# DOCUMENT CHANGE REQUEST

| | | | |
|---|---|---|---|
| DCR number 120 | Changes required for: N/A | Originator: S Thacker |
| Date: 2004/06/04 | Date sent: 2004/06/04 | Organisation: ESA/ESTEC |
| Status: IMPLEMENTED | | |

| | | | |
|---|---|---|---|
| Title: | CMOS Analogue Multiplexer/Demultiplexer, based on type 4052B | | |
| Number: | 9202/048 | Issue: | 1 |

Other documents affected:

Page:

1) Maximum Ratings Table - Table 1(b) page 6

2) Electrical test table - Table 2 page 23 & Test Circuits Fig 4(h) page 39 (also Table 3(a)&(b)) - parameter: Input Voltage tests VIL1, VIL2, VIH1, VIH2.

3) Electrical Test table Table 2 page 24 & 25 & Test

Paragraph:

1) Maximum Ratings Table - Table 1(b) page 6

2) Electrical test table - Table 2 page 23 & Test Circuits Fig 4(h) page 39 (also Table 3(a)&(b)) - parameter: Input Voltage tests VIL1, VIL2, VIH1, VIH2.

3) Electrical Test table Table 2 page 24 & 25 & Test

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 :

1) Maximum Ratings Table (Table1(b)(para 1.5))
Changes to take into account VEE as well as VDD - see attached sheets for current and new table.

Addition of application note as follows:
"Note 3. To avoid draining VDD supply current into the ON Channel when current flows from CH to COM the voltage drop across the ON Channel shall not exceed 0.4V."

2) Electrical test table (Table 2 note 5/Fig 4(h)(para 2.3.1/2.3.3 note 5)) - parameter: Input Voltage tests VIL & VIH.
Addition & clarification of the functional test condition to check for OFF channel current: IOFF<2uA.
- see attached sheets for current and new table & note.
(same change applies to Table 3(a)&(b)(para 2.3.2))

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3) Electrical Test table & circuit (Table 2/Fig 4(p) (para 2.3.1/2.3.3 note 8)) - parameters: Propagation times.
Test conditions for channel inputs for tPLH2(=tPZH1), tPLH3(=tPZH2),tPHL2 (=tPHZ1),tPHL3(=tPHZ2) have been amended/clarifed for correct switching. The switching waveforms have also been corrected for in Fig 4(p)(para 2.3.3 note 8).
- see attached sheets for current and new table & fig/note.

Justification:

1), 2), 3) - The current specification is incomplete, unclear or incorrect for these requirements.

Note : Manufacturer ST has agreed these changes

Attachments:

DCR_9202048_old_new_ref_pages.pdf, 120attmod.pdf, null

Modifications:

N/A

Approval signature:

Date signed:

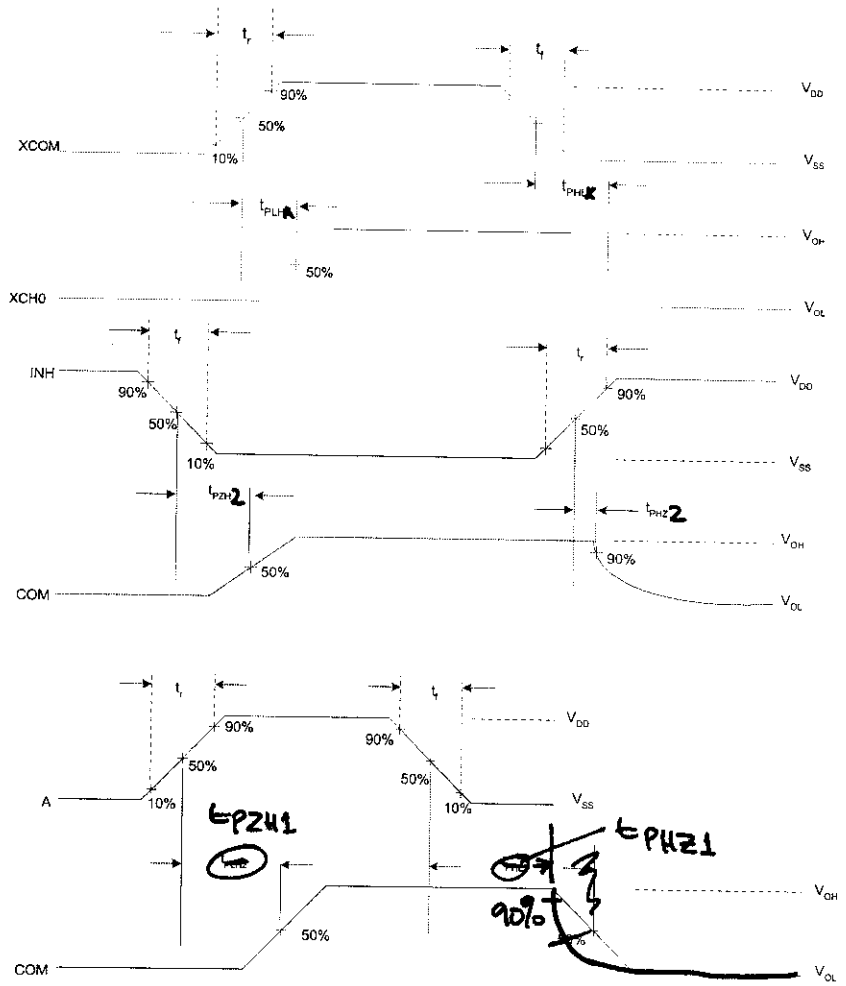
2004-06-04

| Characteristics | Symbols | MIL-STD-883 Test Method | Test Conditions Note 1 | Limits | | Units |
|---|---|---|---|---|---|---|
| | | | | Min | Max | |
| High Level Input Voltage 2 (Noise Immunity) (Functional Test) | $V_{IH2}$ | - | Verify Truth Table<br>$V_{DD}$=15V,<br>$V_{SS}$=$V_{EE}$= 0V<br>Note 5 | 11 | - | V |
| Threshold Voltage N-Channel | $V_{THN}$ | - | INH Input and $V_{EE}$ at Ground<br>All Other Inputs:<br>$V_{IN}$=5V<br>$V_{DD}$=5V, $I_{SS}$=-10µA | -0.7 | -3 | V |
| Threshold Voltage P-Channel | $V_{THP}$ | - | INH Input at Ground<br>All Other Inputs:<br>$V_{IN}$=-5V<br>$V_{SS}$=$V_{EE}$=-5V,<br>$I_{DD}$=3.5µA | 0.7 | 3 | V |
| Input Clamp Voltage 1, to $V_{SS}$, Control Inputs | $V_{IC1}$ | - | $I_{IN}$ (Under Test)= -100µA<br>$V_{DD}$=Open, $V_{SS}$=0V<br>All Other Pins Open | - | -2 | V |
| Input Clamp Voltage 2, to $V_{DD}$, Control Inputs | $V_{IC2}$ | - | $V_{IN}$ (Under Test)=6V<br>R=30kΩ, $V_{SS}$=Open<br>All Other Pins Open<br>Note 6 | 3 | - | V |
| Input Capacitance, Control Inputs | $C_{IN}$ | 3012 | $V_{IN}$ (Not Under Test)=0V<br>$V_{DD}$= $V_{SS}$=$V_{EE}$=0V<br>f = 100 kHz to 1 MHz<br>Note 7 | - | 7.5 | pF |
| Channel Capacitance, CH | $C_{CH}$ | 3012 | $V_{IN}$ (Not Under Test)=0V<br>$V_{DD}$= $V_{SS}$=$V_{EE}$=0V<br>f = 100 kHz to 1 MHz<br>Note 7 | - | 7.5 | pF |
| Channel Capacitance, XCOM, YCOM | $C_{COM}$ | 3012 | $V_{IN}$ (Not Under Test)=0V<br>$V_{DD}$= $V_{SS}$=$V_{EE}$=0V<br>f = 100 kHz to 1 MHz<br>Note 7 | - | 30 | pF |
| Propagation Delay Low to High X, XCOM to XCH0 | $t_{PLHX}$ | 3003 | $V_{IN}$(COM)=Pulse Generator<br>$V_{IN}$ (Remaining Inputs)=Truth Table<br>$V_{IL}$=0V, $V_{IH}$=5V,<br>$R_L$=200kΩ<br>$V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V<br>Note 8 | - | 40 | ns |

| Characteristics | Symbols | MIL-STD-883 Test Method | Test Conditions Note 1 | Limits Min | Limits Max | Units |
|---|---|---|---|---|---|---|
| Propagation Delay High to Low X XCOM to CH0 | $t_{PHL}$X | 3003 | $V_{IN}$(COM)=Pulse Generator $V_{IN}$ (Remaining Inputs)=Truth Table $V_{IL}$=0V, $V_{IH}$=5V, $R_L$=200kΩ $V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V Note 8 | - | 40 | ns |
| ~~Propagation Delay Low to High 2~~, A to YCOM ~~(Channels ON)~~ Output Enable Time High Impedance to High Output 1, A to YCOM | ~~$t_{PLH2}$~~ $t_{PZH1}$ | 3003 | $V_{IN}$(A)=Pulse Generator $V_{IN}$ (Remaining Inputs)=Truth Table $V_{IL}$=0V, $V_{IH}$=5V, $V_{IN}$(CH)=~~0V and~~ 5V and Open $R_L$=10kΩ $V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V Note 8 | - | 720 | ns |
| ~~Propagation Delay High to Low 2~~, A to YCOM ~~(Channels ON)~~ Output Disable Time High Output to High Impedance 1, A to YCOM | ~~$t_{PHL2}$~~ $t_{PHZ1}$ | 3003 | $V_{IN}$(A)=Pulse Generator $V_{IN}$ (Remaining Inputs)=Truth Table $V_{IL}$=0V, $V_{IH}$=5V, $V_{IN}$(CH)=~~0V and~~ 5V and Open $R_L$=~~10kΩ~~ 300Ω $V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V Note 8 | - | 720 | ns |
| Output Enable Time High Impedance to High Output 2, INH to YCOM | $t_{PZH}$2 | 3003 | $V_{IN}$(INH)=Pulse Generator $V_{IN}$ (Remaining Inputs)=Truth Table $V_{IL}$=0V, $V_{IH}$=5V, $V_{IN}$(CH)=5V, $R_L$=10kΩ $V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V Note 8 | - | 400 | ns |
| Output Disable Time High Output to High Impedance 2, INH to YCOM | $t_{PHZ}$2 | 3003 | $V_{IN}$(INH)=Pulse Generator $V_{IN}$ (Remaining Inputs)=Truth Table $V_{IL}$=0V, $V_{IH}$=5V, $V_{IN}$(CH)=5V, $R_L$=300Ω $V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V Note 8 | - | 400 | ns |

2.3.2 High and Low Temperatures Electrical Measurements

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




2.4 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at $T_{amb}$=+22 ±3°C.

The test methods and test conditions shall be as per the corresponding test defined in Room Temperature Electrical Measurements.

The drift values (Δ) shall not be exceeded for each characteristic specified. The corresponding absolute limit values for each characteristic shall not be exceeded.

## TABLE 1(a) - TYPE VARIANTS

| VARIANT | CASE | FIGURE | LEAD MATERIAL AND/OR FINISH |
|---|---|---|---|
| 01 | FLAT | 2(a) | G2 or G8 |
| 02 | FLAT | 2(a) | G4 |
| 03 | D.I.L. | 2(b) | G2 or G8 |
| 04 | D.I.L. | 2(b) | G4 |
| 07 | CHIP CARRIER | 2(c) | 2 |
| 08 | D.I.L. | 2(d) | G2 |
| 09 | D.I.L. | 2(d) | G4 |
| 10 | SO CERAMIC | 2(e) | G2 |
| 11 | SO CERAMIC | 2(e) | G4 |

## TABLE 1(b) - MAXIMUM RATINGS

| NO. | CHARACTERISTICS | SYMBOL | MAXIMUM RATINGS | UNITS | REMARKS |
|---|---|---|---|---|---|
| 1 | Supply Voltage | $V_{DD}$ | -0.5 to +18 | V | Note 1 |
| 2 | Input Voltage | $V_{IN}$ | -0.5 to $V_{DD}$ + 0.5 | V | Note 2<br>Power on |
| 3 | D.C. Input Current | $\pm I_{IN}$ | 10 | mA | - |
| 4 | D.C. Output Current | $\pm I_O$ | 10 | mA | Note 3 |
| 5 | Device Dissipation | $P_D$ | 200 | mWdc | Per Package |
| 6 | Output Dissipation | $P_{DSO}$ | 100 | mWdc | Note 4 |
| 7 | Operating Temperature Range | $T_{op}$ | -55 to +125 | °C | - |
| 8 | Storage Temperature Range | $T_{stg}$ | -65 to +150 | °C | - |
| 9 | Soldering Temperature<br>For FP and DIP<br>For CCP | $T_{sol}$ | <br>+300<br>+245 | °C | <br>Note 5<br>Note 6 |

**NOTES**

1. Device is functional from +3V to +15V with reference to $V_{SS}$.
2. $V_{DD}$ +0.5V should not exceed +18V.
3. The maximum output current of any single output.
4. The maximum power dissipation of any single output.
5. Duration 10 seconds maximum at a distance of not less than 1.5mm from the device body and the same lead shall not be resoldered until 3 minutes have elapsed.
6. Duration 30 seconds maximum and the same terminal shall not be resoldered until 3 minutes have elapsed.

**TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - d.c. PARAMETERS (CONT'D)**

| NO. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS MIN | LIMITS MAX | UNIT |
|---|---|---|---|---|---|---|---|---|
| 274 | Input Voltage Low Level (Noise Immunity) (Functional Test) | $V_{IL1}$ | - | 4(h) | Address and Inhibit Inputs: $V_{IL}$ = 1.5Vdc, $V_{IH}$ = 3.5Vdc Channel Input: $V_{IL}$ = 0Vdc, $V_{IH}$ = 5Vdc $V_{DD}$ = 5Vdc, $V_{SS}$ = $V_{EE}$ = 0Vdc Note 5 (Pins D/F 1-2-4-5-11-12-14-15) (Pins C 1-2-5-6-14-15-17-19) | - | 0.5 | V |
| | Input Voltage High Level (Noise Immunity) (Functional Test) | $V_{IH1}$ | | | | 4.5 | - | |
| 275 | Input Voltage Low Level (Noise Immunity) (Functional Test) | $V_{IL2}$ | - | 4(h) | Address and Inhibit Inputs: $V_{IL}$ = 4Vdc, $V_{IH}$ = 11Vdc Channel Input: $V_{IL}$ = 0Vdc, $V_{IH}$ = 15Vdc $V_{DD}$ = 15Vdc, $V_{SS}$ = $V_{EE}$ = 0Vdc Note 5 (Pins D/F 1-2-4-5-11-12-14-15) (Pins C 1-2-5-6-14-15-17-19) | - | 1.5 | V |
| | Input Voltage High Level (Noise Immunity) (Functional Test) | $V_{IH2}$ | | | | 13.5 | - | |
| 276 | Threshold Voltage N-Channel | $V_{THN}$ | - | 4(i) | Inhibit and $V_{EE}$ at Ground. All Other Inputs: $V_{IN}$ = 5Vdc $V_{DD}$ = 5Vdc, $I_{SS}$ = -10µA (Pin D/F 8) (Pin C 10) | -0.7 | -3.0 | V |
| 277 | Threshold Voltage P-Channel | $V_{THP}$ | - | 4(j) | Inhibit at Ground. All Other Inputs: $V_{IN}$ = -5Vdc $V_{SS}$ = $V_{EE}$ = -5Vdc, $I_{DD}$ = 3.5µA (Pin D/F 16) (Pin C 20) | 0.7 | 3.0 | V |
| 278 to 280 | Input Clamp Voltage (to $V_{SS}$) | $V_{IC1}$ | - | 4(k) | $I_{IN}$ (Under Test) = -100µA $V_{DD}$ = Open, $V_{SS}$ = 0Vdc All Other Pins Open (Pins D/F 6-9-10) (Pins C 7-11-12) | - | -2.0 | V |
| 281 to 283 | Input ClampVoltage (to $V_{DD}$) | $V_{IC2}$ | - | 4(l) | $V_{IN}$ (Under Test) = 6Vdc $V_{SS}$ = Open, R = 30kΩ; (Pins D/F 6-9-10) (Pins C 7-11-12) | 3.0 | - | V |

**NOTES:** See Page 25.

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

| NO. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | | | | | MIN | MAX | |
| 284 to 286 | Input Capacitance Address or Inhibit | $C_{IN}$ | 3012 | 4(m) | $V_{IN}$ (Not Under Test) = 0Vdc<br>$V_{DD}$ = $V_{SS}$ = $V_{EE}$ = 0Vdc<br>Note 6<br>(Pins D/F 6-9-10)<br>(Pins C 7-11-12) | - | 7.5 | pF |
| 287 to 294 | Channel Capacitance (Input) | $C_{INC}$ | 3012 | 4(n) | $V_{DD}$ = $V_{SS}$ = $V_{EE}$ = 0Vdc<br>Note 6<br>(Pins D/F 1-2-4-5-11-12-14-15)<br>(Pins C 1-2-5-6-14-15-17-19) | - | 7.5 | pF |
| 295 to 296 | Channel Capacitance (Output) | $C_{OC}$ | 3012 | 4(o) | $V_{DD}$ = $V_{SS}$ = $V_{EE}$ = 0Vdc<br>Note 6<br>(Pins D/F 3-13)<br>(Pins C 4-16) | - | 30 | pF |
| 297 | Propagation Delay Channel Input to Channel Output | $t_{PLH1}$ | 3003 | 4(q) | $V_{IN}$ (Under Test) = Pulse Generator<br>$V_{IL}$ = 0Vdc, $V_{IH}$ = 5Vdc<br>$R_L$ = 200kΩ<br>$V_{DD}$ = 5Vdc,<br>$V_{SS}$ = $V_{EE}$ = 0Vdc<br>Note 7<br>Pins D/F: 13 to 12 Pins C: 16 to 15 | - | 40 | ns |
| 298 | Propagation Delay Address to Signal OUT (Channel turning ON) | $t_{PLH2}$ | 3003 | 4(p) | $V_{IN}$ (Under Test) = Pulse Generator<br>$V_{IL}$ = 0Vdc, $V_{IH}$ = 5Vdc<br>$R_L$ = 10kΩ<br>$V_{DD}$ = 5Vdc,<br>$V_{SS}$ = $V_{EE}$ = 0Vdc<br>Note 7<br>Pins D/F: 10 to 3 Pins C: 12 to 4 | - | 720 | ns |
| 299 | Propagation Delay Inhibit to Signal OUT (Channel turning ON) | $t_{PLH3}$ | 3003 | 4(p) | $V_{IN}$ (Under Test) = Pulse Generator<br>$V_{IL}$ = 0Vdc, $V_{IH}$ = 5Vdc<br>$R_L$ = 10kΩ<br>$V_{DD}$ = 5Vdc,<br>$V_{SS}$ = $V_{EE}$ = 0Vdc<br>Note 7<br>Pins D/F: 6 to 3 Pins C: 7 to 4 | - | 400 | ns |

**NOTES:** See Page 25.

**TABLE 2 - ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE - a.c. PARAMETERS (CONT'D)**

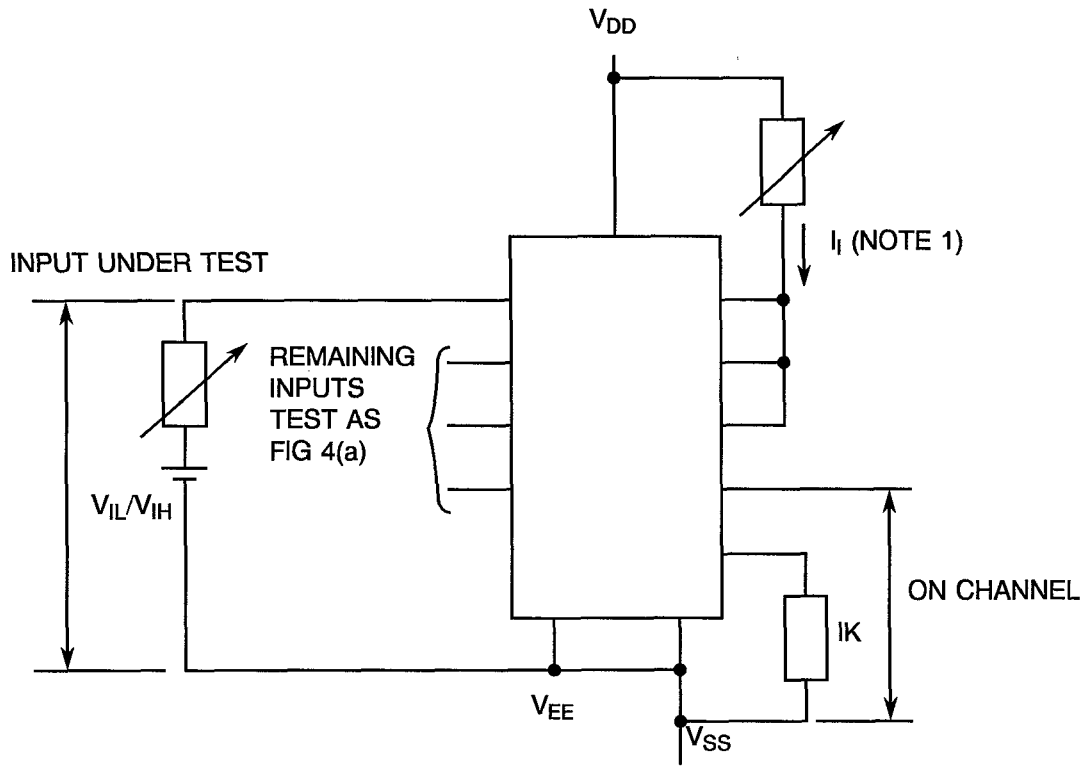
| NO. | CHARACTERISTICS | SYMBOL | TEST METHOD MIL-STD 883 | TEST FIG. | TEST CONDITIONS (PINS UNDER TEST D/F = DIP AND FP C = CCP) | LIMITS | | UNIT |
|---|---|---|---|---|---|---|---|---|
| | | | | | | MIN | MAX | |
| 300 | Propagation Delay Channel Input to Channel Output | $t_{PHL1}$ | 3003 | 4(q) | $V_{IN}$ (Under Test) = Pulse Generator<br>$V_{IL}$ = 0Vdc, $V_{IH}$ = 5Vdc<br>$R_L$ = 200kΩ<br>$V_{DD}$ = 5Vdc,<br>$V_{SS}$ = $V_{EE}$ = 0Vdc<br>Note 7<br>Pins D/F: 13 to 12 Pins C: 16 to 15 | - | 40 | ns |
| 301 | Propagation Delay Address to Signal OUT (Channel turning OFF) | $t_{PHL2}$ | 3003 | 4(p) | $V_{IN}$ (Under Test) = Pulse Generator<br>$V_{IL}$ = 0Vdc, $V_{IH}$ = 5Vdc,<br>$R_L$ = 300Ω<br>$V_{DD}$ = 5Vdc,<br>$V_{SS}$ = $V_{EE}$ = 0Vdc<br>Note 7<br>Pins D/F: 10 to 3 Pins C: 12 to 4 | - | 720 | ns |
| 302 | Propagation Delay Inhibit to Signal OUT (Channel turning OFF) | $t_{PHL3}$ | 3003 | 4(p) | $V_{IN}$ (Under Test) = Pulse Generator<br>$V_{IL}$ = 0Vdc, $V_{IH}$ = 5Vdc<br>$R_L$ = 300Ω<br>$V_{DD}$ = 5Vdc,<br>$V_{SS}$ = $V_{EE}$ = 0Vdc<br>Note 7<br>Pins D/F: 6 to 3 Pins C: 7 to 4 | - | 400 | ns |

**NOTES**

1. GO-NO-GO Test, each pattern of Test Table 4(a).
   $V_{OH} \geq V_{DD}$ - 0.5Vdc $V_{OL} \leq$ 0.5Vdc
2. Maximum time to output comparator strobe 300µsec.
3. Measure each value of $I_{DD}$ for the input conditions given in Table 4(b).
4. For characterisation during qualification, the incremental method or the method shown in Figure 4(g)(ii), which incorporates a plotter, shall apply. For procurement, the Orderer may accept that the devices are tested go-no-go to the maximum limits of Table 2. In the case that go-no-go testing is performed, it is necessary that at least one discrete value shall be measured and recorded in order that drift values may be applied. Figure 4(g)(iii) shall be used for the discrete value measurement.
5. This is performed as a Functional Test in which extreme $V_{IN}$ conditions are applied and channel selection is monitored.
6. Measurement performed on a sample basis, LTPD 7 or less, with a Capacitance Bridge connected between each input or output under test and $V_{SS}$, only for Lots where LAT Level 2 is to be performed. (For LTPD sampling plan, see Annexe I of ESA/SCC 9000).
7. Measurement performed on a sample basis LTPD 7, or less (see Annexe I of ESA/SCC 9000).

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

FIGURE 4(h) - INPUT VOLTAGE HIGH AND LOW LEVEL

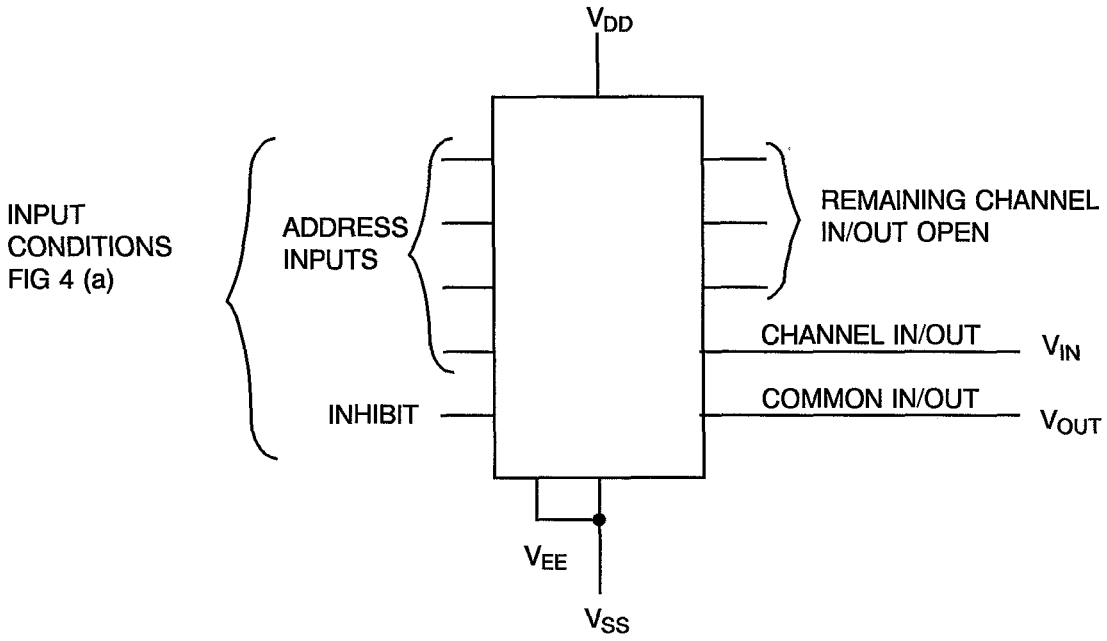



**NOTES:**

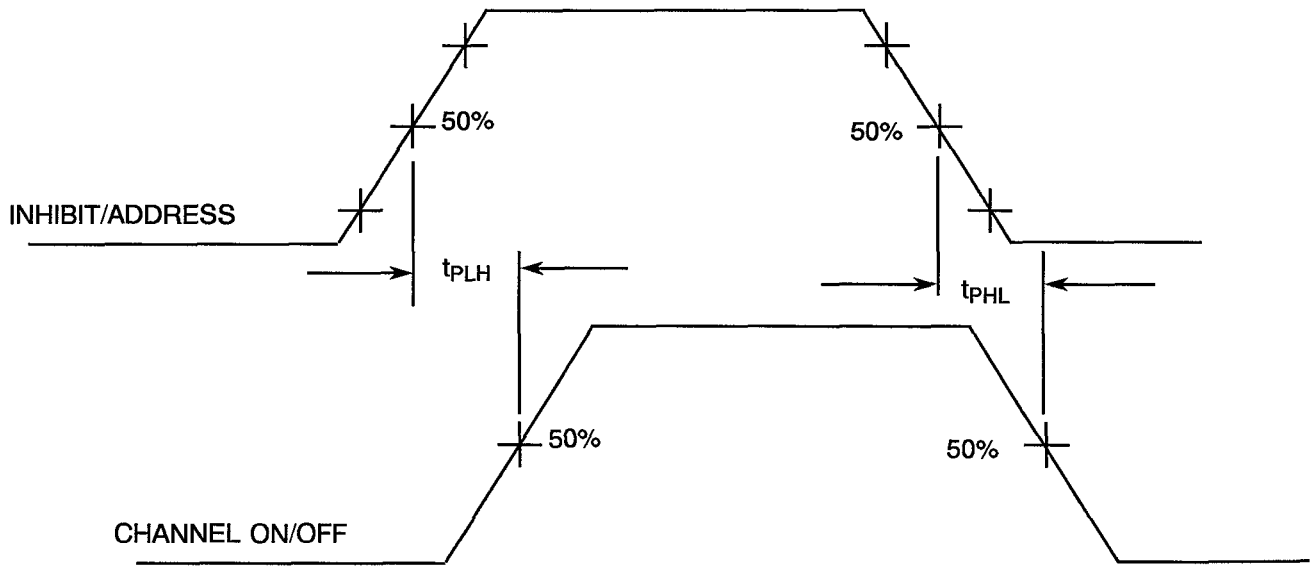
1. $I_I$ < 2μA for all OFF Channels

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

FIGURE 4(p) - PROPAGATION DELAY, INHIBIT OR ADDRESS INPUTS TO CHANNEL ON OR OFF




VOLTAGE WAVEFORMS




**NOTES** 1. Pulse Generator - $V_P$ = 0 to $V_{DD}$, $t_r$ and $t_f$ ≤ 15ns, f = 500kHz.

The terminal material and/or finish shall be in accordance with the requirements of ESCC Basic Specification No. 23500.

1.5 MAXIMUM RATINGS

The maximum ratings shall not be exceeded at any time during use or storage.

Maximum ratings shall only be exceeded during testing to the extent specified in this specification and when stipulated in Test Methods and Procedures of the ESCC Generic Specification.

| Characteristics | Symbols | Maximum Ratings | Units | Remarks |
|---|---|---|---|---|
| Supply Voltage | $V_{DD}$ | -0.5 to 18 | V | Note 1 |
| Supply Voltage Range | $V_{DD}$-$V_{EE}$ | -0.5 to 18 | V | Note 2 |
| Control Input Voltage | $V_{IN}$ | -0.5 to $V_{DD}$ +0.5 | V | Note 1<br>Power on |
| Channel Input/Output Voltage | $V_{IN}$ | $V_{EE}$ -0.5 to $V_{DD}$ +0.5 | V | Note 1, 3 |
| Control Input Current | $I_{IN}$ | ±10 | mA | - |
| Device Power Dissipation (Continuous) | $P_D$ | 200 | mW | - |
| Power Dissipation per Single Output | $P_{DSO}$ | 100 | mW | - |
| Operating Temperature Range | $T_{op}$ | -55 to +125 | $^oC$ | $T_{amb}$ |
| Storage Temperature Range | $T_{stg}$ | -65 to +150 | $^oC$ | - |
| Soldering Temperature<br>For FP, DIP and SO<br>For CCP | $T_{sol}$ | <br>+265<br>+245 | $^oC$ | <br>Note 4<br>Note 5 |

**NOTES:**

1. Device is functional for $3V \leq V_{DD} \leq 15V$ with reference to $V_{SS}$.
2. Device is functional for $3V \leq V_{DD}\text{-}V_{EE} \leq 15V$.
3. To avoid draining $V_{DD}$ supply current into the ON Channel when current flows from CH to COM the voltage drop across the ON Channel shall not exceed 0.4V.
4. Duration 10 seconds maximum at a distance of not less than 1.5mm from the device body and the same terminal shall not be resoldered until 3 minutes have elapsed.
5. Duration 5 seconds maximum and the same terminal shall not be resoldered until 3 minutes have elapsed.

1.6 HANDLING PRECAUTIONS

These devices are susceptible to damage by electrostatic discharge. Therefore, suitable precautions shall be employed for protection during all phases of manufacture, testing, packaging, shipment and any handling.

These components are categorised as Class 1 per ESCC Basic Specification No. 23800 with a minimum Critical Path Failure Voltage of 400 Volts.

| Characteristics | Symbols | MIL-STD-883 Test Method | Test Conditions Note 1 | Limits | | Units |
|---|---|---|---|---|---|---|
| | | | | Min | Max | |
| Channel OFF Leakage Current 1, Any Channel CH | $I_{OFF1}$ | - | Channel Under Test<br>$V_{IN}$ (CH)=15V<br>$V_{IN}$ (COM)=0V<br>All other Channels Open<br>$V_{DD}$=15V,<br>$V_{SS}$=$V_{EE}$= 0V | - | -100 | nA |
| Channel OFF Leakage Current 2, Any Channel CH | $I_{OFF2}$ | - | Channel Under Test<br>$V_{IN}$ (CH)=0V<br>$V_{IN}$ (COM)=15V<br>All other Channels Open<br>$V_{DD}$=15V,<br>$V_{SS}$=$V_{EE}$= 0V | - | 100 | nA |
| Channel OFF Leakage Current 3, All Channels Tested Together | $I_{OFF3}$ | - | $V_{IN}$ (CH)=0V<br>$V_{IN}$ (COM)=15V<br>$V_{DD}$=15V,<br>$V_{SS}$=$V_{EE}$= 0V | - | 100 | nA |
| Channel OFF Leakage Current 4, All Channels Tested Together | $I_{OFF4}$ | - | $V_{IN}$ (CH)=15V<br>$V_{IN}$ (COM)=0V<br>$V_{DD}$=15V,<br>$V_{SS}$=$V_{EE}$= 0V | - | -100 | nA |
| Channel ON Resistance 1 | $R_{ON1}$ | - | $V_{IL}$=0V, $V_{IH}$=5V<br>$R_L$=10kΩ<br>$V_{DD}$=5V,$V_{SS}$=$V_{EE}$= 0V<br>Note 4 | - | 1050 | Ω |
| Channel ON Resistance 2 | $R_{ON2}$ | - | $V_{IL}$=0V, $V_{IH}$=15V<br>$R_L$=10kΩ<br>$V_{DD}$=15V,<br>$V_{SS}$=$V_{EE}$= 0V<br>Note 4 | - | 280 | Ω |
| Low Level Input Voltage 1 (Noise Immunity) (Functional Test) | $V_{IL1}$ | - | Verify Truth Table<br>$V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V<br>Note 5 | - | 1.5 | V |
| Low Level Input Voltage 2 (Noise Immunity) (Functional Test) | $V_{IL2}$ | - | Verify Truth Table<br>$V_{DD}$=15V,<br>$V_{SS}$=$V_{EE}$= 0V<br>Note 5 | - | 4 | V |
| High Level Input Voltage 1 (Noise Immunity) (Functional Test) | $V_{IH1}$ | - | Verify Truth Table<br>$V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V<br>Note 5 | 3.5 | - | V |

| Characteristics | Symbols | MIL-STD-883 Test Method | Test Conditions Note 1 | Limits | | Units |
|---|---|---|---|---|---|---|
| | | | | Min | Max | |
| High Level Input Voltage 2 (Noise Immunity) (Functional Test) | $V_{IH2}$ | - | Verify Truth Table<br>$V_{DD}$=15V,<br>$V_{SS}$=$V_{EE}$= 0V<br>Note 5 | 11 | - | V |
| Threshold Voltage N-Channel | $V_{THN}$ | - | INH Input and $V_{EE}$ at Ground<br>All Other Inputs:<br>$V_{IN}$=5V<br>$V_{DD}$=5V, $I_{SS}$=-10µA | -0.7 | -3 | V |
| Threshold Voltage P-Channel | $V_{THP}$ | - | INH Input at Ground<br>All Other Inputs:<br>$V_{IN}$=-5V<br>$V_{SS}$=$V_{EE}$=-5V,<br>$I_{DD}$=3.5µA | 0.7 | 3 | V |
| Input Clamp Voltage 1, to $V_{SS}$, Control Inputs | $V_{IC1}$ | - | $I_{IN}$ (Under Test)= -100µA<br>$V_{DD}$=Open, $V_{SS}$=0V<br>All Other Pins Open | - | -2 | V |
| Input Clamp Voltage 2, to $V_{DD}$, Control Inputs | $V_{IC2}$ | - | $V_{IN}$ (Under Test)=6V<br>R=30kΩ, $V_{SS}$=Open<br>All Other Pins Open<br>Note 6 | 3 | - | V |
| Input Capacitance, Control Inputs | $C_{IN}$ | 3012 | $V_{IN}$ (Not Under Test)=0V<br>$V_{DD}$= $V_{SS}$=$V_{EE}$=0V<br>f = 100 kHz to 1 MHz<br>Note 7 | - | 7.5 | pF |
| Channel Capacitance, CH | $C_{CH}$ | 3012 | $V_{IN}$ (Not Under Test)=0V<br>$V_{DD}$= $V_{SS}$=$V_{EE}$=0V<br>f = 100 kHz to 1 MHz<br>Note 7 | - | 7.5 | pF |
| Channel Capacitance, XCOM, YCOM | $C_{COM}$ | 3012 | $V_{IN}$ (Not Under Test)=0V<br>$V_{DD}$= $V_{SS}$=$V_{EE}$=0V<br>f = 100 kHz to 1 MHz<br>Note 7 | - | 30 | pF |
| Propagation Delay Low to High 1, XCOM to XCH0 | $t_{PLH1}$ | 3003 | $V_{IN}$(COM)=Pulse Generator<br>$V_{IN}$ (Remaining Inputs)=Truth Table<br>$V_{IL}$=0V, $V_{IH}$=5V,<br>$R_L$=200kΩ<br>$V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V<br>Note 8 | - | 40 | ns |

| Characteristics | Symbols | MIL-STD-883 Test Method | Test Conditions Note 1 | Limits | | Units |
|---|---|---|---|---|---|---|
| | | | | Min | Max | |
| Propagation Delay High to Low 1, XCOM to CH0 | $t_{PHL1}$ | 3003 | $V_{IN}$(COM)=Pulse Generator<br>$V_{IN}$ (Remaining Inputs)=Truth Table<br>$V_{IL}$=0V, $V_{IH}$=5V,<br>$R_L$=200kΩ<br>$V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V<br>Note 8 | - | 40 | ns |
| Propagation Delay Low to High 2, A to YCOM (Channels ON) | $t_{PLH2}$ | 3003 | $V_{IN}$(A)=Pulse Generator<br>$V_{IN}$ (Remaining Inputs)=Truth Table<br>$V_{IL}$=0V, $V_{IH}$=5V,<br>$V_{IN}$(CH)=0V and 5V<br>$R_L$=10kΩ<br>$V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V<br>Note 8 | - | 720 | ns |
| Propagation Delay High to Low 2, A to YCOM (Channels ON) | $t_{PHL2}$ | 3003 | $V_{IN}$(A)=Pulse Generator<br>$V_{IN}$ (Remaining Inputs)=Truth Table<br>$V_{IL}$=0V, $V_{IH}$=5V,<br>$V_{IN}$(CH)=0V and 5V<br>$R_L$=10kΩ<br>$V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V<br>Note 8 | - | 720 | ns |
| Output Enable Time High Impedance to High Output, INH to YCOM | $t_{PZH}$ | 3003 | $V_{IN}$(INH)=Pulse Generator<br>$V_{IN}$ (Remaining Inputs)=Truth Table<br>$V_{IL}$=0V, $V_{IH}$=5V,<br>$V_{IN}$(CH)=5V, $R_L$=10kΩ<br>$V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V<br>Note 8 | - | 400 | ns |
| Output Disable Time High Output to High Impedance, INH to YCOM | $t_{PHZ}$ | 3003 | $V_{IN}$(INH)=Pulse Generator<br>$V_{IN}$ (Remaining Inputs)=Truth Table<br>$V_{IL}$=0V, $V_{IH}$=5V,<br>$V_{IN}$(CH)=5V, $R_L$=300Ω<br>$V_{DD}$=5V, $V_{SS}$=$V_{EE}$=0V<br>Note 8 | - | 400 | ns |

2.3.2 High and Low Temperatures Electrical Measurements

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

| Characteristics | Symbols | MIL-STD-883 Test Method | Test Conditions Note 1 | Limits | | Units |
|---|---|---|---|---|---|---|
| | | | | Min | Max | |
| Threshold Voltage P-Channel | $V_{THP}$ | - | INH Input at Ground<br>All Other Inputs:<br>$V_{IN}$=-5V<br>$V_{SS}$=$V_{EE}$=-5V,<br>$I_{DD}$=3.5µA<br>$T_{amb}$=+125°C<br>$T_{amb}$=- 55°C | <br><br><br><br><br><br>0.3<br>0.7 | <br><br><br><br><br><br>3.5<br>3.5 | V |

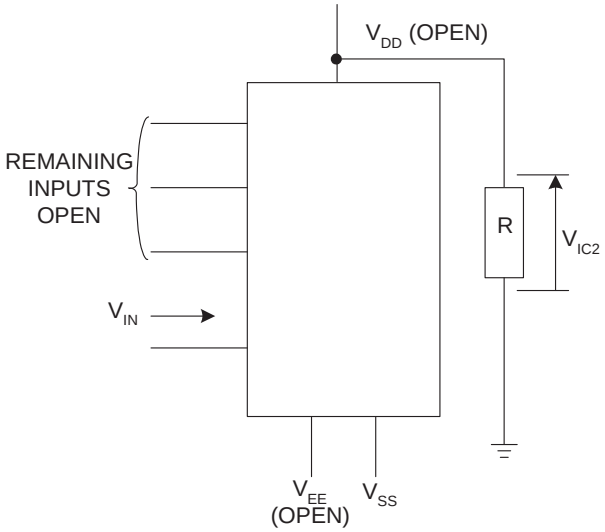
2.3.3 Notes to Electrical Measurement Tables

1. Unless otherwise specified all inputs and channels shall be tested for each characteristic, inputs not under test shall be $V_{IN}$ = $V_{SS}$ or $V_{DD}$ and channels not under test shall be open.
2. Functional tests shall be performed to verify Truth Table. The Maximum time to output comparator strobe = 300µs.
3. Quiescent Current shall be tested using the following input conditions where 1 = $V_{IH}$ and 0 =$V_{IL}$:

| TEST | INPUT CONDITIONS | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | INH | A | B | XCOM | XCH0 | XCH1 | XCH2 | XCH3 | YCOM | YCH0 | YCH1 | YCH2 | YCH3 |
| (a) | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| (b) | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| (c) | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (d) | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| (e) | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

4. Channel ON Resistance shall be tested for each channel in both directions using the following input conditions:
   (a) INH = $V_{IL}$
   (b) A, B = $V_{IL}$ or $V_{IH}$ per Truth Table to select channel under test.
   (c) $I_{IN}$ (CH or COM) = 100µA.
   (d) $R_{ON1}$ shall be tested with $V_{IN}$ (CH or COM)= 1.5V, 1.9V, 2.3V, 2.7V, 3.3V, 3.7V, 4.1V.
   $R_{ON2}$ shall be tested with $V_{IN}$ (CH or COM)= 1.5V, 1.9V, 2.3V, 2.7V, 13.3V, 13.7V, 14.1V, 14.5V.
   Channel ON Resistance shall be recorded for Channel Y0 (YCH0 to YCOM, YCOM to YCH0) at each specified $V_{IN.}$ Other channels may be tested go-no-go.

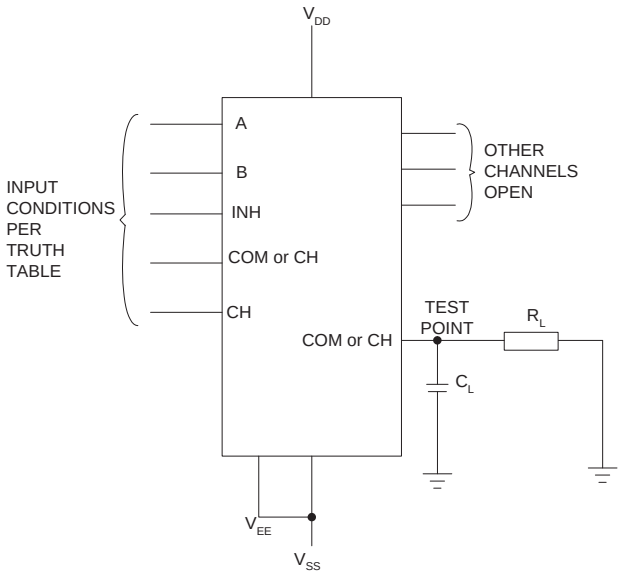
5. Performed as a functional test to verify for all OFF channels $I_{OFF}$<2µA with $V_{IN}$ (CH)=$V_{DD}$ through 1kΩ, COM output load resistance $R_L$=1kΩ.
6. Input Clamp Voltage 2 to $V_{DD}$, $V_{IC2}$, shall be tested on each input as follows:-

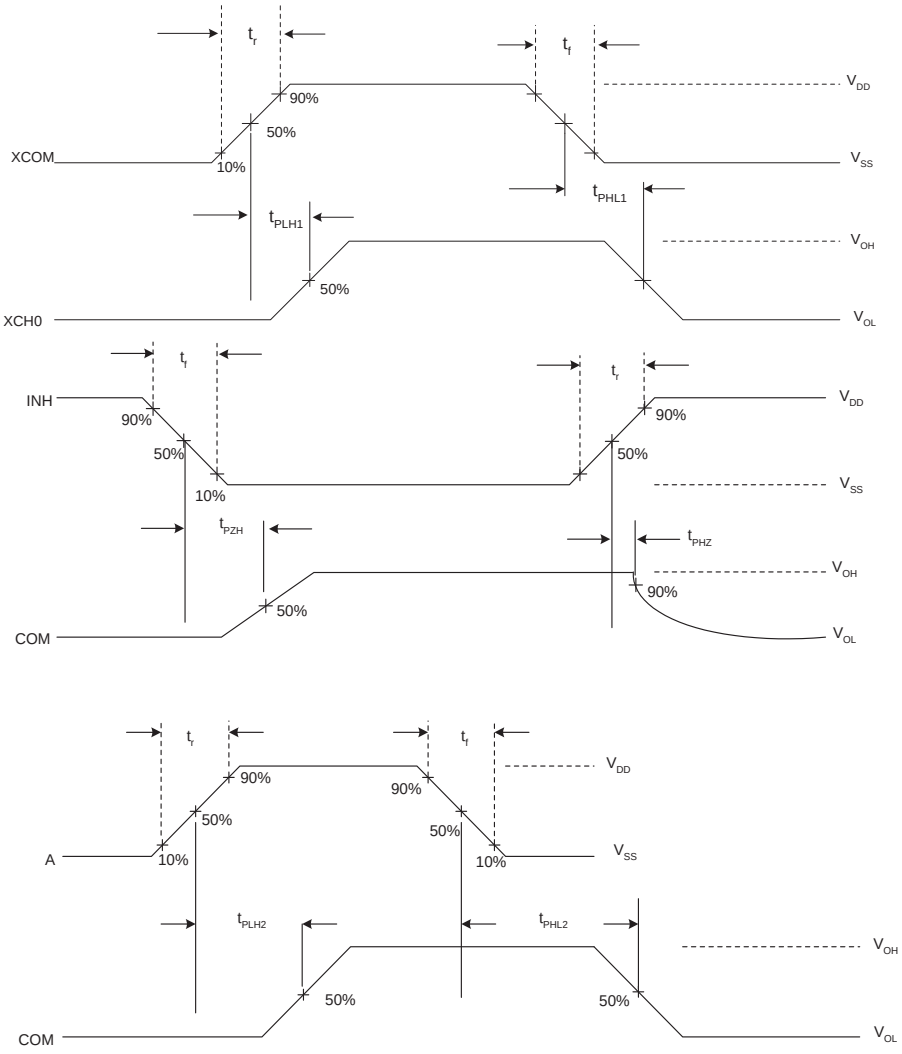



7. Guaranteed but not tested.
8. Read and record measurements shall be performed on a sample of 32 components with 0 failures permitted.
   The pulse generator shall have the following characteristics:

   $V_{GEN}$ = 0 to $V_{DD}$; f = 500kHz; tr and $t_f$ ≤15 ns (10% to 90%); duty cycle = 50%. Output load capacitance $C_L$ = 50pF ±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:






2.4 PARAMETER DRIFT VALUES

Unless otherwise specified, the measurements shall be performed at $T_{amb}$=+22 ±3°C.

The test methods and test conditions shall be as per the corresponding test defined in Room Temperature Electrical Measurements.

The drift values (Δ) shall not be exceeded for each characteristic specified. The corresponding absolute limit values for each characteristic shall not be exceeded.