



# F100122

## 9-Bit Buffer

### General Description

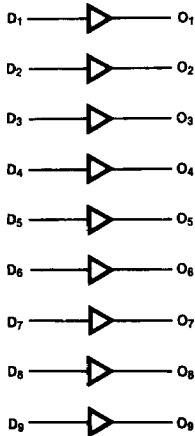
The F100122 is a monolithic 9-bit buffer. The device contains nine non-inverting buffer gates with single input and output. All inputs have 50 kΩ pull-down resistors and all outputs are buffered.

Refer to the F100322 datasheet for:

- PCC packaging
- Lower power
- Military versions
- Extended voltage specs (-4.2V to -5.7V)

**Ordering Code:** See Section 8

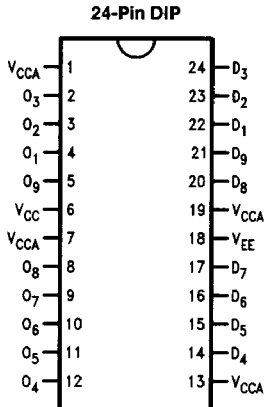
### Logic Symbol



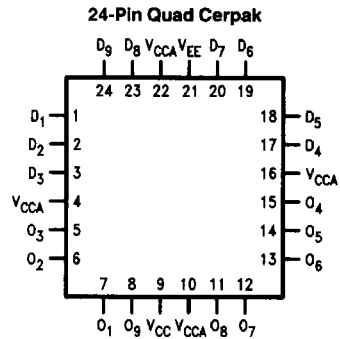
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| Pin Names                       | Description  |
|---------------------------------|--------------|
| D <sub>1</sub> , D <sub>9</sub> | Data Inputs  |
| O <sub>1</sub> , O <sub>9</sub> | Data Outputs |

### Connection Diagrams



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## Absolute Maximum Ratings

Above which the useful life may be impaired. (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Storage Temperature  $-65^{\circ}\text{C}$  to  $+150^{\circ}\text{C}$   
 Maximum Junction Temperature ( $T_J$ )  $+150^{\circ}\text{C}$

Case Temperature under Bias ( $T_C$ )  $0^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
 $V_{EE}$  Pin Potential to Ground Pin  $-7.0\text{V}$  to  $+0.5\text{V}$   
 Input Voltage (DC)  $V_{EE}$  to  $+0.5\text{V}$   
 Output Current (DC Output HIGH)  $-50\text{mA}$   
 Operating Range (Note 2)  $-5.7\text{V}$  to  $-4.2\text{V}$

## DC Electrical Characteristics

$V_{EE} = -4.5\text{V}$ ,  $V_{CC} = V_{CCA} = \text{GND}$ ,  $T_C = 0^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  (Note 3)

| Symbol    | Parameter           | Min   | Typ   | Max   | Units         | Conditions (Note 4)                                      |  |
|-----------|---------------------|-------|-------|-------|---------------|--|--|
| $V_{OH}$  | Output HIGH Voltage | -1025 | -955  | -880  | mV            | $V_{IN} = V_{IH}(\text{Max})$<br>or $V_{IL}(\text{Min})$ | Loading with<br>$50\Omega$ to $-2.0\text{V}$ |
| $V_{OL}$  | Output LOW Voltage  | -1810 | -1705 | -1620 |               |  |  |
| $V_{OHC}$ | Output HIGH Voltage | -1035 |       |       | mV            | $V_{IN} = V_{IH}(\text{Min})$<br>or $V_{IL}(\text{Max})$ | Loading with<br>$50\Omega$ to $-2.0\text{V}$ |
| $V_{OLC}$ | Output LOW Voltage  |       |       | -1610 |               |  |  |
| $V_{IH}$  | Input HIGH Voltage  | -1165 |       | -880  | mV            | Guaranteed HIGH Signal<br>for All Inputs                 |  |
| $V_{IL}$  | Input LOW Voltage   | -1810 |       | -1475 | mV            | Guaranteed LOW Signal<br>for All Inputs                  |  |
| $I_{IL}$  | Input LOW Current   | 0.50  |       |       | $\mu\text{A}$ | $V_{IN} = V_{IL}(\text{Min})$                            |  |

## DC Electrical Characteristics

$V_{EE} = -4.2\text{V}$ ,  $V_{CC} = V_{CCA} = \text{GND}$ ,  $T_C = 0^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  (Note 3)

| Symbol    | Parameter           | Min   | Typ | Max   | Units         | Conditions (Note 4)                                      |  |
|-----------|---------------------|-------|-----|-------|---------------|--|--|
| $V_{OH}$  | Output HIGH Voltage | -1020 |     | -870  | mV            | $V_{IN} = V_{IH}(\text{Max})$<br>or $V_{IL}(\text{Min})$ | Loading with<br>$50\Omega$ to $-2.0\text{V}$ |
| $V_{OL}$  | Output LOW Voltage  | -1810 |     | -1605 |               |  |  |
| $V_{OHC}$ | Output HIGH Voltage | -1030 |     |       | mV            | $V_{IN} = V_{IH}(\text{Min})$<br>or $V_{IL}(\text{Max})$ | Loading with<br>$50\Omega$ to $-2.0\text{V}$ |
| $V_{OLC}$ | Output LOW Voltage  |       |     | -1595 |               |  |  |
| $V_{IH}$  | Input HIGH Voltage  | -1150 |     | -870  | mV            | Guaranteed HIGH Signal<br>for All Inputs                 |  |
| $V_{IL}$  | Input LOW Voltage   | -1810 |     | -1475 | mV            | Guaranteed LOW Signal<br>for All Inputs                  |  |
| $I_{IL}$  | Input LOW Current   | 0.50  |     |       | $\mu\text{A}$ | $V_{IN} = V_{IL}(\text{Min})$                            |  |

## DC Electrical Characteristics

$V_{EE} = -4.8\text{V}$ ,  $V_{CC} = V_{CCA} = \text{GND}$ ,  $T_C = 0^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  (Note 3)

| Symbol    | Parameter           | Min   | Typ | Max   | Units         | Conditions (Note 4)                                      |  |
|-----------|---------------------|-------|-----|-------|---------------|--|--|
| $V_{OH}$  | Output HIGH Voltage | -1035 |     | -880  | mV            | $V_{IN} = V_{IH}(\text{Max})$<br>or $V_{IL}(\text{Min})$ | Loading with<br>$50\Omega$ to $-2.0\text{V}$ |
| $V_{OL}$  | Output LOW Voltage  | -1830 |     | -1620 |               |  |  |
| $V_{OHC}$ | Output HIGH Voltage | -1045 |     |       | mV            | $V_{IN} = V_{IH}(\text{Min})$<br>or $V_{IL}(\text{Max})$ | Loading with<br>$50\Omega$ to $-2.0\text{V}$ |
| $V_{OLC}$ | Output LOW Voltage  |       |     | -1610 |               |  |  |
| $V_{IH}$  | Input HIGH Voltage  | -1165 |     | -880  | mV            | Guaranteed HIGH Signal<br>for All Inputs                 |  |
| $V_{IL}$  | Input LOW Voltage   | -1830 |     | -1490 | mV            | Guaranteed LOW Signal<br>for All Inputs                  |  |
| $I_{IL}$  | Input LOW Current   | 0.50  |     |       | $\mu\text{A}$ | $V_{IN} = V_{IL}(\text{Min})$                            |  |

**Note 1:** Absolute maximum ratings are those values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

**Note 2:** Parametric values specified at  $-4.2\text{V}$  to  $-4.8\text{V}$ .

**Note 3:** The specified limits represent the "worst case" value for the parameter. Since these "worst case" values normally occur at the temperature extremes, additional noise immunity and guard banding can be achieved by decreasing the allowable system operating ranges.

**Note 4:** Conditions for testing shown in the tables are chosen to guarantee operation under "worst case" conditions.

### DC Electrical Characteristics

$V_{EE} = -4.2V$  to  $-4.8V$  unless otherwise specified,  $V_{CC} = V_{CCA} = GND$ ,  $T_C = 0^{\circ}C$  to  $+85^{\circ}C$

| Symbol   | Parameter            | Min | Typ | Max | Units   | Conditions              |
|----------|----------------------|-----|-----|-----|---------|-------------------------|
| $I_{IH}$ | Input HIGH Current   |     |     | 350 | $\mu A$ | $V_{IN} = V_{IH} (Max)$ |
| $I_{EE}$ | Power Supply Current | -96 | -70 | -46 | mA      | Inputs Open             |

### Ceramic Dual-In-Line Package AC Electrical Characteristics

$V_{EE} = -2.4V$  to  $-4.8V$ ,  $V_{CC} = V_{CCA} = GND$

| Symbol                 | Parameter                                 | $T_C = 0^{\circ}C$ |      | $T_C = +25^{\circ}C$ |      | $T_C = +85^{\circ}C$ |      | Units | Conditions      |
|------------------------|---|--------------------|------|----------------------|------|----------------------|------|-------|-----------------|
|                        |   | Min                | Max  | Min                  | Max  | Min                  | Max  |       |                 |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>Data to Output       | 0.45               | 1.60 | 0.45                 | 1.45 | 0.45                 | 1.60 | ns    | Figures 1 and 2 |
| $t_{TLH}$<br>$t_{THL}$ | Transition Time<br>20% to 80%, 80% to 20% | 0.45               | 1.50 | 0.45                 | 1.40 | 0.45                 | 1.40 | ns    |                 |

### Cerpak AC Electrical Characteristics

$V_{EE} = -4.2V$  to  $-4.8V$ ,  $V_{CC} = V_{CCA} = GND$

| Symbol                 | Parameter                                 | $T_C = 0^{\circ}C$ |      | $T_C = +25^{\circ}C$ |      | $T_C = +85^{\circ}C$ |      | Units | Conditions      |
|------------------------|---|--------------------|------|----------------------|------|----------------------|------|-------|-----------------|
|                        |   | Min                | Max  | Min                  | Max  | Min                  | Max  |       |                 |
| $t_{PLH}$<br>$t_{PHL}$ | Propagation Delay<br>Data to Output       | 0.45               | 1.40 | 0.45                 | 1.25 | 0.45                 | 1.40 | ns    | Figures 1 and 2 |
| $t_{TLH}$<br>$t_{THL}$ | Transition Time<br>20% to 80%, 80% to 20% | 0.45               | 1.40 | 0.45                 | 1.30 | 0.45                 | 1.30 | ns    |                 |

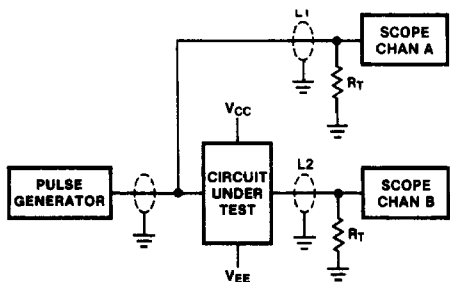


FIGURE 1. AC Test Circuit

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**Notes:**

- $V_{CC}, V_{CCA} = +2V, V_{EE} = -2.5V$
- L1 and L2 = equal length 50 $\Omega$  impedance lines
- $R_T = 50\Omega$  terminator internal to scope
- Decoupling 0.1  $\mu F$  from GND to  $V_{CC}$  and  $V_{EE}$
- All unused outputs are loaded with 50 $\Omega$  to GND
- $C_L$  = Fixture and stray capacitance  $\leq 3$  pF

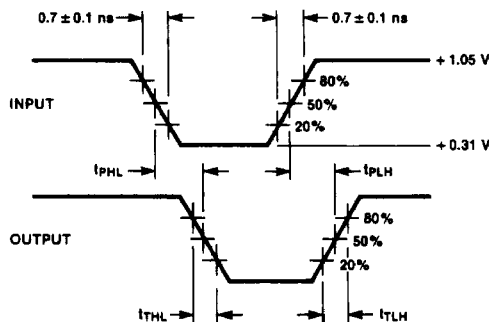


FIGURE 2. Propagation Delay and Transition Times

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