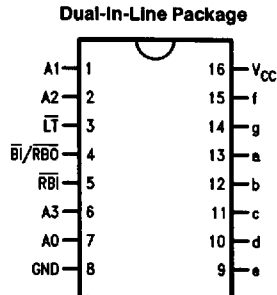


# DM74LS249 BCD to 7-Segment Decoder with Open-Collector Outputs

## General Description

The 'LS249 has active HIGH open-collector outputs and incorporates the Lamp Test and BI/RBO inputs. Additionally, the 'LS249 will light the top bar (segment a) for numeral 6 and the bottom bar (segment d) for numeral 9.

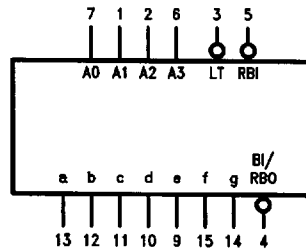
## Connection Diagram



TL/F/10213-1

**Order Number DM74LS249N**  
**See NS Package Number N16E**

## Logic Symbol



TL/F/10213-2

V<sub>CC</sub> = Pin 16  
GND = Pin 8

Pin Names	Description
A <sub>0</sub> -A <sub>3</sub>	BCD Inputs
BI	Blanking Input (Active LOW)
LT	Lamp Test Input (Active LOW)
BI/RBO	Blanking Input (Active LOW) or Ripple Blanking Output (Active LOW)
a-g	Segment Outputs (Active HIGH)

### Absolute Maximum Ratings (Note)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°C

Note: 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.

### 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 ( $\overline{BI}/\overline{RBO}$ )			-0.25	mA
I <sub>OL</sub>	Low Level Output Current			8	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 1)	Max	Units
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.5	V
V <sub>OH</sub>	High Level Output Voltage ( $\overline{BI}/\overline{RBO}$ )	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max V <sub>IL</sub> = Max	2.7	3.4		V
I <sub>CEX</sub>	High Level Output Current (a thru g)	V <sub>CC</sub> = Min, V <sub>O</sub> = 5.5V			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		0.35	0.5	V
		I <sub>OL</sub> = 4 mA, V <sub>CC</sub> = Min		0.25	0.4	
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 7V			0.1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V			20	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V	Inputs		-0.4	mA
			$\overline{BI}/\overline{RBO}$		-1.2	
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 2)	-0.3		-2.0	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = Max, V <sub>IN</sub> = 4.5V			15	mA

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

## Switching Characteristics

$V_{CC} = +5.0V, T_A = +25^\circ C$

Symbol	Parameter	$R_L = 2\text{ k}\Omega$		Units
		$C_L = 15\text{ pF}$		
		Min	Max	
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time A <sub>n</sub> to a-g ( $54LS R_L = 2\text{ k}\Omega$ )		100	ns
$t_{PLH}$ $t_{PHL}$	Propagation Delay Time $\overline{BI}$ to a-g ( $54LS R_L = 6\text{ k}\Omega$ )		100	ns

### Numerical Designations—Resultant Displays

0	1	2	3	4	5	6	7	8	9	c	d	e	f	g
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TL/F/10213-3

### Truth Table

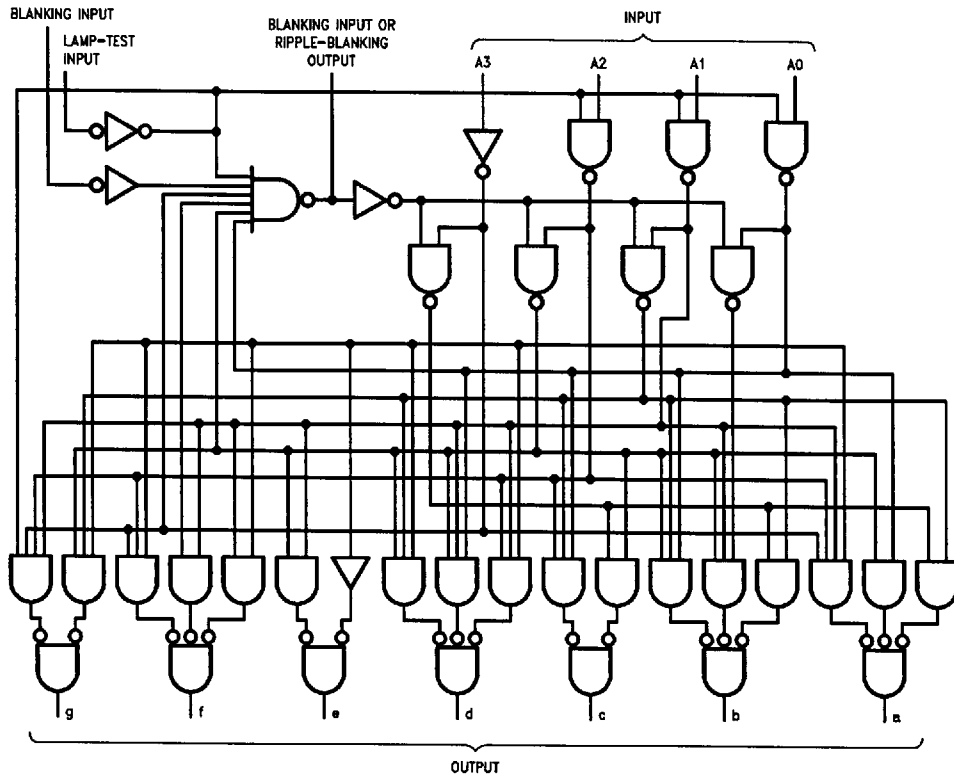
Decimal or Function	Inputs						Outputs							Note
	$\overline{LT}$	A <sub>3</sub>	A <sub>2</sub>	A <sub>1</sub>	A <sub>0</sub>	$\overline{BI}/R\overline{B}\overline{O}$	a	b	c	d	e	f	g	
0	H	L	L	L	L	H	H	H	H	H	H	H	L	1
1	H	L	L	L	H	H	L	H	H	L	L	L	L	1
2	H	L	L	H	L	H	H	H	L	H	H	L	H	
3	H	L	L	H	H	H	H	H	H	H	L	L	H	
4	H	L	H	L	L	H	L	H	H	L	L	H	H	
5	H	L	H	L	H	H	H	L	H	H	L	H	H	
6	H	L	H	H	L	H	L	L	H	H	H	H	H	
7	H	L	H	H	H	H	H	H	H	L	L	L	L	
8	H	H	L	L	L	H	H	H	H	H	H	H	H	
9	H	H	L	L	H	H	H	H	H	L	L	H	H	
10	H	H	L	H	L	H	L	L	L	H	H	L	H	
11	H	H	L	H	H	H	L	L	H	H	L	L	H	
12	H	H	H	L	L	H	L	H	L	L	L	H	H	
13	H	H	H	L	H	H	H	L	L	H	L	H	H	
14	H	H	H	H	L	H	L	L	L	H	H	H	H	
15	H	H	H	H	H	H	L	L	L	L	L	L	L	
$\overline{BI}$	X	X	X	X	X	L	L	L	L	L	L	L	L	2
$\overline{LT}$	L	X	X	X	X	H	H	H	H	H	H	H	H	3

**Note 1:**  $\overline{BI}/R\overline{B}\overline{O}$  is wired-AND logic serving as blanking input ( $\overline{BI}$ ) and/or ripple-blanking output ( $R\overline{B}\overline{O}$ ). The blanking out ( $\overline{BI}$ ) must be open or held at a HIGH level when output functions 0 through 15 are desired. X = input may be HIGH or LOW.

**Note 2:** When a LOW level is applied to the blanking input (forced condition) all segment outputs go to a LOW level, regardless of the state of any other input condition.

**Note 3:** When the blanking input/ripple-blanking output ( $\overline{BI}/R\overline{B}\overline{O}$ ) is open or held at a HIGH level, and a LOW level is applied to lamp test input, all segment outputs go to a HIGH level.

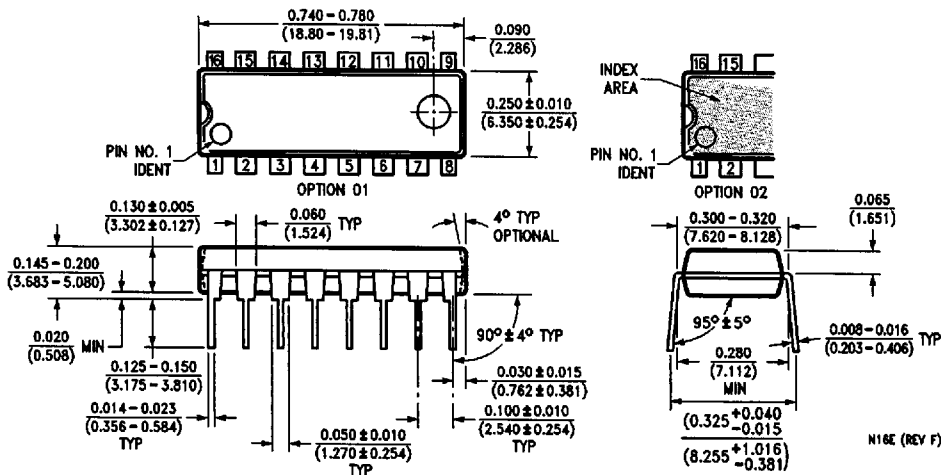
# Logic Diagram



TL/F/10213-4

**DM74LS249 BCD to 7-Segment Decoder with Open-Collector Outputs**

**Physical Dimensions** inches (millimeters)



**16-Lead Molded Dual-In-Line Package (N)**  
**Order Number DM74LS249N**  
**NS Package Number N16E**

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