

DM74LS243 Quadruple Bus Transceiver

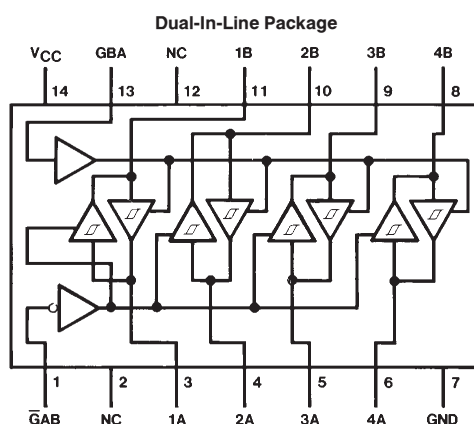
General Description

This four data line transceiver is designed for asynchronous two-way communications between data buses. It can be used to drive terminated lines down to 133Ω.

Features

- Two-way asynchronous communication between data buses
- PNP inputs reduce DC loading on bus line
- Hysteresis at data inputs improves noise margin

Connection Diagram



TL/F/6412-1

Order Number DM74LS243WM or DM74LS243N
See NS Package Number M14B or N14A

Function Table

Control Inputs		Data Port Status	
$\overline{\text{GAB}}$	GBA	A	B
H	H	O	I
L	H	*	*
H	L	ISOLATED	
L	L	I	O

*Possibly destructive oscillation may occur if the transceivers are enabled in both directions at once.

I = Input, O = Output.

H = High Logic Level, L = Low Logic Level.

Absolute Maximum Ratings (Note)

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

Supply Voltage	7V
Input Voltage	
Any G	7V
A or B	5.5V
Operating Free Air Temperature Range	
DM74LS	0°C to +70°C
Storage Temperature Range	–65°C to +150°C

Note: The “Absolute Maximum Ratings” are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the “Electrical Characteristics” table are not guaranteed at the absolute maximum ratings. The “Recommended Operating Conditions” table will define the conditions for actual device operation.

Recommended Operating Conditions

Symbol	Parameter	DM74LS243			Units
		Min	Nom	Max	
V _{CC}	Supply Voltage	4.75	5	5.25	V
V _{IH}	High Level Input Voltage	2			V
V _{IL}	Low Level Input Voltage			0.8	V
I _{OH}	High Level Output Current			–15	mA
I _{OL}	Low Level Output Current			24	mA
T _A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
V _I	Input Clamp Voltage	V _{CC} = Min, I _I = –18 mA			–1.5	V
HYS	Hysteresis (V _{T+} – V _{T–}) (Data Inputs Only)	V _{CC} = Min	0.2	0.4		V
V _{OH}	High Level Output Voltage	V _{CC} = Min, V _{IH} = Min V _{IL} = Max, I _{OH} = –1 mA	2.7			V
		V _{CC} = Min, V _{IH} = Min V _{IL} = Max, I _{OH} = –3 mA	2.4	3.4		
		V _{CC} = Min, V _{IH} = Min V _{IL} = 0.5V, I _{OH} = Max	2			
V _{OL}	Low Level Output Voltage	V _{CC} = Min V _{IL} = Max V _{IH} = Min	I _{OL} = 12 mA I _{OL} = Max		0.4 0.5	V
I _{OZH}	Off-State Output Current, High Level Voltage Applied	V _{CC} = Max V _{IL} = Max V _{IH} = Min	V _O = 2.7V		40	μA
I _{OZL}	Off-State Output Current, Low Level Voltage Applied		V _O = 0.4V		–200	μA
I _I	Input Current at Maximum Input Voltage	V _{CC} = Max	V _I = 5.5V	A or B	0.1	mA
			V _I = 7V	Any G	0.1	mA
I _{IH}	High Level Input Current	V _{CC} = Max, V _I = 2.7V			20	μA
I _{IL}	Low Level Input Current	V _{CC} = Max, V _I = 0.4V			–0.2	mA
I _{OS}	Short Circuit Output Current	V _{CC} = Max (Note 2)	–40		–225	mA
I _{CC}	Supply Current	V _{CC} = Max Outputs Open	Outputs High	22	38	mA
			Outputs Low	29	50	
			Outputs Disabled	32	54	

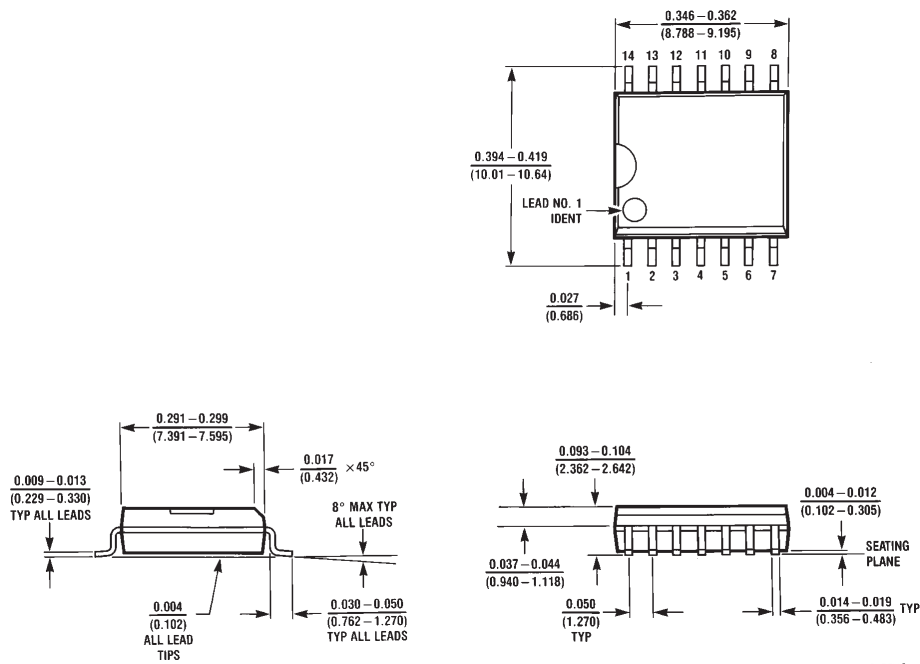
Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Switching Characteristics at $V_{CC} = 5V$, $T_A = 25^\circ C$ (See Section 1 for Test Waveforms and Output Load)

Symbol	Parameter	Conditions	Min	Max	Units
t_{PLH}	Propagation Delay Time Low to High Level Output	$C_L = 45 \text{ pF}$ $R_L = 667\Omega$		18	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	$C_L = 45 \text{ pF}$ $R_L = 667\Omega$		18	ns
t_{PZL}	Output Enable Time to Low Level	$C_L = 45 \text{ pF}$ $R_L = 667\Omega$		30	ns
t_{PZH}	Output Enable Time to High Level	$C_L = 45 \text{ pF}$ $R_L = 667\Omega$		23	ns
t_{PLZ}	Output Disable Time from Low Level	$C_L = 5 \text{ pF}$ $R_L = 667\Omega$		25	ns
t_{PHZ}	Output Disable Time from High Level	$C_L = 5 \text{ pF}$ $R_L = 667\Omega$		18	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	$C_L = 150 \text{ pF}$ $R_L = 667\Omega$		21	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	$C_L = 150 \text{ pF}$ $R_L = 667\Omega$		22	ns
t_{PZL}	Output Enable Time to Low Level	$C_L = 150 \text{ pF}$ $R_L = 667\Omega$		33	ns
t_{PZH}	Output Enable Time to High Level	$C_L = 150 \text{ pF}$ $R_L = 667\Omega$		26	ns

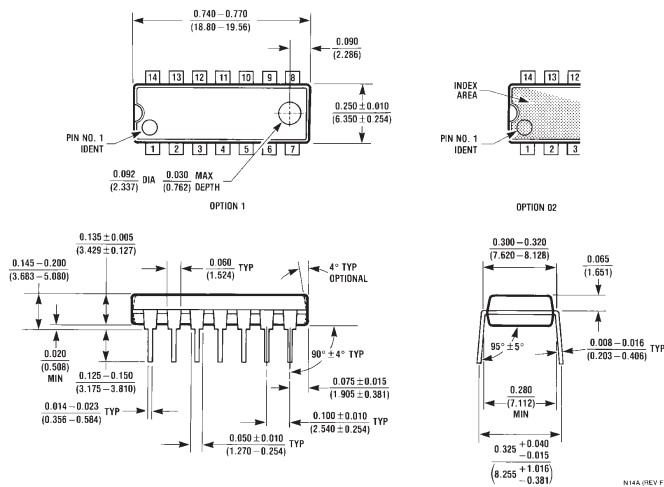
Physical Dimensions inches (millimeters)



14-Lead Wide Small Outline Package (M)
Order Number DM74LS243WM
NS Package Number M14B

M14B (REV D)

Physical Dimensions inches (millimeters) (Continued)



14-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS243N
NS Package Number N14A

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE PRESIDENT OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and whose failure to perform, when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.



National Semiconductor Corporation
 1111 West Bardin Road
 Arlington, TX 76017
 Tel: 1(800) 272-9959
 Fax: 1(800) 737-7018

National Semiconductor Europe
 Fax: (+49) 0-180-530 85 86
 Email: cnjwge@tevm2.nsc.com
 Deutsch Tel: (+49) 0-180-530 85 85
 English Tel: (+49) 0-180-532 78 32
 Français Tel: (+49) 0-180-532 93 58
 Italiano Tel: (+49) 0-180-534 16 80

National Semiconductor Hong Kong Ltd.
 13th Floor, Straight Block,
 Ocean Centre, 5 Canton Rd.
 Tsimshatsui, Kowloon
 Hong Kong
 Tel: (852) 2737-1600
 Fax: (852) 2736-9960

National Semiconductor Japan Ltd.
 Tel: 81-043-299-2309
 Fax: 81-043-299-2408