FAIRCHILD SEMICONDUCTOR™

August 1986
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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.

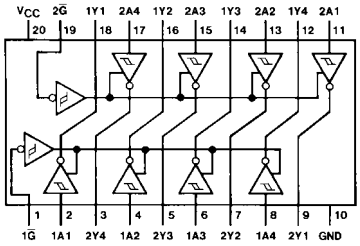
Features

- 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) 64 mA
- Typical I_{OH} (source current) −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

Ordering Code:

Order Number	Package Number	Package Description
DM74S240N	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
DM74S241N	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
DM74S244N	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Connection Diagrams



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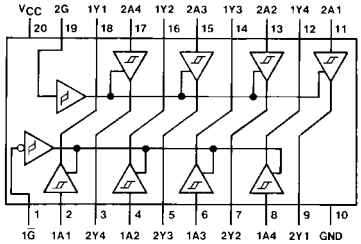

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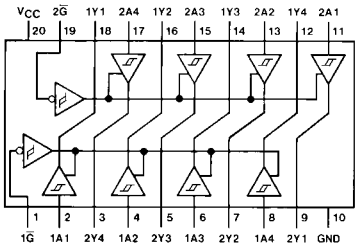


DM74S244N

Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range	0°C to +70°C
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 tables 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_{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			64	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 2)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA				−1.2	V
H_{ys}	Hysteresis ($V_{T+} - V_{T-}$) (Data Inputs Only)	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				0.55	V
I_{OZH}	Off-State Output Current, HIGH Level Voltage Applied	V_{CC} = Max, V_{IL} = 0.8V	V_O = 2.4V			50	µA
I_{OZL}	Off-State Output Current, LOW Level Voltage Applied	V_{IH} = 2V	V_O = 0.5V			−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 3)		−50		−225	mA
I_{CC}	Supply Current	Outputs HIGH	DM74S240		80	135	mA
			DM74S241, DM74244		95	160	
		Outputs LOW	DM74S240		100	150	
			DM74S241, DM74244		120	180	
		Outputs Disabled	DM74S240		100	150	
			DM74S241, DM74S244		120	180	

Note 2: All typical values are at V_{CC} = 5V, T_A = 25°C.

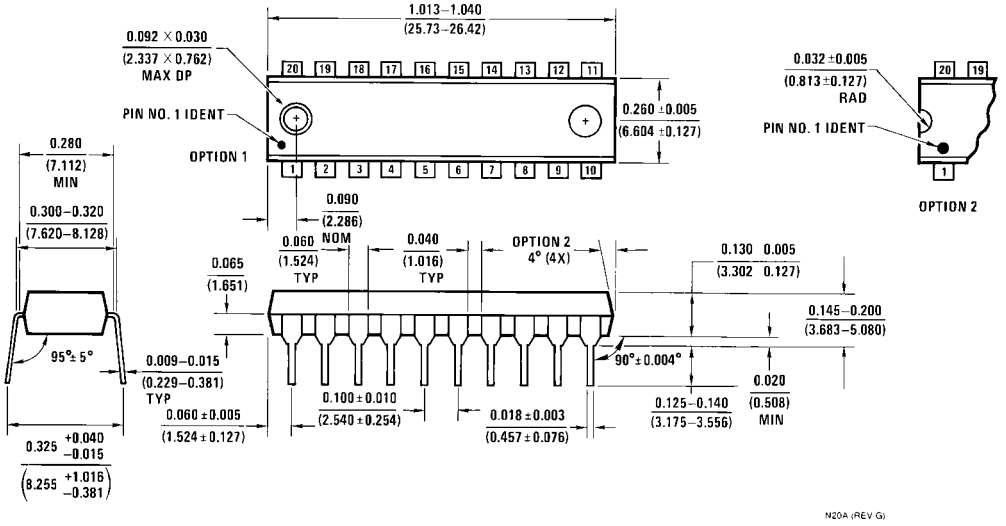
Note 3: Not more than one output should be shorted at a time and duration should not exceed one second.

Switching Characteristics

V_{CC} = 5V, T_A = 25°C

Symbol	Parameter	Conditions		Min	Max	Units
t_{PLH}	Propagation Delay Time	C_L = 45 pF	DM74S240	2	7	ns
	LOW-to-HIGH Level Output	R_L = 90Ω	DM74S241, DM74244	2	9	
t_{PHL}	Propagation Delay Time	C_L = 45 pF	DM74S240	2	7	ns
	HIGH-to-LOW Level Output	R_L = 90Ω	DM74S241, DM74244	2	9	
t_{PZL}	Output Enable Time to	C_L = 45 pF	DM74S240	3	15	ns
	LOW Level	R_L = 90Ω	DM74S241, DM74244	3	15	
t_{PZH}	Output Enable Time to	C_L = 45 pF	DM74S240	2	10	ns
	HIGH Level	R_L= 90Ω	DM74S241, DM74244	3	12	
t_{PLZ}	Output Disable Time	C_L = 5 pF	DM74S240	4	15	ns
	from Low Level	R_L = 90Ω	DM74S241, DM74244	2	15	
t_{PHZ}	Output Disable Time	C_L = 5 pF	DM74S240	2	9	ns
	from High Level	R_L = 90Ω	DM74S241, DM74244	2	9	
t_{PLH}	Propagation Delay Time	C_L = 150 pF	DM74S240	3	10	ns
	LOW-to-HIGH Level Output	R_L = 90Ω	DM74S241, DM74244	4	12	
t_{PHL}	Propagation Delay Time	C_L = 150 pF	DM74S240	3	10	ns
	HIGH-to-LOW Level Output	R_L = 90Ω	DM74S241, DM74244	4	12	
t_{PZL}	Output Enable Time to	C_L = 150 pF	DM74S240	6	21	ns
	LOW Level	R_L = 90Ω	DM74S241, DM74244	6	21	
t_{PZH}	Output Enable Time to	C_L = 150 pF	DM74S240	4	12	ns
	HIGH Level	R_L = 90Ω	DM74S241, DM74244	4	15	

Physical Dimensions inches (millimeters) unless otherwise noted



20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N20A