

DM7445 BCD to Decimal Decoders/Drivers

General Description

These BCD-to-decimal decoders/drivers 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 BCD input logic ensures that all outputs remain OFF for all invalid (10–15) binary input conditions. These decoders feature high-performance, NPN output transistors designed for use as indicator/relay drivers, or as open-collector logic-circuit drivers. The high-breakdown output transistors are compatible for interfacing with most MOS integrated circuits.

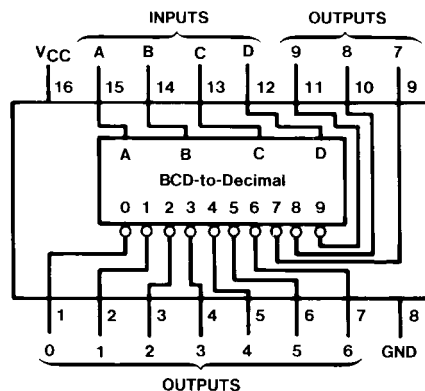
Features

- Full decoding of input logic
- 80 mA sink-current capability
- All outputs are off for invalid BCD input conditions

Ordering Code:

| Order Number | Package Number | Package Description |
|--------------|----------------|---|
| DM7445 | N16E | 16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide |

Connection Diagram

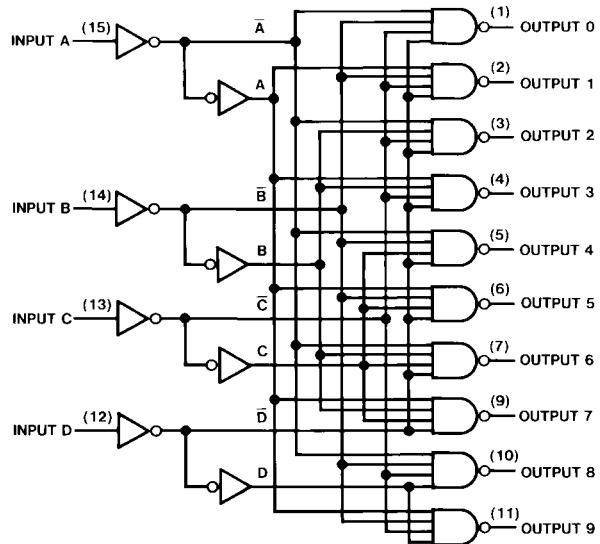


Function Table

| No. | Inputs | | | | Outputs | | | | | | | | | |
|-----|--------|---|---|---|---------|---|---|---|---|---|---|---|---|---|
| | 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 (OFF)
L = LOW Level (ON)

Logic Diagram



Absolute Maximum Ratings(Note 1)

| | |
|--------------------------------------|-----------------|
| Supply Voltage | 7V |
| Input Voltage | 5.5V |
| Output Voltage | 30V |
| 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_{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 |
| V_{OH} | HIGH Level Output Voltage | | | 30 | V |
| I_{OL} | LOW Level Output Current | | | 20 | mA |
| T_A | 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_I | Input Clamp Voltage | $V_{CC} = \text{Min}, I_I = -12 \text{ mA}$ | | | -1.5 | V |
| I_{CEX} | HIGH Level Output Current | $V_{CC} = \text{Min}, V_O = 30V$ $V_{IL} = \text{Max}, V_{IH} = \text{Min}$ | | | 250 | μA |
| V_{OL} | LOW Level Output Voltage | $V_{CC} = \text{Min}, I_{OL} = \text{Max}$ $V_{IH} = \text{Min}, V_{IL} = \text{Max}$ | | 0.2 | 0.4 | V |
| | | $I_{OL} = 80 \text{ mA}$ $V_{CC} = \text{Min}$ | | 0.5 | 0.9 | |
| I_I | Input Current @ Max Input Voltage | $V_{CC} = \text{Max}, V_I = 5.5V$ | | | 1 | mA |
| I_{IH} | HIGH Level Input Current | $V_{CC} = \text{Max}, V_I = 2.4V$ | | | 40 | μA |
| I_{IL} | LOW Level Input Current | $V_{CC} = \text{Max}, V_I = 0.4V$ | | | -1.6 | mA |
| I_{CC} | Supply Current | $V_{CC} = \text{Max}$ (Note 3) | | 43 | 70 | mA |

Note 2: All typicals are at $V_{CC} = 5V, T_A = 25^\circ\text{C}$.

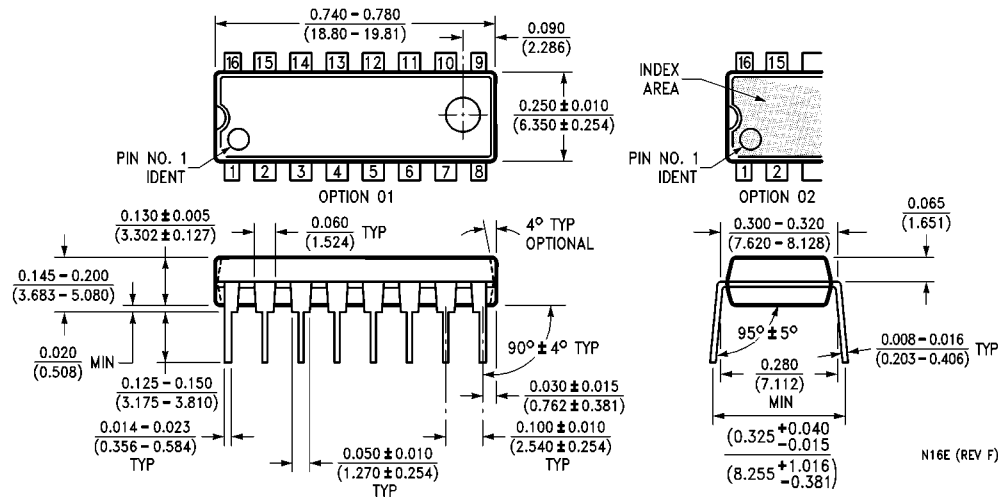
Note 3: I_{CC} is measured with all inputs grounded and all outputs OPEN.

Switching Characteristics

at $V_{CC} = 5V$ and $T_A = 25^\circ\text{C}$

| Symbol | Parameter | Conditions | Min | Max | Units |
|-----------|--|--|-----|------|-------|
| t_{PLH} | Propagation Delay Time LOW-to-HIGH Level Output | $C_L = 15 \text{ pF}$ $R_L = 100\Omega$ | | 49.5 | ns |
| t_{PHL} | Propagation Delay Time HIGH-to-LOW Level Output | | | 49.5 | 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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