

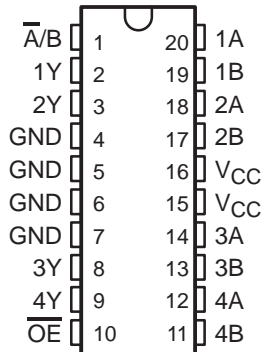
# 74AC11257

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

SCAS049C – MARCH 1989 – REVISED MAY 2004

- 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
- 500-mA Typical Latch-Up Immunity at 125°C
- Provides Bus Interface From Multiple Sources in High-Performance Systems

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



### description/ordering information

This device 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.

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.

### ORDERING INFORMATION

T <sub>A</sub>	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
-40°C to 85°C	PDIP – N	Tube	74AC11257N	74AC11257N
	SOIC – DW	Tube	74AC11257DW	AC11257
		Tape and reel	74AC11257DWR	
	SSOP – DB	Tape and reel	74AC11257DBR	AE257
	TSSOP – PW	Tube	74AC11257PW	AE257
		Tape and reel	74AC11257PWR	

† 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).

### FUNCTION TABLE

$\overline{OE}$	INPUTS			OUTPUT Y
	SELECT $\overline{A/B}$	DATA		
		A	B	
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



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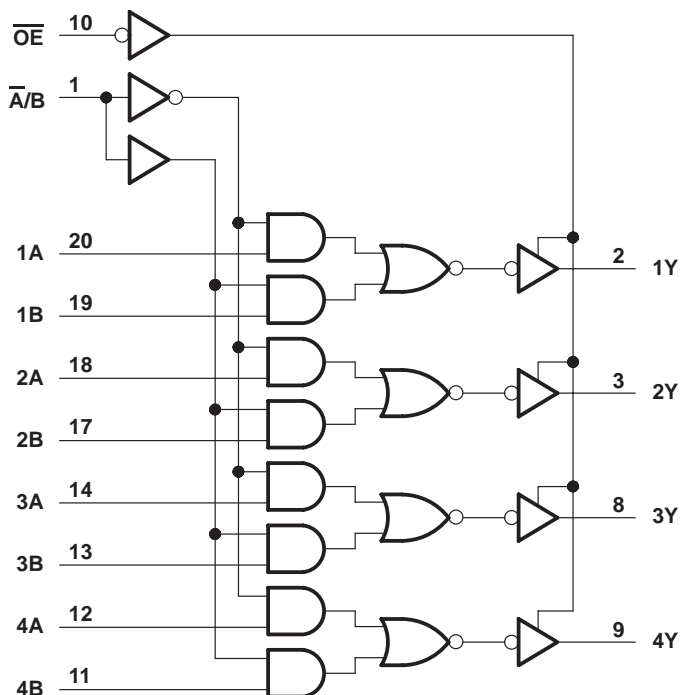
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# 74AC11257

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

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### 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 $V_I > V_{CC}$ ) .....	$\pm 20$ mA
Output clamp current, $I_{OK}$ ( $V_O < 0$ or $V_O > V_{CC}$ ) .....	$\pm 50$ mA
Continuous output current, $I_O$ ( $V_O = 0$ to $V_{CC}$ ) .....	$\pm 50$ mA
Continuous current through $V_{CC}$ or GND .....	$\pm 100$ mA
Package thermal impedance, $\theta_{JA}$ (see Note 2): DB package .....	70°C/W
DW package .....	58°C/W
N package .....	60°C/W
PW package .....	83°C/W

Storage temperature range,  $T_{stg}$  .....

† 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 package thermal impedance is calculated in accordance with JESD 51-7.



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**74AC11257**  
**QUADRUPLE 2-LINE TO 1-LINE DATA SELECTOR/MULTIPLEXER**  
**WITH 3-STATE OUTPUTS**

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**recommended operating conditions (see Note 3)**

		MIN	NOM	MAX	UNIT
V <sub>CC</sub>	Supply voltage	3	5	5.5	V
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 3 V	2.1		V
		V <sub>CC</sub> = 4.5 V	3.15		
		V <sub>CC</sub> = 5.5 V	3.85		
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 3 V		0.9	V
		V <sub>CC</sub> = 4.5 V		1.35	
		V <sub>CC</sub> = 5.5 V		1.65	
V <sub>I</sub>	Input voltage	0		V <sub>CC</sub>	V
V <sub>O</sub>	Output voltage	0		V <sub>CC</sub>	V
I <sub>OH</sub>	High-level output current	V <sub>CC</sub> = 3 V		-4	mA
		V <sub>CC</sub> = 4.5 V		-24	
		V <sub>CC</sub> = 5.5 V		-24	
I <sub>OL</sub>	Low-level output current	V <sub>CC</sub> = 3 V		12	mA
		V <sub>CC</sub> = 4.5 V		24	
		V <sub>CC</sub> = 5.5 V		24	
Δt/Δv	Input transition rise or fall rate			10	ns/V
T <sub>A</sub>	Operating free-air temperature	-40		85	°C

NOTE 3: All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	T <sub>A</sub> = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
V <sub>OH</sub>	I <sub>OH</sub> = -50 μA	3 V	2.9		2.9		V	
		4.5 V	4.4		4.4			
		5.5 V	5.4		5.4			
	I <sub>OH</sub> = -4 mA	3 V	2.58		2.48			
		4.5 V	3.94		3.8			
		5.5 V	4.94		4.8			
I <sub>OH</sub> = -75 mA†	5.5 V			3.85				
V <sub>OL</sub>	I <sub>OL</sub> = 50 μA	3 V			0.1	0.1	V	
		4.5 V			0.1	0.1		
		5.5 V			0.1	0.1		
	I <sub>OL</sub> = 12 mA	3 V		0.36		0.44		
		4.5 V		0.36		0.44		
		5.5 V		0.36		0.44		
I <sub>OL</sub> = 75 mA†	5.5 V				1.65			
I <sub>OZ</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	5.5 V		±0.5		±5	μA	
I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5.5 V		±0.1		±1	μA	
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND, I <sub>O</sub> = 0	5.5 V		8		80	μA	
C <sub>i</sub>	V <sub>I</sub> = V <sub>CC</sub> or GND	5 V		3.5			pF	
C <sub>o</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	5.5 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.



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

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
$t_{PLH}$	A or B	Y	1.5	5.6	8.1	1.5	8.9	ns
$t_{PHL}$			1.5	6.2	9	1.5	10.1	
$t_{PLH}$	$\bar{A}/B$	Any Y	1.5	6.1	9.2	1.5	10.2	ns
$t_{PHL}$			1.5	6.6	10	1.5	11.2	
$t_{PZH}$	$\overline{OE}$	Any Y	1.5	5.6	8.2	1.5	9.1	ns
$t_{PZL}$			1.5	7.5	10.4	1.5	11.8	
$t_{PHZ}$	$\overline{OE}$	Any Y	1.5	5.6	7.6	1.5	8.3	ns
$t_{PLZ}$			1.5	6.2	8.8	1.5	9.6	

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
$t_{PLH}$	A or B	Y	1.5	3.6	5.8	1.5	6.4	ns
$t_{PHL}$			1.5	4.1	6.5	1.5	7.2	
$t_{PLH}$	$\bar{A}/B$	Any Y	1.5	4	6.5	1.5	7.2	ns
$t_{PHL}$			1.5	4.4	7.1	1.5	7.9	
$t_{PZH}$	$\overline{OE}$	Any Y	1.5	3.8	5.9	1.5	6.5	ns
$t_{PZL}$			1.5	5	7.6	1.5	8.6	
$t_{PHZ}$	$\overline{OE}$	Any Y	1.5	4.5	6.4	1.5	7.6	ns
$t_{PLZ}$			1.5	4.8	6.9	1.5	7.6	

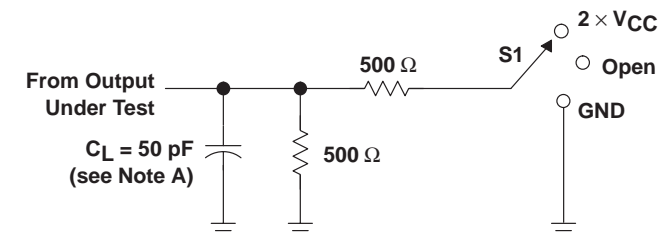
operating characteristics,  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	TYP	UNIT
$C_{pd}$	Power dissipation capacitance	$C_L = 50\text{ pF}$ , $f = 1\text{ MHz}$	37	pF
			11	

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

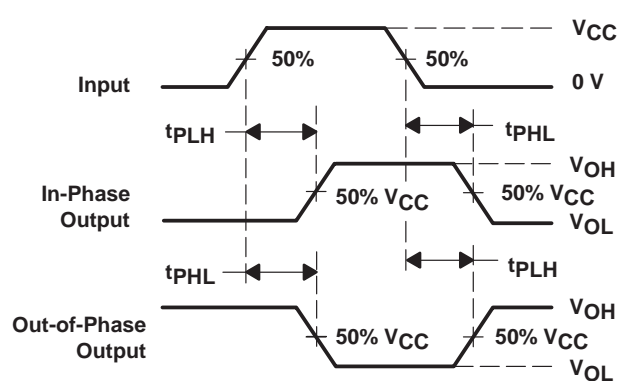
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## PARAMETER MEASUREMENT INFORMATION

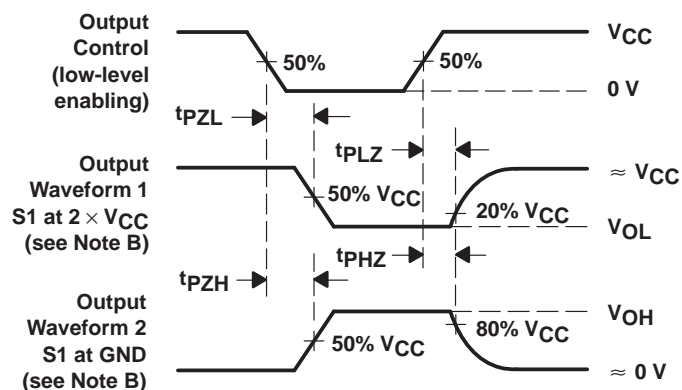


LOAD CIRCUIT

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



VOLTAGE WAVEFORMS



VOLTAGE WAVEFORMS

- NOTES:
- $C_L$  includes probe and jig capacitance.
  - 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.
  - All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r = 3 \text{ ns}$ ,  $t_f = 3 \text{ ns}$ .
  - 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 <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
74AC11257DBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257DBRE4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257DBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257DWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257DWRE4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257DWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
74AC11257NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type
74AC11257PW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257PWE4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257PWG4	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257PWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257PWRE4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
74AC11257PWRG4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM

<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), 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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**TAPE AND REEL INFORMATION**



**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
74AC11257DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
74AC11257DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
74AC11257PWR	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)
74AC11257DBR	SSOP	DB	20	2000	346.0	346.0	33.0
74AC11257DWR	SOIC	DW	20	2000	346.0	346.0	41.0
74AC11257PWR	TSSOP	PW	20	2000	346.0	346.0	33.0

DB (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN

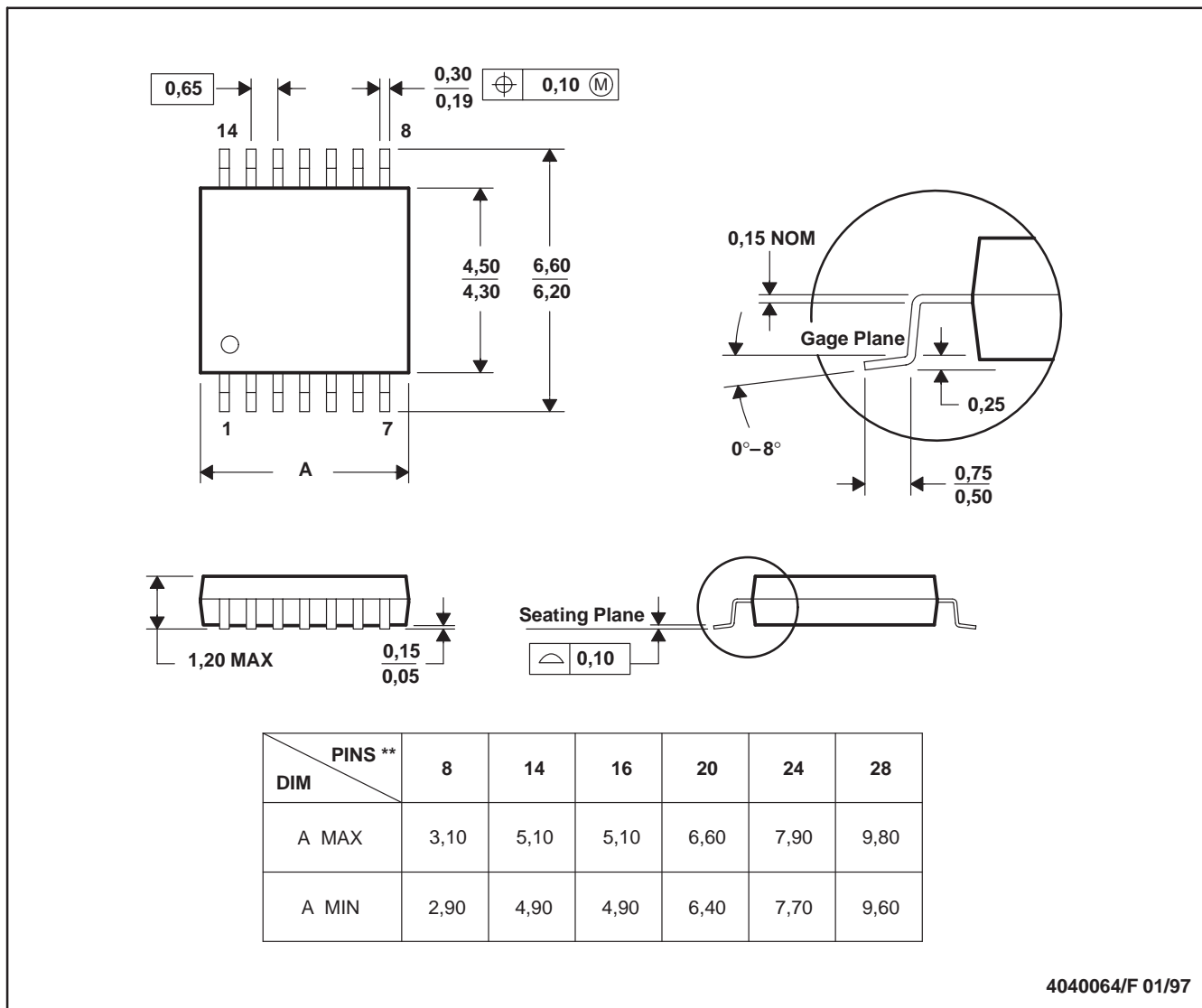


- NOTES: A. All linear dimensions are in millimeters.  
 B. This drawing is subject to change without notice.  
 C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.  
 D. Falls within JEDEC MO-150

PW (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



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

DW (R-PDSO-G20)

PLASTIC SMALL-OUTLINE PACKAGE



- 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\*\*)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



4040049/E 12/2002

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

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