# 54ABT241

***54ABT241 Octal Buffer/Line Driver with TRI-STATE Outputs***

Literature Number: SNOS044A

National Semiconductor

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# 54ABT241
# Octal Buffer/Line Driver with TRI-STATE® Outputs

## General Description

The ABT241 is an octal buffer and line driver with 3-STATE outputs designed to be employed as a memory and address driver, clock driver, or bus-oriented transmitter/receiver.

## Features

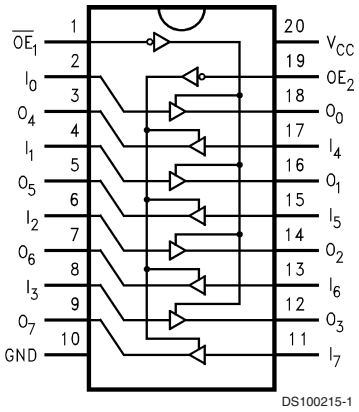
- Non-inverting buffers
- Output sink capability of 48 mA, source capability of 24 mA
- Guaranteed latchup protection
- High impedance glitch free bus loading during entire power up and power down cycle
- Nondestructive hot insertion capability
- Standard Microcircuit Drawing (SMD) 5962-9322701

## Ordering Code

| Military | Package Number | Package Description |
|---|---|---|
| 54ABT241J-QML | J20A | 20-Lead Ceramic Dual-In-Line |
| 54ABT241W-QML | W20A | 20-Lead Cerpack |
| 54ABT241E-QML | E20A | 20-Lead Ceramic Leadless Chip Carrier, Type C |

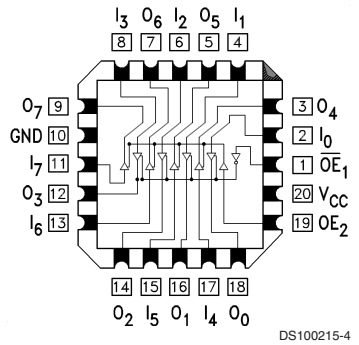
## Connection Diagram

**Pin Assignment for DIP and Cerpack**




DS100215-1

**Pin Assignment for LCC**




DS100215-4

| Pin Names | Description |
|---|---|
| $\overline{OE}_1$ | Output Enable Input (Active Low) |
| $OE_2$ | Output Enable Input (Active High) |
| $I_0$–$I_7$ | 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 | L | X | Z |
| L | H | H | H | H | H |
| L | L | L | H | L | L |

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

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## 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 | |
| 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 | |
| (Over Comm Operating Range) | −500 mA |
| Over Voltage Latchup (I/O) | 10V |

## 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 |

**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.

## DC Electrical Characteristics

| Symbol | Parameter | | Min | Typ | 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 | 54ABT | 2.5 | | | V | Min | $I_{OH}$ = −3 mA |
| | | 54ABT | 2.0 | | | V | Min | $I_{OH}$ = −24 mA |
| $V_{OL}$ | Output LOW Voltage | 54ABT | | | 0.55 | V | Min | $I_{OL}$ = 48 mA |
| $I_{IH}$ | Input HIGH Current | | | | 5 | µA | Max | $V_{IN}$ = 2.7V (Note 4) |
| | | | | | 5 | | | $V_{IN}$ = $V_{CC}$ |
| $I_{BVI}$ | Input HIGH Current Breakdown Test | | | | 7 | µA | Max | $V_{IN}$ = 7.0V |
| $I_{IL}$ | Input LOW Current | | | | −5 | µA | Max | $V_{IN}$ = 0.5V (Note 4) |
| | | | | | −5 | | | $V_{IN}$ = 0.0V |
| $V_{ID}$ | Input Leakage Test | | 4.75 | | | V | 0.0 | $I_{ID}$ = 1.9 µA<br>All Other Pins Grounded |
| $I_{OZH}$ | Output Leakage Current | | | | 50 | µA | 0 − 5.5V | $V_{OUT}$ = 2.7V; $\overline{OE}_n$ = 2.0V |
| $I_{OZL}$ | Output Leakage Current | | | | −50 | µA | 0 − 5.5V | $V_{OUT}$ = 0.5V; $\overline{OE}_n$ = 2.0V |
| $I_{OS}$ | Output Short-Circuit Current | | −100 | | −275 | mA | Max | $V_{OUT}$ = 0.0V |
| $I_{CEX}$ | Output High Leakage Current | | | | 50 | µA | Max | $V_{OUT}$ = $V_{CC}$ |
| $I_{ZZ}$ | Bus Drainage Test | | | | 100 | µA | 0.0 | $V_{OUT}$ = 5.5V; All Others GND |
| $I_{CCH}$ | Power Supply Current | | | | 50 | µA | Max | All Outputs HIGH |
| $I_{CCL}$ | Power Supply Current | | | | 30 | mA | Max | All Outputs LOW |
| $I_{CCZ}$ | Power Supply Current | | | | 50 | µA | Max | $\overline{OE}_n$ = $V_{CC}$;<br>All Others at $V_{CC}$ or Ground |
| $I_{CCT}$ | Additional $I_{CC}$/Input | Outputs Enabled | | | 2.5 | mA | Max | $V_I$ = $V_{CC}$ − 2.1V |
| | | Outputs 3-STATE | | | 2.5 | mA | | Enable Input $V_I$ = $V_{CC}$ − 2.1V |
| | | Outputs 3-STATE | | | 50 | µA | | Data Input $V_I$ = $V_{CC}$ − 2.1V |
| | | | | | | | | All Others at $V_{CC}$ or Ground |
| $I_{CCD}$ | Dynamic $I_{CC}$ | No Load | | | | mA/ | Max | Outputs Open |
| | (Note 4) | | | | 0.1 | MHz | | $\overline{OE}_n$ = GND, (Note 3) |
| | | | | | | | | One Bit Toggling, 50% |
| | | | | | | | | Duty Cycle |

**Note 3:** For 8 bits toggling, $I_{CCD}$ < 0.8 mA/MHz.

**Note 4:** Guaranteed, but not tested.

## DC Electrical Characteristics

| Symbol | Parameter | Min | Max | Units | $V_{CC}$ | Conditions $C_L$ = 50 pF, $R_L$ = 500Ω |
|---|---|---|---|---|---|---|
| $V_{OLP}$ | Quiet Output Maximum Dynamic $V_{OL}$ | | 0.67 | V | 5.0 | $T_A$ = 25˚C (Note 5) |
| $V_{OLV}$ | Quiet Output Minimum Dynamic $V_{OL}$ | | -1.35 | V | 5.0 | $T_A$ = 25˚C (Note 5) |

**Note 5:** Max number of outputs defined as (n). n – 1 data inputs are driven 0V to 3V. One output at LOW. Guaranteed, but not tested.

## AC Electrical Characteristics

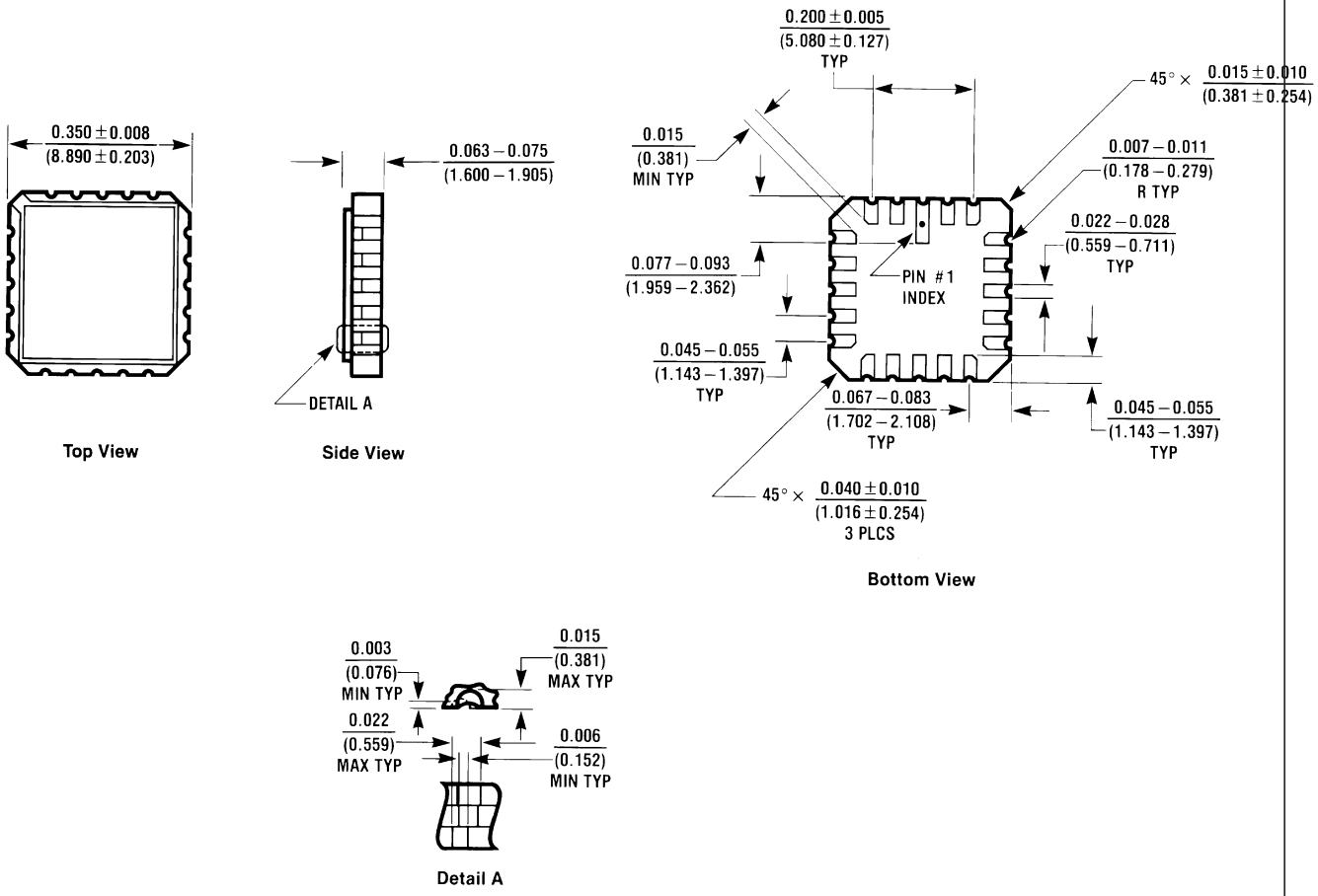
| Symbol | Parameter | $T_A$ = –55˚C to +125˚C, $V_{CC}$ = 4.5V–5.5V, $C_L$ = 50 pF | | Units |
|---|---|---|---|---|
| | | Min | Max | |
| $t_{PLH}$ | Propagation Delay | 0.8 | 5.3 | ns |
| $t_{PHL}$ | Data to Outputs | 0.8 | 5.0 | |
| $t_{PZH}$ | Output Enable | 1.0 | 7.0 | ns |
| $t_{PZL}$ | Time | 1.0 | 7.0 | |
| $t_{PHZ}$ | Output Disable | 0.8 | 7.9 | ns |
| $t_{PLZ}$ | Time | 0.8 | 6.2 | |

## Capacitance

| Symbol | Parameter | Typ | Units | Conditions $T_A$ = 25˚C |
|---|---|---|---|---|
| $C_{IN}$ | Input Capacitance | 5.0 | pF | $V_{CC}$ = 0V |
| $C_{OUT}$ (Note 6) | Output Capacitance | 9.0 | pF | $V_{CC}$ = 5.0V |

**Note 6:** $C_{OUT}$ is measured at frequency f = 1 MHz, per MIL-STD-883B, Method 3012.

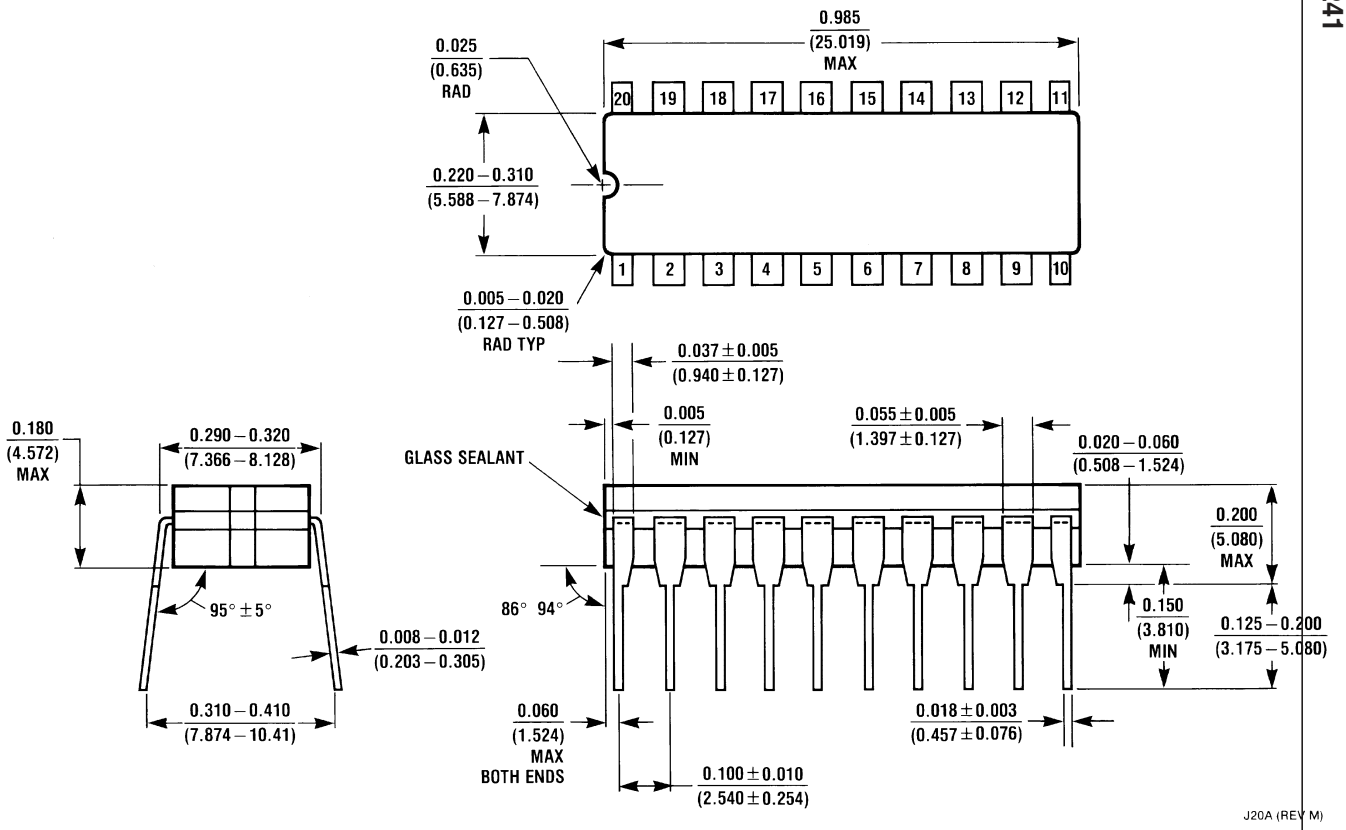
## Physical Dimensions inches (millimeters) unless otherwise noted



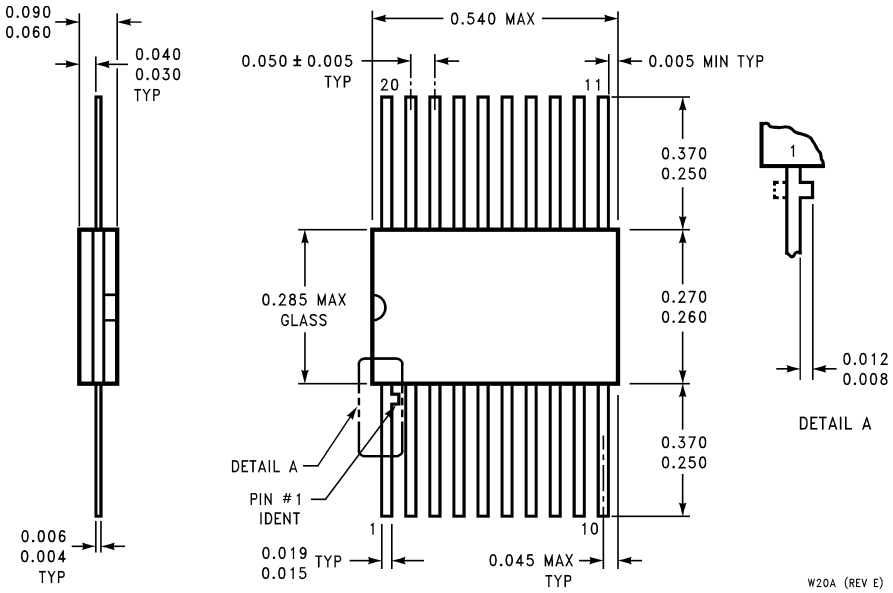

E20A (REV D)

**20-Lead Ceramic Leadless Chip Carrier**
**Package Number E20A**

## Physical Dimensions inches (millimeters) unless otherwise noted (Continued)




**20-Lead Ceramic Dual-In-Line**
**Package Number J20A**




**20-Lead Ceramic Flatpack**
**Package Number W20A**

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