54248/74248 BCD-to-Seven-Segment Decoder / Driver

	Schottky TTL					High-Speed TTL					Low-power Schottky TTL					Standard TTL					Low-Power TTL				
	Device Type	Package				Device Type	Package				Device Type	Package				Device Type	Package				Device Type	Package			
		C	P	M	CF		C	P	M	CF		C	P	M	CF		C	P	M	CF		C	P	M	CF
T.I.											SN54LS248	J①		W①	W①	SN54248	J①			W①					
											SN74LS248	J①	N①			SN74248	J①	N①							
FAIRCHILD																									
MOTOROLA																									
N.S.C.																									
PHILIPS																									
SIGNETICS																									
SIEMENS																									
FUJITSU																									
HITACHI											HD74LS248		P①												
NITSUBISHI																									
NEC																									
TOSHIBA																									

Electrical Characteristicss SN54LS248/SN74LS248

absolute maximum ratings over operating free-air temperature range

Supply voltage, V_{CC}	7 V	Operating free-air temperature range	SN54LS	−55°C to 125°C
Input voltage	7V		SN74LS	0°C to 70°C
		Storage temperature range		−65°C to 150°C

recommended operating conditions

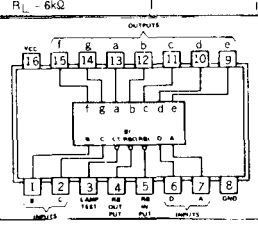
		SN54248			SN74248			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}		4.5	5	5.25	4.75	5	5.25	V
High-level output current, I_{OH}	a thru g			−100			−100	μA
	BI/RBO			−50			−50	
Low-level output current, I_{OL}	a thru g			2			6	mA
	BI/RBO			1.6			3.2	
Operating free-air temperature, T_A		−55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range

PARAMETER*			TEST CONDITIONS†	MIN	NOM‡	MAX	UNIT
V_{IH}	High-level input voltage			2			V
V_{IL}	Low-level input voltage					0.8	V
V_I	Input clamp voltage		V_{CC} = MIN, I_I = −18mA			−1.5	V
V_{OH}	High-level output voltage	a thru g	V_{CC} = MIN, V_{IH} = 2V, V_{IL} = 0.8V, I_{OH} = MAX	2.4	4.2		V
		BI/RBO		2.4	4.2		
I_O	Output current	a thru g	V_{CC} = MIN, V_O = 0.85V, Input conditions as for V_{OH}	−1.3	−2		mA
V_{OL}	Low-level output voltage		V_{CC} = MIN, V_{IH} = 2V, V_{IL} = 0.8V, I_{OL} = MAX		0.35	0.5	V
I_I	Input current at maximum input voltage	Any input except BI/RBO	V_{CC} = MAX, V_I = 7V			0.1	mA
I_{IH}	High-level input current	Any input except BI/RBO	V_{CC} = MAX, V_I = 2.7V			20	μA
I_{IL}	Low-level input current	Any input except BI/RBO	V_{CC} = MAX, V_I = 0.4V			0.4	mA
		BI/RBO				1.2	
I_{OS}	Short-circuit output current	BI/RBO	V_{CC} = MAX		0.3	2	mA
I_{CC}	Supply current		V_{CC} = MAX, See Note 1		25	38	mA
t_{PHL}	from A input		V_{CC} = 5V, T_A = 25°C.			100	ns
t_{PLH}	from A input		C_L = 15pF, R_L = 4kΩ			100	
t_{PHL}	from RBI input		V_{CC} = 5V, T_A = 25°C.			100	ns
t_{PLH}	from RBI input		C_L = 15pF, R_L = 6kΩ			100	

Pin Assignment (Top View)

①



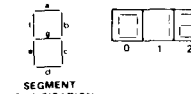
positive logic: see function table

† For conditions shown as MIN or MAX, use appropriate value specified under recommended operating conditions.
‡ All typical values are at V_{CC} = 5V, T_A = 25°C.
* t_{PLH} = propagation delay time, low-to-high-level output
t_{PHL} = propagation delay time, high-to-low-level output

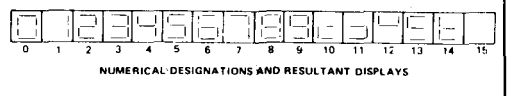
,248, 'LS248 Function Table

DECIMAL OR FUNCTION	INPUTS LT	RBI	D	C	B	A	BI/RBO #	OUTPUTS a	b	c	d	e	f	g	NOTE
0	H	H	L	L	L	L	H	H	H	H	H	H	H	L	2
1	H	X	L	L	L	H	H	L	H	H	L	L	L	L	2
2	H	X	L	L	H	L	H	H	H	L	H	H	L	H	
3	H	X	L	L	H	H	H	H	H	H	H	L	L	H	
4	H	X	L	H	L	L	H	L	H	H	L	L	H	H	
5	H	X	L	H	L	H	H	H	L	H	H	L	H	H	
6	H	X	L	H	H	L	H	H	L	H	H	H	H	H	
7	H	X	L	H	H	H	H	H	H	H	L	L	L	L	2
8	H	X	H	L	L	L	H	H	H	H	H	H	H	H	
9	H	X	H	L	L	H	H	H	H	H	H	L	H	H	
10	H	X	H	L	H	L	H	L	L	L	H	H	L	H	
11	H	X	H	L	H	H	H	L	L	H	H	L	L	H	
12	H	X	H	H	L	L	H	L	H	L	L	L	H	H	
13	H	X	H	H	L	H	H	H	L	L	H	L	H	H	
14	H	X	H	H	H	L	H	L	L	L	H	H	H	H	
15	H	X	H	H	H	H	H	L	L	L	L	L	L	L	
BI	X	X	X	X	X	X	L	L	L	L	L	L	L	L	3
RBI	H	L	L	L	L	L	L	L	L	L	L	L	L	L	4
LT	L	X	X	X	X	X	H	H	H	H	H	H	H	H	5

# BI/RBO is wire-AND logic serving as blanking input (BI) and/or ripple blanking output (RBO).
H = high level, L = low level, X = irrelevant

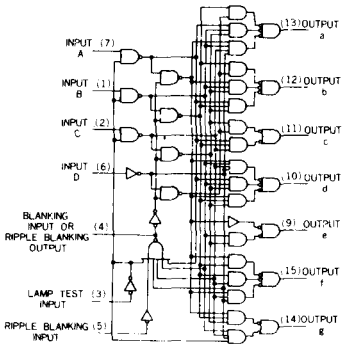


SEGMENT IDENTIFICATION



NUMERICAL DESIGNATIONS AND RESULTANT DISPLAYS

Functional Block Diagram



248, 'LS248 BCD-TO-SEVEN-SEGMENT DECODER DRIVER

NOTES

1. I_{CC} is measured with all outputs open and all inputs at 4.5V.
2. The blanking input (BI) must be open or held at a high logic level when output functions 0 through 15 are desired. The ripple blanking input (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 (BI), all segment outputs are low regardless of the level of any other input.
4. When ripple blanking input (RBI) and inputs A, B, C, and D are at a low level with the lamp test input high, all segment outputs go low and the ripple blanking output (RBO) goes to a low level (response condition).
5. When the blanking input/ripple blanking output (BI/RBO) is open or held high and a low is applied to the lamp test input, all segment outputs are high.