

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

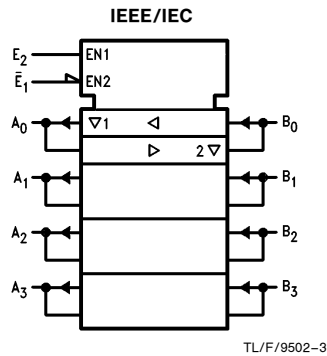
- 2-Way asynchronous data bus communication
- Input clamp diodes limit high-speed termination effects
- Guaranteed 4000V minimum ESD protection

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

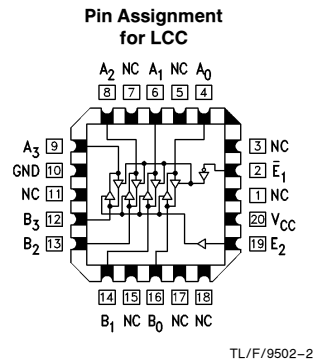
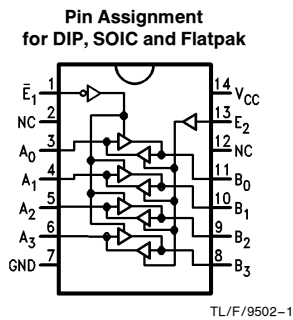
Note 1: Devices also available in 13" reel. Use Suffix = SCX.

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

Logic Symbol



Connection Diagrams



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Unit Loading/Fan Out

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 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	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)	
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)
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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

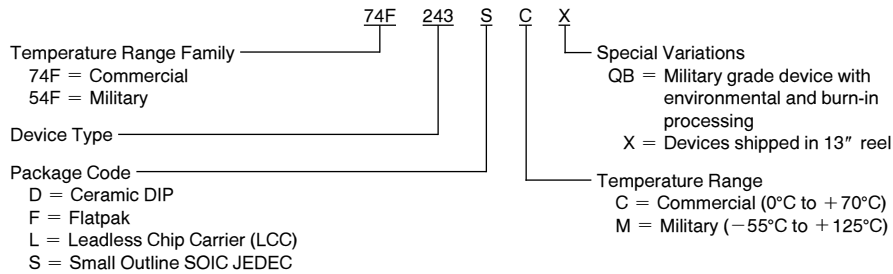
Symbol	Parameter	54F/74F			Units	V _{CC}	Conditions
		Min	Typ	Max			
V _{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V _{IL}	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V _{CD}	Input Clamp Diode Voltage			−1.2	V	Min	I _{IN} = −18 mA
V _{OH}	Output HIGH Voltage	54F 10% V _{CC} 54F 10% V _{CC} 74F 10% V _{CC} 74F 10% V _{CC} 74F 5% V _{CC}	2.4 2.0 2.4 2.0 2.7		V	Min	I _{OH} = −3 mA (A _n , B _n) I _{OH} = −12 mA (A _n , B _n) I _{OH} = −3 mA (A _n , B _n) I _{OH} = −15 mA (A _n , B _n) I _{OH} = −3 mA (A _n , B _n)
V _{OL}	Output LOW Voltage	54F 10% V _{CC} 74F 10% V _{CC}		0.55 0.55	V	Min	I _{OL} = 48 mA (A _n , B _n) I _{OL} = 64 mA (A _n , B _n)
I _{IH}	Input HIGH Current	54F 74F		20.0 5.0	μA	Max	V _{IN} = 2.7V
I _{BVI}	Input HIGH Current Breakdown Test	54F 74F		100 7.0	μA	Max	V _{IN} = 7.0V (E ₁ , E ₂)
I _{BVIT}	Input HIGH Current Breakdown (I/O)	54F 74F		1.0 0.5	mA	Max	V _{IN} = 5.5V (A _n , B _n)
I _{CEX}	Output HIGH Leakage Current	54F 74F		250 50	μA	Max	V _{OUT} = V _{CC}
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 _{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

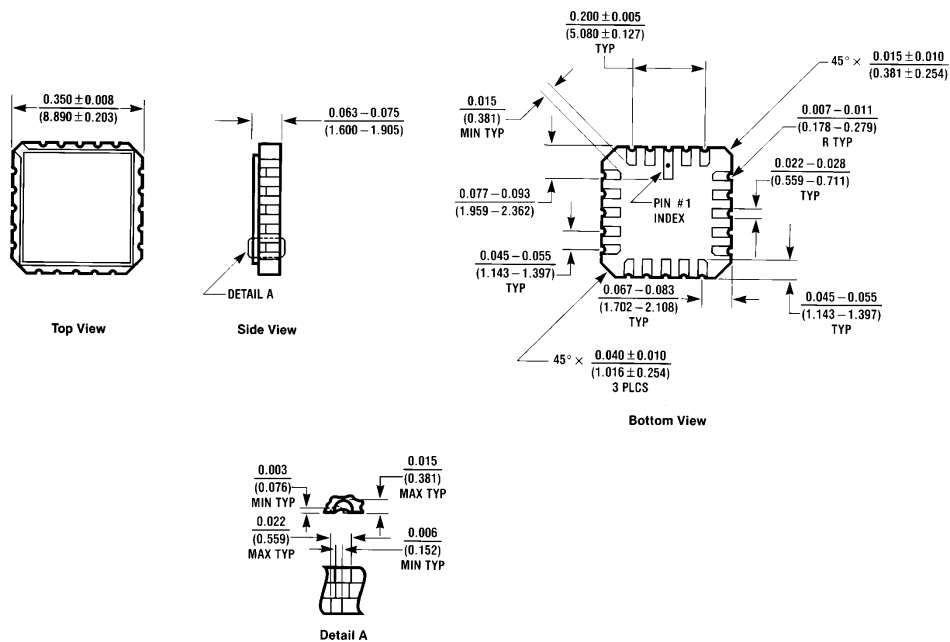
Symbol	Parameter	74F			54F		74F		Units
		$T_A = +25^{\circ}\text{C}$ $V_{CC} = +5.0\text{V}$ $C_L = 50\text{ pF}$			$T_A, V_{CC} = \text{Mil}$ $C_L = 50\text{ pF}$		$T_A, V_{CC} = \text{Com}$ $C_L = 50\text{ pF}$		
		Min	Typ	Max	Min	Max	Min	Max	
t _{PLH}	Propagation Delay	2.5	4.0	5.2	2.0	6.5	2.0	6.2	ns
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
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	

Ordering Information

The device number is used to form part of a simplified purchasing code where the package type and temperature range are defined as follows:



Physical Dimensions inches (millimeters)



20-Lead Ceramic Leadless Chip Carrier (L)
NS Package Number E20A

E20A (REV D)

Physical Dimensions inches (millimeters) (Continued)

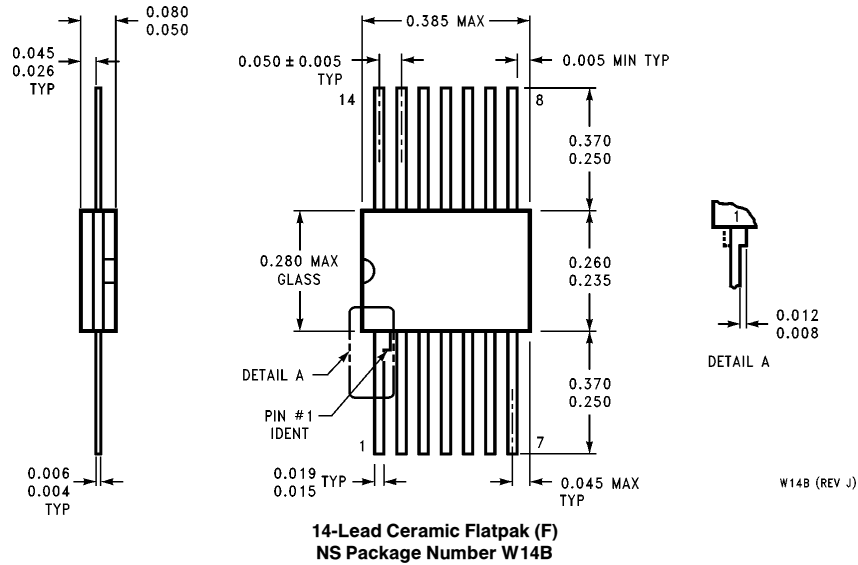
14-Lead Ceramic Dual-In-Line Package (D)
NS Package Number J14A

Top view dimensions: 0.785 (19.939) MAX, 0.025 (0.635) RAD, 0.220-0.310 (5.588-7.874), 0.290-0.320 (7.366-8.128), 0.180 (4.572) MAX, 95° ±5°, 10° MAX, 0.310-0.410 (7.874-10.41), 0.008-0.012 (0.203-0.305), 0.098 (2.489) MAX BOTH ENDS, 0.005 (0.127) MIN, GLASS SEALANT, 0.060 ±0.005 (1.524 ±0.127), 0.200 (5.080) MAX, 0.020-0.060 (0.508-1.524), 0.018 ±0.003 (0.457 ±0.076), 0.125-0.200 (3.175-5.080), 0.100 ±0.010 (2.540 ±0.254), 0.150 (3.81) MIN.

Side view dimensions: 0.228-0.244 (5.791-6.198), 0.335-0.344 (8.509-8.738), 0.010-0.020 (0.254-0.508) × 45°, 0.008-0.010 (0.203-0.254) TYP ALL LEADS, 0.004 (0.102) ALL LEAD TIPS, 8° MAX TYP ALL LEADS, 0.016-0.050 (0.406-1.270) TYP ALL LEADS, 0.053-0.069 (1.346-1.753), 0.014 (0.356), 0.050 (1.270) TYP, 0.004-0.010 (0.102-0.254), 0.014-0.020 (0.356-0.508) TYP, 0.008 (0.203) TYP, 30° TYP, 0.010 MAX (0.254).

14-Lead (0.150" Wide) Molded Small Outline Package, JEDEC (S)
NS Package Number M14A

Physical Dimensions inches (millimeters) (Continued)



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