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## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



## DM7445 BCD to Decimal Decoders/Drivers

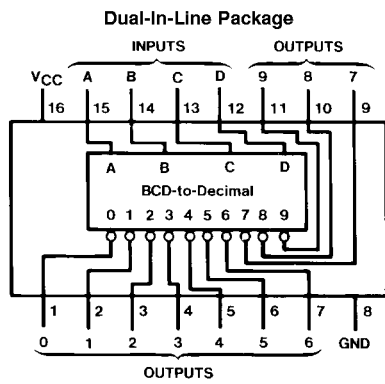
### General Description

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	7V
Input Voltage	5.5V
Output Voltage	30V

Operating Free Air Temperature Range

DM54	-55°C to +125°C
DM74	0°C to +70°C
Storage Temperature Range	-65°C to +150°C

## Recommended Operating Conditions

Symbol	Parameter	DM5445			DM7445			Units
		Min	Nom	Max	Min	Nom	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub>	High Level Input Voltage	2			2			V
V <sub>IL</sub>	Low Level Input Voltage			0.8			0.8	V
V <sub>OH</sub>	High Level Output Voltage			30			30	V
I <sub>OL</sub>	Low Level Output Current			20			20	mA
T <sub>A</sub>	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 <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -12 mA			-1.5	V
I <sub>CEX</sub>	High Level Output Current	V <sub>CC</sub> = Min, V <sub>O</sub> = 30V V <sub>IL</sub> = Max, V <sub>IH</sub> = Min			250	μA
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = Max V <sub>IH</sub> = Min, V <sub>IL</sub> = Max		0.2	0.4	V
		I <sub>OL</sub> = 80 mA V <sub>CC</sub> = Min		0.5	0.9	
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>CC</sub>	Supply Current	V <sub>CC</sub> = Max (Note 3)	DM54	43	62	mA
			DM74	43	70	

## Switching Characteristics

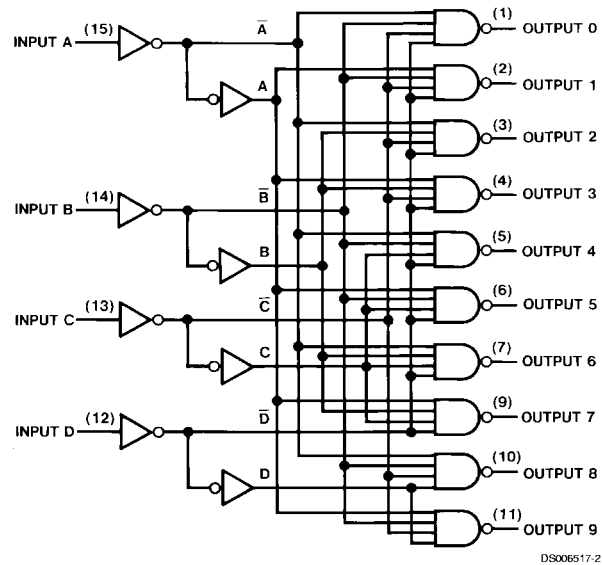
at V<sub>CC</sub> = 5V and T<sub>A</sub> = 25°C (See Section 1 for Test Waveforms and Output Load)

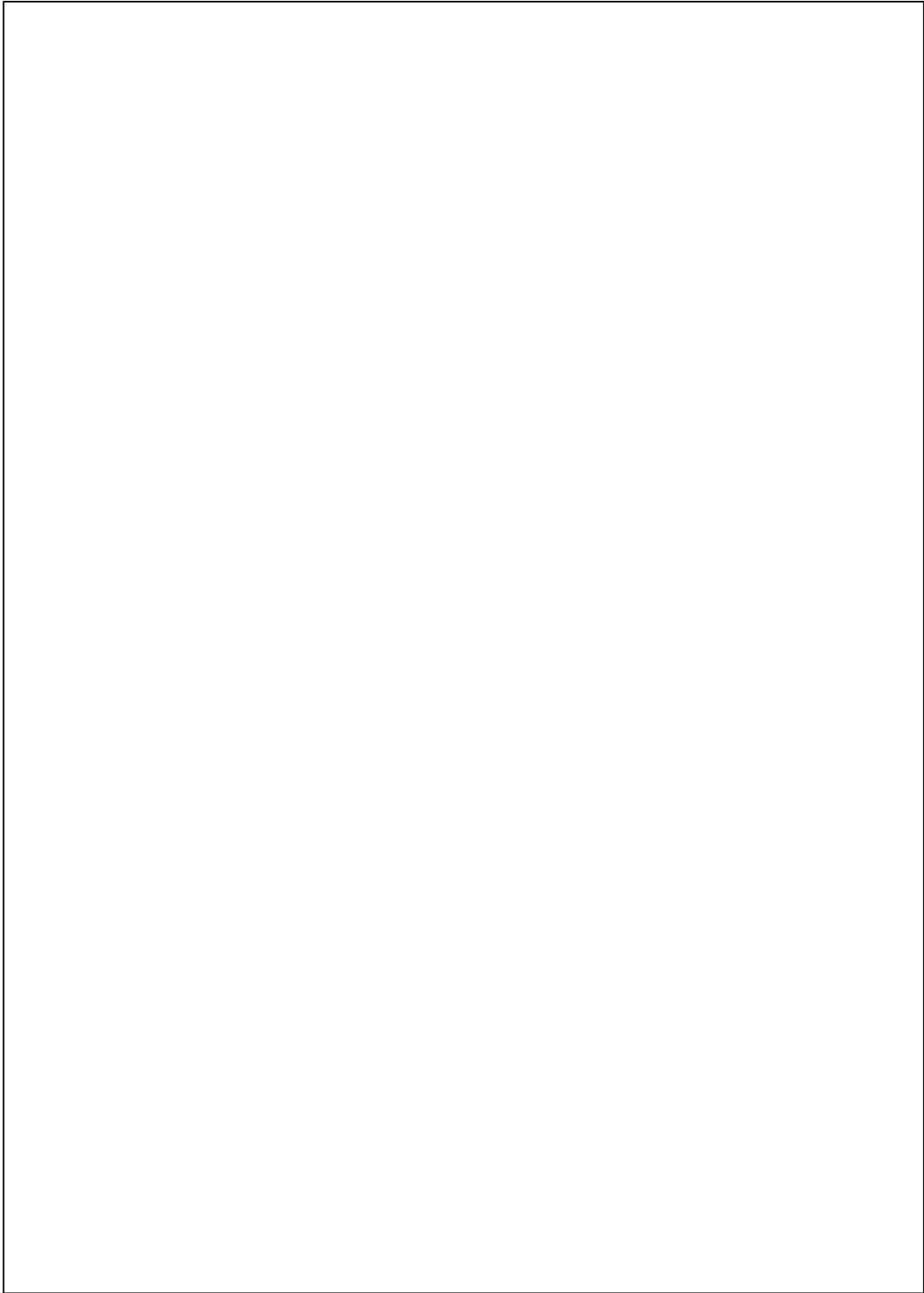
Symbol	Parameter	Conditions	Min	Max	Units
t <sub>PLH</sub>	Propagation Delay Time Low to High Level Output	C <sub>L</sub> = 15 pF R <sub>L</sub> = 100Ω		49.5	ns
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output			49.5	ns

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

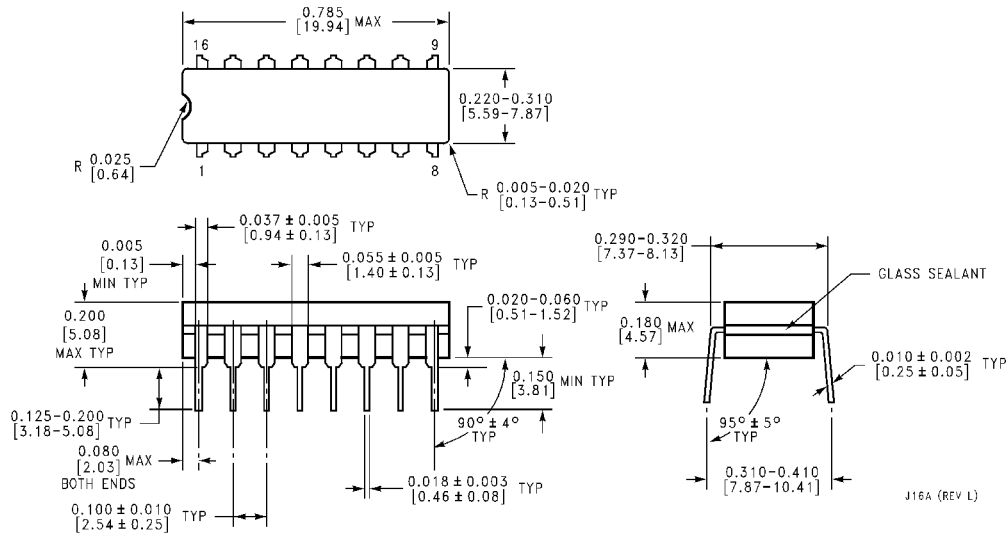
**Note 3:** I<sub>CC</sub> is measured with all inputs grounded and all outputs open.

## Logic Diagram

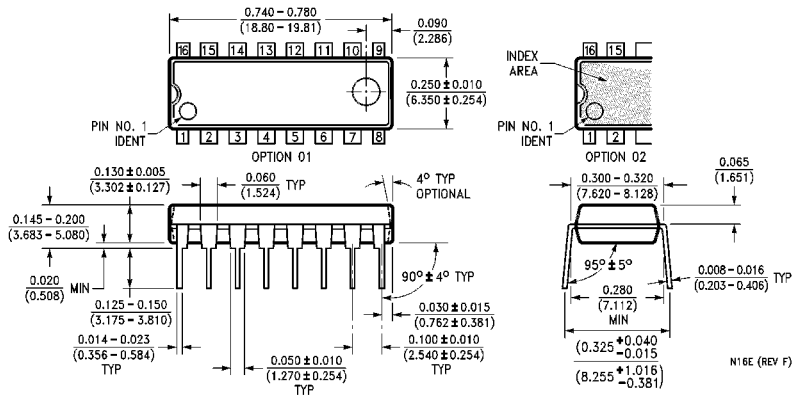




**Physical Dimensions** inches (millimeters) unless otherwise noted

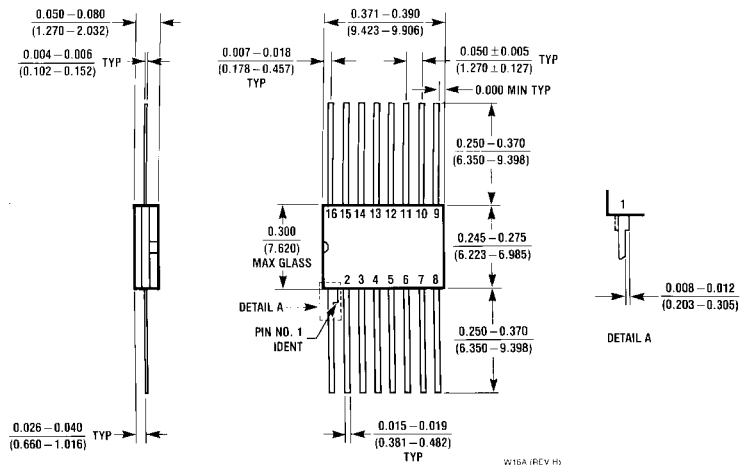


**16-Lead Ceramic Dual-In-Line Package (J)**  
**Order Number DM5445J**  
**Package Number J16A**



**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

[www.fairchildsemi.com](http://www.fairchildsemi.com)