

## DM7442A BCD to Decimal Decoder

### General Description

These BCD-to-decimal decoders consist of eight inverters and ten, four-input NAND gates. The inverters are connected in pairs to make BCD input data available for decoding by the NAND gates. Full decoding of input logic ensures that all outputs remain off for all invalid (10–15) input conditions.

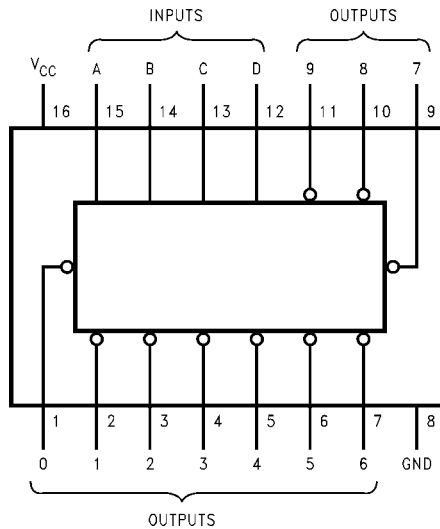
### Features

- Diode clamped inputs
- Also for application as 4-line-to-16-line decoders;  
3-line-to-8-line decoders
- All outputs are high for invalid input conditions
- Typical power dissipation 140 mW
- Typical propagation delay 17 ns

### Ordering Code:

| Order Number | Package Number | Package Description   |
|--------------|----------------|---|
| DM7442AN     | N16E           | 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

### Connection Diagram

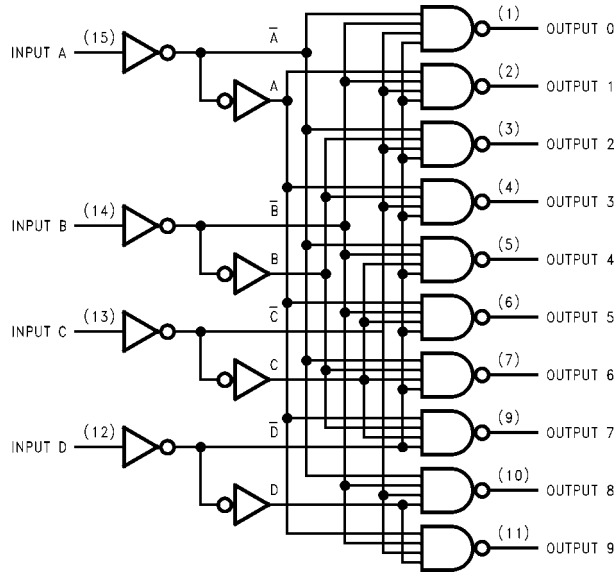


**Function Table**

| No. | BCD Input |   |   |   | Decimal Output |   |   |   |   |   |   |   |   |   |
|-----|-----------|---|---|---|----------------|---|---|---|---|---|---|---|---|---|
|     | D         | C | B | A | 0              | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 0   | L         | L | L | L | L              | H | H | H | H | H | H | H | H | H |
| 1   | L         | L | L | H | H              | L | H | H | H | H | H | H | H | H |
| 2   | L         | L | H | L | H              | H | L | H | H | H | H | H | H | H |
| 3   | L         | L | H | H | H              | H | H | L | H | H | H | H | H | H |
| 4   | L         | H | L | L | H              | H | H | H | L | H | H | H | H | H |
| 5   | L         | H | L | H | H              | H | H | H | H | L | H | H | H | H |
| 6   | L         | H | H | L | H              | H | H | H | H | H | L | H | H | H |
| 7   | L         | H | H | H | H              | H | H | H | H | H | H | L | H | H |
| 8   | H         | L | L | L | H              | H | H | H | H | H | H | H | L | H |
| 9   | H         | L | L | H | H              | H | H | H | H | H | H | H | H | L |
| I   | H         | L | H | L | H              | H | H | H | H | H | H | H | H | H |
| N   | H         | L | H | H | H              | H | H | H | H | H | H | H | H | H |
| V   | H         | H | L | L | H              | H | H | H | H | H | H | H | H | H |
| A   | H         | H | L | H | H              | H | H | H | H | H | H | H | H | H |
| L   | H         | H | H | L | H              | H | H | H | H | H | H | H | H | H |
| I   | H         | H | H | H | H              | H | H | H | H | H | H | H | H | H |
| D   |           |   |   |   |                |   |   |   |   |   |   |   |   |   |

H = HIGH Level  
L = LOW Level

**Logic Diagram**



**Absolute Maximum Ratings**(Note 1)

|                                      |                 |
|--------------------------------------|-----------------|
| Supply Voltage                       | 7V              |
| Input Voltage                        | 5.5V            |
| Operating Free Air Temperature Range | 0°C to +70°C    |
| Storage Temperature Range            | -65°C to +150°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 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 <sub>CC</sub> | Supply Voltage                 | 4.75 | 5   | 5.25 | V     |
| V <sub>IH</sub> | HIGH Level Input Voltage       | 2    |     |      | V     |
| V <sub>IL</sub> | LOW Level Input Voltage        |      |     | 0.8  | V     |
| I <sub>OH</sub> | HIGH Level Output Current      |      |     | -0.8 | mA    |
| I <sub>OL</sub> | LOW Level Output Current       |      |     | 16   | mA    |
| T <sub>A</sub>  | Free Air Operating Temperature | 0    |     | 70   | °C    |

**Electrical Characteristics**

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

| Symbol          | Parameter                         | Conditions   | Min | Typ (Note 2) | Max  | Units |
|-----------------|-----------------------------------|--|-----|--------------|------|-------|
| V <sub>I</sub>  | Input Clamp Voltage               | V <sub>CC</sub> = Min, I <sub>I</sub> = -12 mA   |     |              | -1.5 | V     |
| V <sub>OH</sub> | HIGH Level Output Voltage         | V <sub>CC</sub> = Min, I <sub>OH</sub> = Max<br>V <sub>IL</sub> = Max, V <sub>IH</sub> = Min | 2.4 | 3.4          |      | V     |
| V <sub>OL</sub> | LOW Level Output Voltage          | V <sub>CC</sub> = Min, I <sub>OL</sub> = Max<br>V <sub>IH</sub> = Min, V <sub>IL</sub> = Max |     | 0.2          | 0.4  | V     |
| I <sub>I</sub>  | Input Current @ Max Input Voltage | V <sub>CC</sub> = Max, V <sub>I</sub> = 5.5V   |     |              | 1    | mA    |
| I <sub>IH</sub> | HIGH Level Input Current          | V <sub>CC</sub> = Max, V <sub>I</sub> = 2.4V   |     |              | 40   | μA    |
| I <sub>IL</sub> | LOW Level Input Current           | V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V   |     |              | -1.6 | mA    |
| I <sub>OS</sub> | Short Circuit Output Current      | V <sub>CC</sub> = Max (Note 3)   | -18 |              | -55  | mA    |
| I <sub>CC</sub> | Supply Current                    | V <sub>CC</sub> = Max (Note 4)   |     | 28           | 56   | mA    |

**Note 2:** All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

**Note 3:** Not more than one output should be shorted at a time.

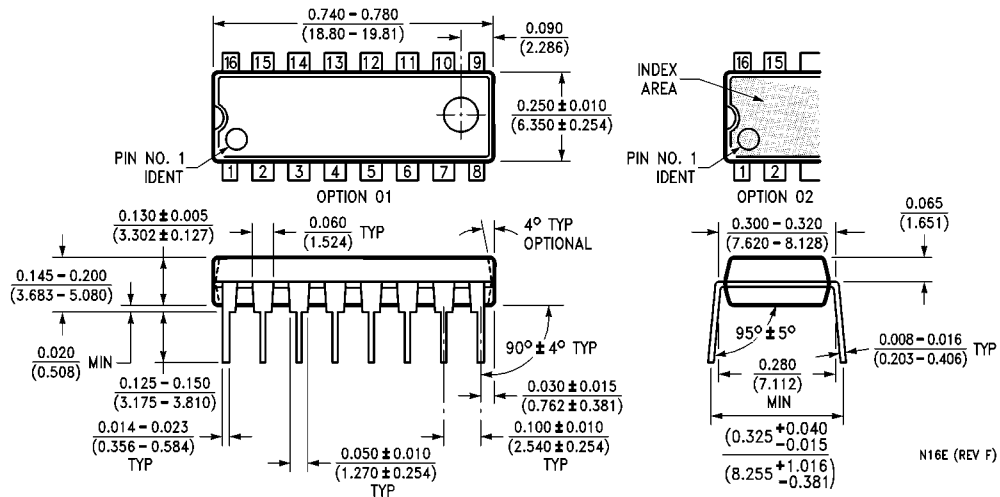
**Note 4:** I<sub>CC</sub> is measured with all outputs open and all inputs grounded.

**Switching Characteristics**

at V<sub>CC</sub> = 5V and T<sub>A</sub> = 25°C

| Symbol           | Parameter  | Conditions                                      | Min | Max | Units |
|------------------|--|---|-----|-----|-------|
| t <sub>PHL</sub> | Propagation Delay Time<br>HIGH-to-LOW Level Output<br>from A, B, C or D through<br>2 Levels of Logic | C <sub>L</sub> = 15 pF<br>R <sub>L</sub> = 400Ω |     | 25  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time<br>HIGH-to-LOW Level Output<br>from A, B, C or D through<br>3 Levels of Logic |   |     | 30  | ns    |
| t <sub>PLH</sub> | Propagation Delay Time<br>LOW-to-HIGH Level Output<br>from A, B, C or D through<br>2 Levels of Logic |   |     | 25  | ns    |
| t <sub>PLH</sub> | Propagation Delay Time<br>LOW-to-HIGH Level Output<br>from A, B, C or D through<br>3 Levels of Logic |   |     | 30  | ns    |

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



**16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N16E**

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