

# 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)

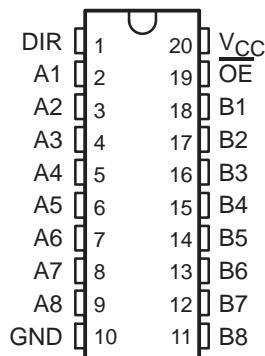
### description

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.

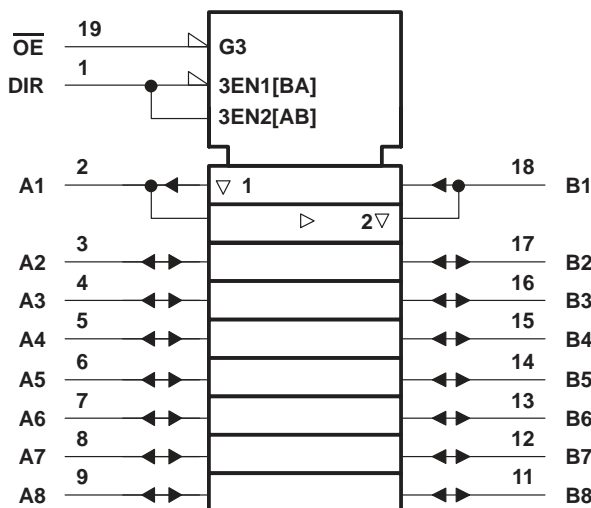
DB OR N PACKAGE  
(TOP VIEW)



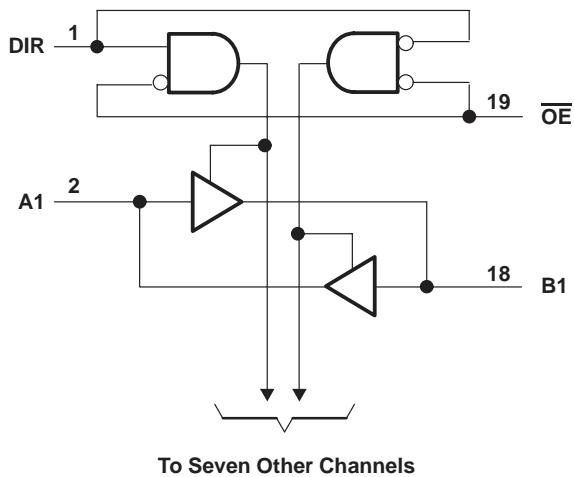
FUNCTION TABLE

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

### logic symbol†



### logic diagram (positive logic)



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



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1995, Texas Instruments Incorporated

# SN74F2245

## 25-Ω OCTAL BUS TRANSCEIVER

### WITH 3-STATE OUTPUTS

SDFS099 – MAY 1995

#### 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.



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

SDFS099 – MAY 1995

**switching characteristics (see Figure 1)**

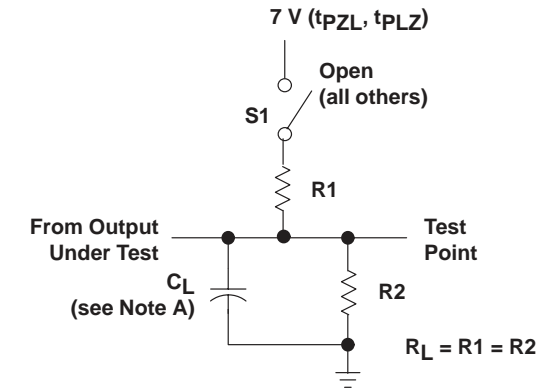
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5\text{ V},$ $C_L = 50\text{ pF},$ $R_1 = 500\ \Omega,$ $R_2 = 500\ \Omega,$ $T_A = 25^\circ\text{C}$			$V_{CC} = 4.5\text{ V to }5.5\text{ V},$ $C_L = 50\text{ pF},$ $R_1 = 500\ \Omega,$ $R_2 = 500\ \Omega,$ $T_A = \text{MIN to MAX}^\dagger$		UNIT
			MIN	TYP	MAX	MIN	MAX	
$t_{PLH}$	A or B	B or A	2.5	3.9	5.5	2.1	6.6	ns
$t_{PHL}$			3.1	4.6	6.6	2.9	7.1	
$t_{PZH}$	$\overline{OE}$	A or B	2.4	4.8	7.3	1.6	8.5	ns
$t_{PZL}$			3.6	6.6	10.6	3	12	
$t_{PHZ}$	$\overline{OE}$	A or B	2.3	4.3	6.3	2	7.5	ns
$t_{PLZ}$			2	4	5.8	1.9	6.8	

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

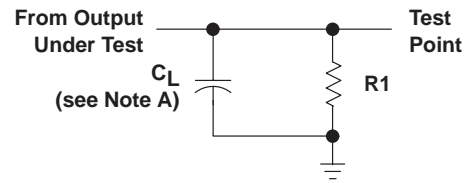
**SN74F2245**  
**25-Ω OCTAL BUS TRANSCEIVER**  
**WITH 3-STATE OUTPUTS**

SDFS099 – MAY 1995

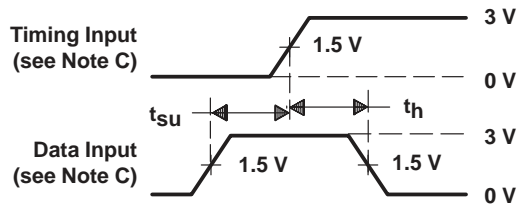
**PARAMETER MEASUREMENT INFORMATION**



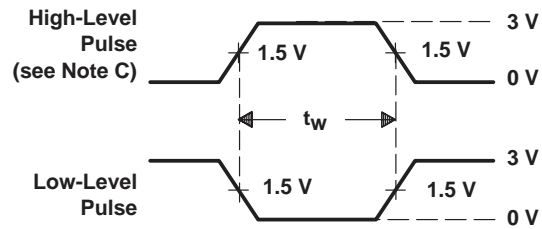
**LOAD CIRCUIT FOR 3-STATE AND OPEN-COLLECTOR OUTPUTS**



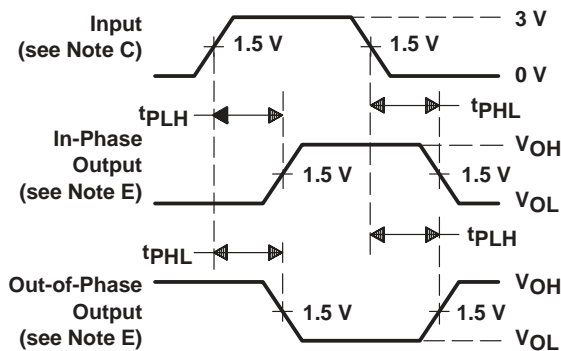
**LOAD CIRCUIT FOR TOTEM-POLE OUTPUTS**



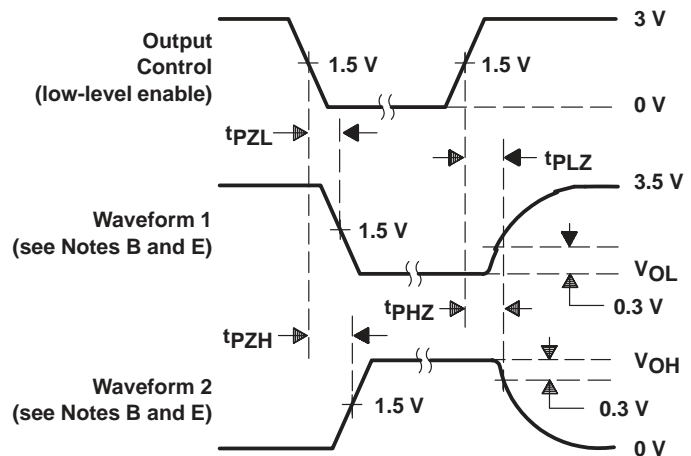
**VOLTAGE WAVEFORMS SETUP AND HOLD TIMES**



**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**

## **IMPORTANT NOTICE**

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

**CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.**

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.

		<b>THE WORLD LEADER IN DSP AND ANALOG</b>	
<input type="text" value="Products"/>	<input type="text" value="Development Tools"/>	<input type="text" value="Applications"/>	
<input type="button" value="GO"/>	<input type="button" value="GO"/>	<input type="button" value="GO"/>	
<input type="text" value="Search"/>	<input type="checkbox"/> Advanced Search	<input type="checkbox"/> TI Home	<input type="checkbox"/> TI&ME
<input type="button" value="GO"/>	<input type="checkbox"/> Tech Support	<input type="checkbox"/> Comments	<input type="checkbox"/> Site Map
		<input type="checkbox"/> Employment	<input type="checkbox"/> TI Global

[PRODUCT FOLDER](#) | PRODUCT INFO: [FEATURES](#) | [DESCRIPTION](#) | [DATASHEETS](#) | [PRICING/AVAILABILITY](#) | [APPLICATION NOTES](#) | [RELATED DOCUMENTS](#)

PRODUCT SUPPORT: [TRAINING](#)

## SN74F2245, Octal bus transceivers with series damping resistors

DEVICE STATUS: **ACTIVE**

PARAMETER NAME	SN74F2245
Voltage Nodes (V)	5
Vcc range (V)	4.5 to 5.5
Input Level	TTL
Output Level	TTL
Output Drive (mA)	-3/12
No. of Outputs	8
Logic	True
Static Current	97.5
tpd(max) (ns)	7.1

### FEATURES

[▲ Back to Top](#)

- 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

[▲ Back to Top](#)

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-  $\Omega$  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.

TECHNICAL DOCUMENTS[▲ Back to Top](#)

To view the following documents, [Acrobat Reader 3.x](#) is required.

To download a document to your hard drive, right-click on the link and choose 'Save'.

DATASHEET[▲ Back to Top](#)

Full datasheet in Acrobat PDF: [sdfs099.pdf](#) (84 KB) (Updated: 05/01/1995)

Full datasheet in Zipped PostScript: [sdfs099.psz](#) (78 KB)

APPLICATION NOTES[▲ Back to Top](#)

View Application Reports for [Digital Logic](#)

- [Bus-Interface Devices With Output-Damping Resistors Or Reduced-Drive Outputs](#) (SCBA012A - Updated: 08/01/1997)
- [Designing With Logic](#) (SDYA009C - Updated: 06/01/1997)
- [Input and Output Characteristics of Digital Integrated Circuits](#) (SDYA010 - Updated: 10/01/1996)
- [LVT-to-LVTH Conversion](#) (SCEA010 - Updated: 12/08/1998)
- [Logic Solutions For IEEE Std 1284](#) (SCEA013 - Updated: 06/01/1999)

RELATED DOCUMENTS[▲ Back to Top](#)

- [Documentation Rules \(SAP\) And Ordering Information](#) (SZZU001B, 4 KB - Updated: 05/06/1999)
- [Logic Selection Guide Second Half 2000](#) (SDYU001N, 5035 KB - Updated: 04/17/2000)
- [MicroStar Junior BGA Design Summary](#) (SCET004, 167 KB - Updated: 07/28/2000)
- [More Power In Less Space - Technical Article](#) (SCAU001A, 850 KB - Updated: 03/01/1996)

PRICING/ AVAILABILITY[▲ Back to Top](#)

<u>ORDERABLE DEVICE</u>	<u>PACKAGE</u>	<u>PINS</u>	<u>TEMP (°C)</u>	<u>STATUS</u>	<u>BUDGETARY PRICE US\$/UNIT QTY= 1000+</u>	<u>PACK QTY</u>	<u>PRICING/AVAILABILITY</u>
SN74F2245DBR	<u>DB</u>	20	0 TO 70	ACTIVE	0.43	2000	<u>Check stock or order</u>
SN74F2245DW	<u>DW</u>	20	0 TO 70	ACTIVE	0.43	25	<u>Check stock or order</u>
SN74F2245DWR	<u>DW</u>	20	0 TO 70	ACTIVE	0.50	2000	<u>Check stock or order</u>
SN74F2245N	<u>N</u>	20	0 TO 70	ACTIVE	0.43	20	<u>Check stock or order</u>

Table Data Updated on: 11/ 15/ 2000