- **3-State Outputs Drive Bus Lines Directly**
- **Flow-Through Architecture Optimizes PCB Layout**
- **Center-Pin V$_{CC}$ and GND Configurations Minimize High-Speed Switching Noise**
- *EPIC* ™ **(Enhanced-Performance Implanted CMOS) 1-μm Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages, and Standard Plastic 300-mil DIPs (NT)**

DB, DW, NT, OR PW PACKAGE
(TOP VIEW)

Pin		Pin
A1	1	24 DIR
A2	2	23 B1
A3	3	22 B2
A4	4	21 B3
GND	5	20 B4
GND	6	19 V$_{CC}$
GND	7	18 V$_{CC}$
GND	8	17 B5
A5	9	16 B6
A6	10	15 B7
A7	11	14 B8
A8	12	13 $\overline{OE}$
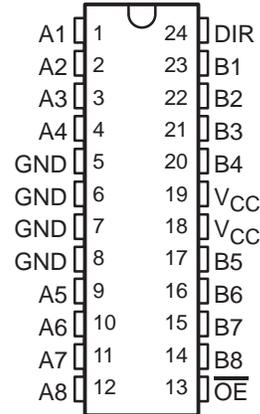
description

This octal bus transceiver is designed for asynchronous two-way communication between data buses. The control-function implementation minimizes external timing requirements.

The device allows noninverted data transmission from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable ($\overline{OE}$) input can be used to disable the device so that the buses are effectively isolated.

The 74AC11245 is characterized for operation from –40°C to 85°C.

FUNCTION TABLE

OUTPUT ENABLE $\overline{OE}$	DIRECTION CONTROL DIR	OPERATION
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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TEXAS INSTRUMENTS

74AC11245
OCTAL BUS TRANSCEIVER
WITH 3-STATE OUTPUTS

SCAS010B – JULY 1987 – REVISED APRIL 1996

logic symbol†
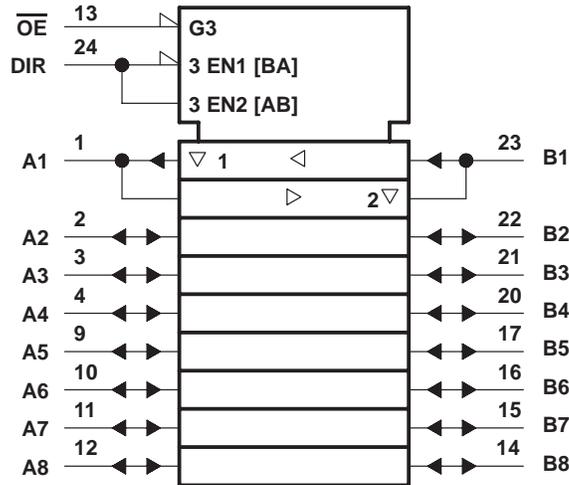
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)
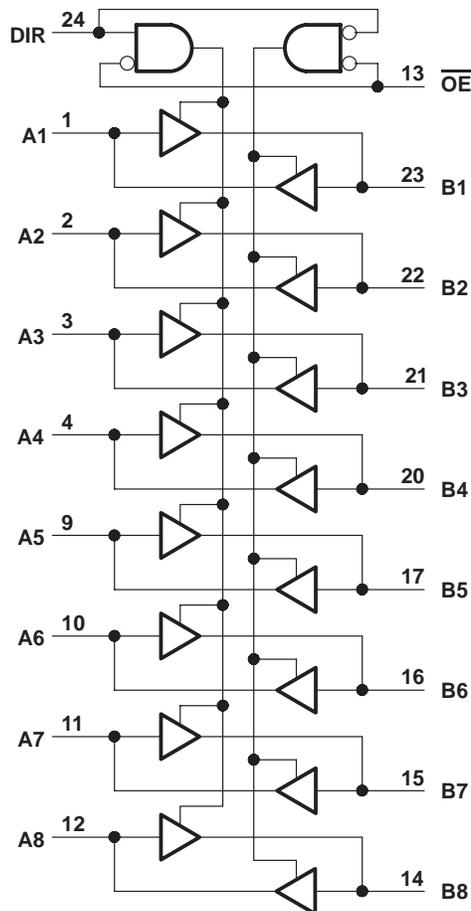
absolute maximum ratings over operating free-air temperature range (unless otherwise noted)†

Supply voltage range, V_{CC} . . . . −0.5 V to 7 V
Input voltage range, V_I (see Note 1) . . . . −0.5 V to V_{CC} + 0.5 V
Output voltage range, V_O (see Note 1) . . . . −0.5 V to V_{CC} + 0.5 V
Input clamp current, I_{IK} (V_I < 0 or V_I > V_{CC}) . . . . ±20 mA
Output clamp current, I_{OK} (V_O < 0 or V_O > V_{CC}) . . . . ±50 mA
Continuous output current, I_O (V_O = 0 to V_{CC}) . . . . ±50 mA
Continuous current through V_{CC} or GND . . . . ±200 mA
Maximum power dissipation at T_A = 55°C (in still air) (see Note 2): DB package . . . . 0.65 W
DW package . . . . 1.7 W
NT package . . . . 1.3 W
PW package . . . . 0.7 W
Storage temperature range, T_{stg} . . . . −65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and
  functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not
  implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
         2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils,
            except for the NT package, which has a trace length of zero.

recommended operating conditions

			MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		3	5	5.5	V
V_{IH}	High-level input voltage	V_{CC} = 3 V	2.1			V
		V_{CC} = 4.5 V	3.15			
		V_{CC} = 5.5 V	3.85			
V_{IL}	Low-level input voltage	V_{CC} = 3 V			0.9	V
		V_{CC} = 4.5 V			1.35	
		V_{CC} = 5.5 V			1.65	
V_I	Input voltage		0		V_{CC}	V
V_O	Output voltage		0		V_{CC}	V
I_{OH}	High-level output current	V_{CC} = 3 V			−4	mA
		V_{CC} = 4.5 V			−24	
		V_{CC} = 5.5 V			−24	
I_{OL}	Low-level output current	V_{CC} = 3 V			12	mA
		V_{CC} = 4.5 V			24	
		V_{CC} = 5.5 V			24	
$\Delta t/\Delta v$	Input transition rise or fall rate		0		10	ns/V
T_A	Operating free-air temperature		−40		85	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS		V_{CC}	$T_A = 25°C$			MIN	MAX	UNIT
					MIN	TYP	MAX			
V_{OH}		$I_{OH} = -50\ \mu A$		3 V	2.9			2.9		V
				4.5 V	4.4			4.4		
				5.5 V	5.4			5.4		
		$I_{OH} = -4\ mA$		3 V		2.58		2.48		
		$I_{OH} = -24\ mA$		4.5 V		3.94		3.8		
				5.5 V		4.94		4.8		
		$I_{OH} = -75\ mA†$		5.5 V				3.85		
V_{OL}		$I_{OL} = 50\ \mu A$		3 V			0.1		0.1	V
				4.5 V			0.1		0.1	
				5.5 V			0.1		0.1	
		$I_{OL} = 12\ mA$		3 V			0.36		0.44	
		$I_{OL} = 24\ mA$		4.5 V			0.36		0.44	
				5.5 V			0.36		0.44	
		$I_{OL} = 75\ mA†$		5.5 V					1.65	
I_I	A or B ports‡	$V_O = V_{CC}$ or GND		5.5 V			±0.5		±5	μA
	$\overline{OE}$ or DIR						±0.1		±1	
I_{CC}		$V_I = V_{CC}$ or GND,	$I_O = 0$	5.5 V			8		80	μA
C_i		$V_I = V_{CC}$ or GND		5 V		4				pF
C_{io}		$V_O = V_{CC}$ or GND		5 V		12				pF

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.
‡ For I/O ports, the parameter I_{OZ} includes the input leakage current.

switching characteristics over recommended operating free-air temperature range, $V_{CC} = 3.3\ V \pm 0.3\ V$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25°C$			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	B or A	1.5	6.5	11.2	1.5	12.5	ns
t_{PHL}			1.5	5.7	8.5	1.5	9.7	
t_{PZH}	$\overline{OE}$	B or A	1.5	8.6	14.2	1.5	15.9	ns
t_{PZL}			1.5	8.2	11.5	1.5	12.7	
t_{PHZ}	$\overline{OE}$	B or A	1.5	7.7	10.5	1.5	11.3	ns
t_{PLZ}			1.5	8.5	12	1.5	13	

switching characteristics over recommended operating free-air temperature range, $V_{CC} = 5\ V \pm 0.5\ V$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25°C$			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	B or A	1.5	4.8	8.5	1.5	9.5	ns
t_{PHL}			1.5	4.1	6.3	1.5	6.9	
t_{PZH}	$\overline{OE}$	B or A	1.5	6.2	10.2	1.5	11.4	ns
t_{PZL}			1.5	5.9	8.6	1.5	9.5	
t_{PHZ}	$\overline{OE}$	B or A	1.5	6.4	8.8	1.5	9.5	ns
t_{PLZ}			1.5	7	9.6	1.5	10.4	

TEXAS
INSTRUMENTS

operating characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance per transceiver	Outputs enabled	C_L = 50 pF, f = 1 MHz	64	pF
		Outputs disabled		16	

PARAMETER MEASUREMENT INFORMATION

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT

VOLTAGE WAVEFORMS

VOLTAGE WAVEFORMS
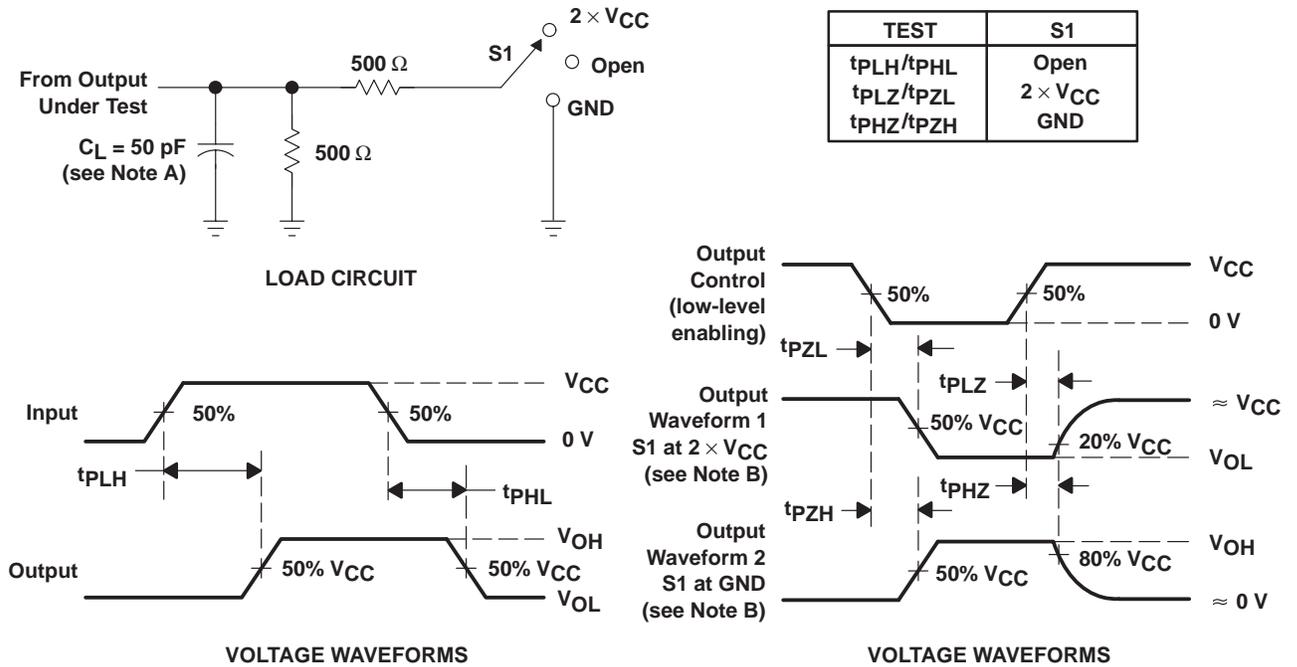
NOTES: A. C_L includes probe and jig capacitance.
   B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
       Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
   C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
   D. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

PACKAGE OPTION ADDENDUM

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
74AC11245DBLE	OBSOLETE	SSOP	DB	24		TBD	Call TI	Call TI
74AC11245DBR	OBSOLETE	SSOP	DB	24		TBD	Call TI	Call TI
74AC11245DW	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11245DWE4	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11245DWG4	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11245DWR	ACTIVE	SOIC	DW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11245DWRE4	ACTIVE	SOIC	DW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11245DWRG4	ACTIVE	SOIC	DW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11245NSRE4	ACTIVE	SO	NS	24		TBD	Call TI	Call TI
74AC11245NSRG4	ACTIVE	SO	NS	24		TBD	Call TI	Call TI
74AC11245NT	ACTIVE	PDIP	NT	24	15	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
74AC11245NTE4	ACTIVE	PDIP	NT	24	15	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
74AC11245PWLE	OBSOLETE	TSSOP	PW	24		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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PACKAGE MATERIALS INFORMATION

TAPE AND REEL INFORMATION

REEL DIMENSIONS

TAPE DIMENSIONS

Reel Diameter

Reel Width (W1)

A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

Cavity
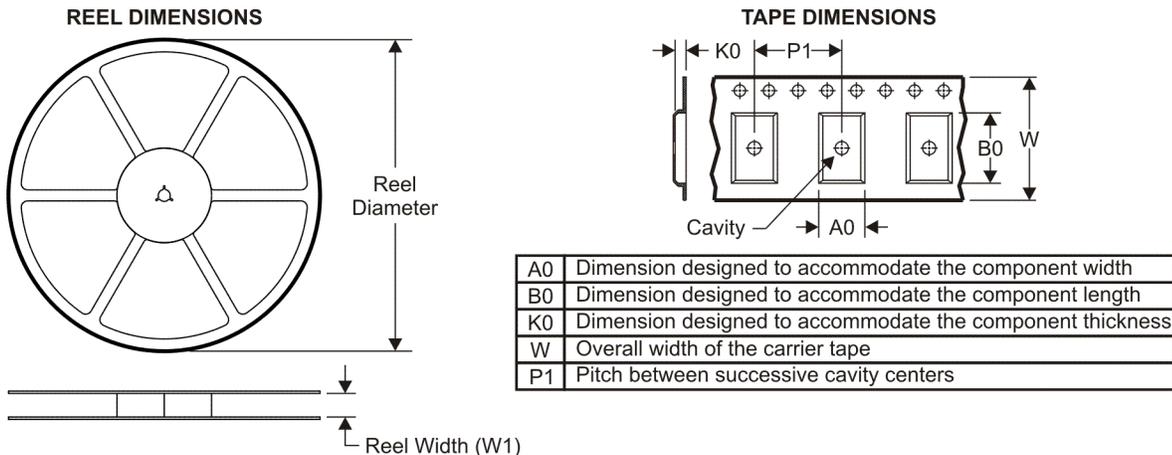
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

Sprocket Holes

Q1 | Q2
Q3 | Q4

Q1 | Q2
Q3 | Q4

User Direction of Feed

Pocket Quadrants
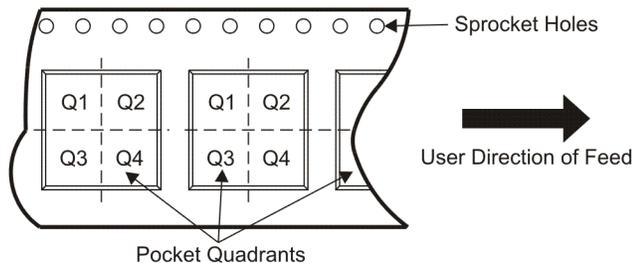
*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
74AC11245DWR	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1

TAPE AND REEL BOX DIMENSIONS
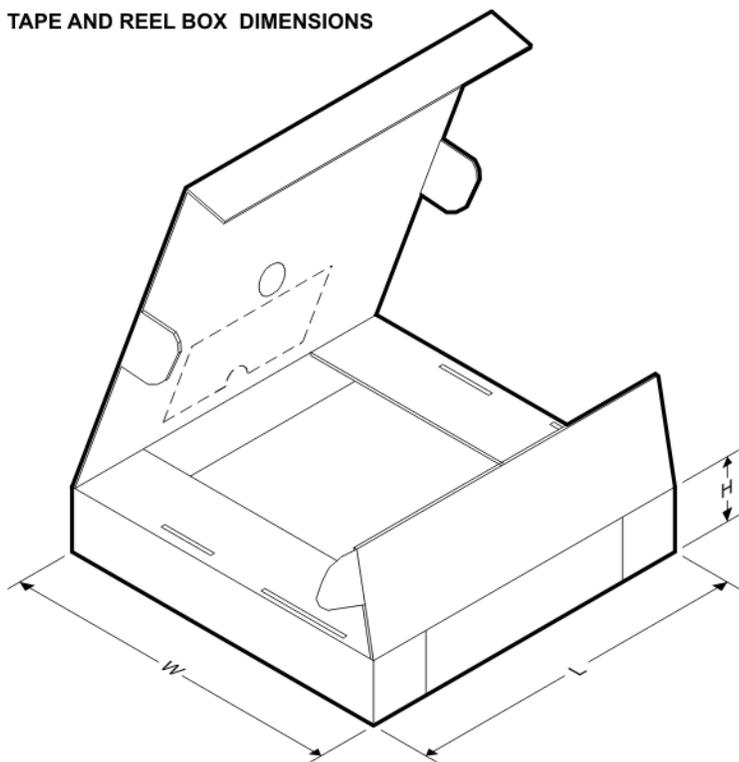
*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
74AC11245DWR	SOIC	DW	24	2000	346.0	346.0	41.0

DB (R-PDSO-G)**   **PLASTIC SMALL-OUTLINE**

28 PINS SHOWN
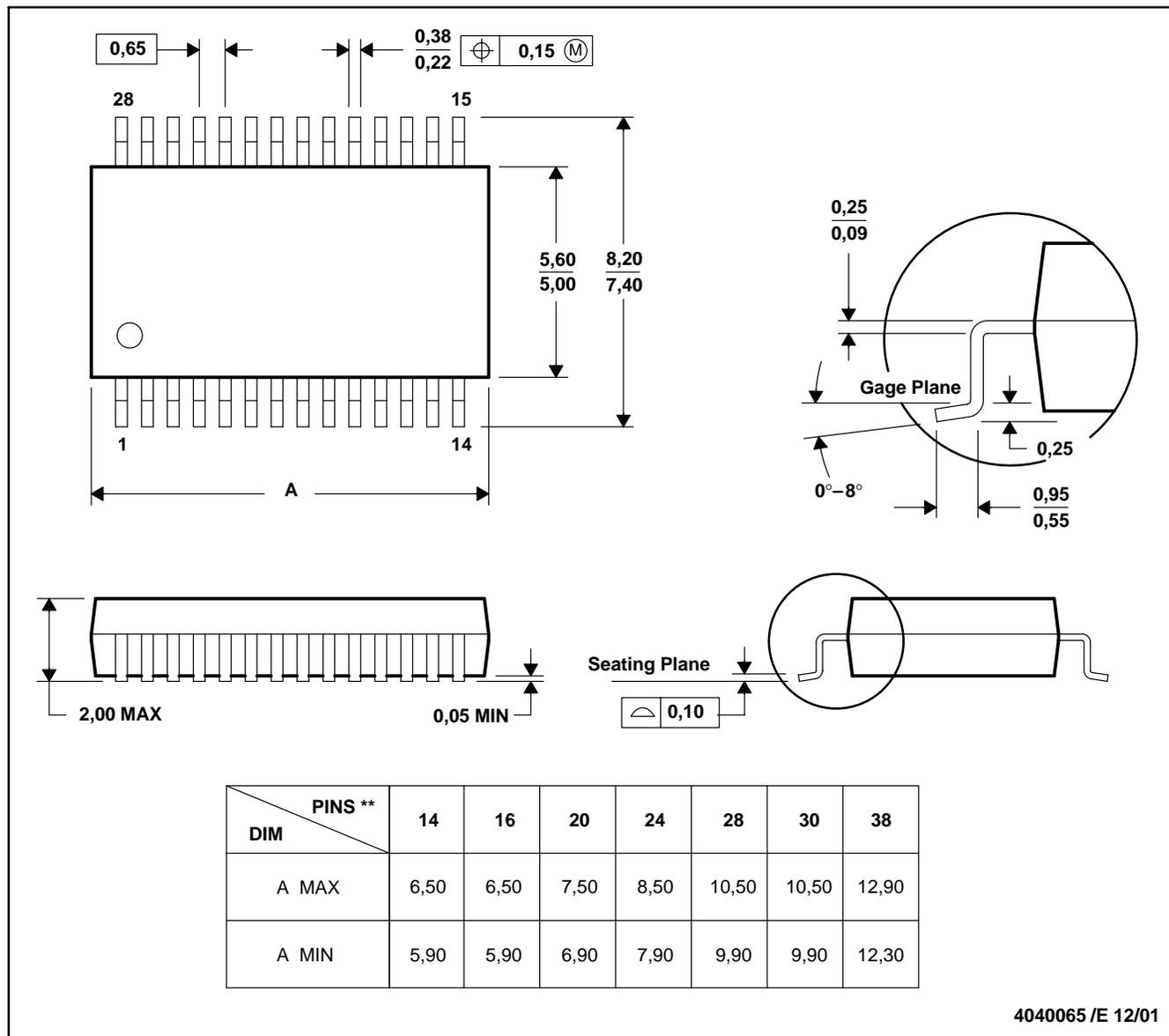
PINS ** DIM	14	16	20	24	28	30	38
A MAX	6,50	6,50	7,50	8,50	10,50	10,50	12,90
A MIN	5,90	5,90	6,90	7,90	9,90	9,90	12,30

4040065 /E 12/01

NOTES: A. All linear dimensions are in millimeters.
        B. This drawing is subject to change without notice.
        C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
        D. Falls within JEDEC MO-150

MECHANICAL DATA

PW (R-PDSO-G**)   **PLASTIC SMALL-OUTLINE PACKAGE**

14 PINS SHOWN

DIM \ PINS **	8	14	16	20	24	28
A MAX	3,10	5,10	5,10	6,60	7,90	9,80
A MIN	2,90	4,90	4,90	6,40	7,70	9,60
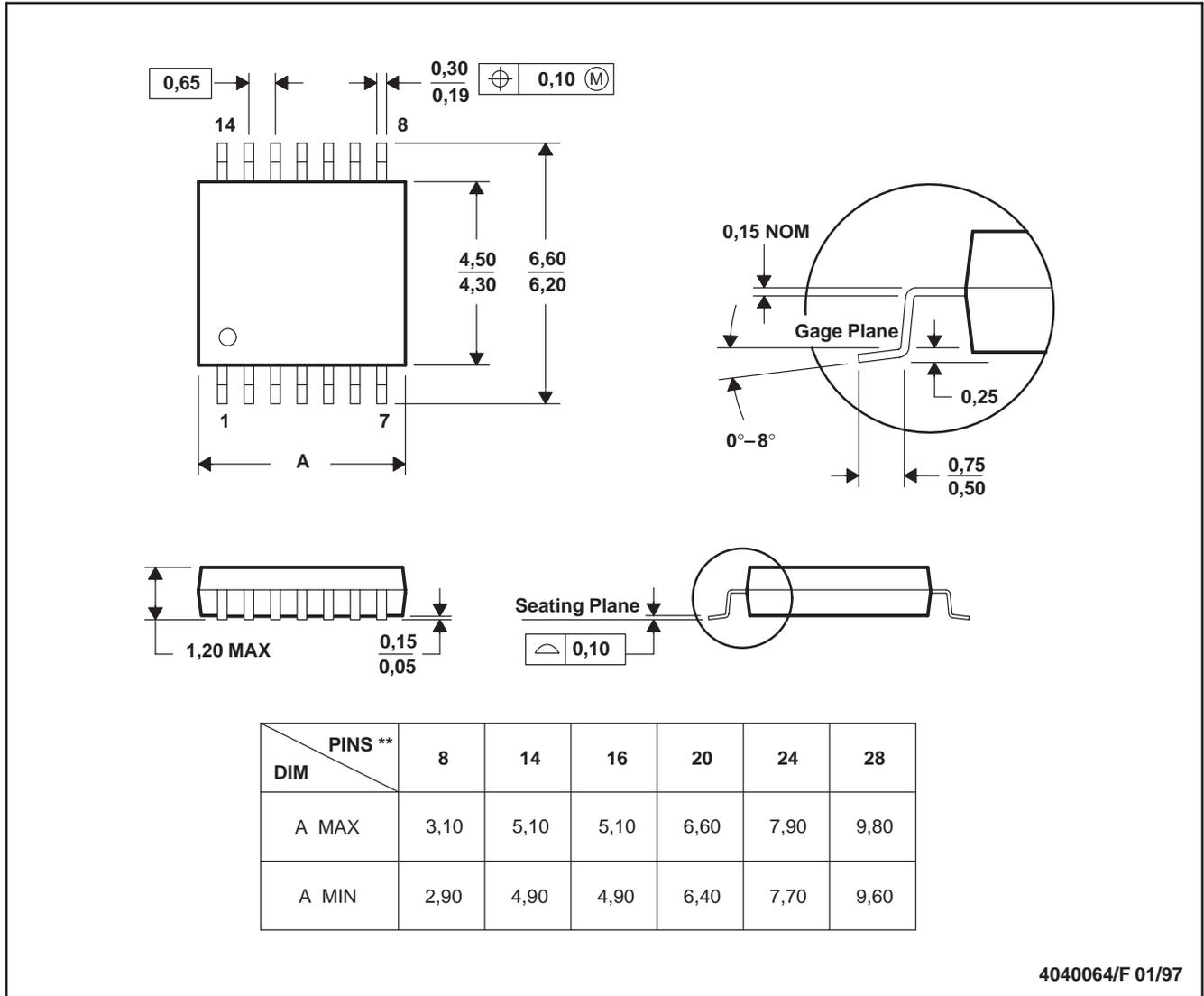
4040064/F 01/97

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

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE
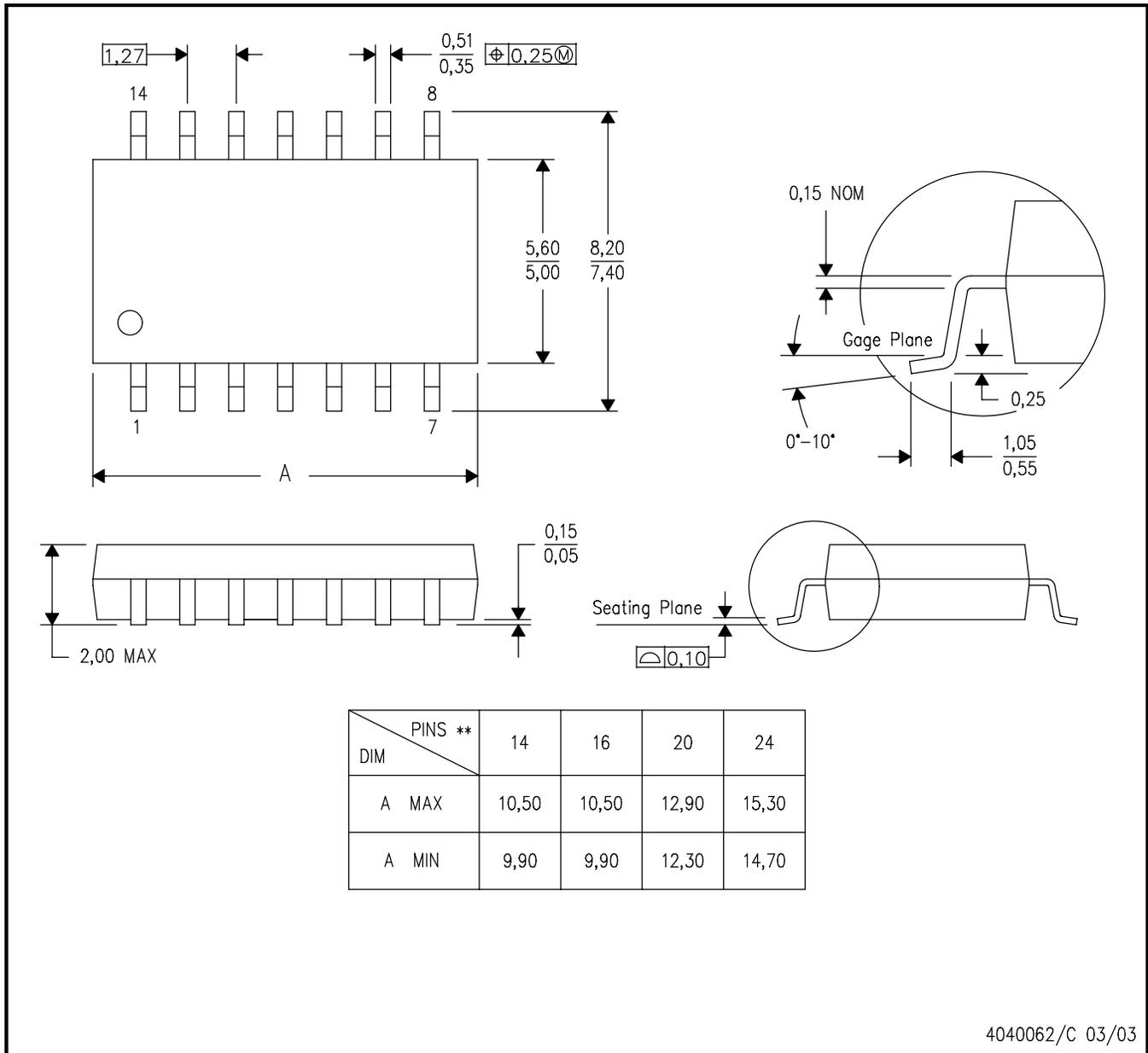
14-PINS SHOWN

DIM \ PINS **	14	16	20	24
A MAX	10,50	10,50	12,90	15,30
A MIN	9,90	9,90	12,30	14,70

4040062/C 03/03

NOTES: A. All linear dimensions are in millimeters.
   B. This drawing is subject to change without notice.
        C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

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NT (R−PDIP−T**) PLASTIC DUAL−IN−LINE PACKAGE
24 PINS SHOWN

DIM	PINS **	24	28
A MAX		1.260 (32,04)	1.425 (36,20)
A MIN		1.230 (31,24)	1.385 (35,18)
B MAX		0.310 (7,87)	0.315 (8,00)
B MIN		0.290 (7,37)	0.295 (7,49)

A

24   13

0.280 (7,11)
0.250 (6,35)

1   12

0.070 (1,78) MAX

0.020 (0,51) MIN

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.100 (2,54)

0.021 (0,53)
0.015 (0,38)

⊕ 0.010 (0,25) Ⓜ

B

0°−15°

0.010 (0,25) NOM

24 Pin − Full Lead
28 Pin − Vendor option ⚠C

4040050/C 04/09
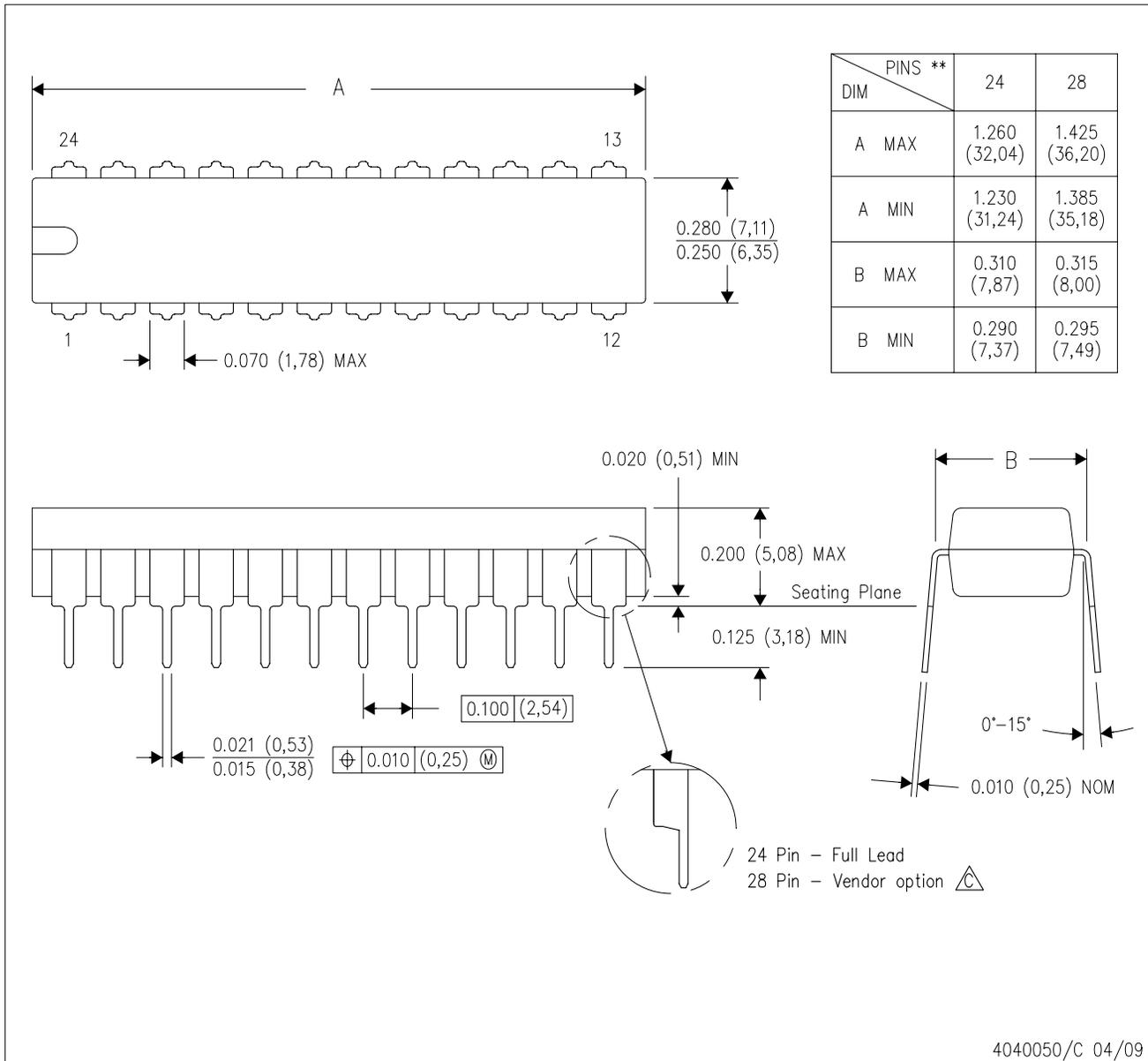
NOTES: A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M−1994.
        B. This drawing is subject to change without notice.
        ⚠C The 28 pin end lead shoulder width is a vendor option, either half or full width.

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DW (R−PDSO−G24) PLASTIC SMALL−OUTLINE PACKAGE

0.614 (15,60)
0.598 (15,20)

24 13

0.419 (10,63)
0.393 (9,97)

0.299 (7,60)
0.291 (7,40)

1 12

Pin 1
Index Area

0.050 (1,27)

0.020 (0,51)
0.012 (0,31)

⊕ 0.010 (0,25) Ⓜ

0.104 (2,65) Max

0.012 (0,30)
0.004 (0,10)

0.013 (0,33)
0.008 (0,20)

⌂ 0.004 (0,10)

Gauge Plane

Seating Plane

0.010 (0,25)

0°−8°

0.050 (1,27)
0.016 (0,40)

4040000−5/F 06/2004

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 MS−013 variation AD.

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Microcontrollers	microcontroller.ti.com	Telephony	www.ti.com/telephony
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