- **4-Line to 1-Line Multiplexers That Can Select 1-of-16 Data Inputs**
- **Applications:**
  - **Boolean Function Generator**
  - **Parallel-to-Serial Converter**
  - **Data Source Selector**
- **Buffered 3-State Bus Driver Inputs Permit Multiplexing From n Lines to One Line**
- **Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (NT) and Ceramic (JT) 300-mil DIPs**

description

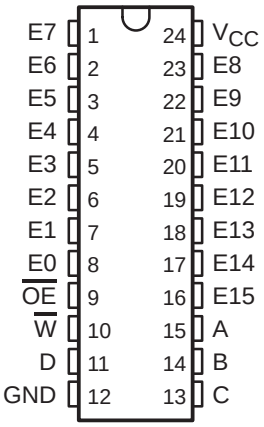
The ′AS250A devices provide full binary decoding to select 1-of-16 data inputs or use sources as an input with an inverting $\overline{W}$ output. The selected sources are buffered with symmetrical propagation delay times. This reduces the possibility of transients occurring at the output.

A buffered output-enable ($\overline{OE}$) input can be used for n-line to 1-line cascading. Taking $\overline{OE}$ high places the output in the high-impedance state. In the high-impedance state, the output neither loads nor drives the bus lines significantly.

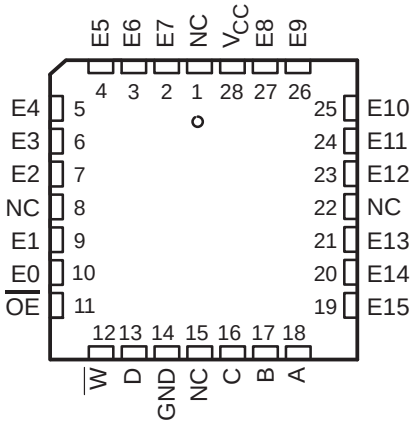
$\overline{OE}$ does not affect the internal operations of the data selector/multiplexer. New data can be set up while the outputs are disabled.

The SN54AS250A is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74AS250A is characterized for operation from 0°C to 70°C.

SN54AS250A . . . JT PACKAGE
SN74AS250A . . . DW OR NT PACKAGE
(TOP VIEW)



SN54AS250A . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

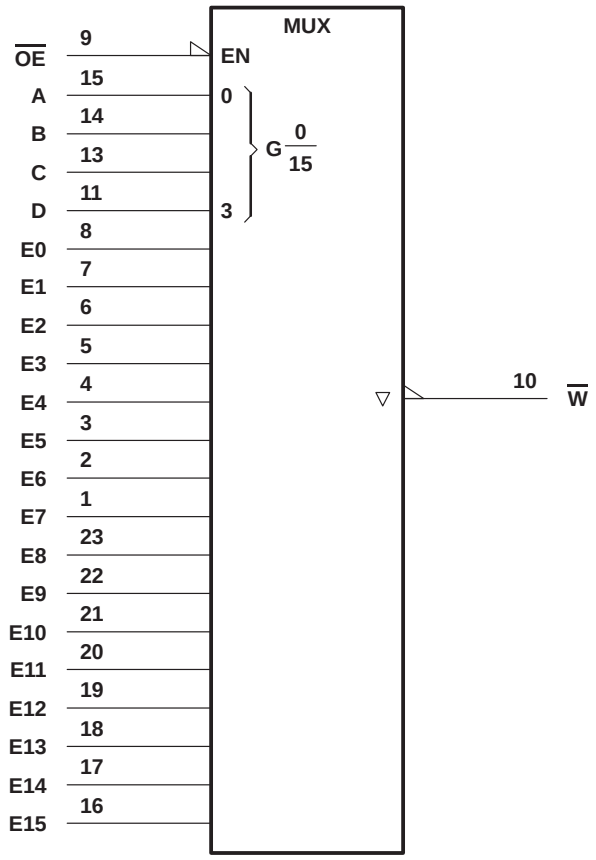
PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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FUNCTION TABLE

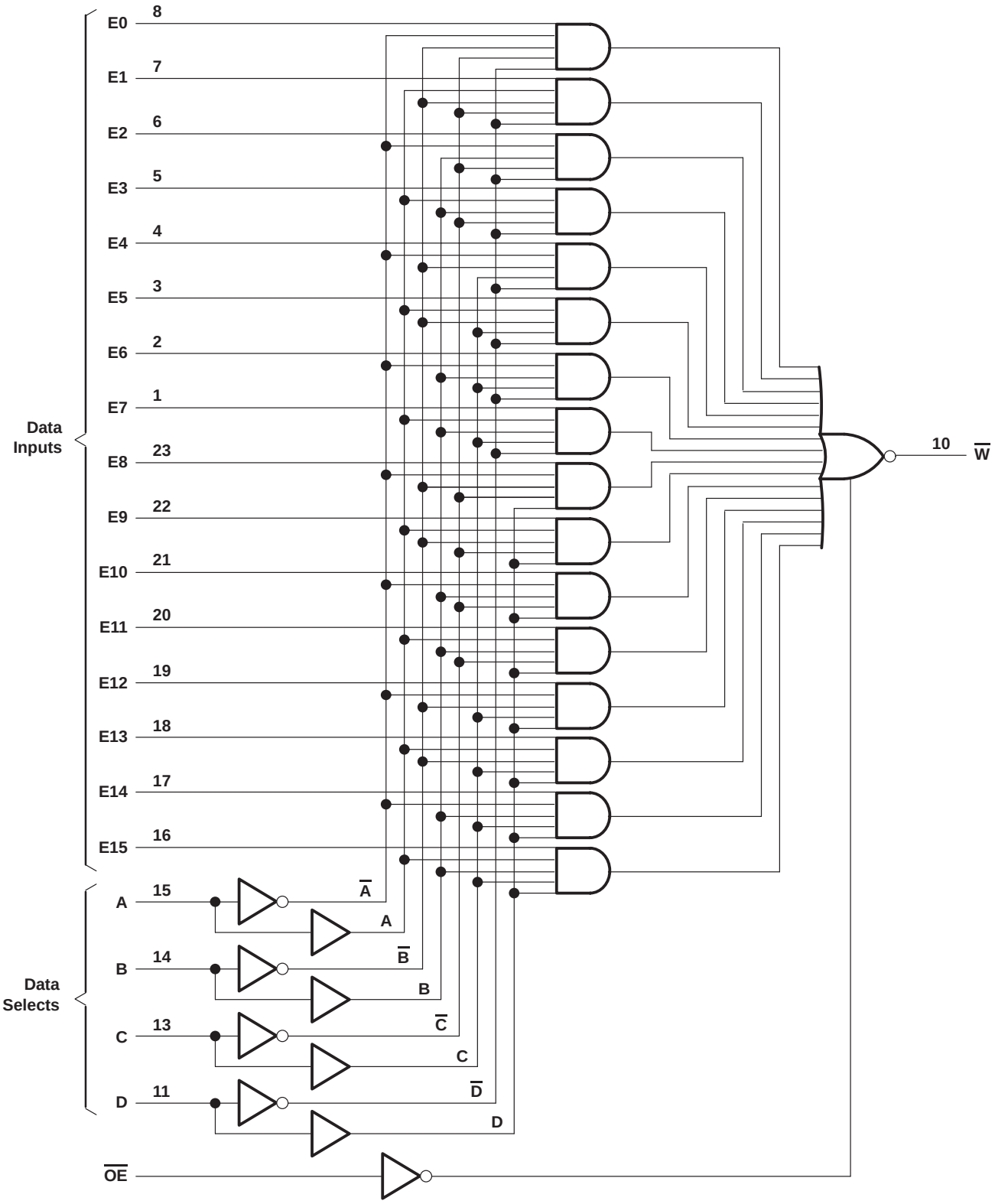
INPUTS						OUTPUT
$\overline{OE}$	A	B	C	D	Ei	$\overline{W}$
L	L	L	L	L	E0	$\overline{E}0$
L	H	L	L	L	E1	$\overline{E}1$
L	L	H	L	L	E2	$\overline{E}2$
L	H	H	L	L	E3	$\overline{E}3$
L	L	L	H	L	E4	$\overline{E}4$
L	H	L	H	L	E5	$\overline{E}5$
L	L	H	H	L	E6	$\overline{E}6$
L	H	H	H	L	E7	$\overline{E}7$
L	L	L	L	H	E8	$\overline{E}8$
L	H	L	L	H	E9	$\overline{E}9$
L	L	H	L	H	E10	$\overline{E}10$
L	H	H	L	H	E11	$\overline{E}11$
L	L	L	H	H	E12	$\overline{E}12$
L	H	L	H	H	E13	$\overline{E}13$
L	L	H	H	H	E14	$\overline{E}14$
L	H	H	H	H	E15	$\overline{E}15$
H	X	X	X	X	X	Z

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the DW, JT, and NT packages.

logic diagram (positive logic)



Pin numbers shown are for the DW, JT, and NT packages.

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

Supply voltage, V_{CC} . . . . . 7 V
Input voltage, V_I . . . . . 7 V
Operating free-air temperature range, T_A: SN54AS250A . . . . . –55°C to 125°C
SN74AS250A . . . . . 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

		SN54AS250A			SN74AS250A			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{OH}	High-level output current			–12			–15	mA
I_{OL}	Low-level output current			32			48	mA
T_A	Operating free-air temperature	–55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS		SN54AS250A			SN74AS250A			UNIT
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IK}	V_{CC} = 4.5 V,	I_I = –18 mA			–1.2			–1.2	V
V_{OH}	V_{CC} = 4.5 V to 5.5 V,	I_{OH} = –2 mA	V_{CC} –2			V_{CC} –2			V
	V_{CC} = 4.5 V	I_{OH} = –12 mA	2.4	3.3					
		I_{OH} = –15 mA				2.4	3.3		
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 32 mA		0.35	0.5				V
		I_{OL} = 48 mA					0.35	0.5	
I_{OZH}	V_{CC} = 5.5 V,	V_O = 2.7 V			50			50	µA
I_{OZL}	V_{CC} = 5.5 V,	V_O = 0.4 V			–50			–50	µA
I_I	V_{CC} = 5.5 V,	V_I = 7 V			0.1			0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V			20			20	µA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.4 V			–0.5			–0.5	mA
I_O§	V_{CC} = 5.5 V,	V_O = 2.25 V	–30		–112	–30		–112	mA
I_{CC}	V_{CC} = 5.5 V	Outputs high		26	42		26	42	mA
		Outputs low		31	50		31	50	
		Outputs disabled		30	48		30	48	

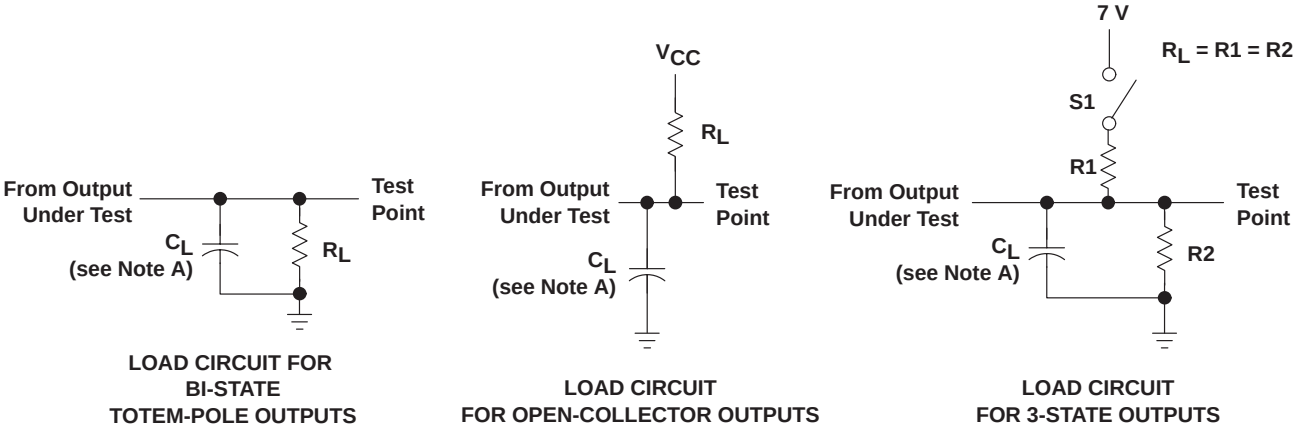
‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.
§ The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS}.

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T_A = MIN to MAX†				UNIT
			SN54AS250A		SN74AS250A		
			MIN	MAX	MIN	MAX	
t_{PLH}	Data	$\overline{W}$	2	9.5	2	8	ns
t_{PHL}			2	8.5	2	7	
t_{PLH}	A, B, C, D	$\overline{W}$	4	15.5	4	13	ns
t_{PHL}			4	12	4	10.5	
t_{PZH}	$\overline{OE}$	$\overline{W}$	2	7.5	2	7	ns
t_{PZL}			2	10	2	9	
t_{PHZ}	$\overline{OE}$	$\overline{W}$	1.5	6.5	1.5	6	ns
t_{PLZ}			2	8.5	2	6.5	

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

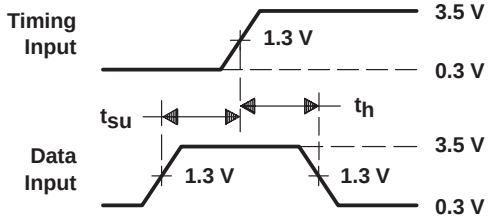
PARAMETER MEASUREMENT INFORMATION
SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



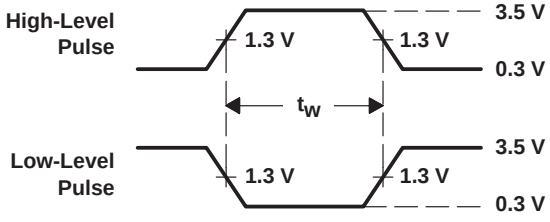
LOAD CIRCUIT FOR BI-STATE TOTEM-POLE OUTPUTS

LOAD CIRCUIT FOR OPEN-COLLECTOR OUTPUTS

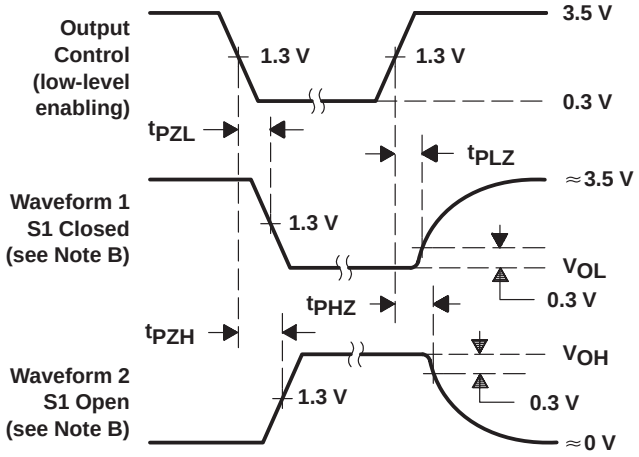
LOAD CIRCUIT FOR 3-STATE OUTPUTS



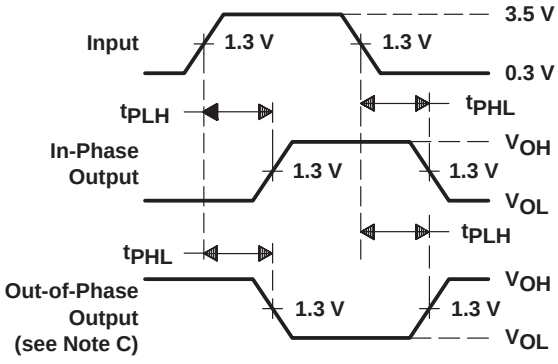
VOLTAGE WAVEFORMS SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS PULSE DURATIONS



VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES, 3-STATE OUTPUTS



VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES

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 ≤ 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

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