HD74HC4518/HD74HC4520

Dual BCD Up Counters/Dual Binary Up Counters

HITACHI

ADE-205-542 (Z)
1st. Edition
Sep. 2000

Description

The HD74HC4518 dual BCD counter and the HD74HC4520 dual binary counter consist of two identical, independent, internally synchronous 4-stage counters. The counter stages are type D flip-flops, with interchangeable Clock and Enable lines for incrementing on either the positive-going or negative-going transition as required when cascading multiple stages. Each counter can be cleared by applying a high level on the Reset line. In addition, the HD74HC4518 will count out of all undefined states within two clock periods. These complementary MOS up counters find primary use in multi-stage synchronous or ripple counting applications requiring low power dissipation and/or high noise immunity.

Features

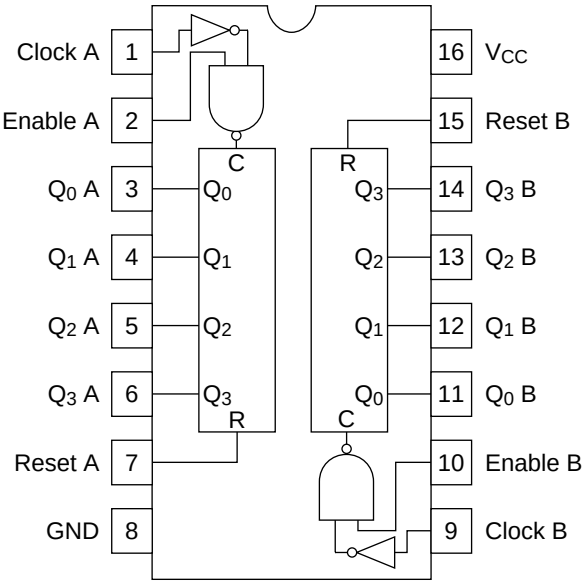
- High Speed Operation
- High Output Current: Fanout of 10 LSTTL Loads
- Wide Operating Voltage: V_{CC} = 2 to 6 V
- Low Input Current: 1 µA max
- Low Quiescent Supply Current: I_{CC} (static) = 4 µA max (Ta = 25°C)

Function Table

Clock	Enable	Reset	Operation
⎍	H	L	Increment counter
L	⎏	L	Increment counter
⎏	X	L	No change
X	⎍	L	No change
⎍	L	L	No change
H	⎏	L	No change
X	X	H	Q_0 to Q_3 = L

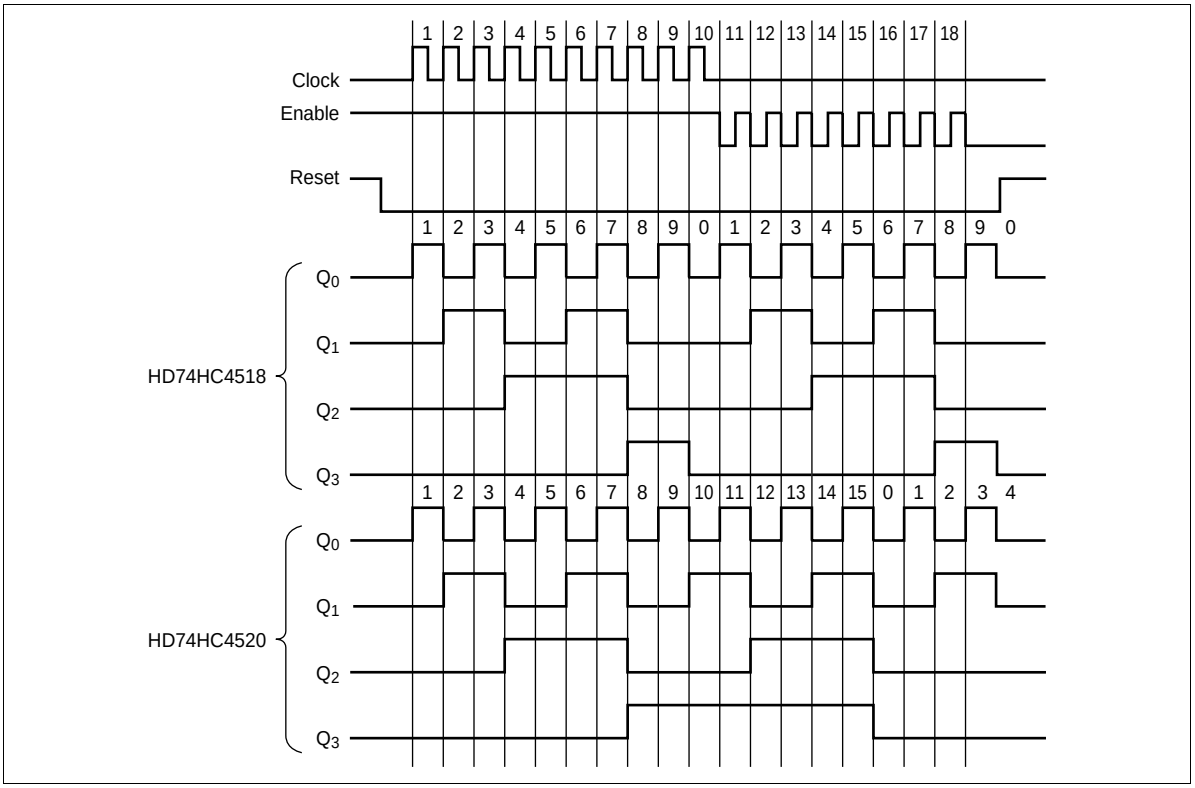
Hitachi semiconductor

Pin Arrangement



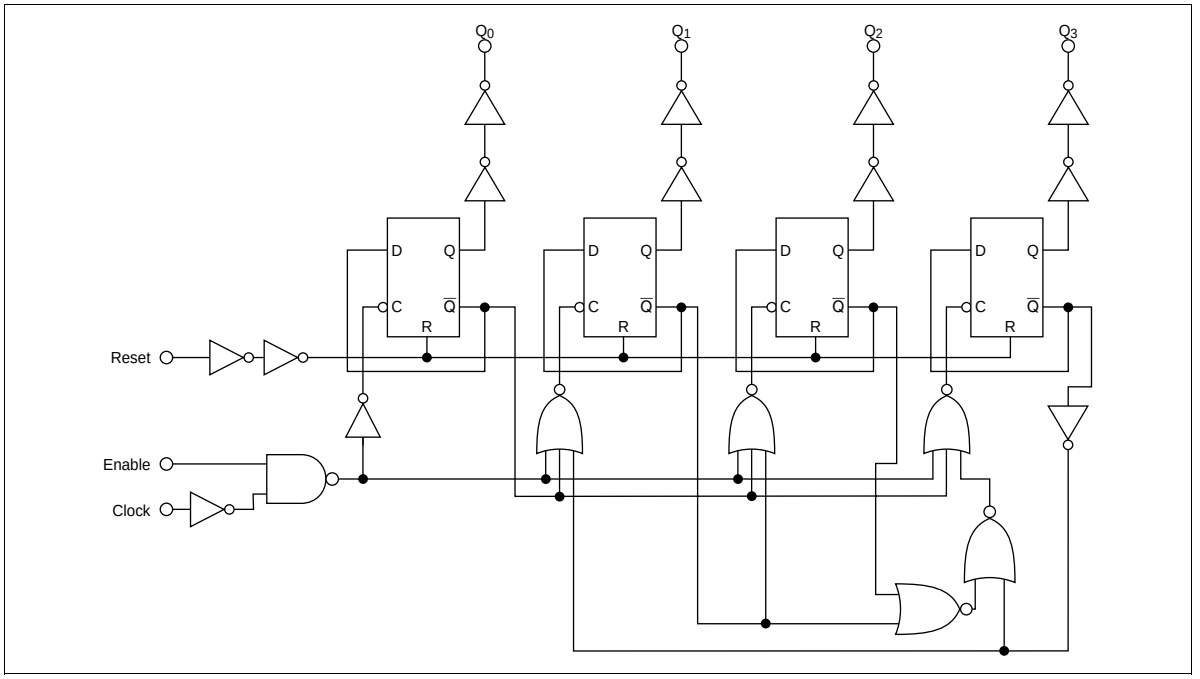
(Top view)

Timing Diagram

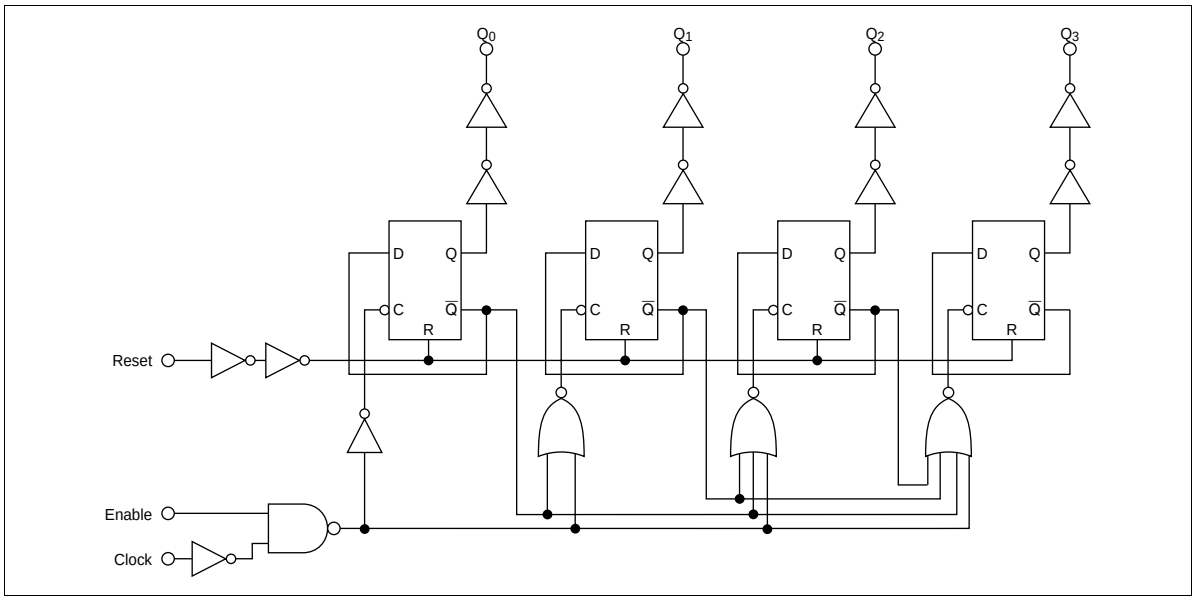


Logic Diagram

HD74HC4518



HD74HC4520



DC Characteristics

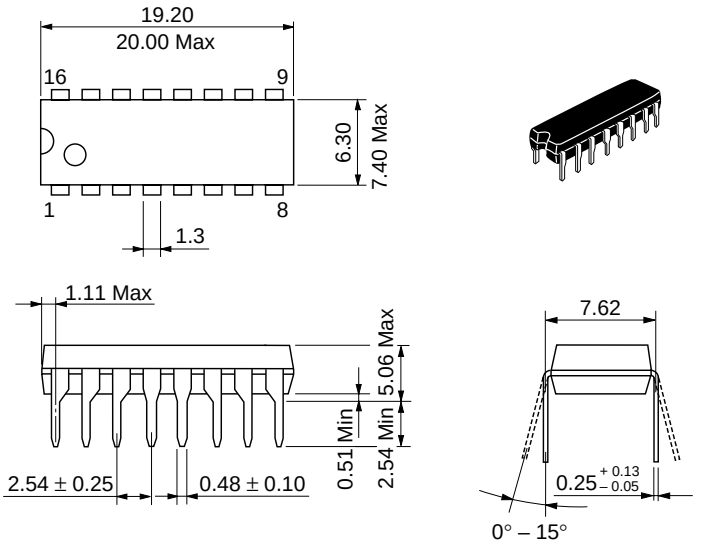
Item	Symbol	V_{CC} (V)	Ta = 25°C Min	Typ	Max	Ta = –40 to +85°C Min	Max	Unit	Test Conditions
Input voltage	V_{IH}	2.0	1.5	—	—	1.5	—	V	
		4.5	3.15	—	—	3.15	—		
		6.0	4.2	—	—	4.2	—		
	V_{IL}	2.0	—	—	0.5	—	0.5	V	
		4.5	—	—	1.35	—	1.35		
		6.0	—	—	1.8	—	1.8		
Output voltage	V_{OH}	2.0	1.9	2.0	—	1.9	—	V	Vin = 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} = –4 mA
		6.0	5.68	—	—	5.63	—		I_{OH} = –5.2 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} = 4 mA
		6.0	—	—	0.26	—	0.33		I_{OL} = 5.2 mA
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	—	—	5	—	4	MHz	
		4.5	—	—	27	—	21		
		6.0	—	—	32	—	25		
Propagation delay time	t_{PLH}	2.0	—	—	190	—	240	ns	Clock to Q
	t_{PHL}	4.5	—	22	38	—	48		
		6.0	—	—	32	—	41		
	t_{PLH}	2.0	—	—	200	—	250	ns	Reset to Q
	t_{PHL}	4.5	—	22	40	—	50		
		6.0	—	—	34	—	43		
	t_{PLH}	2.0	—	—	190	—	240	ns	Enable to Q
	t_{PHL}	4.5	—	17	38	—	48		
		6.0	—	—	32	—	41		
Pulse width	t_w	2.0	80	—	—	100	—	ns	
		4.5	16	7	—	20	—		
		6.0	14	—	—	17	—		
Output rise/fall time	t_{TLH}	2.0	—	—	75	—	95	ns	
	t_{THL}	4.5	—	—	15	—	19		
		6.0	—	—	13	—	16		
Input capacitance	Cin	—	—	5	10	—	10	pF	
Removel time	t_{rem}	2.0	0	—	—	0	—	ns	Reset clock
		4.5	0	–3	—	0	—		
		6.0	0	—	—	0	—		

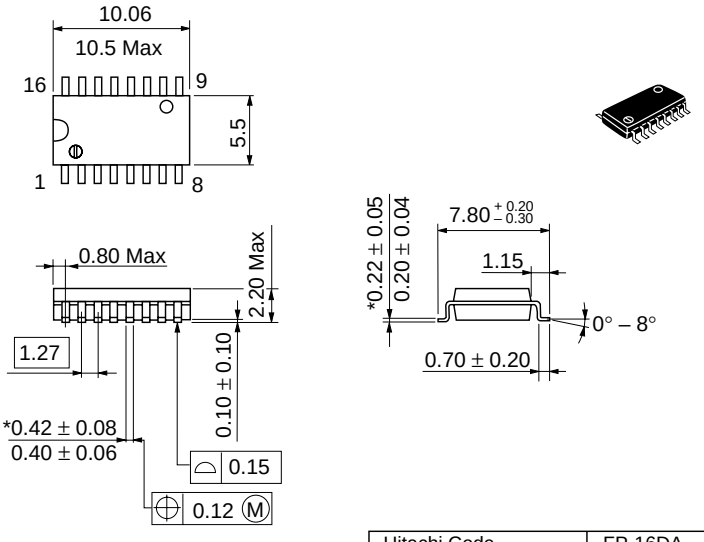
Package Dimensions

Unit: mm



Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	1.07 g

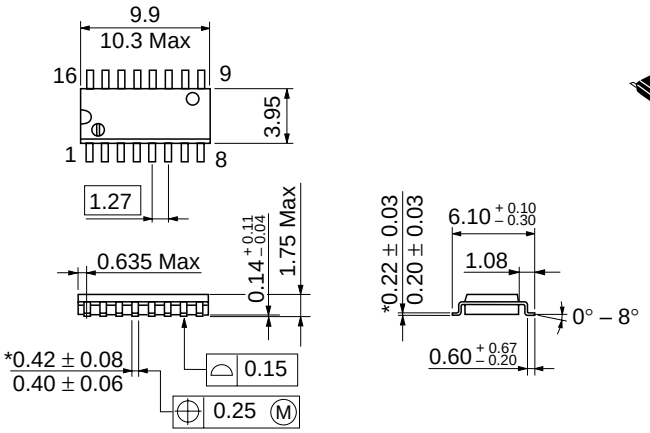
Unit: mm



Hitachi Code	FP-16DA
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.24 g

*Dimension including the plating thickness
Base material dimension

Unit: mm



Hitachi Code	FP-16DN
JEDEC	Conforms
EIAJ	Conforms
Mass (reference value)	0.15 g

*Dimension including the plating thickness
Base material dimension

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