

- 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) $< 1\text{ V}$ at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$
- Distributed V_{CC} and GND Pin Configuration Minimizes High-Speed Switching Noise
- Flow-Through Architecture Optimizes PCB Layout
- High-Drive Outputs ($-32\text{-mA } I_{OH}$, $64\text{-mA } I_{OL}$)
- Packaged in Plastic 300-mil Shrink Small-Outline (SSOP) Packages

description

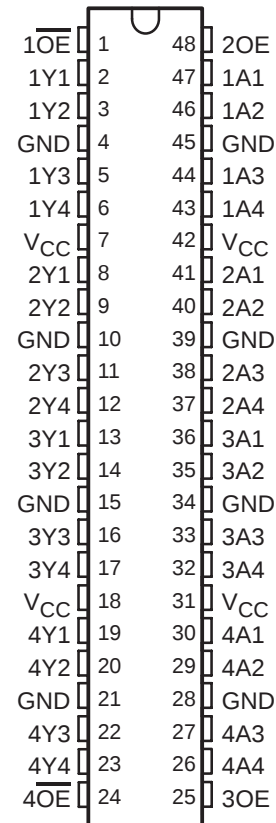
The SN74ABT16241 is a 16-bit buffer and line driver designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. The device can be used as four 4-bit buffers, two 8-bit buffers, or one 16-bit buffer. This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

To ensure the high-impedance state during power up or power down, $\overline{\text{OE}}$ 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 1Y, 4Y	INPUTS		OUTPUTS 2Y, 3Y
$\overline{1\text{OE}}, \overline{4\text{OE}}$	1A, 4A		$\overline{2\text{OE}}, \overline{3\text{OE}}$	2A, 3A	
L	H	H	H	H	H
L	L	L	H	L	L
H	X	Z	L	X	Z

Widebus and EPIC-II B are trademarks of Texas Instruments Incorporated.

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.



POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

POST OFFICE BOX 1443 • HOUSTON, TEXAS 77251-1443

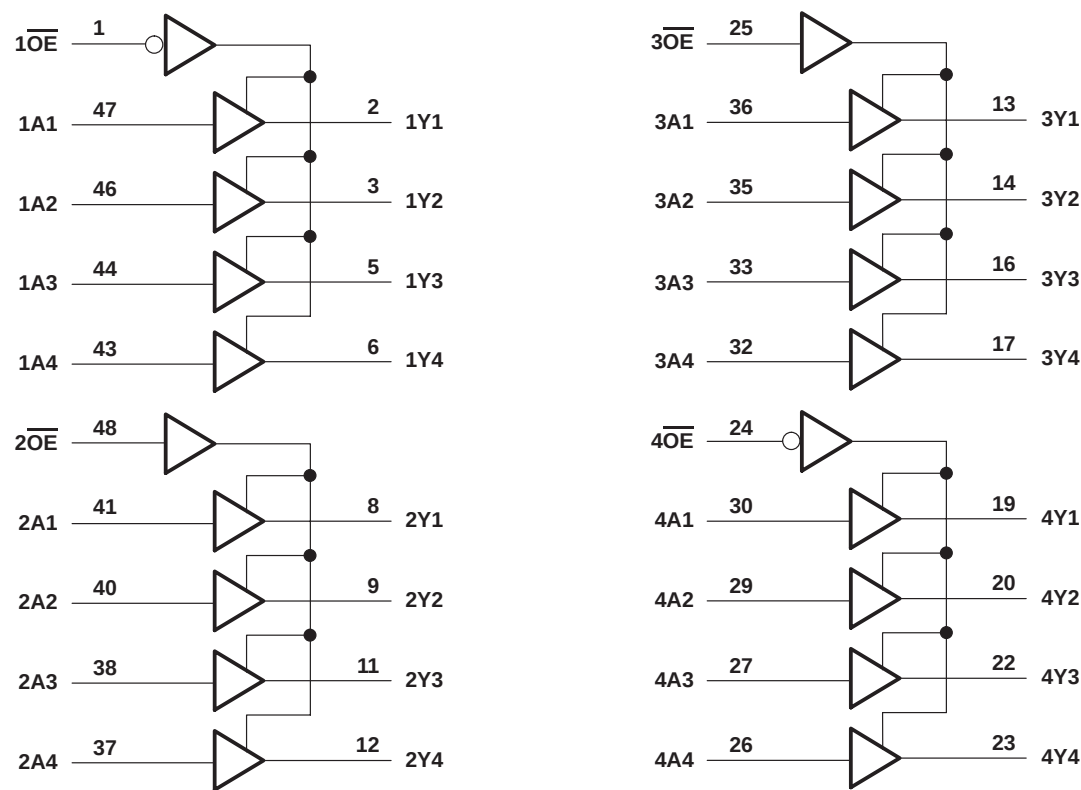
Copyright © 1994, Texas Instruments Incorporated

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

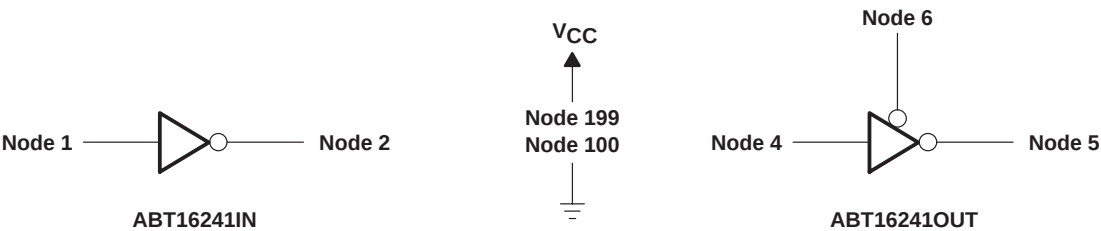
SCBS347 – MAY 1994

SPICE I/O MODEL

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	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
** | |
** 1 2 199 100
.SUBCKT ABT16241IN
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
** | | | |
** 4 5 6 199 100
.SUBCKT ABT16241OUT
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 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

```



SN74ABT16241

16-BIT BUFFER/DRIVER

WITH 3-STATE OUTPUTS

SCBS347 - MAY 1994

SPICE I/O MODEL

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.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN74ABT16241 :

- Military: [SN54ABT16241](#)

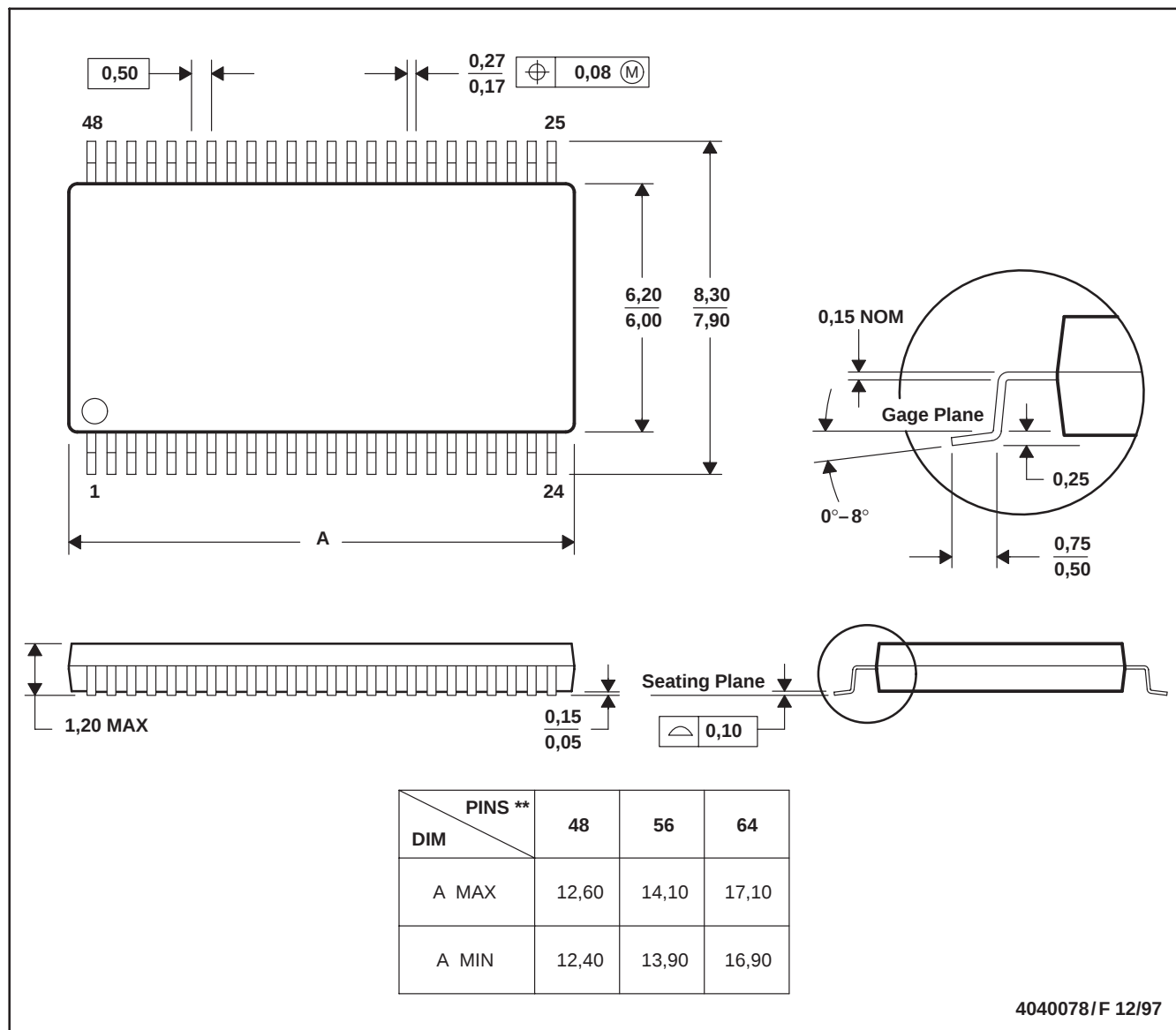
NOTE: Qualified Version Definitions:

- Military - QML certified for Military and Defense Applications

DGG (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

48 PINS SHOWN

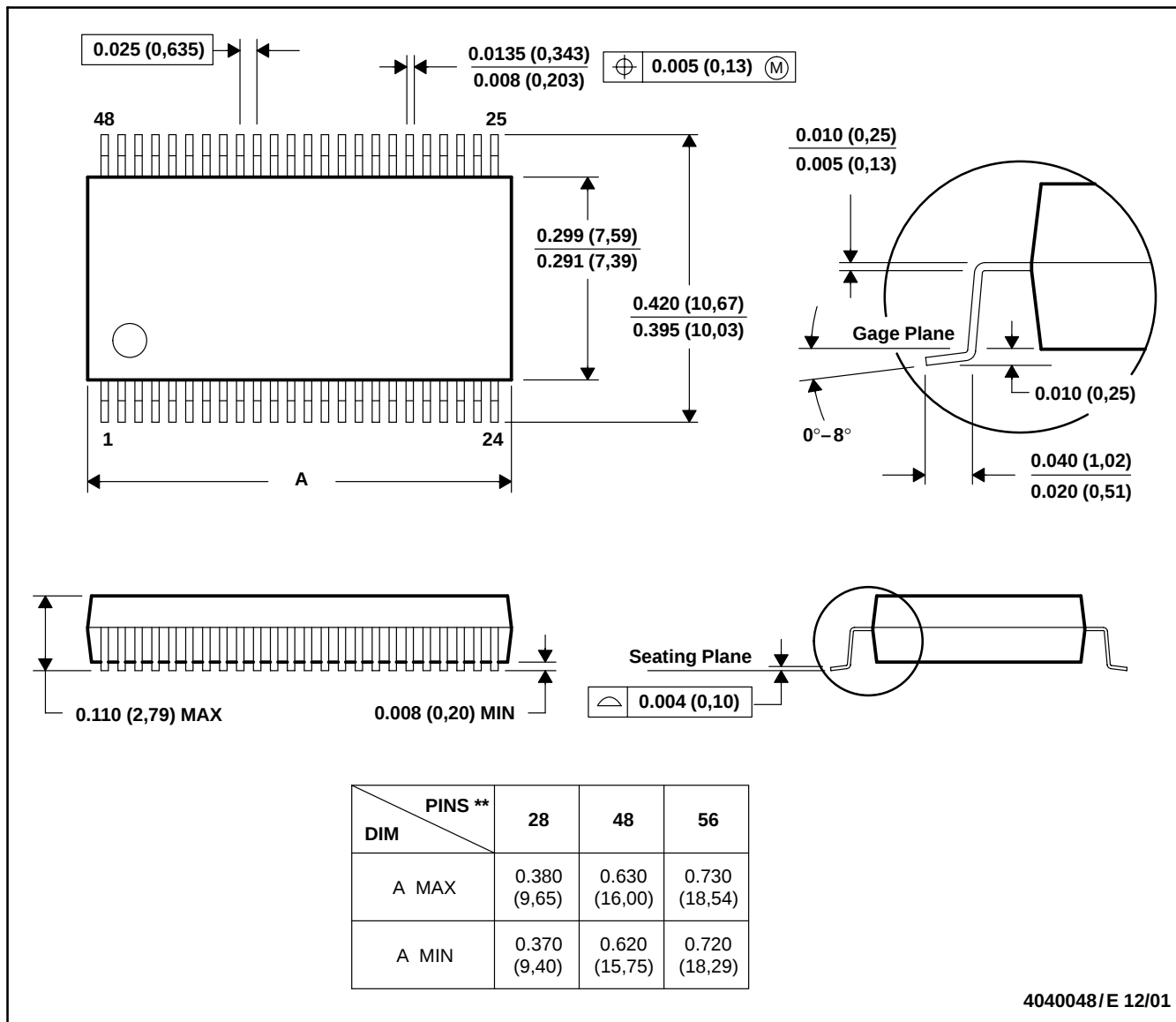


- NOTES: A. All linear dimensions are in millimeters.
 B. This drawing is subject to change without notice.
 C. Body dimensions do not include mold protrusion not to exceed 0,15.
 D. Falls within JEDEC MO-153

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

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products

Amplifiers	amplifier.ti.com
Data Converters	dataconverter.ti.com
DSP	dsp.ti.com
Clocks and Timers	www.ti.com/clocks
Interface	interface.ti.com
Logic	logic.ti.com
Power Mgmt	power.ti.com
Microcontrollers	microcontroller.ti.com
RFID	www.ti-rfid.com
RF/IF and ZigBee® Solutions	www.ti.com/lprf

Applications

Audio	www.ti.com/audio
Automotive	www.ti.com/automotive
Broadband	www.ti.com/broadband
Digital Control	www.ti.com/digitalcontrol
Medical	www.ti.com/medical
Military	www.ti.com/military
Optical Networking	www.ti.com/opticalnetwork
Security	www.ti.com/security
Telephony	www.ti.com/telephony
Video & Imaging	www.ti.com/video
Wireless	www.ti.com/wireless

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2008, Texas Instruments Incorporated