

54F/74F243

Quad Bus Transceiver with TRI-STATE® Outputs

General Description

The 'F243 is a quad bus transmitter/receiver designed for 4-line asynchronous 2-way data communications between data busses.

Features

- 2-Way asynchronous data bus communication
- Input clamp diodes limit high-speed termination effects
- Guaranteed 4000V minimum ESD protection

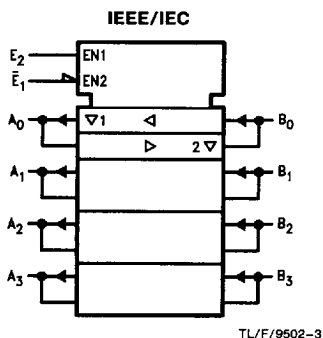
Ordering Code: See Section 11

Commercial	Military	Package Number	Package Description
	54F243DM (Note 2)	J14A	14-Lead Ceramic Dual-In-Line
74F243SC (Note 1)		M14A	14-Lead (0.150" Wide) Molded Small Outline, JEDEC
	54F243FM (Note 2)	W14B	14-Lead Cerpack
	54F243LM (Note 2)	E20A	20-Lead Ceramic Leadless Chip Carrier, Type C

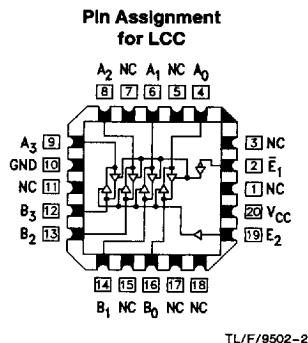
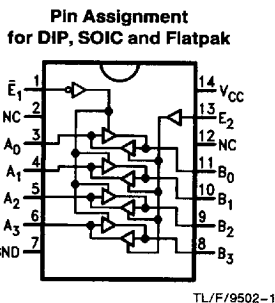
Note 1: Devices also available in 13" reel. Use Suffix = SCX.

Note 2: Military grade device with environmental and burn-in processing. Use suffix = DMQB, FMQB and LMQB.

Logic Symbol



Connection Diagrams



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}
$\bar{E}_1$	Enable Input (Active LOW)	1.0/1.67	20 μ A/ -1 mA
E_2	Enable Input (Active HIGH)	1.0/1.67	20 μ A/ -1 mA
A_n, B_n	Inputs	3.5/2.67	70 μ A/ -1.6 mA
	Outputs	600/106.6(80)	-12 mA/64 mA(48 mA)

Truth Table

Inputs		Inputs/Outputs	
$\bar{E}_1$	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

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
Plastic	-55°C to +150°C

V _{CC} Pin Potential to Ground Pin	-0.5V to +7.0V
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Input Voltage (Note 2)	-0.5V to +7.0V
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Input Current (Note 2)	-30 mA to +5.0 mA
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Voltage Applied to Output in HIGH State (with V _{CC} = 0V)	-0.5V to V _{CC}
Standard Output	-0.5V to +5.5V
TRI-STATE Output	-0.5V to +5.5V

Current Applied to Output in LOW State (Max)	twice the rated I _{OL} (mA)
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ESD Last Passing Voltage (Min)	4000V
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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

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		V	Min	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				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	54F 10% V _{CC}		0.55	V	Min	I _{OL} = 48 mA (A _n , B _n)
		74F 10% V _{CC}		0.55			I _{OL} = 64 mA (A _n , B _n)
I _{IH}	Input HIGH Current	54F		20.0	μA	Max	V _{IN} = 2.7V
		74F		5.0			
I _{BVI}	Input HIGH Current Breakdown Test	54F		100	μA	Max	V _{IN} = 7.0V (E ₁ , E ₂)
		74F		7.0			
I _{BVIT}	Input HIGH Current Breakdown (I/O)	54F		1.0	mA	Max	V _{IN} = 5.5V (A _n , B _n)
		74F		0.5			
I _{CEX}	Output HIGH Leakage Current	54F		250	μA	Max	V _{OUT} = V _{CC}
		74F		50			
V _{ID}	Input Leakage Test	74F	4.75		V	0.0	I _{ID} = 1.9 μA All Other Pins Grounded
I _{OD}	Output Leakage Circuit Current	74F		3.75	μA	0.0	V _{IOD} = 150 mV All Other Pins Grounded
I _{IL}	Input LOW Current			-1.0	mA	Max	V _{IN} = 0.5V (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 _{CC}	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			54F		74F		Units	Fig. No.
		$T_A = +25^{\circ}\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50\text{ pF}$			$T_A, V_{CC} = \text{Mil}$ $C_L = 50\text{ pF}$		$T_A, V_{CC} = \text{Com}$ $C_L = 50\text{ pF}$			
		Min	Typ	Max	Min	Max	Min	Max		
t_{PLH}	Propagation Delay	2.5	4.0	5.2	2.0	6.5	2.0	6.2	ns	2-3
t_{PHL}	A_n to B_n , B_n to A_n	2.5	4.0	5.2	2.0	8.5	2.0	6.5		
t_{pZH}	Output Enable Time	2.0	4.3	5.7	2.0	8.0	2.0	6.7	ns	2-5
t_{pZL}	$\bar{E}_1$ to B_n , E_2 to A_n	2.0	5.8	7.5	2.0	10.5	2.0	8.5		
t_{pHZ}	Output Disable Time	2.0	4.5	6.0	1.5	7.5	1.5	7.0		
t_{pLZ}	$\bar{E}_1$ to B_n , E_2 to A_n	2.0	4.5	6.0	2.0	8.5	2.0	7.0		