National Semiconductor

DM54S242/DM74S242, DM54S243/DM74S243 Quadruple Bus Transceivers

General Description

These four data line transceivers are designed for asynchronous two-way communications between data buses. They can be used to drive terminated lines down to 133 ohms.

Features

- Two-Way Asynchronous Communication Between Data Buses
- P-N-P Inputs Reduce D-C Loading
- Hysteresis (Typically 400 mV) at Inputs Improves Noise Margin

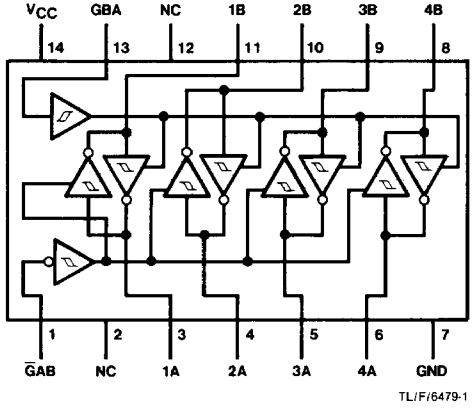
Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	5.5V
Storage Temperature Range	−65°C to 150°C

Note 1: 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.

Connection Diagrams

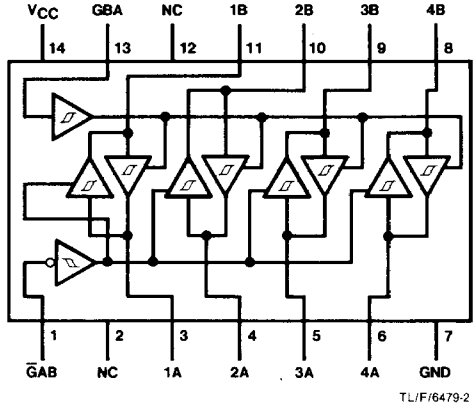
Dual-In-Line Package



TL/F/6479-1

54S242 (J) 74S242 (N)

Dual-In-Line Package



TL/F/6479-2

54S243 (J) 74S243 (N)

Function Table

Control Inputs		S242 Data Port Status		S243 Data Port Status	
$\overline{G}AB$	GBA	A	B	A	B
H	H	$\overline{O}$	I	O	I
L	H	*	*	*	*
H	L	ISOLATED		ISOLATED	
L	L	I	$\overline{O}$	I	O

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

I = Input, O = Output, $\overline{O}$ = Inverting Output.

Recommended Operating Conditions

Symbol	Parameter	DM54S			DM74S			Units
		Min	Typ	Max	Min	Typ	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.8			0.8	V
I_{OH}	High Level Output Current			−12			−15	mA
I_{OL}	Low Level Output Current			48			64	mA

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				−1.2	V
	Hysteresis ($V_{T+} - V_{T-}$)	V_{CC} = Min		0.2	0.4		V
V_{OH}	High Level Output Voltage	V_{CC} = 4.75V, V_{IH} = 2V V_{IL} = 0.8V, I_{OH} = −1 mA		2.7			V
		V_{CC} = Min, V_{IH} = 2V V_{IL} = 0.8V, I_{OH} = −3 mA		2.4	3.4		
		V_{CC} = Min, V_{IH} = 2V V_{IL} = 0.5V, I_{OH} = Max		2			
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max V_{IL} = 0.8V V_{IH} = 2V	DM54			0.55	V
			DM74			0.55	
I_{OZH}	Off-State Output Current, High Level Voltage Applied	V_{CC} = Max, V_O = 2.4V V_{IL} = 0.8V, V_{IH} = 2V				50	μA
I_{OZL}	Off-State Output Current, Low Level Voltage Applied	V_{IH} = 2V, V_O = 0.5V V_{IL} = 0.8V, V_{CC} = Max				−50	μA
I_I	Input Current at Maximum Input Voltage	V_{CC} = Max, V_I = 5.5V				1	mA
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = 2.7V				50	μA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.5V	Any A			−400	μA
			Any G			−2	mA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 2)		−50		−225	mA
I_{CC}	Supply Current	Outputs High	DM54S242		80	123	mA
			DM74S242		80	135	
			DM54S243		95	147	
			DM74S243		95	160	
		Outputs Low	DM54S242		100	145	
			DM74S242		100	150	
			DM54S243		120	170	
			DM74S243		120	180	
		Outputs Disabled	DM54S242		100	145	
			DM74S242		100	150	
			DM54S243		120	170	
			DM74S243		120	180	

Note 1: All typical values are at V_{CC} = 5 V, T_A = 25°C.
Note 2: Not more than one output should be shorted at a time and duration should not exceed one second.

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

Sym	Parameter	Conditions		Min	Typ	Max	Units
t_{PLH}	Propagation Delay Time Low to High Level Output	$C_L = 45$ pF, $R_L = 90\Omega$	DM54/74S242	2	4.5	7	ns
			DM54/74S243	2	6	9	
t_{PHL}	Propagation Delay Time High to Low Level Output	$C_L = 45$ pF, $R_L = 90\Omega$	DM54/74S242	2	4.5	7	ns
			DM54/74S243	2	6	9	
t_{PZL}	Output Enable Time to Low Level	$C_L = 45$ pF, $R_L = 90\Omega$	DM54/74S242	3	10	15	ns
			DM54/74S243	3	10	15	
t_{PZH}	Output Enable Time to High Level	$C_L = 45$ pF, $R_L = 90\Omega$	DM54/74S242	2	6.5	10	ns
			DM54/74S243	3	8	12	
t_{PLZ}	Output Disable Time from Low Level	$C_L = 5$ pF, $R_L = 90\Omega$	DM54/74S242	4	10	15	ns
			DM54/74S243	2	10	15	
t_{PHZ}	Output Disable Time from High Level	$C_L = 5$ pF, $R_L = 90\Omega$	DM54/74S242	2	6	9	ns
			DM54/74S243	2	6	9	
t_{PLH}	Propagation Delay Time Low to High Level Output	$C_L = 150$ pF, $R_L = 90\Omega$	DM54/74S242	3	7	10	ns
			DM54/74S243	4	9	12	
t_{PHL}	Propagation Delay Time High to Low Level Output	$C_L = 150$ pF, $R_L = 90\Omega$	DM54/74S242	3	7	10	ns
			DM54/74S243	4	9	12	
t_{PZL}	Output Enable Time to Low Level	$C_L = 150$ pF, $R_L = 90\Omega$	DM54/74S242	6	14	21	ns
			DM54/74S243	6	14	21	
t_{PZH}	Output Enable Time to High Level	$C_L = 150$ pF, $R_L = 90\Omega$	DM54/74S242	4	9	12	ns
			DM54/74S243	4	10	15	