

HD74LS374

Octal D-type Edge-triggered Flip-Flops (with three-state outputs)

REJ03D0483-0200
Rev.2.00
Feb.18.2005

The HD74LS374, 8-bit register features totem-pole three-state outputs designed specifically for driving highly-capacitive or relatively low-impedance loads. The high-impedance third state and increased high-logic-level drive provide this register with the capability of being connected directly to and driving the bus lines in a bus-organized system without need for interface or pull-up components. They are particularly attractive for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers. The eight flip-flops are edge-triggered D-type flip-flops. On the positive transition the clock, the Q outputs will be set to the logic states that were setup at the D inputs. On the negative transition the clock, the Q outputs will be set to the logic states that were setup at the D inputs.

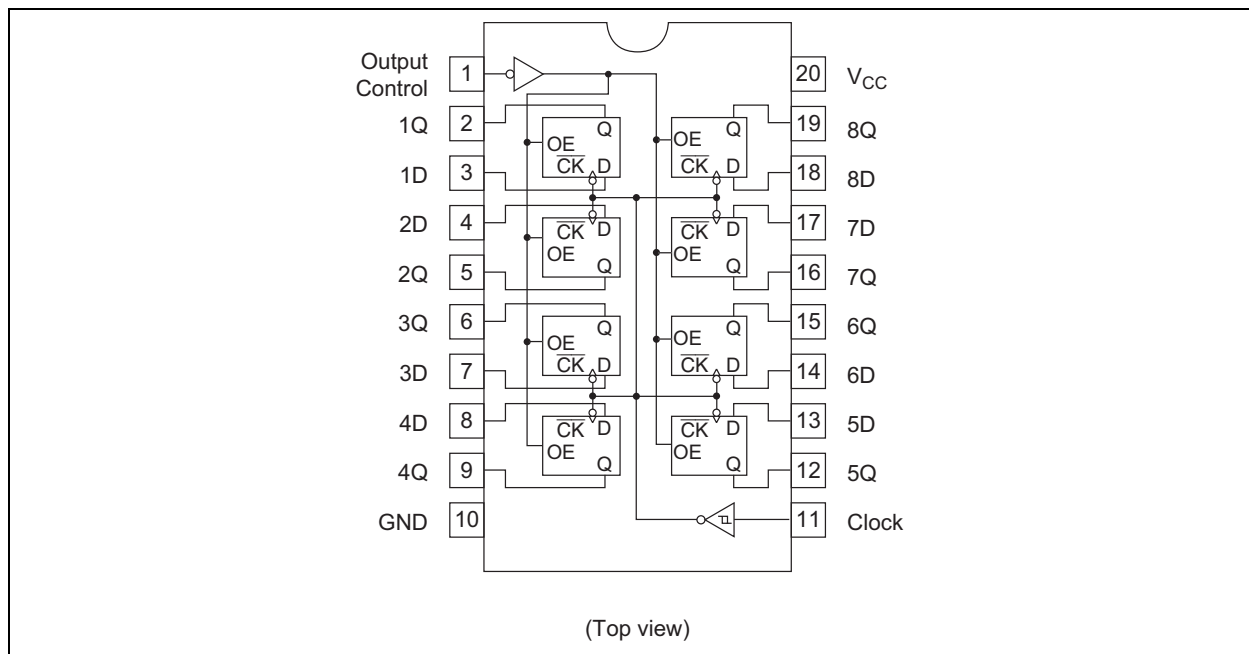
Features

- Ordering Information

Part Name	Package Type	Package Code (Previous Code)	Package Abbreviation	Taping Abbreviation (Quantity)
HD74LS374P	DILP-20 pin	PRDP0020AC-B (DP-20NEV)	P	—
HD74LS374FPEL	SOP-20 pin (JEITA)	PRSP0020DD-B (FP-20DAV)	FP	EL (2,000 pcs/reel)
HD74LS374RPEL	SOP-20 pin (JEDEC)	PRSP0020DC-A (FP-20DBV)	RP	EL (1,000 pcs/reel)

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

Pin Arrangement



Function Table

Inputs		Outputs	
Output control	Clock	D	Q
L	↑	H	H
L	↑	L	L
L	L	X	Q ₀
H	X	X	Z

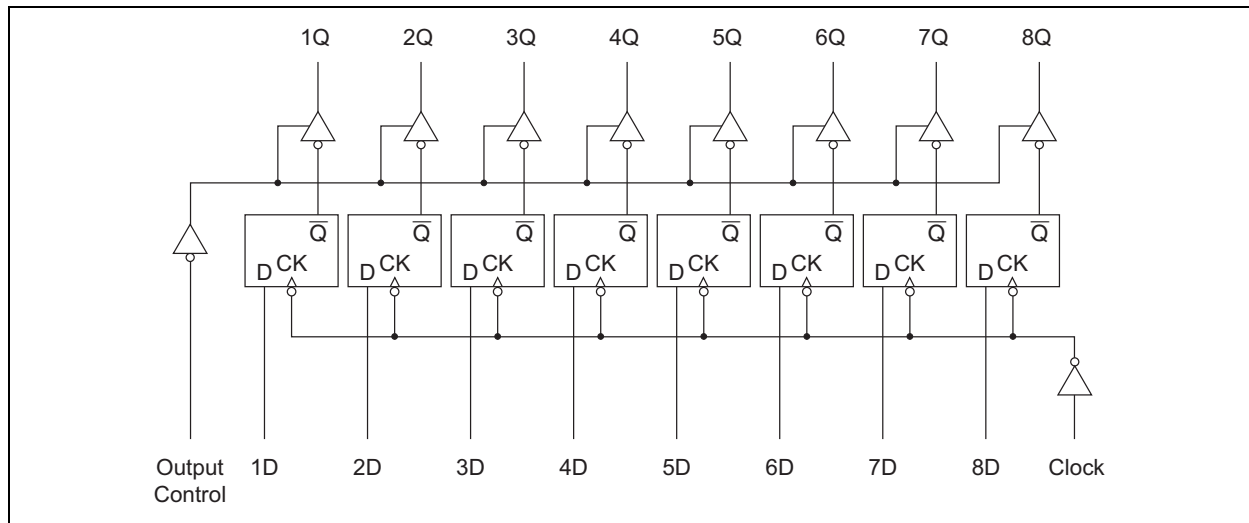
Notes: H; high level, L; low level, X; irrelevant

↑; transition from low to high level

Q₀; level of Q before the indicated steady state input conditions were established

Z; off (high-impedance) state of a three state output

Block Diagram



Absolute Maximum Ratings

Item	Symbol	Ratings	Unit
Supply voltage	V _{CC}	7	V
Input voltage	V _{IN}	7	V
Power dissipation	P _T	400	mW
Storage temperature	T _{stg}	-65 to +150	°C

Note: Voltage value, unless otherwise noted, are with respect to network ground terminal.

Recommended Operating Conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage	V _{CC}	4.75	5.00	5.25	V
Output voltage	V _{OH}	—	—	5.5	V
Output current	I _{OH}	—	—	-2.6	mA
	I _{OL}	—	—	24	mA
Operating temperature	T _{opr}	-20	25	75	°C
Clock pulse width	t _w	"H" Level	15	—	ns
		"L" Level	15	—	ns
Data setup time	t _{su}	20↑	—	—	ns
Data hold time	t _h	0↑	—	—	ns

Electrical Characteristics

(Ta = -20 to +75 °C)

Item	Symbol	min.	typ.*	max.	Unit	Condition	
Input voltage	V _{IH}	2.0	—	—	V		
	V _{IL}	—	—	0.8	V		
Output voltage	V _{OH}	2.4	—	—	V	V _{CC} = 4.75 V, V _{IH} = 2 V, V _{IL} = 0.8 V, I _{OH} = -2.6 mA	
	V _{OL}	—	—	0.4	V	I _{OL} = 12 mA	V _{CC} = 4.75 V, V _{IH} = 2 V, V _{IL} = 0.8 V
—		—	0.5	I _{OL} = 24 mA			
Output current	I _{OZH}	—	—	20	μA	V _O = 2.7 V	V _{CC} = 5.25 V, V _{IH} = 2 V, V _{IL} = 0.8 V
	I _{OZL}	—	—	-20		V _O = 0.4 V	
Input current	I _{IH}	—	—	20	μA	V _{CC} = 5.25 V, V _I = 2.7 V	
	I _{IL}	—	—	-0.4	mA	V _{CC} = 5.25 V, V _I = 0.4 V	
	I _I	—	—	0.1	mA	V _{CC} = 5.25 V, V _I = 7 V	
Short-circuit output current	I _{OS}	-30	—	-130	mA	V _{CC} = 5.25 V	
Supply current	I _{CC}	—	27	40	mA	V _{CC} = 5.25 V, V _I = 4.5 V (Output control)	
Input clamp voltage	V _{IK}	—	—	-1.5	V	V _{CC} = 4.75 V, I _{IN} = -18 mA	

Note: * V_{CC} = 5 V, Ta = 25°C

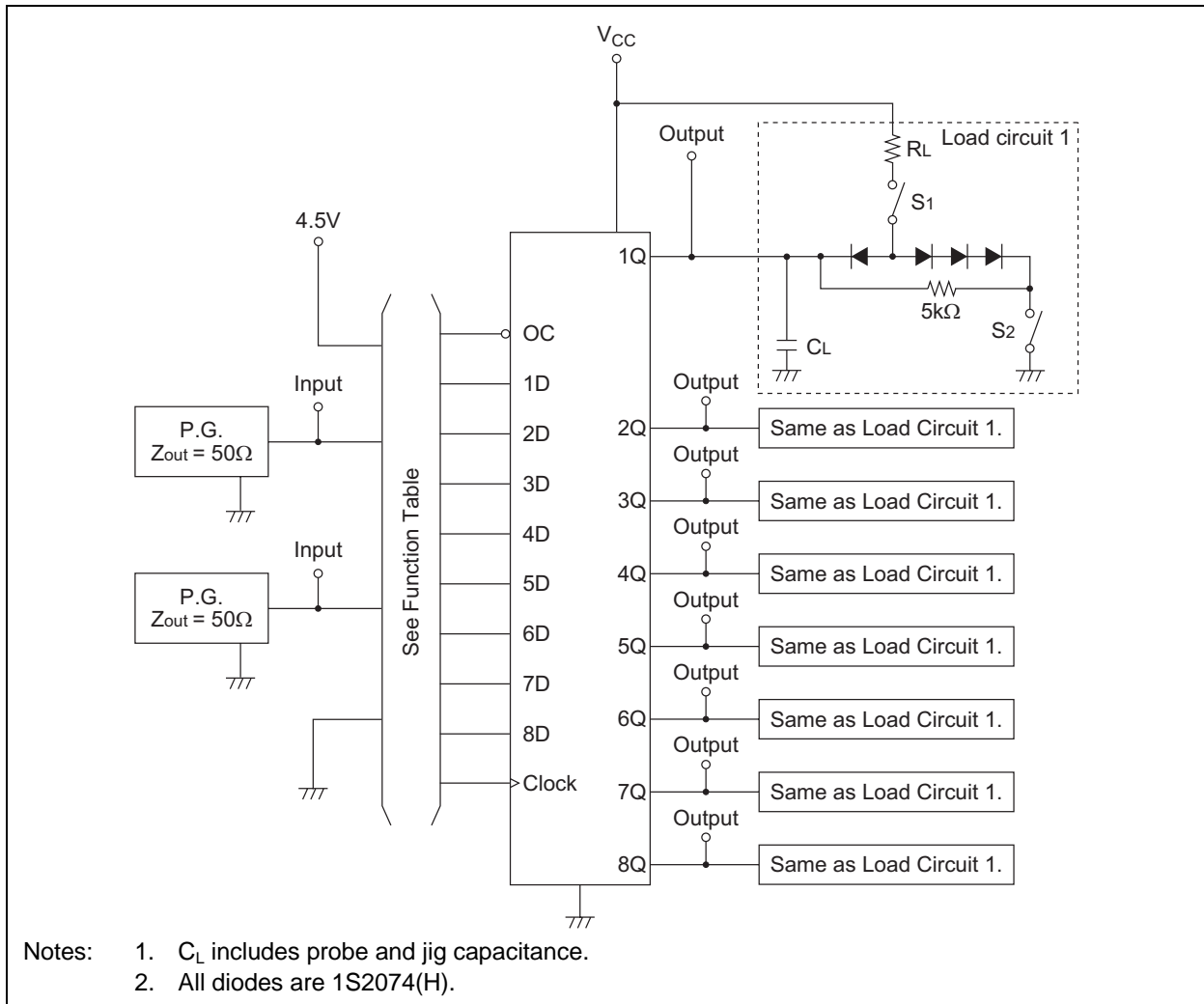
Switching Characteristics

(V_{CC} = 5 V, Ta = 25°C)

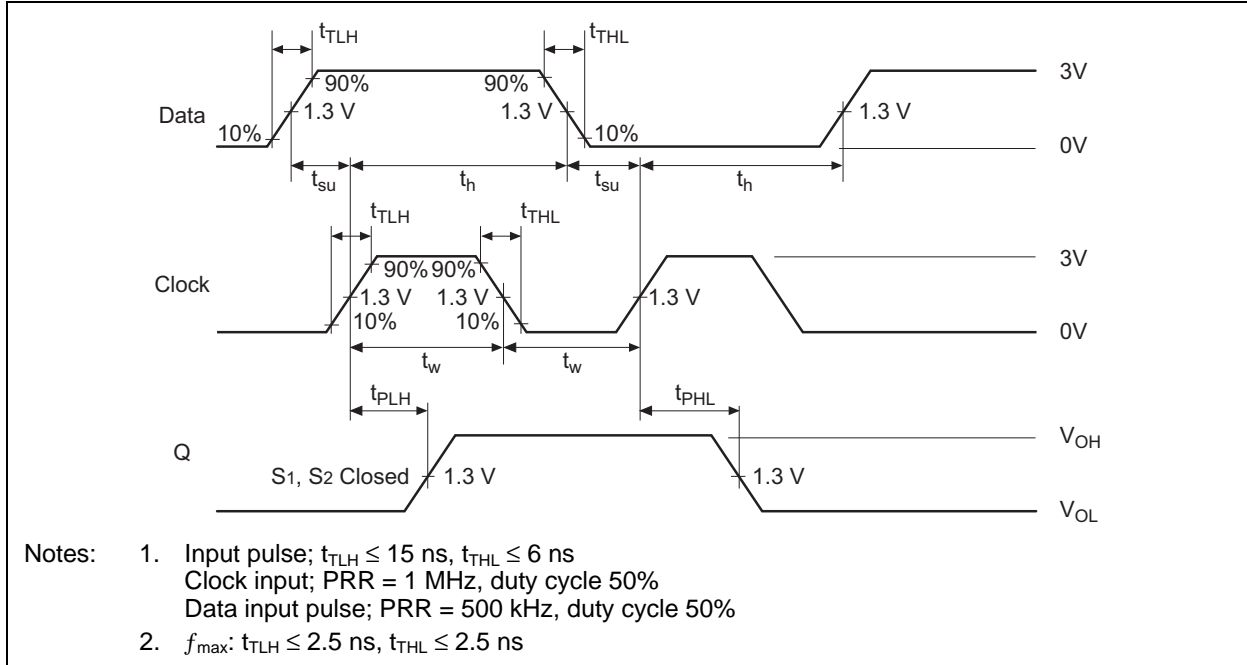
Item	Symbol	Inputs	Output	min.	typ.	max.	Unit	Condition
Maximum clock frequency	f _{max}	Clock	Q	35	50	—	MHz	C _L = 45 pF, R _L = 667 Ω
Propagation delay time	t _{PLH}	Clock	Q	—	15	28	ns	
	t _{PHL}			—	19	28		
Output enable time	t _{ZH}	OC	Q	—	20	28		
	t _{ZL}			—	21	28		
Output disable time	t _{HZ}	OC	Q	—	12	20		
	t _{LZ}			—	14	25		

Testing Method

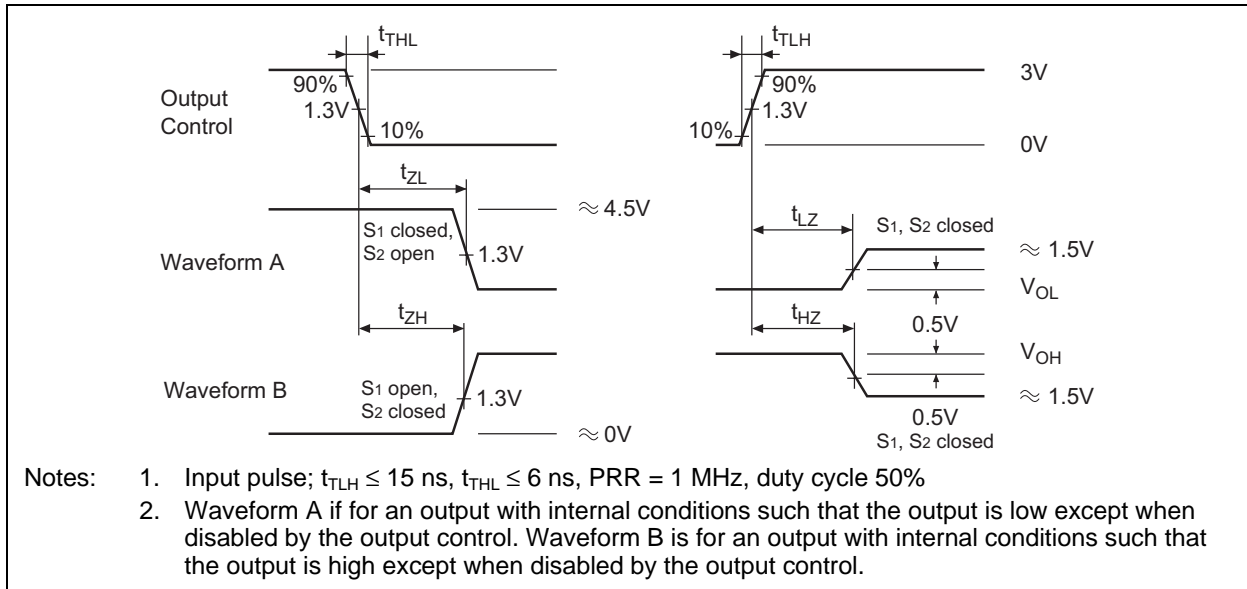
Test Circuit



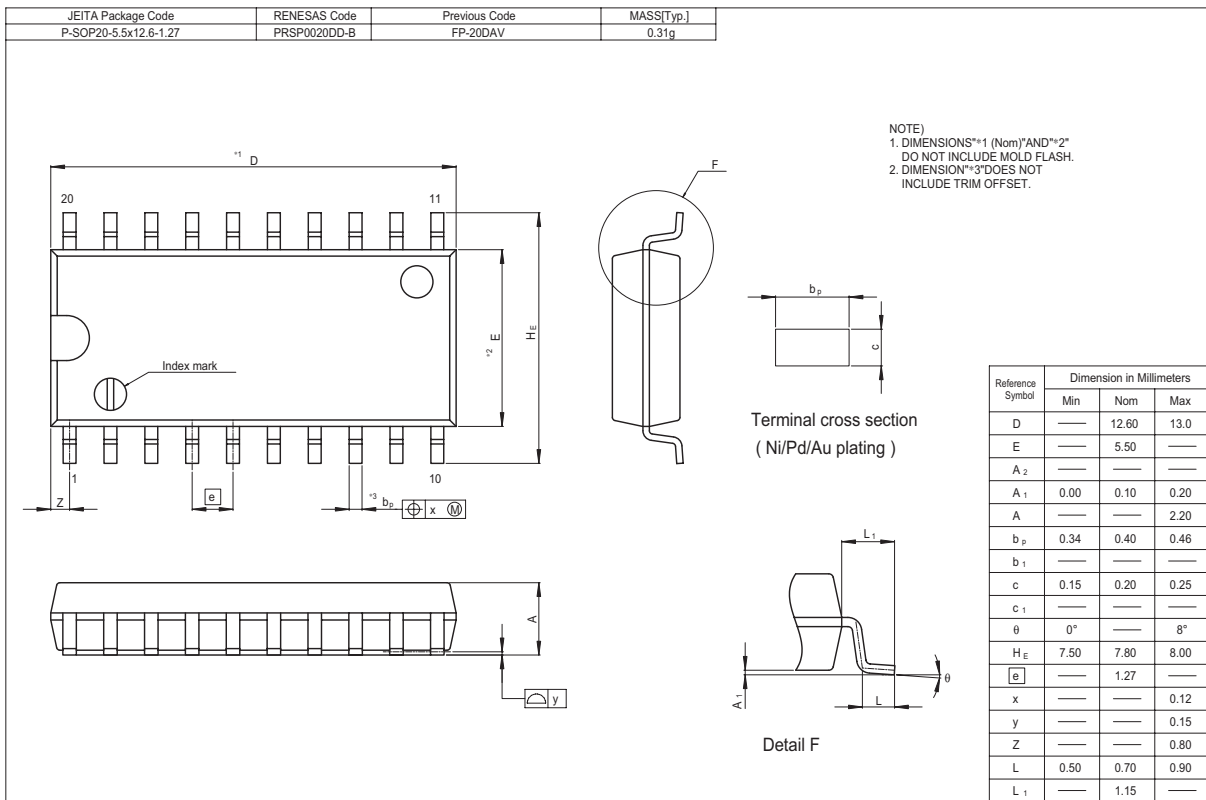
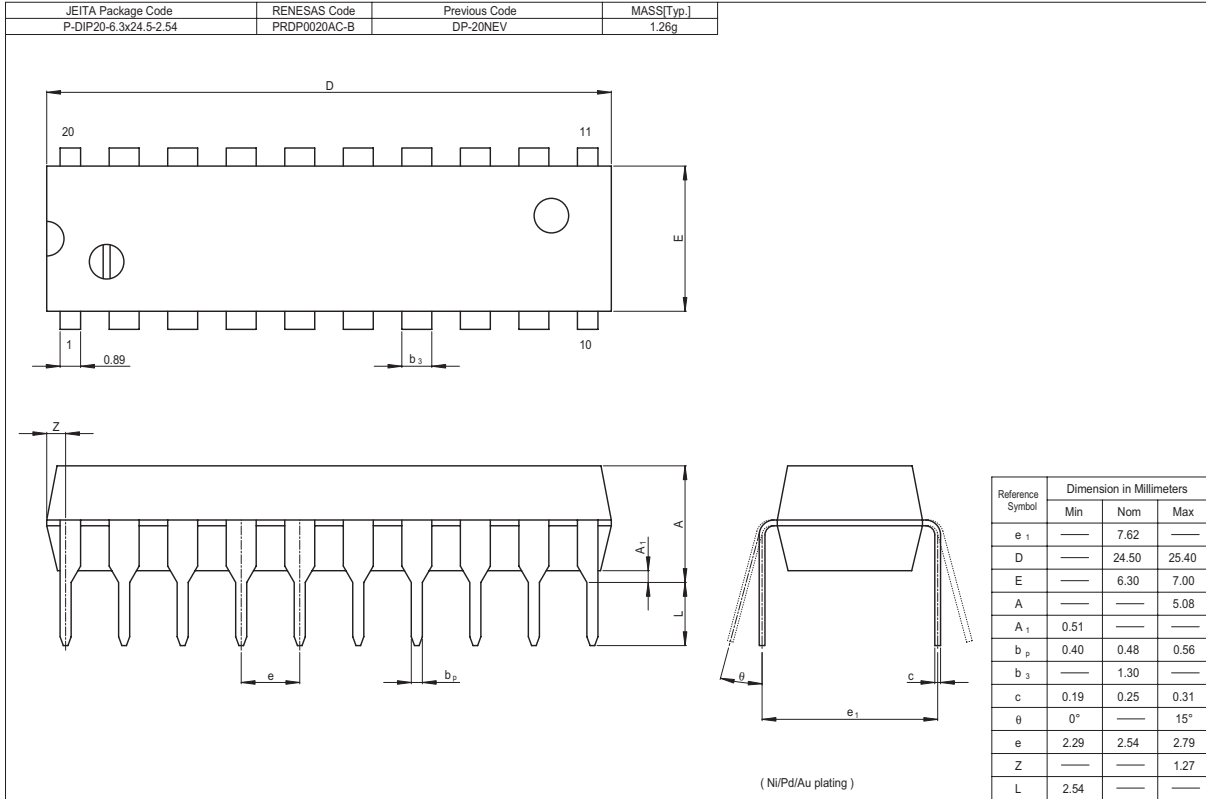
Waveforms 1



Waveforms 2

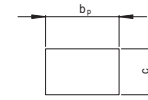
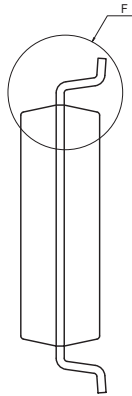
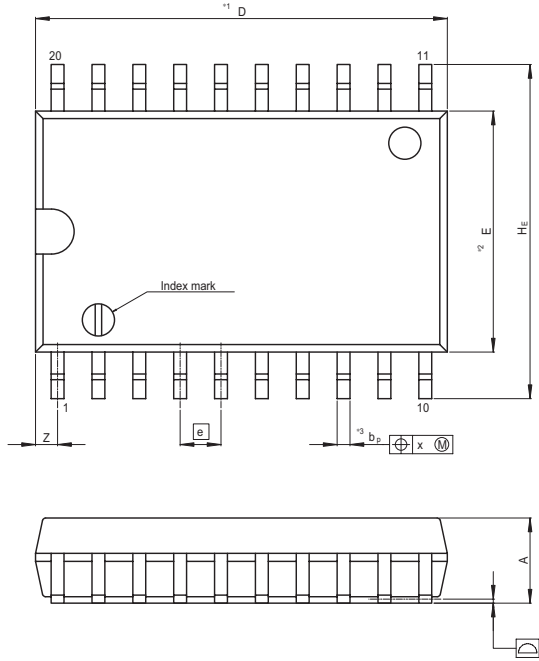


Package Dimensions

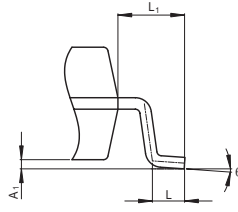


HD74LS374

JEITA Package Code P-SOP20-7.5x12.8-1.27	RENESAS Code PRSP0020DC-A	Previous Code FP-20DBV	MASS[Typ.] 0.52g
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Terminal cross section
(Ni/Pd/Au plating)



Detail F

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

Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	—	12.80	13.2
E	—	7.50	—
A ₂	—	—	—
A ₁	0.10	0.20	0.30
A	—	—	2.65
b _p	0.34	0.40	0.46
b ₁	—	—	—
c	0.20	0.25	0.30
c ₁	—	—	—
θ	0°	—	8°
H _E	10.00	10.40	10.65
e	—	1.27	—
x	—	—	0.12
y	—	—	0.15
Z	—	—	0.935
L	0.40	0.70	1.27
L ₁	—	1.45	—

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