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## DM74ALS540A

### Octal Inverting Buffer and Line Driver with 3-STATE Outputs

#### General Description

This octal buffer and line driver is designed to have the performance of the DM74ALS240A series and, at the same time, offer a pinout with inputs and outputs on opposite sides of the package. This arrangement greatly enhances printed circuit board layout. The 3-STATE control gate is a 2-input NOR such that if either  $\bar{G}1$  or  $\bar{G}2$  is HIGH, all eight outputs are in the high impedance state.

#### Features

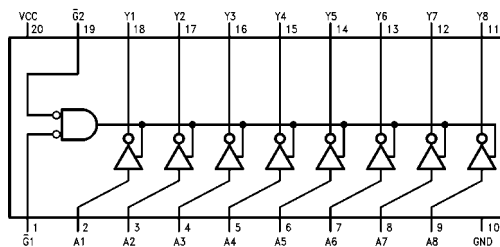
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Switching performance is guaranteed over full temperature and  $V_{CC}$  supply range
- Data flow-thru pinout (All inputs on opposite side from outputs)
- P-N-P inputs reduce DC loading

#### Ordering Code:

| Order Number  | Package Number | Package Description   |
|---------------|----------------|---|
| DM74ALS540AWM | M20B           | 20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide |
| DM74ALS540ASJ | M20D           | 20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide             |
| DM74ALS540AN  | 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



#### Function Table

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

H = HIGH Logic Level  
L = LOW Logic Level  
X = Don't Care (Either HIGH or LOW Logic Level)  
Hi-Z = High Impedance (OFF) State

DM74ALS540A Octal Inverting Buffer and Line Driver with 3-STATE Outputs

**Absolute Maximum Ratings** (Note 1)

|   |                 |
|---|-----------------|
| Supply Voltage                                  | 7V              |
| Input Voltage                                   | 7V              |
| Voltage Applied to a<br>Disabled 3-STATE Output | 5.5V            |
| Operating Free-Air Temperature Range            | 0°C to +70°C    |
| Storage Temperature Range                       | -65°C to +150°C |
| Typical $\theta_{JA}$                           |                 |
| N Package                                       | 58.5°C/W        |
| M Package                                       | 77.5°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 | Nom | 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        |     |     | 0.7 | V     |
| $I_{OH}$ | HIGH Level Output Current      |     |     | -15 | mA    |
| $I_{OL}$ | LOW Level Output Current       |     |     | 24  | mA    |
| $T_A$    | Free Air Operating Temperature | 0   |     | 70  | °C    |

**Electrical Characteristics**

over recommended free air temperature range

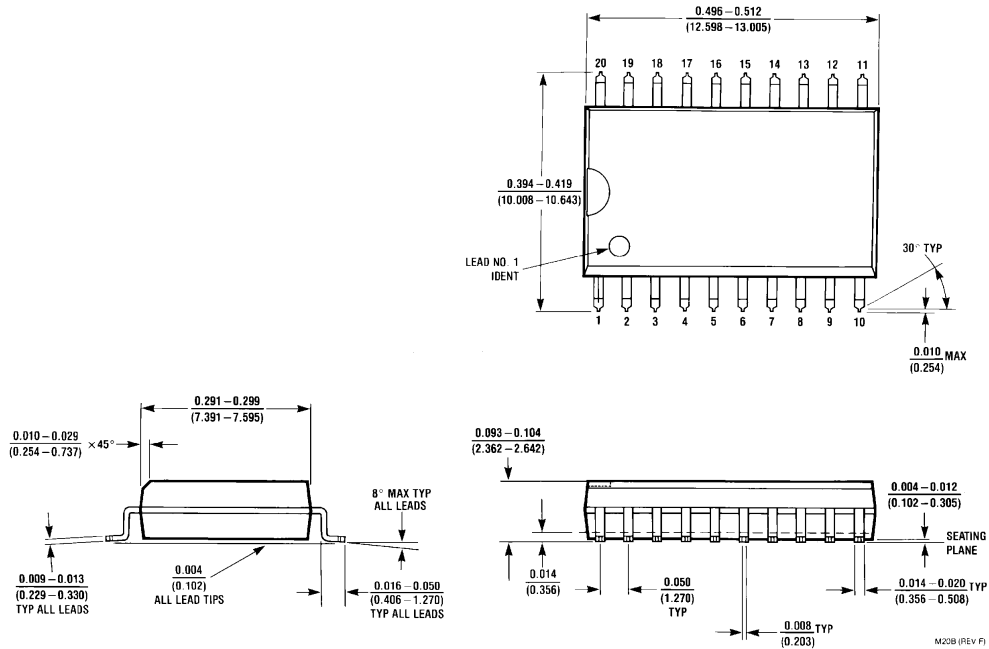
| Symbol    | Parameter                             | Test Conditions                             | Min                        | Typ          | Max  | Units         |    |
|-----------|---------------------------------------|---|----------------------------|--------------|------|---------------|----|
| $V_{IK}$  | Input Clamp Voltage                   | $V_{CC} = \text{Min}, I_I = -18 \text{ mA}$ |                            |              | -1.5 | V             |    |
| $V_{OH}$  | HIGH Level Output Voltage             | $V_{CC} = 4.5\text{V to } 5.5\text{V}$      | $I_{OH} = -0.4 \text{ mA}$ | $V_{CC} - 2$ |      | V             |    |
|           |                                       | $V_{CC} = \text{Min}$                       | $I_{OH} = -3 \text{ mA}$   | 2.4          | 3.2  |               |    |
|           |                                       |   | $I_{OH} = \text{Max}$      | 2            |      |               |    |
| $V_{OL}$  | LOW Level Output Voltage              | $V_{CC} = \text{Min}$                       | $I_{OL} = 12 \text{ mA}$   |              | 0.25 | 0.4           | mA |
|           |                                       |   | $I_{OL} = 24 \text{ mA}$   |              | 0.35 | 0.5           |    |
| $I_I$     | Input Current @ Maximum Input Voltage | $V_{CC} = \text{Max}, V_I = 7\text{V}$      |                            |              | 100  | $\mu\text{A}$ |    |
| $I_{IH}$  | HIGH Level Input Current              | $V_{CC} = \text{Max}, V_I = 2.7\text{V}$    |                            |              | 20   | $\mu\text{A}$ |    |
| $I_{IL}$  | LOW Level Input Current               | $V_{CC} = \text{Max}, V_I = 0.4\text{V}$    |                            |              | -100 | $\mu\text{A}$ |    |
| $I_{OZH}$ | HIGH Level 3-STATE Output Current     | $V_{CC} = \text{Max}, V_O = 2.7\text{V}$    |                            |              | 20   | $\mu\text{A}$ |    |
| $I_{OZL}$ | LOW Level 3-STATE Output Current      | $V_{CC} = \text{Max}, V_O = 0.4\text{V}$    |                            |              | -20  | $\mu\text{A}$ |    |
| $I_O$     | Output Drive Current                  | $V_{CC} = \text{Max}, V_O = 2.25\text{V}$   | -30                        |              | -112 | mA            |    |
| $I_{CC}$  | Supply Current                        | $V_{CC} = \text{Max}$                       | Outputs HIGH               |              | 5    | 10            | mA |
|           |                                       |   | Outputs LOW                |              | 13   | 22            |    |
|           |                                       |   | Outputs Disabled           |              | 11   | 19            |    |

**Switching Characteristics**

over recommended free air operating temperature range

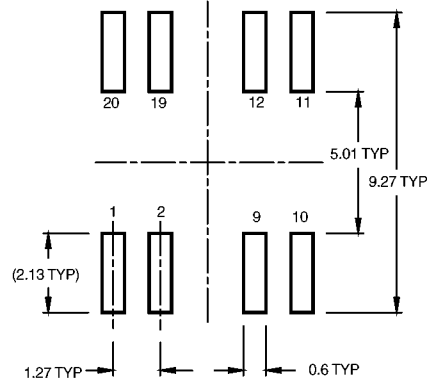
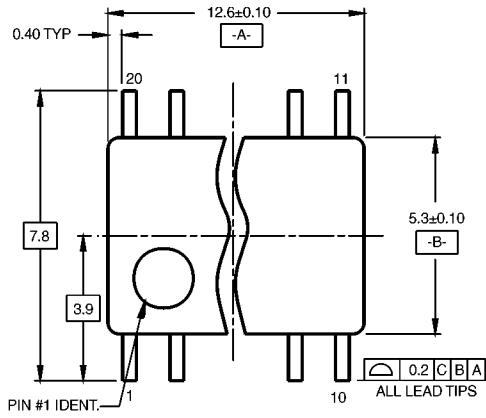
| Symbol    | Parameter  | Conditions   | From (Input)<br>To (Output) | Min | Max | Units |
|-----------|--|--|-----------------------------|-----|-----|-------|
| $t_{PLH}$ | Propagation Delay Time<br>LOW-to-HIGH Level Output | $V_{CC} = 4.5\text{V to } 5.5\text{V},$<br>$R_1 = R_2 = 500\Omega,$<br>$C_L = 50 \text{ pF}$ | A or B to Y                 | 2   | 12  | ns    |
| $t_{PHL}$ | Propagation Delay Time<br>HIGH-to-LOW Level Output |  | A or B to Y                 | 2   | 9   | ns    |
| $t_{PZH}$ | Output Enable Time to HIGH Level Output            |  | $\bar{G}$ to Y              | 5   | 15  | ns    |
| $t_{PZL}$ | Output Enable Time to LOW Level Output             |  | $\bar{G}$ to Y              | 8   | 20  | ns    |
| $t_{PHZ}$ | Output Disable Time from HIGH Level Output         |  | $\bar{G}$ to Y              | 1   | 10  | ns    |
| $t_{PLZ}$ | Output Disable Time from LOW Level Output          |  | $\bar{G}$ to Y              | 2   | 12  | ns    |

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

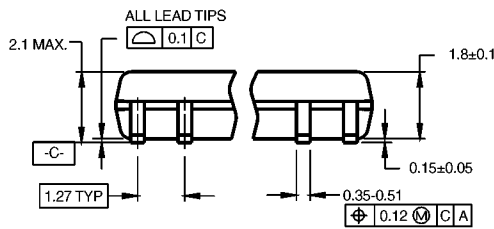


**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300 Wide  
Package Number M20B**

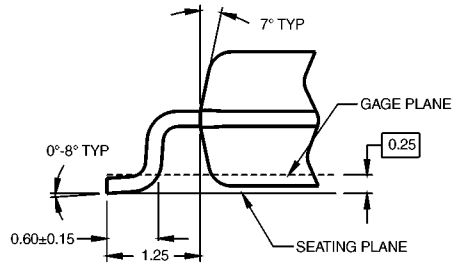
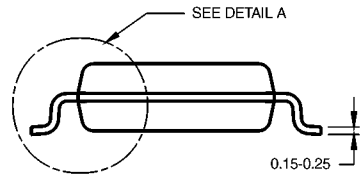
**Physical Dimensions** inches (millimeters) unless otherwise noted (Continued)



**LAND PATTERN RECOMMENDATION**



DIMENSIONS ARE IN MILLIMETERS



**DETAIL A**

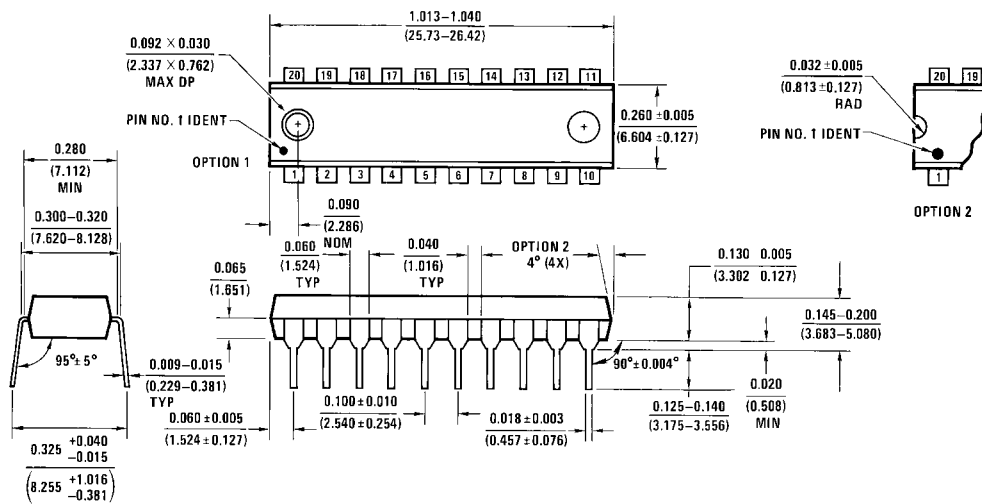
**NOTES:**

- 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**

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