

# SN74F2245 25-Ω OCTAL BUS TRANSCEIVER WITH 3-STATE OUTPUTS

SDFS099 – MAY 1995

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Package Options Include Plastic Small-Outline (DB) Packages and Plastic 300-mil DIPs (N)

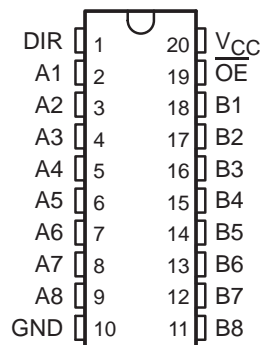
## description

The SN74F2245 is designed for asynchronous communication between data buses. The devices transmit data from the A bus to the B bus or from the B bus to the A bus depending upon the logic level at the direction-control (DIR) input. The output-enable ( $\overline{OE}$ ) input disables the device so the buses are effectively isolated.

Both A and B outputs can sink up to 12 mA; 25-Ω resistors are included in the lower output circuit to reduce overshoot and undershoot.

The SN74F2245 is characterized for operation from 0°C to 70°C.

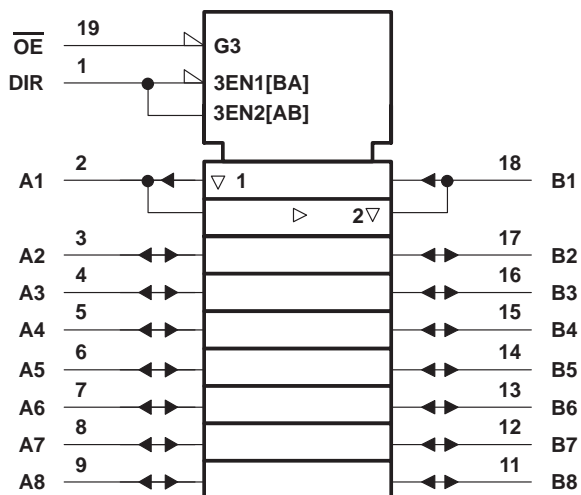
DB OR N PACKAGE  
(TOP VIEW)



FUNCTION TABLE

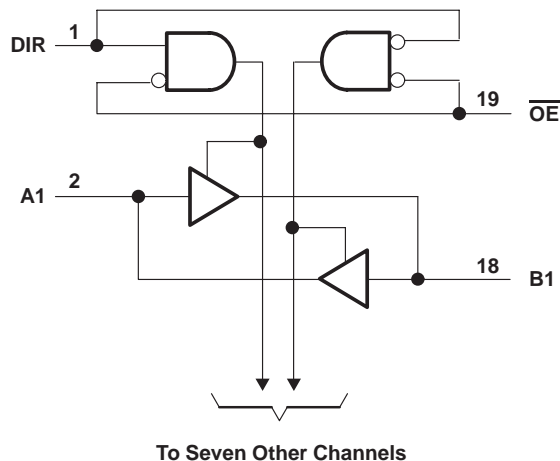
INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

## logic symbol†



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

## logic diagram (positive logic)



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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.

**TEXAS  
INSTRUMENTS**

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# SN74F2245

## 25-Ω OCTAL BUS TRANSCEIVER

### WITH 3-STATE OUTPUTS

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#### 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)	-1.2 V to 7 V
Input current range	-30 mA to 5 mA
Voltage range applied to any output in the disabled or power-off state	-0.5 V to 5.5 V
Voltage range applied to any output in the high state	-0.5 V to $V_{CC}$
Current into any output in the low state	30 mA
Operating free-air temperature range, $T_A$	0°C to 70°C
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.

NOTE 1: The input voltage ratings may be exceeded provided the input current ratings are observed.

#### 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
$I_{IK}$ Input clamp current			-18	mA
$I_{OH}$ High-level output current			-3	mA
$I_{OL}$ Low-level output current			12	mA
$T_A$ Operating free-air temperature	0		70	°C

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

PARAMETER		TEST CONDITIONS		MIN	TYP‡	MAX	UNIT
$V_{IK}$		$V_{CC} = 4.5\text{ V}$ ,	$I_I = -18\text{ mA}$			-1.2	V
$V_{OH}$	Any output	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -1\text{ mA}$	2.5	3.4		V
			$I_{OH} = -3\text{ mA}$	2.4	3.3		
		$V_{CC} = 4.75\text{ V}$ ,	$I_{OH} = -1\text{ mA to } -3\text{ mA}$	2.7			
$V_{OL}$	Any output	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 1\text{ mA}$		0.2	0.5	V
			$I_{OL} = 12\text{ mA}$		0.5	0.75	
$I_I$	A and B	$V_{CC} = 5.5\text{ V}$	$V_I = 5.5\text{ V}$			1	mA
	DIR and $\overline{OE}$		$V_I = 7\text{ V}$			0.1	
$I_{IH}§$	A and B	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 2.7\text{ V}$			70	$\mu\text{A}$
	DIR and $\overline{OE}$					20	
$I_{IL}§$	A and B	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 0.5\text{ V}$			-0.5	mA
	DIR and $\overline{OE}$					-0.5	
$I_{OS}¶$	A and B	$V_{CC} = 5.5\text{ V}$ ,	$V_O = 0$	-50		-120	mA
$I_{CC}$		$V_{CC} = 5.5\text{ V}$	Outputs high		62	90	mA
			Outputs low		73	105	
			Outputs disabled		72	100	

‡ All typical values are at  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

§ For I/O ports, the parameters  $I_{IH}$  and  $I_{IL}$  include the off-state output current.

¶ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.



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**switching characteristics (see Figure 1)**

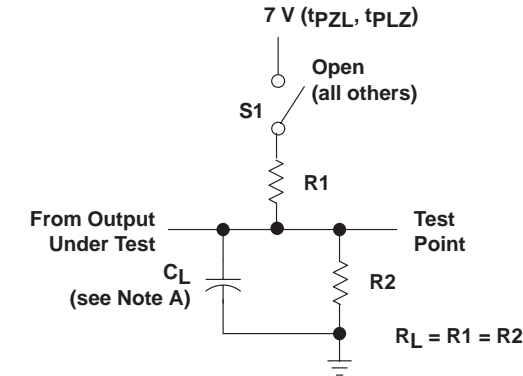
PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = 25°C			V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>1</sub> = 500 Ω, R <sub>2</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX†		UNIT
			MIN	TYP	MAX	MIN	MAX	
t <sub>PLH</sub>	A or B	B or A	2.5	3.9	5.5	2.1	6.6	ns
t <sub>PHL</sub>			3.1	4.6	6.6	2.9	7.1	
t <sub>PZH</sub>	$\overline{\text{OE}}$	A or B	2.4	4.8	7.3	1.6	8.5	ns
t <sub>PZL</sub>			3.6	6.6	10.6	3	12	
t <sub>PHZ</sub>	$\overline{\text{OE}}$	A or B	2.3	4.3	6.3	2	7.5	ns
t <sub>PLZ</sub>			2	4	5.8	1.9	6.8	

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

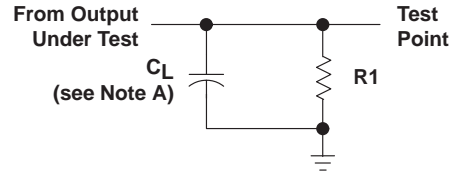
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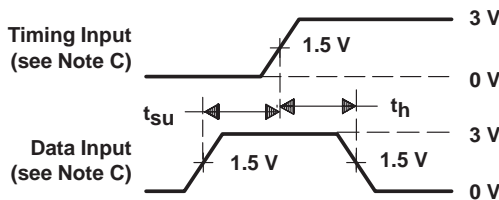
**PARAMETER MEASUREMENT INFORMATION**



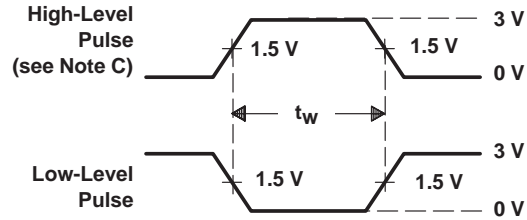
**LOAD CIRCUIT FOR 3-STATE AND OPEN-COLLECTOR OUTPUTS**



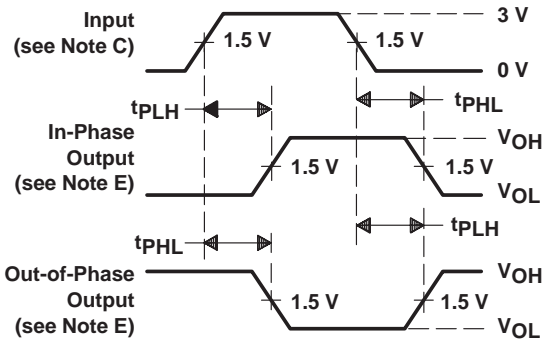
**LOAD CIRCUIT FOR TOTEM-POLE OUTPUTS**



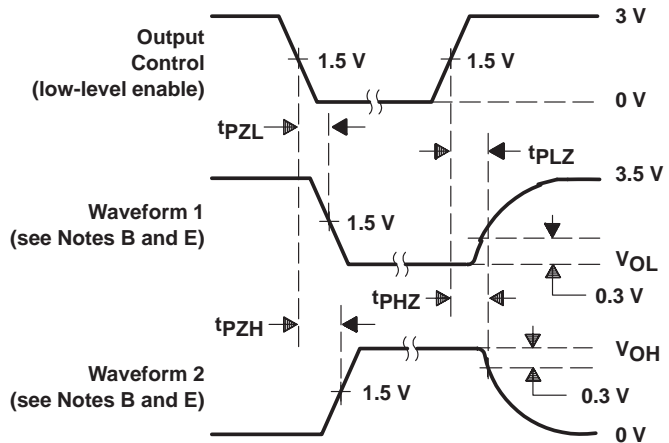
**VOLTAGE WAVEFORMS SETUP AND HOLD TIMES**



**VOLTAGE WAVEFORMS PULSE DURATION**



**VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES (see Note D)**



**VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES, 3-STATE OUTPUTS**

- 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:  $PRR \leq 1$  MHz,  $t_r = t_f \leq 2.5$  ns, duty cycle = 50%.  
 D. When measuring propagation delay times of 3-state outputs, switch S1 is open.  
 E. The outputs are measured one at a time with one transition per measurement.

**Figure 1. Load Circuit and Voltage Waveforms**



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