

## DM74S240, DM74S241, DM74S244 Octal 3-STATE Buffer/Line Driver/Line Receiver

### General Description

These buffers/line drivers are designed to improve both the performance and PC board density of 3-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.

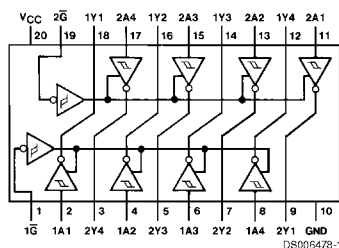
### Features

- 3-STATE outputs drive bus lines directly
- PNP inputs reduce DC loading on bus lines

- Hysteresis at data inputs improves noise margins
- 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

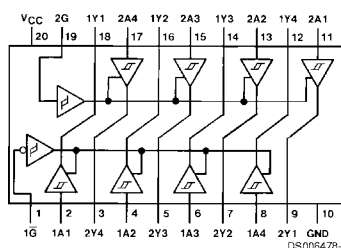
### Connection Diagrams

Dual-In-Line Package



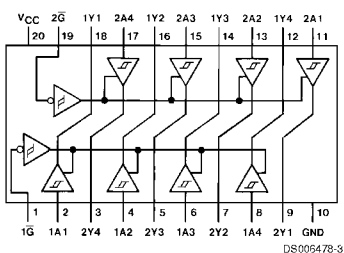
Order Number DM74S240N  
See Package Number N20A  
Dual-In-Line Package

Dual-In-Line Package



Order Number DM74S241N  
See Package Number N20A

Dual-In-Line Package



Order Number DM74S244N  
See Package Number N20A

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## Absolute Maximum Ratings (Note 1)

Supply Voltage  
Input Voltage

7V  
5.5V

Operating Free Air Temperature Range

DM74S  
Storage Temperature Range

0°C to +70°C  
-65°C to +150°C

## 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

**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.

## Electrical Characteristics

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

Symbol	Parameter	Conditions	Min	Typ (Note 2)	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
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 3)	-50		-225	mA	
I <sub>CC</sub>	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 2:** All typical values are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

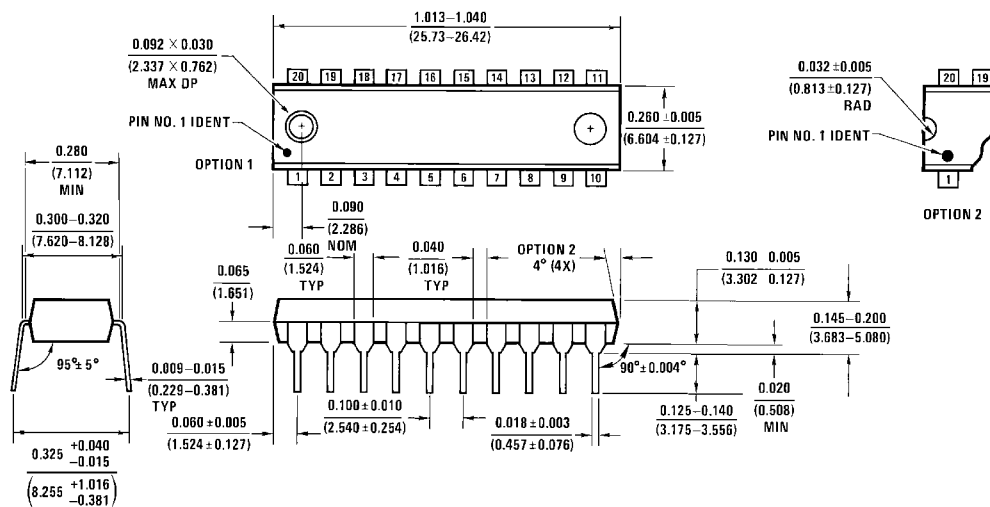
**Note 3:** Not more than one output should be shorted at a time and duration should not exceed one second.

### Switching Characteristics:

for test waveforms and output load.  $V_{CC} = 5V$ ,  $T_A = 25^\circ C$

Symbol	Parameter	Conditions	Min	Max	Units	
t <sub>PLH</sub>	Propagation Delay Time Low to High Level Output	C <sub>L</sub> = 45 pF R <sub>L</sub> = 90Ω	S240	2	7	ns
			S241, 244	2	9	
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output	C <sub>L</sub> = 45 pF R <sub>L</sub> = 90Ω	S240	2	7	ns
			S241, 244	2	9	
t <sub>PZL</sub>	Output Enable Time to Low Level	C <sub>L</sub> = 45 pF R <sub>L</sub> = 90Ω	S240	3	15	ns
			S241, 244	3	15	
t <sub>PZH</sub>	Output Enable Time to High Level	C <sub>L</sub> = 45 pF R <sub>L</sub> = 90Ω	S240	2	10	ns
			S241, 244	3	12	
t <sub>PLZ</sub>	Output Disable Time from Low Level	C <sub>L</sub> = 5 pF R <sub>L</sub> = 90Ω	S240	4	15	ns
			S241, 244	2	15	
t <sub>PHZ</sub>	Output Disable Time from High Level	C <sub>L</sub> = 5 pF R <sub>L</sub> = 90Ω	S240	2	9	ns
			S241, 244	2	9	
t <sub>PLH</sub>	Propagation Delay Time Low to High Level Output	C <sub>L</sub> = 150 pF R <sub>L</sub> = 90Ω	S240	3	10	ns
			S241, 244	4	12	
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output	C <sub>L</sub> = 150 pF R <sub>L</sub> = 90Ω	S240	3	10	ns
			S241, 244	4	12	
t <sub>PZL</sub>	Output Enable Time to Low Level	C <sub>L</sub> = 150 pF R <sub>L</sub> = 90Ω	S240	6	21	ns
			S241, 244	6	21	
t <sub>PZH</sub>	Output Enable Time to High Level	C <sub>L</sub> = 150 pF R <sub>L</sub> = 90Ω	S240	4	12	ns
			S241, 244	4	15	

**Physical Dimensions** inches (millimeters) unless otherwise noted



N20A (REV G)

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

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