Sistemas Digitales
Memorias
Flip-Flops

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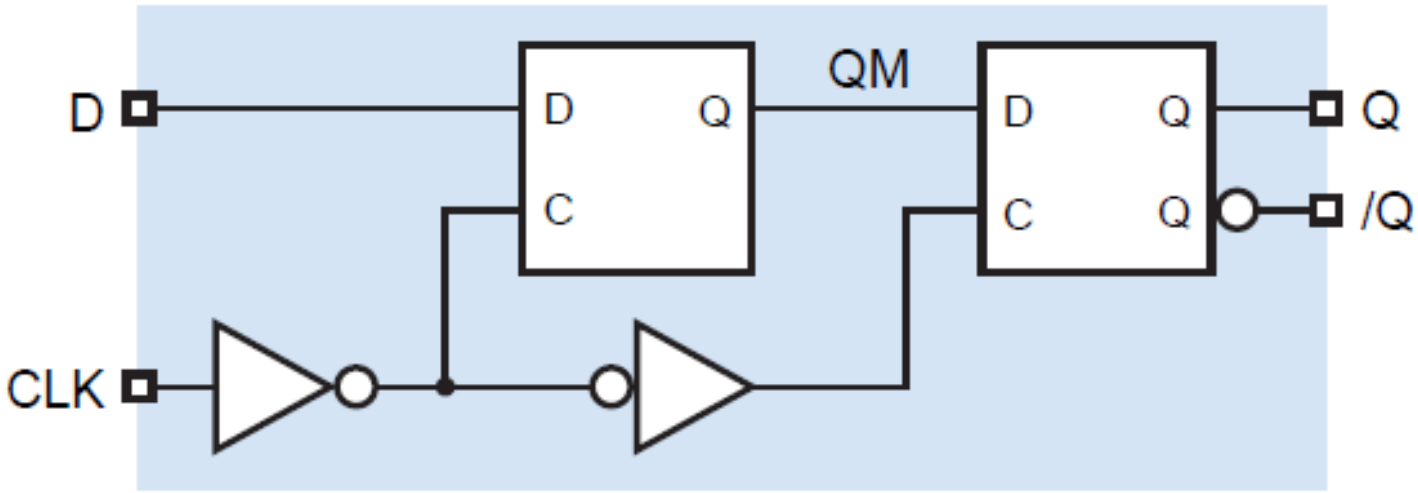
VENEZUELA

Flip Flop D flanco positivo(LH)

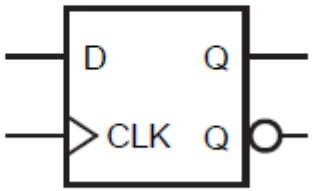
(a)



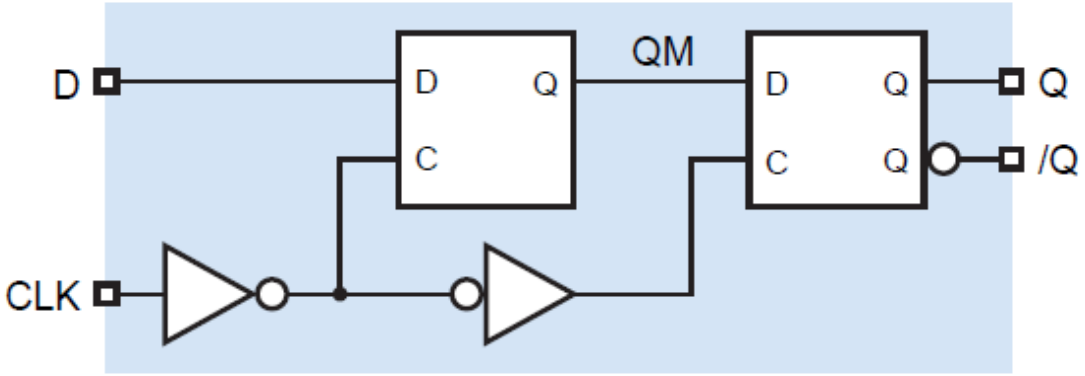
(b)

D	CLK	Q	/Q
0	↑	0	1
1	↑	1	0
x	0	last Q	last /Q
x	1	last Q	last /Q

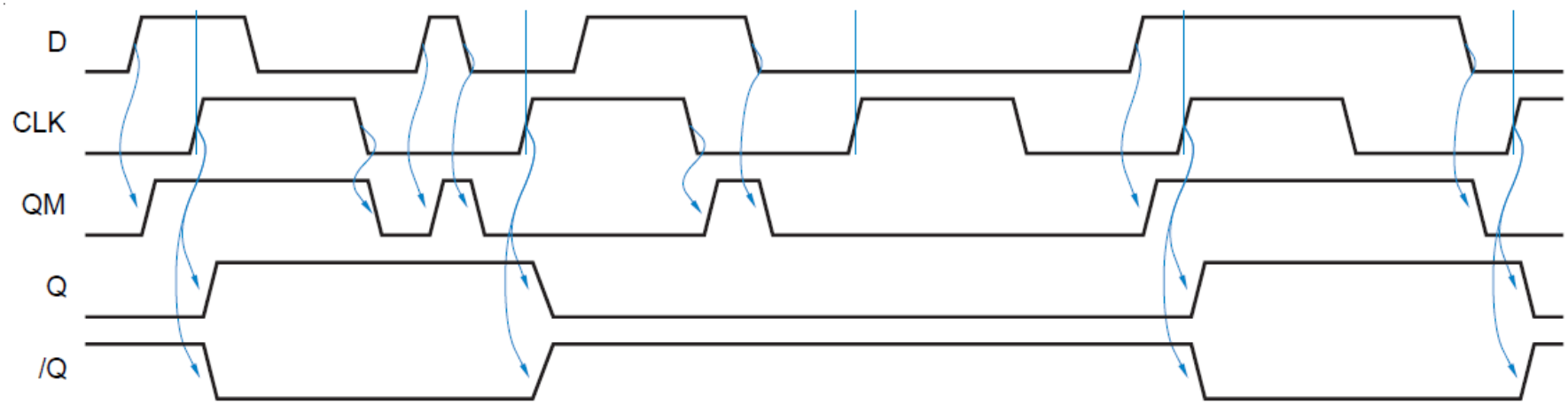
(c)



Flip Flop D

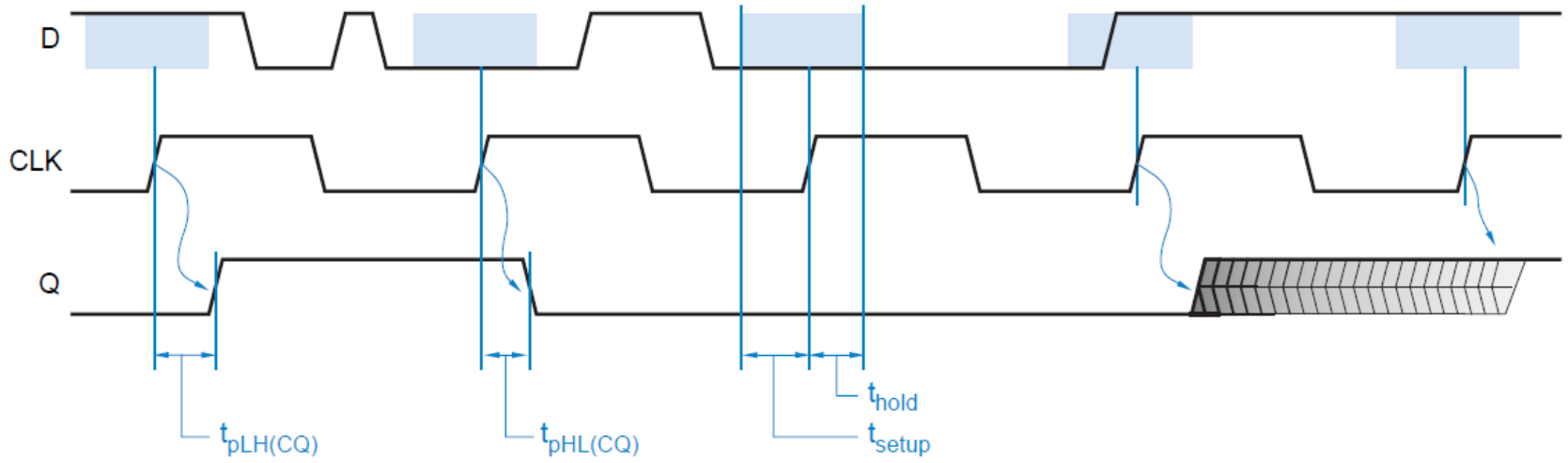


C	D	Q	/Q
1	0	0	1
1	1	1	0
0	x	last Q	last /Q



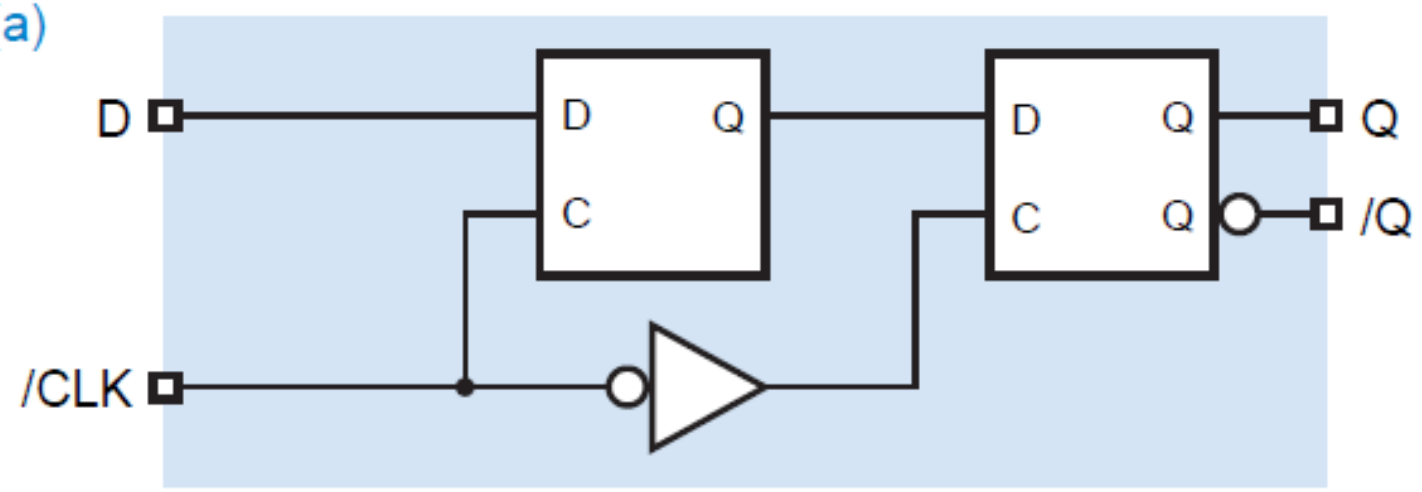
Temporización Flip Flop D

- Retardo de propagación (t_p)
  - $t_{pLH(CQ)}$, $t_{pHL(CQ)}$
- Tiempo de Establecimiento (t_{setup})
- Tiempo de Retención (t_{hold})



Flip Flop D flanco negativo(HL)

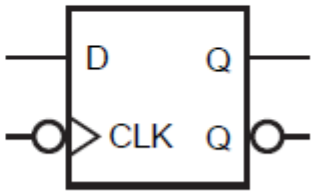
(a)



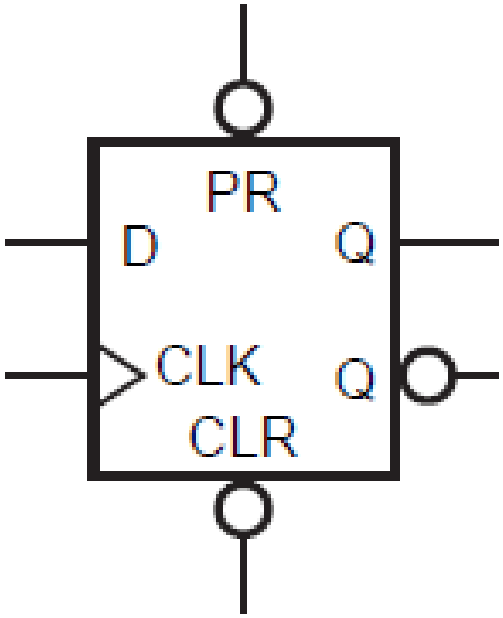
(b)

D	/CLK	Q	/Q
0	↓	0	1
1	↓	1	0
x	0	last Q	last /Q
x	1	last Q	last /Q

(c)

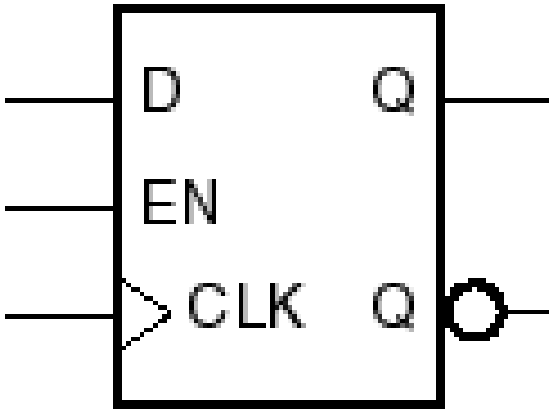


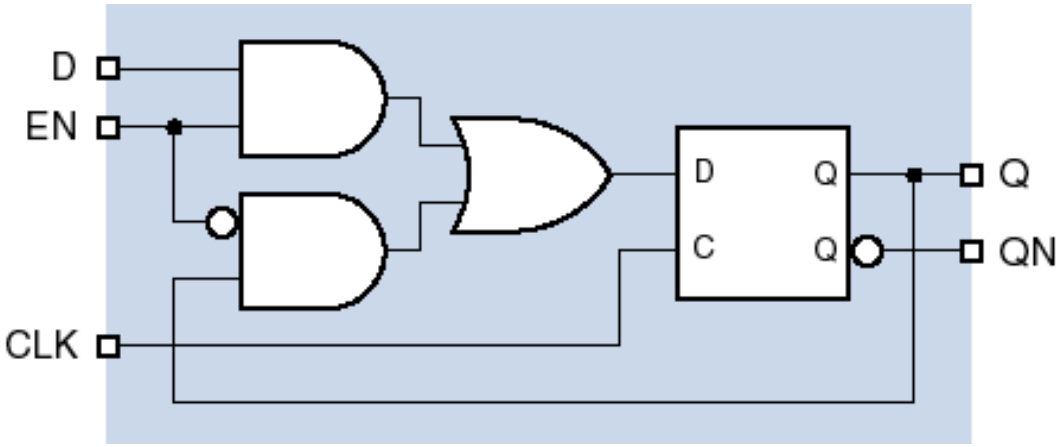
Flip Flop D con entradas asíncronas



CLR	PR	CLK	Q
0	-	-	0
1	0	-	1
1	1	⌐¬	D
1	1	0, 1, ¬⌐	Last Q

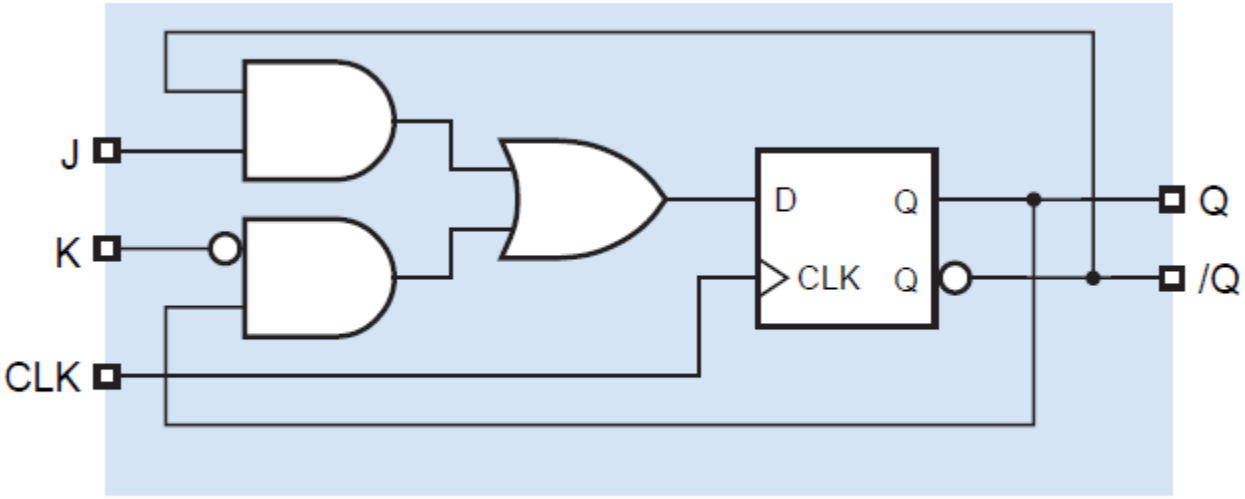
Flip Flop D con entradas habilitación



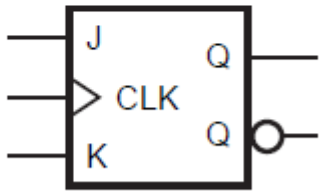


EN	CLK	Q
0	-	Last Q
1	⎍	D
1	0,1, ⎍	Last Q

Flip Flop J-K

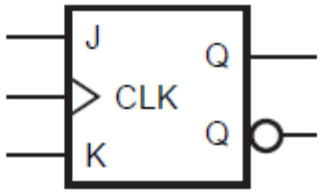


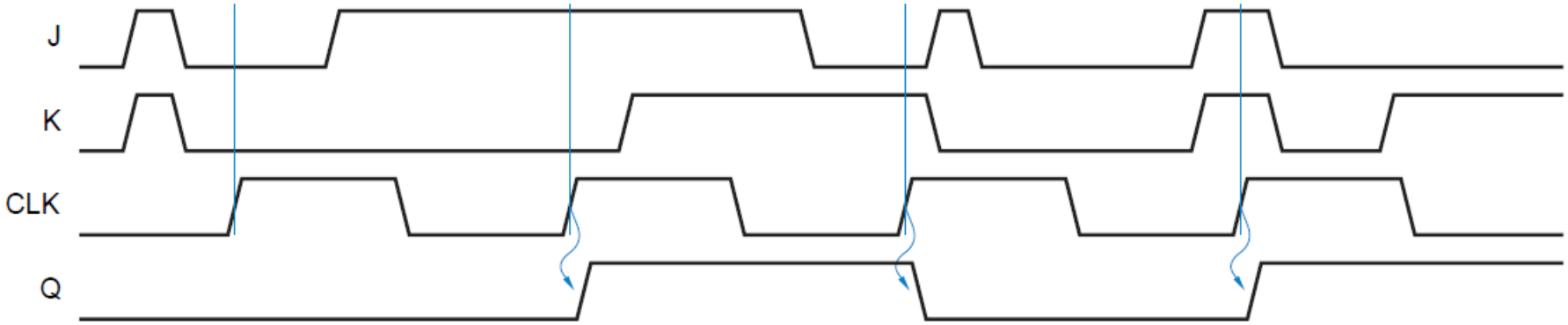
J	K	CLK	Q	/Q
x	x	0	last Q	last /Q
x	x	1	last Q	last /Q
0	0	↑	last Q	last /Q
0	1	↑	0	1
1	0	↑	1	0
1	1	↑	last /Q	last Q



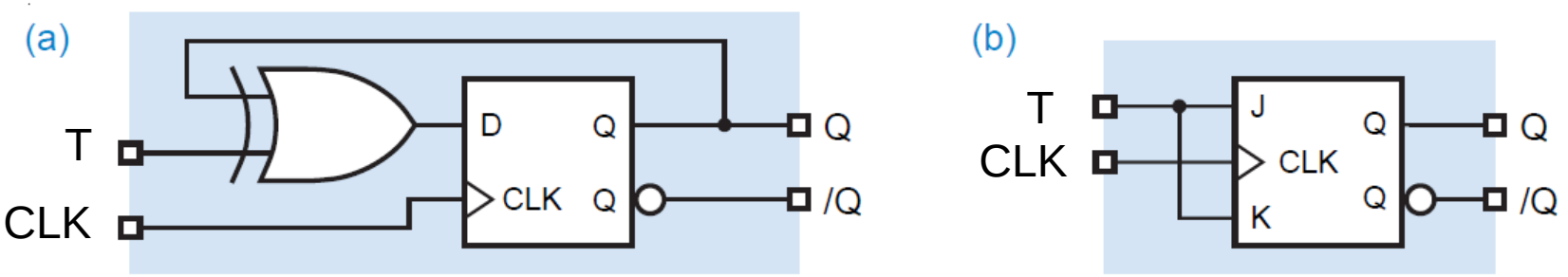
Flip Flop J-K

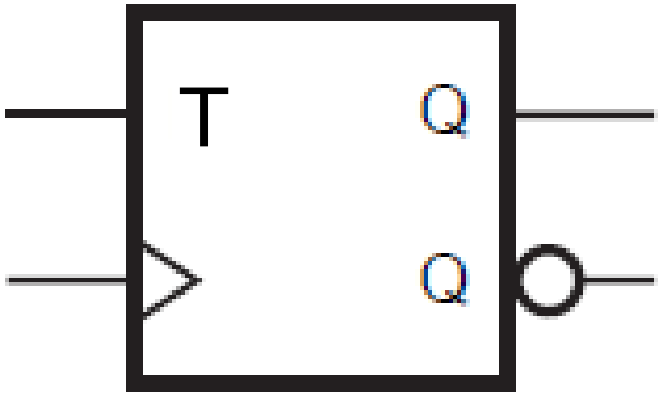
J	K	CLK	Q	/Q
x	x	0	last Q	last /Q
x	x	1	last Q	last /Q
0	0	↑	last Q	last /Q
0	1	↑	0	1
1	0	↑	1	0
1	1	↑	last /Q	last Q



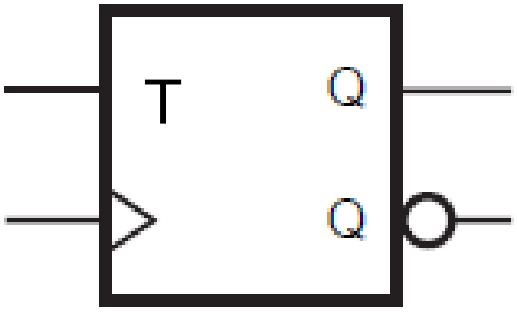


Flip Flop T

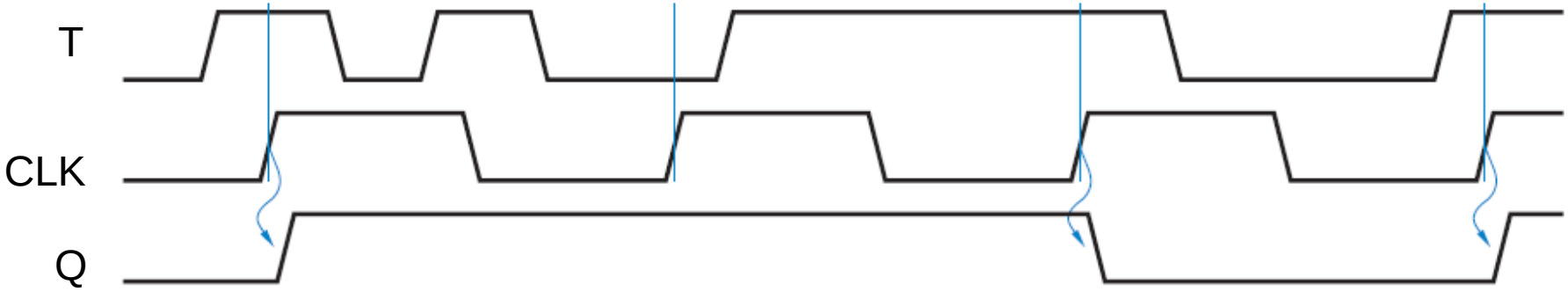




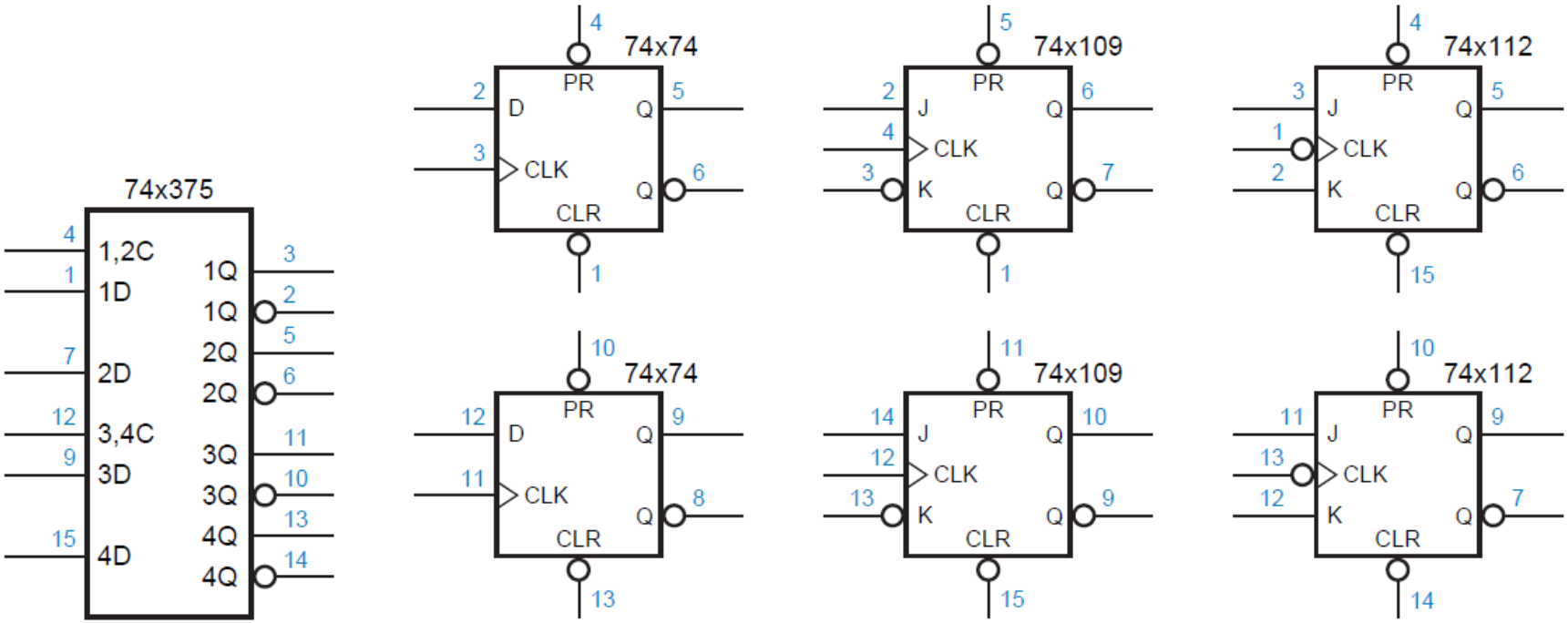
Flip Flop T



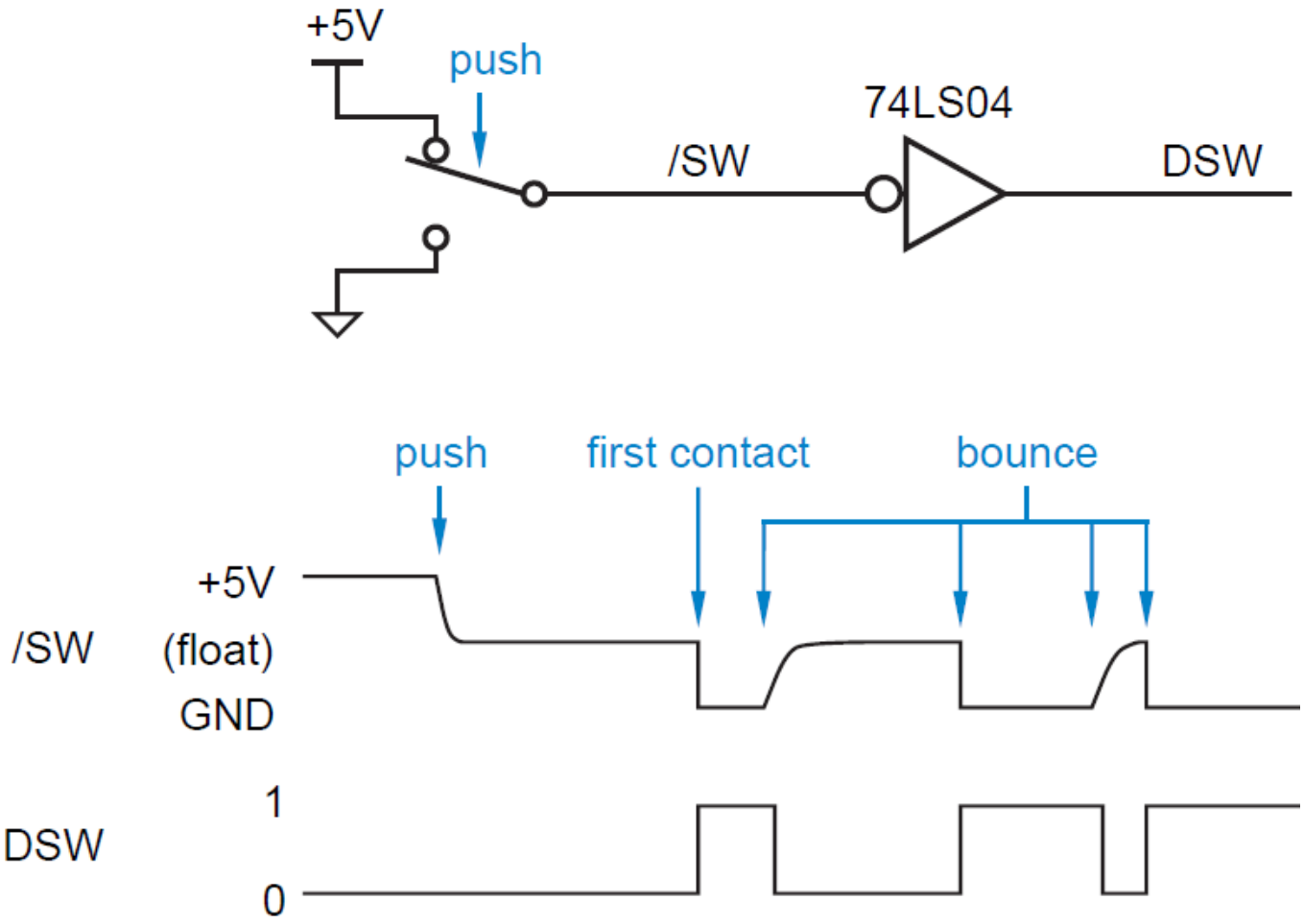
T	Q
0	Last Q
1	Last /Q



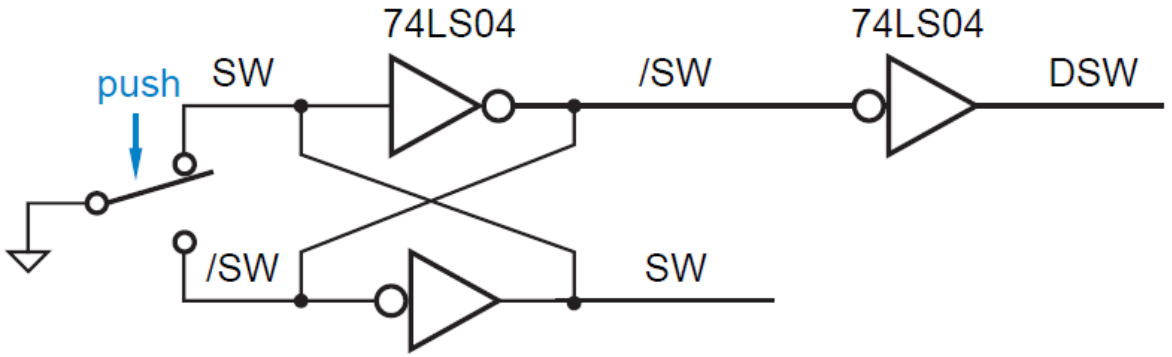
Latch y Flip Flop Comerciales

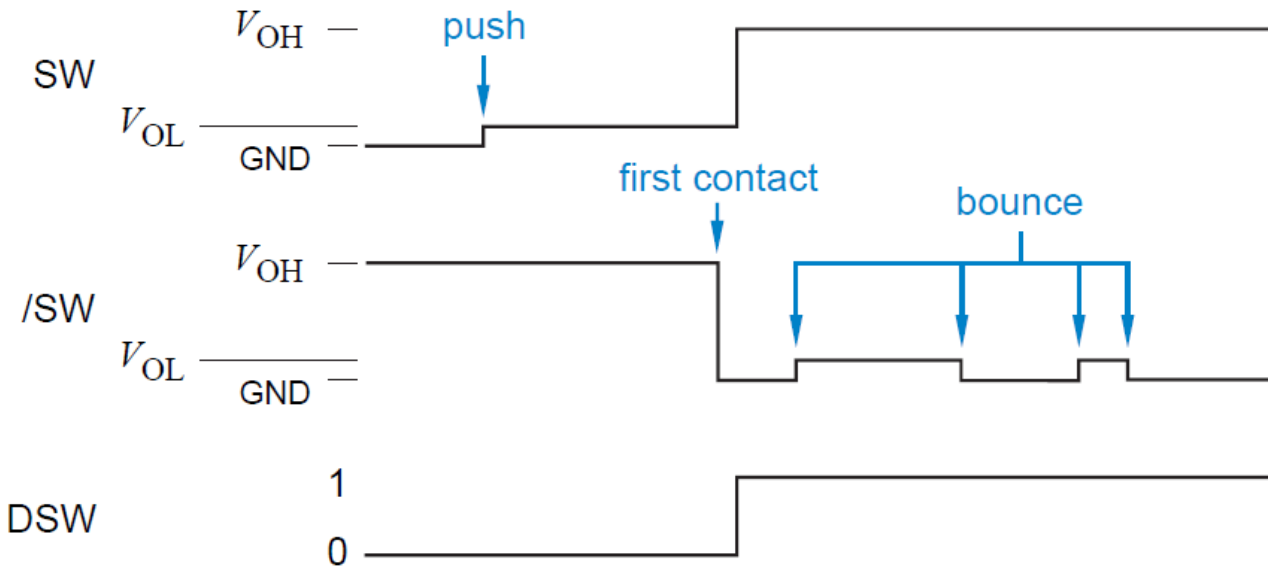


Rebote

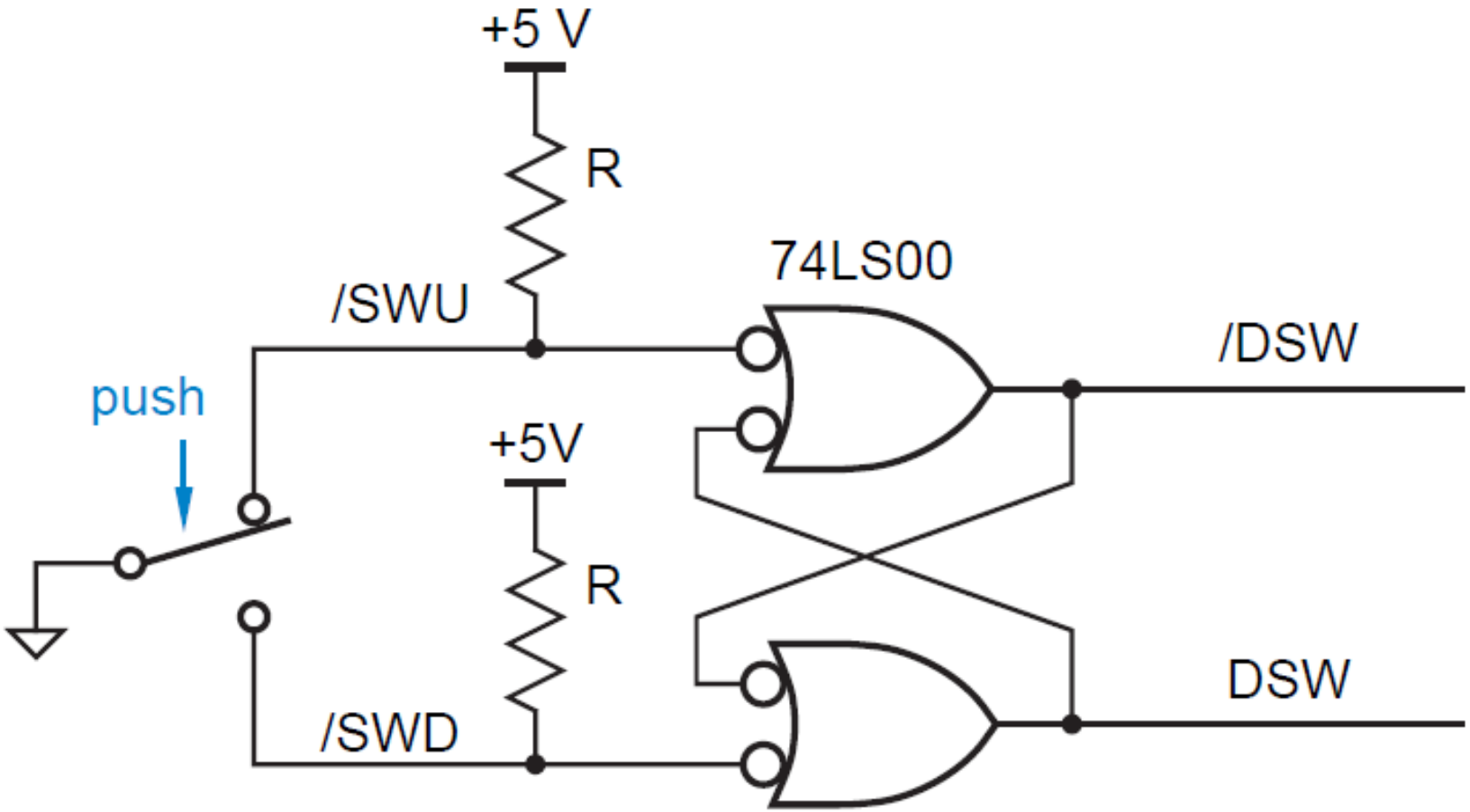

+5V
push
74LS04
/SW
DSW
push
first contact
bounce
+5V
/SW
(float)
GND
1
DSW
0

Rebote


74LS04
74LS04
push
SW
/SW
DSW
/SW
SW

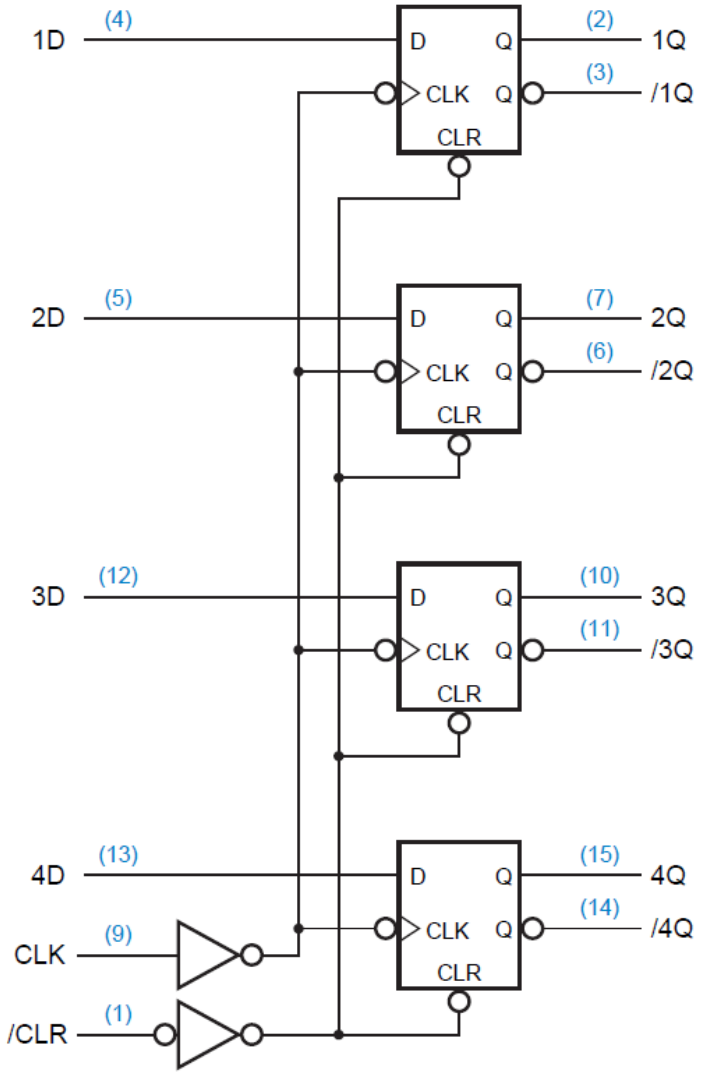

V_{OH}
push
SW
V_{OL}
GND
first contact
bounce
V_{OH}
/SW
V_{OL}
GND
1
DSW
0

Rebote

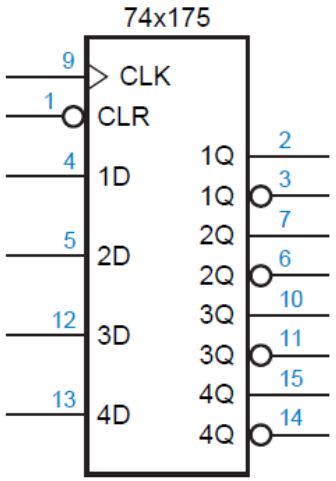


Registros

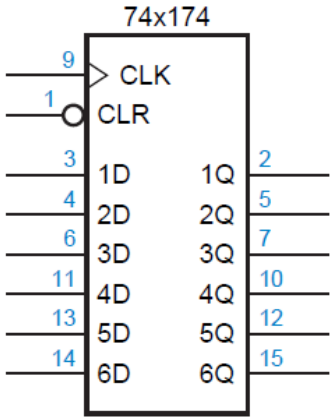
(a)



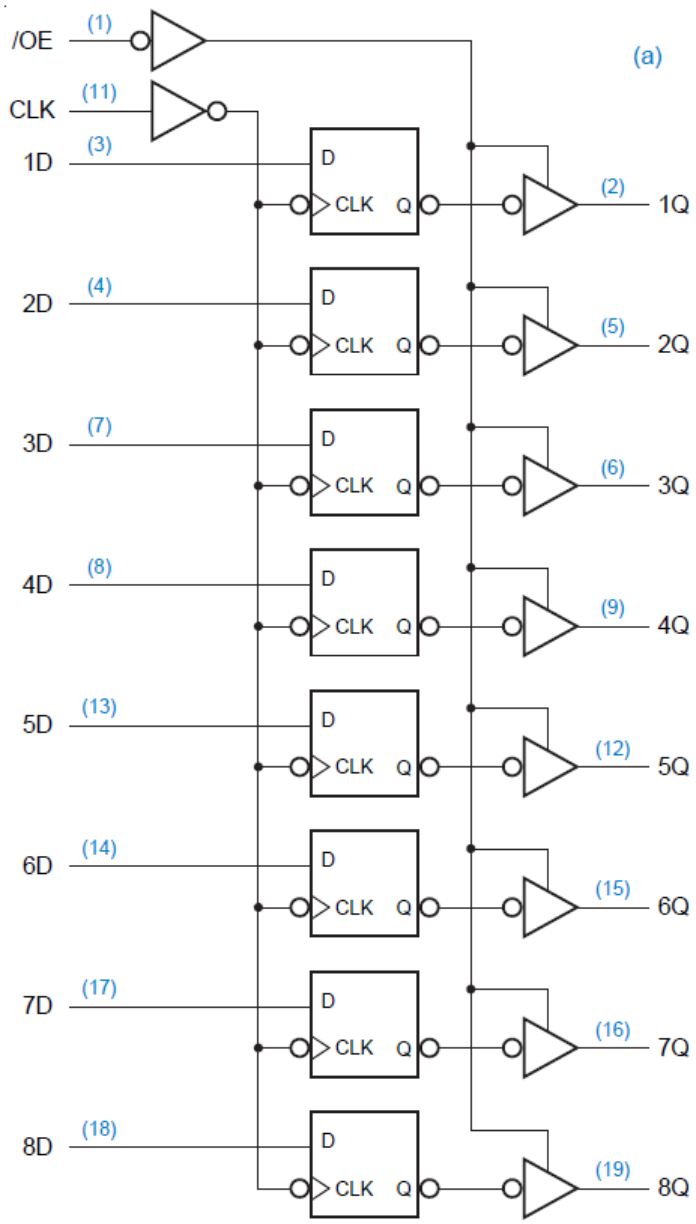
(b)

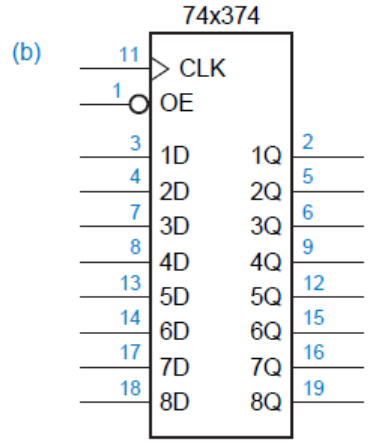


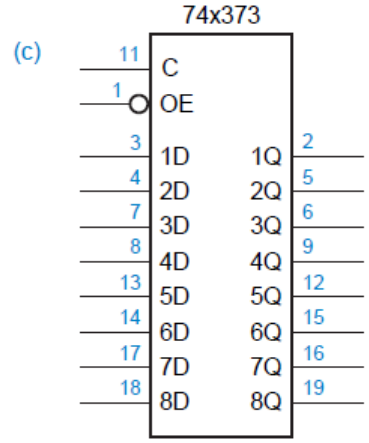
(c)



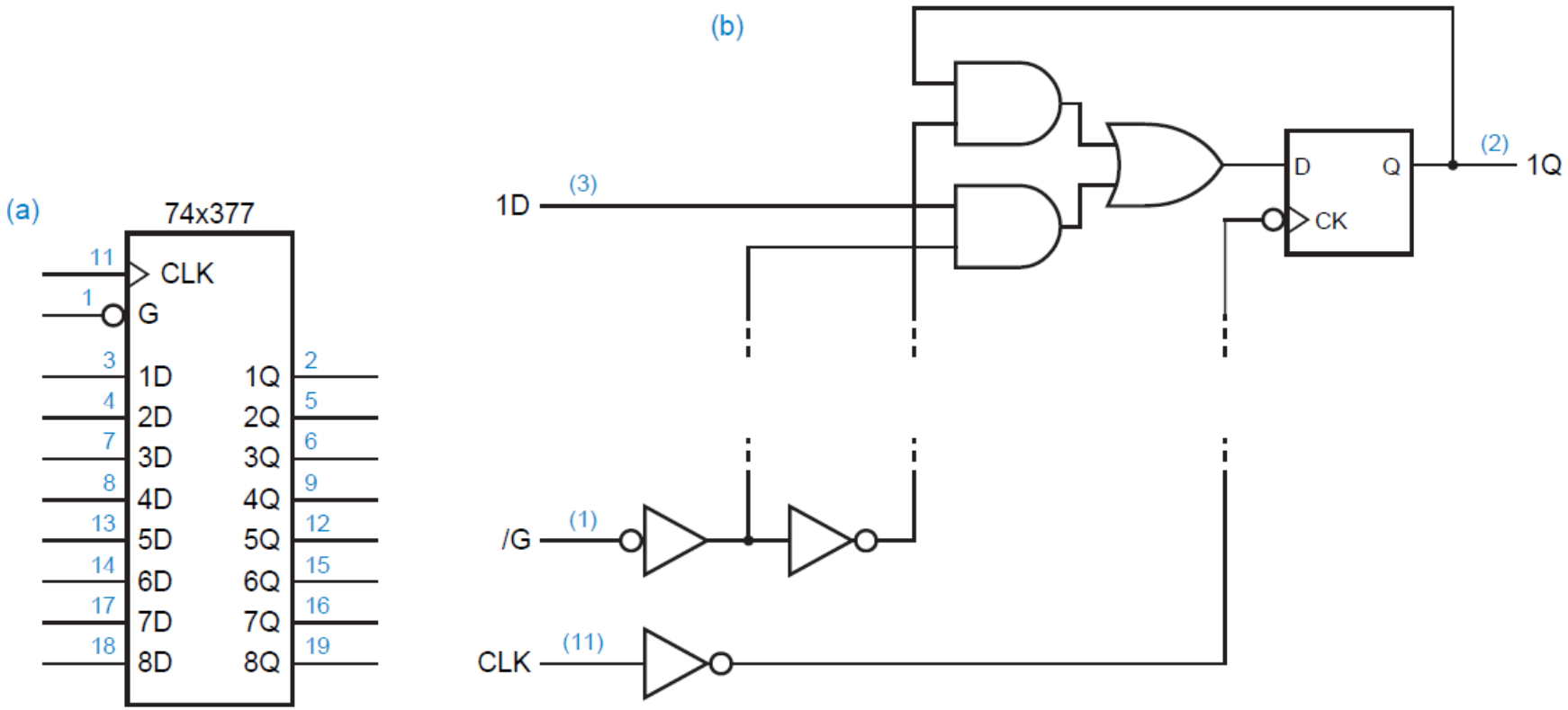
Registros


(a)
/OE
(1)
CLK
(11)
1D
(3)
2D
(4)
3D
(7)
4D
(8)
5D
(13)
6D
(14)
7D
(17)
8D
(18)
D
CLK
Q
(2)
1Q
(5)
2Q
(6)
3Q
(9)
4Q
(12)
5Q
(15)
6Q
(16)
7Q
(19)
8Q


(b)
74x374
CLK
OE
1D
2D
3D
4D
5D
6D
7D
8D
1Q
2Q
3Q
4Q
5Q
6Q
7Q
8Q


(c)
74x373
C
OE
1D
2D
3D
4D
5D
6D
7D
8D
1Q
2Q
3Q
4Q
5Q
6Q
7Q
8Q

Registros


(a)
74x377
11
CLK
1
G
3
1D
1Q
2
4
2D
2Q
5
7
3D
3Q
6
8
4D
4Q
9
13
5D
5Q
12
14
6D
6Q
15
17
7D
7Q
16
18
8D
8Q
19
(b)
1D
(3)
D
Q
CK
(2)
1Q
/G
(1)
CLK
(11)