T-52-31-00

2243

National Semiconductor

54F/74F2243
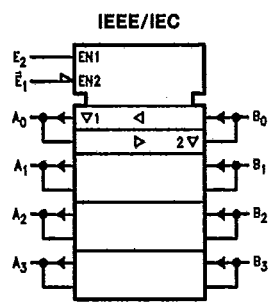## Quad Bus Transceiver with 25Ω Series Resistors in the Outputs

General Description

The 'F2243 is a quad bus transmitter/receiver which can be used for 4-line asynchronous 2-way data communications between data busses. It is designed to drive the capacitive inputs of MOS memory drivers, address drivers, clock drivers, and bus-oriented transmitters/receivers.

The 25Ω series resistors in the outputs reduce ringing and eliminate the need for external resistors.

Features

- 25Ω series resistors in outputs eliminate the need for external resistors
- 2-Way asynchronous data bus communication
- TRI-STATE® outputs
- 12 mA source current
- Designed to drive the capacitive inputs of MOS devices
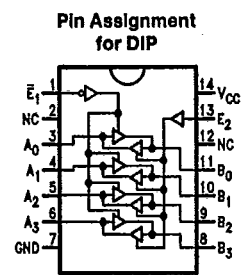- Guaranteed 4000V minimum ESD protection

Ordering Code: See Section 5

Logic Symbol

IEEE/IEC

TL/F/9530-1

Connection Diagram

Pin Assignment for DIP

TL/F/9530-2

Unit Loading/Fan Out: See Section 2 for U.L. definitions

Pin Names	Description	54F/74F	
		U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
$\overline{E}_1$	Enable Input (Active LOW)	1.0/1.67	20 μA/−1 mA
E_2	Enable Input (Active HIGH)	1.0/1.67	20 μA/−1 mA
A_n, B_n	Inputs	3.5/2.67	70 μA/−1.6 mA
	Outputs	750/20	−15 mA/12 mA

Truth Table

Inputs		Inputs/Outputs	
$\overline{E}_1$	E_2	A_n	B_n
L	L	Input	B = A
L	H	N/A	N/A
H	L	Z	Z
H	H	A = B	Input

H = HIGH Voltage Level
L = LOW Voltage Level
Z = High Impedance
N/A = Not Allowed

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Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Storage Temperature	−65°C to +150°C
Ambient Temperature under Bias	−55°C to +125°C
Junction Temperature under Bias	−55°C to +175°C
V_{CC} Pin Potential to Ground Pin	−0.5V to +7.0V
Input Voltage (Note 2)	−0.5V to +7.0V
Input Current (Note 2)	−30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V_{CC} = 0V)	
Standard Output	−0.5V to V_{CC}
TRI-STATE Output	−0.5V to +5.5V
Current Applied to Output in LOW State (Max)	twice the rated I_{OL} (mA)
ESD Last Passing Voltage (Min)	4000V

Note 1: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 2: Either voltage limit or current limit is sufficient to protect inputs.

Recommended Operating Conditions

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Free Air Ambient Temperature	
Military	−55°C to +125°C
Commercial	0°C to +70°C
Supply Voltage	
Military	+4.5V to +5.5V
Commercial	+4.5V to +5.5V

DC Electrical Characteristics

Symbol	Parameter	54F/74F			Units	V_{CC}	Conditions
		Min	Typ	Max			
V_{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V_{IL}	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V_{CD}	Input Clamp Diode Voltage			−1.2	V	Min	I_{IN} = −18 mA
V_{OH}	Output HIGH Voltage 54F 10% V_{CC}	2.4					I_{OH} = −3 mA (A_n, B_n)
	54F 10% V_{CC}	2.0					I_{OH} = −12 mA (A_n, B_n)
	74F 10% V_{CC}	2.4			V	Min	I_{OH} = −3 mA (A_n, B_n)
	74F 10% V_{CC}	2.0					I_{OH} = −15 mA (A_n, B_n)
	74F 5% V_{CC}	2.7					I_{OH} = −3 mA (A_n, B_n)
V_{OL}	Output LOW Voltage			0.50	V	Min	I_{OL} = 1 mA (A_n, B_n)
				0.75			I_{OL} = 12 mA (A_n, B_n)
I_{IH}	Input HIGH Current			20	μA	Max	V_{IN} = 2.7V ($\overline{E}_1$, $\overline{E}_2$)
I_{BVI}	Input HIGH Current Breakdown Test			100	μA	Max	V_{IN} = 7.0V ($\overline{E}_1$, E_2)
I_{BVIT}	Input HIGH Current Breakdown Test (I/O)			1.0	mA	Max	V_{IN} = 5.5V (A_n, B_n)
I_{IL}	Input LOW Current			−1.0	mA	Max	V_{IN} = 0.5V ($\overline{E}_1$, E_2)
$I_{IH} + I_{OZH}$	Output Leakage Current			70	μA	Max	V_{OUT} = 2.7V (A_n, B_n)
$I_{IL} + I_{OZL}$	Output Leakage Current			−1.6	mA	Max	V_{OUT} = 0.5V (A_n, B_n)
I_{OS}	Output Short-Circuit Current	−100		−225	mA	Max	V_{OUT} = 0V (A_n, B_n)
I_{CEX}	Output HIGH Leakage Current			250	μA	Max	V_{OUT} ≐ V_{CC}
I_{CCH}	Power Supply Current		64	80	mA	Max	V_O = HIGH
I_{CCL}	Power Supply Current		64	90	mA	Max	V_O = LOW
I_{CCZ}	Power Supply Current		71	90	mA	Max	V_O = HIGH Z

AC Electrical Characteristics: See Section 2 for Waveforms and Load Configurations

Symbol	Parameter	74F $T_A = +25°C$ $V_{CC} = +5.0V$ $C_L = 50\,pF$			54F $T_A, V_{CC} = Mil$ $C_L = 50\,pF$		74F $T_A, V_{CC} = Com$ $C_L = 50\,pF$		Units	Fig. No.
		Min	Typ	Max	Min	Max	Min	Max		
t_{PLH} t_{PHL}	Propagation Delay A_n to B_n, B_n to A_n	1.5 2.5		7.0 8.0	1.5 2.0	7.0 8.0	1.5 2.0	7.0 8.0	ns	2–3
t_{PZH} t_{PZL}	Output Enable Time $\bar{E}_1$ to B_n, E_2 to A_n	1.5 2.5		9.0 11.5	1.0 2.5	9.5 12.0	1.0 2.5	9.5 12.0	ns	2–5
t_{PHZ} t_{PLZ}	Output Disable Time $\bar{E}_1$ to B_n, E_2 to A_n	1.5 1.5		9.0 8.5	1.0 1.5	9.5 9.5	1.0 1.5	9.5 9.5		

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