



## **MICROCIRCUIT DATA SHEET**

**CN54F240-X REV 0A0**

Original Creation Date: 06/25/97

Last Update Date: 07/08/97

Last Major Revision Date: 06/25/97

### **OCTAL BUFFERS/LINE DRIVERS WITH TRI-STATE OUTPUTS**

#### **General Description**

The F240 is an octal buffer and line driver designed to be employed as a memory and address driver, clock driver and bus oriented transmitter/receiver which provides improved PC and board density.

#### **Industry Part Number**

54F240

#### **NS Part Numbers**

54F240DC

#### **Prime Die**

M240

#### **Processing**

#### **Quality Conformance Inspection**

#### **Subgrp Description Temp ( °C)**

|    |                     |     |
|----|---------------------|-----|
| 1  | Static tests at     | +25 |
| 2  | Static tests at     | +70 |
| 3  | Static tests at     | 0   |
| 4  | Dynamic tests at    | +25 |
| 5  | Dynamic tests at    | +70 |
| 6  | Dynamic tests at    | 0   |
| 7  | Functional tests at | +25 |
| 8A | Functional tests at | +70 |
| 8B | Functional tests at | 0   |
| 9  | Switching tests at  | +25 |
| 10 | Switching tests at  | +70 |
| 11 | Switching tests at  | 0   |

## **Features**

- Guaranteed 4000V minimum ESD protection
- TRI-STATE outputs drive bus lines or buffer memory address registers
- Outputs sink 64 mA (48 mA mil)
- 12 mA source current
- Input clamp diodes limit high-speed termination effects

**(Absolute Maximum Ratings)**

(Note 1)

|                                                       |                         |
|-------------------------------------------------------|-------------------------|
| Storage Temperature                                   | -65 C to +150 C         |
| Ambient Temperature under Bias                        | -55 C to +125 C         |
| Junction Temperature under Bias                       | -55 C to +175 C         |
| Vcc Pin Potential to Ground Pin                       | -0.5V to +7.0V          |
| Input Voltage<br>(Note 2)                             | -0.5V to +7.0V          |
| Input Current<br>(Note 2)                             | -30mA to +5.0mA         |
| Voltage Applied to Output in HIGH State (with Vcc=0V) |                         |
| Standard Output                                       | -0.5V to Vcc            |
| TRI-STATE Output                                      | -0.5V to +5.5V          |
| Current Applied to Output in LOW State (Max)          | twice the rated Iol(mA) |
| ESD Last Passing Voltage (Min)                        | 4000V                   |

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: Either voltage limit or current limit is sufficient to protect inputs.

**Recommended Operating Conditions**

|                              |                |
|------------------------------|----------------|
| Free Air Ambient Temperature |                |
| Commercial                   | 0 C to +70 C   |
| Supply Voltage               |                |
| Commercial                   | +4.5V to +5.5V |

## Electrical Characteristics

### DC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)

DC: VCC 4.5V to 5.5V, Temp range: 0°C to +70°C

| SYMBOL | PARAMETER                         | CONDITIONS                                        | NOTES | PIN-NAME | MIN  | MAX  | UNIT | SUB-GROUPS |
|--------|-----------------------------------|---------------------------------------------------|-------|----------|------|------|------|------------|
| VIH    | Input HIGH Voltage                | Recognized as a HIGH Signal                       | 1     | INPUTS   | 2.0  |      | V    | 1, 2, 3    |
| VIL    | Input LOW Voltage                 | Recognized as a LOW Signal                        | 1     | INPUTS   |      | 0.8  | V    | 1, 2, 3    |
| VCD    | Input Clamp Diode Voltage         | VCC=4.5V, IIN=-18mA                               | 2, 3  | INPUTS   |      | -1.2 | V    | 1, 2, 3    |
| VOH    | Output HIGH Voltage               | VCC=4.5V, IOH=-3.0mA                              | 2, 3  | OUTPUTS  | 2.5  |      | V    | 1, 2, 3    |
|        |                                   | VCC=4.75V, IOH=-3.0mA                             | 2, 3  | OUTPUTS  | 2.7  |      | V    | 1, 2, 3    |
|        |                                   | VCC=4.5V, IOH=-15.0mA                             | 2, 3  | OUTPUTS  | 2.0  |      | V    | 1, 2, 3    |
| VOL    | Output LOW Voltage                | VCC=4.5V, IOL=64mA                                | 2, 3  | OUTPUTS  |      | 0.5  | V    | 1, 2, 3    |
| IIH    | Input HIGH Current                | VCC=5.5V, VIN=2.7V                                | 2, 3  | INPUTS   |      | 5.0  | uA   | 1, 2, 3    |
| IBVI   | Input HIGH Current Breakdown Test | VCC=5.5V, VIN=7.0V                                | 2, 3  | INPUTS   |      | 7.0  | uA   | 1, 2, 3    |
| ICEX   | Output HIGH Leakage Current       | VCC=5.5V, VOUT = VCC                              | 2, 3  | OUTPUTS  |      | 100  | uA   | 1, 2, 3    |
| VID    | Input Leakage Test                | VCC = 0.0V, IID = 1.9uA, All other pins grounded  | 2, 3  | INPUTS   | 4.75 |      | V    | 1, 2, 3    |
| IOD    | Output Leakage Circuit Current    | VCC = 0.0V, VIOD = 150mV, All other pins grounded | 2, 3  | OUTPUTS  |      | 4.75 | uA   | 1, 2, 3    |
| IIL    | Input LOW Current                 | VCC=5.5V, VIN=0.5V (0E1, 0E2, 0E2, Dn)            | 2, 3  | INPUTS   |      | -0.6 | mA   | 1, 2, 3    |
| IOZH   | Output Leakage Current            | VCC=5.5V, VOUT=2.7V                               | 2, 3  | OUTPUTS  |      | 50   | uA   | 1, 2, 3    |
| IOZL   | Output Leakage Current            | VCC=5.5V, VOUT=0.5V                               | 2, 3  | OUTPUTS  |      | -50  | uA   | 1, 2, 3    |
| IOS    | Output Short Circuit Current      | VCC=5.5V, VOUT = 0V                               | 2, 3  | OUTPUTS  | -100 | -150 | mA   | 1, 2, 3    |
| IZZ    | Bus Drainage Test                 | VCC=0.0V, VOUT=5.25V                              | 2, 3  | OUTPUTS  |      | 500  | uA   | 1, 2, 3    |
| ICCH   | Power Supply Current              | VCC=5.5V, VO = HIGH                               | 2, 3  | VCC      |      | 29   | mA   | 1, 2, 3    |
| ICCL   | Power Supply Current              | VCC=5.5V, VO = LOW                                | 2, 3  | VCC      |      | 75   | mA   | 1, 2, 3    |
| ICCZ   | Power Supply Current              | VCC=5.5V, VO = HIGH Z                             | 2, 3  | VCC      |      | 63   | mA   | 1, 2, 3    |

## Electrical Characteristics

### AC PARAMETERS

(The following conditions apply to all the following parameters, unless otherwise specified.)

AC: CL=50pf, RL=500 OHMS, TR=2.5ns, TF=2.5ns SEE AC FIGS. Temp Range: 0C to +70C

| SYMBOL  | PARAMETER              | CONDITIONS                                    | NOTES | PIN-NAME             | MIN | MAX  | UNIT | SUB-GROUPS |
|---------|------------------------|-----------------------------------------------|-------|----------------------|-----|------|------|------------|
| tpLH(1) | Propagation Delay      | VCC=+5.0V @ +25C,<br>VCC=4.5V & 5.5V @ 0/+70C | 2, 3  | In to<br>0n/0n       | 3.0 | 7.0  | ns   | 9          |
|         |                        |                                               | 2, 3  | In to<br>0n/0n       | 3.0 | 8.0  | ns   | 10, 11     |
| tpHL(1) | Propagation Delay      | VCC=+5.0V @ +25C,<br>VCC=4.5V & 5.5V @ 0/+70C | 2, 3  | In to<br>0n/0n       | 2.0 | 4.7  | ns   | 9          |
|         |                        |                                               | 2, 3  | In to<br>0n/0n       | 2.0 | 5.7  | ns   | 10, 11     |
| tpZH(1) | Output Enable<br>Time  | VCC=+5.0V @ +25C,<br>VCC=4.5V & 5.5V @ 0/+70C | 2, 3  | 0E/0E<br>to<br>0n/0n | 2.0 | 4.7  | ns   | 9          |
|         |                        |                                               | 2, 3  | 0E/0E<br>to<br>0n/0n | 2.0 | 5.7  | ns   | 10, 11     |
| tpZL    | Output Enable<br>Time  | VCC=+5.0V @ +25C,<br>VCC=4.5V & 5.5V @ 0/+70C | 2, 3  | 0E/0E<br>to<br>0n/0n | 4.0 | 9.0  | ns   | 9          |
|         |                        |                                               | 2, 3  | 0E/0E<br>to<br>0n/0n | 4.0 | 10.0 | ns   | 10, 11     |
| tpHZ    | Disable Enable<br>Time | VCC=+5.0V @ +25C,<br>VCC=4.5V & 5.5V @ 0/+70C | 2, 3  | 0E/0E<br>to<br>0n/0n | 2.0 | 5.3  | nS   | 9          |
|         |                        |                                               | 2, 3  | 0E/0E<br>to<br>0n/0n | 2.0 | 6.3  | nS   | 10, 11     |

Note 1: Guaranteed by applying specific input condition and testing VOL & VOH.

Note 2: Screen tested 100% on each device at +75C temperature only, subgroups A2 & A10.

Note 3: Sample tested (Method 5005, Table 1) on each MFG. lot at +75C temperature only, subgroups A2 & A10.

## Revision History

| Rev | ECN #    | Rel Date | Originator    | Changes                                                                                                                                                                          |
|-----|----------|----------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0A0 | M0001724 | 07/08/97 | Linda Collins | Legal issue with Fairchild, due to the Fairchild/National split, is forcing the change from CN74F which is 'Fairchilds' product code to CN54F which is 'Nationals' product code. |