HD74HC564/HD74HC574

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

HITACHI

ADE-205-510 (Z)
1st. Edition
Sep. 2000

Description

These devices are positive edge triggered flip-flops. The difference between HD74HC564 and HD74HC574 is only that the former has inverting outputs and the latter has noninvertering 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 cotrol (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

- High Speed Operation: t_{pd} (Clock to Output) = 13 ns typ (C_L = 50 pF)
- High Output Current: Fanout of 15 LSTTL Loads
- Wide Operating Voltage: V_{CC} = 2 to 6 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**	**HD74HC564**	**HD74HD574**
L	⎍	H	L	H
L	⎍	L	H	L
L	L	X	$\overline{Q_0}$	Q_0
H	X	X	Z	Z

Q_0 : level of Q before the indicated Steady-sate input conditions were established.
$\overline{Q_0}$: complement of Q_0 or level of $\overline{Q}$ before the indicated Steady-state input Conditions were established.

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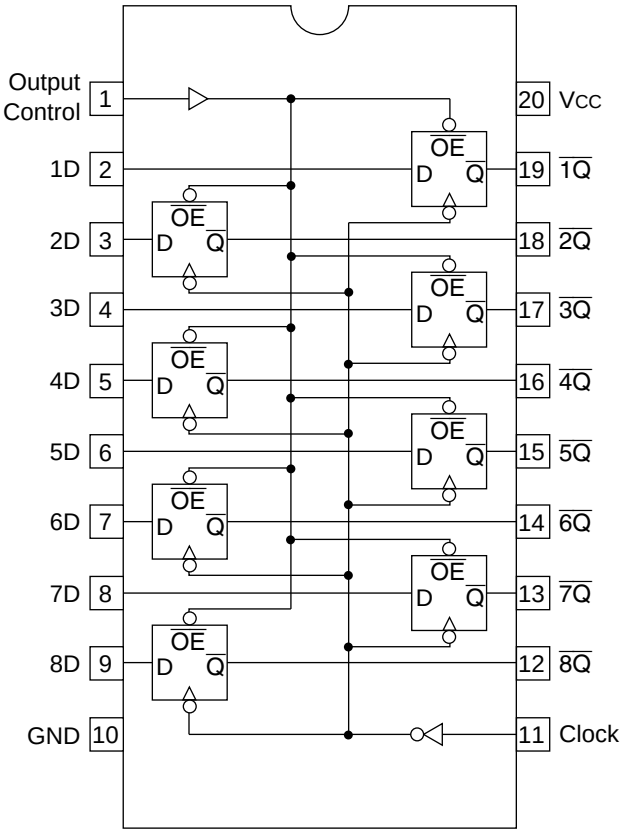
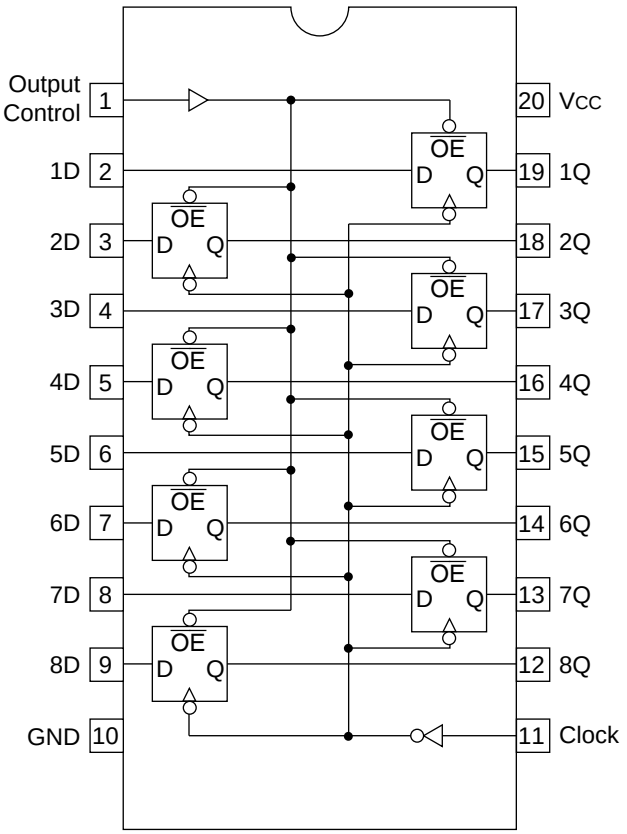
Pin Arrangement

HD74HC564



(Top view)

HD74HC574



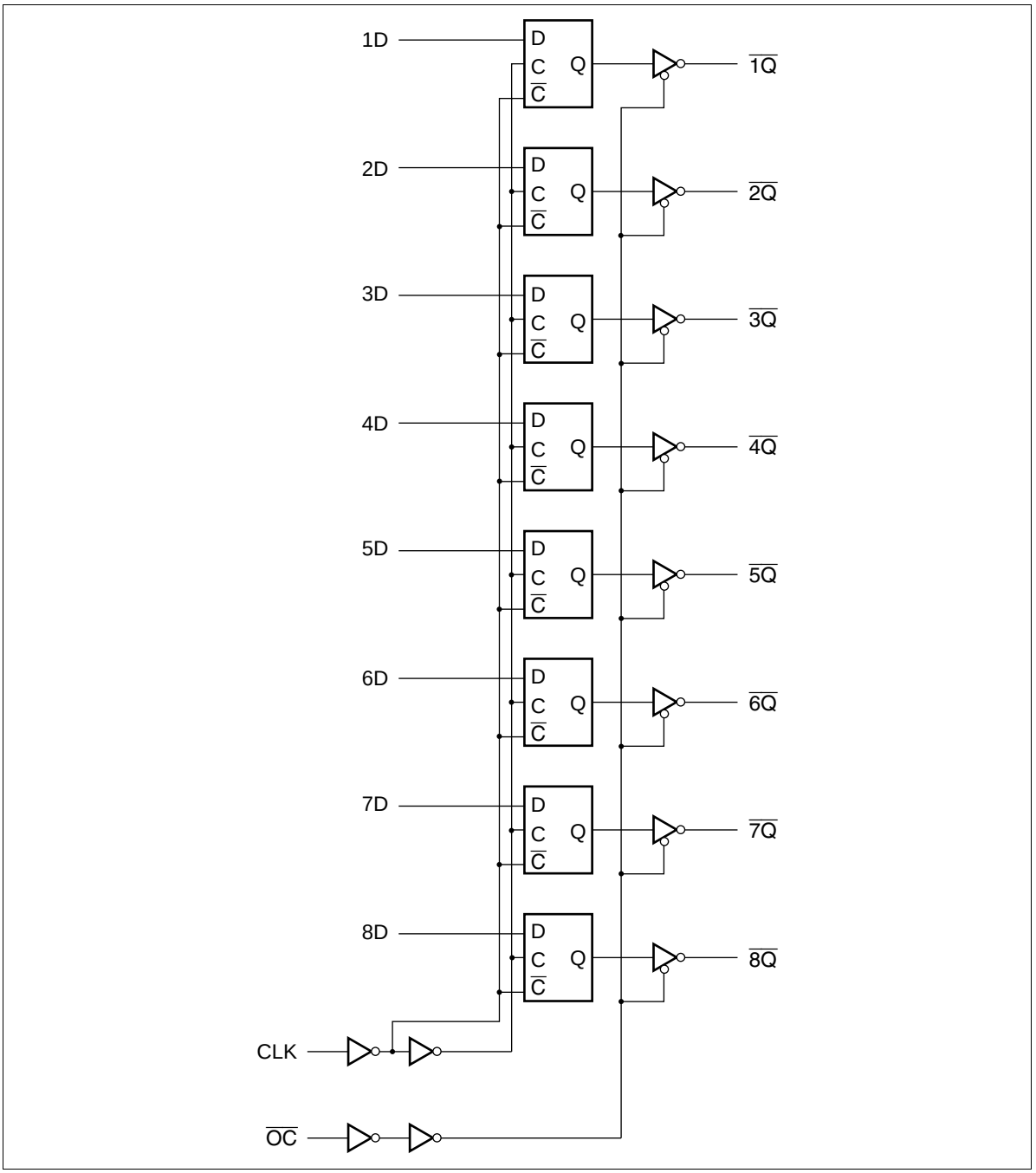
(Top view)

Absolute Maximum Ratings

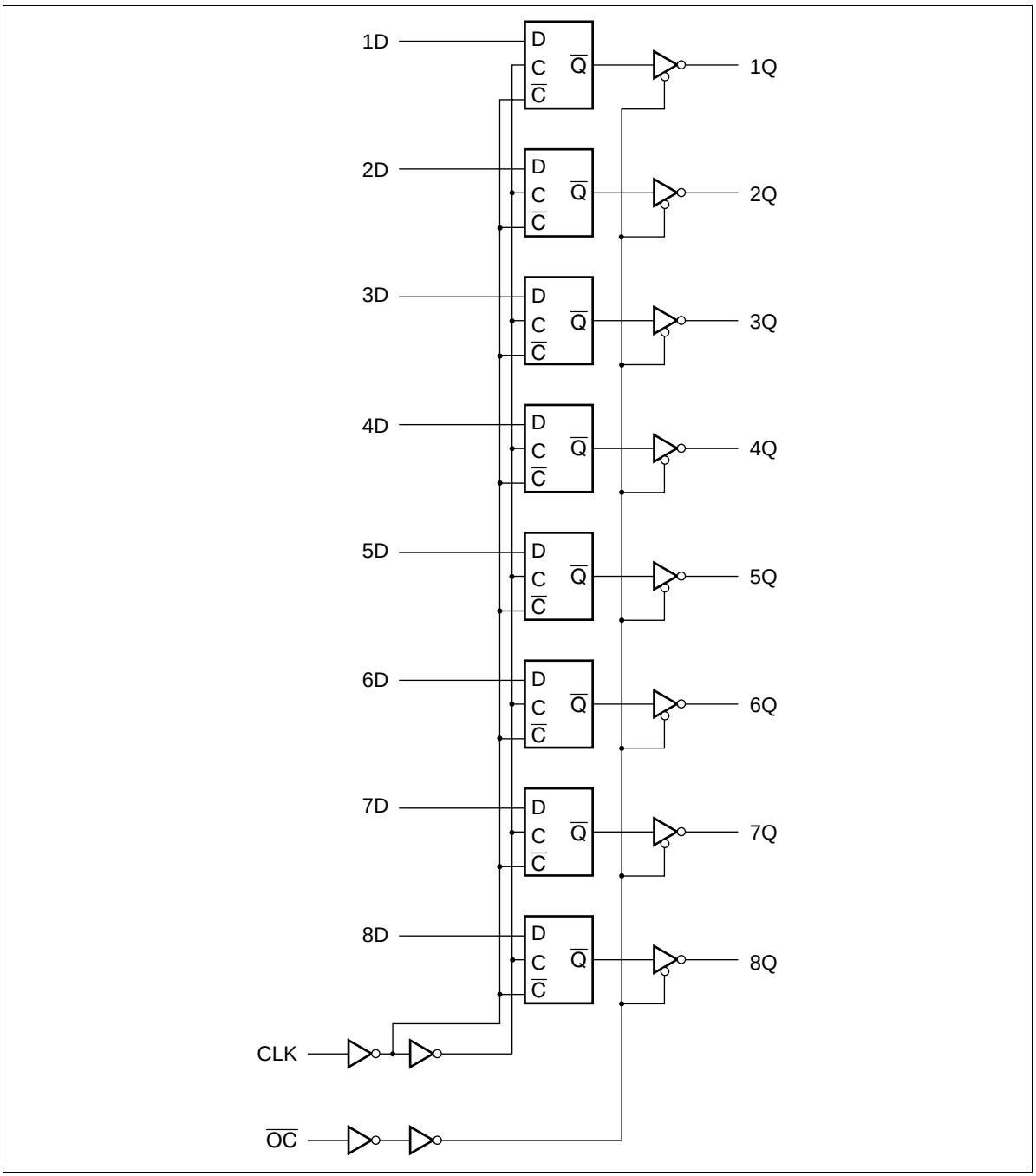
Item	Symbol	Rating	Unit
Supply voltage range	V_{CC}	–0.5 to +7.0	V
Input voltage	V_{IN}	–0.5 to V_{CC} + 0.5	V
Output voltage	V_{OUT}	–0.5 to V_{CC} + 0.5	V
Output current	I_{OUT}	±35	mA
DC current drain per V_{CC} , GND	I_{CC}, I_{GND}	±75	mA
DC input diode current	I_{IK}	±20	mA
DC output diode current	I_{OK}	±20	mA
Power Dissipation per package	P_T	500	mW
Storage temperature	Tstg	–65 to +150	°C

Block Diagram

HD74HC564



HD74HC574



DC Characteristics

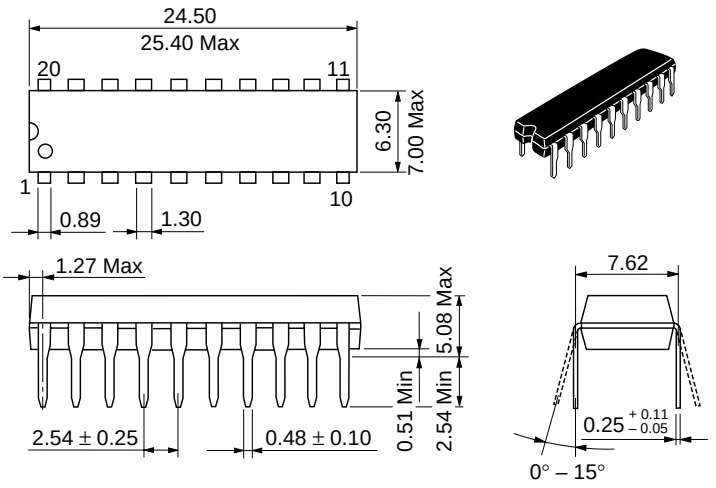
Item	Symbol	V_{CC} (V)	Ta = 25°C Min	Typ	Max	Ta = –40 to +85°C Min	Max	Unit	Test Conditions
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V	
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V_{IL}	2.0	—	—	0.5	—	0.5	V	
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin = V_{IH} or V_{IL} I_{OH} = –20 µA
		4.5	4.4	4.5	—	4.4	—		
		6.0	5.9	6.0	—	5.9	—		
		4.5	4.18	—	—	4.13	—		I_{OH} = –6 mA
		6.0	5.68	—	—	5.63	—		I_{OH} = –7.8 mA
	V_{OL}	2.0	—	0.0	0.1	—	0.1	V	Vin = V_{IH} or V_{IL} I_{OL} = 20 µA
		4.5	—	0.0	0.1	—	0.1		
		6.0	—	0.0	0.1	—	0.1		
		4.5	—	—	0.26	—	0.33		I_{OL} = 6 mA
		6.0	—	—	0.26	—	0.33		I_{OL} = 7.8 mA
Off-state output current	I_{OZ}	6.0	—	—	±0.5	—	±5.0	µA	Vin = V_{IH} or V_{IL}, Vout = V_{CC} or GND
Input current	Iin	6.0	—	—	±0.1	—	±1.0	µA	Vin = V_{CC} or GND
Quiescent supply current	I_{CC}	6.0	—	—	4.0	—	40	µA	Vin = V_{CC} or GND, Iout = 0 µA

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

			Ta = 25°C			Ta = –40 to +85°C			
Item	**Symbol**	**V_{cc} (V)**	**Min**	**Typ**	**Max**	**Min**	**Max**	**Unit**	**Test Conditions**
Maximum clock frequency	f_{max}	2.0	—	—	6	—	5	MHz	
		4.5	—	—	30	—	24		
		6.0	—	—	35	—	28		
Propagation delay time	t_{PLH}	2.0	—	—	155	—	195	ns	Clock to output
	t_{PHL}	4.5	—	13	31	—	39		
		6.0	—	—	26	—	33		
Output enable time	t_{ZH}	2.0	—	—	150	—	190	ns	
	t_{ZL}	4.5	—	13	30	—	38		
		6.0	—	—	26	—	33		
Output disable time	t_{HZ}	2.0	—	—	150	—	190	ns	
	t_{LZ}	4.5	—	15	30	—	38		
		6.0	—	—	26	—	33		
Setup time	t_{su}	2.0	—	—	100	—	125	ns	
		4.5	—	1	20	—	25		
		6.0	—	—	17	—	21		
Hold time	t_h	2.0	5	—	—	5	—	ns	
		4.5	5	0	—	5	—		
		6.0	5	—	—	5	—		
Pulse width	t_w	2.0	80	—	—	100	—	ns	
		4.5	16	4	—	20	—		
		6.0	14	—	—	17	—		
Output rise/fall time	t_{TLH}	2.0	—	—	60	—	75	ns	
	t_{THL}	4.5	—	4	12	—	15		
		6.0	—	—	10	—	13		
Input capacitance	Cin	—	—	5	10	—	10	pF	

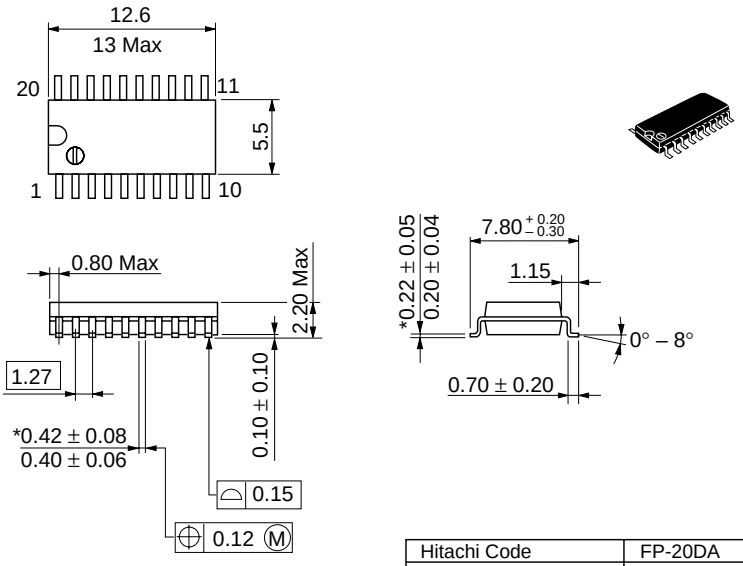
Package Dimensions

Unit: mm



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

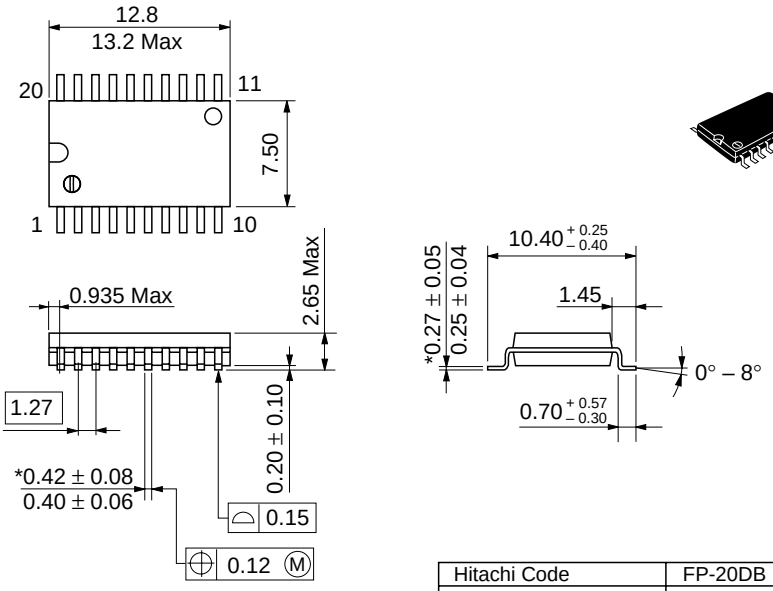
Unit: mm



*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

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