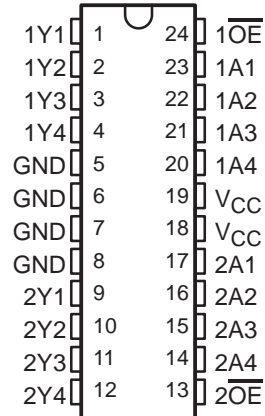


# 74AC11240 OCTAL BUFFER/LINE DRIVER WITH 3-STATE OUTPUTS

SCAS448A – MAY 1987 – REVISED APRIL 1996

- **Flow-Through Architecture Optimizes PCB Layout**
- **Center-Pin  $V_{CC}$  and GND Configurations Minimize High-Speed Switching Noise**
- **EPIC™ (Enhanced-Performance Implanted CMOS) 1- $\mu$ m Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Plastic Small-Outline (DW) and Shrink Small-Outline (DB) Packages, and Standard Plastic 300-mil DIPs (NT)**

DB, DW, OR NT PACKAGE  
(TOP VIEW)



## description

This octal buffer/line driver is designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. This device provides inverting outputs and symmetrical active-low output-enable ( $\overline{OE}$ ) inputs. This device features high fan-out and improved fan-in.

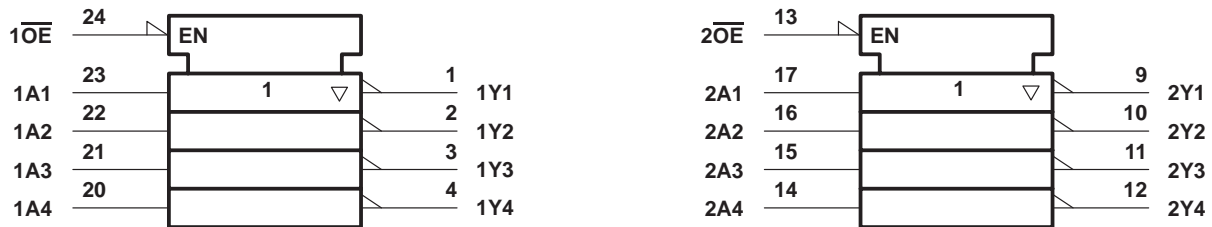
The 74AC11240 is organized as two 4-bit buffers/line drivers with separate  $\overline{OE}$  inputs. When  $\overline{OE}$  is low, the device passes inverted data from the A inputs to the Y outputs. When  $\overline{OE}$  is high, the outputs are in the high-impedance state.

The 74AC11240 is characterized for operation from  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ .

**FUNCTION TABLE**  
(each buffer)

INPUTS		OUTPUT
$\overline{OE}$	A	Y
L	H	L
L	L	H
H	X	Z

## logic symbol†



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



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**TEXAS  
INSTRUMENTS**

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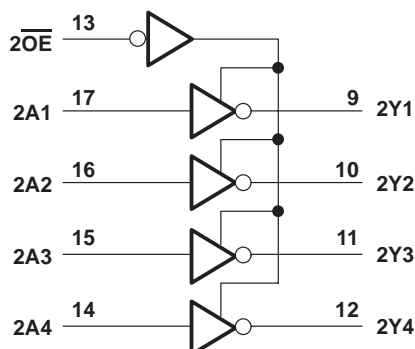
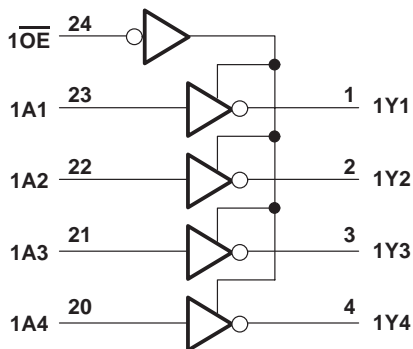
# 74AC11240

## OCTAL BUFFER/LINE DRIVER

### 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 6 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 .....	$\pm 200$ mA
Maximum power dissipation at $T_A = 55^\circ\text{C}$ (in still air) (see Note 2):	
DB package .....	0.65 W
DW package .....	1.7 W
NT package .....	1.3 W
Storage temperature range, $T_{stg}$ .....	$-65^\circ\text{C}$ to $150^\circ\text{C}$

† 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  $150^\circ\text{C}$  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 <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	OE	0	5	ns/V
		Data	0	10	
T <sub>A</sub>	Operating free-air temperature	-40	85		°C

**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		
		5.5 V	I <sub>OH</sub> = -75 mA <sup>†</sup>			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		
		5.5 V	I <sub>OL</sub> = 75 mA <sup>†</sup>			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	4					pF
C <sub>O</sub>	V <sub>O</sub> = V <sub>CC</sub> or GND	5 V	10					pF

<sup>†</sup> Not more than one output should be tested at a time, and the duration of the test should not exceed 10 ms.

**74AC11240**  
**OCTAL BUFFER/LINE DRIVER**  
**WITH 3-STATE OUTPUTS**

SCAS448A – MAY 1987 – REVISED APRIL 1996

**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	Y	1.5	7.6	10.5	1.5	11.7	ns
$t_{PHL}$			1.5	6.3	8.6	1.5	9.5	
$t_{PZH}$	$\overline{OE}$	Y	1.5	8.2	11.6	1.5	12.7	ns
$t_{PZL}$			1.5	7.6	10.8	1.5	12	
$t_{PHZ}$	$\overline{OE}$	Y	1.5	5.5	7.5	1.5	7.8	ns
$t_{PLZ}$			1.5	6.7	9.4	1.5	9.8	

**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)**

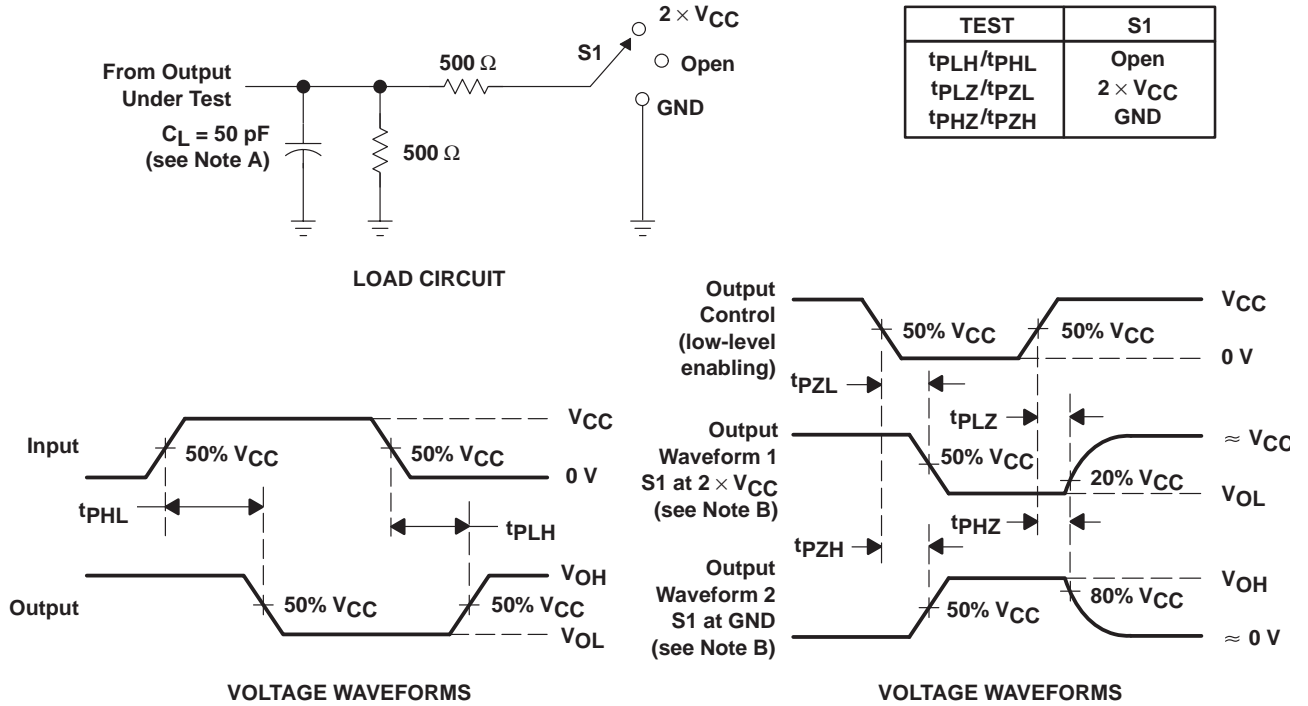
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$T_A = 25^\circ\text{C}$			MIN	MAX	UNIT
			MIN	TYP	MAX			
$t_{PLH}$	A	Y	1.5	5.4	7.5	1.5	8.4	ns
$t_{PHL}$			1.5	4.6	6.6	1.5	7.2	
$t_{PZH}$	$\overline{OE}$	Y	1.5	5.7	8.2	1.5	9.2	ns
$t_{PZL}$			1.5	5.3	7.7	1.5	8.7	
$t_{PHZ}$	$\overline{OE}$	Y	1.5	4.7	6.3	1.5	6.6	ns
$t_{PLZ}$			1.5	5.2	7.3	1.5	7.7	

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

PARAMETER		TEST CONDITIONS	TYP	UNIT
$C_{pd}$	Power dissipation capacitance per buffer	Outputs enabled	39	pF
		Outputs disabled	12	



**PARAMETER MEASUREMENT INFORMATION**



- 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:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r = 3 \text{ ns}$ ,  $t_f = 3 \text{ ns}$ .  
 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)	Op Temp (°C)	Top-Side Markings (4)	Samples
74AC11240DBLE	OBSOLETE	SSOP	DB	24		TBD	Call TI	Call TI	-40 to 85		
74AC11240DBR	ACTIVE	SSOP	DB	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AE240	<a href="#">Samples</a>
74AC11240DBRE4	ACTIVE	SSOP	DB	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AE240	<a href="#">Samples</a>
74AC11240DBRG4	ACTIVE	SSOP	DB	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AE240	<a href="#">Samples</a>
74AC11240DW	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC11240	<a href="#">Samples</a>
74AC11240DWE4	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC11240	<a href="#">Samples</a>
74AC11240DWG4	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AC11240	<a href="#">Samples</a>
74AC11240PW	ACTIVE	TSSOP	PW	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AE240	<a href="#">Samples</a>
74AC11240PWE4	ACTIVE	TSSOP	PW	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AE240	<a href="#">Samples</a>
74AC11240PWG4	ACTIVE	TSSOP	PW	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	AE240	<a href="#">Samples</a>

(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.

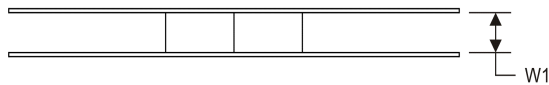
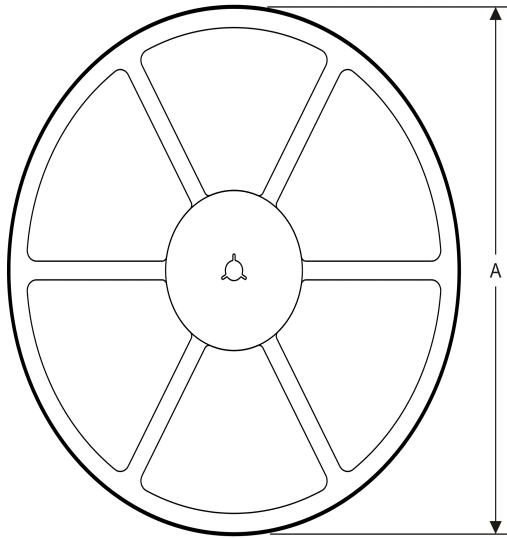
(4) Multiple Top-Side Markings will be inside parentheses. Only one Top-Side Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Top-Side Marking for that device.

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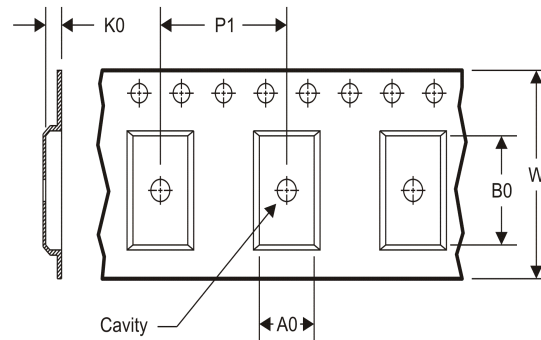
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**TAPE AND REEL INFORMATION**

**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

**TAPE AND REEL INFORMATION**

\*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
74AC11240DBR	SSOP	DB	24	2000	330.0	16.4	8.2	8.8	2.5	12.0	16.0	Q1



TAPE AND REEL BOX DIMENSIONS



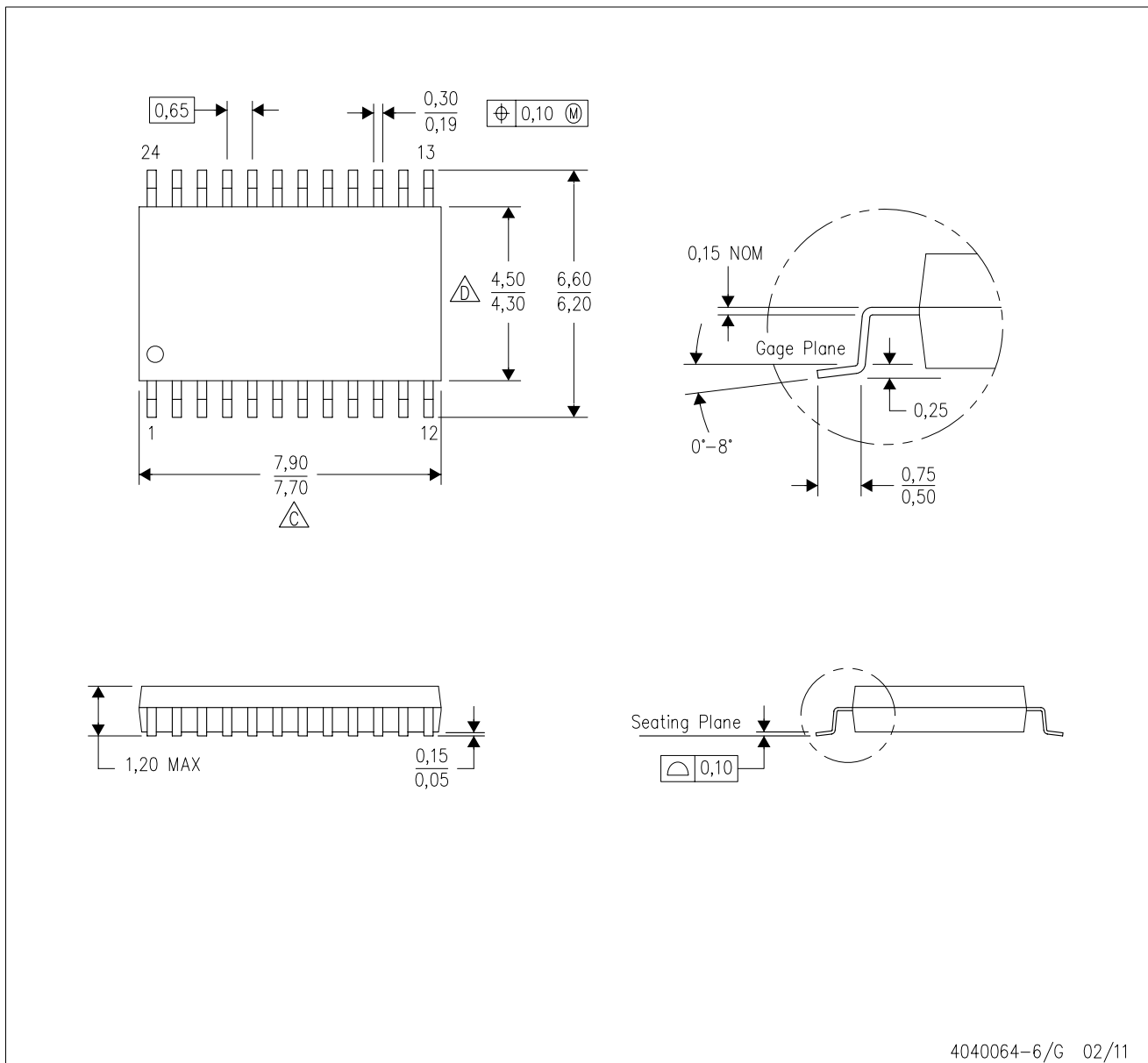
\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
74AC11240DBR	SSOP	DB	24	2000	367.0	367.0	38.0



PW (R-PDSO-G24)

PLASTIC SMALL OUTLINE

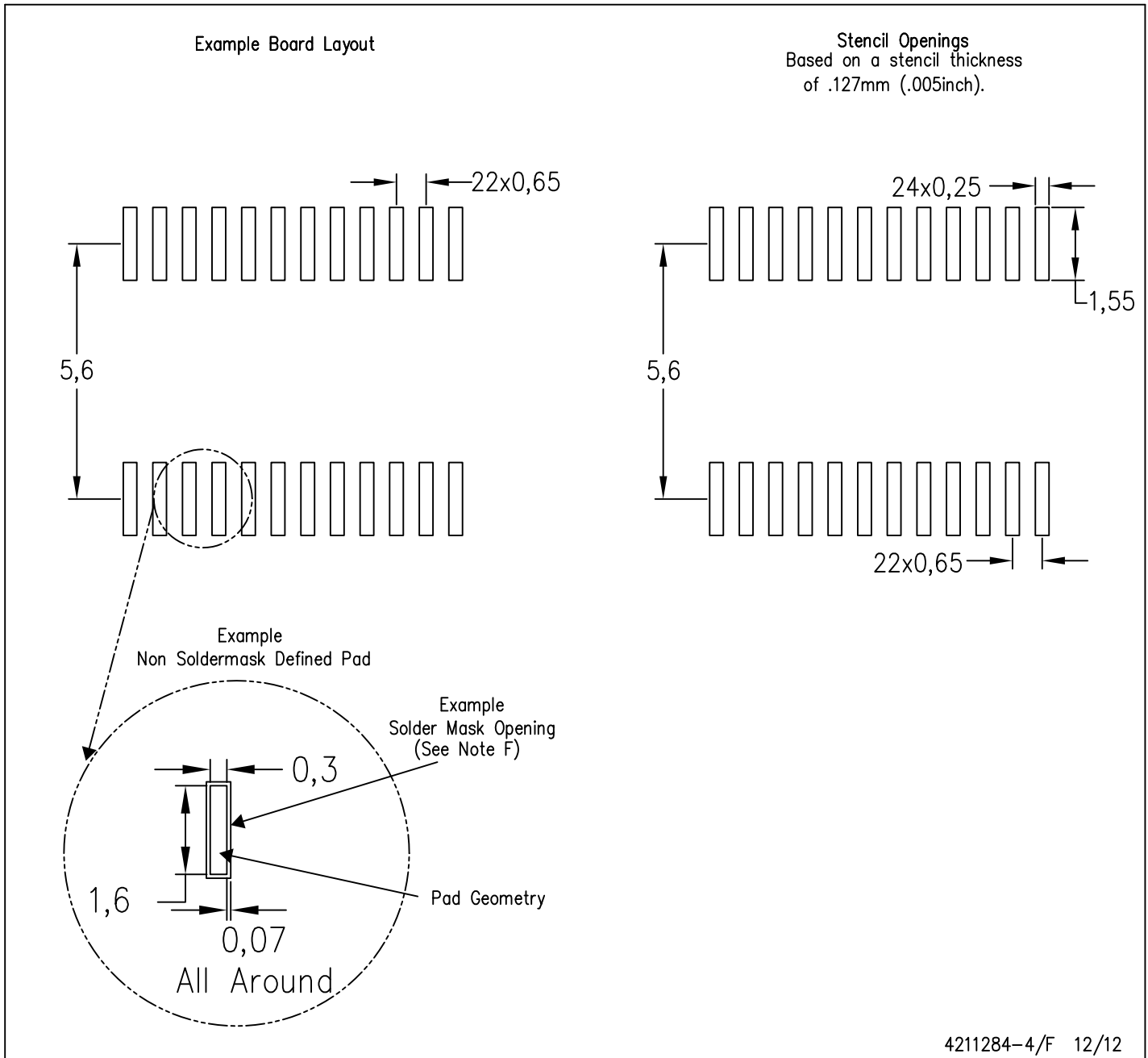


4040064-6/G 02/11

- 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.
  -  Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0,15 each side.
  -  Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
  - E. Falls within JEDEC MO-153

PW (R-PDSO-G24)

PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Publication IPC-7351 is recommended for alternate design.
  - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525 for other stencil recommendations.
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

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

4040065 /E 12/01

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