

DM7445 BCD to Decimal Decoders/Drivers

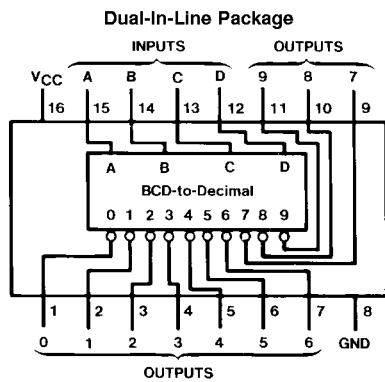
General Description

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

Connection Diagram



DS006517-1

Order Number DM5445J, DM5445W or DM7445N
See Package Number J16A, N16E or W16A

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)

Absolute Maximum Ratings (Note 1)

Supply Voltage
Input Voltage
Output Voltage

7V
5.5V
30V

Operating Free Air Temperature Range

DM54
DM74

Storage Temperature Range

–55°C to +125°C
0°C to +70°C
–65°C to +150°C

Recommended Operating Conditions

Symbol	Parameter	DM5445			DM7445			Units
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.8			0.8	V
V_{OH}	High Level Output Voltage			30			30	V
I_{OL}	Low Level Output Current			20			20	mA
T_A	Free Air Operating Temperature	–55		125	0		70	°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" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

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	$V_{CC} = \text{Min}$, $V_O = 30 \text{ V}$ $V_{IL} = \text{Max}$, $V_{IH} = \text{Min}$			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	$V_{CC} = \text{Max}$, $V_I = 5.5 \text{ V}$			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_{CC}	Supply Current	$V_{CC} = \text{Max}$	DM54	43	62	mA
		(Note 3)	DM74	43	70	

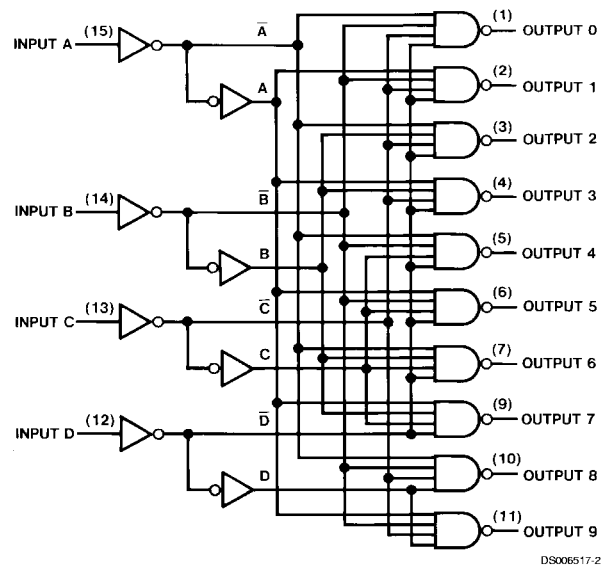
Switching Characteristicsat $V_{CC} = 5 \text{ V}$ and $T_A = 25^\circ\text{C}$ (See Section 1 for Test Waveforms and Output Load)

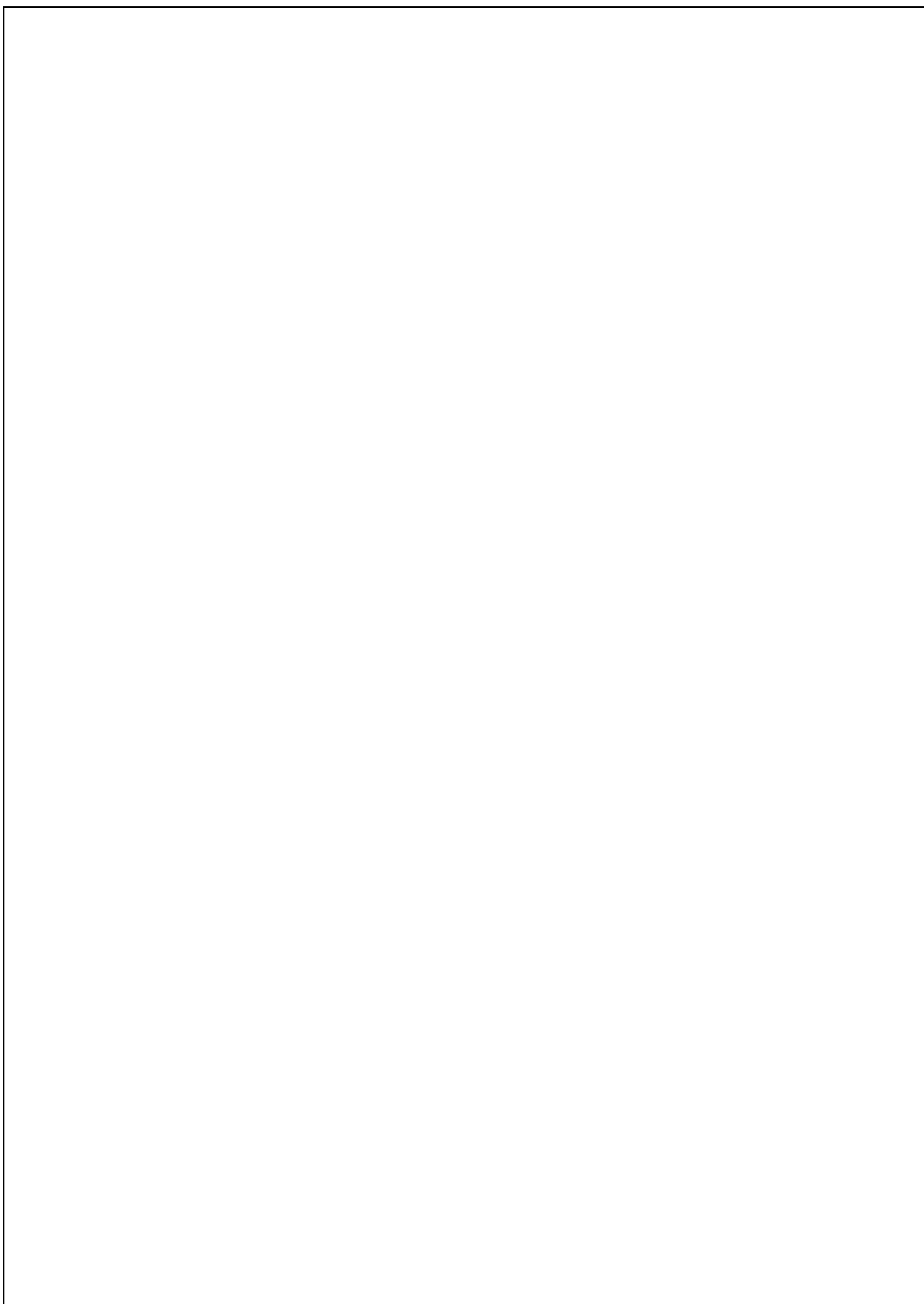
Symbol	Parameter	Conditions	Min	Max	Units
t_{PLH}	Propagation Delay Time Low to High Level Output	$C_L = 15 \text{ pF}$ $R_L = 100\Omega$		49.5	ns
t_{PHL}	Propagation Delay Time High to Low Level Output			49.5	ns

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

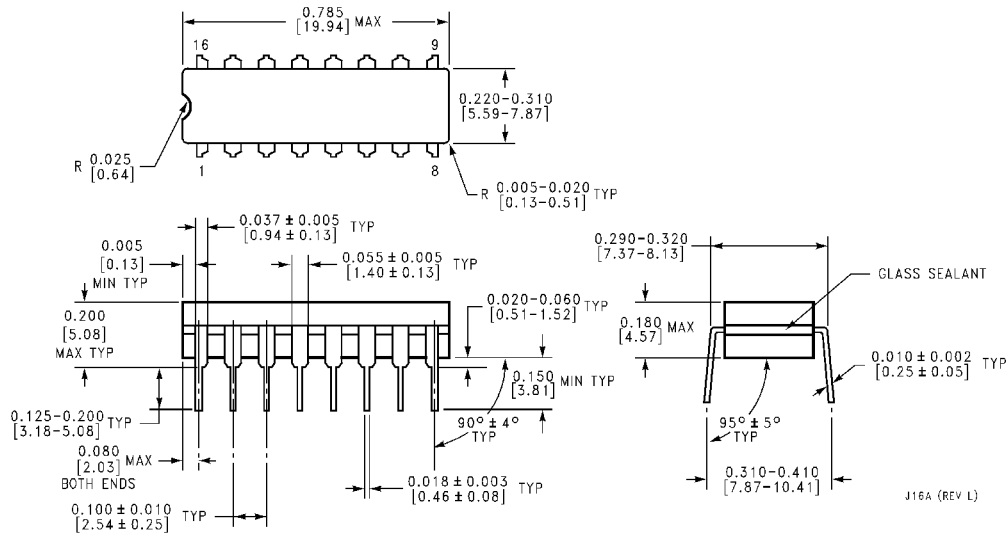
Note 3: I_{CC} is measured with all inputs grounded and all outputs open.

Logic Diagram

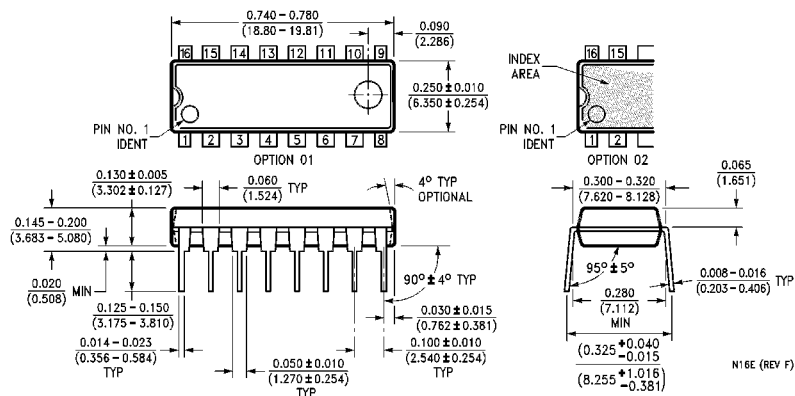




Physical Dimensions inches (millimeters) unless otherwise noted

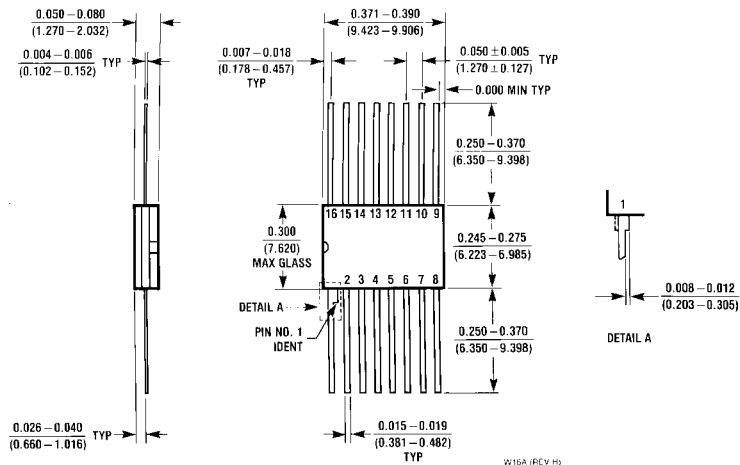


16-Lead Ceramic Dual-In-Line Package (J)
Order Number DM5445J
Package Number J16A



16-Lead Molded Dual-In-Line Package (N)
Order Number DM7445N
Package Number N16E

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



16-Lead Ceramic Flat Package (W)
Order Number DM5445W
Package Number W16A

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Fairchild Semiconductor
 Corporation
 Americas
 Customer Response Center
 Tel: 1-888-522-5372

Fairchild Semiconductor
 Europe
 Fax: +49 (0) 1 80-530 85 86
 Email: europe.support@nsc.com
 Deutsch Tel: +49 (0) 8 141-35-0
 English Tel: +44 (0) 1 793-85-68-56
 Italy Tel: +39 (0) 2 57 5631

Fairchild Semiconductor
 Hong Kong Ltd.
 13th Floor, Straight Block,
 Ocean Centre, 5 Canton Rd.
 Tsimshatsui, Kowloon
 Hong Kong
 Tel: +852 2737-7200
 Fax: +852 2314-0061

National Semiconductor
 Japan Ltd.
 Tel: 81-3-5620-6175
 Fax: 81-3-5620-6179

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