

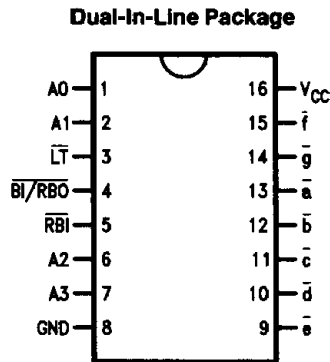


## 54LS447/DM74LS447 BCD to 7-Segment Decoder/Driver

### General Description

The 'LS447 is the same as the 'LS247 except that the Output OFF Voltage,  $V_{OH}$  is specified as 7.0V rather than 15V, with the same  $I_{OH}$  limit of 250  $\mu$ A. For all other information please refer to the 'LS247 data sheet.

### Connection Diagram



TL/F/10187-1

Order Number 54LS447FMQB, 54LS447FMQB, DM74LS447M or DM74LS447N  
See NS Package Number J16A, M16A, N16E or W16A

## Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	
54LS	-55°C to +125°C
DM74LS	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	54LS447			DM74LS447			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			0.7			0.8	V
I <sub>OH</sub>	High Level Output Current			-50			-50	μA
I <sub>OL</sub>	Low Level Output Current			12			24	mA
T <sub>A</sub>	Free Air Operating Temperature	-55		125	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	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max, V <sub>IL</sub> = Max	54LS	2.4		V
			DM74	2.4	3.4	
I <sub>OFF</sub>	High Level Output Current	Segment Outputs, V <sub>M</sub> = 7.0V			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	54LS		0.4	V
			DM74		0.35	
		I <sub>OL</sub> = 12 mA, V <sub>CC</sub> = Min	DM74		0.25	
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 10V			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 BI/RBO Inputs		-0.03	-0.4	mA
				-0.09	-1.2	mA
I <sub>OS</sub>	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 2)	54LS	-0.3	-2.0	mA
			DM74	-0.3	-2.0	
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = Max			13	mA

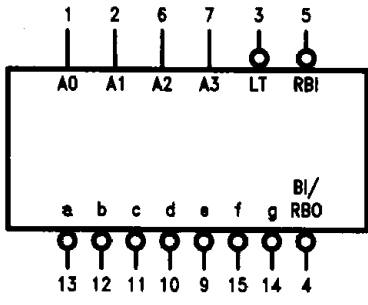
Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

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

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

Symbol	Parameter	R <sub>L</sub> = 2 kΩ, C <sub>L</sub> = 15 pF		Units
		Min	Max	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation Delay		100	ns
			100	

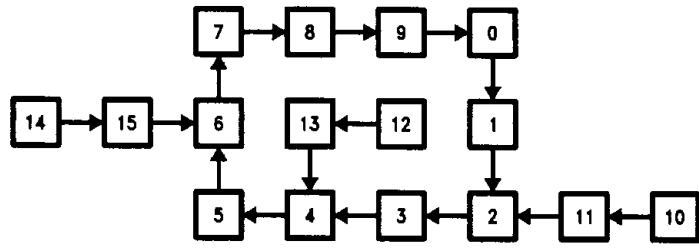
### Logic Symbol



TL/F/10187-2

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

### State Diagram



TL/F/10187-3