

- Member of the Texas Instruments *Widebus*™ Family
- State-of-the-Art *EPIC-II B*™ BiCMOS Design Significantly Reduces Power Dissipation
- Typical V_{OLP} (Output Ground Bounce) < 1 V at $V_{CC} = 5$ V, $T_A = 25^\circ\text{C}$
- Distributed V_{CC} and GND Pin Configuration Minimizes High-Speed Switching Noise
- Flow-Through Architecture Optimizes PCB Layout
- High-Drive Outputs (–32-mA I_{OH} , 64-mA I_{OL})
- Packaged in Plastic 300-mil Shrink Small-Outline (SSOP) Packages

description

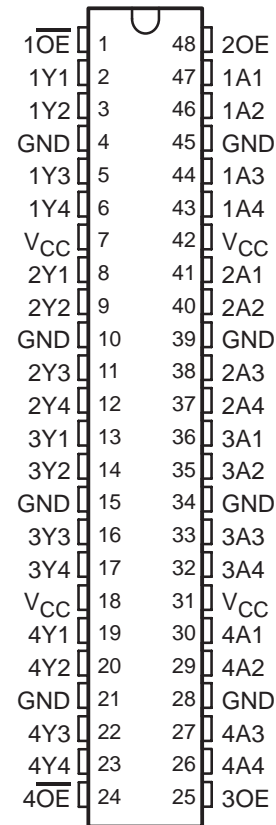
The SN74ABT16241 is a 16-bit buffer and line driver designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. The device can be used as four 4-bit buffers, two 8-bit buffers, or one 16-bit buffer. This device provides true outputs and complementary output-enable (OE and \overline{OE}) inputs.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver. OE should be tied to GND through a pulldown resistor; the minimum value of the resistor is determined by the current-sourcing capability of the driver.

The SN74ABT16241 is available in TI's shrink small-outline package (DL), which provides twice the I/O pin count and functionality of standard small-outline packages in the same printed-circuit-board area.

The SN74ABT16241 is characterized for operation from –40°C to 85°C.

DL PACKAGE
(TOP VIEW)



FUNCTION TABLE

INPUTS		OUTPUTS	INPUTS		OUTPUTS
$\overline{1OE}, \overline{4OE}$	1A, 4A	1Y, 4Y	2OE, 3OE	2A, 3A	2Y, 3Y
L	H	H	H	H	H
L	L	L	H	L	L
H	X	Z	L	X	Z

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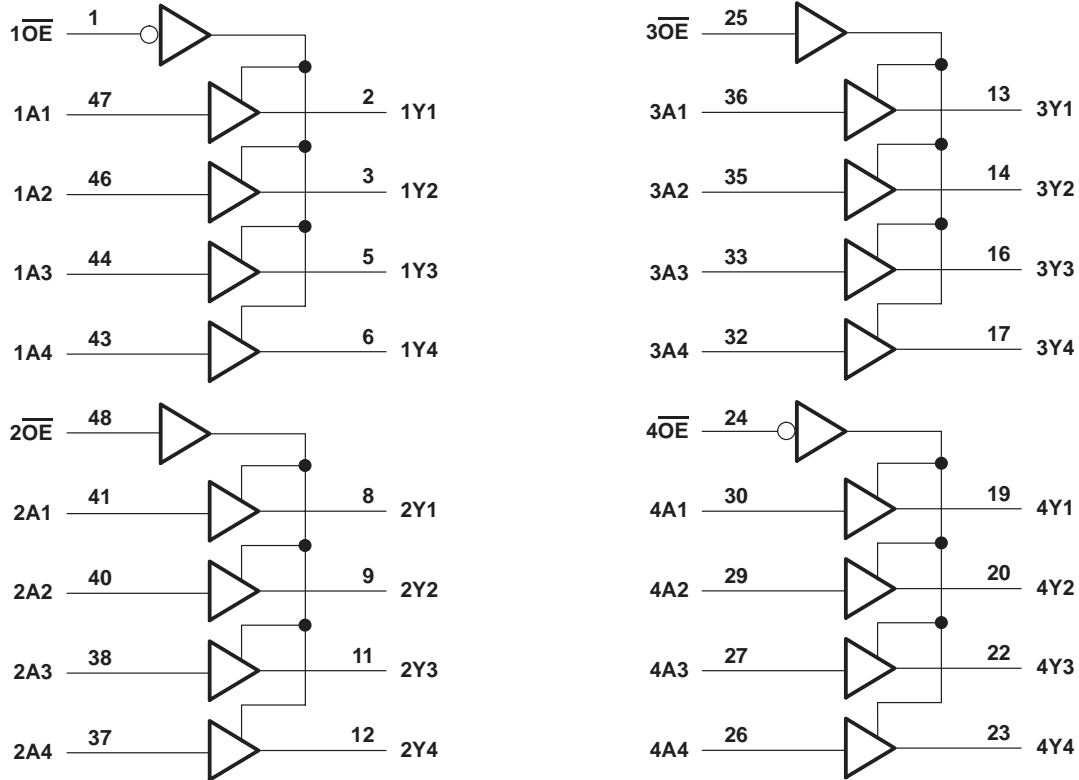


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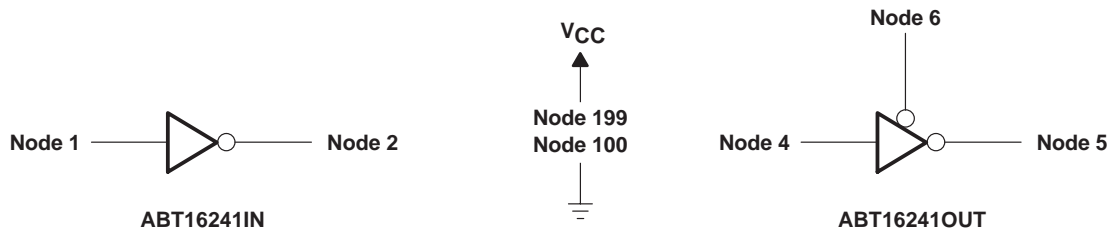
SN74ABT16241
16-BIT BUFFER/DRIVER
WITH 3-STATE OUTPUTS

SCBS347 – MAY 1994

logic diagram (positive logic)



SPICE block diagram



SPICE FUNCTION TABLE

NODE		OPERATION	NODE			OPERATION
1	2		4	5	6	
L	H	Input	L	H	L	Output
H	L	Input	H	L	L	Output
X	X		X	Z	H	Hi-Z

SPICE netlist

```

*      ABT16241 SPICE I/O MODEL SUBCIRCUIT
*      ADVANCED BUS INTERFACE
*      ADVANCED SYSTEM LOGIC, TEXAS INSTRUMENTS
*
*      SUBCIRCUITS:  ABT16241IN, ABT16241OUT
*
*      PACKAGE PARASITICS
*      .LIB 'PKGS.LIB'    SSOP48
*
*      PROCESS MODELS
*      .LIB 'EPIC2B.LIB'  NOMINAL_L13
*      .LIB 'EPIC2B.LIB'  STRONG_L13
*      .LIB 'EPIC2B.LIB'  WEAK_L13
*
* ABT16241 INPUT SUBCIRCUIT
*      NODES:                INPUT NODE
*                             |         |
*                             |         | INTERNAL OUTPUT NODE
*                             |         |         |
*                             |         |         | VCC
*                             |         |         | |
*                             |         |         | | GND
*                             |         |         | |
*      .SUBCKT ABT16241IN      1         2         199     100
*      X_PKGIN                 1         1001                SSOP48_47
*      X_PKGVCC                199     1199                SSOP48_07
*      X_PKGGND               100     1100                SSOP48_04
*      XABT16241IN           1001     2         1199     1100    ABT16241__IN
*      .ENDS ABT16241IN
*
* ABT16241 OUTPUT SUBCIRCUIT
*      NODES:                INTERNAL INPUT NODE
*                             |         |
*                             |         | OUTPUT NODE
*                             |         |         |
*                             |         |         | INTERNAL OE NODE
*                             |         |         |         |
*                             |         |         |         | VCC
*                             |         |         |         | |
*                             |         |         |         | | GND
*                             |         |         |         | |
*      .SUBCKT ABT16241OUT    4         5         6         199     100
*      X_PKGOUT                 5         1005                SSOP48_02
*      X_PKGVCC                199     1199                SSOP48_07
*      X_PKGGND               100     1100                SSOP48_04
*      XABT16241OUT           4         1005     6         1199     1100    ABT16241__OUT
*      .ENDS ABT16241OUT
*
*      .SUBCKT ABT16241__IN  501     502     599     500
*      XP1        502     504     506     599     PM          WP=200U      LP=0.8U
*      XP2        509     502     599     599     PM          WP=20U       LP=0.8U
*      XP3        506     509     599     599     PM          WP=85U       LP=0.8U
*      XP4        508     500     599     599     PM          WP=50U       LP=0.8U
*      XN1        502     504     500     500     NM          WN=220U     LN=0.8U
*      XN2        509     502     500     500     NM          WN=20U      LN=0.8U
*      XN4        599     500     508     500     NM          WN=20U      LN=0.8U
*      QA         599     508     507                Q2_NPN      10
*      QB         599     507     506                Q5_NPN      60
*      Q_ESD1     501     500     500                Q7_NPN      200
*      Q_ESD      504     505     500                Q5_NPN      46
*      XR1        506     507     507     507     RMOS       WR=4U       RES=6K
*      RESD1      501     504                50
*      RESD2      505     500                1K
*      CBP        501     500                0.3P
*      CL         502     500                0.2P
*      .ENDS ABT16241__IN
*
*      .SUBCKT ABT16241__OUT  601     602     603     699     600
*      XP1        605     603     699     699     PM          WP=200U     LP=0.8U
*      XP4        601     603     621     699     PM          WP=40U      LP=0.8U
*      XP5        613     601     605     699     PM          WP=30U      LP=0.8U
*      XP10       618     603     699     699     PM          WP=50U      LP=0.8U
*      XP11       607     612     605     699     PM          WP=60U      LP=0.8U
*      XN1        607     601     608     600     NM          WN=100U     LN=0.8U
    
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SN74ABT16241
16-BIT BUFFER/DRIVER
WITH 3-STATE OUTPUTS

SPICE I/O MODEL

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SPICE netlist (continued)

```

XN2      606  619  607  600  NM      WN=50U      LN=0.8U
XN3      608  609  600  600  NM      WN=25U      LN=0.8U
XN4      608  603  600  600  NM      WN=80U      LN=0.8U
XN6      613  603  600  600  NM      WN=25U      LN=0.8U
XN7      602  621  600  600  NM      WN=100U     LN=0.8U
XN8      621  603  600  600  NM      WN=10U      LN=0.8U
XN9      601  622  621  600  NM      WN=20U      LN=0.8U
XN10     619  619  620  600  NM      WN=25U      LN=0.8U
XN11     620  604  602  600  NM      WN=25U      LN=0.8U
XN12     613  601  600  600  NM      WN=40U      LN=0.8U
QM1      616  615  602          Q9_NPN      200
QM2      602  608  600          Q11_NPN     600
QM3      614  613  615          Q4_NPN      15
QD4      614  614  616          Q2_NPN      8
QDR1     615  615  613          Q2_NPN      8
D1       613  614          D1_GDS      156
D2       699  617          D9_GSD      4700
XR1      606  605  605  605  RMOS      WR=6U      RES=1K
XR2      607  606  606  606  RMOS      WR=4U      RES=3K
XR3      614  605  605  605  RMOS      WR=6U      RES=1K
R4       616  617          10
XR10     619  618  618  618  RMOS      WR=3U      RES=20K
XPVREF   670  603  699  699  PM        WP=50U     LP=0.8U
XNVREF   671  671  600  600  NM        WN=30U     LN=0.8U
XRVREF1  604  670  670  670  RMOS      WR=3U      RES=20K
XRVREF2  671  604  604  604  RMOS      WR=3U      RES=1.5K
XNCLAMP  673  612  674  600  NM        WN=250U    LN=0.8U
DCLAMP1  608  673          D6_GSD      800
DCLAMP2  674  602          D6_GSD      800
XPNOR1   675  609  699  699  PM        WP=30U     LP=0.8U
XPNOR2   612  611  675  699  PM        WP=30U     LP=0.8U
XNNOR1   612  611  600  600  NM        WN=6U      LN=0.8U
XNNOR2   612  609  600  600  NM        WN=6U      LN=0.8U
XP_INV1  609  601  699  699  PM        WP=20U     LP=0.8U
XN_INV1  609  601  600  600  NM        WN=10U     LN=0.8U
XP_INV2  622  603  699  699  PM        WP=15U     LP=0.8U
XN_INV2  622  603  600  600  NM        WN=5U      LN=0.8U
XP_INV3  610  603  699  699  PM        WP=4U      LP=0.8U
XN_INV3  610  603  600  600  NM        WN=4U      LN=0.8U
XP_INV4  611  610  699  699  PM        WP=4U      LP=0.8U
XN_INV4  611  610  600  600  NM        WN=4U      LN=0.8U
CBP      602  600          0.3P
.ENDS ABT16241__OUT

```

*



PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SN74ABT16241DGGR	OBSOLETE	TSSOP	DGG	48		TBD	Call TI	Call TI
SN74ABT16241DL	OBSOLETE	SSOP	DL	48		TBD	Call TI	Call TI
SN74ABT16241DLR	OBSOLETE	SSOP	DL	48		TBD	Call TI	Call TI

⁽¹⁾ 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.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), 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.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

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)

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

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OTHER QUALIFIED VERSIONS OF SN74ABT16241 :

- Military: [SN54ABT16241](#)

NOTE: Qualified Version Definitions:

- Military - QML certified for Military and Defense Applications

DGG (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

48 PINS SHOWN



- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold protrusion not to exceed 0,15.
 D. Falls within JEDEC MO-153

DL (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

48 PINS SHOWN



- NOTES: A. All linear dimensions are in inches (millimeters).
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 D. Falls within JEDEC MO-118

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
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