveform – 2

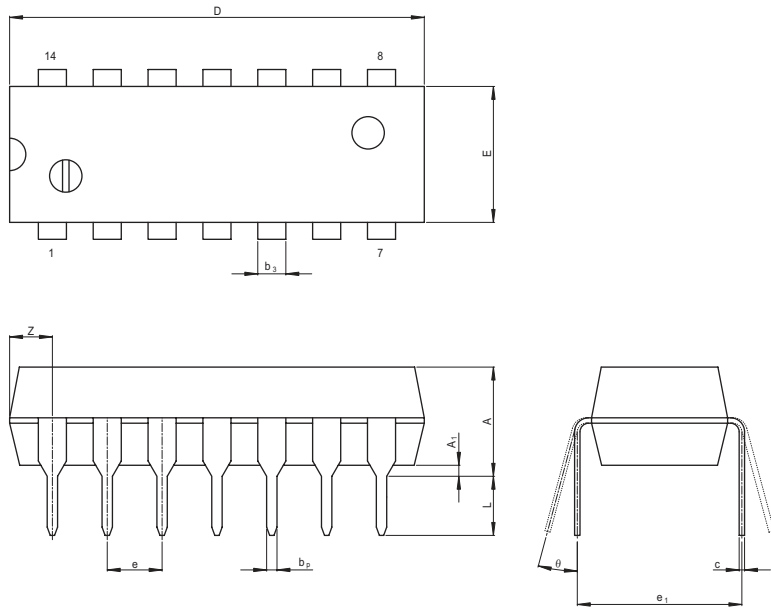


- Notes :
1.  $t_r \leq 6 \text{ ns}$ ,  $t_f \leq 6 \text{ ns}$
  2. Input waveform :  $\text{PRR} \leq 1 \text{ MHz}$ , duty cycle 50%
  3. Waveform- A is for an output with internal conditions such that the output is low except when disabled by the output control.
  4. Waveform- B is for an output with internal conditions such that the output is high except when disabled by the output control.



Package Dimensions

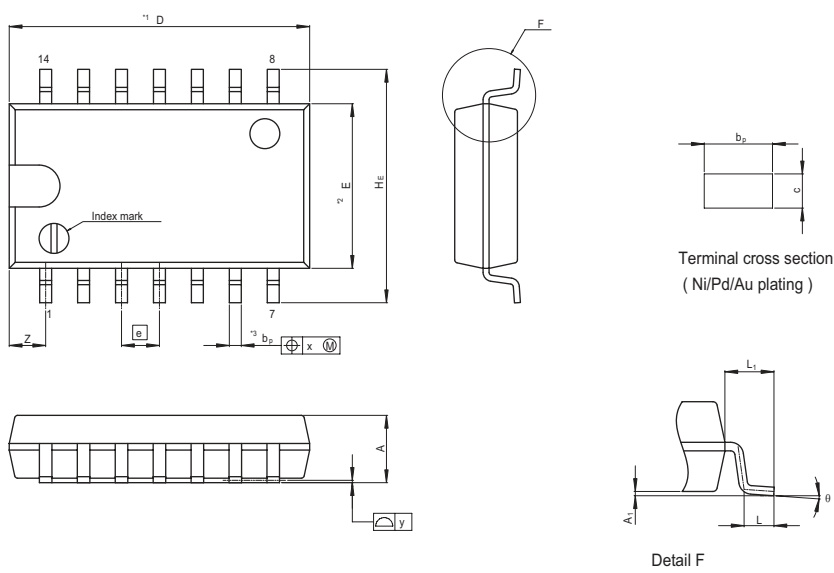
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-DIP14-6.3x19.2-2.54	PRDP0014AB-B	DP-14AV	0.97g



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e <sub>1</sub>	—	7.62	—
D	—	19.2	20.32
E	—	6.3	7.4
A	—	—	5.06
A <sub>1</sub>	0.51	—	—
b <sub>p</sub>	0.40	0.48	0.56
b <sub>3</sub>	—	1.30	—
c	0.19	0.25	0.31
θ	0°	—	15°
e	2.29	2.54	2.79
Z	—	—	2.39
L	2.54	—	—

( Ni/Pd/Au plating )

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP14-5.5x10.06-1.27	PRSP0014DF-B	FP-14DAV	0.23g



NOTE)  
 1. DIMENSIONS\*\*1 (Nom)\*AND\*\*2\* DO NOT INCLUDE MOLD FLASH.  
 2. DIMENSION\*\*3\*DOES NOT INCLUDE TRIM OFFSET.

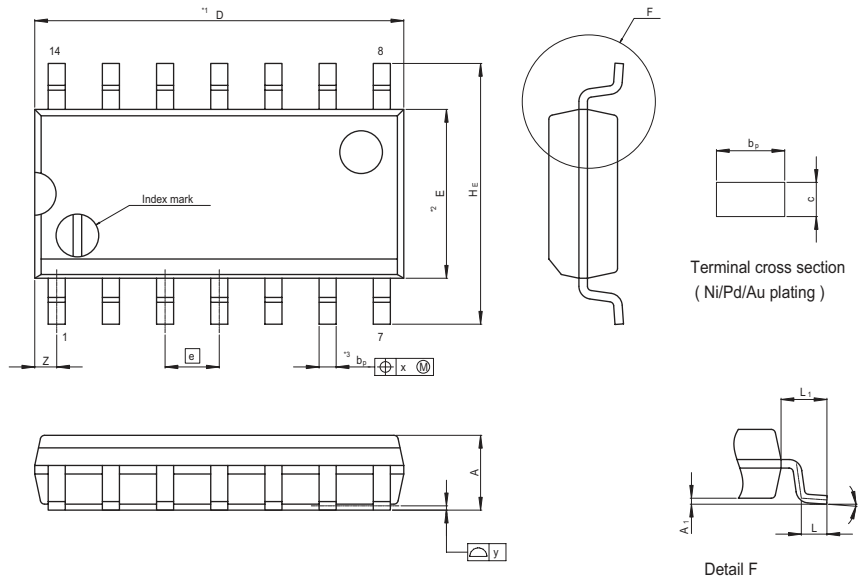
Terminal cross section  
( Ni/Pd/Au plating )

Detail F

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	10.06	10.5
E	—	5.50	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.00	0.10	0.20
A	—	—	2.20
b <sub>p</sub>	0.34	0.40	0.46
b <sub>1</sub>	—	—	—
c	0.15	0.20	0.25
c <sub>1</sub>	—	—	—
θ	0°	—	8°
H <sub>E</sub>	7.50	7.80	8.00
Ⓧ	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	1.42
L	0.50	0.70	0.90
L <sub>1</sub>	—	1.15	—

# HD74HCT125, HD74HCT126

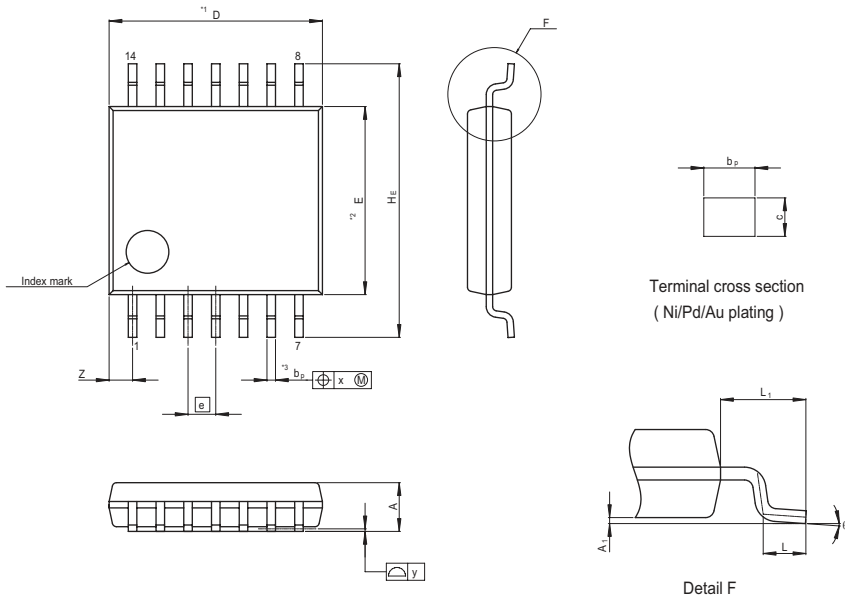
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP14-3.95x8.65-1.27	PRSP0014DE-A	FP-14DNV	0.13g



NOTE  
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 2. DIMENSION\*\*3\*DOES NOT  
 INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	8.65	9.05
E	—	3.95	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.10	0.14	0.25
A	—	—	1.75
b <sub>p</sub>	0.34	0.40	0.46
b <sub>1</sub>	—	—	—
c	0.15	0.20	0.25
c <sub>1</sub>	—	—	—
θ	0°	—	8°
HE	5.80	6.10	6.20
Ⓜ	—	1.27	—
x	—	—	0.25
y	—	—	0.15
Z	—	—	0.635
L	0.40	0.60	1.27
L <sub>1</sub>	—	1.08	—

JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-TSSOP14-4.4x5-0.65	PTSP0014JA-B	TTP-14DV	0.05g



NOTE  
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 DO NOT INCLUDE MOLD FLASH.  
 2. DIMENSION\*\*3\*DOES NOT  
 INCLUDE TRIM OFFSET.

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	5.00	5.30
E	—	4.40	—
A <sub>2</sub>	—	—	—
A <sub>1</sub>	0.03	0.07	0.10
A	—	—	1.10
b <sub>p</sub>	0.15	0.20	0.25
b <sub>1</sub>	—	—	—
c	0.10	0.15	0.20
c <sub>1</sub>	—	—	—
θ	0°	—	8°
HE	6.20	6.40	6.60
Ⓜ	—	0.65	—
x	—	—	0.13
y	—	—	0.10
Z	—	—	0.83
L	0.4	0.5	0.6
L <sub>1</sub>	—	1.0	—

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