FAIRCHILD SEMICONDUCTOR™

September 1986
Revised February 2000

DM74ALS240A • DM74ALS241A
Octal 3-STATE Bus Driver

General Description

These octal 3-STATE bus drivers are designed to provide the designer with flexibility in implementing a bus interface with memory, microprocessor, or communication systems. The output 3-STATE gating control is organized into two separate groups of four buffers. The DM74ALS240A control inputs symmetrically enable the respective outputs when set logic LOW, while the DM74ALS241A has complementary enable gating. The 3-STATE circuitry contains a feature that maintains the buffer outputs in 3-STATE (high impedance state) during power supply ramp-up or ramp-down. This eliminates bus glitching problems that arise during power-up and power-down.

Features

- Advanced low power oxide-isolated ion-implanted Schottky TTL process
- Functional and pin compatible with the DM74LS counterpart
- Improved switching performance with less power dissipation compared with the DM74LS counterpart
- Switching response specified into 500Ω and 50 pF load
- Switching response specifications guaranteed over full temperature and V_{CC} supply range
- PNP input design reduces input loading
- Low level drive current: 74ALS = 24 mA

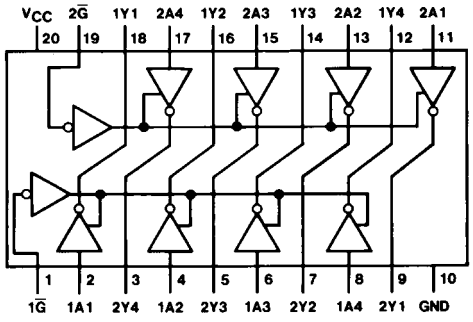
Ordering Code:

Order Number	Package Number	Package Description
DM74ALS240AWM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
DM74ALS240ASJ	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
DM74ALS240AN	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
DM74ALS241AWM	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide
DM74ALS241AN	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

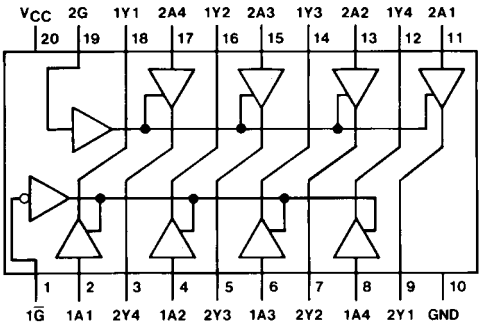
Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagrams

DM74ALS240A



DM74ALS241A



Function Tables

DM74ALS240A

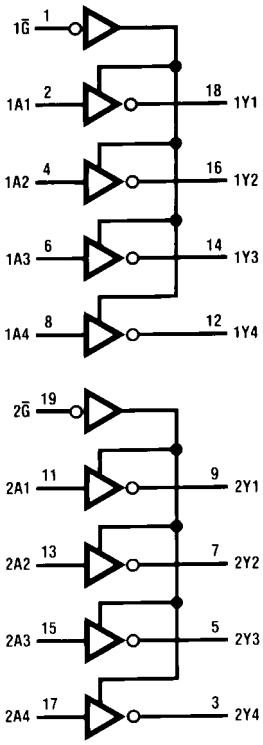
Input		Output
$\overline{G}$	A	Y
L	L	H
L	H	L
H	X	Z

DM74ALS241A

Input		Output	Input		Output
$1\overline{G}$	1A	Y	2G	2A	Y
L	L	L	H	L	L
L	H	H	H	H	H
H	X	Z	L	X	Z

Logic Diagrams

DM74ALS240A



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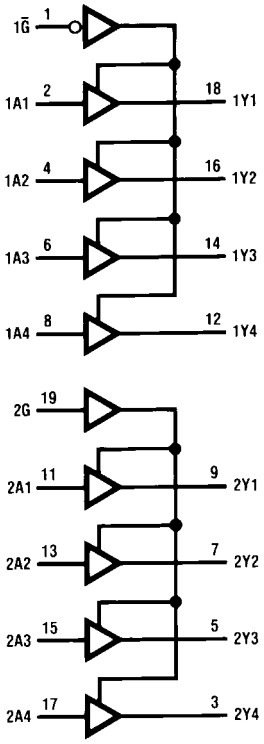


Absolute Maximum Ratings(Note 1)

Supply Voltage, V_{CC}	7V
Input Voltage	7V
Voltage Applied to Disabled Output	5.5V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	–65°C to +150°C
Typical θ_{JA}	
N Package	60.5°C/W
M Package	79.8°C/W

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	4.5	5	5.5	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			24	mA
T_A	Operating Free Air Temperature	0		70	°C

Electrical Characteristics

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

Symbol	Parameter	Conditions		Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage	V_{CC} = 4.5V, I_I = –18 mA				–1.5	V
V_{OH}	HIGH Level Output Voltage	V_{CC} = 4.5V to 5.5V	I_{OH} = –0.4 mA	V_{CC} – 2			V
		V_{CC} = 4.5V	I_{OH} = –3 mA	2.4			V
			I_{OH} = Max	2			V
V_{OL}	LOW Level Output Voltage	V_{CC} = 4.5V, I_{OL} = Max			0.35	0.5	V
I_I	Input Current at Max Input Voltage	V_{CC} = 5.5V, V_I = 7V				0.1	mA
I_{IH}	HIGH Level Input Current	V_{CC} = 5.5V, V_I = 2.7V				20	µA
I_{IL}	LOW Level Input Current	V_{CC} = 5.5V, V_{IL} = 0.4V				–0.1	mA
I_O	Output Drive Current	V_{CC} = 5.5V, V_O = 2.25V		–30		–112	mA
I_{OZH}	HIGH Level 3-STATE Output Current	V_{CC} = 5.5V, V_O = 2.7V				20	µA
I_{OZL}	LOW Level 3-STATE Output Current	V_{CC} = 5.5V, V_O = 0.4V				–20	µA
I_{CC}	Supply Current	V_{CC} = 5.5V, ALS240A Outputs HIGH			4	10	mA
		Outputs LOW			13	23	mA
		Outputs 3-STATE			14	25	mA
		V_{CC} = 5.5V, ALS241A Outputs HIGH			9	15	mA
		Outputs LOW			15	26	mA
		Outputs 3-STATE			17	30	mA

Switching Characteristics DM74ALS240A

over recommended operating free air temperature range

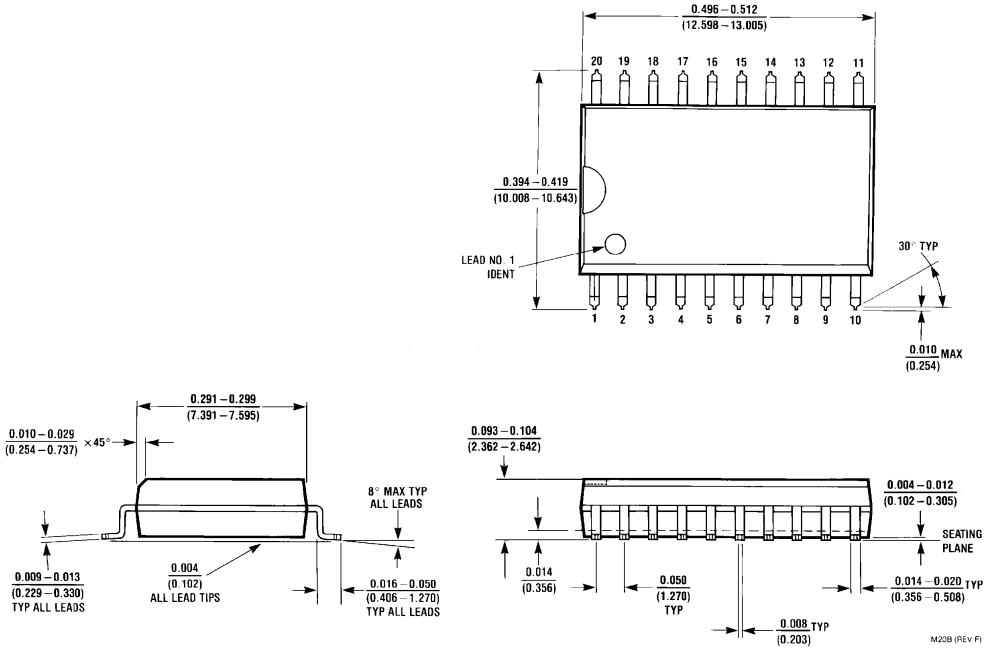
Symbol	Parameter	Conditions	From (Input)	To (Output)	Min	Max	Units
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	V_{CC} = 4.5V to 5.5V, C_L = 50 pF, R1 = 500Ω, R2 = 500Ω, T_A = Min to Max	A	Y	2	9	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output				2	9	ns
t_{PZH}	Output Enable Time to HIGH Level Output		$\overline{G}$	Y	3	13	ns
t_{PZL}	Output Enable Time to LOW Level Output				3	18	ns
t_{PHZ}	Output Disable Time from HIGH Level Output		$\overline{G}$	Y	2	10	ns
t_{PLZ}	Output Disable Time from LOW Level Output				3	12	ns

Switching Characteristics DM74ALS241A

over recommended operating free air temperature range

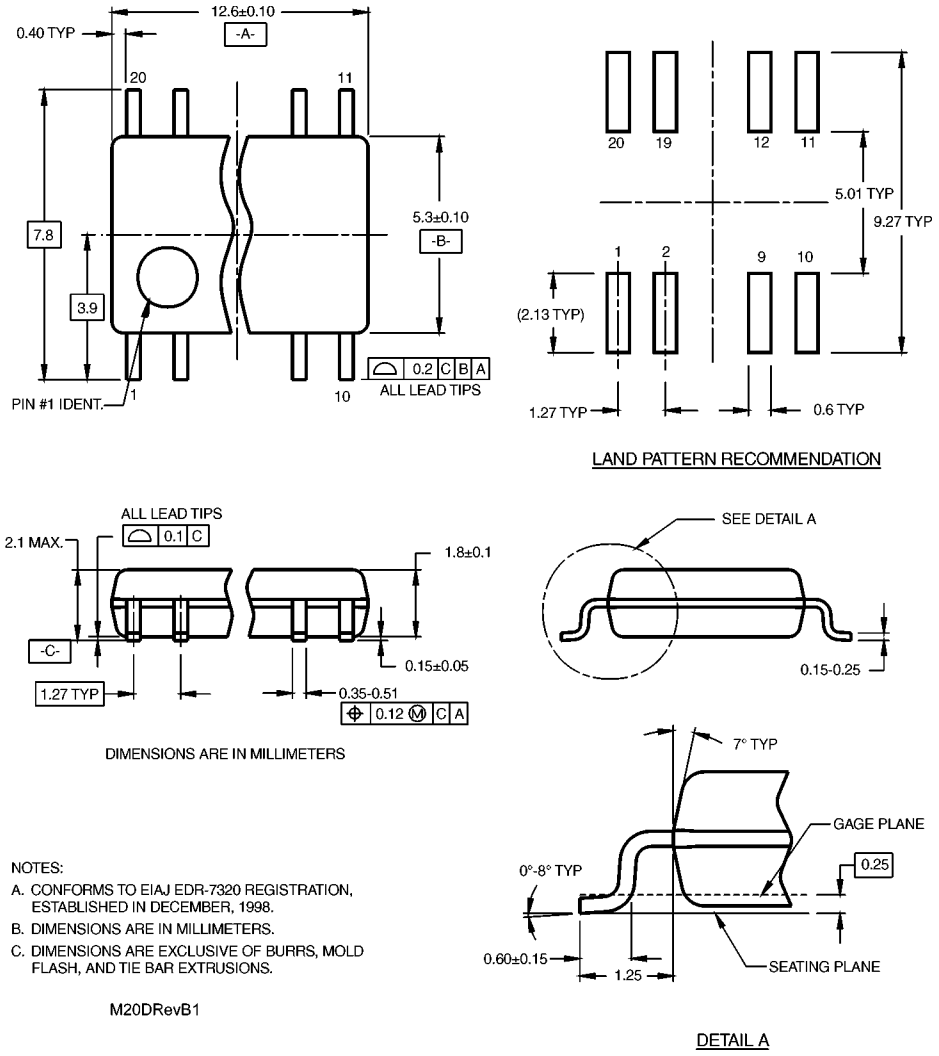
Symbol	Parameter	Conditions	From (Input)	To (Output)	Min	Max	Units
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	V_{CC} = 4.5V to 5.5V, C_L = 50 pF, R1 = 500Ω, R2 = 500Ω, T_A = Min to Max	A	Y	3	11	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output				3	10	ns
t_{PZH}	Output Enable Time to HIGH Level Output		$1\overline{G}$	Y	3	21	ns
t_{PZL}	Output Enable Time to HIGH Level Output				3	21	ns
t_{PHZ}	Output Disable Time to HIGH Level Output		$1\overline{G}$	Y	2	10	ns
t_{PLZ}	Output Disable Time to LOW Level Output				3	15	ns
t_{PZH}	Output Enable Time to HIGH Level Output		2G	Y	7	21	ns
t_{PZL}	Output Enable Time to LOW Level Output				7	21	ns
t_{PHZ}	Output Disable Time from HIGH Level Output		2G	Y	2	10	ns
t_{PLZ}	Output Disable Time from LOW Level Output				3	15	ns

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)



NOTES:

A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.

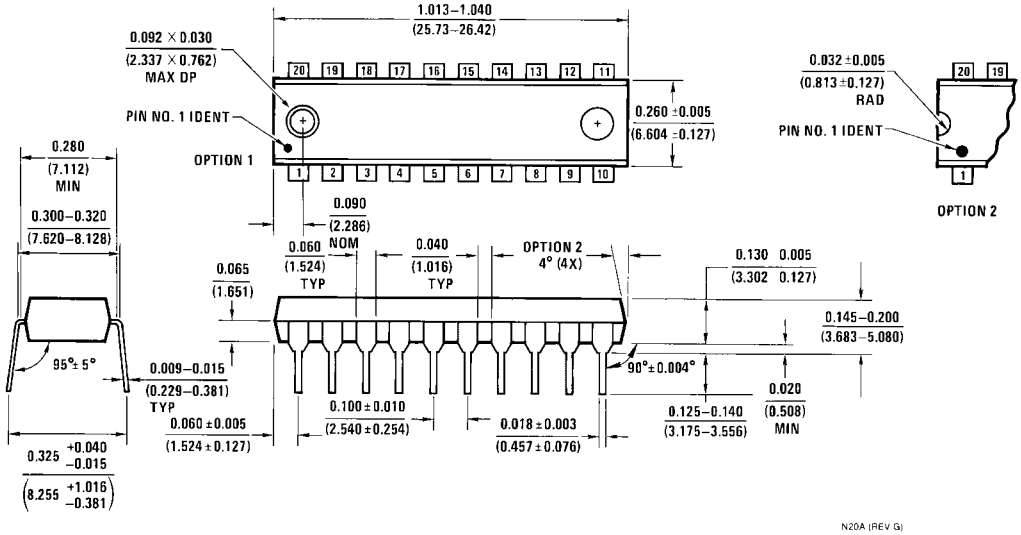
B. DIMENSIONS ARE IN MILLIMETERS.

C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

M20DRevB1

20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M20D

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