FAIRCHILD SEMICONDUCTOR™

September 1991
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DM81LS95A • DM81LS96A • DM81LS97A
3-STATE Octal Buffer

General Description

These devices provide eight, two-input buffers in each package. All employ low-power-Schottky TTL technology. One of the two inputs to each buffer is used as a control line to gate the output into the high-impedance state, while the other input passes the data through the buffer. The DM81LS95A and DM81LS97A present true data at the outputs, while the DM81LS96A is inverting. On the DM81LS95A and DM81LS96A versions, all eight 3-STATE enable lines are common, with access through a 2-input NOR gate. On the DM81LS97A version, four buffers are enabled from one common line, and the other four buffers are enabled form another common line. In all cases the outputs are placed in the 3-STATE condition by applying a high logic level to the enable pins.

Features

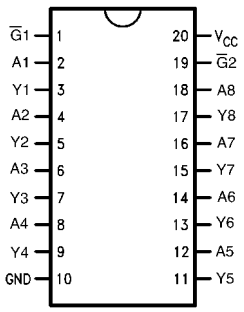
- Typical power dissipation
  - DM81LS95A, DM81LS97A 80 mW
  - DM81LS96A 65 mW
- Typical propagation delay
  - DM81LS95A, DM81LS97A 15 ns
  - DM81LS96A 10 ns
- Low power-Schottky, 3-STATE technology

Ordering Code:

Order Number	Package Number	Package Description
DM81LS95AWM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
DM81LS95AN	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
DM81LS96AWM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
DM81LS96AN	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
DM81LS97AN	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagram



Pin Descriptions

DM81LS95A and DM92LS96A

Pin Names	Descriptions
A1–A8	Inputs
Y1–Y8	Outputs
$\overline{G}1$–$\overline{G}2$	Active LOW Output Enables (Note 1)

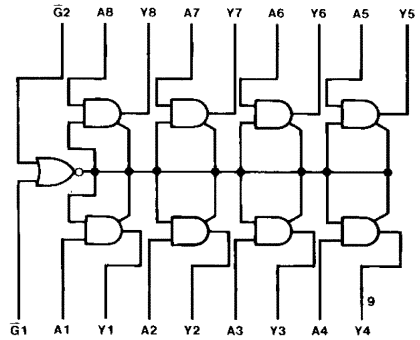
Note 1: Both $\overline{G}1$ and $\overline{G}2$ must be LOW for outputs to be enabled.

DM81LS97A

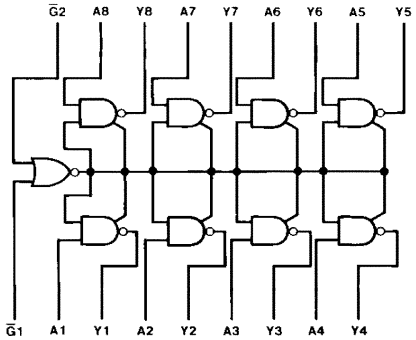
Pin Names	Descriptions
A1–A8	Inputs
Y1–Y8	Outputs
$\overline{G}1$	Active LOW Output Enable (Y1–Y4)
$\overline{G}2$	Active LOW Output Enable (Y5–Y8)

Logic Symbols

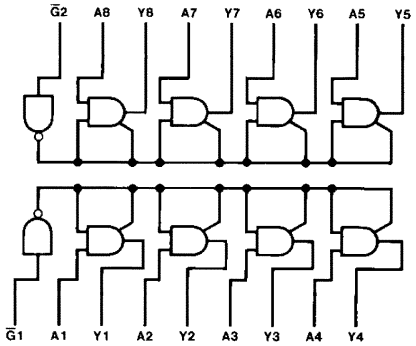
DM81LS95A



DM81LS96A



DM81LS97A



Truth Tables

DM81LS95A

Inputs			Output
$\overline{G}1$	$\overline{G}2$	A	Y
H	X	X	Hi-Z
X	H	X	Hi-Z
L	L	H	H
L	L	L	L

DM81LS96A

Inputs			Output
$\overline{G}1$	$\overline{G}2$	A	Y
H	X	X	Hi-Z
X	H	X	Hi-Z
L	L	H	L
L	L	L	H

DM81LS97A

Inputs		Output
$\overline{G}1$	A1–A4	Y1–Y4
H	X	Hi-Z
L	H	H
L	L	L
$\overline{G}2$	A5–A6	Y5–Y8
H	X	Hi-Z
L	H	H
L	L	L

Absolute Maximum Ratings(Note 2)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C

Note 2: 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	Nom	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			−5.2	mA
I_{OL}	LOW Level Output Current			24	mA
T_A	Free Air Operating Temperature	0		70	°C

DC Electrical Characteristics DM81LS95A and DM81LS97A

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

Symbol	Parameter	Conditions			Min	Typ (Note 3)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA					−1.5	V
V_{OH}	HIGH Level Output Voltage	V_{CC} = Min, I_{OH} = Max V_{IL} = Max, V_{IH} = Min			2.7			V
V_{OL}	LOW Level Output Voltage	V_{CC} = Min, I_{OL} = Max I_{OL} = Max, V_{IH} = Min					0.5	V
		I_{OL} = 12 mA, V_{CC} = Min					0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 7V					0.1	mA
I_{IH}	HIGH Level Input Current	V_{CC} = Max, V_I = 2.7V					20	µA
I_{IL}	LOW Level Input Current	V_{CC} = Max	V_I = 0.5V	A (Note 4)			−20	µA
			V_I = 0.4V	A (Note 5)			−50	
				$\overline{G}$			−50	
I_{OZH}	Off-State Output Current with HIGH Level Output Voltage Applied	V_{CC} = Max, V_O = 2.4V V_{IH} = Min, V_{IL} = Max					20	µA
I_{OZL}	Off-State Output Current with LOW Level Output Voltage Applied	V_{CC} = Max, V_O = 0.4V V_{IH} = Min, V_{IL} = Max					−20	µA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 6)			−20		−100	mA
I_{CC}	Supply Current	V_{CC} = Max (Note 4)				16	26	mA

Note 3: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 4: Both $\overline{G}$ inputs are at 2V.

Note 5: Both $\overline{G}$ inputs are at 0.4V.

Note 6: Not more than one output should be shorted at a time, and the duration should not exceed one second.

AC Electrical Characteristics DM81LS95A and DM81LS97A

V_{CC} = 5V, T_A = 25°C

Symbol	Parameter	R_L = 667 Ω				Units
		C_L = 50 pF		C_L = 150 pF		
		Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		16		25	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		28		40	ns
t_{PZH}	Output Enable Time to HIGH Level Output		25		30	ns
t_{PZL}	Output Enable Time to LOW Level Output		30		42	ns
t_{PHZ}	Output Disable Time from HIGH Level Output (Note 7)		20			ns
t_{PLZ}	Output Disable Time from LOW Level Output (Note 7)		27			ns

Note 7: C_L = 5 pF.

DC Electrical Characteristics DM81LS96A

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

Symbol	Parameter	Conditions			Min	Typ (Note 8)	Max	Units
V_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA					−1.5	V
V_{OH}	HIGH Level Output Voltage	V_{CC} = Min, I_{OH} = Max V_{IL} = Max, V_{IH} = Min			2.7			V
V_{OL}	LOW Level Output Voltage	V_{CC} = Min, I_{OL} = Max I_{OL} = Max, V_{IH} = Min					0.5	V
		I_{OL} = 12 mA, V_{CC} = Min					0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 7V					0.1	mA
I_{IH}	HIGH Level Input Current	V_{CC} = Max, V_I = 2.7V					20	µA
I_{IL}	LOW Level Input Current	V_{CC} = Max	V_I = 0.5V	A (Note 9)			−20	µA
			V_I = 0.4V	A (Note 10)			−50	
				$\overline{G}$			−50	
I_{OZH}	Off-State Output Current with HIGH Level Output Voltage Applied	V_{CC} = Max, V_O = 2.4V V_{IH} = Min, V_{IL} = Max					20	µA
I_{OZL}	Off-State Output Current with LOW Level Output Voltage Applied	V_{CC} = Max, V_O = 0.4V V_{IH} = Min, V_{IL} = Max					−20	µA
I_{OS}	Short Circuit Output Current	V_{CC} = Max (Note 11)			−20		−100	mA
I_{CC}	Supply Current	V_{CC} = Max (Note 10)				13	21	mA

Note 8: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 9: Both $\overline{G}$ inputs are at 2V.

Note 10: Both $\overline{G}$ inputs are at 0.4V.

Note 11: Not more than one output should be shorted at a time, and the duration should not exceed one second.

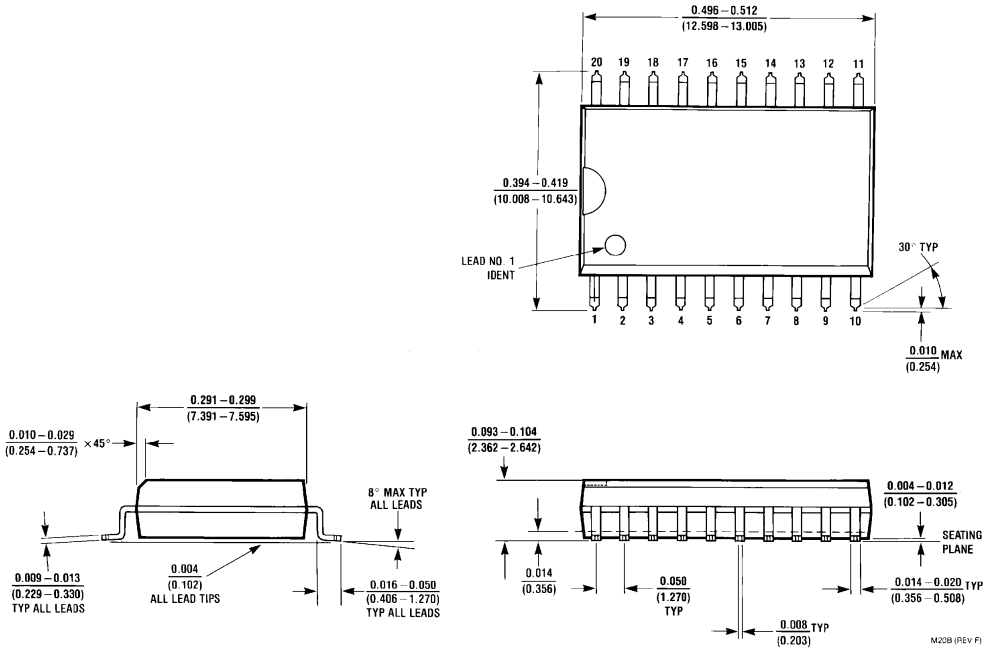
AC Electrical Characteristics DM81LS96A

V_{CC} = 5V, T_A = 25°C

Symbol	Parameter	R_L = 667 Ω				Units
		C_L = 50 pF		C_L = 150 pF		
		Min	Max	Min	Max	
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		10		16	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		17		30	ns
t_{PZH}	Output Enable Time to HIGH Level Output		15		30	ns
t_{PZL}	Output Enable Time to LOW Level Output		35		45	ns
t_{PHZ}	Output Disable Time from HIGH Level Output (Note 12)		20			ns
t_{PLZ}	Output Disable Time from LOW Level Output (Note 12)		27			ns

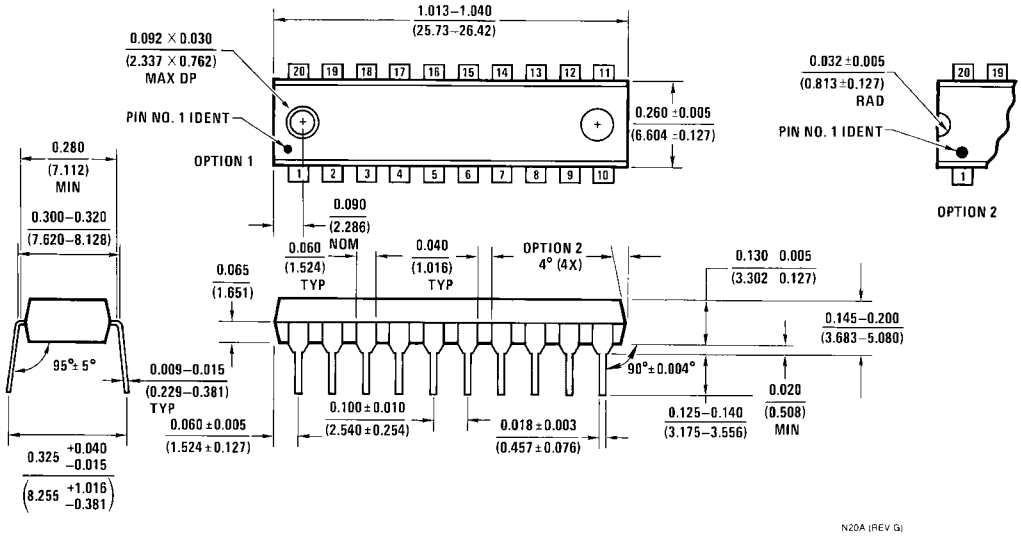
Note 12: C_L = 5 pF.

Physical Dimensions inches (millimeters) unless otherwise noted



20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
Package Number M20B

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



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

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