QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER WITH 3-STATE OUTPUTS

- **Inputs Are TTL-Voltage Compatible**
- **3-State Outputs Interface Directly With System Bus**
- **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**
- **Provides Bus Interface From Multiple Sources in High-Performance Systems**
- **Package Options Include Plastic Small-Outline (DW) and Shrink Small-Outline (DB) Packages, and Standard Plastic 300-mil DIPs (N)**

DB, DW, OR N PACKAGE
(TOP VIEW)

$\overline{A}$/B	1	20	1A
1Y	2	19	1B
2Y	3	18	2A
GND	4	17	2B
GND	5	16	V_{CC}
GND	6	15	V_{CC}
GND	7	14	3A
3Y	8	13	3B
4Y	9	12	4A
$\overline{OE}$	10	11	4B

description

The 74ACT11257 is designed to multiplex signals from 4-bit data sources to four output data lines in bus-organized systems. The 3-state outputs do not load the data lines when the output-enable ($\overline{OE}$) input is at a high logic level.

The 74ACT11257 is characterized for operation from –40°C to 85°C.

FUNCTION TABLE

INPUTS				OUTPUT
$\overline{OE}$	SELECT $\overline{A}$/B	DATA A	DATA B	Y
H	X	X	X	Z
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

EPIC is a trademark of Texas Instruments Incorporated.

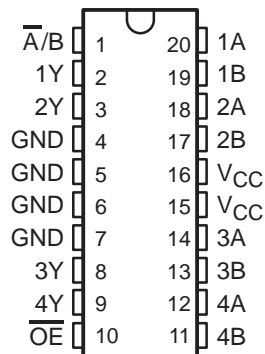**TEXAS INSTRUMENTS**

POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

74ACT11257
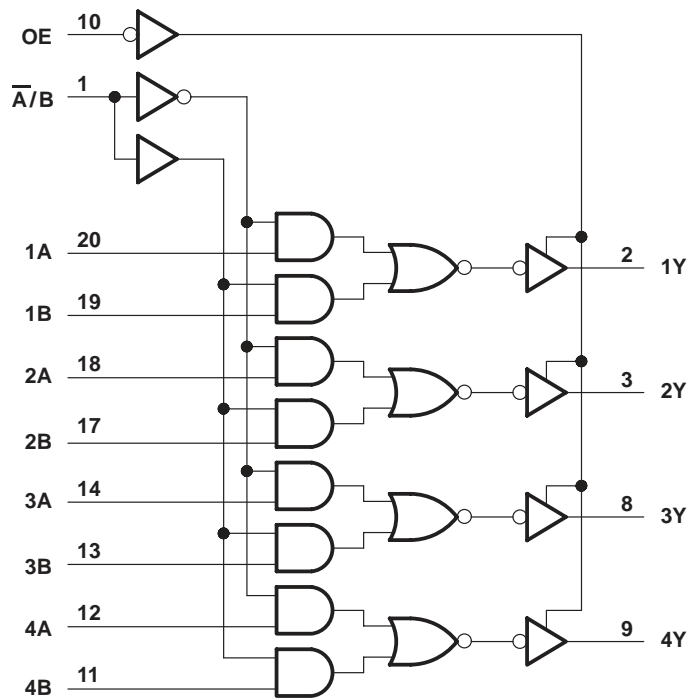## QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER WITH 3-STATE OUTPUTS
SCAS053B – JANUARY 1989 – REVISED APRIL 1996

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 .... ±100 mA
Maximum power dissipation at T_A = 55°C (in still air) (see Note 2): DB package .... 0.6 W
DW package .... 1.6 W
N package .... 1.3 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 N package, which has a trace length of zero.

recommended operating conditions

		MIN	MAX	UNIT
V_{CC}	Supply voltage	4.5	5.5	V
V_{IH}	High-level input voltage	2		V
V_{IL}	Low-level input voltage		0.8	V
V_I	Input voltage	0	V_{CC}	V
V_O	Output voltage	0	V_{CC}	V
I_{OH}	High-level output current		–24	mA
I_{OL}	Low-level output current		24	mA
$\Delta t/\Delta v$	Input transition rise or fall rate	0	10	ns/V
T_A	Operating free-air temperature	–40	85	°C

TEXAS
INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

3

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

PARAMETERS	TEST CONDITIONS		V_{CC}	$T_A = 25°C$			MIN	MAX	UNIT
				MIN	TYP	MAX			
V_{OH}	$I_{OH} = -50\ \mu A$		4.5 V	4.4			4.4		V
			5.5 V	5.4			5.4		
	$I_{OH} = -24\ mA$		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}	$I_{OL} = 50\ \mu A$		4.5 V			0.1		0.1	V
			5.5 V			0.1		0.1	
	$I_{OL} = 24\ mA$		4.5 V			0.36		0.44	
			5.5 V			0.36		0.44	
	$I_{OL} = 75\ mA$†		5.5 V					1.65	
I_{OZ}	$V_O = V_{CC}$ or GND		5.5 V		±0.5			±5	μA
I_I	$V_I = V_{CC}$ or GND		5.5 V		±0.1			±1	μA
I_{CC}	$V_I = V_{CC}$ or GND,	$I_O = 0$	5.5 V		8			80	μA
ΔI_{CC}‡	One input at 3.4 V,	Other inputs at V_{CC} or GND	5.5 V		0.9			1	mA
C_i	$V_I = V_{CC}$ or GND		5 V		3.5				pF
C_o	$V_O = V_{CC}$ or GND		5 V		8				pF

† Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.
‡ This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V to V_{CC}.

switching characteristics over recomended ranges of supply voltage and operating free-air temperature (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	Y	1.5	4.4	6.4	1.5	6.9	ns
t_{PHL}			1.5	5	8	1.5	8.7	
t_{PLH}	$\overline{A}/B$	Any Y	1.5	4.7	7.6	1.5	8.2	ns
t_{PHL}			1.5	5.7	8.5	1.5	9.4	
t_{PZH}	$\overline{OE}$	Any Y	1.5	4.2	6.9	1.5	7.3	ns
t_{PZL}			1.5	5.5	8.7	1.5	9.6	
t_{PHZ}	$\overline{OE}$	Any Y	1.5	5.7	7.6	1.5	8.4	ns
t_{PLZ}			1.5	6	7.9	1.5	8.5	

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

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd} Power dissipation capacitance	Outputs enabled	$C_L = 50$ pF,	$f = 1$ MHz	41	pF
	Outputs disabled			13	

TEXAS
INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

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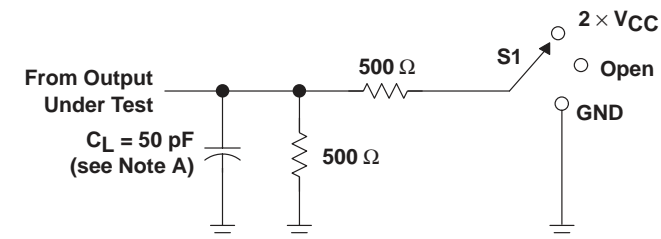
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT
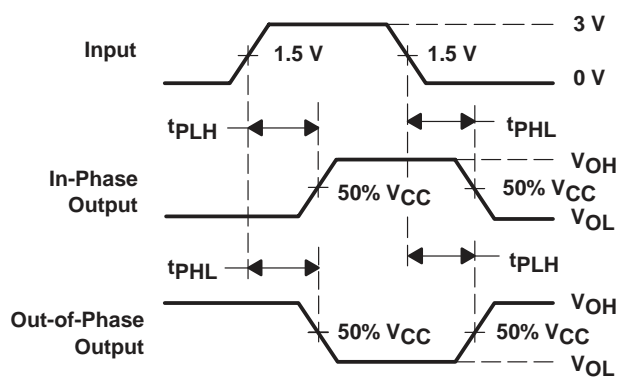
VOLTAGE WAVEFORMS
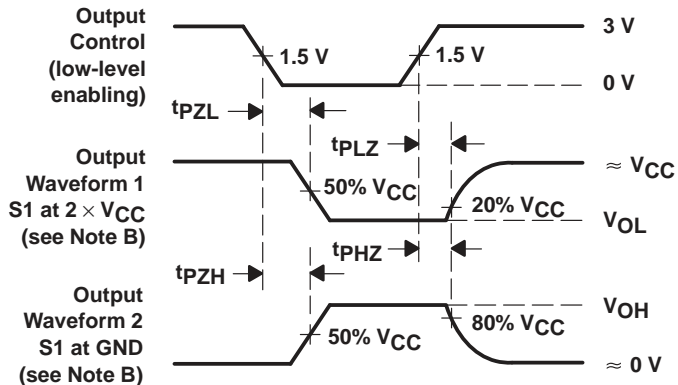
VOLTAGE WAVEFORMS

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 $\leq$ 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

PACKAGING INFORMATION

Orderable Device	Status [1]	Package Type	Package Drawing	Pins	Package Qty	Eco Plan [2]	Lead/Ball Finish	MSL Peak Temp [3]
74ACT11257DBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257DBRE4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257DBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257DWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257DWRE4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257DWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257NE4	ACTIVE	PDIP	N	20		TBD	Call TI	Call TI
74ACT11257NSRE4	ACTIVE	SO	NS	20		TBD	Call TI	Call TI
74ACT11257NSRG4	ACTIVE	SO	NS	20		TBD	Call TI	Call TI
74ACT11257PW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257PWE4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257PWG4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257PWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74ACT11257PWRG4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

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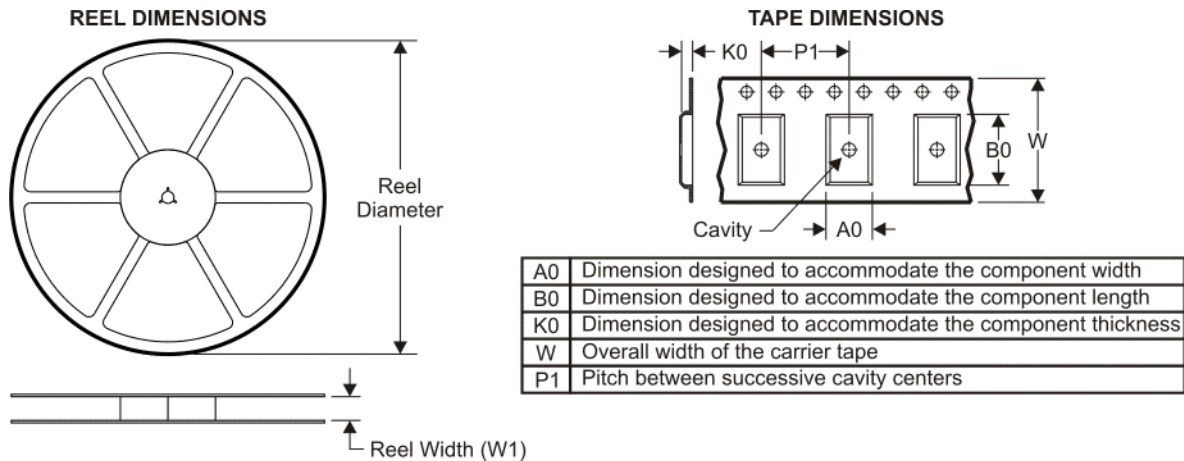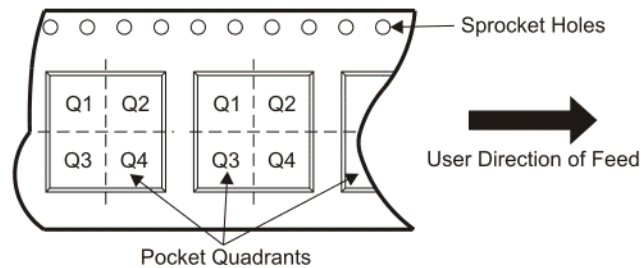**Pb-Free (RoHS Exempt):** This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.
Green (RoHS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

![Texas Instruments logo] **PACKAGE MATERIALS INFORMATION**

TAPE AND REEL INFORMATION

REEL DIMENSIONS

TAPE DIMENSIONS

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

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE

*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
74ACT11257DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
74ACT11257DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
74ACT11257PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.1	1.6	8.0	16.0	Q1

TAPE AND REEL BOX DIMENSIONS

*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
74ACT11257DBR	SSOP	DB	20	2000	346.0	346.0	33.0
74ACT11257DWR	SOIC	DW	20	2000	346.0	346.0	41.0
74ACT11257PWR	TSSOP	PW	20	2000	346.0	346.0	33.0

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

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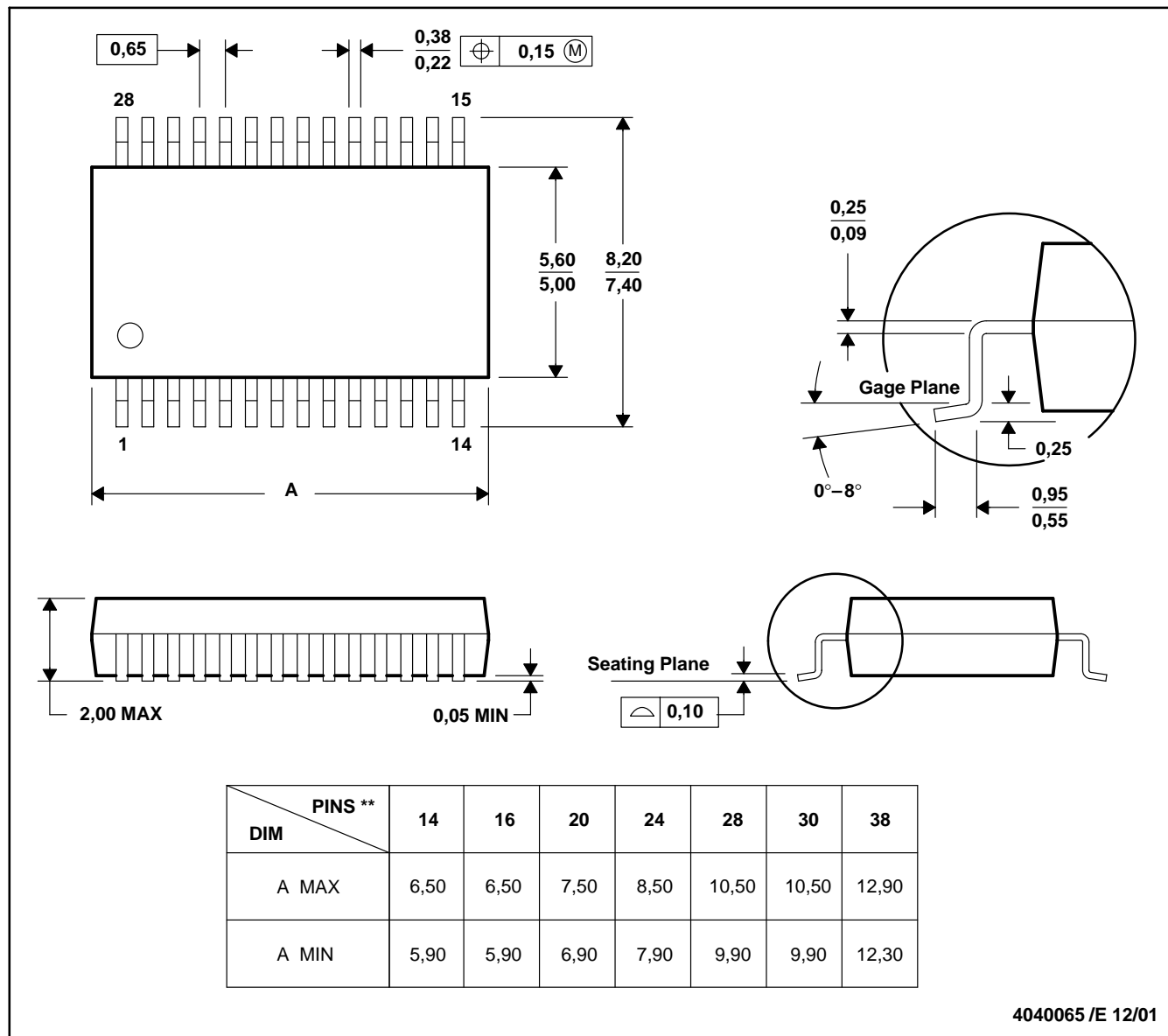
PINS ** DIM	14	16	20	24	28	30	38
A MAX	6,50	6,50	7,50	8,50	10,50	10,50	12,90
A MIN	5,90	5,90	6,90	7,90	9,90	9,90	12,30

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

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

14 PINS SHOWN
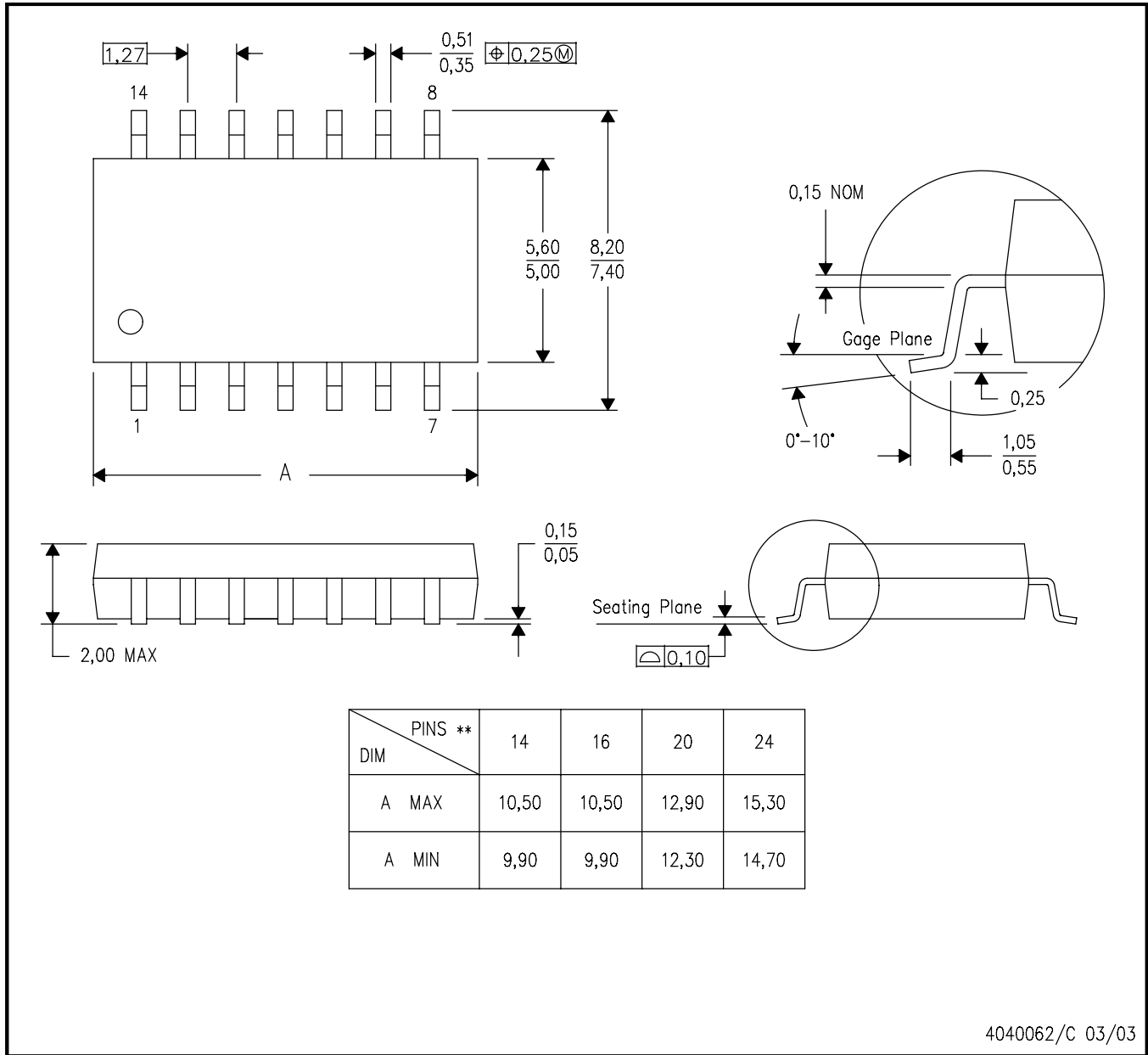
PINS ** DIM	8	14	16	20	24	28
A MAX	3,10	5,10	5,10	6,60	7,90	9,80
A MIN	2,90	4,90	4,90	6,40	7,70	9,60

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

TEXAS INSTRUMENTS

POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

MECHANICAL DATA

PINS ** DIM	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.

DW (R−PDSO−G20)   PLASTIC SMALL−OUTLINE PACKAGE
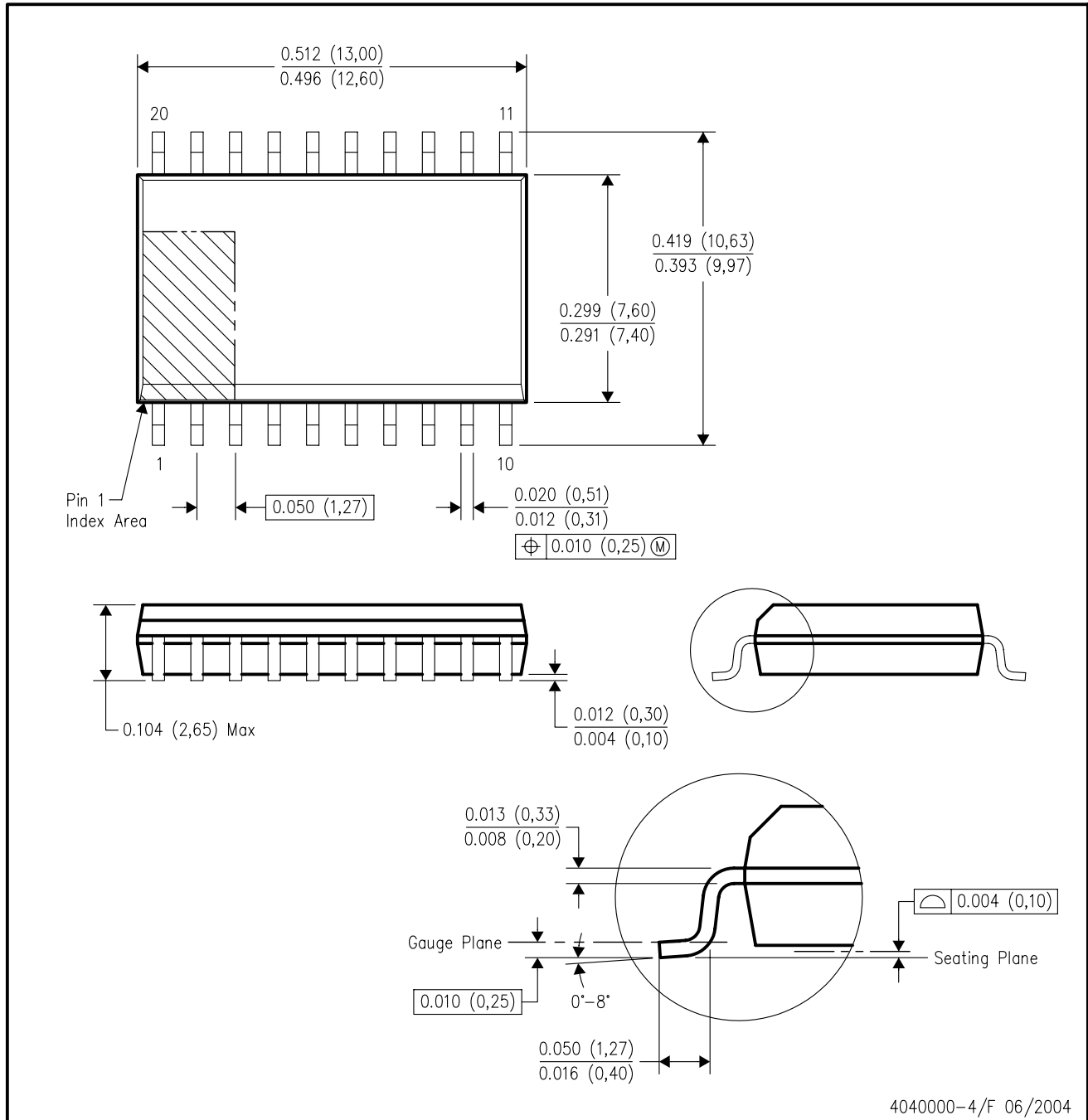
$\frac{0.512\ (13,00)}{0.496\ (12,60)}$

20   11

$\frac{0.419\ (10,63)}{0.393\ (9,97)}$

$\frac{0.299\ (7,60)}{0.291\ (7,40)}$

1   10

Pin 1
Index Area

0.050 (1,27)

$\frac{0.020\ (0,51)}{0.012\ (0,31)}$

⊕ | 0.010 (0,25) Ⓜ

0.104 (2,65) Max

$\frac{0.012\ (0,30)}{0.004\ (0,10)}$

$\frac{0.013\ (0,33)}{0.008\ (0,20)}$

⌓ | 0.004 (0,10)

Gauge Plane

Seating Plane

0.010 (0,25)   0°−8°

$\frac{0.050\ (1,27)}{0.016\ (0,40)}$

4040000−4/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 AC.

N (R−PDIP−T**)
16 PINS SHOWN

PLASTIC DUAL−IN−LINE PACKAGE

DIM \ PINS **	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
/C\ MS−001 VARIATION	AA	BB	AC	AD

A

16   9

0.260 (6,60)
0.240 (6,10)

1   8

0.070 (1,78)
0.045 (1,14) /D\

0.045 (1,14)
0.030 (0,76) /D\

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) Ⓜ

14/18 Pin Only
20 Pin vendor option /D\

0.325 (8,26)
0.300 (7,62)

0.015 (0,38)

Gauge Plane

0.010 (0,25) NOM

0.430 (10,92) MAX

4040049/E   12/2002

NOTES: A.   All linear dimensions are in inches (millimeters).
         B.   This drawing is subject to change without notice.
     /C\   Falls within JEDEC MS−001, except 18 and 20 pin minimum body length (Dim A).
     /D\   The 20 pin end lead shoulder width is a vendor option, either half or full width.