HD74HCT564/HD74HCT574

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

HITACHI

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 µA max
- Low Quiescent Supply Current: I_{CC} (static) = 4 µA max (Ta = 25°C)

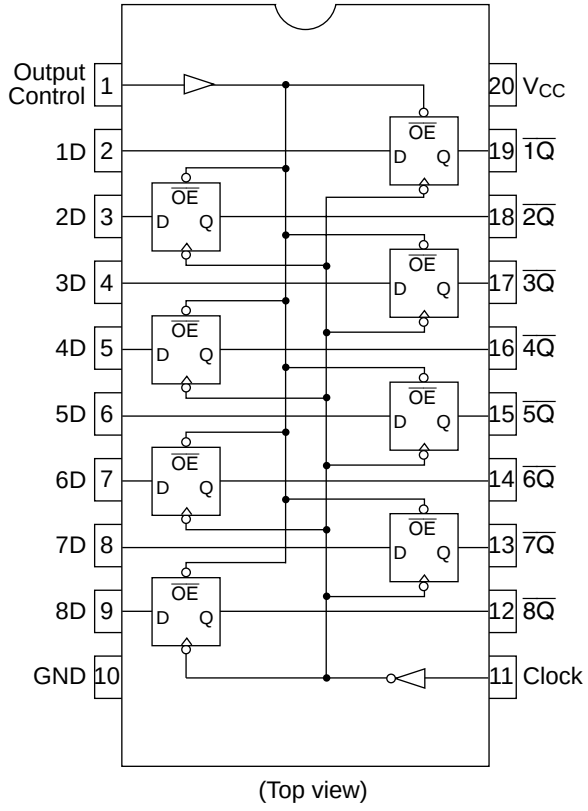
Function Table

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

Hitachi semiconductor

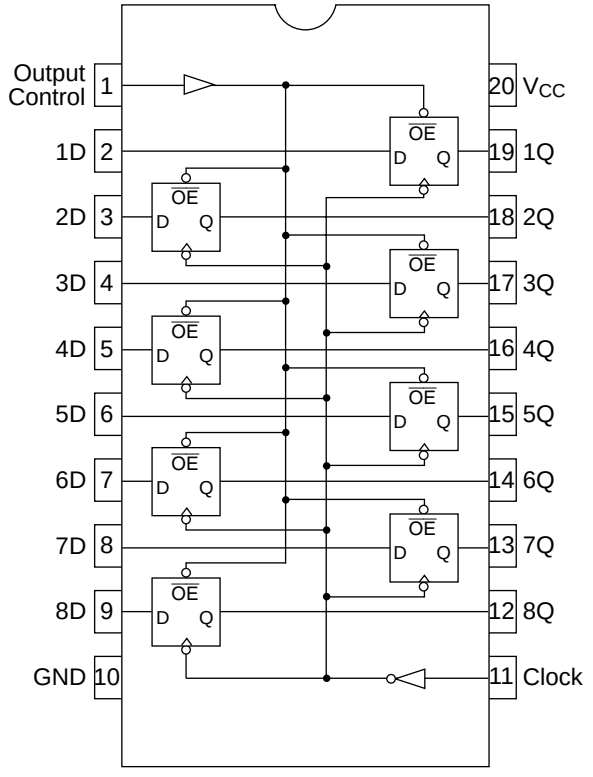
Pin Arrangement

HD74HCT564



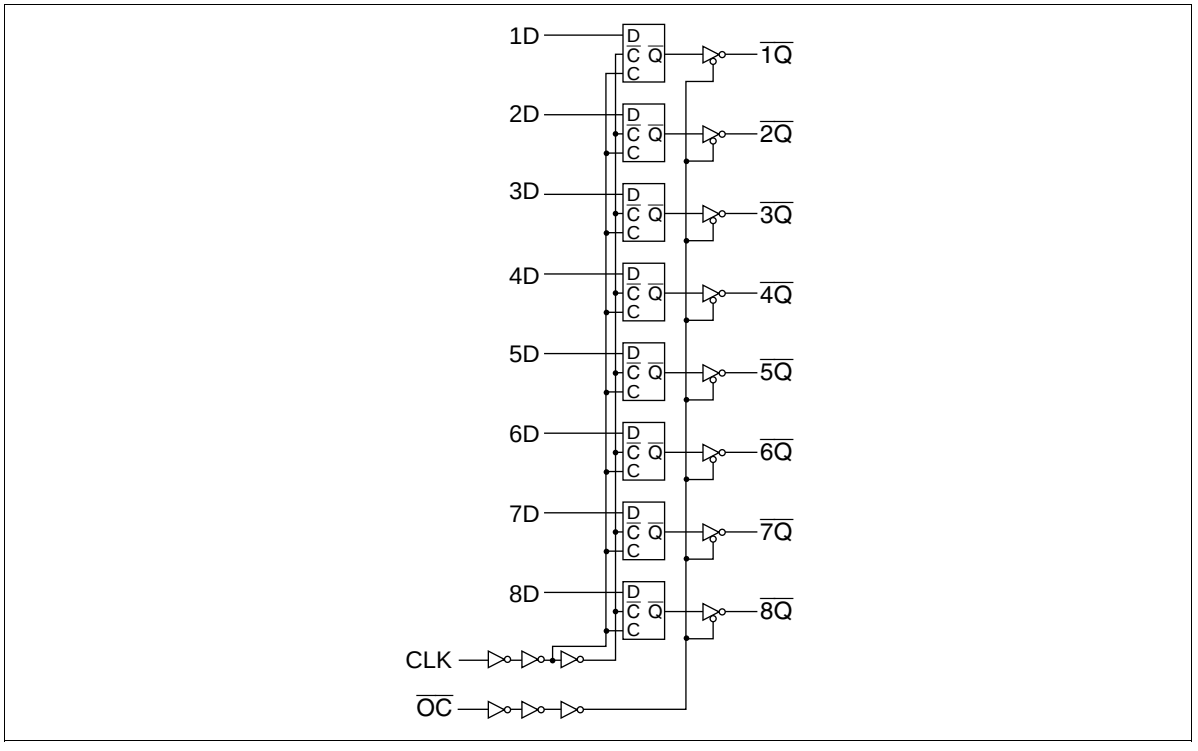
(Top view)

HD74HCT574

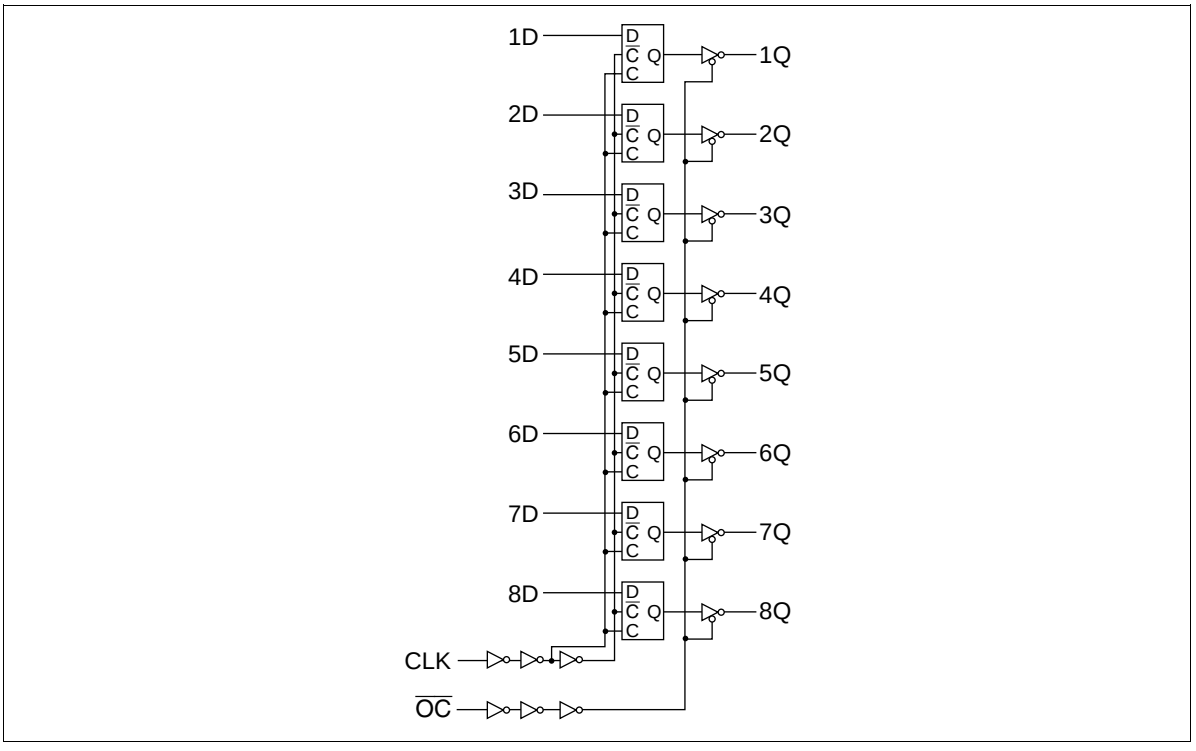

Output Control
1
1D
2
2D
3
3D
4
4D
5
5D
6
6D
7
7D
8
8D
9
GND
10
20
VCC
19
1Q
18
2Q
17
3Q
16
4Q
15
5Q
14
6Q
13
7Q
12
8Q
11
Clock
OE
D
Q
(Top view)

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	Tstg	–65 to +150	°C

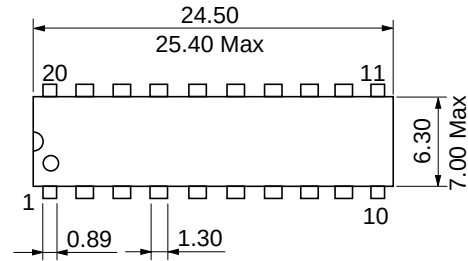
DC Characteristics

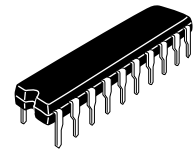
Item	Symbol	Ta = 25°C Min	Typ	Max	Ta = –40 to +85°C Min	Max	Unit	Test Conditions V_{CC} (V)	
Input voltage	V_{IH}	2.0	—	—	2.0	—	V	4.5 to 5.5	
	V_{IL}	—	—	0.8	—	0.8	V	4.5 to 5.5	
Output voltage	V_{OH}	4.4	—	—	4.4	—	V	4.5	Vin = V_{IH} or V_{IL} I_{OH} = –20 µA
		4.18	—	—	4.13	—		4.5	I_{OH} = –6 mA
	V_{OL}	—	—	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	Iin	—	—	±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

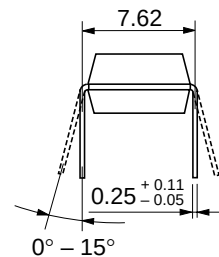
AC Characteristics (C_L = 50 pF, Input t_r = t_f = 6 ns)

Item	Symbol	Ta = 25°C Min	Typ	Max	Ta = –40 to +85°C Min	Max	Unit	Test Conditions V_{CC} (V)
Maximum clock frequency	f_{max}	—	—	30	—	24	ns	4.5
Propagation delay	t_{PLH}	—	14	31	—	39	ns	4.5
time	t_{PHL}	—	15	31	—	39		4.5
Output enable	t_{ZL}	—	16	30	—	38	ns	4.5
time	t_{ZH}	—	16	30	—	38		4.5
Output disable	t_{LZ}	—	15	30	—	38	ns	4.5
time	t_{HZ}	—	18	30	—	38		4.5
Setup time	t_{su}	12	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	t_{TLH}	—	4	12	—	15	ns	4.5
time	t_{THL}	—	4	12	—	15		4.5
Input capacitance	Cin	—	5	10	—	10	pF	—

Unit: mm

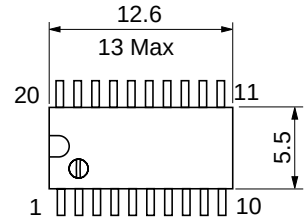


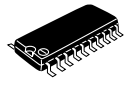


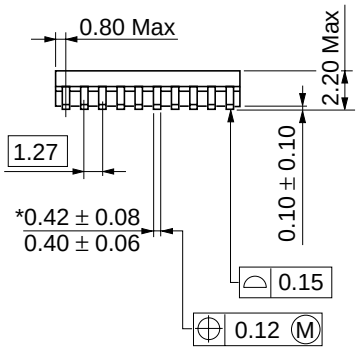


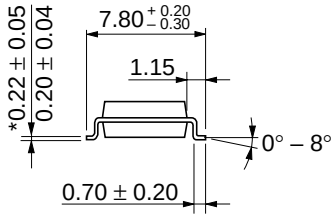
Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Weight (reference value)	1.26 g

Unit: mm





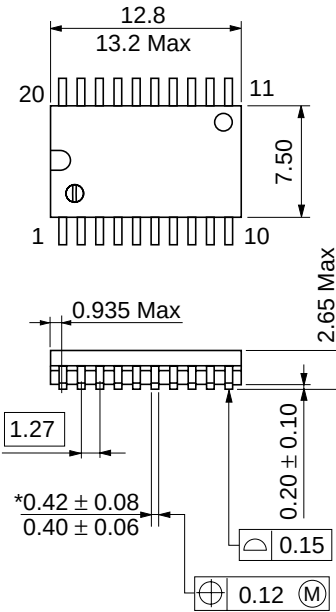


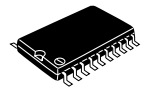


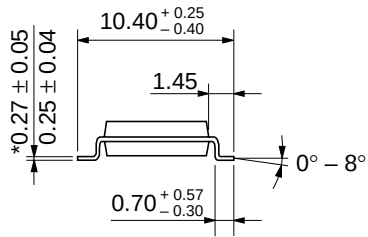
*Dimension including the plating thickness
Base material dimension

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

Unit: mm



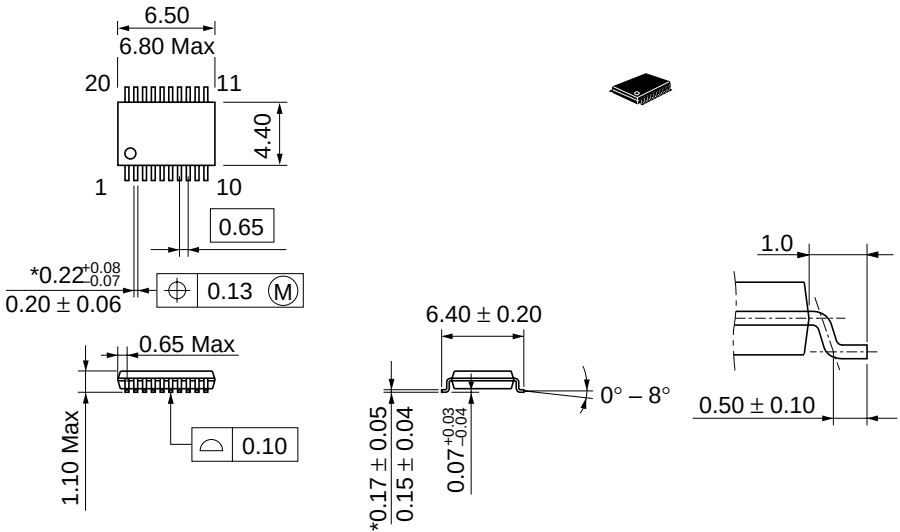




*Dimension including the plating thickness
Base material dimension

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

Unit: mm



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

*Dimension including the plating thickness
Base material dimension

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