

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

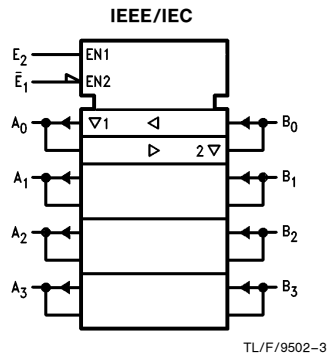
- 2-Way asynchronous data bus communication
- Input clamp diodes limit high-speed termination effects
- Guaranteed 4000V minimum ESD protection

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

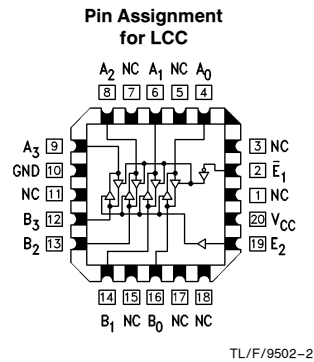
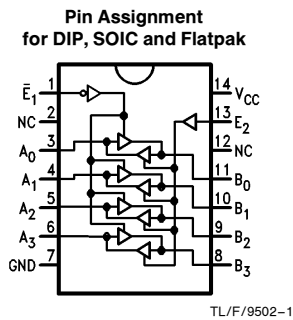
Note 1: Devices also available in 13" reel. Use Suffix = SCX.

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
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

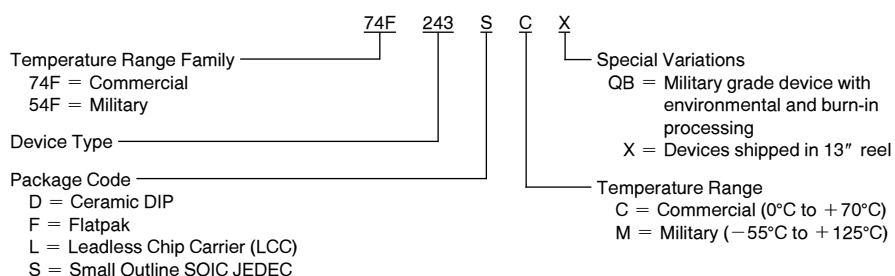
Free Air Ambient Temperature	
Military	−55°C to +125°C
Commercial	0°C to +70°C
Supply Voltage	
Military	+4.5V to +5.5V
Commercial	+4.5V to +5.5V

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 ($\bar{E}_1$, 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 ($\bar{E}_1$, 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

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		

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



Technical drawing of a square component with dimensions and views.

Top View: Shows a square component with a dimension of 0.350 ± 0.008 (8.890 ± 0.203).

Side View: Shows the component's profile with a dimension of $0.063 - 0.075$ (1.600 - 1.905). A detail callout labeled "DETAIL A" points to the bottom edge.

Bottom View: Shows the component's underside with various dimensions and features:

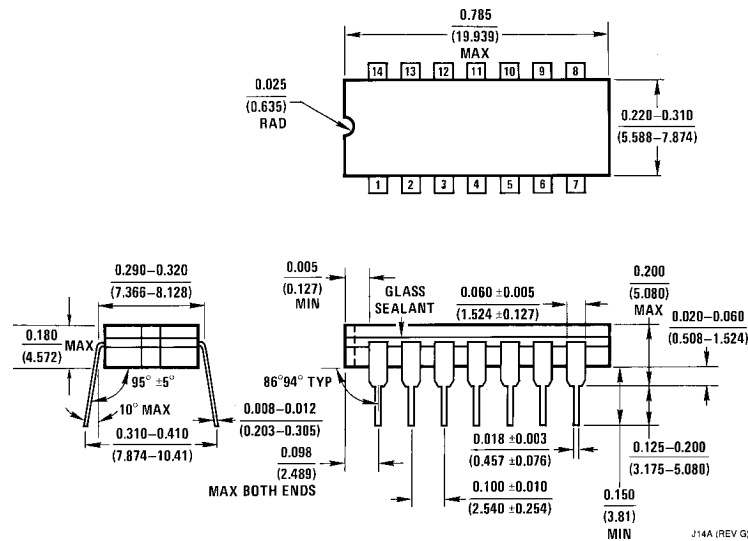
- Top edge: 0.200 ± 0.005 (5.080 ± 0.127) TYP
- Left edge: 0.015 (0.381) MIN TYP
- Right edge: $0.007 - 0.011$ (0.178 - 0.279) R TYP
- Bottom edge: $0.045 - 0.055$ (1.143 - 1.397) TYP
- Bottom-left corner: $45^\circ \times 0.040 \pm 0.010$ (1.016 ± 0.254) 3 PLCS
- Bottom-right corner: $45^\circ \times 0.015 \pm 0.010$ (0.381 ± 0.254) 3 PLCS
- Internal dimensions: $0.077 - 0.093$ (1.959 - 2.362), $0.045 - 0.055$ (1.143 - 1.397) TYP, $0.067 - 0.083$ (1.702 - 2.108) TYP, $0.022 - 0.028$ (0.559 - 0.711) TYP
- Feature: PIN #1 INDEX

Detail A: A close-up view of the bottom edge showing dimensions 0.003 (0.076) MIN TYP, 0.022 (0.559) MAX TYP, and 0.006 (0.152) MIN TYP.

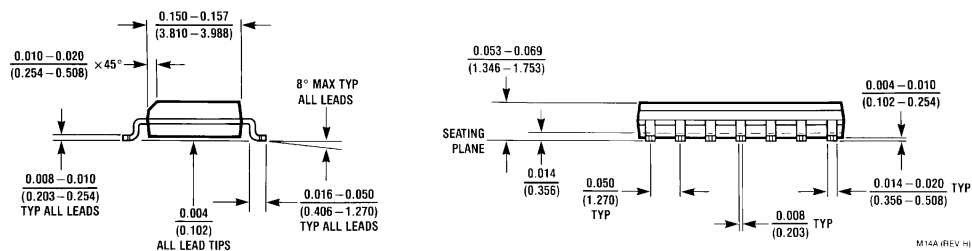
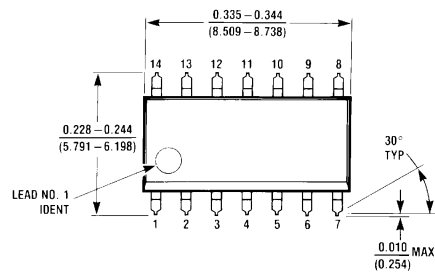
E20A (REV D)

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

Physical Dimensions inches (millimeters) (Continued)

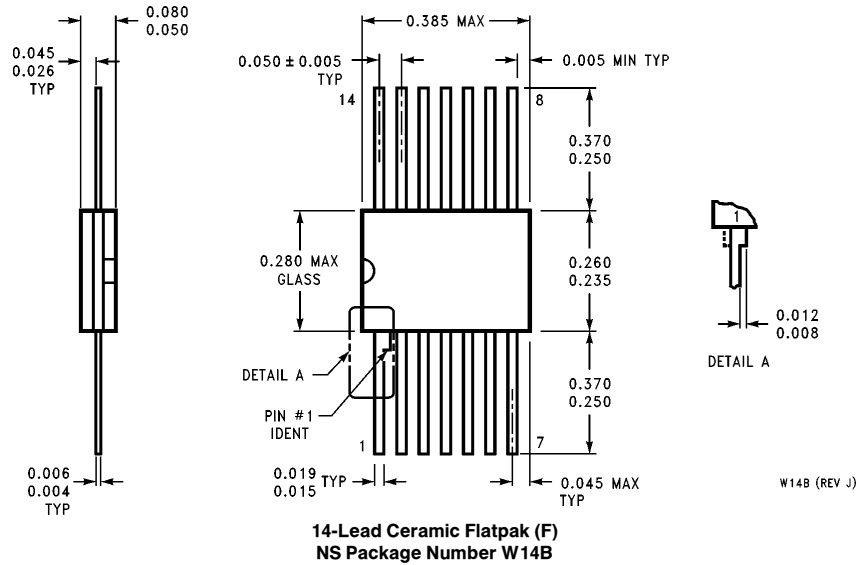


**14-Lead Ceramic Dual-In-Line Package (D)
NS Package Number J14A**



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

Physical Dimensions inches (millimeters) (Continued)



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