

# DM74S240, DM74S241, DM74S244 Octal TRI-STATE® Buffer/Line Driver/Line Receiver

## General Description

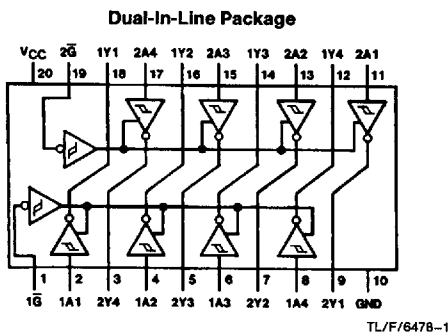
These buffers/line drivers are designed to improve both the performance and PC board density of TRI-STATE buffers/drivers employed as memory-address drivers, clock drivers, and bus-oriented transmitters/receivers. Featuring 400 mV of hysteresis at each low current PNP data line input, they provide improved noise rejection and high fanout outputs, and can be used to drive terminated lines down to 133Ω.

- Typical  $I_{OL}$  (sink current)  
74S 64 mA
- Typical  $I_{OH}$  (source current)  
74S -15 mA
- Typical propagation delay times  
Inverting 4.5 ns  
Noninverting 6 ns
- Typical enable/disable times 9 ns
- Typical power dissipation (enabled)  
Inverting 450 mW  
Noninverting 538 mW

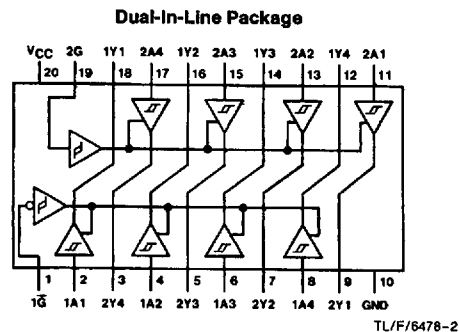
## Features

- TRI-STATE outputs drive bus lines directly
- PNP inputs reduce DC loading on bus lines
- Hysteresis at data inputs improves noise margins

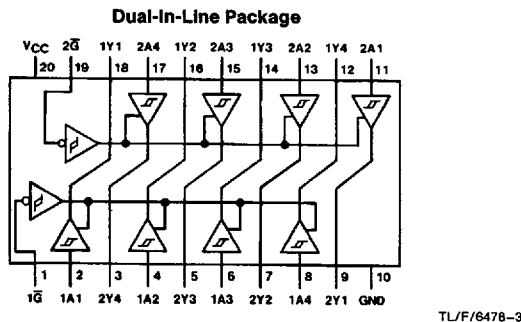
## Connection Diagrams



**Order Number DM74S240N**  
See NS Package Number N20A



**Order Number DM74S241N**  
See NS Package Number N20A



**Order Number DM74S244N**  
See NS Package Number N20A

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### Absolute Maximum Ratings (Note)

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range DM74S	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	Min	Typ	Max	Units
V <sub>CC</sub>	Supply Voltage	4.75	5	5.25	V
V <sub>IH</sub>	High Level Input Voltage	2			V
V <sub>IL</sub>	Low Level Input Voltage			0.8	V
I <sub>OH</sub>	High Level Output Current			-15	mA
I <sub>OL</sub>	Low Level Output Current			64	mA
T <sub>A</sub>	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 <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.2	V
H <sub>ys</sub>	Hysteresis (V <sub>T+</sub> - V <sub>T-</sub> ) (Data Inputs Only)	V <sub>CC</sub> = Min	0.2	0.4		V
V <sub>OH</sub>	High Level Output Voltage	V <sub>CC</sub> = 4.75V, V <sub>IH</sub> = 2V V <sub>IL</sub> = 0.8V, I <sub>OH</sub> = -1 mA	2.7			V
		V <sub>CC</sub> = Min, V <sub>IH</sub> = 2V V <sub>IL</sub> = 0.8V, I <sub>OH</sub> = -3 mA	2.4	3.4		
		V <sub>CC</sub> = Min, V <sub>IH</sub> = 2V V <sub>IL</sub> = 0.5V, I <sub>OH</sub> = Max	2			
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min I <sub>OL</sub> = Max V <sub>IL</sub> = 0.8V, V <sub>IH</sub> = 2V			0.55	V
I <sub>OZH</sub>	Off-State Output Current, High Level Voltage Applied	V <sub>CC</sub> = Max V <sub>IL</sub> = 0.8V			50	μA
I <sub>OZL</sub>	Off-State Output Current, Low Level Voltage Applied	V <sub>IH</sub> = 2V			-50	μA
I <sub>I</sub>	Input Current at Maximum Input Voltage	V <sub>CC</sub> = Max V <sub>I</sub> = 5.5V			1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max V <sub>I</sub> = 2.7V			50	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max V <sub>I</sub> = 0.5V	Any A		-400	μA
			Any G		-2	mA

## Electrical Characteristics

over recommended operating free-air temperature range (unless otherwise noted) (Continued)

Symbol	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
$I_{OS}$	Short Circuit Output Current	$V_{CC} = \text{Max (Note 2)}$	-50		-225	mA
$I_{CC}$	Supply Current	Outputs High	S240	80	135	mA
			S241, 244	95	160	
		Outputs Low	S240	100	150	
			S241, 244	120	180	
		Outputs Disabled	S240	100	150	
			S241, 244	120	180	

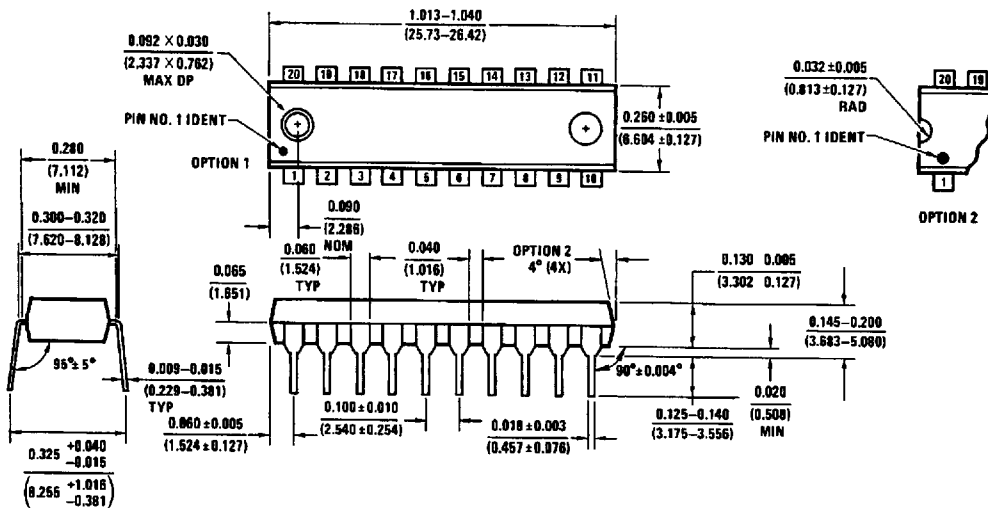
Note 1: All typical values are at  $V_{CC} = 5V$ ,  $T_A = 25^\circ C$ .

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

## Switching Characteristics:

Symbol	Parameter	Conditions	Min	Max	Units	
$t_{PLH}$	Propagation Delay Time Low to High Level Output	$C_L = 45 \text{ pF}$ $R_L = 90\Omega$	S240	2	7	ns
			S241, 244	2	9	
$t_{PHL}$	Propagation Delay Time High to Low Level Output	$C_L = 45 \text{ pF}$ $R_L = 90\Omega$	S240	2	7	ns
			S241, 244	2	9	
$t_{PZL}$	Output Enable Time to Low Level	$C_L = 45 \text{ pF}$ $R_L = 90\Omega$	S240	3	15	ns
			S241, 244	3	15	
$t_{PZH}$	Output Enable Time to High Level	$C_L = 45 \text{ pF}$ $R_L = 90\Omega$	S240	2	10	ns
			S241, 244	3	12	
$t_{PLZ}$	Output Disable Time from Low Level	$C_L = 5 \text{ pF}$ $R_L = 90\Omega$	S240	4	15	ns
			S241, 244	2	15	
$t_{PHZ}$	Output Disable Time from High Level	$C_L = 5 \text{ pF}$ $R_L = 90\Omega$	S240	2	9	ns
			S241, 244	2	9	
$t_{PLH}$	Propagation Delay Time Low to High Level Output	$C_L = 150 \text{ pF}$ $R_L = 90\Omega$	S240	3	10	ns
			S241, 244	4	12	
$t_{PHL}$	Propagation Delay Time High to Low Level Output	$C_L = 150 \text{ pF}$ $R_L = 90\Omega$	S240	3	10	ns
			S241, 244	4	12	
$t_{PZL}$	Output Enable Time to Low Level	$C_L = 150 \text{ pF}$ $R_L = 90\Omega$	S240	6	21	ns
			S241, 244	6	21	
$t_{PZH}$	Output Enable Time to High Level	$C_L = 150 \text{ pF}$ $R_L = 90\Omega$	S240	4	12	ns
			S241, 244	4	15	

**Physical Dimensions** inches (millimeters)



**20-Lead Molded Dual-in-Line Package (N)**  
**Order Numbers DM74S240N, DM74S241N or DM74S244N**  
**NS Package Number N20A**

N20A (REV Q)

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