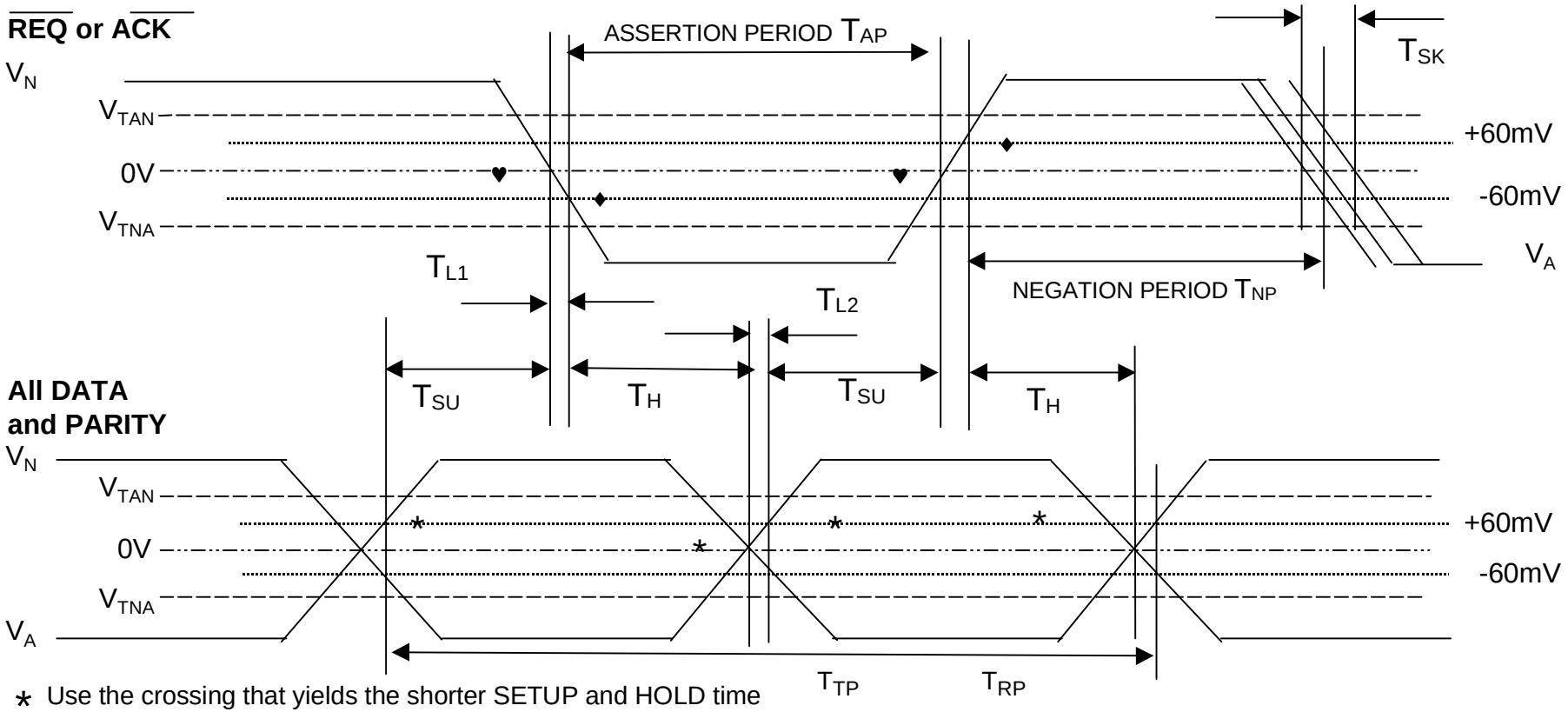
Timing Diagram



* Use the crossing that yields the shorter SETUP and HOLD time

♦ Shall be detected

♥ May be detected

Notes:

1 T_{SU} - Setup time.

2 T_H - Hold time.

3 $T_{L1/2}$ - May detect to Shall detect time.

4 T_{SK} - Skew time.

5 T_{AP} - Asserted time.

6 T_{NP} - Negated time.

7 T_{TP} - Transmitted period

8 T_{RP} - Received period

V_{TNA} = -max[60mV or (0,25 xV_N)]

V_{TAN} = max [60 mV or (-0,25 x V_A)]

1,0 V ≥ V_N ≥ 60 mV

-1,0 V ≤ V_A ≤ -60 mV

Differential voltage signals in all cases

Transmit Timing Equations

(1) $T_{TP} = X - 0.6$ ns

(2) $T_{TP} = T_{AP} + T_{NP} + T_{L1} + T_{L2}$

(3) $T_{NP} = T_H + T_{L1} + T_{SK} + T_{SU} = T_{AP} - T_{ASYM}$

(4) $T_{L1} = a\,T_F$ $T_{L2} = b\,T_R$

For Fast 80:

(1) $T_{TP} = 25$ ns - 0.6 ns = 24.4 ns

(2) $T_{TP} = 11.5$ ns + 11.5 ns + $T_{L1} + T_{L2}$

(5) From (1) & (2) $T_{L1} + T_{L2} = 24.4$ ns - 23 ns = 1.4 ns

(3) $T_{NP} = 4.8$ ns + 0.7 ns + 1 ns + 4.8 ns = 11.3 ns = 11.5 ns- T_{ASYM}

For Fast 40:

(1) $T_{TP} = 50$ ns - 0.6 ns = 49.4 ns

(2) $T_{TP} = 22.5$ ns + 22.5 ns + $T_{L1} + T_{L2}$

(5) From (1) & (2) $T_{L1} + T_{L2} = 49.4$ ns - 45 ns = 4.4 ns

(3) $T_{NP} = 9.25$ ns + 2.2 ns + 1 ns + 9.25 ns = 21.7 ns = 22.5 ns- T_{ASY}

For Fast 20:

(1) $T_{TP} = 100$ ns - 0.6 ns = 99.4 ns

(2) $T_{TP} = 45$ ns + 45 ns + $T_{L1} + T_{L2}$

(5) From (1) & (2) $T_{L1} + T_{L2} = 99.4$ ns - 90 ns = 9.4 ns

(3) $T_{NP} = 18.5$ ns + 4.7 ns + 1 ns + 18.5 ns = 42.7 ns = 45 ns- T_{ASYM}

Receive Timing Equations

(1) $T_{RP} = X - 0.7$ ns

(2) $T_{TP} = T_{AP} + T_{NP} + T_{L1} + T_{L2}$

(3) $T_{NP} = T_H + T_{L1} + T_{SK} + T_{SU} + T_{STSK} = T_{AP} - T_{ASYM}$

(4) $T_{L1} = d\,T_F$ $\quad T_{L2} = e\,T_R$

For Fast 80:

(1) $T_{TP} = 25$ ns $- 0.7$ ns $= 24.3$ ns

(2) $T_{TP} = 10$ ns $+ 10$ ns $+ T_{L1} + T_{L2}$

(5) From (1) & (2) $T_{L1} + T_{L2} = 24.3$ ns $- 20$ ns

$= 4.3$ ns

(3) $T_{NP} = 1.45$ ns $+ 2.15$ ns $+ 1$ ns $+ 1.45$ ns $+ 3.35$ ns

$= 9.4$ ns $= 10$ ns $- T_{ASYM}$

For Fast 40:

(1) $T_{TP} = 50$ ns $- 0.7$ ns $= 49.3$ ns

(2) $T_{TP} = 20$ ns $+ 20$ ns $+ T_{L1} + T_{L2}$

(5) From (1) & (2) $T_{L1} + T_{L2} = 49.3$ ns $- 40$ ns $= 9.3$ ns

(3) $T_{NP} = 4.75$ ns $+ 4.65$ ns $+ 1$ ns $+ 4.75$ ns $+ 6.8$ ns

$= 21.95$ ns $= 20$ ns $- T_{ASYM}$ $\quad \therefore \; T_{L1} = 2.1$ ns

For Fast 20:

(1) $T_{TP} = 100$ ns $- 0.7$ ns $= 99.3$ ns

(2) $T_{TP} = 40$ ns $+ 40$ ns $+ T_{L1} + T_{L2}$

(5) From (1) & (2) $T_{L1} + T_{L2} = 99.3$ ns $- 80$ ns $= 19.3$ ns

(3) $T_{NP} = 11.5$ ns $+ 9.65$ ns $+ 1$ ns $+ 11.5$ ns $+ 13.3$ ns

$=46.95$ ns $= 40$ ns $- T_{ASYM}$ $\quad \therefore \; T_{L1} = 2.1$ ns