



## DOCUMENT CHANGE REQUEST

DCR number 137

Changes required for: N/A

Originator: S Thacker

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Organisation: ESA/ESTEC

Status: IMPLEMENTED

Title: CMOS Quad Bilateral Switch, based on type 4066B

Number: 9408/005

Issue: 1

Other documents affected:

Page:

Electrical Test table Table 2 page 22 & Test Circuits Fig 4(p) page 41, Fig 4(q) page 42 - parameters: Propagation times tPLH1, tPLH2, tPHL.

Paragraph:

Electrical Test table Table 2 page 22 & Test Circuits Fig 4(p) page 41, Fig 4(q) page 42 - parameters: Propagation times tPLH1, tPLH2, tPHL.

Original wording:

Proposed wording:

In addition to general changes to the specification format/layout/content for the 4000B series as summarised in ESCC approved DCR90, there are some additional specific technical changes to this specification as follows :

Electrical Test table & circuit (Table 2/Fig 4(p & q) (para 2.3.1/2.3.3 note 8)) - parameters: Propagation times. Test conditions for channel inputs for tPLH1 (=tPLH), tPHL, tPLH2 (=tPZH) have been amended/clarified for correct switching including definition of load resistance and capacitance RL & CL. The switching waveforms have been corrected for tPLH2 (=tPZH) in Fig 4(q)(para 2.3.3 note 8). - see attached sheets for current and new table & fig/note.

Justification:

The current specification is incomplete, unclear or incorrect for these requirements.

|                                                                                  |
|----------------------------------------------------------------------------------|
| Attachments:                                                                     |
| 9408005_original_pages.pdf, 9408005_new_pages.pdf, null                          |
| Modifications:                                                                   |
| N/A                                                                              |
| Approval signature:                                                              |
|  |
| Date signed:                                                                     |
| 2004-08-06                                                                       |

| Characteristics                                                        | Symbols   | MIL-STD-883<br>Test Method | Test Conditions<br>Note 1                                                                                                                                                                           | Limits |     | Units |
|------------------------------------------------------------------------|-----------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|-------|
|                                                                        |           |                            |                                                                                                                                                                                                     | Min    | Max |       |
| Propagation Delay<br>Low to High,<br>1A to 1B                          | $t_{PLH}$ | 3003                       | $V_{IN}$ (Under<br>Test)=Pulse Generator<br>$V_{IN}$ (Remaining<br>Inputs)=Truth Table<br>$V_{IL}=0V$ , $V_{IH}=5V$ ,<br>$R_L=200k\Omega$<br>$V_{DD}=5V$ , $V_{SS}=0V$<br>Note 8                    | -      | 40  | ns    |
| Propagation Delay<br>High to Low,<br>1A to 1B                          | $t_{PHL}$ | 3003                       | $V_{IN}$ (Under<br>Test)=Pulse Generator<br>$V_{IN}$ (Remaining<br>Inputs)=Truth Table<br>$V_{IL}=0V$ , $V_{IH}=5V$ ,<br>$R_L=200k\Omega$<br>$V_{DD}=5V$ , $V_{SS}=0V$<br>Note 8                    | -      | 40  | ns    |
| Output Enable<br>Time High<br>Impedance to<br>High Output,<br>1C to 1B | $t_{PZH}$ | 3003                       | $V_{IN}$ (Under<br>Test)=Pulse Generator<br>$V_{IN}$ (Remaining<br>Inputs)=Truth Table<br>$V_{IL}=0V$ , $V_{IH}=5V$ ,<br>$V_{IN}(1A)=5V$ ,<br>$R_L=1k\Omega$<br>$V_{DD}=5V$ , $V_{SS}=0V$<br>Note 8 | -      | 70  | ns    |

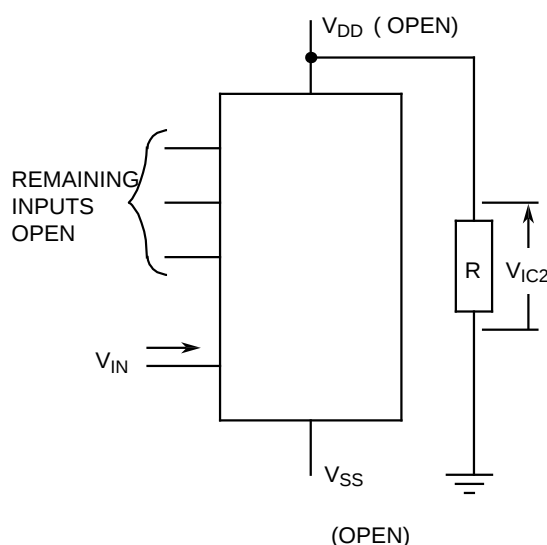
### 2.3.2 High and Low Temperatures Electrical Measurements

The measurements shall be performed at  $T_{amb}=+125 (+0 -5) ^\circ C$  and  $T_{amb}=- 55(+5-0)^\circ C$ .

| Characteristics   | Symbols  | MIL-STD-883<br>Test Method | Test Conditions<br>Note 1                                                                                              | Limits |          | Units   |
|-------------------|----------|----------------------------|------------------------------------------------------------------------------------------------------------------------|--------|----------|---------|
|                   |          |                            |                                                                                                                        | Min    | Max      |         |
| Functional Test 1 | -        | 3014                       | Verify Truth Table<br>$V_{IL}=0V$ , $V_{IH}=3V$<br>$V_{DD}=3V$ , $V_{SS}=0V$<br>Note 2                                 | -      | -        | -       |
| Functional Test 2 | -        | 3014                       | Verify Truth Table<br>$V_{IL}=0V$ , $V_{IH}=15V$<br>$V_{DD}=15V$ , $V_{SS}=0V$<br>Note 2                               | -      | -        | -       |
| Quiescent Current | $I_{DD}$ | 3005                       | $V_{IL}=0V$ , $V_{IH}=15V$<br>$V_{DD}=15V$ , $V_{SS}=0V$<br>Note 3<br>$T_{amb}=+125^\circ C$<br>$T_{amb}=- 55^\circ C$ | -<br>- | 1<br>0.1 | $\mu A$ |

| Characteristic | Input Condi-<br>tions | Limit                    | Remark                                                                             |
|----------------|-----------------------|--------------------------|------------------------------------------------------------------------------------|
|                | $V_{IN}(A)$           | $V_{OUT}(B)$             |                                                                                    |
| $V_{IL2}$      | 15V                   | $\leq 0.1V$<br>$\leq 1V$ | $T_{amb} = +22^{\circ}C, -55^{\circ}C$<br>$T_{amb} = +125^{\circ}C$<br>Channel OFF |
| $V_{IH1}$      | 5V                    | $\geq 4V$                | Channel ON                                                                         |
| $V_{IH2}$      | 15V                   | $\geq 12.5V$             | Channel ON                                                                         |

6. Input Clamp Voltage 2 to  $V_{DD}$ ,  $V_{IC2}$ , shall be tested on each input as follows:

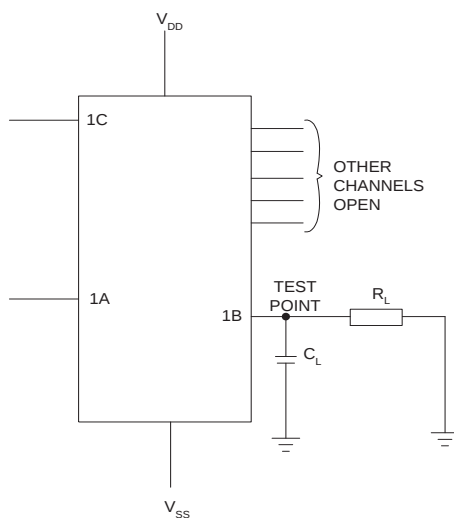


7. Guaranteed but not tested.  
8. Read and record measurements shall be performed on a sample of 32 components with 0 failures permitted.

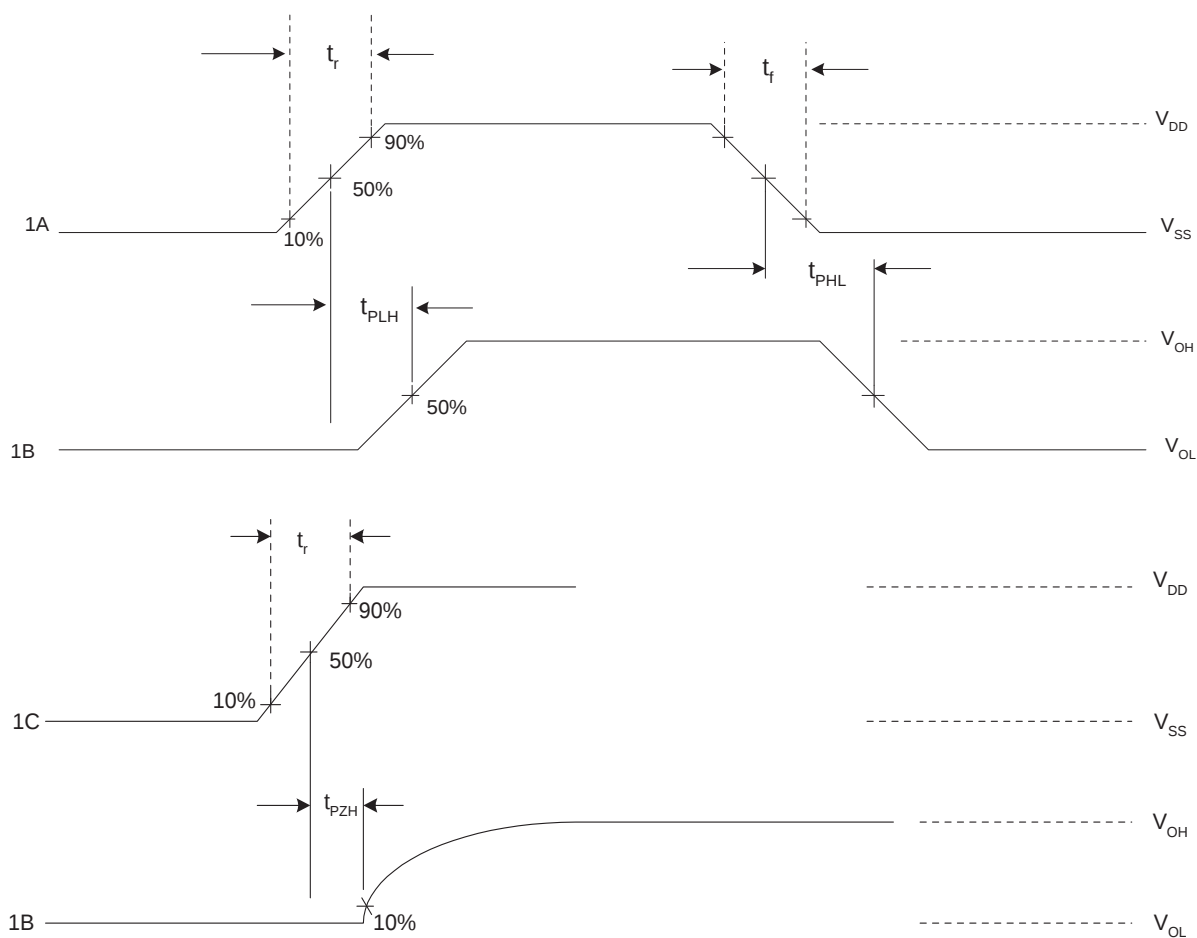
The pulse generator shall have the following characteristics:

$V_{GEN} = 0$  to  $V_{DD}$ ;  $f = 500kHz$ ;  $t_r$  and  $t_f \leq 15$  ns (10% to 90%); duty cycle = 50%. Output load capacitance  $C_L = 50pF \pm 5\%$  including scope probe, wiring and stray capacitance without component in the test fixture. Channel bias resistance  $R_L =$  as specified.

Propagation delay times shall be measured as follows:



### VOLTAGE WAVEFORMS



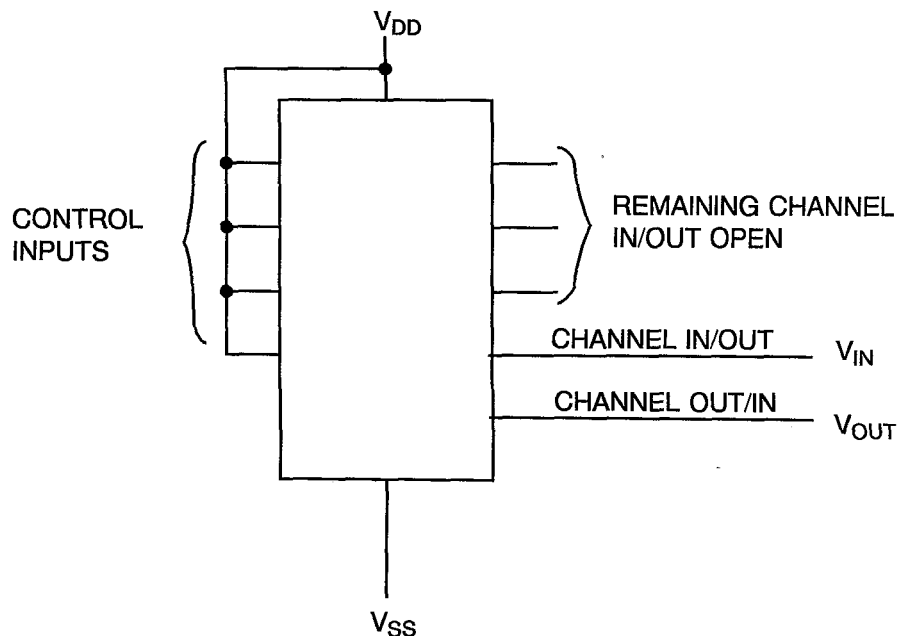

**TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - a.c. PARAMETERS**

| NO.              | CHARACTERISTICS                                                        | SYMBOL     | TEST METHOD<br>MIL-STD<br>883 | TEST FIG. | TEST CONDITIONS<br>(PINS UNDER TEST<br>D/F = DIP AND FP<br>C = CCP)                                                                              | LIMITS |     | UNIT |
|------------------|------------------------------------------------------------------------|------------|-------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------|-----|------|
|                  |                                                                        |            |                               |           |                                                                                                                                                  | MIN    | MAX |      |
| 104<br>to<br>107 | Input Capacitance<br>(Control)                                         | $C_{IN}$   | 3012                          | 4(m)      | $V_{IN}$ (Not Under Test)<br>= 0Vdc<br>$V_{DD} = V_{SS} = 0Vdc$<br>Note 5<br>(Pins D/F 5-6-12-13)<br>(Pins C 7-9-17-19)                          | -      | 7.5 | pF   |
| 108<br>to<br>111 | Channel Capacitance<br>(Input)                                         | $C_{INC}$  | 3012                          | 4(n)      | $V_{DD} = V_{SS} = 0Vdc$<br>Note 5<br>(Pins D/F 1-4-8-11)<br>(Pins C 2-6-12-16)                                                                  | -      | 15  | pF   |
| 112<br>to<br>115 | Channel Capacitance<br>(Output)                                        | $C_{OC}$   | 3012                          | 4(o)      | $V_{DD} = V_{SS} = 0Vdc$<br>Note 5<br>(Pins D/F 2-3-9-10)<br>(Pins C 4-5-14-15)                                                                  | -      | 15  | pF   |
| 116              | Propagation Delay<br>Signal IN to Signal<br>OUT (Channel<br>turned ON) | $t_{PLH1}$ | 3003                          | 4(p)      | $V_{IN}$ (Under Test) = Pulse<br>Generator<br>$V_{DD} = 5Vdc, V_{SS} = 0Vdc$<br>Note 6<br><u>Pins D/F</u> <u>Pins C</u><br>1 to 2        2 to 4  | -      | 40  | ns   |
| 117              | Propagation Delay<br>Signal IN to Signal<br>OUT (Channel<br>turned ON) | $t_{PHL}$  | 3003                          | 4(p)      | $V_{IN}$ (Under Test) = Pulse<br>Generator<br>$V_{DD} = 5Vdc, V_{SS} = 0Vdc$<br>Note 6<br><u>Pins D/F</u> <u>Pins C</u><br>1 to 2        2 to 4  | -      | 40  | ns   |
| 118              | Propagation Delay<br>Time Control to<br>Switch On                      | $t_{PLH2}$ | 3003                          | 4(q)      | $V_{IN}$ (Under Test) = Pulse<br>Generator<br>$V_{DD} = 5Vdc, V_{SS} = 0Vdc$<br>Note 6<br><u>Pins D/F</u> <u>Pins C</u><br>13 to 2       19 to 4 | -      | 70  | ns   |

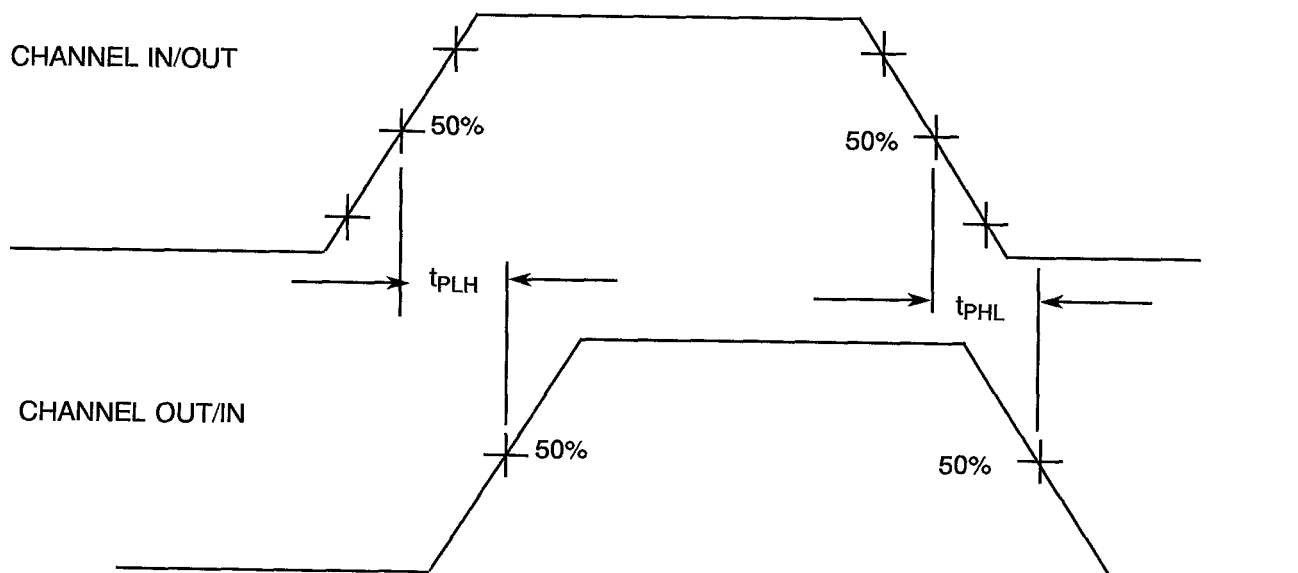
**NOTES:** See Page 23.

**FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS (CONTINUED)**

**FIGURE 4(p) - PROPAGATION DELAY SIGNAL IN TO SIGNAL OUT**

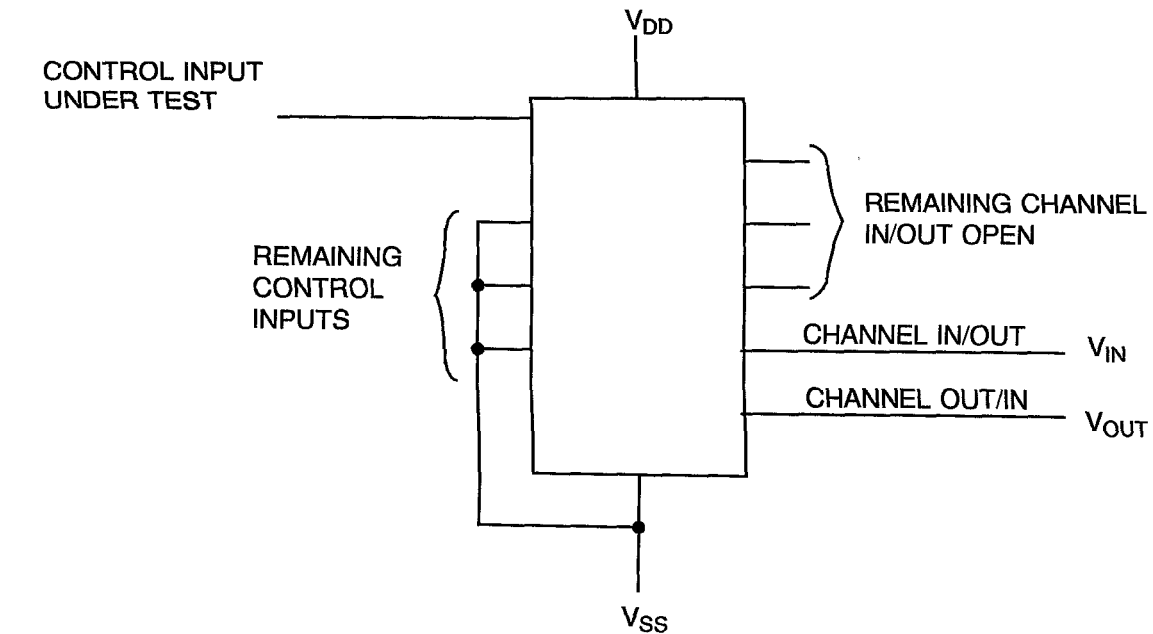
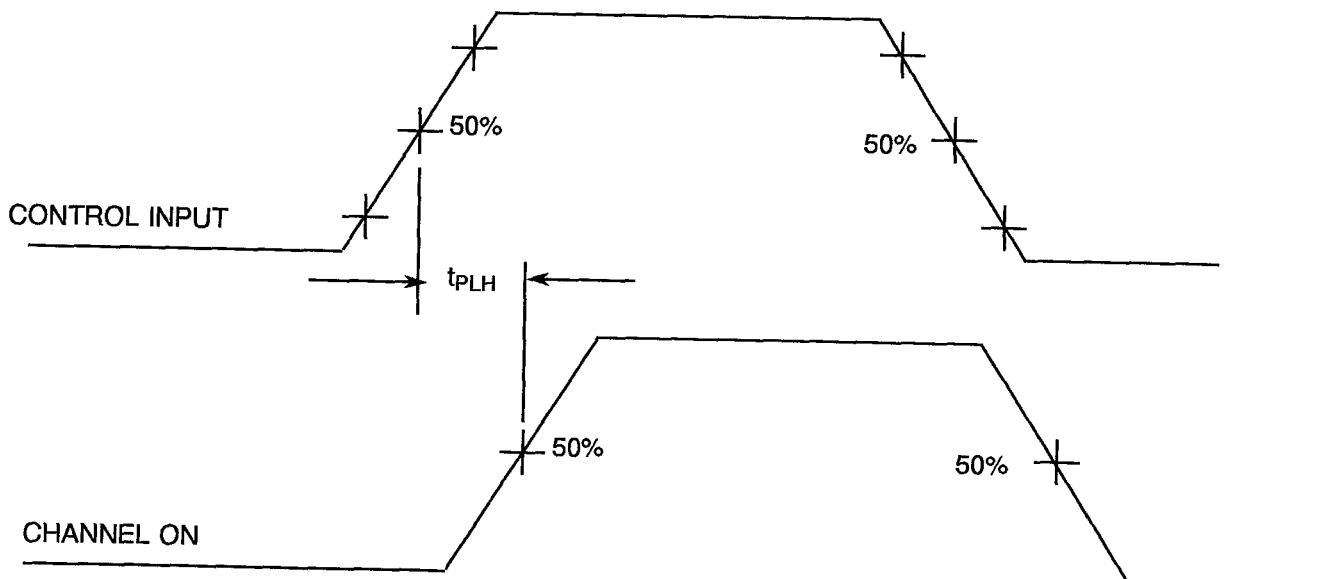


**VOLTAGE WAVEFORMS**



**NOTES**

1. Pulse Generator -  $V_P = 0$  to  $V_{DD}$ ,  $t_r$  and  $t_f \leq 15\text{ns}$ ,  $f = 500\text{kHz}$ .

**FIGURE 4 - CIRCUITS FOR ELECTRICAL MEASUREMENTS (CONTINUED)****FIGURE 4(q) - PROPAGATION DELAY, CONTROL TO SWITCH ON****VOLTAGE WAVEFORMS****NOTES**

1. Pulse Generator -  $V_P = 0$  to  $V_{DD}$ ,  $t_r$  and  $t_f \leq 15\text{ns}$ ,  $f = 500\text{kHz}$ .