National Semiconductor

DM74LS243 Quadruple Bus Transceiver

General Description

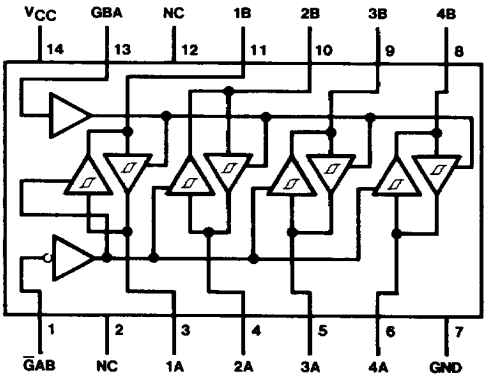
This four data line transceiver is designed for asynchronous two-way communications between data buses. It can be used to drive terminated lines down to 133Ω.

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

Dual-In-Line Package



TL/F/6412–1

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

Function Table

Control Inputs		Data Port Status	
$\overline{GAB}$	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				0.4	V
			I_{OL} = Max				0.5	
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°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 pF R_L = 667Ω		18	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	C_L = 45 pF R_L = 667Ω		18	ns
t_{PZL}	Output Enable Time to Low Level	C_L = 45 pF R_L = 667Ω		30	ns
t_{PZH}	Output Enable Time to High Level	C_L = 45 pF R_L = 667Ω		23	ns
t_{PLZ}	Output Disable Time from Low Level	C_L = 5 pF R_L = 667Ω		25	ns
t_{PHZ}	Output Disable Time from High Level	C_L = 5 pF R_L = 667Ω		18	ns
t_{PLH}	Propagation Delay Time Low to High Level Output	C_L = 150 pF R_L = 667Ω		21	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	C_L = 150 pF R_L = 667Ω		22	ns
t_{PZL}	Output Enable Time to Low Level	C_L = 150 pF R_L = 667Ω		33	ns
t_{PZH}	Output Enable Time to High Level	C_L = 150 pF R_L = 667Ω		26	ns