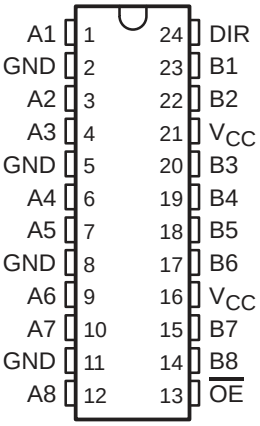
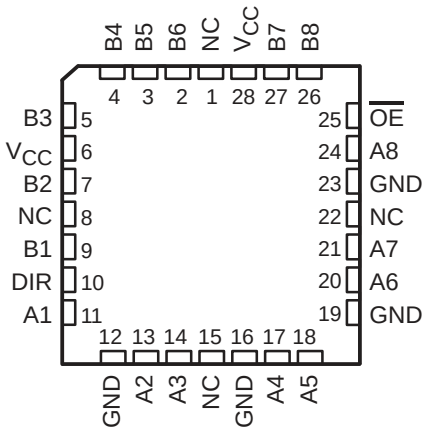
- **State-of-the-Art *EPIC*-IIB™ BiCMOS Design Significantly Reduces Power Dissipation**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)**
- **Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17**
- **Typical V_{OLP} (Output Ground Bounce) < 1 V at V_{CC} = 5 V, T_A = 25°C**
- **High-Impedance State During Power Up and Power Down**
- **Designed to Facilitate Incident-Wave Switching for Line Impedances of 25 Ω or Greater**
- **Distributed V_{CC} and GND Pins Minimize Noise Generated by the Simultaneous Switching of Outputs**
- **Bus Hold on Data Inputs Eliminates the Need for External Pullup/Pulldown Resistors**
- **Package Options Include Plastic Small-Outline (DW) Package, Ceramic Chip Carriers (FK), and Standard Plastic (NT) and Ceramic (JT) DIPs**

SN54ABT25245 . . . JT PACKAGE
SN74ABT25245 . . . DW OR NT PACKAGE
(TOP VIEW)



SN54ABT25245 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

description

The ’ABT25245 are 25-Ω octal bus transceivers designed for asynchronous communication between data buses. They improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented transceivers.

These devices allow noninverted data transmission from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable ($\overline{OE}$) input can disable the device so that both buses are effectively isolated. When $\overline{OE}$ is low, the device is active.

These transceivers are capable of sinking 188 mA of I_{OL} current, which facilitates switching 25-Ω transmission lines on the incident wave. The distributed V_{CC} and GND pins minimize switching noise for more-reliable system operation.

Active bus-hold circuitry is provided to hold unused or floating data inputs at a valid logic level.

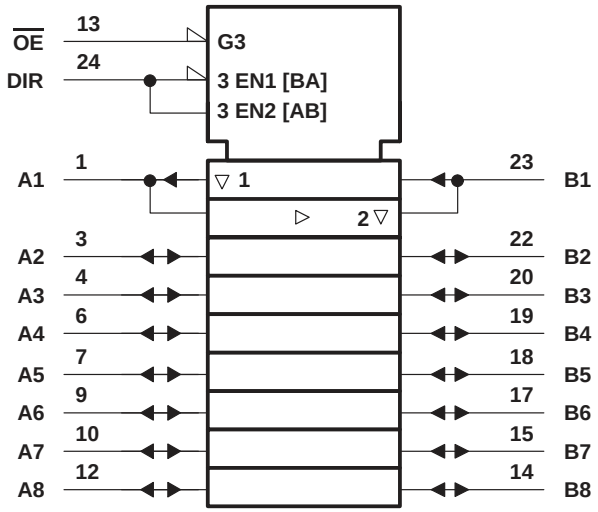
When V_{CC} is between 0 and 2.1 V, the device is in the high-impedance state during power up or power down. However, to ensure the high-impedance state above 2.1 V, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking/current-sourcing capability of the driver.

The SN54ABT25245 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ABT25245 is characterized for operation from –40°C to 85°C.

FUNCTION TABLE

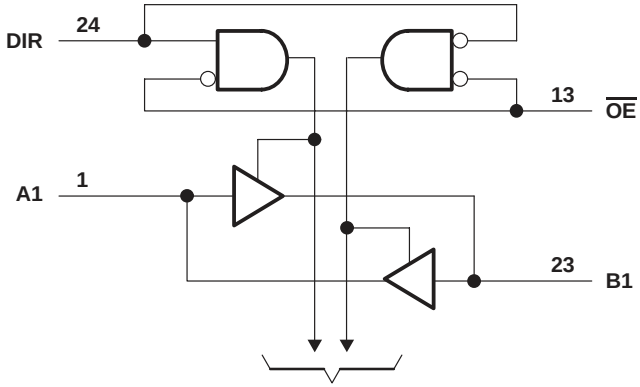
INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

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)



To Seven Other Channels

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 range, V_{CC} . . . . . –0.5 V to 7 V
Input voltage range, V_I (except I/O ports) (see Note 1) . . . . . –0.5 V to 7 V
Voltage range applied to any output in the disabled or power-off state, V_O . . . . . –0.5 V to 5.5 V
Voltage range applied to any output in the high state, V_O . . . . . –0.5 V to V_{CC}
Input clamp current, I_{IK} (V_I < 0) . . . . . –18 mA
Output clamp current, I_{OK} (V_O < 0) . . . . . –50 mA
Current into any output in the low state, I_O: SN74ABT25245 (A port) . . . . . 376 mA
SN74ABT25245 (B port) . . . . . 128 mA
Operating free-air temperature range: SN54ABT25245 . . . . . –55°C to 125°C
SN74ABT25245 . . . . . –40°C to 85°C
Package thermal impedance, θ_{JA} (see Note 2): DW package . . . . . 81°C/W
NT package . . . . . 67°C/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 negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. The package thermal impedance is calculated in accordance with EIA/JEDEC Std JESD51, except for through-hole packages, which use a trace length of zero.

recommended operating conditions (see Note 3)

				SN54ABT25245		SN74ABT25245		UNIT
				MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage			4.5	5.5	4.5	5.5	V
V_{IH}	High-level input voltage			2		2		V
V_{IL}	Low-level input voltage				0.8		0.8	V
V_I	Input voltage			0	V_{CC}	0	V_{CC}	V
I_{IK}	Input clamp current				–18		–18	mA
I_{OH}	High-level output current		A port		–80		–80	mA
			B port		–32		–32	
I_{OL}	Low-level output current		A port		188		188	mA
			B port		64		64	
$\Delta t/\Delta v$	Input transition rise or fall rate	Outputs enabled	Control inputs		4		4	ns/V
			A or B ports		10		10	
$\Delta t/\Delta V_{CC}$	Power-up ramp rate			200		200		µs/V
T_A	Operating free-air temperature			–55	125	–40	85	°C

NOTE 3: Unused pins (input or I/O) must be held high or low to prevent them from floating.

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

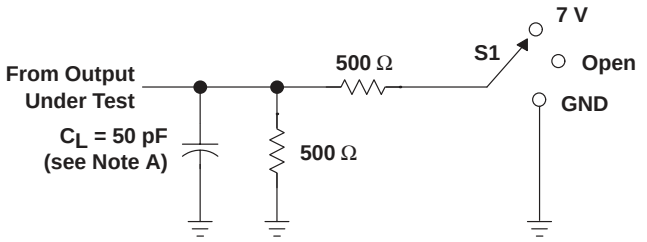
PARAMETER		TEST CONDITIONS		SN54ABT25245			SN74ABT25245			UNIT
				MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}		V_{CC} = 4.5 V,	I_I = –18 mA			–1.2			–1.2	V
V_{OH}	A port	V_{CC} = 4.75 V,	I_{OH} = –3 mA	2.7			2.7			V
		V_{CC} = 4.5 V,	I_{OH} = –80 mA	2.4			2.4			
	B port	V_{CC} = 4.5 V,	I_{OH} = –3 mA	2.5			2.5			
		V_{CC} = 5 V,	I_{OH} = –3 mA	3			3			
		V_{CC} = 4.5 V,	I_{OH} = –32 mA	2*			2			
V_{OL}	A port	V_{CC} = 4.5 V	I_{OL} = 94 mA			0.55			0.55	V
			I_{OL} = 188 mA			0.7			0.7	
	B port	V_{CC} = 4.5 V,	I_{OL} = 64 mA			0.55*			0.55	
V_{hys}					100			100		mV
I_I	Control inputs	V_{CC} = 0 to 5.5 V,	V_I = V_{CC} or GND			±1			±1	µA
	A or B ports	V_{CC} = 2.1 V to 5.5 V,	V_I = V_{CC} or GND			±20			±20	
$I_{I(hold)}$	A or B ports	V_{CC} = 4.5 V	V_I = 0.8 V	100			100			µA
			V_I = 2 V	–100			–100			
I_{OZPU}‡		V_{CC} = 0 to 2.1 V, V_O = 0.5 V to 2.7 V, $\overline{OE}$ = X				±50			±50	µA
I_{OZPD}‡		V_{CC} = 2.1 V to 0, V_O = 0.5 V to 2.7 V, $\overline{OE}$ = X				±50			±50	µA
I_{OZH}§		V_{CC} = 2.1 V to 5.5 V, V_O = 2.7 V, $\overline{OE}$ ≥ 2 V				10			10	µA
I_{OZL}§		V_{CC} = 2.1 V to 5.5 V, V_O = 0.5 V, $\overline{OE}$ ≥ 2 V				–10			–10	µA
I_{off}		V_{CC} = 0,	V_I or V_O ≤ 4.5 V			±100			±100	µA
I_{CEX}		V_{CC} = 5.5 V,	V_O = 5.5 V			50			50	µA
I_O¶	B port	V_{CC} = 5.5 V,	V_O = 2.5 V	–50		–210	–50		–210	mA
I_{CC}		V_{CC} = 5.5 V, Outputs open, V_I = V_{CC} or GND	Outputs high			500			500	µA
			Outputs low			20			20	mA
			Outputs disabled			500			500	µA
ΔI_{CC}#		V_{CC} = 5.5 V, One input at 3.4 V, Other inputs at V_{CC} or GND				1			1	mA
C_i	Control inputs	V_{CC} = 5 V,	V_I = V_{CC} or GND		4			4		pF
C_{io}	A or B ports	V_{CC} = 5 V,	V_O = V_{CC} or GND		11.5			11.5		pF

* On products compliant to MIL-PRF-38535, this parameter does not apply.
† All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡ This parameter is characterized, but not production tested.
§ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.
¶ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
# This is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 50 pF (unless otherwise noted) (see Figure 1)

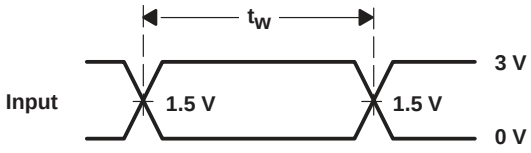
PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, T_A = 25°C			SN54ABT25245		SN74ABT25245		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	1	2.3	3.5	1		1	3.9	ns
t_{PHL}			1	2.4	3.5	1		1	4.3	
t_{PZH}	$\overline{OE}$	A or B	1.5	3.7	5.4	1.5		1.5	6.5	ns
t_{PZL}			1.4	4	5.8	1.4		1.4	6.8	
t_{PHZ}	$\overline{OE}$	A or B	2	4.3	6.1	2		2	7.2	ns
t_{PLZ}			2	3.9	5.8	2		2	6.4	

PARAMETER MEASUREMENT INFORMATION

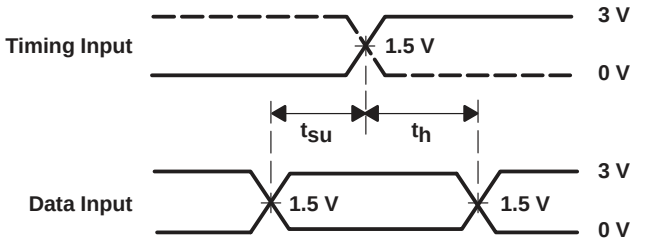


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open

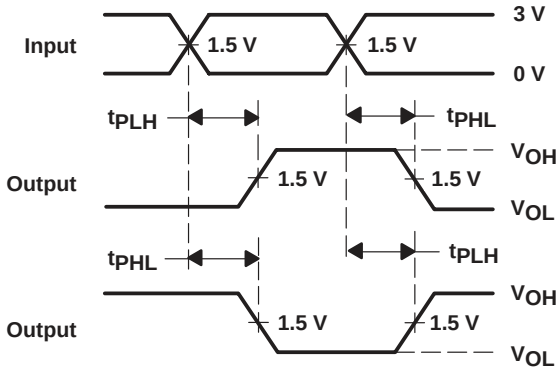
LOAD CIRCUIT



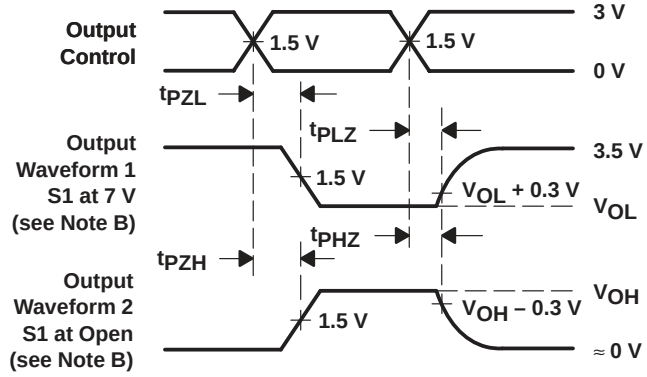
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

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 ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns
D. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

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