Type	Ordering code
FZK 101	Q67000–K6
FZK 105	Q67000–K7

The FZK 101/105 timer has the following electrical functions and characteristics:

1. Monostable multivibrator: connect L, J and M.
2. Pulse delay: connect L and K.
3. Pulse shortening: connect J and M.
4. Turn-on delay: connect L to K and M to 0_S.
5. The pulse delay is retriggerable if the pulse interval $t_p > t_t$.
6. A polarized capacitor C_t may be used as the timing element.
7. When supply voltage U_S is switched on, Q is at L if $\overline{R}$ is at L during switch-on.

8. No external voltages or currents may be applied to terminals J, K, L and M. Keep the connections between these terminals for function selection as short as possible (max. 5 mm).

9. If the device is driven at inputs C and D, input A or B must be held at L level.

10. Connect the additional capacitor between terminal N and ground.

Static characteristics in the 12 V range

in temperature ranges 1 and 5

		Test conditions	Lower limit B	typ.	Upper limit A	Unit
Supply voltage	U_S		11,4	12,0	13,5	V
H input voltage	U_{IH}	$U_S = U_{SB}$	7,5			V
L input voltage	U_{IL}	$U_S = U_{SB}$ and U_{SA}			4,5	V
H output voltage	U_{QH}	$U_S = U_{SB}$ and U_{SA} $U_{IL} = 4,5$ V, $-I_{QH} = 0,1$ mA	10,0	11,3		V
L output voltage	U_{QL}	$U_S = U_{SB}$, $U_{IH} = 7,5$ V $I_{QL} = 15$ mA		1,0	1,7	V
Static noise immunity						
H signal	U_{ss}		2,5	5,0		V
L signal	U_{ss}		2,8	5,0		V
H input current per input	I_{IH}	$U_S = U_{SA}$, $U_I = U_{IHA}$			1,0	µA
L input current per input	$-I_{IL}$	$U_S = U_{SA}$, $U_{IL} = 1,7$ V		0,8	1,5	mA
Short-circuit output current	$-I_Q$	$U_S = U_{SA}$	9,0	15,0	25,0	mA
L supply current	I_{SL}			13,0	19,0	mA
H supply current	I_{SH}			12,0	19,0	mA

Static characteristics in the 15 V range

in temperature ranges 1 and 5

		Test conditions	Lower limit B	typ.	Upper limit A	Unit
Supply voltage	U_S		13,5	15,0	17,0	V
H input voltage	U_{IH}	$U_S = U_{SB}$	7,5			V
L input voltage	U_{IL}	$U_S = U_{SB}$ and U_{SA}			4,5	V
H output voltage	U_{QH}	$U_S = U_{SB}$ and U_{SA} $U_{IL} = 4,5$ V $-I_{QH} = 0,1$ mA	12,0	14,3		V
L output voltage	U_{QL}	$U_S = U_{SB}$, $U_{IH} = 7,5$ V $I_{QL} = 18$ mA		1,1	1,7	V
Static noise immunity						
H signal	U_{ssH}		4,5	8,0		V
L signal	U_{ssL}		2,8	5,0		V
H input current per input	I_{IH}	$U_S = U_{SA}$, $U_I = U_{IHA}$			1,0	µA
L input current per input	$-I_{IL}$	$U_S = U_{SA}$, $U_{IL} = 1,7$ V		1,0	1,8	mA
Short-circuit output current	$-I_Q$	$U_S = U_{SA}$	9,0	15,0	25,0	mA
H supply current	I_{SH}			14,0	22,0	mA
L supply current	I_{SL}			15,0	23,0	mA

Switching times at $U_S = 12$ V, $T_U = 25$ °C

Input pulse duration	t_{pI}		0,5			µs
Reset pulse duration	t_{pR}		0,5			µs
Setup time A, B	t_V		0			µs
Setup time C, D	t_V		0,5			µs
Recovery time	t_t			$(C_O + C_t) \times 10^3$		s/F
Min. output pulse duration	t_p		400			ns
Output pulse duration	t_p	$U_S = 11,4$ V $R_t = 0,5$ MΩ $C_t = 2$ nF	650	700	780	µs
Propagation delay						
from A, B, C, D to Q	t_{PLH}	$C_L = 10$ pF at 4,5 V above ground	220	270	740	ns
	t_{PHL}		110	180	450	ns
from $\overline{R}$ to Q	t_{PHL}		150	300	550	ns
Signal transition time						
at A, B	t_{TLH}		0,1			V/µs
at C, D	t_{THL}		1			V/µs
at Q	t_{TLH}	$C_L = 10$ pF	50	100	200	ns
	t_{THL}		30	80	150	ns

Timing element

		Test conditions	Lower limit B	typ.	Upper limit A	Unit
Resistor	R_t		5		500	k Ω
Recommended resistance range for high accuracy	R_t		40		200	k Ω
Capacitor	C_t	Rated voltage >10 V	No restriction			
Capacitor	C_N		0		500	pF
Internal capacitance between terminal H and 0_S	C_O			10		pF

Logic data

H output load factor	F_{QH}			100
L output load factor	F_{QL}			10
Input load factor per input	F_I			1

Logic function: $Q = (A \wedge B) \vee \overline{(C \wedge D)}$, see timing diagram

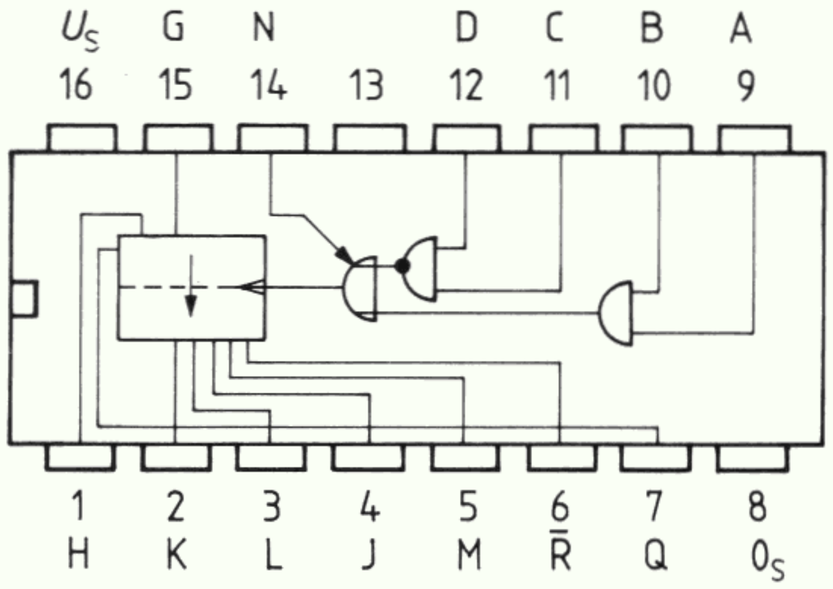
Logic behavior

Inputs				Output
A	B	C	D	Q
L	X	H	H	L
X	L	H	H	L
H	H	X	X	L
X	X	L	X	L
X	X	X	L	L
⌐	H	H	H	⌐¬
H	⌐	H	H	⌐¬
L	X	¬	H	⌐¬
L	X	H	¬	⌐¬
X	L	¬	H	⌐¬
X	L	H	¬	⌐¬

Note:

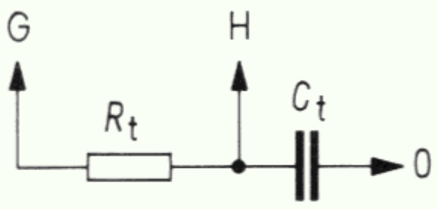
X = H or L signal
⌐¬ = H pulse of adjustable duration
⌐ = Transition from L to H signal
¬ = Transition from H to L signal

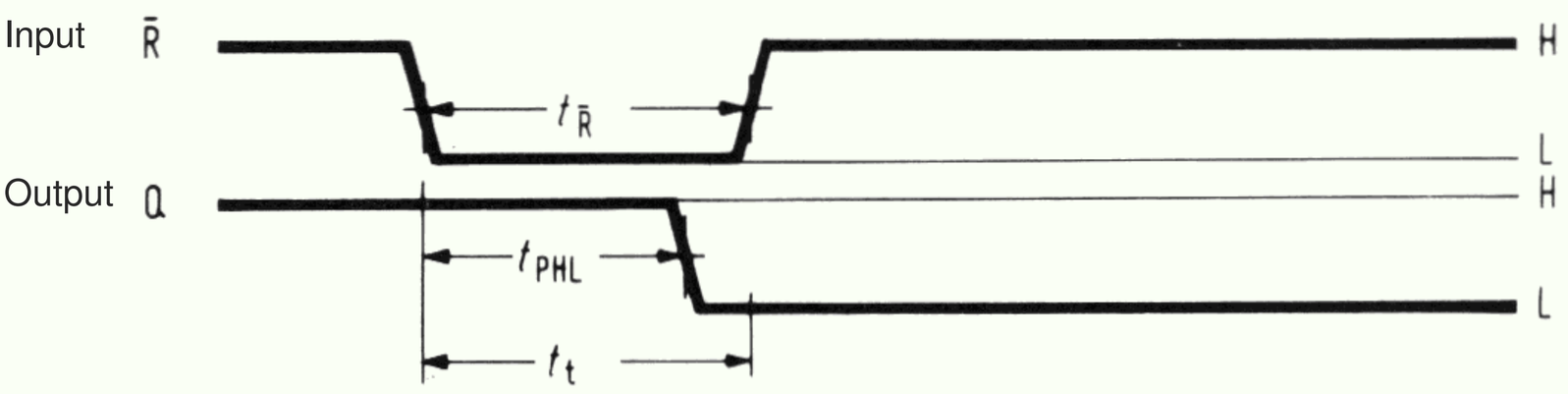
Output Q is shown for monostable operation.
Corresponding behavior applies to the other operating modes.



Pin configuration
Top view

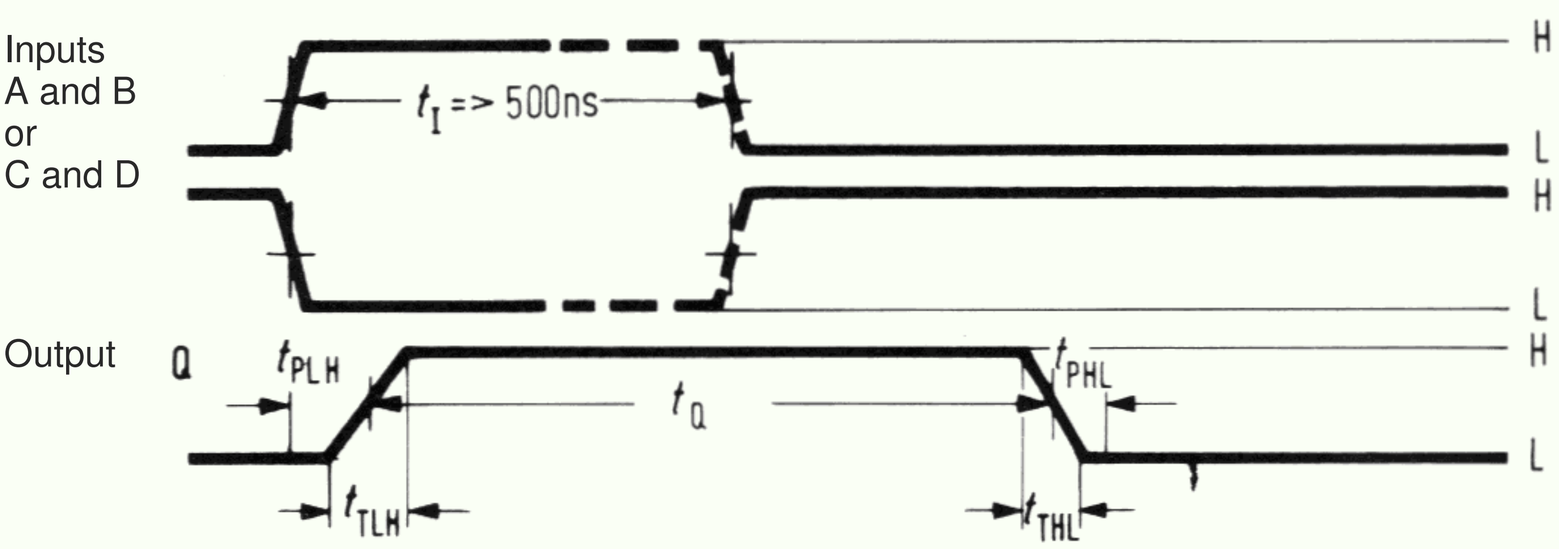
A, B, C, D = Inputs
J, K, L, M = Function inputs
Q = Output
$\bar{R}$ = Reset input





Timing diagram for:

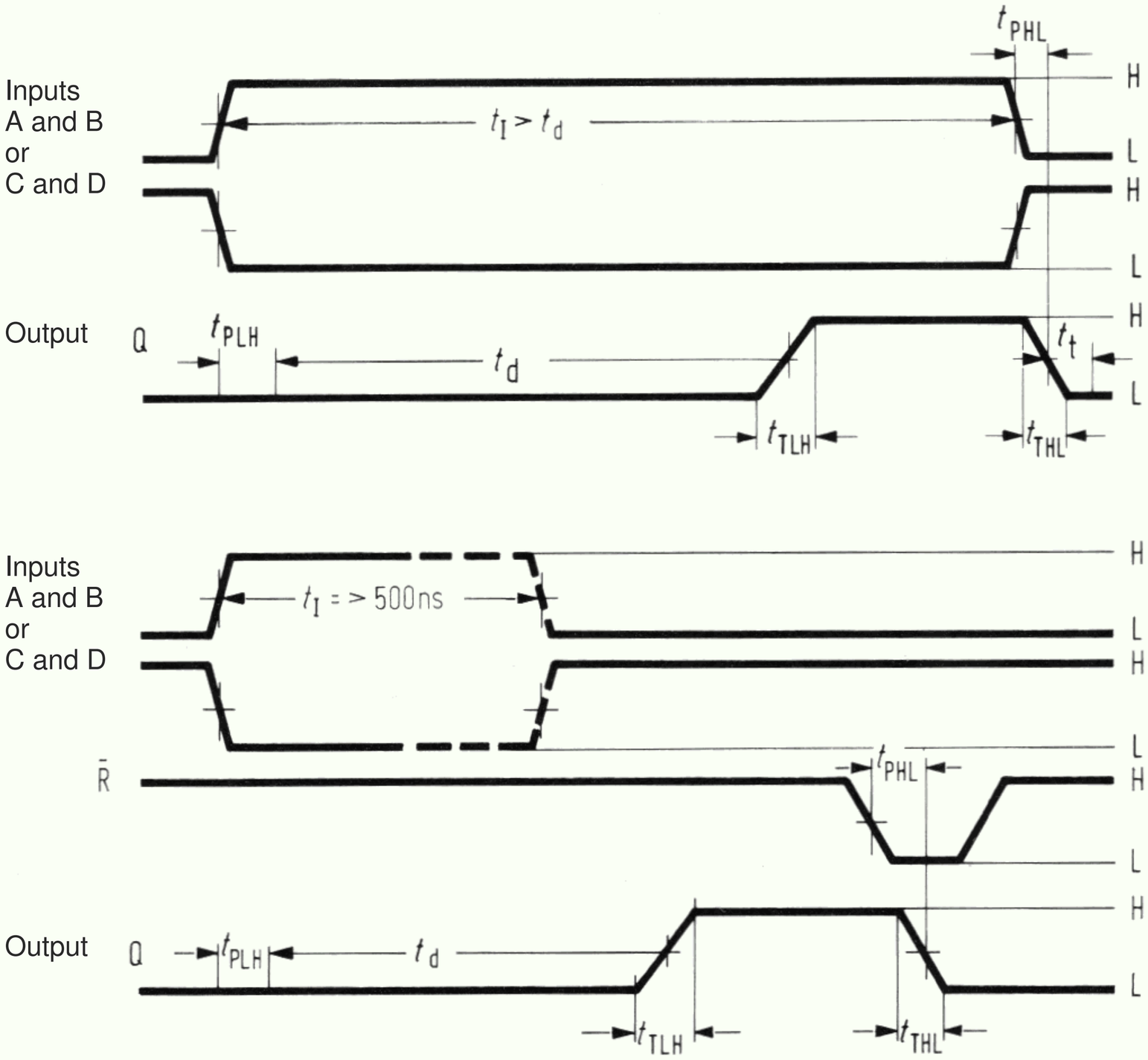
Reset via $\bar{R}$
(all operating modes)



Monostable multivibrator
(connect L, J and M)

$t_Q = 0{,}7 \cdot R_1 \cdot (CO + C_t)$

Timing diagram for:



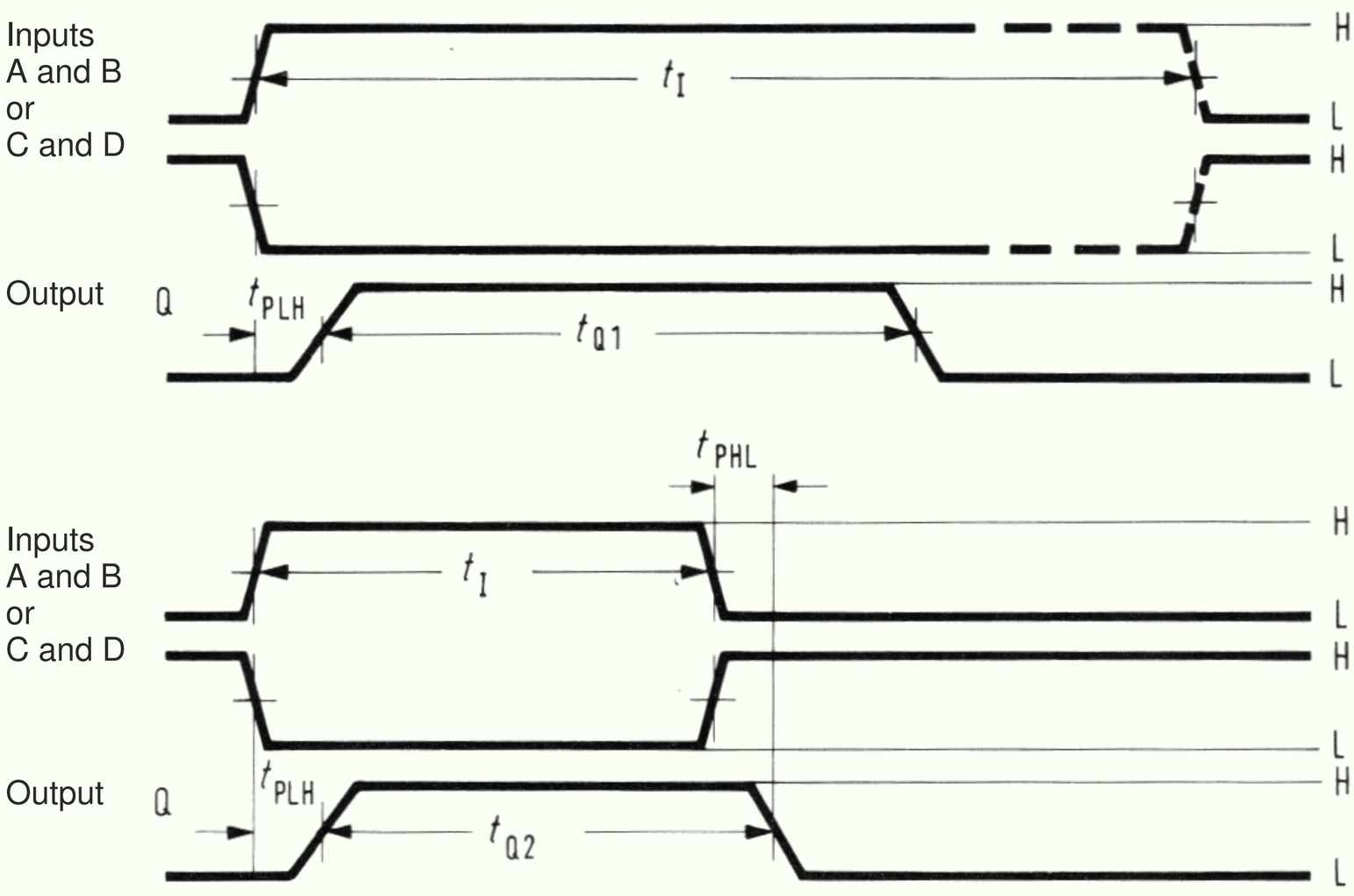
Pulse delay
(connect L and K)

$t_d = 0{,}7 \cdot R_t \cdot (C_O + C_t)$

Turn-on delay
(connect L and K)
(connect M and 0_S)

Output Q is reset to L only by $\bar{R}$ = L

$t_d = 0{,}7 \cdot R_t \cdot (C_O + C_t)$



Pulse shortening
(connect J and M)

a) $t_I > 0{,}7 \cdot R_t \cdot (C_O + C_t)$

$t_{Q1} = 0{,}7 \cdot R_t \cdot (C_O + C_t)$

b) $t_I \leqq 0{,}7 \cdot R_t \cdot (C_O + C_t)$

$t_{Q2} = t_I$

Circuit diagram

