FAIRCHILD SEMICONDUCTOR™

March 1998

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

General Description

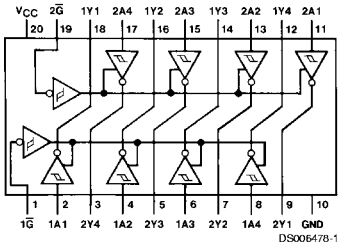
These buffers/line drivers are designed to improve both the performance and PC board density of 3-STATE buffers/drivers employed as memory-address drivers, clock drivers, and bus-oriented transmitters/receivers. Featuring 400 mV of hysteresis at each low current PNP data line input, they provide improved 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

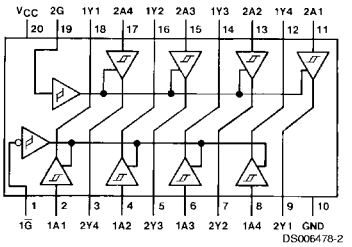
Connection Diagrams

Dual-In-Line Package



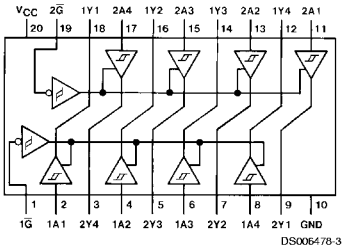
Order Number DM74S240N
See Package Number N20A
Dual-In-Line Package

Dual-In-Line Package



Order Number DM74S241N
See Package Number N20A

Dual-In-Line Package



Order Number DM74S244N
See Package Number N20A

Absolute Maximum Ratings (Note 1)

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

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

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_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_{IH} = 2V	V_O = 2.4V			50	µA
I_{OZL}	Off-State Output Current, Low Level Voltage Applied		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	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_{CC} = 5V, T_A = 25°C.

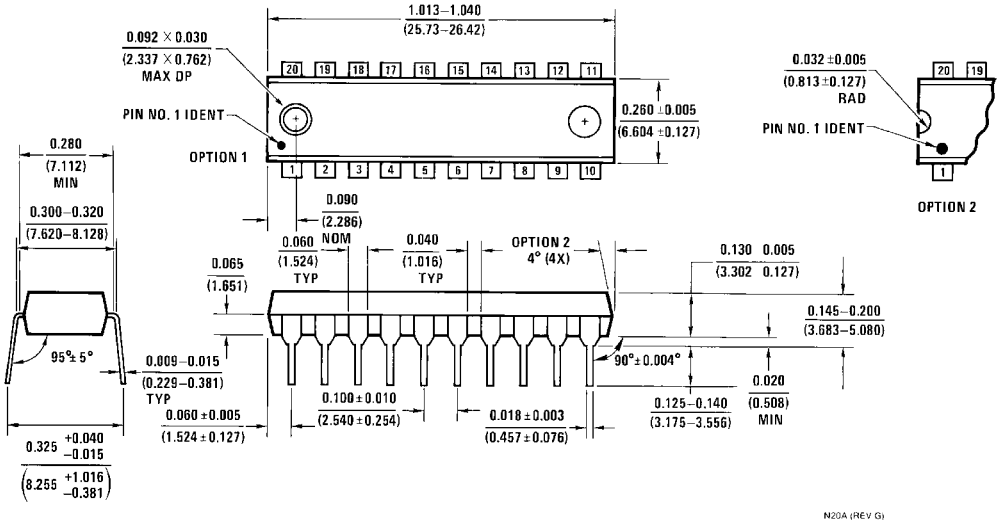
Note 3: Not more than one output should be shorted at a time and duration should not exceed one second.

Switching Characteristics:

for test waveforms and output load. V_{CC} = 5V, T_A = 25˚C

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

Physical Dimensions inches (millimeters) unless otherwise noted



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

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

Fairchild Semiconductor Corporation
Americas
Customer Response Center
Tel: 1-888-522-5372

Fairchild Semiconductor Europe
Fax: +49 (0) 1 80-530 85 86
Email: europe.support@nsc.com
Deutsch Tel: +49 (0) 8 141-35-0
English Tel: +44 (0) 1 793-85-68-56
Italy Tel: +39 (0) 2 57 5631

Fairchild Semiconductor Hong Kong Ltd.
13th Floor, Straight Block,
Ocean Centre, 5 Canton Rd.
Tsimshatsui, Kowloon
Hong Kong
Tel: +852 2737-7200
Fax: +852 2314-0061

National Semiconductor Japan Ltd.
Tel: 81-3-5620-6175
Fax: 81-3-5620-6179

www.fairchildsemi.com