



钜地半导体
Tudi Semiconductor

Product Specification

TUDI-SN74LS47N

BCD-to-Seven-Segment Common anode LED Decodes Drivers

网址 www.sztdbdt.com Q

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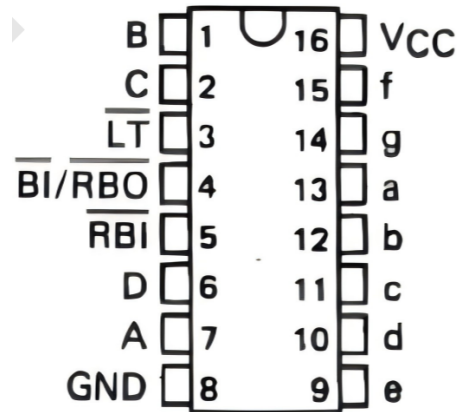
**semiconductor device
manufacturer**

- Design
- research and development
- production
- and sales



Features

- Supply voltage range: 2V to 6V
- Temperature range: -20°C to +85°C
- IPackaging information: DIP-16/SOP-16/TSSOP-16



Description

The SN74LS47 feature active-low outputs designed for driving common-anode LEDs or incandescent indicators directly. Display patterns for BCD input counts above 9 are unique symbols to authenticate input conditions.



Block Diagram

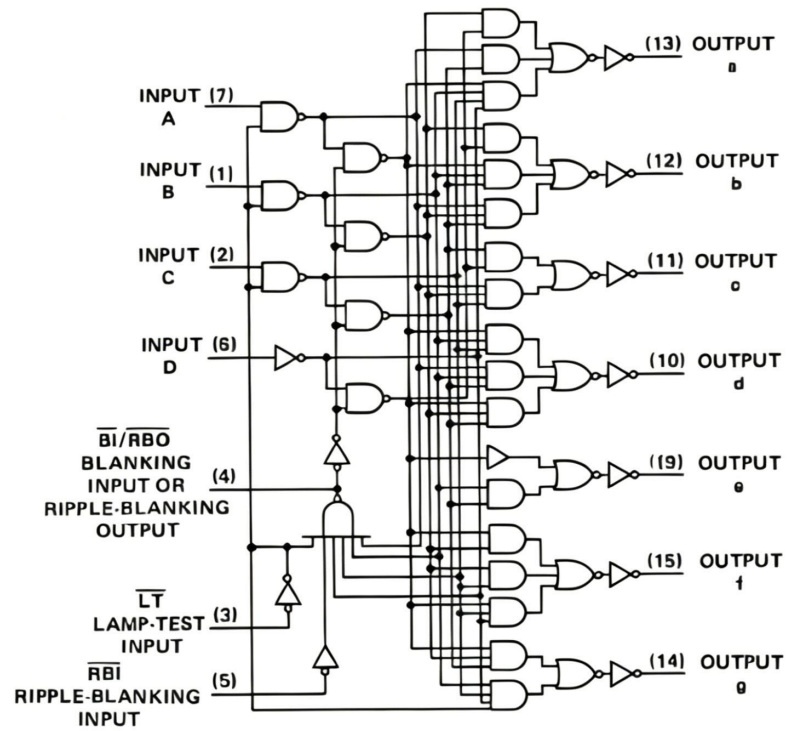


Figure 1.logic symbol



Pin Description

Pin No.	Pin Name	Description
1	B	data input
2	C	data input
3	$\overline{\text{LT}}$	lamp test
4	$\overline{\text{BI}}/\overline{\text{RBO}}$	blanking input/ripple blanking output
5	$\overline{\text{RBI}}$	ripple blanking input
6	D	data input
7	A	data input
8	GND	ground (0V)
9	e	data output
10	d	data output
11	c	data output
12	b	data output
13	a	data output
14	g	data output
15	f	data output
16	Vcc	supply voltage



Function Table

Decimal or function	Input						$\overline{\text{BI/RBO}}$	Output						
	$\overline{\text{LT}}$	$\overline{\text{RBI}}$	D	C	B	A		a	b	c	d	e	f	g
0	H	H	L	L	L	L	H	on	on	on	on	on	on	off
1	H	X	L	L	L	H	H	off	on	on	off	off	off	off
2	H	X	L	L	H	L	H	on	on	off	on	on	off	on
3	H	X	L	L	H	H	H	on	on	on	on	off	off	on
4	H	X	L	H	L	L	H	off	on	on	off	off	on	on
5	H	X	L	H	L	H	H	on	off	on	on	off	on	on
6	H	X	L	H	H	L	H	off	off	on	on	on	on	on
7	H	X	L	H	H	H	H	on	off	off	off	off	off	off
8	H	X	H	L	L	L	H	on	on	on	on	on	on	on
9	H	X	H	L	L	H	H	on	on	off	off	off	on	on
10	H	X	H	L	H	L	H	off	off	off	on	on	off	on
11	H	X	H	L	H	H	H	off	off	on	on	off	off	on
12	H	X	H	H	L	L	H	off	on	off	off	off	on	on
13	H	X	H	H	L	H	H	on	off	off	on	off	on	on
14	H	X	H	H	H	L	H	off	off	off	on	on	on	on
15	H	X	H	H	H	H	H	off	off	off	off	off	off	off
$\overline{\text{BI}}$	X	X	X	X	X	X	L	off	off	off	off	off	off	off
$\overline{\text{RBI}}$	H	L	L	L	L	L	L	off	off	off	off	off	off	off
LT	L	X	X	X	X	X	H	on	on	on	on	on	on	on

Note:

[1] H=HIGH voltage level; L=LOW voltage level; X=don't care.

[2] The blanking input ($\overline{\text{BI}}$) must be open or held at a high logic level when output functions 0 through 15 are desired. The ripple-blanking input ($\overline{\text{RBI}}$) must be open or high if blanking of a decimal zero is not desired. [3] When a low logic level is applied directly to the blanking input ($\overline{\text{BI}}$), all segment outputs are off regardless of the level of any other input.

[4] When ripple-blanking input ($\overline{\text{RBI}}$) and inputs A, B, C, D are at a low level with the lamp test input high, all segment outputs go off and the ripple-blanking output ($\overline{\text{RBO}}$) goes to a low level (response condition).

[5] When the blanking input/ripple blanking output ($\overline{\text{BI/RBO}}$) is open or held high and a low is applied to the lamp test input, all segment outputs are on.

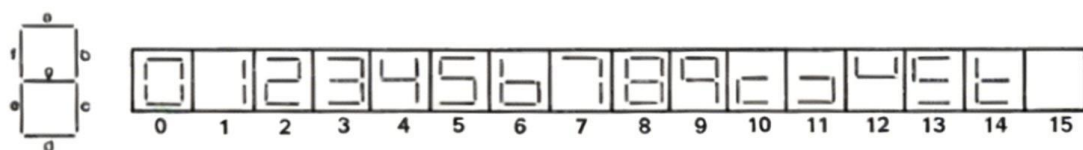


Figure 3. Segment identification



Electrical Parameter

Absolute Maximum Ratings

(Voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Max.	Unit
supply voltage	V _{CC}	-		-0.5	+7	V
supply current	I _{CC}	-		-	50	mA
ground current	I _{GND}	-		-50	-	mA
input clamping current	I _{IK}	V _I < -0.5V or V _I > V _{CC} +0.5V		-	±20	mA
output clamping current	I _{OK}	V _O < -0.5V or V _O > V _{CC} +0.5V		-	±20	mA
output current	I _O	-0.5V < V _O < V _{CC} +0.5V		-	±25	mA
storage temperature	T _{stg}	-		-65	+150	°C
soldering temperature	T _L	10s	DIP	245		°C
			SOP/TSSOP	260		

Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
supply voltage	V_{CC}	-	2.0	5.0	6.0	V
input voltage	V_I	-	0	-	V_{CC}	V
output voltage	V_O	-	0	-	V_{CC}	V
ambient temperature	T_{amb}	-	-20	-	+85	°C



Electrical Characteristics

DC Characteristics

($T_{amb} = -20^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	V _{CC}	Conditions	Min.	Typ.	Max.	Unit
HIGH-level input voltage	V _{DI}	2.0V	-	1.5	1.2	-	V
		4.5V	-	3.15	2.4	-	V
		6.0V	-	4.2	3.2	-	V
LOW-level input voltage	V _{IL}	2.0V	-	-	0.8	0.5	V
		4.5V	-	-	2.1	1.35	V
		6.0V	-	-	2.8	1.8	V
LOW-level output voltage	V _{OL}	2.0V	I _O =20 μ A	-	0	0.1	V
		4.5V	I _O =20 μ A	-	0	0.1	V
		6.0V	I _O =20 μ A	-	0	0.1	V
		4.5V	I _O =4.0mA	-	0.15	0.33	V
		6.0V	I _O =5.2mA	-	0.16	0.33	V
HIGH-level input current	I _{IH}	6.0V	V _I =V _{CC}	-	-	20	μ A
LOW-level input voltage	I _{IL} (A/B/ C/D)	6.0V	V _I = GND	-	-	-20	μ A
	I _{IL} ($\bar{\text{BI}}$ / $\bar{\text{RBI}}$ / $\bar{\text{RBI/LT}}$)	6.0V	V _I = GND	-	-	-1.2	mA
supply current	I _{CC}	6.0V	V _I =V _{CC} or GND; I _O =0A	-	-	13	mA

AC Characteristics

($T_{amb} = 25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
Turn-on time	t _{ON}	V _{CC} =5.0V; C _L =15pF; R _L =665 Ω	from A input	-	-	100	ns
			from $\bar{\text{RBI}}$ input, outputs (a-f only)	-	-	100	ns
Turn-off time	t _{OFF}	V _{CC} =5.0V; C _L =15pF; R _L =665 Ω	from A input	-	-	100	ns
			from $\bar{\text{RBI}}$ input, outputs (a-f only)	-	-	100	ns



Testing Circuit

AC Testing Circuit

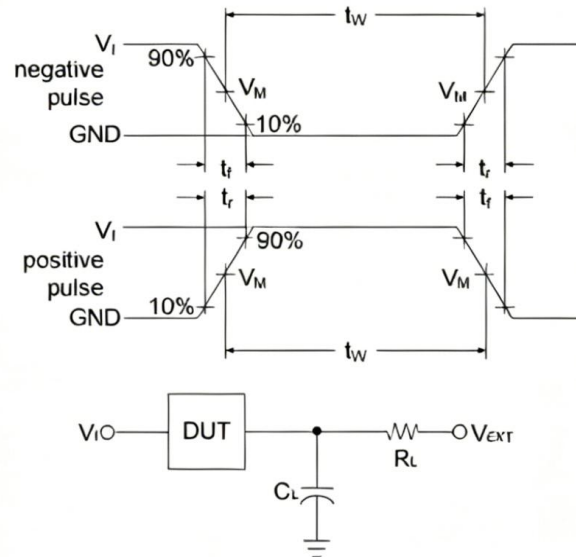


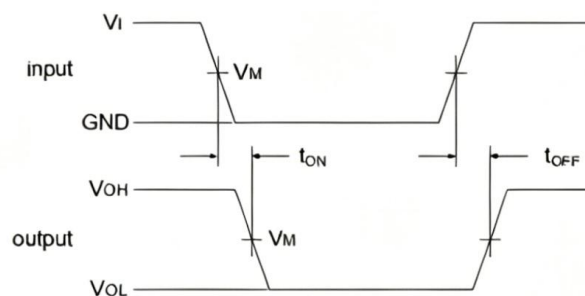
Figure 4. Test circuit for measuring switching times

C_L includes probe and jig capacitance.

Test Data

Type	Input		Load		V_{EXT}
	V_I	$t_r = t_f$	C_L	R_L	t_{ON}/t_{OFF}
SN74LS47	V_{CC}	3.0ns	15pF	665 Ω	V_{CC}

AC Testing Waveforms



Measurement Points

Type	Input	Output
	V_M	V_M
SN74LS47	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$

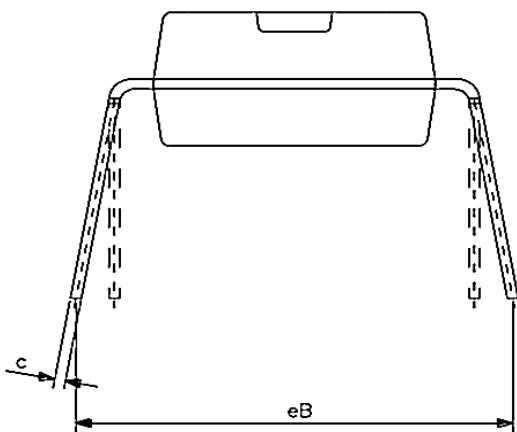
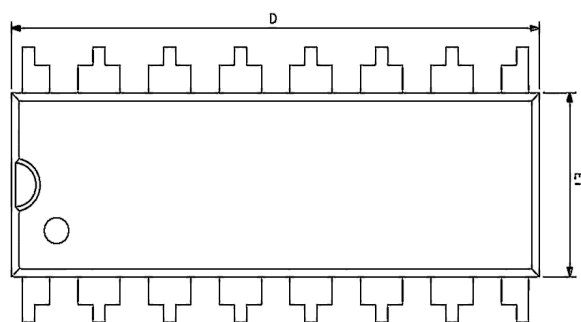
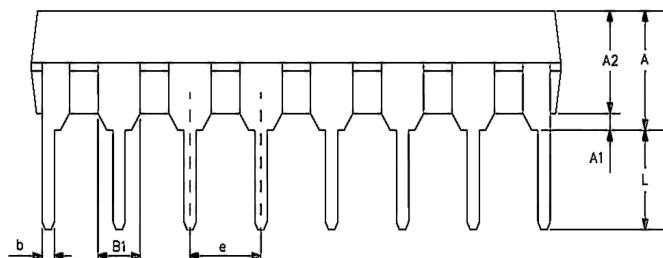


Ordering Information

Order Number	Package	Package Quantity	Marking On The park
SN74LS47N-TUDI	DIP16	Tube,25,A box of 1000	SN74LS47N



Package DIP16



SIZE SYMBOL	MIN./mm	MAX./mm
A2	3.20	3.60
A1	0.51	—
A	3.60	5.33
L	3.00	3.60
b	0.36	0.56
B1	1.52	
D	18.80	19.94
E1	6.20	6.60
e	2.54	
C	0.20	0.36
eB	7.62	9.30
R	0.20TYP	
R1	0.30TYP	
θ	0°	8°
$\theta 1$	45°TYP	
02	12°TYP	
03	0°	8°
04	0°	10°



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