National Semiconductor

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# 54FCT244
# Octal Buffer/Line Driver with TRI-STATE® Outputs

## General Description

The 'FCT244 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

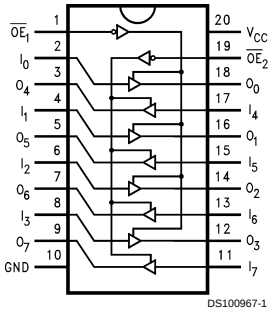
- Non-inverting buffers
- Output sink capability of 48 mA, source capability of 12 mA
- TRI-STATE outputs drive lines or buffer memory address registers
- TTL input and output level compatible
- CMOS power consumption
- Standard Microcircuit Drawing (SMD) 5962-8763001

## 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 Assignment for DIP and Flatpak**

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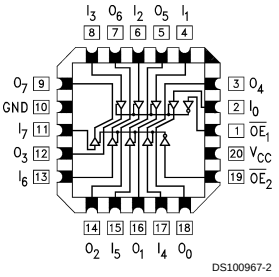
**Pin Assignment for LCC**

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| 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 |
| $V_{CC}$ 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 $V_{CC}$ |
| Current Applied to Output | |
| in LOW State (Max) | twice the rated $I_{OL}$ (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 | (ΔV/Δt) |
| Data Input | 50 mV/ns |
| Enable Input | 20 mV/ns |

## DC Electrical Characteristics for 'FCT Family Devices

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

**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

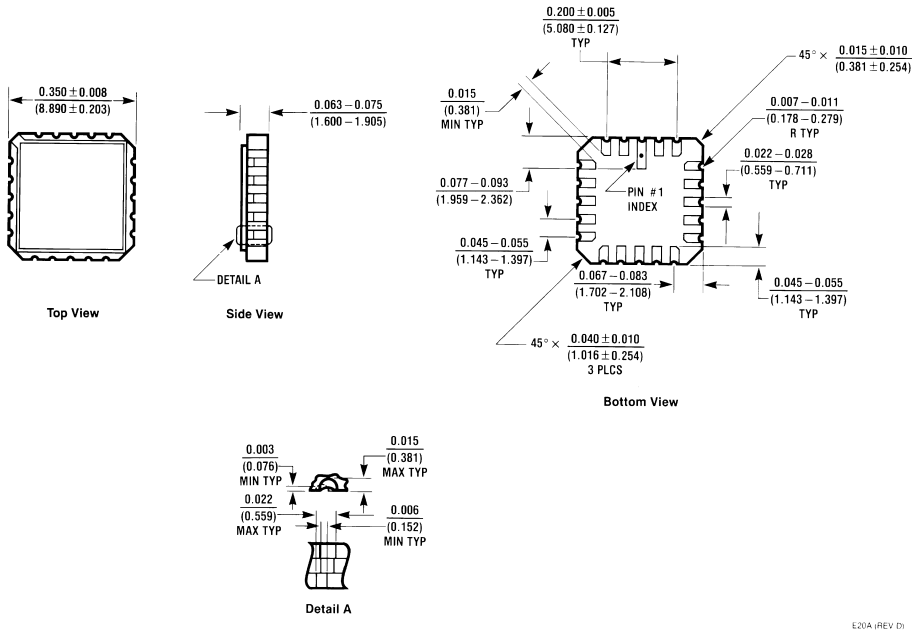
| Symbol | Parameter | 54FCT | | Units | Fig. No. |
|---|---|---|---|---|---|
| | | $T_A$ = −55°C to +125°C<br>$V_{CC}$ = 4.5V–5.5V<br>$C_L$ = 50 pF | | | |
| | | Min | Max | | |
| $t_{PLH}$ | Propagation Delay | 1.5 | 7.5 | ns | |
| $t_{PHL}$ | Data to Outputs | 1.5 | 7.5 | | |
| $t_{PZH}$ | Output 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

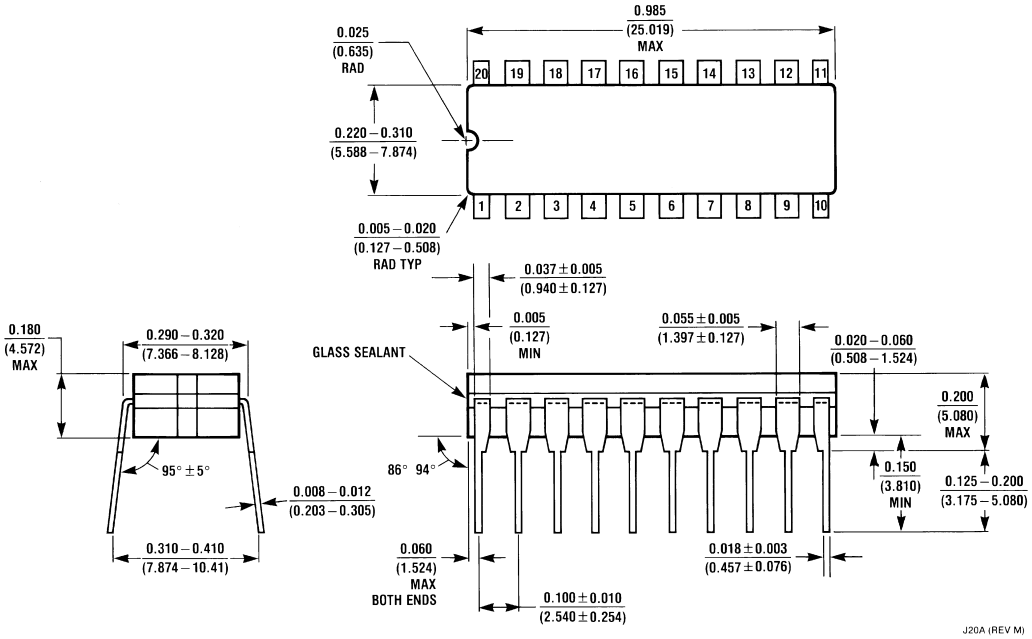
| Symbol | Parameter | Max | Units | Conditions $T_A$ = 25°C |
|---|---|---|---|---|
| $C_{IN}$ | Input Capacitance | 10.0 | pF | $V_{CC}$ = 0V |
| $C_{OUT}$ (Note 5) | Output Capacitance | 12.0 | pF | $V_{CC}$ = 5.0V |

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

## Physical Dimensions inches (millimeters) unless otherwise noted

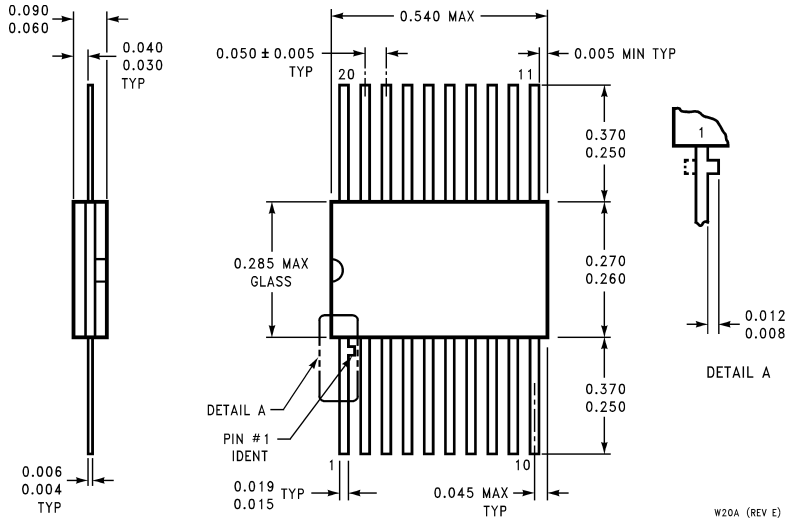



**20-Terminal Ceramic Chip Carrier (L)**
**NS Package Number E20A**




**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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