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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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Keep safety first in your circuit designs!

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Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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HD74HCT564/HD74HCT574

Octal D-type Flip-Flops (with 3-state outputs)



ADE-205-560 (Z)
1st. Edition
Sep. 2000

Description



These devices are positive edge triggered flip-flops. The difference between HD74HCT564 and HD74HCT574 is only that the former has inverting outputs and the latter has non-inverting outputs.

Data at the D inputs, meeting the set-up and hold time requirements, are transferred to the Q or \overline{Q} outputs on positive going transitions of the clock (CK) input. When a high logic level is applied to the output control (OC) input, all outputs go to a high impedance state, regardless of what signals are present at the other inputs and the state of the storage elements.

Features

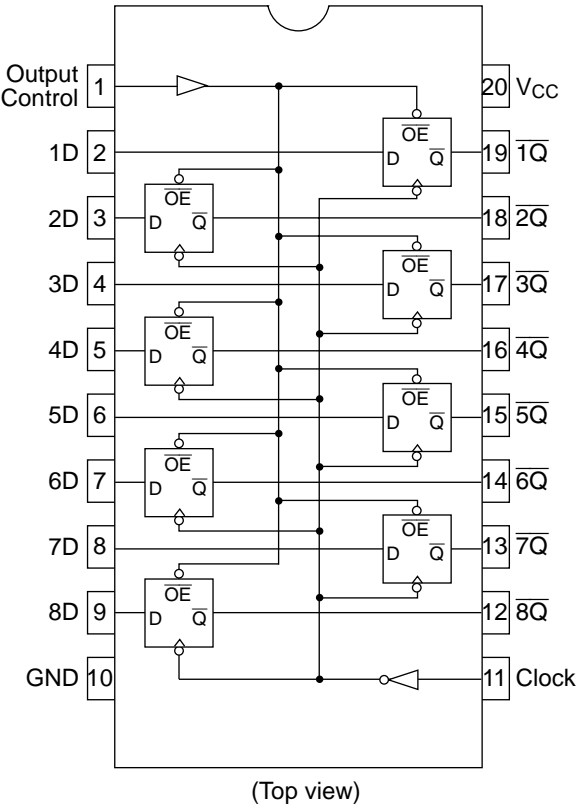
- LSTTL Output Logic Level Compatibility as well as CMOS Output Compatibility
- High Speed Operation: t_{pd} (D to Q, \overline{Q}) = 15 ns typ (C_L = 50 pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: V_{CC} = 4.5 to 5.5 V
- Low Input Current: 1 μ A max
- Low Quiescent Supply Current: I_{CC} (static) = 4 μ A max (T_a = 25°C)

Function Table

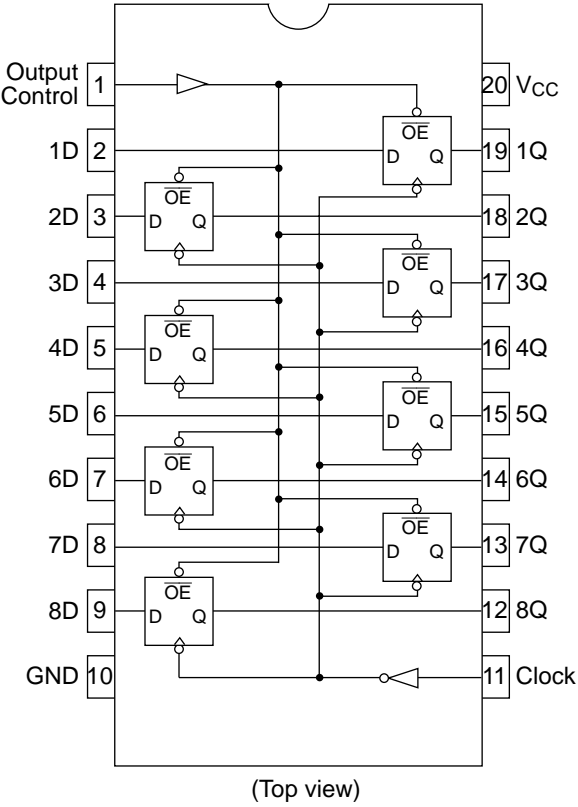
Output Control	Clock	Data	Outputs	
			HD74HCT564	HD74HCT574
L		H	L	H
L		L	H	L
L	L	X	\overline{Q}_0	Q_0
H	X	X	Z	Z

Pin Arrangement

HD74HCT564

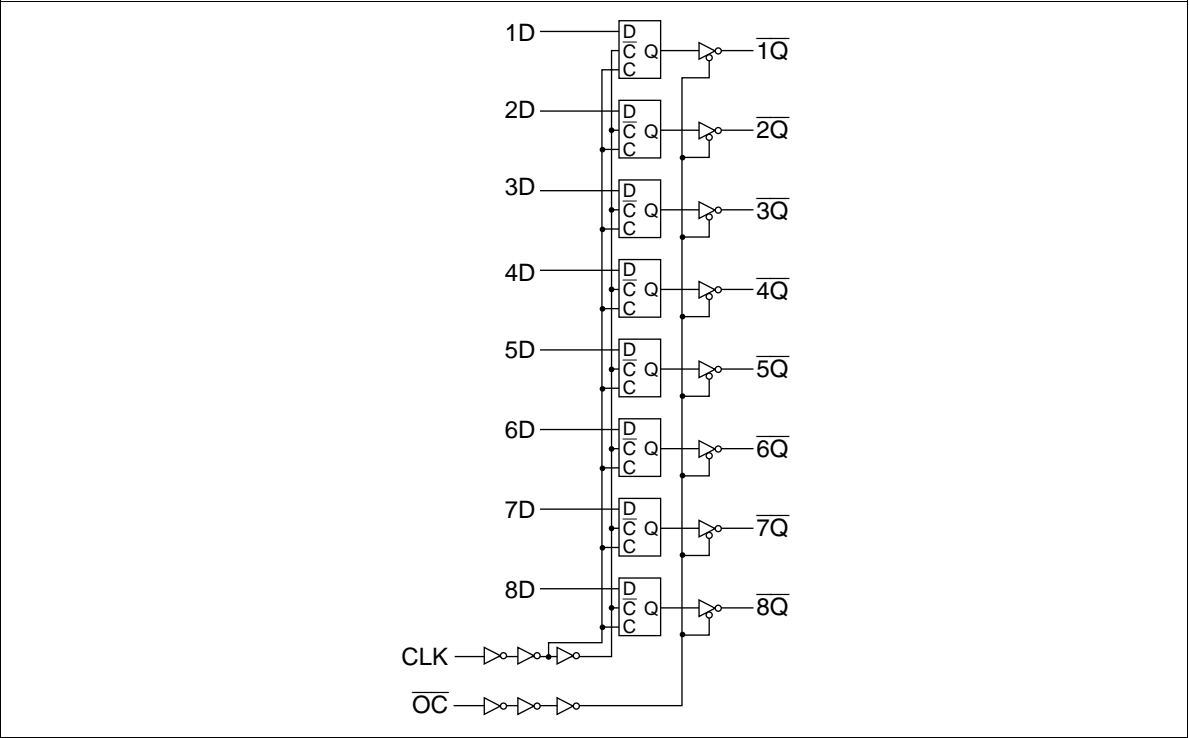


HD74HCT574

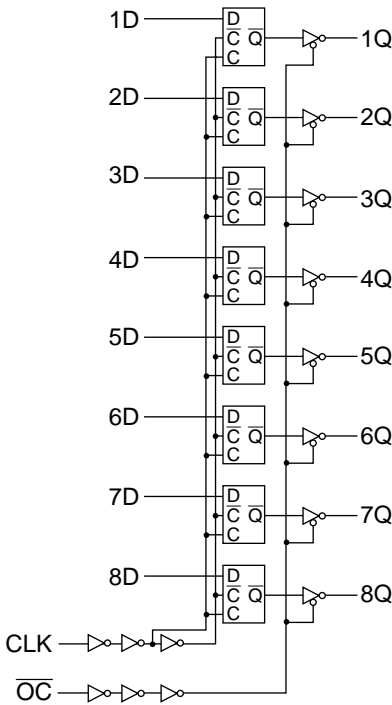


Block Diagram

HD74HCT564



HD74HCT574



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
DC current drain per pin	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	$^{\circ}\text{C}$

DC Characteristics

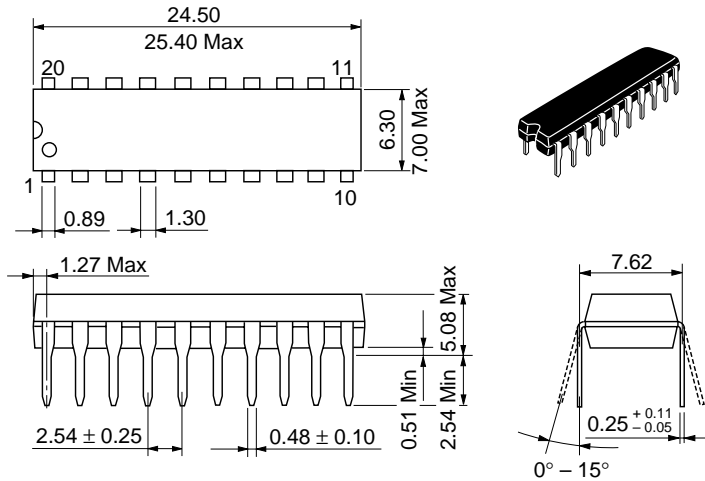
Item	Symbol	Ta = -40 to +85°C						Test Conditions	
		Ta = 25°C							
		Min	Typ	Max	Min	Max	Unit	V _{CC} (V)	
Input voltage	V _{IH}	2.0	—	—	2.0	—	V	4.5 to 5.5	
	V _{IL}	—	—	0.8	—	0.8	V	4.5 to 5.5	
Output voltage	V _{OH}	4.4	—	—	4.4	—	V	4.5	Vin = V _{IH} or V _{IL} I _{OH} = -20 μA
		4.18	—	—	4.13	—		4.5	I _{OH} = -6 mA
	V _{OL}	—	—	0.1	—	0.1	V	4.5	Vin = V _{IH} or V _{IL} I _{OL} = 20 μA
		—	—	0.26	—	0.33		4.5	I _{OL} = 6 mA
Off-state output current	I _{OZ}	—	—	±0.5	—	±5.0	μA	5.5	Vin = V _{IH} or V _{IL} , Vout = V _{CC} or GND
Input current	I _{in}	—	—	±0.1	—	±1.0	μA	5.5	Vin = V _{CC} or GND
Quiescent current	I _{CC}	—	—	4.0	—	40	μA	5.5	Vin = V _{CC} or GND, Iout = 0 μA

AC Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	Ta = −40 to +85°C					Unit	Test Conditions
		Ta = 25°C						
Maximum clock frequency	f _{max}	—	—	30	—	24	ns	4.5
Propagation delay time	t _{PLH}	—	14	31	—	39	ns	4.5
	t _{PHL}	—	15	31	—	39		4.5
Output enable time	t _{ZL}	—	16	30	—	38	ns	4.5
	t _{ZH}	—	16	30	—	38		4.5
Output disable time	t _{LZ}	—	15	30	—	38	ns	4.5
	t _{HZ}	—	18	30	—	38		4.5
Setup time	t _{su}	20	3	—	25	—	ns	4.5
Hold time	t _h	5	−2	—	5	—	ns	4.5
Pulse width	t _w	16	7	—	20	—	ns	4.5
Output rise/fall time	t _{TLH}	—	4	12	—	15	ns	4.5
	t _{THL}	—	4	12	—	15		4.5
Input capacitance	C _{in}	—	5	10	—	10	pF	—

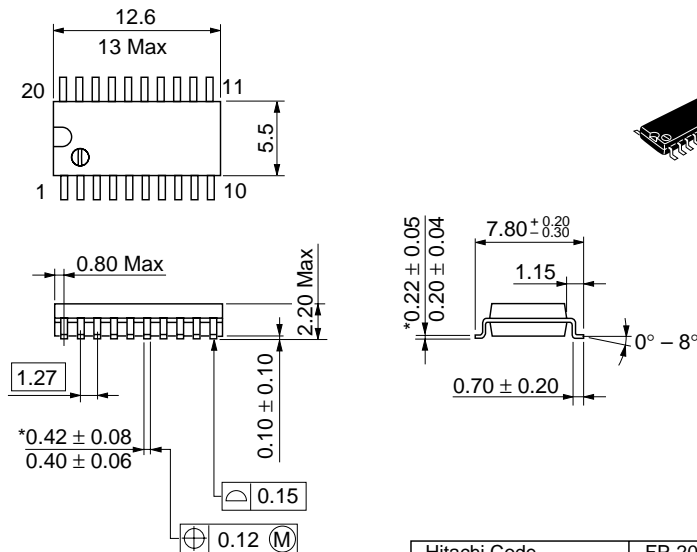
Package Dimensions

Unit: mm



Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Mass (reference value)	1.26 g

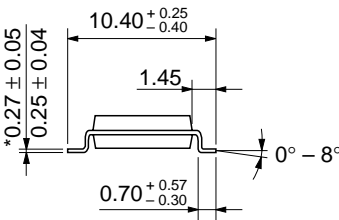
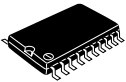
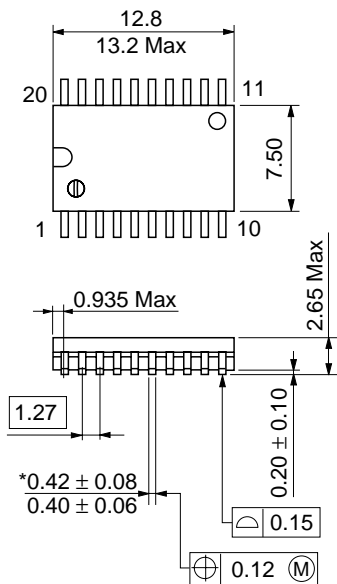
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DA
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.31 g

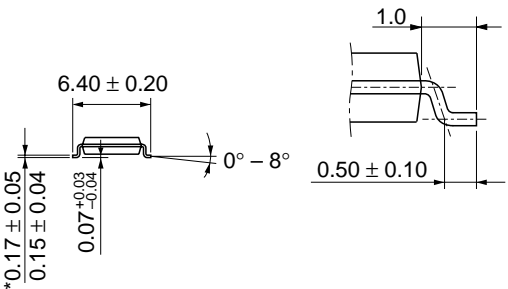
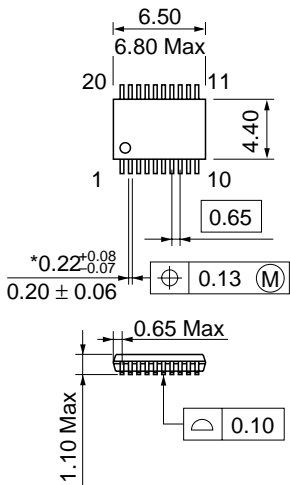
Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DB
JEDEC	Conforms
EIAJ	—
Mass (reference value)	0.52 g

Unit: mm



*Dimension including the plating thickness
Base material dimension

Hitachi Code	TTP-20DA
JEDEC	—
EIAJ	—
Mass (reference value)	0.07 g

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