

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.

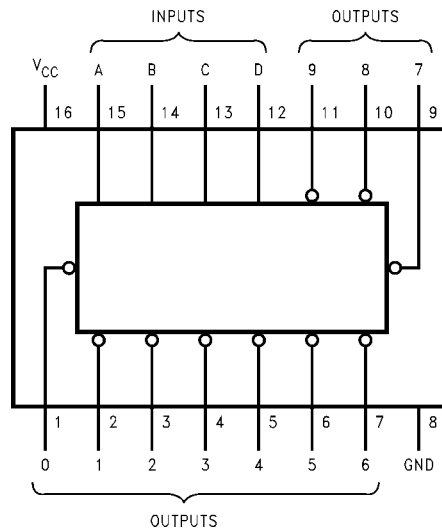
Features

- 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

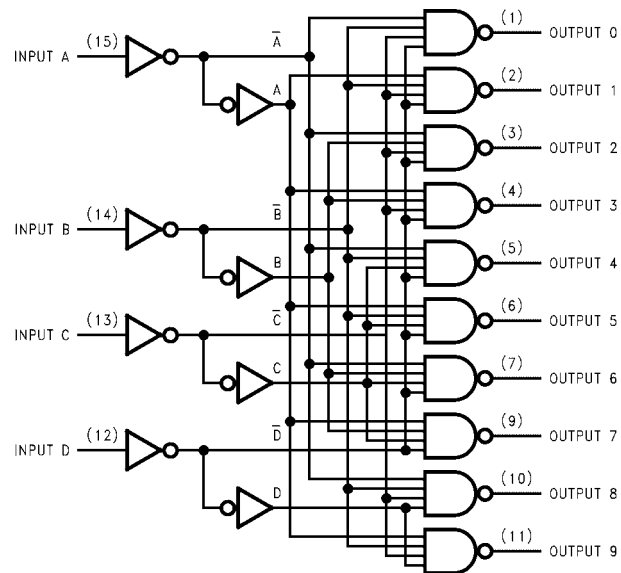


Function Table

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_{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
I_{OH}	HIGH Level Output Current			–0.8	mA
I_{OL}	LOW Level Output Current			16	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
V_{OH}	HIGH Level Output Voltage	$V_{CC} = \text{Min}$, $I_{OH} = \text{Max}$ $V_{IL} = \text{Max}$, $V_{IH} = \text{Min}$	2.4	3.4		V
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_I	Input Current @ Max Input Voltage	$V_{CC} = \text{Max}$, $V_I = 5.5 \text{ V}$			1	mA
I_{IH}	HIGH Level Input Current	$V_{CC} = \text{Max}$, $V_I = 2.4 \text{ V}$			40	μA
I_{IL}	LOW Level Input Current	$V_{CC} = \text{Max}$, $V_I = 0.4 \text{ V}$			–1.6	mA
I_{OS}	Short Circuit Output Current	$V_{CC} = \text{Max}$ (Note 3)	–18		–55	mA
I_{CC}	Supply Current	$V_{CC} = \text{Max}$ (Note 4)		28	56	mA

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

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

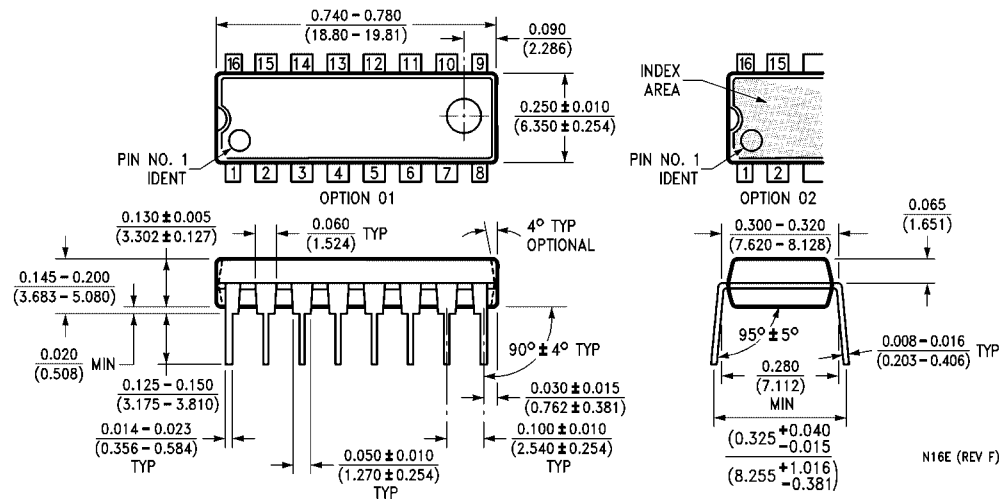
Note 4: I_{CC} is measured with all outputs open and all inputs grounded.

Switching Characteristics

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

Symbol	Parameter	Conditions	Min	Max	Units
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output from A, B, C or D through 2 Levels of Logic	$C_L = 15 \text{ pF}$ $R_L = 400 \Omega$		25	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output from A, B, C or D through 3 Levels of Logic			30	ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output from A, B, C or D through 2 Levels of Logic			25	ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output from A, B, C or D through 3 Levels of Logic			30	ns

Physical Dimensions inches (millimeters) unless otherwise noted



N16E (REV F)

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