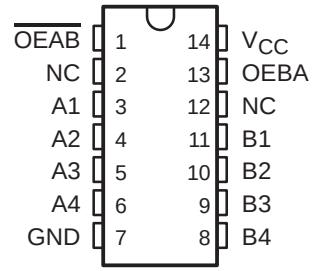
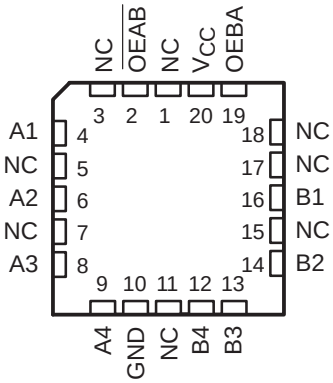
- **Asynchronous Communication Between Data Buses**
- **Local Bus-Latch Capability**
- **Inverting Logic**
- **Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**

SN54F242 . . . J PACKAGE
SN74F242 . . . D OR N PACKAGE
(TOP VIEW)



SN54F242 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

description

These quadruple bus transceivers are designed for asynchronous communications between data buses. The control function implementation allows for maximum flexibility in timing. These devices allow data transmission from the A bus to the B bus or from the B bus to the A bus depending upon the logic levels at the output-enable (OEBA and $\overline{\text{OEAB}}$) inputs. The output-enable inputs can be used to disable the device so that the buses are effectively isolated.

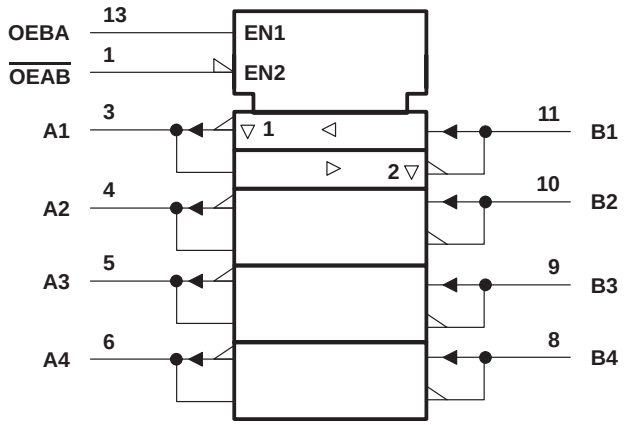
The dual-enable configuration gives the quadruple bus transceivers the capability to store data by simultaneous enabling of OEBA and $\overline{\text{OEAB}}$. Each output reinforces its input in this transceiver configuration. Thus, when both control inputs are enabled and all other data sources to the two sets of bus lines are at high impedance, both sets of bus lines (eight in all) remain at their states. The 4-bit codes appearing on the two sets of buses will be complementary for the ′F242.

The SN54F242 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74F242 is characterized for operation from 0°C to 70°C.

FUNCTION TABLE

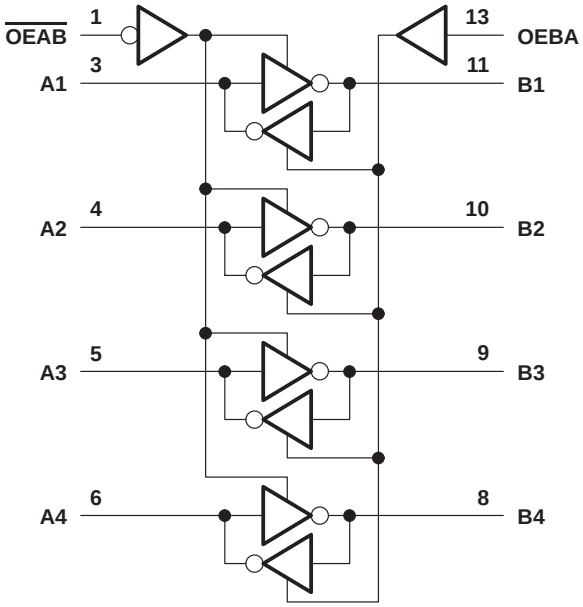
INPUTS		FUNCTION
$\overline{\text{OEAB}}$	OEBA	
L	L	$\overline{\text{A}}$ to B
H	H	$\overline{\text{B}}$ to A
H	L	Isolation
L	H	Latch A and B ($\text{A} = \overline{\text{B}}$)

logic symbol†



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

logic diagram (positive logic)



Pin numbers shown are for the D, J, and N 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 (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: SN54F242 . . . . . 96 mA
SN74F242 . . . . . 128 mA
Operating free-air temperature range: SN54F242 . . . . . –55°C to 125°C
SN74F242 . . . . . 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.

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

recommended operating conditions

		SN54F242			SN74F242			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_{IK}	Input clamp current			–18			–18	mA
I_{OH}	High-level output current			– 12			– 15	mA
I_{OL}	Low-level output current			48			64	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		SN54F242			SN74F242			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	I_{OH} = – 3 mA	2.4	3.3		2.4	3.3		V
			I_{OH} = – 12 mA	2	3.2					
			I_{OH} = – 15 mA				2	3.1		
		V_{CC} = 4.75 V,	I_{OH} = – 3 mA				2.7			
V_{OL}		V_{CC} = 4.5 V	I_{OL} = 48 mA		0.38	0.55				V
			I_{OL} = 64 mA					0.42	0.55	
I_I	A or B port	V_{CC} = 5.5 V	V_I = 5.5 V			1			1	mA
	Control inputs		V_I = 7 V			0.1			0.1	
I_{IH}	A or B port‡	V_{CC} = 5.5 V,	V_I = 2.7 V			70			70	µA
	Control inputs					20			20	
I_{IL}‡		V_{CC} = 5.5 V,	V_I = 0.5 V			– 1			– 1	mA
I_{OS}§		V_{CC} = 5.5 V,	V_O = 0	–100		–225	–100		–225	mA
I_{CC}		V_{CC} = 5.5 V, See Note 2	Outputs high		30	46		30	46	mA
			Outputs low		46	69		46	69	
			Outputs disabled		42	63		42	63	

† All typical values are at V_{CC} = 5 V, T_A = 25°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.
NOTE 2: I_{CC} is measured either with all transceivers enabled in only one direction or all transceivers disabled.

switching characteristics (see Note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R_L = 500 Ω, T_A = 25°C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX¶				UNIT
			′F242			SN54F242		SN74F242		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	B or A	2.2	4.1	6.5	2.2	9	2.2	7.5	ns
t_{PHL}			1	2.6	4.5	0.5	5	1	4.5	
t_{PZL}	Enable	A or B	2.7	5.6	7.5	2.2	10	2.7	8.5	ns
t_{PZH}			2.7	6.1	9	2.2	12	2.7	10.5	
t_{PHZ}	Disable	A or B	1.8	6.6	9	1.8	11	1.8	9.5	ns
t_{PLZ}			2.7	5.6	9.5	2.3	13.5	2.7	11	

¶ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
NOTE 3: Load circuits and waveforms are shown in Section 1.

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