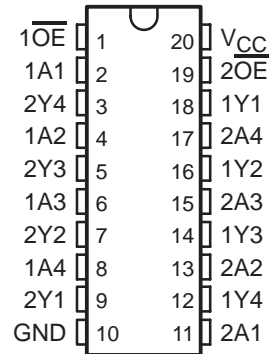


SN74AS230A OCTAL BUFFER/DRIVER WITH 3-STATE OUTPUTS

SDAS213B – DECEMBER 1982 – REVISED DECEMBER 1994

- True and Complementary Outputs
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- High Capacitive-Drive Capability
- Current-Sinking Capability Up to 64 mA
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic (N) 300-mil DIPs

DW OR N PACKAGE
(TOP VIEW)



description

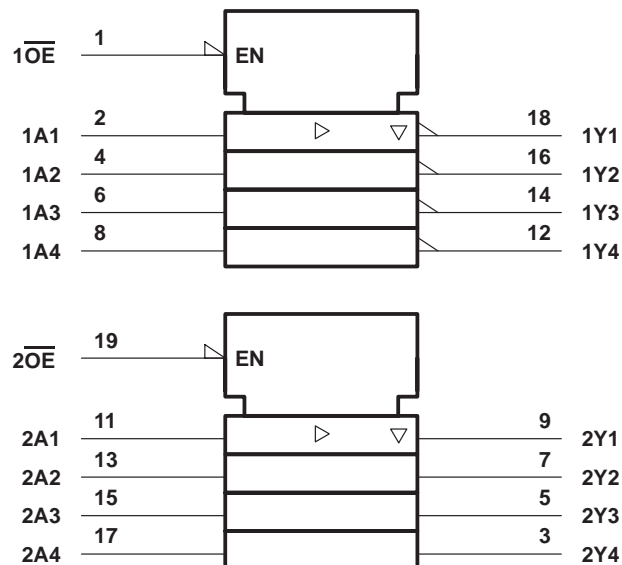
This octal buffer/driver is designed specifically to improve the performance of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. When used together, multiples of this device provide the choice of selected combinations of inverting and noninverting outputs, symmetrical active-low output-enable (\overline{OE}) inputs, and complementary OE and \overline{OE} inputs.

The SN74AS230A is characterized for operation from 0°C to 70°C.

FUNCTION TABLE
(each buffer)

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

logic symbol†



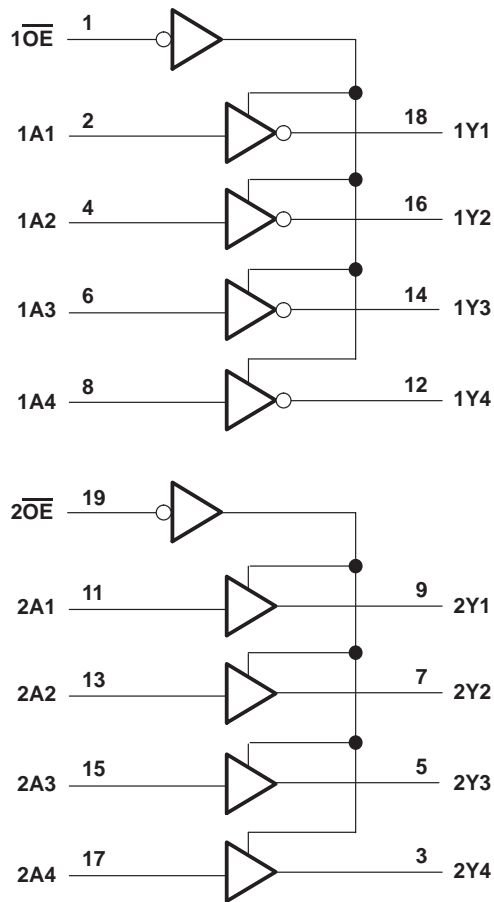
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

SN74AS230A

OCTAL BUFFER/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, V_{CC}	7 V
Input voltage, V_I	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range, T_A	0°C to 70°C
Storage temperature range	-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.

recommended operating conditions

	MIN	NOM	MAX	UNIT
V_{CC} Supply voltage	4.5	5	5.5	V
V_{IH} High-level input voltage	2			V
V_{IL} Low-level input voltage			0.8	V
I_{OH} High-level output current			-15	mA
I_{OL} Low-level output current			64	mA
T_A Operating free-air temperature	0		70	°C



SN74AS230A OCTAL BUFFER/DRIVER WITH 3-STATE OUTPUTS

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

PARAMETER		TEST CONDITIONS	MIN	TYP†	MAX	UNIT
V _{IK}		V _{CC} = 4.5 V, I _I = -18 mA			-1.2	V
V _{OH}		V _{CC} = 4.5 V to 5.5 V, I _{OH} = -2 mA	V _{CC} - 2			V
		V _{CC} = 4.5 V	I _{OH} = -3 mA	2.4	3.4	
			I _{OH} = -15 mA	2.4		
V _{OL}		V _{CC} = 4.5 V, I _{OL} = 64 mA	0.31	0.55		V
I _{OZH}		V _{CC} = 5.5 V, V _O = 2.7 V			50	μA
I _{OZL}		V _{CC} = 5.5 V, V _O = 0.4 V			-50	μA
I _I		V _{CC} = 5.5 V, V _I = 7 V			0.1	mA
I _{IH}		V _{CC} = 5.5 V, V _I = 2.7 V			20	μA
I _{IL}	2A inputs	V _{CC} = 5.5 V, V _I = 0.4 V			-1	mA
	All other inputs				-0.5	
I _{O‡}		V _{CC} = 5.5 V, V _O = 2.25 V	-50		-150	mA
I _{CC}		V _{CC} = 5.5 V	Outputs high	16	25	mA
			Outputs low	55	87	
			Outputs disabled	29	46	

† All typical values are at V_{CC} = 5 V, T_A = 25°C.

‡ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω, T _A = MIN to MAX§		UNIT
			MIN	MAX	
t _{PLH}	1A	1Y	2	6.5	ns
t _{PHL}			1	5.7	
t _{PLH}	2A	2Y	2	6.2	ns
t _{PHL}			1	6.2	
t _{PZH}	1 \overline{OE}	1Y	2	6.4	ns
t _{PZL}			2	8.5	
t _{PHZ}	1 \overline{OE}	1Y	2	6	ns
t _{PLZ}			2	9.5	
t _{PZH}	2 \overline{OE}	2Y	2	9	ns
t _{PZL}			2	7.5	
t _{PHZ}	2 \overline{OE}	2Y	2	6	ns
t _{PLZ}			2	9	

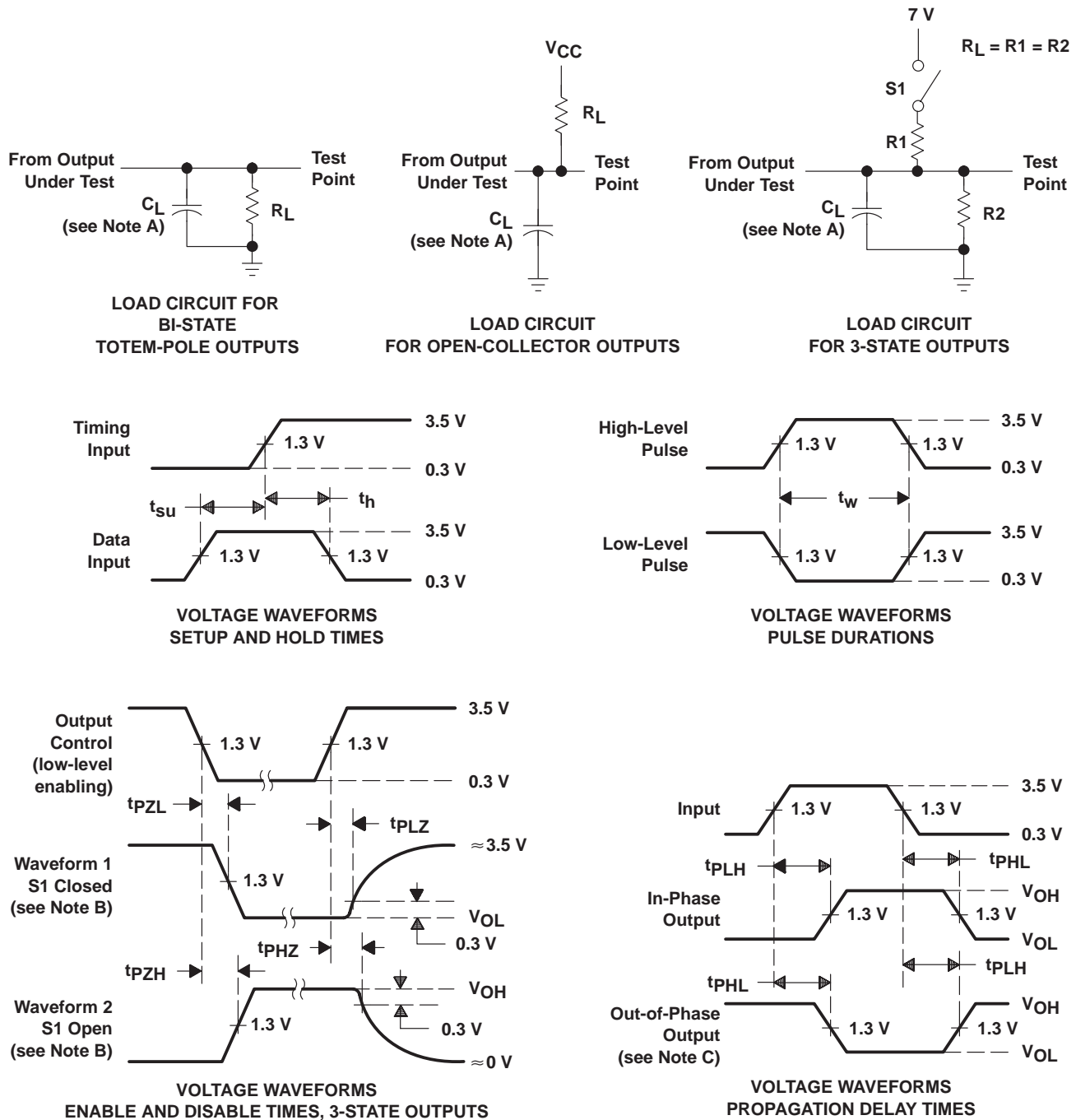
§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.



SN74AS230A OCTAL BUFFER/DRIVER WITH 3-STATE OUTPUTS

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PARAMETER MEASUREMENT INFORMATION SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- 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. When measuring propagation delay items of 3-state outputs, switch S1 is open.
 D. All input pulses have the following characteristics: $PRR \leq 1$ MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
 E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits 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
SN74AS230ADW	OBSOLETE	SOIC	DW	20		TBD	Call TI	Call TI	0 to 70		
SN74AS230ADWR	OBSOLETE	SOIC	DW	20		TBD	Call TI	Call TI	0 to 70		
SN74AS230AN	OBSOLETE	PDIP	N	20		TBD	Call TI	Call TI	0 to 70		

(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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N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



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

DW0020A



PACKAGE OUTLINE

SOIC - 2.65 mm max height

SOIC



4220724/A 05/2016

NOTES:

1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
5. Reference JEDEC registration MS-013.

EXAMPLE BOARD LAYOUT

DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

4220724/A 05/2016

NOTES: (continued)

8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

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