

# Lógica Secuencial (Memorias)

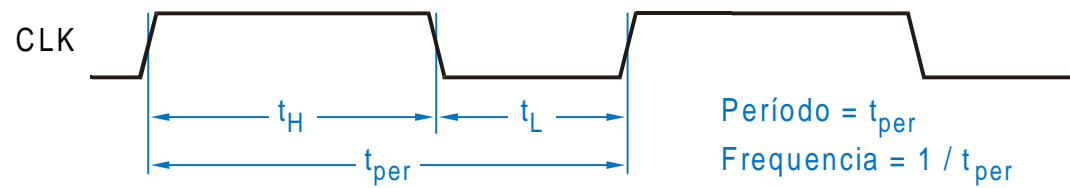
Prof. Luis Araujo

Sistemas Digitales

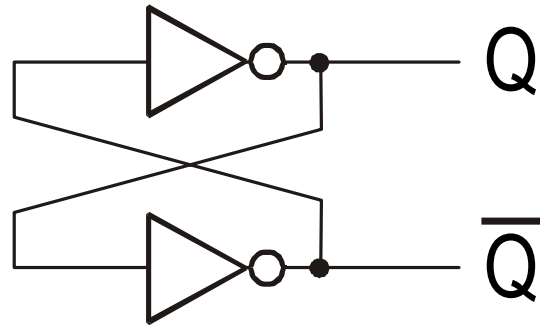
<http://www.ing.ula.ve/~araujol/sd>

# Memorias

- Reloj

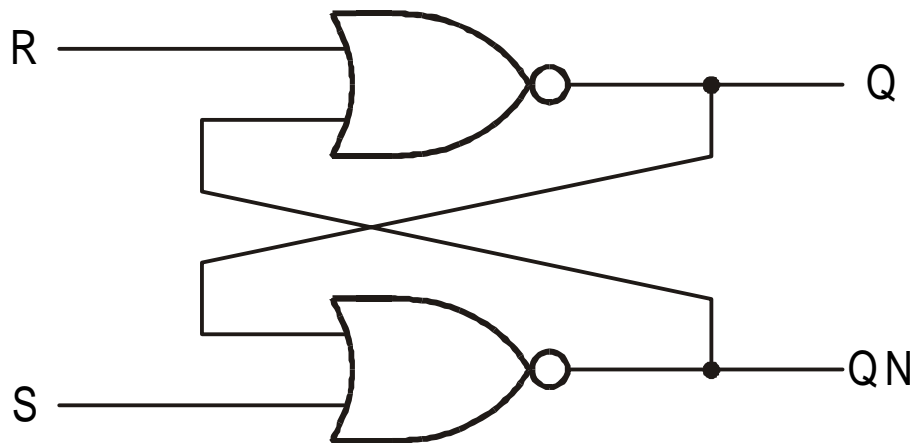


- Biestables



- Latch
- Flip Flop

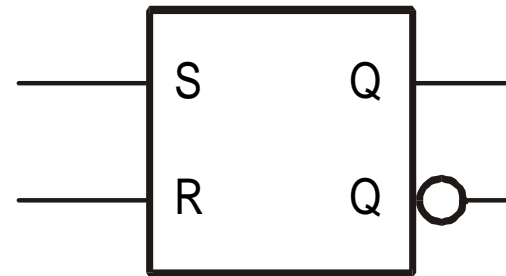
# Latch SR



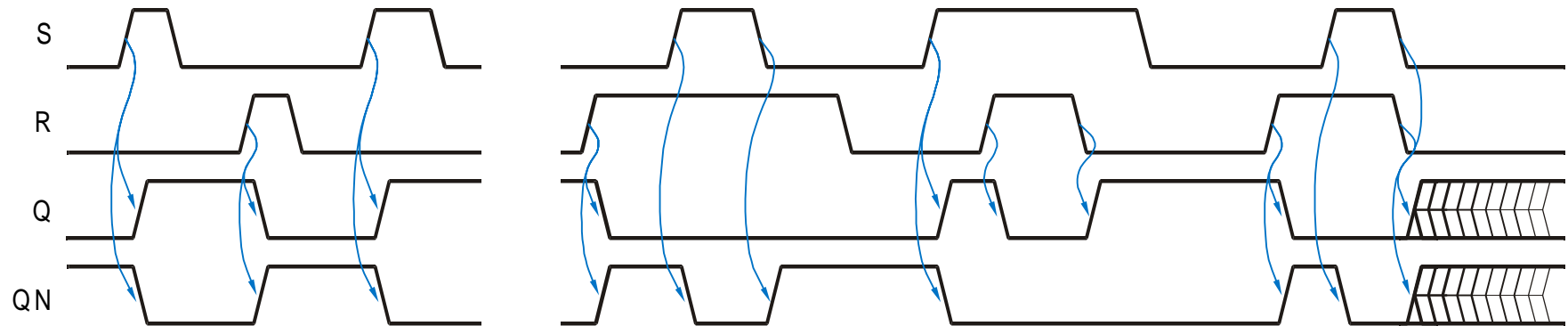
S	R	Q*	QN*
0	0	Q	QN
0	1	0	1
1	0	1	0
1	1	0	0

**Ecuación Característica:**

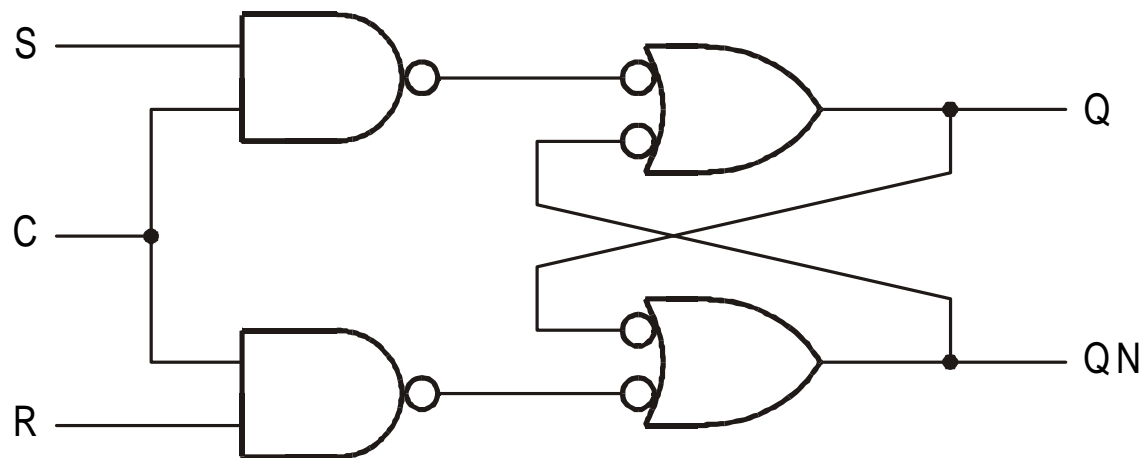
$$Q^* = S + \overline{R} \cdot Q$$



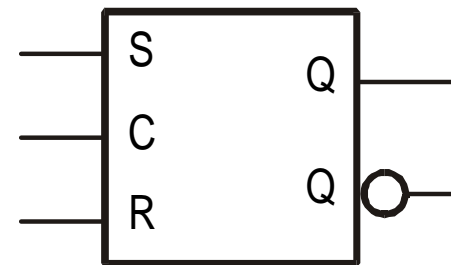
# Diagrama de tiempo



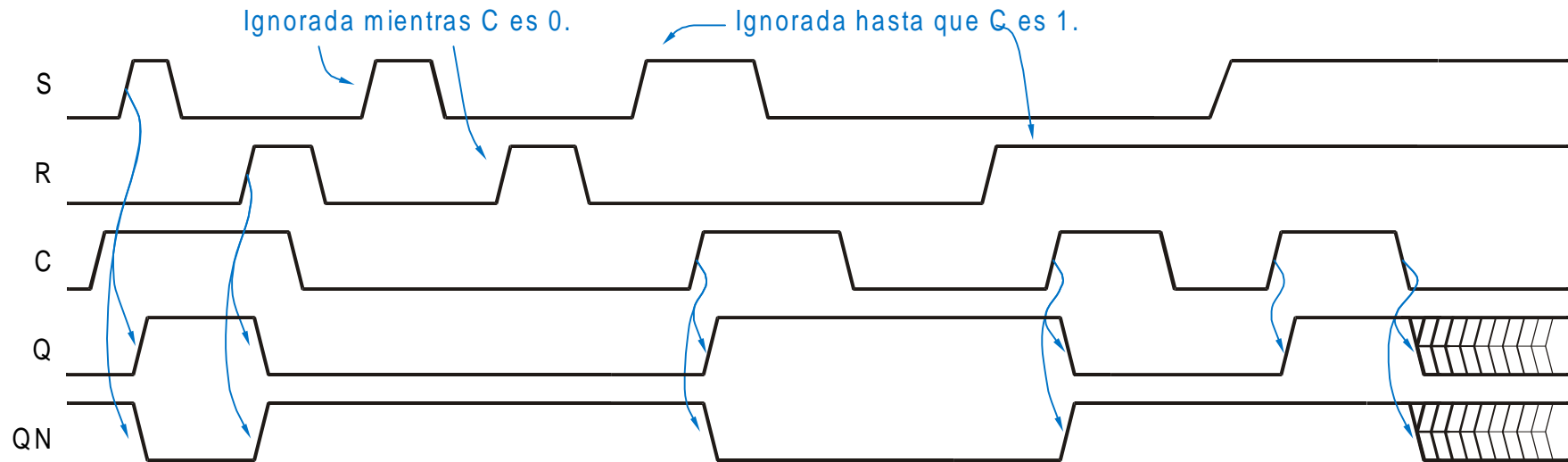
# Latch SR con habilitación



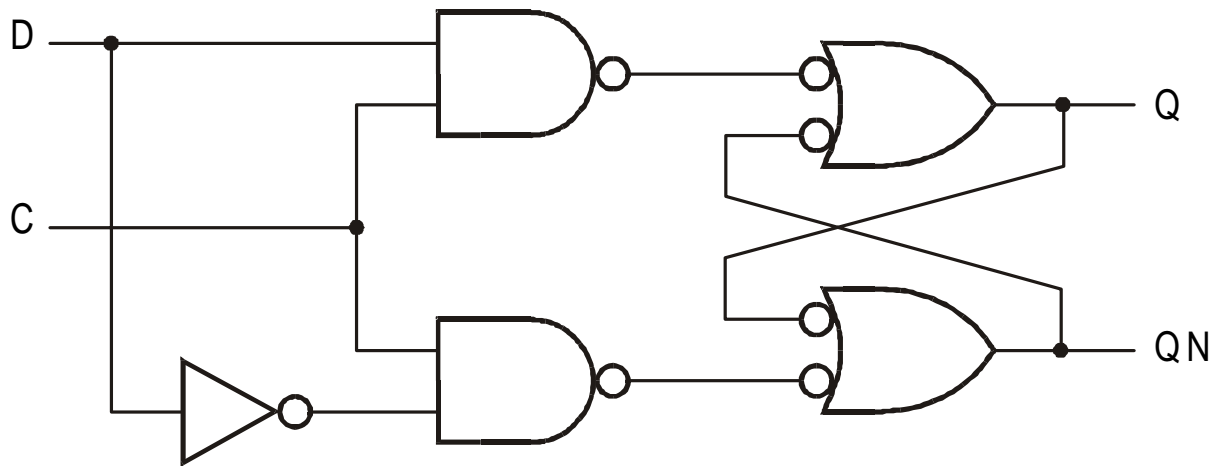
S	R	C	Q*	QN*
0	0	1	Q	QN
0	1	1	0	1
1	0	1	1	0
1	1	1	1	1
x	x	0	Q	QN



# Diagrama de tiempo



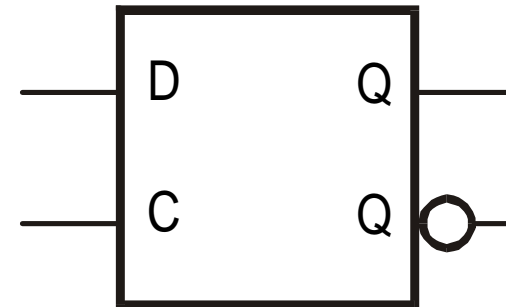
# Latch D



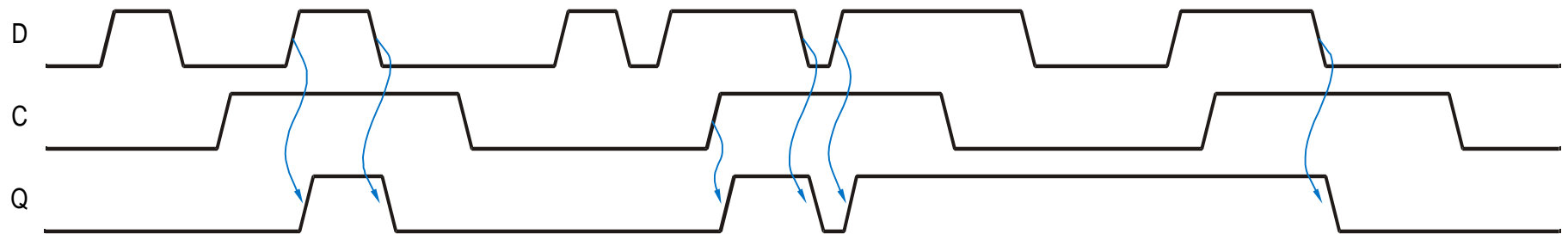
C	D	Q*	QN*
1	0	0	1
1	1	1	0
0	x	Q	QN

**Ecuación Característica:**

$$Q^* = D$$

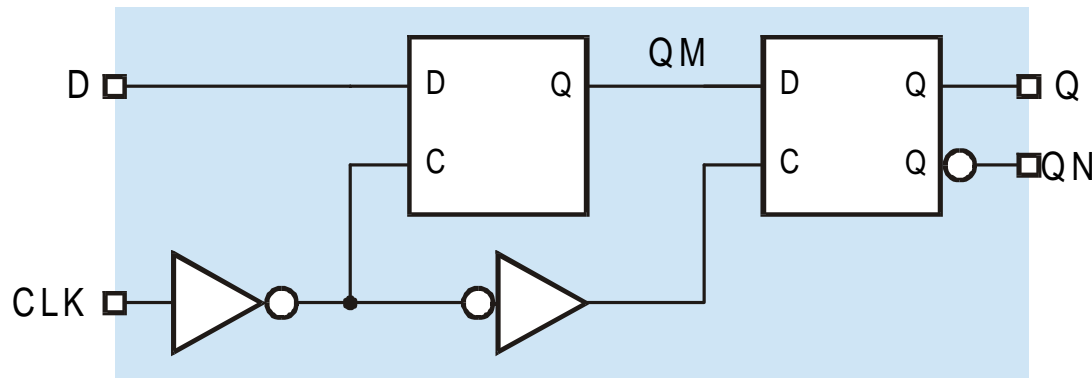


# Diagrama de tiempo





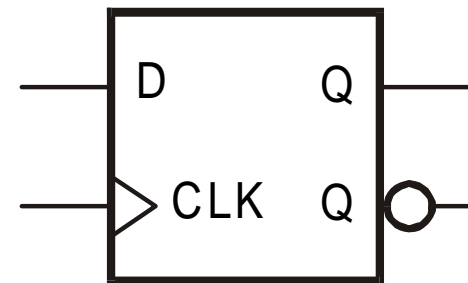
# Flip Flop D



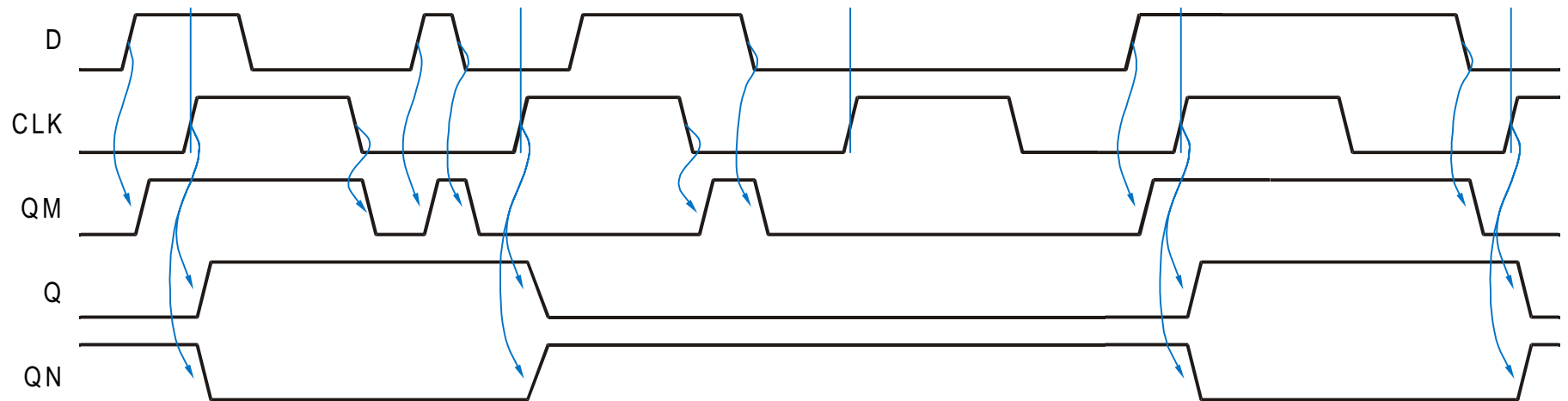
D	CLK	Q*	QN*
0		0	1
1		1	0
x	0	Q	QN
x	1	Q	QN

**Ecuación Característica:**

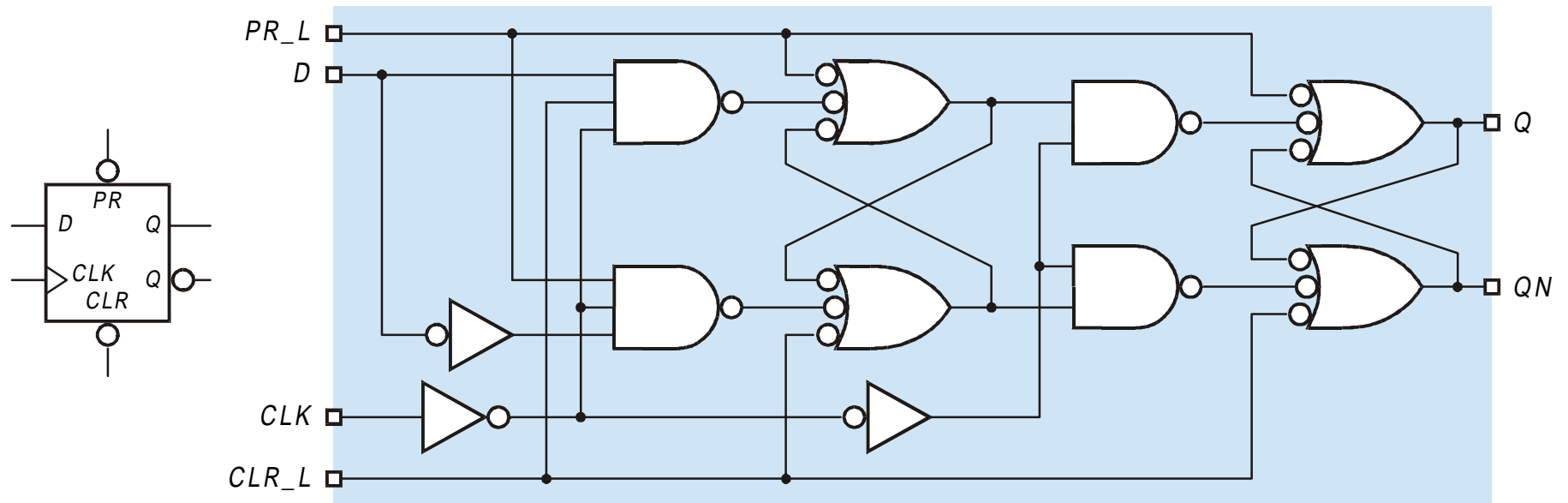
$$Q^* = D$$



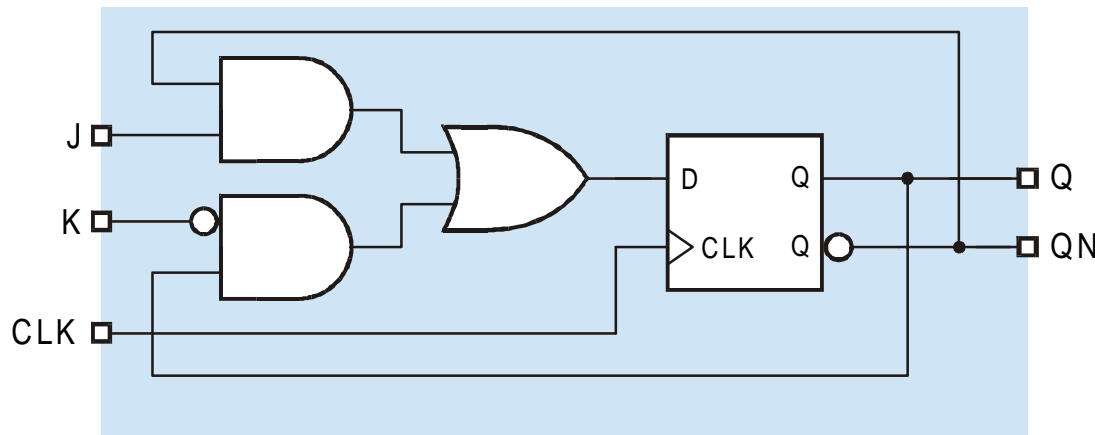
# Diagramas de tiempo



# Entradas Asíncronas



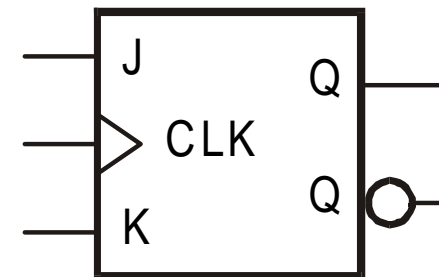
# Flip Flop JK



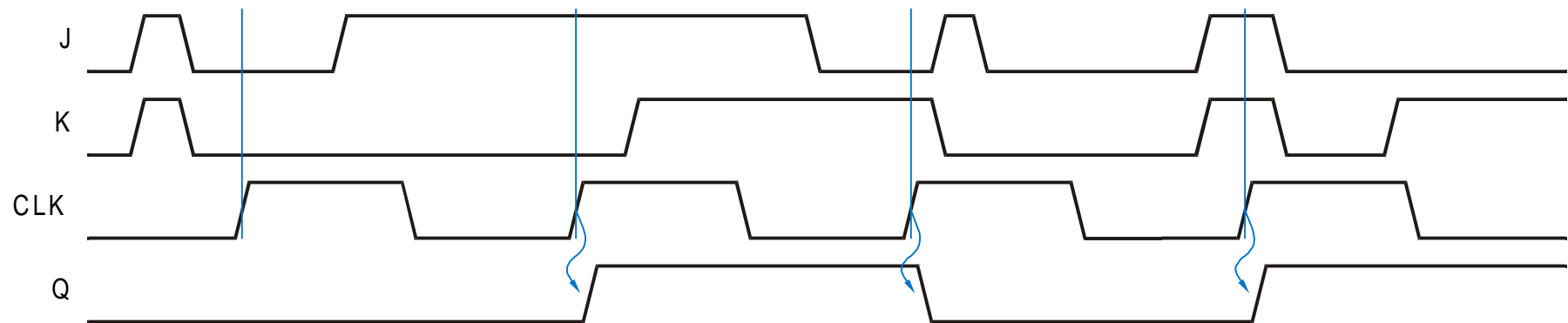
J	K	CLK	Q*	QN*
x	x	0	Q	QN
x	x	1	Q	QN
0	0		Q	QN
0	1		0	1
1	0		1	0
1	1		QN	Q

**Ecuación Característica:**

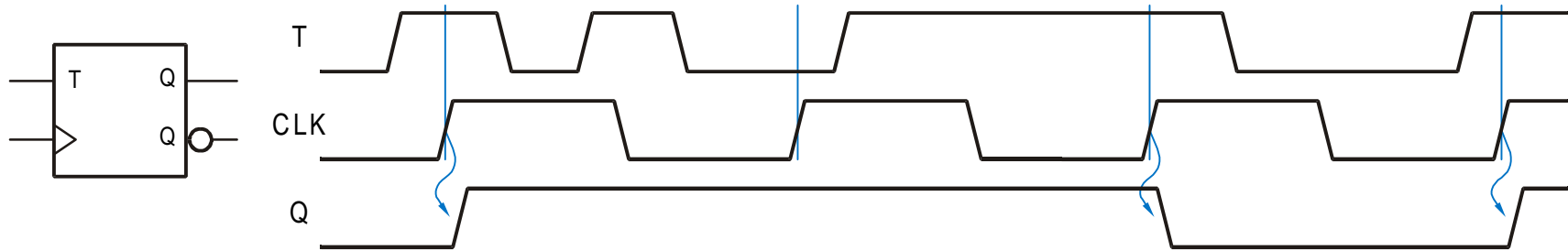
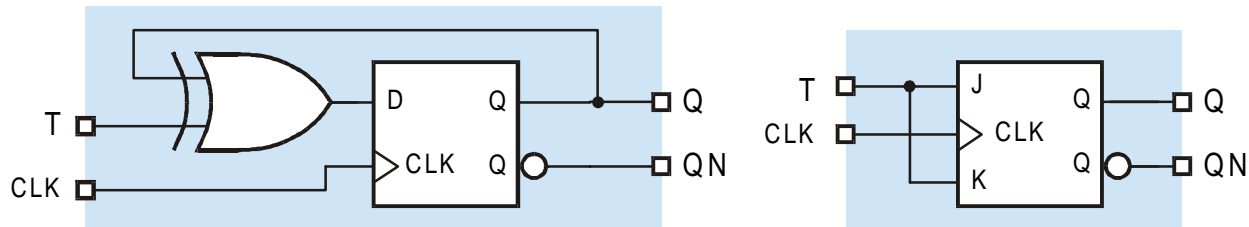
$$Q^* = J \cdot \overline{Q} + \overline{K} \cdot Q$$



# Diagrama de tiempo



# Flip Flop T



**Ecuación Característica:** 
$$Q^* = T \cdot \overline{Q} + \overline{T} \cdot Q$$

# Flip Flop comerciales

