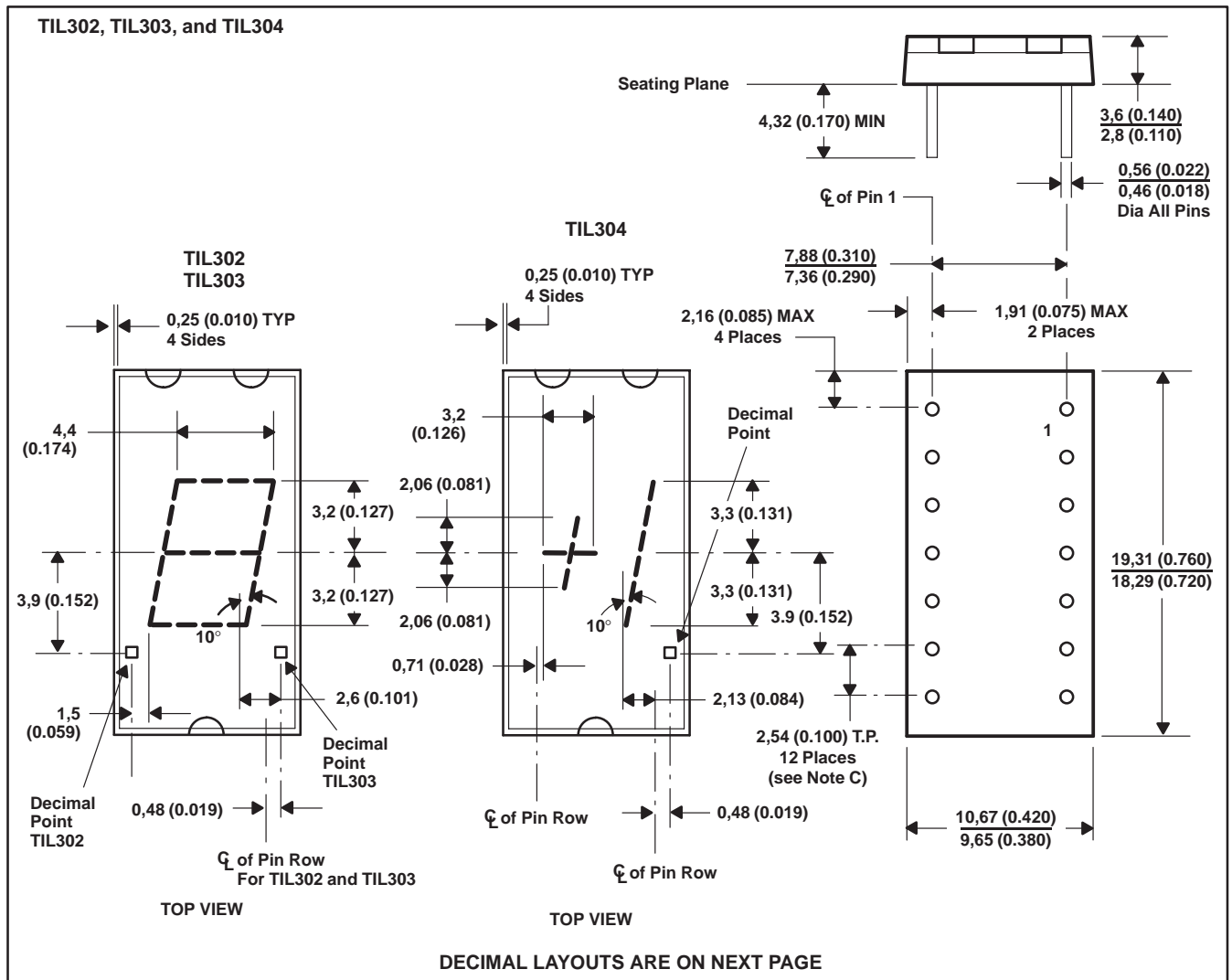


- Red Solid-State Display
- 6,9-mm (0.270-Inch) Character Height
- High Luminous Intensity
- Low Power Requirements
- Each Unit Visually Checked for Uniformity of Elements
- Sign, Overflow, and Left or Right Decimal Capabilities
- Wide Viewing Angle
- Compatible With Most TTL and DTL Circuits

## mechanical data

These assemblies consist of display chips mounted on a header with molded plastic body. Multiple displays may be mounted on 11,43-mm (0.450-inch) centers.

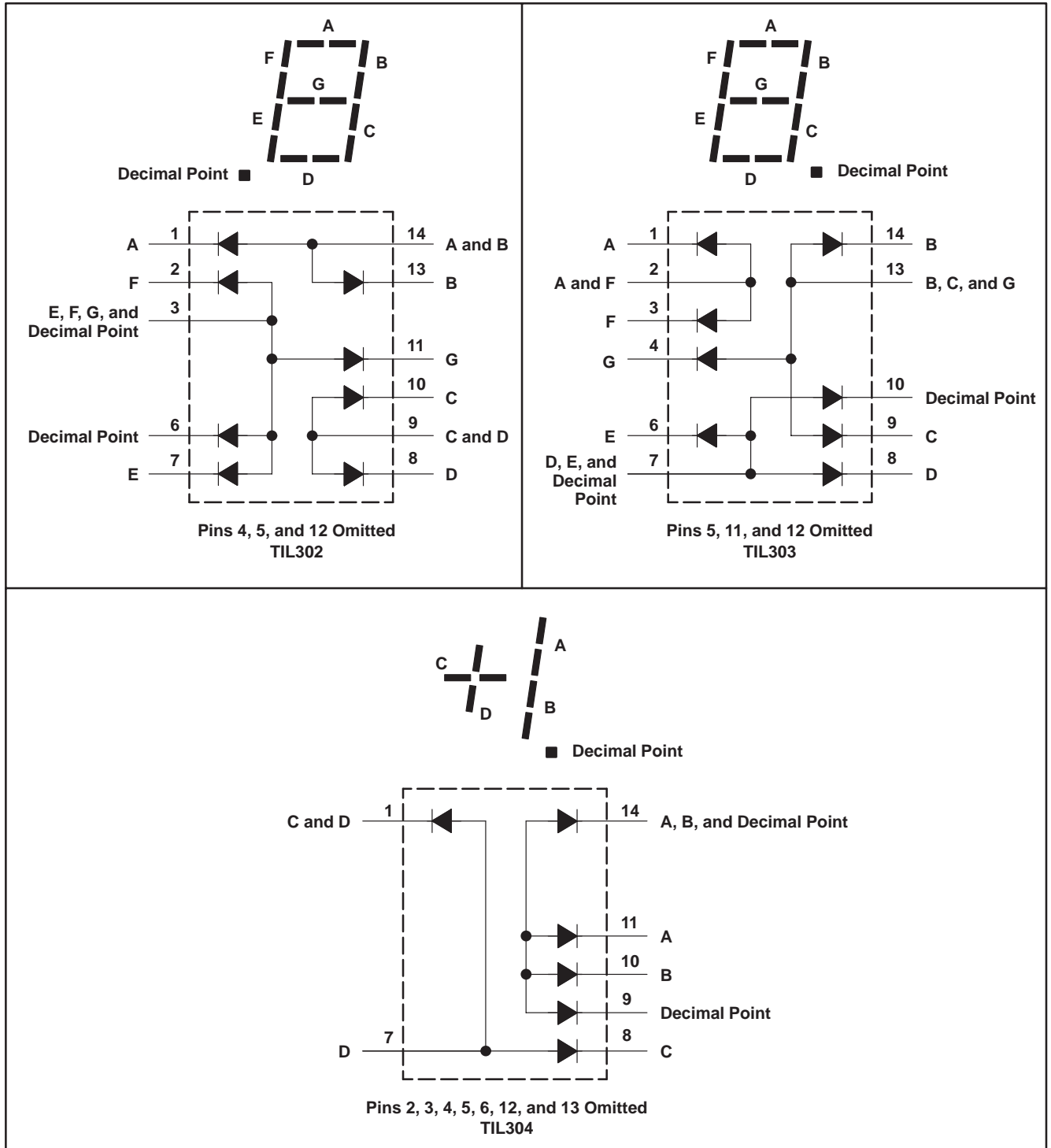


- NOTES: A. All linear dimensions are in millimeters and parenthetically in inches.  
 B. Centerlines of character segments are shown as dashed lines. Associated dimensions are nominal.  
 C. The true-position pin spacing is 2,54 mm (0.100 inch) between centerlines. Each centerline is located within 0,26 mm (0.010 inch) of its true longitudinal position relative to pins 1 and 11.

# TIL302, TIL303, TIL304 NUMERIC DISPLAYS

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## pin layouts



**absolute maximum ratings over operating free-air temperature range (unless otherwise noted)**

Reverse voltage at 25°C free-air temperature: Each segment	6 V
Decimal point	3 V
Peak forward current, each segment or decimal point (see Note 1)	200 mA
Continuous forward current: Each segment or decimal point	30 mA
Total for TIL302, TIL303	240 mA
Total for TIL304	150 mA
Operating free-air temperature range, $T_A$	0°C to 70°C
Storage temperature range	-25°C to 85°C

NOTE 1: This value applies for PRR ≥ 60 Hz, duty cycle ≤ 10%.

**operating characteristics of each segment at 25°C free-air temperature (unless otherwise noted)**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$I_V$ Luminous intensity (see Note 2)	$I_F = 20 \text{ mA}$	100	275		$\mu\text{cd}$
$\lambda_p$ Wavelength at peak emission			660		nm
$\Delta\lambda$ Spectral bandwidth			20		nm
$V_F$ Static forward voltage		3	3.4	3.8	V
$\alpha_{VF}$ Average temperature coefficient of static forward voltage	$I_F = 20 \text{ mA}$ , $T_A = 0^\circ\text{C to } 70^\circ\text{C}$		-2.7		$\text{mV}/^\circ\text{C}$
$I_R$ Static reverse current	$V_R = 6 \text{ V}$			100	$\mu\text{A}$
C Anode-to-cathode capacitance	$V_R = 0$ , $f = 1 \text{ MHz}$		85		pF

**operating characteristics of decimal point at 25°C free-air temperature (unless otherwise noted)**

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$I_V$ Luminous intensity (see Note 2)	$I_F = 20 \text{ mA}$	40	110		$\mu\text{cd}$
$\lambda_p$ Wavelength at peak emission			660		nm
$\Delta\lambda$ Spectral bandwidth			20		nm
$V_F$ Static forward voltage		1.5	1.65	2	V
$\alpha_{VF}$ Average temperature coefficient of static forward voltage	$I_F = 20 \text{ mA}$ , $T_A = 0^\circ\text{C to } 70^\circ\text{C}$		-1.4		$\text{mV}/^\circ\text{C}$
$I_R$ Static reverse current	$V_R = 3 \text{ V}$			100	$\mu\text{A}$
C Anode-to-cathode capacitance	$V_R = 0$ , $f = 1 \text{ MHz}$		120		pF

NOTE 2: Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (International Commission on Illumination) eye-response curve.

TYPICAL CHARACTERISTICS

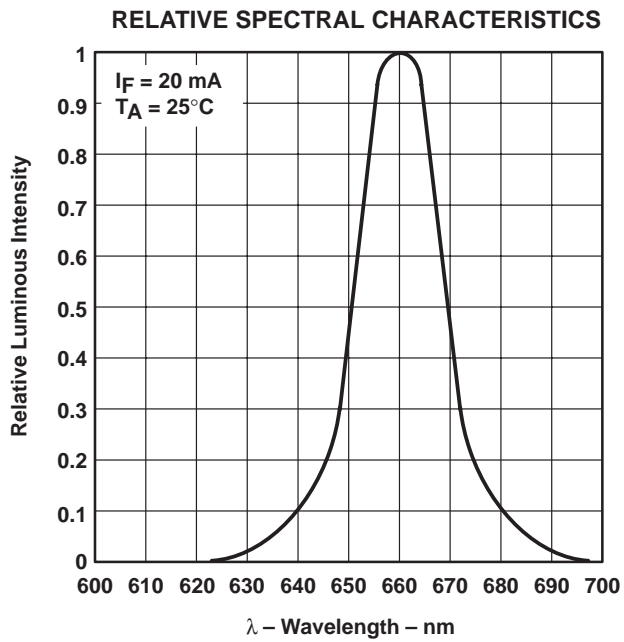


Figure 1

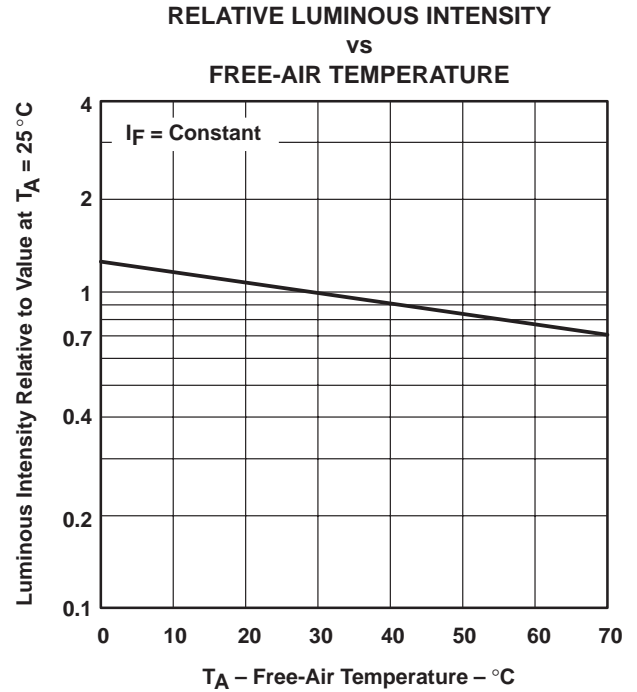


Figure 2

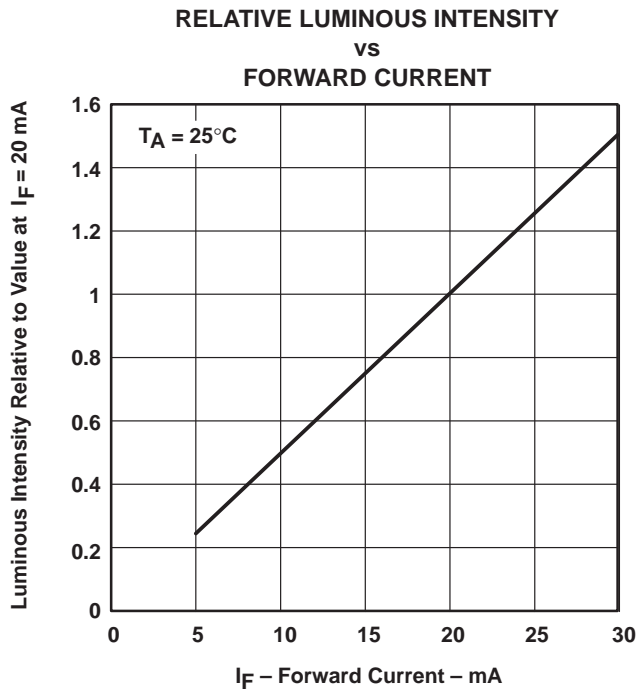


Figure 3

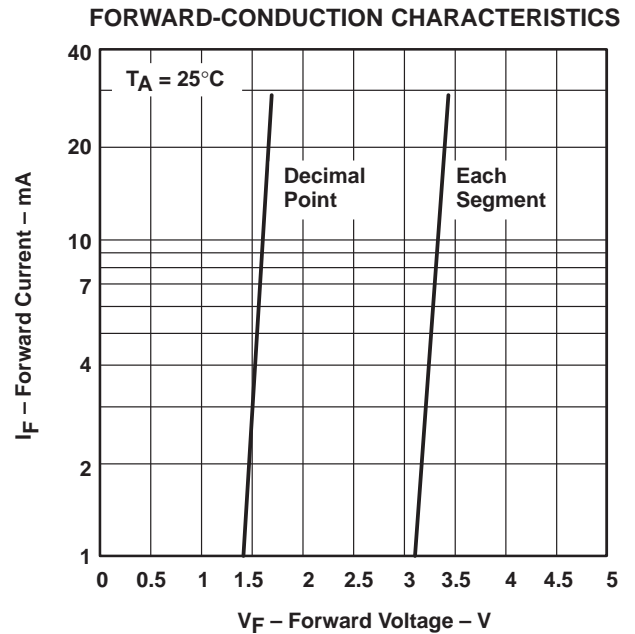
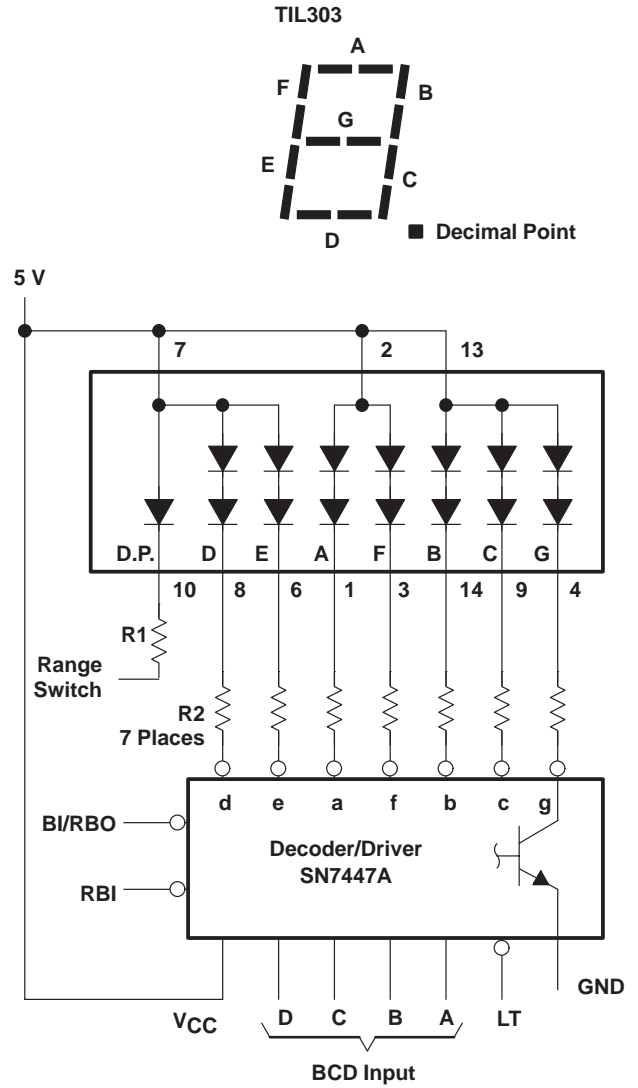
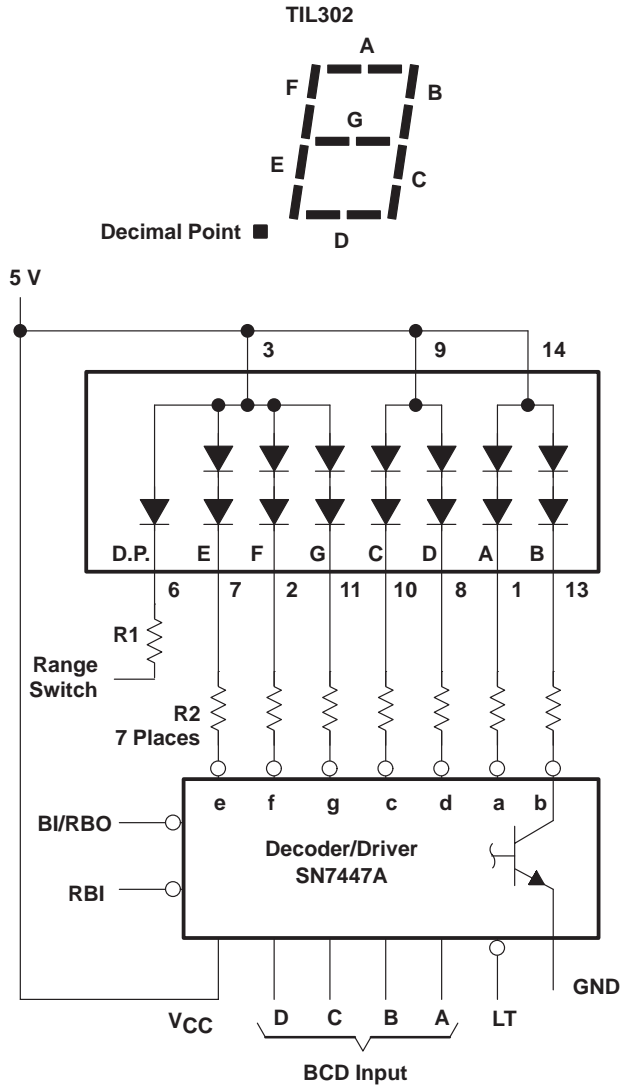


Figure 4

APPLICATION INFORMATION



NOTE A: R1 and R2 are selected for desired brightness.

# TIL302, TIL303, TIL304 NUMERIC DISPLAYS

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## APPLICATION INFORMATION

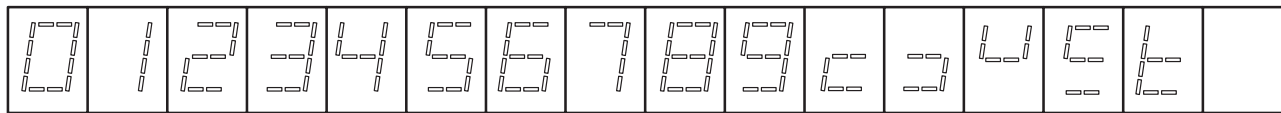
FUNCTION TABLE  
SN7447A

DECIMAL OR FUNCTION	INPUTS						BI/RBO†	SEGMENTS							NOTE
	LT	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
1	H	X	L	L	L	H	H	OFF	ON	ON	OFF	OFF	OFF	OFF	1
2	H	X	L	L	H	L	H	ON	ON	OFF	ON	ON	OFF	ON	1
3	H	X	L	L	H	H	H	ON	ON	ON	ON	OFF	OFF	ON	1
4	H	X	L	H	L	L	H	OFF	ON	ON	OFF	OFF	ON	ON	1
5	H	X	L	H	L	H	H	ON	OFF	ON	ON	OFF	ON	ON	1
6	H	X	L	H	H	L	H	OFF	OFF	ON	ON	ON	ON	ON	1
7	H	X	L	H	H	H	H	ON	ON	ON	OFF	OFF	OFF	OFF	1
8	H	X	H	L	L	L	H	ON	ON	ON	ON	ON	ON	ON	1
9	H	X	H	L	L	H	H	ON	ON	ON	OFF	OFF	ON	ON	1
10	H	X	H	L	H	L	H	OFF	OFF	OFF	ON	ON	OFF	ON	1
11	H	X	H	L	H	H	H	OFF	OFF	ON	ON	OFF	OFF	ON	1
12	H	X	H	H	L	L	H	OFF	ON	OFF	OFF	OFF	ON	ON	1
13	H	X	H	H	L	H	H	ON	OFF	OFF	ON	OFF	ON	ON	1
14	H	X	H	H	H	L	H	OFF	OFF	OFF	ON	ON	ON	ON	1
15	H	X	H	H	H	H	H	OFF	OFF	OFF	OFF	OFF	OFF	OFF	1
BI	X	X	X	X	X	X	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF	2
RBI	H	L	L	L	L	L	L	OFF	OFF	OFF	OFF	OFF	OFF	OFF	3
LT	L	X	X	X	X	X	H	ON	ON	ON	ON	ON	ON	ON	4

H = high level (logic 1 in positive logic), L = low level (logic 0 in positive logic), X = irrelevant

† BI/RBO is a wire-AND logic serving as a blanking input (BI) and/or ripple-blanking output (RBO).

- NOTES: 1. 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.
2. When a low logic level is applied directly to the blanking input (BI), all segment outputs are off regardless of any other input.
3. When the ripple-blanking input (RBI) and inputs A, B, C, and D are at a low logic level with the lamp-test input (LT) high, all segment outputs are off and the ripple-blanking output (RBO) of the decoder goes to a low level (response condition).
4. When the blanking input/ripple-blanking output (BI/RBO) is open or held high and a low is applied to the lamp-test input (LT), all segments are illuminated.



0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

NUMERICAL DESIGNATIONS RESULTANT DISPLAYS

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