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April 1st, 2010
Renesas Electronics Corporation

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

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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 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max (T_a = 25°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

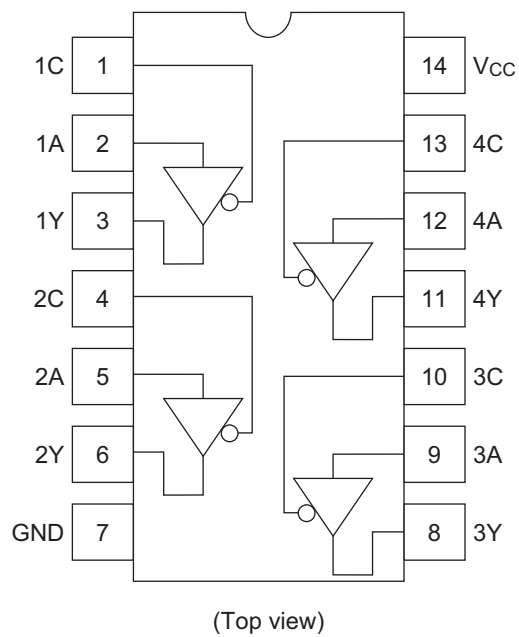
L : Low level

X : Irrelevant

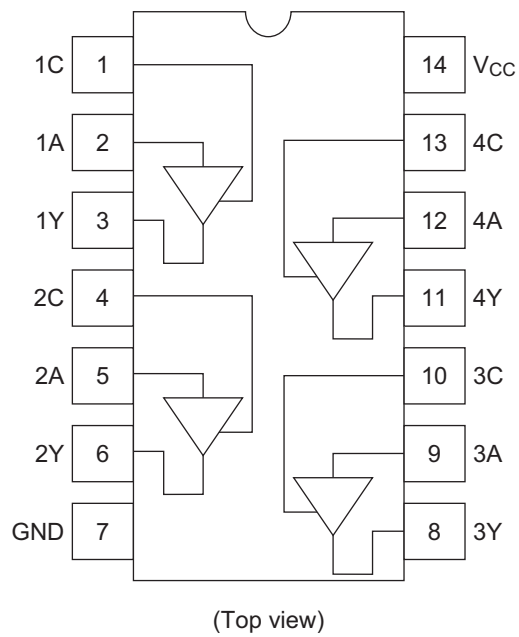
Z : Off (high-impedance) state of a 3-state output.

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}	± 35	mA
DC current drain per V_{CC} , GND	I_{CC} , I_{GND}	± 75	mA
DC input diode current	I_{IK}	± 20	mA
DC output diode current	I_{OK}	± 20	mA
Power dissipation per package	P_T	500	mW
Storage temperature	T_{stg}	-65 to +150	°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	°C	
Input rise / fall time ^{*1}	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

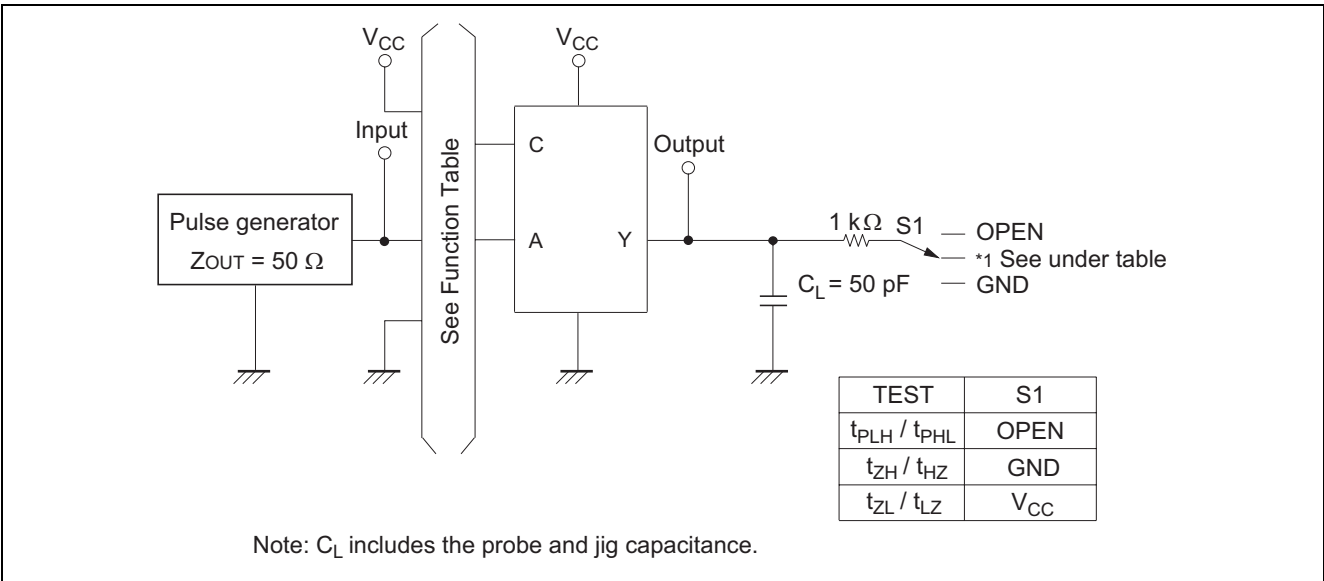
Item	Symbol	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } +85^\circ\text{C}$		Unit	Test Conditions	
			Min	Typ	Max	Min	Max			
Input voltage	V_{IH}	4.5 to 5.5	2.0	—	—	2.0	—	V		
	V_{IL}	4.5 to 5.5	—	—	0.8	—	0.8	V		
Output voltage	V_{OH}	4.5	4.4	—	—	4.4	—	V	$V_{in} = V_{IH} \text{ or } V_{IL}$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

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	

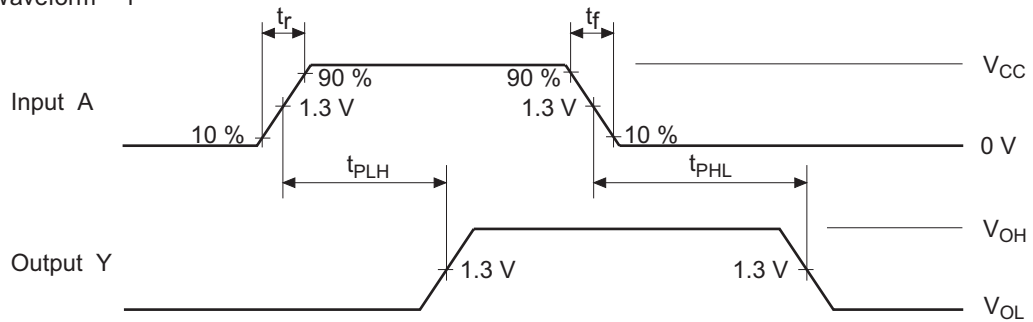
Test Circuit



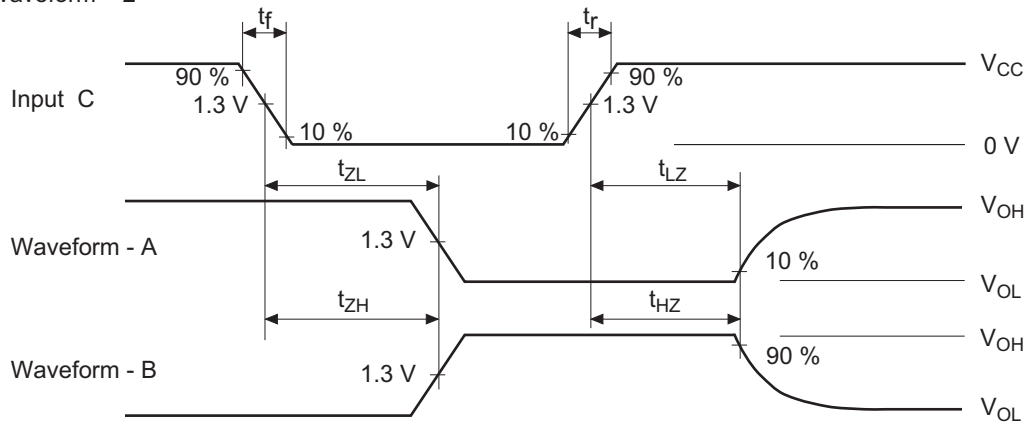
Waveforms

- HD74HCT125

- Waveform – 1



- Waveform – 2

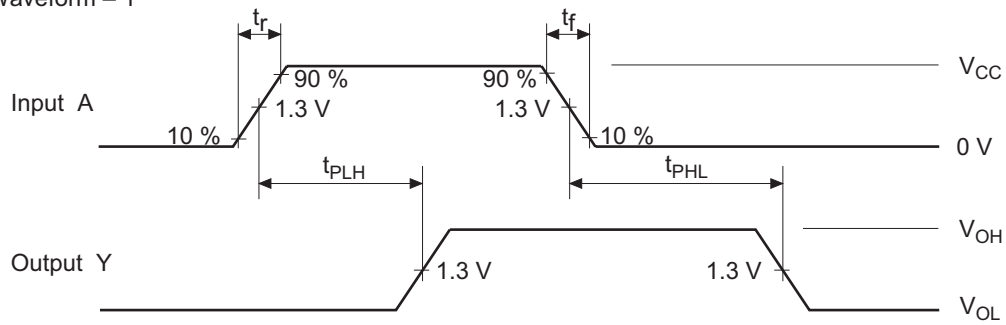


- Notes :
1. $t_r \leq 6 \text{ ns}$, $t_f \leq 6 \text{ ns}$
 2. Input waveform : $\text{PRR} \leq 1 \text{ MHz}$, duty cycle 50%
 3. Waveform– A is for an output with internal conditions such that the output is low except when disabled by the output control.
 4. Waveform– B is for an output with internal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

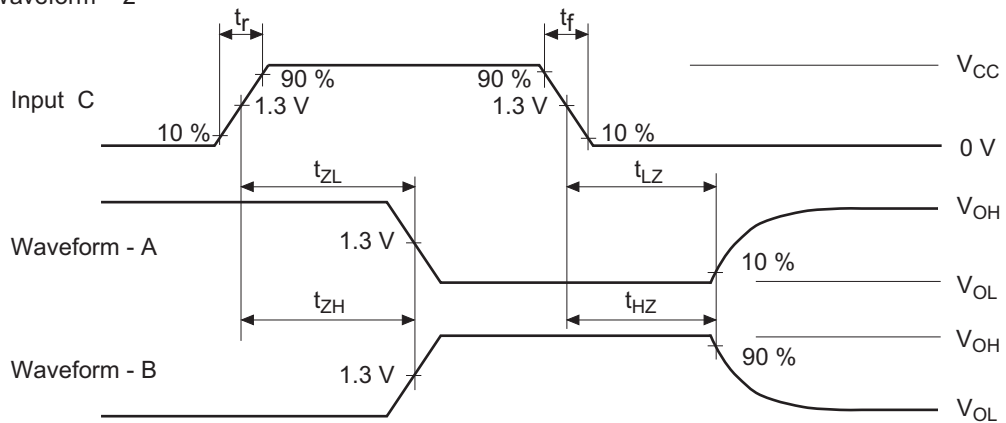
Waveforms

- HD74HCT126

- Waveform – 1

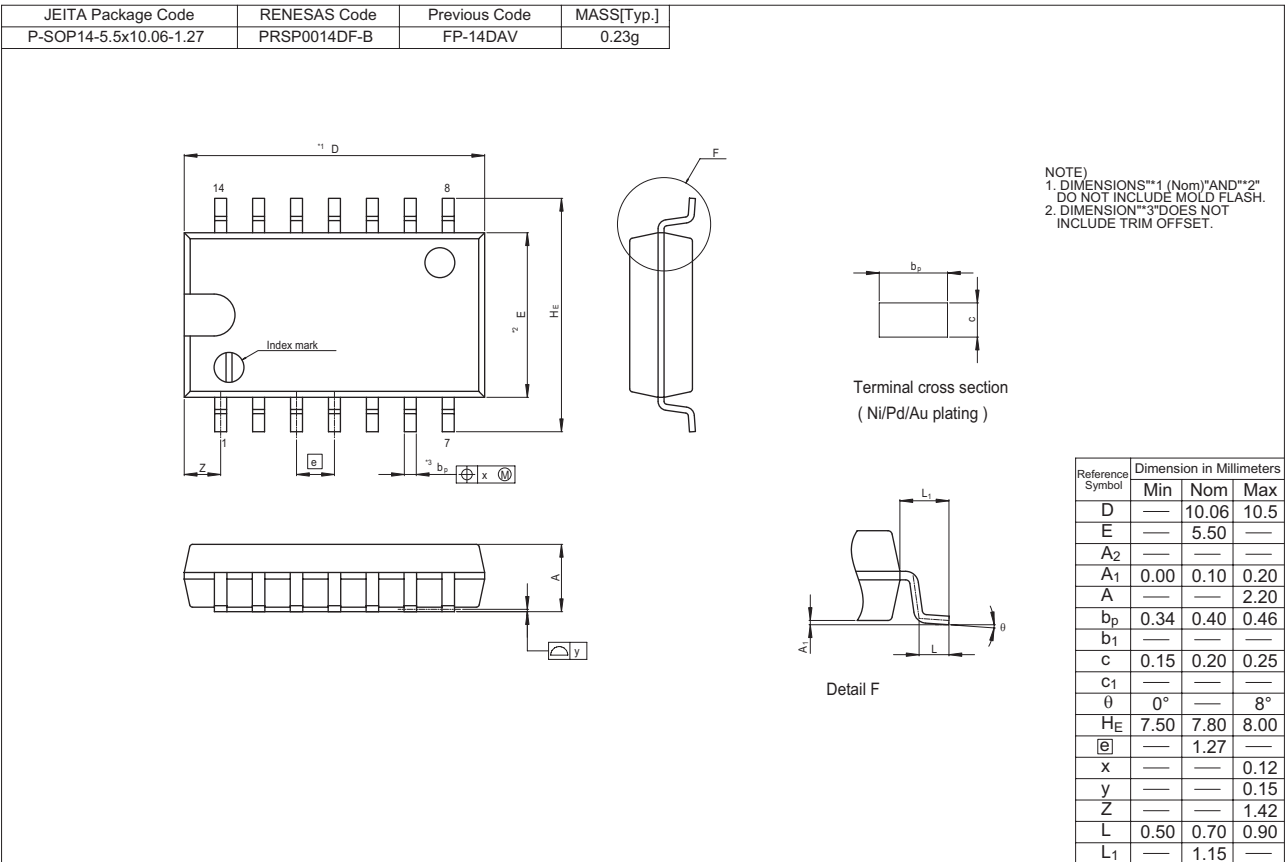
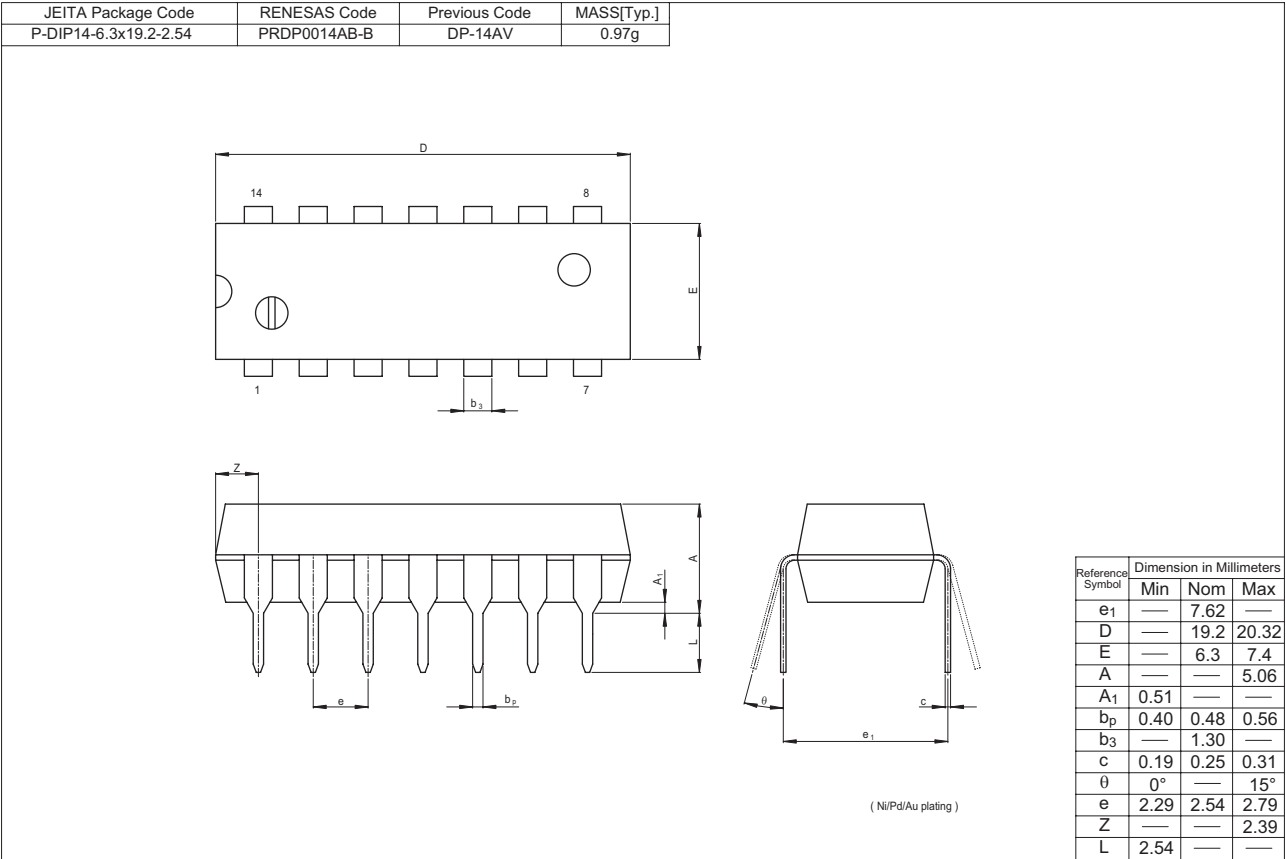


- Waveform – 2



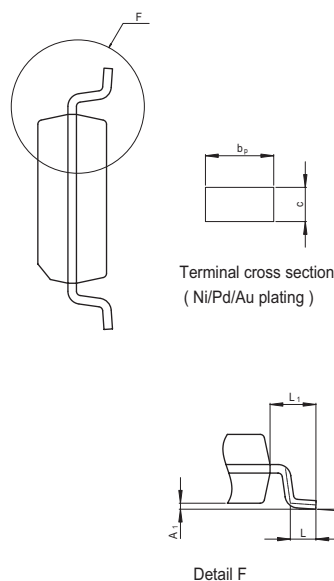
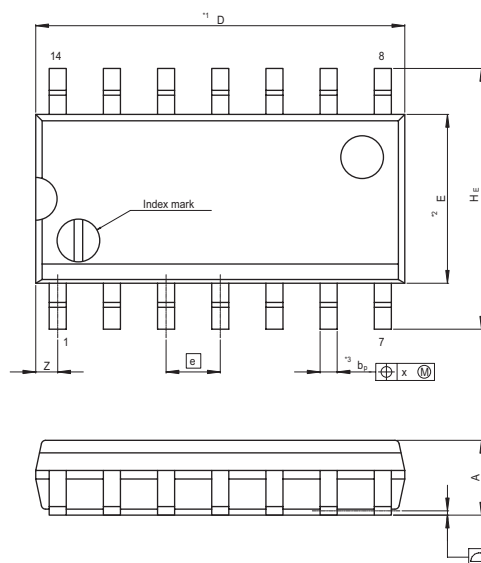
- Notes :
- $t_r \leq 6\text{ ns}$, $t_f \leq 6\text{ ns}$
 - Input waveform : $\text{PRR} \leq 1\text{ MHz}$, duty cycle 50%
 - Waveform– A is for an output with internal conditions such that the output is low except when disabled by the output control.
 - Waveform– B is for an output with internal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

Package Dimensions



HD74HCT125, HD74HCT126

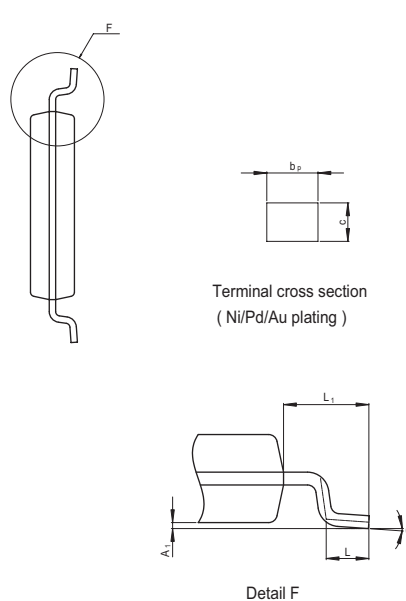
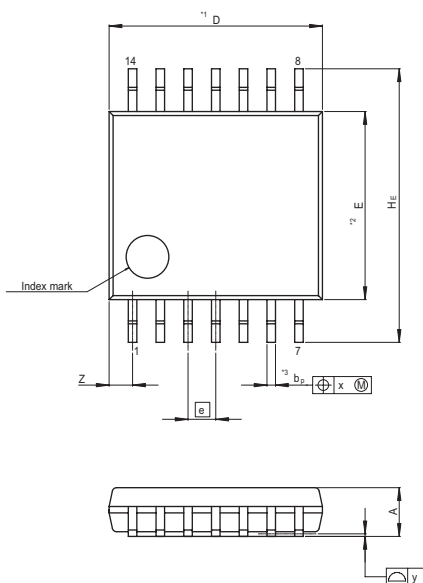
JEITA Package Code	RENESAS Code	Previous Code	MASS[Typ.]
P-SOP14-3.95x8.65-1.27	PRSP0014DE-A	FP-14DNV	0.13g



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

Reference Symbol	Min	Nom	Max
D	—	8.65	9.05
E	—	3.95	—
A2	—	—	—
A1	0.10	0.14	0.25
A	—	—	1.75
b _p	0.34	0.40	0.46
b ₁	—	—	—
c	0.15	0.20	0.25
c ₁	—	—	—
θ	0°	—	8°
H _E	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 ₁	—	1.08	—

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



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

Reference Symbol	Min	Nom	Max
D	—	5.00	5.30
E	—	4.40	—
A2	—	—	—
A1	0.03	0.07	0.10
A	—	—	1.10
b _p	0.15	0.20	0.25
b ₁	—	—	—
c	0.10	0.15	0.20
c ₁	—	—	—
θ	0°	—	8°
H _E	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 ₁	—	1.0	—

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Renesas Technology America, Inc.
450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

Renesas Technology Hong Kong Ltd.
7th Floor, North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2377-3473

Renesas Technology Taiwan Co., Ltd.
10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

Renesas Technology Singapore Pte. Ltd.
1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

Renesas Technology Malaysia Sdn. Bhd
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510