

# SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS

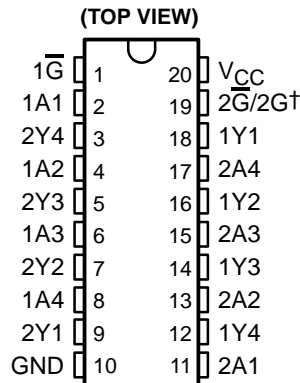
SDLS144B – APRIL 1985 – REVISED FEBRUARY 2002

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- PNP Inputs Reduce DC Loading
- Hysteresis at Inputs Improves Noise Margins

## description

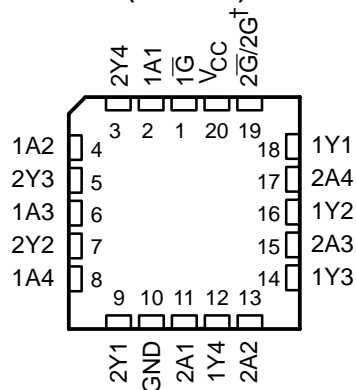
These octal buffers and line drivers are designed specifically to improve both the performance and density of three-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. The designer has a choice of selected combinations of inverting and noninverting outputs, symmetrical, active-low output-control ( $\overline{G}$ ) inputs, and complementary output-control ( $G$  and  $\overline{G}$ ) inputs. These devices feature high fan-out, improved fan-in, and 400-mV noise margin. The SN74LS' and SN74S' devices can be used to drive terminated lines down to 133  $\Omega$ .

SN54LS', SN54S' . . . J OR W PACKAGE  
SN74LS240, SN74LS244 . . . DB, DW, N, OR NS PACKAGE  
SN74LS241 . . . DW, N, OR NS PACKAGE  
SN74S' . . . DW OR N PACKAGE



† 2G for 'LS241 and 'S241 or  $\overline{2G}$  for all other drivers.

SN54LS', SN54S' . . . FK PACKAGE  
(TOP VIEW)



† 2G for 'LS241 and 'S241 or  $\overline{2G}$  for all other drivers.



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PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

 **TEXAS  
INSTRUMENTS**

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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

**SN54LS240, SN54LS241, SN54LS244, SN54S240, SN54S241, SN54S244  
 SN74LS240, SN74LS241, SN74LS244, SN74S240, SN74S241, SN74S244  
 OCTAL BUFFERS AND LINE DRIVERS WITH 3-STATE OUTPUTS**

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**ORDERING INFORMATION**

| <b>T<sub>A</sub></b> | <b>PACKAGE†</b> |               | <b>ORDERABLE PART NUMBER</b> | <b>TOP-SIDE MARKING</b> |
|----------------------|-----------------|---------------|------------------------------|-------------------------|
| 0°C to 70°C          | PDIP – N        | Tube          | SN74LS240N                   | SN74LS240N              |
|                      |                 |               | SN74LS241N                   | SN74LS241N              |
|                      |                 |               | SN74LS244N                   | SN74LS244N              |
|                      |                 |               | SN74S240N                    | SN74S240N               |
|                      |                 |               | SN74S241N                    | SN74S241N               |
|                      |                 |               | SN74S244N                    | SN74S244N               |
|                      | SOIC – DW       | Tube          | SN74LS240DW                  | LS240                   |
|                      |                 | Tape and reel | SN74LS240DWR                 |                         |
|                      |                 | Tube          | SN74LS241DW                  | LS241                   |
|                      |                 | Tape and reel | SN74LS241DWR                 |                         |
|                      |                 | Tube          | SN74LS244DW                  | LS244                   |
|                      |                 | Tape and reel | SN74LS244DWR                 |                         |
|                      |                 | Tube          | SN74S240DW                   | S240                    |
|                      |                 | Tape and reel | SN74S240DWR                  |                         |
|                      |                 | Tube          | SN74S241DW                   | S241                    |
|                      |                 | Tape and reel | SN74S241DWR                  |                         |
|                      |                 | Tube          | SN74S244DW                   | S244                    |
|                      |                 | Tape and reel | SN74S244DWR                  |                         |
|                      | SOP – NS        | Tube          | SN74LS240NSR                 | 74LS240                 |
|                      |                 |               | SN74LS241NSR                 | 74LS241                 |
|                      |                 |               | SN74LS244NSR                 | 74LS244                 |
|                      | SSOP – DB       | Tape and reel | SN74LS240DBR                 | LS240                   |
|                      |                 |               | SN74LS244DBR                 | LS244                   |

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).



| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup>               |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|--|
| SN74LS241NSR     | ACTIVE                | SO           | NS              | 20   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74LS244DBR     | ACTIVE                | SSOP         | DB              | 20   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74LS244DBRE4   | ACTIVE                | SSOP         | DB              | 20   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74LS244DW      | ACTIVE                | SOIC         | DW              | 20   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-250C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74LS244DWR     | ACTIVE                | SOIC         | DW              | 20   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-250C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74LS244J       | OBSOLETE              | CDIP         | J               | 20   |             | TBD                     | Call TI          | Call TI                                    |
| SN74LS244N       | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC                             |
| SN74LS244N3      | OBSOLETE              | PDIP         | N               | 20   |             | TBD                     | Call TI          | Call TI                                    |
| SN74LS244NSR     | ACTIVE                | SO           | NS              | 20   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-260C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74S240DW       | ACTIVE                | SOIC         | DW              | 20   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-250C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74S240DWR      | ACTIVE                | SOIC         | DW              | 20   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-250C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74S240N        | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC                             |
| SN74S240N3       | OBSOLETE              | PDIP         | N               | 20   |             | TBD                     | Call TI          | Call TI                                    |
| SN74S241DW       | ACTIVE                | SOIC         | DW              | 20   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-250C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74S241DWR      | ACTIVE                | SOIC         | DW              | 20   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-250C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74S241J        | OBSOLETE              | CDIP         | J               | 20   |             | TBD                     | Call TI          | Call TI                                    |
| SN74S241N        | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC                             |
| SN74S241N3       | OBSOLETE              | PDIP         | N               | 20   |             | TBD                     | Call TI          | Call TI                                    |
| SN74S244DW       | ACTIVE                | SOIC         | DW              | 20   | 25          | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-250C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74S244DWR      | ACTIVE                | SOIC         | DW              | 20   | 2000        | Pb-Free (RoHS)          | CU NIPDAU        | Level-2-250C-1 YEAR/<br>Level-1-235C-UNLIM |
| SN74S244J        | OBSOLETE              | CDIP         | J               | 20   |             | TBD                     | Call TI          | Call TI                                    |
| SN74S244N        | ACTIVE                | PDIP         | N               | 20   | 20          | Pb-Free (RoHS)          | CU NIPDAU        | Level-NC-NC-NC                             |
| SN74S244N3       | OBSOLETE              | PDIP         | N               | 20   |             | TBD                     | Call TI          | Call TI                                    |
| SNJ54LS240FK     | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS240J      | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS240W      | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS241FK     | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS241J      | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS241W      | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS244FK     | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS244J      | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC                             |
| SNJ54LS244W      | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC                             |

| Orderable Device | Status <sup>(1)</sup> | Package Type | Package Drawing | Pins | Package Qty | Eco Plan <sup>(2)</sup> | Lead/Ball Finish | MSL Peak Temp <sup>(3)</sup> |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| SNJ54S240FK      | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54S240J       | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54S240W       | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54S241FK      | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54S241J       | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54S241W       | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54S244FK      | ACTIVE                | LCCC         | FK              | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54S244J       | ACTIVE                | CDIP         | J               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |
| SNJ54S244W       | ACTIVE                | CFP          | W               | 20   | 1           | TBD                     | Call TI          | Level-NC-NC-NC               |

<sup>(1)</sup> The marketing status values are defined as follows:

**ACTIVE:** Product device recommended for new designs.

**LIFEBUY:** TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

**NRND:** Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

**PREVIEW:** Device has been announced but is not in production. Samples may or may not be available.

**OBSOLETE:** TI has discontinued the production of the device.

<sup>(2)</sup> Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

**TBD:** The Pb-Free/Green conversion plan has not been defined.

**Pb-Free (RoHS):** TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

**Green (RoHS & no Sb/Br):** TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

<sup>(3)</sup> MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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