

# 54FCT244

*54FCT244 Octal Buffer/Line Driver with -TRISTATE Outputs*



Literature Number: SNOS430

## 54FCT244

### Octal Buffer/Line Driver with TRI-STATE® Outputs

#### General Description

The 54FCT244 is an octal buffer and line driver with TRI-STATE outputs designed to be employed as a memory and address driver, clock driver, or bus-oriented transmitter/receiver.

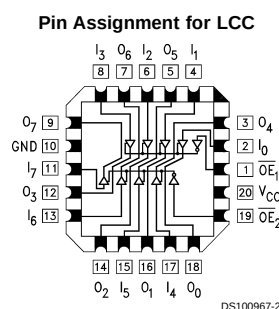
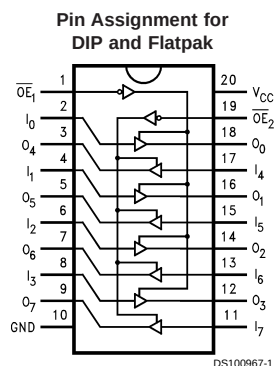
#### Features

- Non-inverting buffers
- Output sink capability of 48 mA, source capability of 12 mA
- TRI-STATE outputs drive lines or buffer memory address registers
- TTL input and output level compatible
- CMOS power consumption
- Standard Microcircuit Drawing (SMD) 5962-8763001

#### Ordering Code

| Military     | Package Number | Package Description                           |
|--------------|----------------|-----------------------------------------------|
| 54FCT244DMQB | J20A           | 20-Lead Ceramic Dual-In-Line                  |
| 54FCT244FMQB | W20A           | 20-Lead Cerpack                               |
| 54FCT244LMQB | E20A           | 20-Lead Ceramic Leadless Chip Carrier, Type C |

#### Connection Diagrams



| Pin Names                          | Description                      |
|------------------------------------|----------------------------------|
| $\overline{OE}_1, \overline{OE}_2$ | Output Enable Input (Active Low) |
| $I_0-I_7$                          | Inputs                           |
| $O_0-O_7$                          | Outputs                          |

| $\overline{OE}_1$ | $I_{0-3}$ | $O_{0-3}$ | $\overline{OE}_2$ | $I_{4-7}$ | $O_{4-7}$ |
|-------------------|-----------|-----------|-------------------|-----------|-----------|
| H                 | X         | Z         | H                 | X         | Z         |
| L                 | H         | H         | L                 | H         | H         |
| L                 | L         | L         | L                 | L         | L         |

H = HIGH Voltage Level  
L = LOW Voltage Level  
X = Immaterial  
Z = High Impedance

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**Absolute Maximum Ratings** (Note 1)

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

|                                             |                          |
|---------------------------------------------|--------------------------|
| Storage Temperature                         | –65°C to +150°C          |
| Ambient Temperature under Bias              | –55°C to +125°C          |
| Junction Temperature under Bias             |                          |
| Ceramic                                     | –55°C to +175°C          |
| V <sub>CC</sub> Pin Potential to Ground Pin | –0.5V to +7.0V           |
| Input Voltage (Note 2)                      | –0.5V to +7.0V           |
| Input Current (Note 2)                      | –30 mA to +5.0 mA        |
| Voltage Applied to Any Output               |                          |
| in the Disabled or                          |                          |
| Power-Off State                             | –0.5V to 5.5V            |
| in the HIGH State                           | –0.5V to V <sub>CC</sub> |

|                           |                                      |
|---------------------------|--------------------------------------|
| Current Applied to Output |                                      |
| in LOW State (Max)        | twice the rated I <sub>OL</sub> (mA) |
| DC Latchup Source Current | –500 mA                              |

**Recommended Operating Conditions**

|                              |                         |
|------------------------------|-------------------------|
| Free Air Ambient Temperature |                         |
| Military                     | –55°C to +125°C         |
| Supply Voltage               |                         |
| Military                     | +4.5V to +5.5V          |
| Minimum Input Edge Rate      | ( $\Delta V/\Delta t$ ) |
| Data Input                   | 50 mV/ns                |
| Enable Input                 | 20 mV/ns                |

**DC Electrical Characteristics for 'FCT Family Devices**

| Symbol           | Parameter                             | FCT244 |          | Units      | V <sub>CC</sub> | Conditions                                                                                                                                                                                    |
|------------------|---------------------------------------|--------|----------|------------|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                  |                                       | Min    | Max      |            |                 |                                                                                                                                                                                               |
| V <sub>IH</sub>  | Input HIGH Voltage                    | 2.0    |          | V          |                 | Recognized HIGH Signal                                                                                                                                                                        |
| V <sub>IL</sub>  | Input LOW Voltage                     |        | 0.8      | V          |                 | Recognized LOW Signal                                                                                                                                                                         |
| V <sub>CD</sub>  | Input Clamp Diode Voltage             |        | –1.2     | V          | Min             | I <sub>IN</sub> = –18 mA                                                                                                                                                                      |
| V <sub>OH</sub>  | Output HIGH Voltage                   | 54FCT  | 4.3      | V          | Min             | I <sub>OH</sub> = –300 $\mu$ A                                                                                                                                                                |
|                  |                                       | 54FCT  | 2.4      |            |                 | I <sub>OH</sub> = –12 mA                                                                                                                                                                      |
| V <sub>OL</sub>  | Output LOW Voltage                    | 54FCT  | 0.2      | V          | Min             | I <sub>OL</sub> = 300 $\mu$ A                                                                                                                                                                 |
|                  |                                       | 54FCT  | 0.55     |            |                 | I <sub>OL</sub> = 48 mA                                                                                                                                                                       |
| I <sub>IH</sub>  | Input HIGH Current                    |        | 5        | $\mu$ A    | Max             | V <sub>IN</sub> = V <sub>CC</sub>                                                                                                                                                             |
| I <sub>IL</sub>  | Input LOW Current                     |        | –5       | $\mu$ A    | Max             | V <sub>IN</sub> = 0.0V                                                                                                                                                                        |
| I <sub>OZ</sub>  | Maximum TRI-STATE Current HIGH or LOW |        | $\pm 10$ | $\mu$ A    | Max             | V <sub>IN</sub> = 0.0V or V <sub>IN</sub> = V <sub>CC</sub>                                                                                                                                   |
| I <sub>OS</sub>  | Output Short-Circuit Current          |        | –60      | mA         | Max             | V <sub>OUT</sub> = 0.0V                                                                                                                                                                       |
| I <sub>CCQ</sub> | Quiescent Power Supply Current        |        | 1.5      | mA         | Max             | V <sub>IN</sub> < 0.2V or V <sub>IN</sub> 5.3V, V <sub>CC</sub> = 5.5V                                                                                                                        |
| $\Delta I_{CC}$  | Quiescent Power Supply Current        |        | 2.0      | mA         | Max             | V <sub>I</sub> = 3.4V, V <sub>CC</sub> = 5.5V                                                                                                                                                 |
| I <sub>CCD</sub> | Dynamic I <sub>CC</sub>               |        | 0.4      | mA/<br>MHz | Max             | Outputs Open, V <sub>CC</sub> = 5.5V, V <sub>IN</sub> 5.3V or V <sub>IN</sub> < 0.2V, One Bit Toggling, 50% Duty Cycle, $\overline{OE}$ = GND, LE = V <sub>CC</sub>                           |
| I <sub>CCT</sub> | Total Power Supply Current            |        | 6.0      | mA         | Max             | Outputs Open, f <sub>CP</sub> = 10 MHz, V <sub>CC</sub> = 5.5V, V <sub>IN</sub> 5.3V or V <sub>IN</sub> < 0.2V, One Bit Toggling, 50% Duty Cycle, $\overline{OE}$ = GND, LE = V <sub>CC</sub> |

**Note 1:** Absolute maximum ratings are 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.

**Note 3:** All outputs loaded; thresholds on input associated with output under test.

**Note 4:** Maximum test duration 2.0 ms, one output loaded at a time.

### AC Electrical Characteristics for 'FCT Family Devices

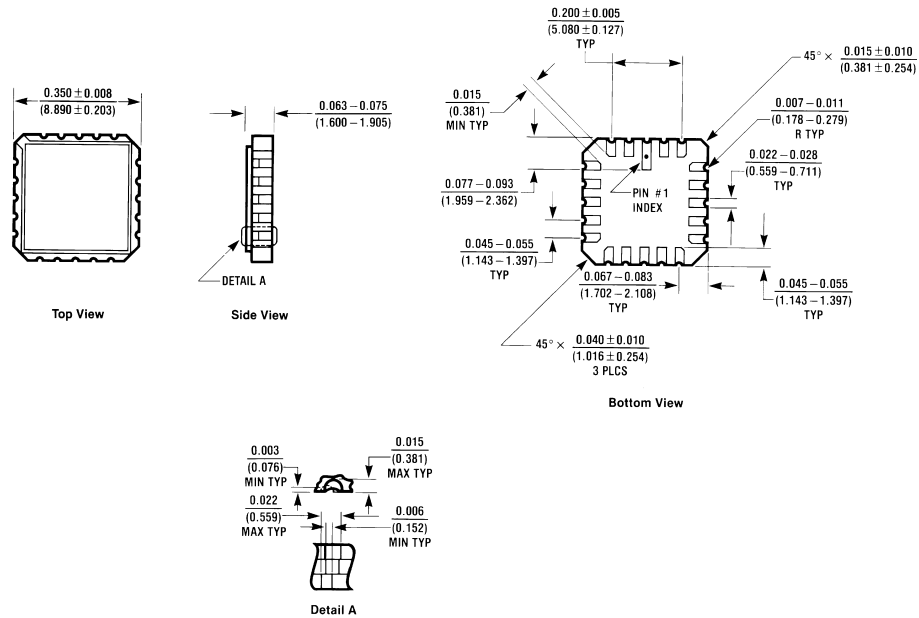
| Symbol    | Parameter         | 54FCT                                                                                                                |      | Units | Fig. No. |
|-----------|-------------------|----------------------------------------------------------------------------------------------------------------------|------|-------|----------|
|           |                   | $T_A = -55^{\circ}\text{C to } +125^{\circ}\text{C}$<br>$V_{CC} = 4.5\text{V} - 5.5\text{V}$<br>$C_L = 50\text{ pF}$ |      |       |          |
|           |                   | Min                                                                                                                  | Max  |       |          |
| $t_{PLH}$ | Propagation Delay | 1.5                                                                                                                  | 7.5  | ns    |          |
| $t_{PHL}$ | Data to Outputs   | 1.5                                                                                                                  | 7.5  |       |          |
| $t_{PZH}$ | Output Enable     | 1.5                                                                                                                  | 10.5 | ns    |          |
| $t_{PZL}$ | Time              | 1.5                                                                                                                  | 10.5 |       |          |
| $t_{PHZ}$ | Output Disable    | 1.5                                                                                                                  | 8.0  | ns    |          |
| $t_{PLZ}$ | Time              | 1.5                                                                                                                  | 8.0  |       |          |

### Capacitance

| Symbol             | Parameter          | Max  | Units | Conditions<br>$T_A = 25^{\circ}\text{C}$ |
|--------------------|--------------------|------|-------|------------------------------------------|
| $C_{IN}$           | Input Capacitance  | 10.0 | pF    | $V_{CC} = 0\text{V}$                     |
| $C_{OUT}$ (Note 5) | Output Capacitance | 12.0 | pF    | $V_{CC} = 5.0\text{V}$                   |

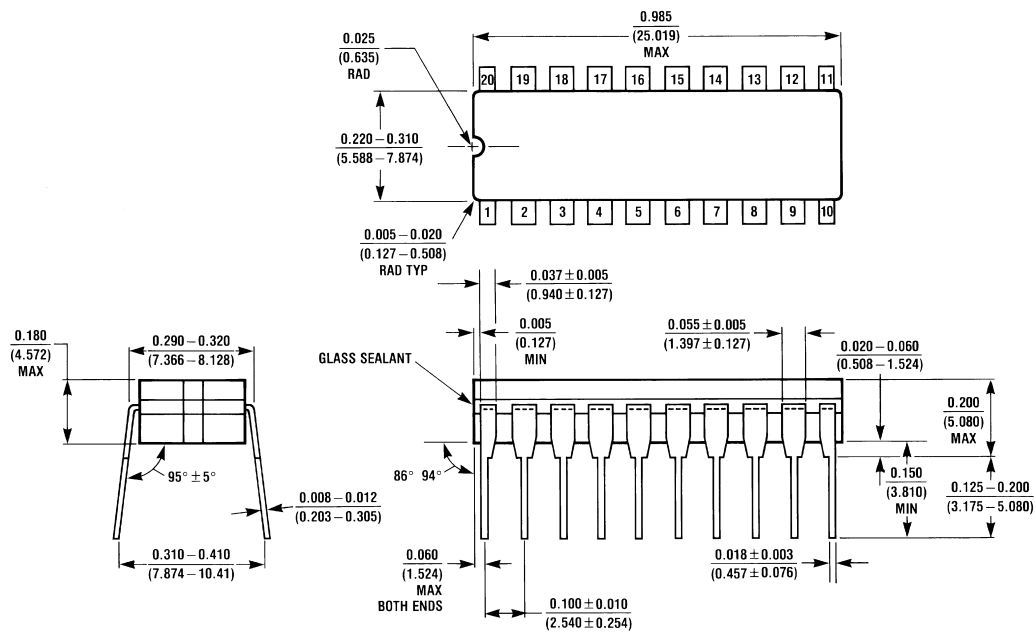
**Note 5:**  $C_{OUT}$  is measured at frequency  $f = 1\text{ MHz}$ , per MIL-STD-883B, Method 3012.

# Physical Dimensions inches (millimeters) unless otherwise noted



E20A (REV D)

**20-Terminal Ceramic Chip Carrier (L)**  
**NS Package Number E20A**

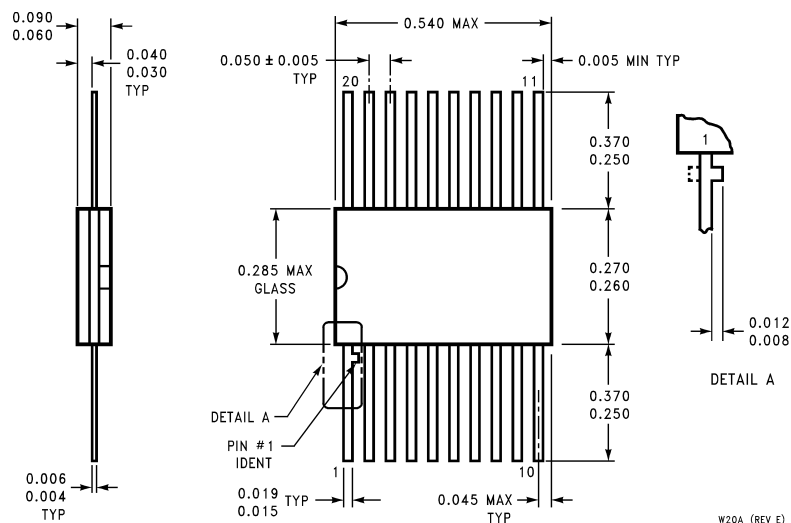


J20A (REV M)

**20-Lead Ceramic Dual-In-Line (D)**  
**NS Package Number J20A**

# Physical Dimensions

inches (millimeters) unless otherwise noted (Continued)



**20-Lead Ceramic Flatpak (F)  
NS Package Number W20A**

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