

DM74ALS240A, DM74ALS241A Octal 3-STATE Bus Driver

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 50pF load
- Switching response specifications guaranteed over full temperature and V_{CC} supply range
- PNP input design reduces input loading
- Low level drive current: 74ALS = 24mA

General Description

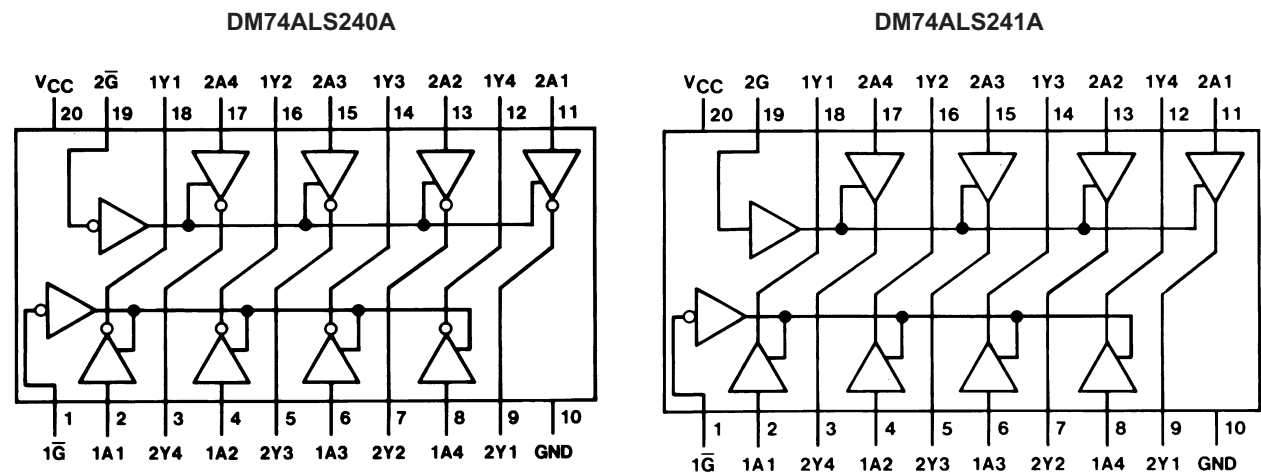
These octal 3-STATE bus drivers are designed to provide the designer with flexibility in implementing a bus interface with memory, microprocessor, or communication systems. The output 3-STATE gating control is organized into two separate groups of four buffers. The DM74ALS240A control inputs symmetrically 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.

Ordering Information

| 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 |

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

Connection Diagram



Function Tables

DM74ALS240A

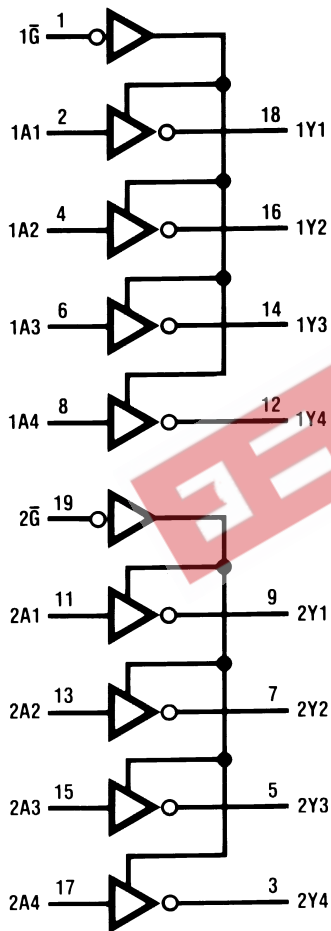
| Input | | Output |
|----------------|---|--------|
| \overline{G} | A | Y |
| L | L | H |
| L | H | L |
| H | X | Z |

DM74ALS241A

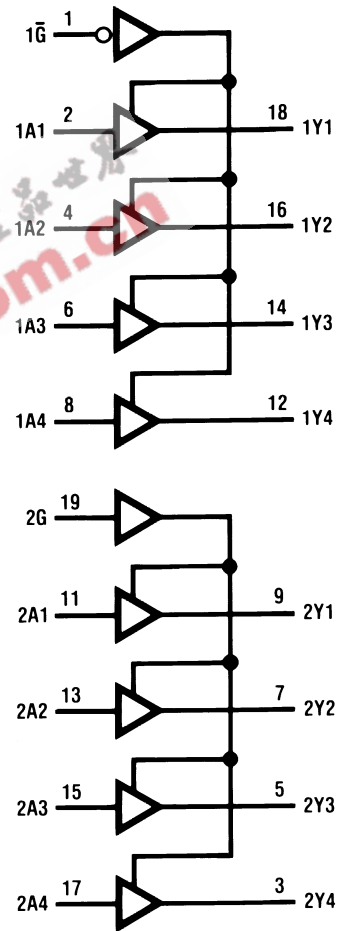
| Input | | Output | Input | | Output |
|-----------------|----|--------|-------|----|--------|
| $1\overline{G}$ | 1A | Y | 2G | 2A | Y |
| L | L | L | H | L | L |
| L | H | H | H | H | H |
| H | X | Z | L | X | Z |

Logic Diagrams

DM74ALS240A



DM74ALS241A



Absolute Maximum Ratings

Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

| Symbol | Parameter | Rating |
|---------------|--------------------------------------|-----------------|
| V_{CC} | Supply Voltage | 7V |
| V_I | Input Voltage | 7V |
| | Voltage Applied to Disabled Output | 5.5V |
| T_A | Operating Free Air Temperature Range | 0°C to +70°C |
| T_{STG} | Storage Temperature Range | -65°C to +150°C |
| θ_{JA} | Typical Thermal Resistance | |
| | N Package | 60.5°C/W |
| | M Package | 79.8°C/W |

Recommended Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended operating conditions are specified to ensure optimal performance to the datasheet specifications. Fairchild does not recommend exceeding them or designing to absolute maximum ratings.

| 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 | $V_{CC} = 4.5V, I_I = -18mA$ | | | -1.5 | V |
| V_{OH} | HIGH Level Output Voltage | $V_{CC} = 4.5V \text{ to } 5.5V, I_{OH} = -0.4mA$ | $V_{CC} - 2$ | | | V |
| | | $V_{CC} = 4.5V$ | $I_{OH} = -3mA$ | 2.4 | | |
| | | | $I_{OH} = \text{Max.}$ | 2 | | |
| V_{OL} | LOW Level Output Voltage | $V_{CC} = 4.5V, I_{OL} = \text{Max.}$ | | 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 | $V_{CC} = 5.5V, \text{ALS240A, Outputs HIGH}$ | | 4 | 10 | mA |
| | | Outputs LOW | | 13 | 23 | |
| | | Outputs 3-STATE | | 14 | 25 | |
| | | $V_{CC} = 5.5V, \text{ALS241A, Outputs HIGH}$ | | 9 | 15 | |
| | | Outputs LOW | | 15 | 26 | |
| | | Outputs 3-STATE | | 17 | 30 | |

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 $5.5V$, $C_L = 50pF$, $R1 = 500\Omega$, $R2 = 500\Omega$, $T_A = \text{Min. to Max.}$ | 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 | | \bar{G} | Y | 3 | 13 | ns |
| t_{PZL} | Output Enable Time to LOW Level Output | | \bar{G} | Y | 3 | 18 | ns |
| t_{PHZ} | Output Disable Time from HIGH Level Output | | \bar{G} | Y | 2 | 10 | ns |
| t_{PLZ} | Output Disable Time from LOW Level Output | | \bar{G} | Y | 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 $5.5V$, $C_L = 50pF$, $R1 = 500\Omega$, $R2 = 500\Omega$, $T_A = \text{Min. to Max.}$ | 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 | | $1\bar{G}$ | Y | 3 | 21 | ns |
| t_{PZL} | Output Enable Time to HIGH Level Output | | $1\bar{G}$ | Y | 3 | 21 | ns |
| t_{PHZ} | Output Disable Time to HIGH Level Output | | $1\bar{G}$ | Y | 2 | 10 | ns |
| t_{PLZ} | Output Disable Time to LOW Level Output | | $1\bar{G}$ | Y | 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 | | 2G | Y | 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 | 2G | Y | 3 | 15 | ns | |

Physical Dimensions

Dimensions are in millimeters unless otherwise noted.

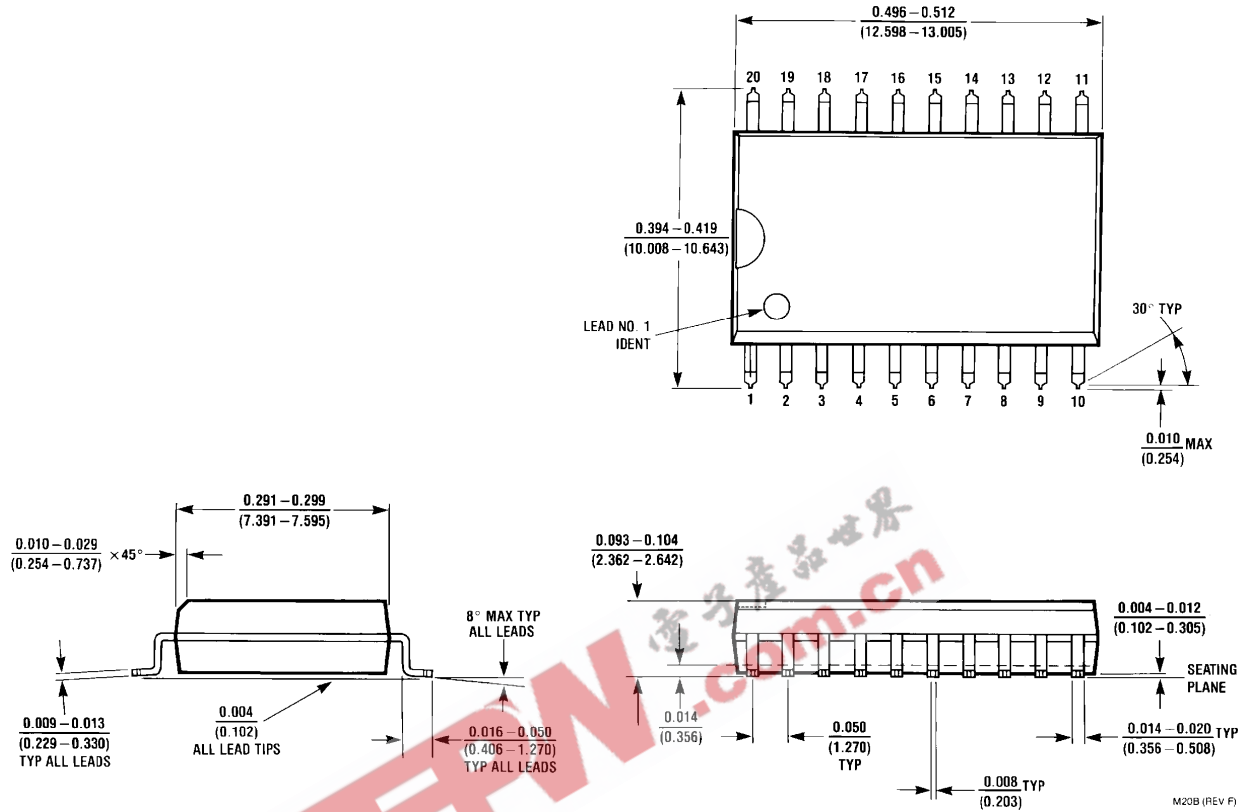
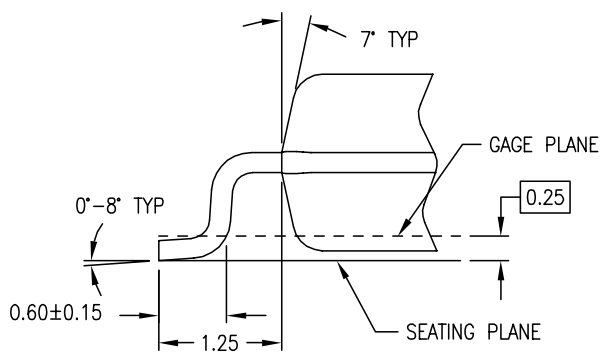
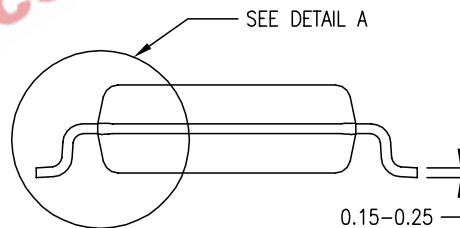
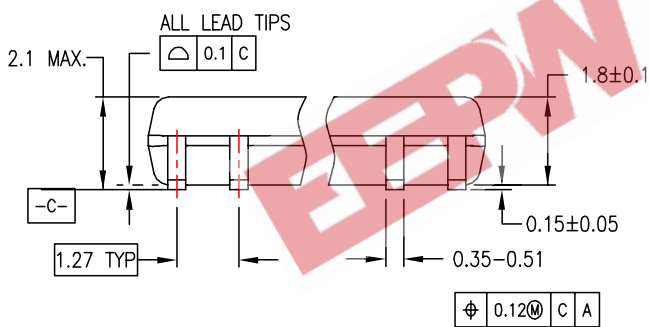
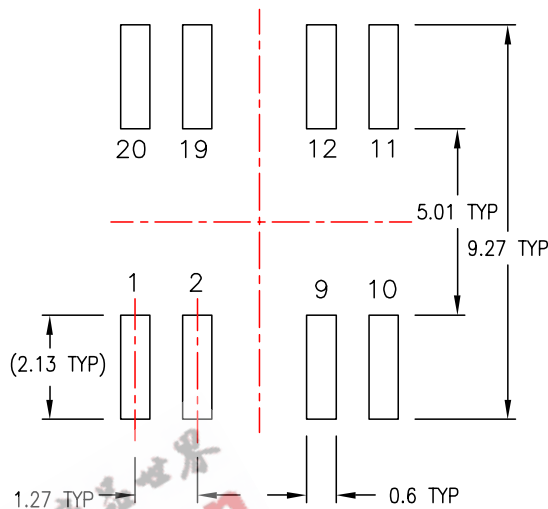
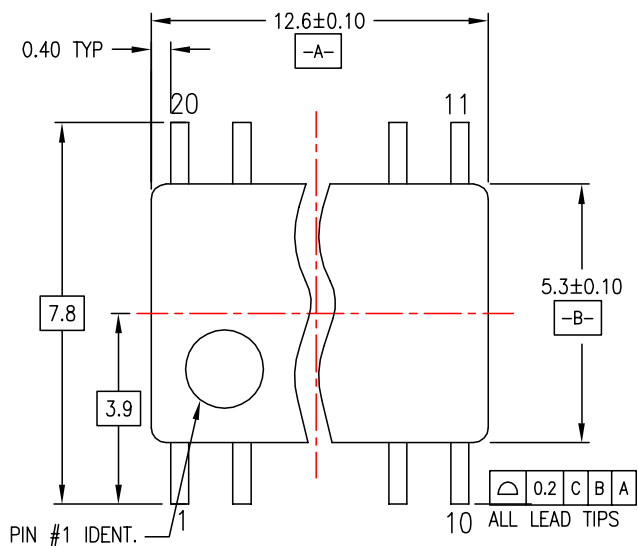


Figure 1. 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide Package Number M20B

Physical Dimensions (Continued)

Dimensions are in millimeters unless otherwise noted.



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.

M20DREV C

Figure 2. 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide Package Number M20D

Physical Dimensions (Continued)

Dimensions are in inches (millimeters) unless otherwise noted.

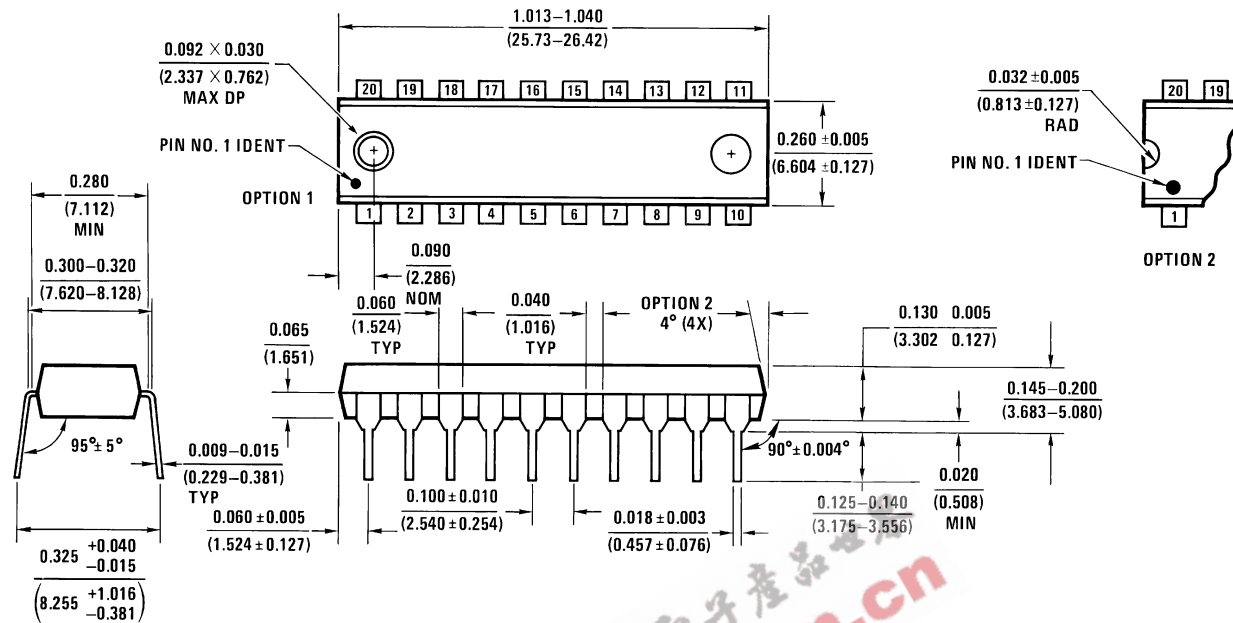



Figure 3. 20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide Package Number N20A

N20A (REV G)



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