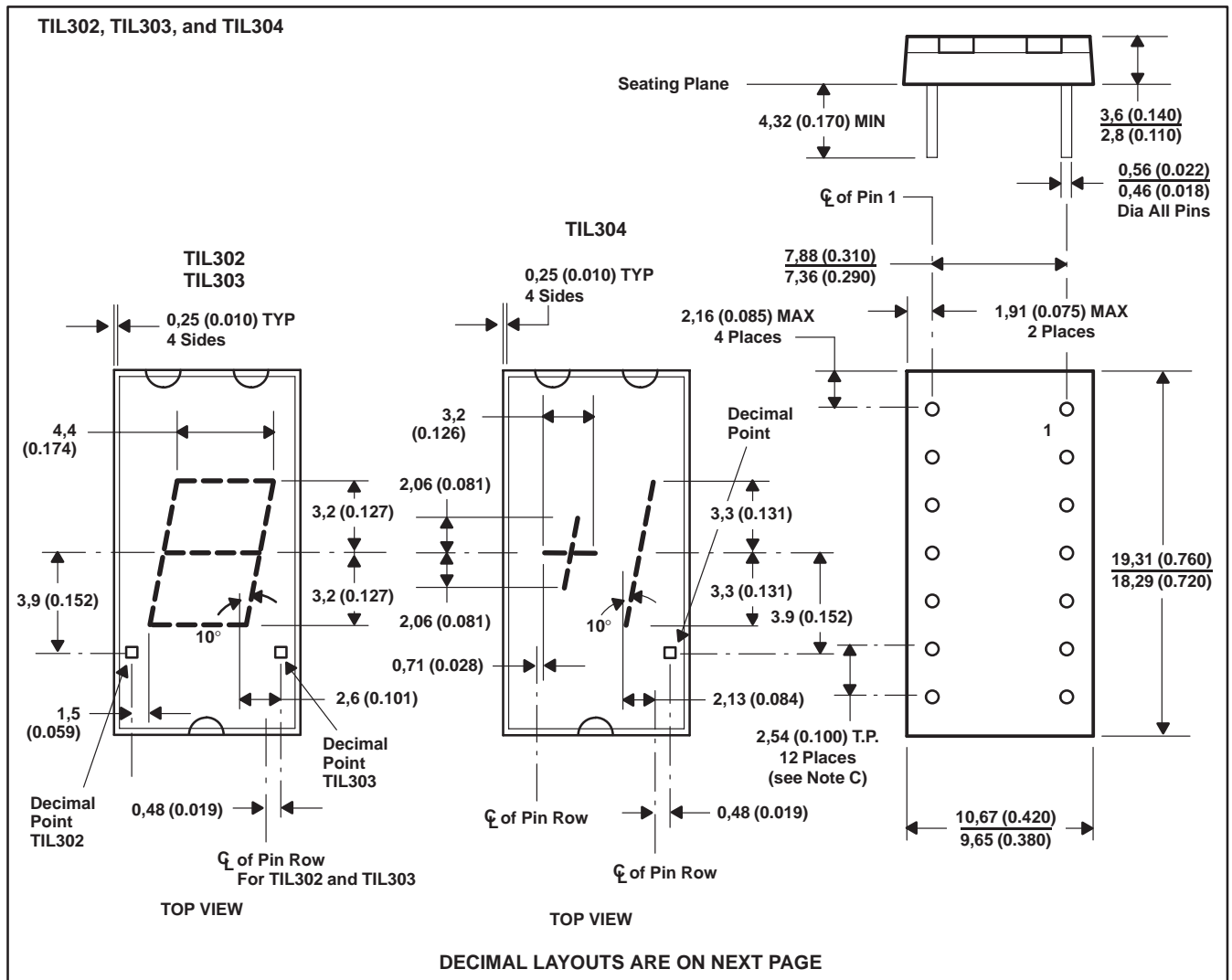


- Red Solid-State Display
- 6,9-mm (0.270-Inch) Character Height
- High Luminous Intensity
- Low Power Requirements
- Each Unit Visually Checked for Uniformity of Elements
- Sign, Overflow, and Left or Right Decimal Capabilities
- Wide Viewing Angle
- Compatible With Most TTL and DTL Circuits

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.

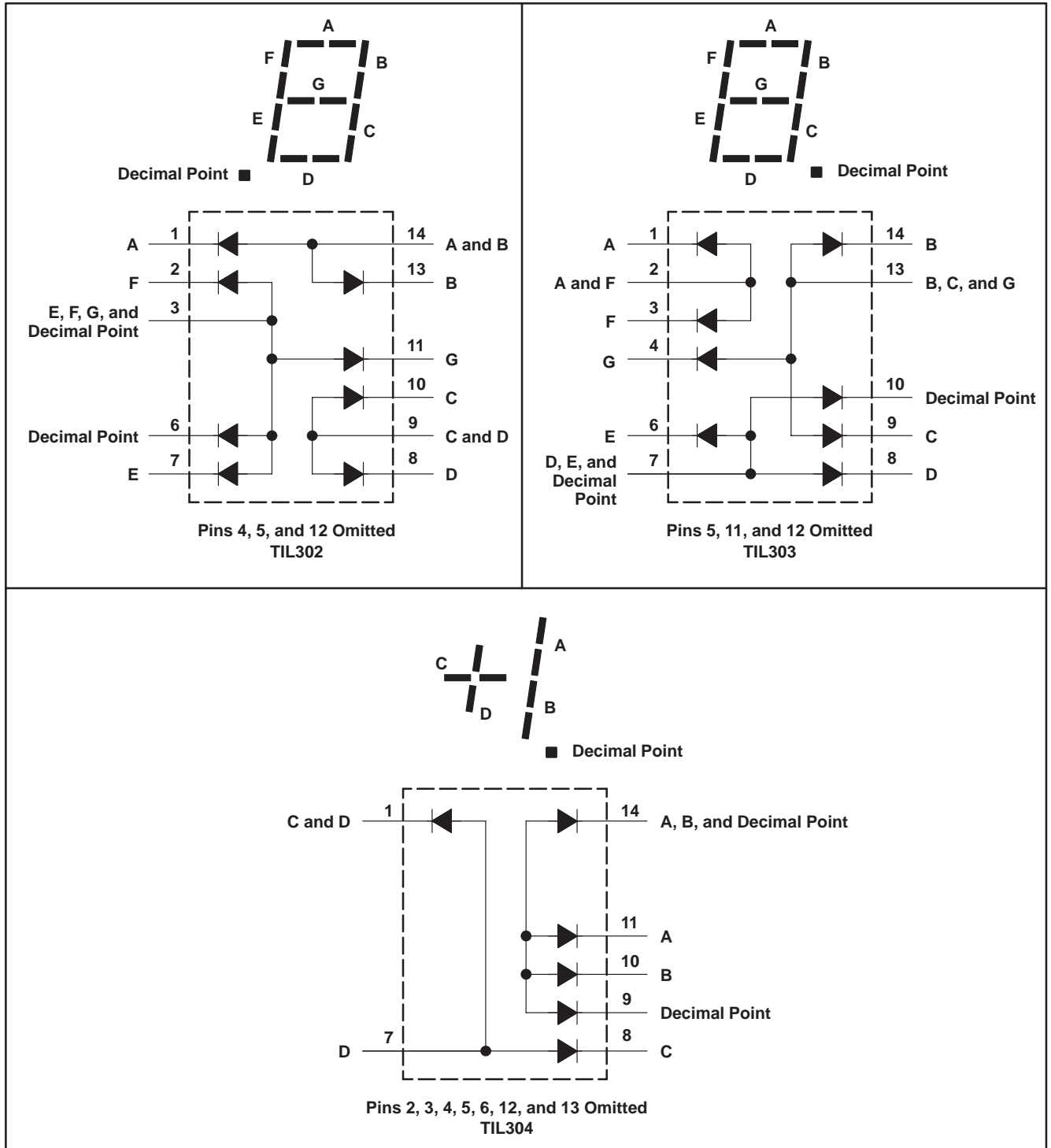


- NOTES: A. All linear dimensions are in millimeters and parenthetically in inches.
 B. Centerlines of character segments are shown as dashed lines. Associated dimensions are nominal.
 C. The true-position pin spacing is 2,54 mm (0.100 inch) between centerlines. Each centerline is located within 0,26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

TIL302, TIL303, TIL304 NUMERIC DISPLAYS

SOES010A, APRIL 1971 – REVISED DECEMBER 1993

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 \geq 60 Hz, duty cycle \leq 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		μcd
λ_p	Wavelength at peak emission			660		nm
$\Delta\lambda$	Spectral bandwidth			20		nm
V_F	Static forward voltage		3	3.4	3.8	V
α_{V_F}	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	μA
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		μcd
λ_p	Wavelength at peak emission			660		nm
$\Delta\lambda$	Spectral bandwidth			20		nm
V_F	Static forward voltage		1.5	1.65	2	V
α_{V_F}	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	μA
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

RELATIVE SPECTRAL CHARACTERISTICS

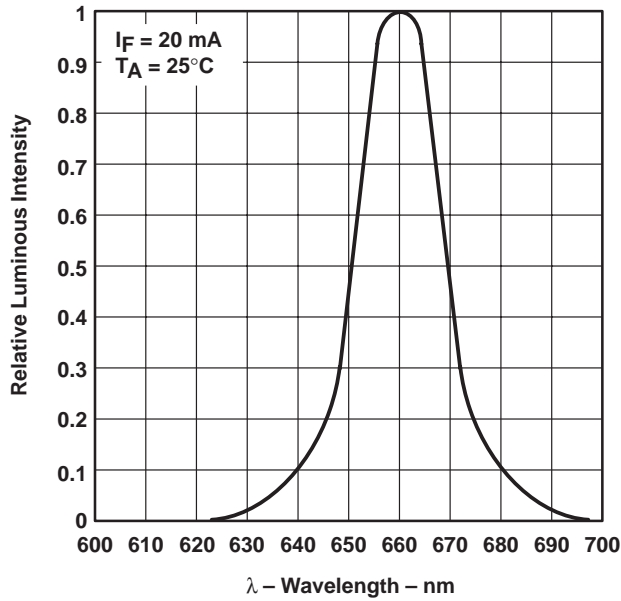


Figure 1

RELATIVE LUMINOUS INTENSITY
 vs
 FREE-AIR TEMPERATURE

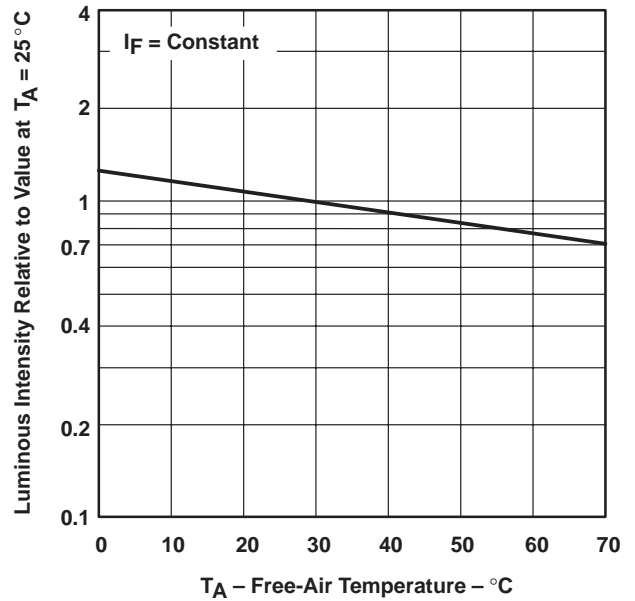


Figure 2

RELATIVE LUMINOUS INTENSITY
 vs
 FORWARD CURRENT

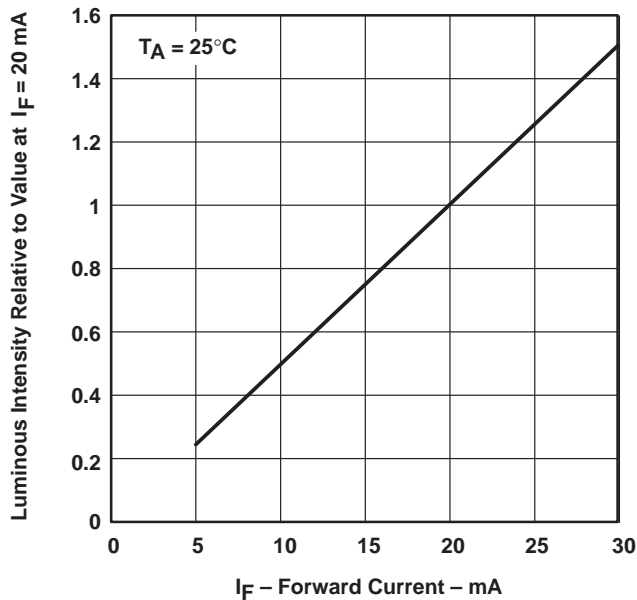


Figure 3

FORWARD-CONDUCTION CHARACTERISTICS

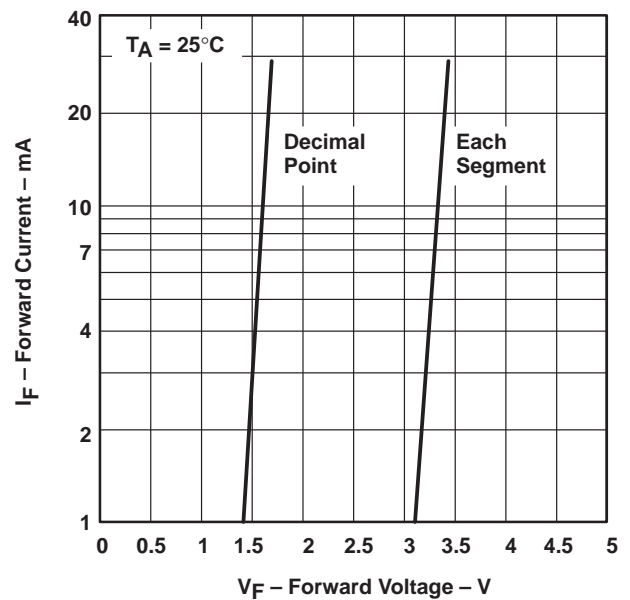
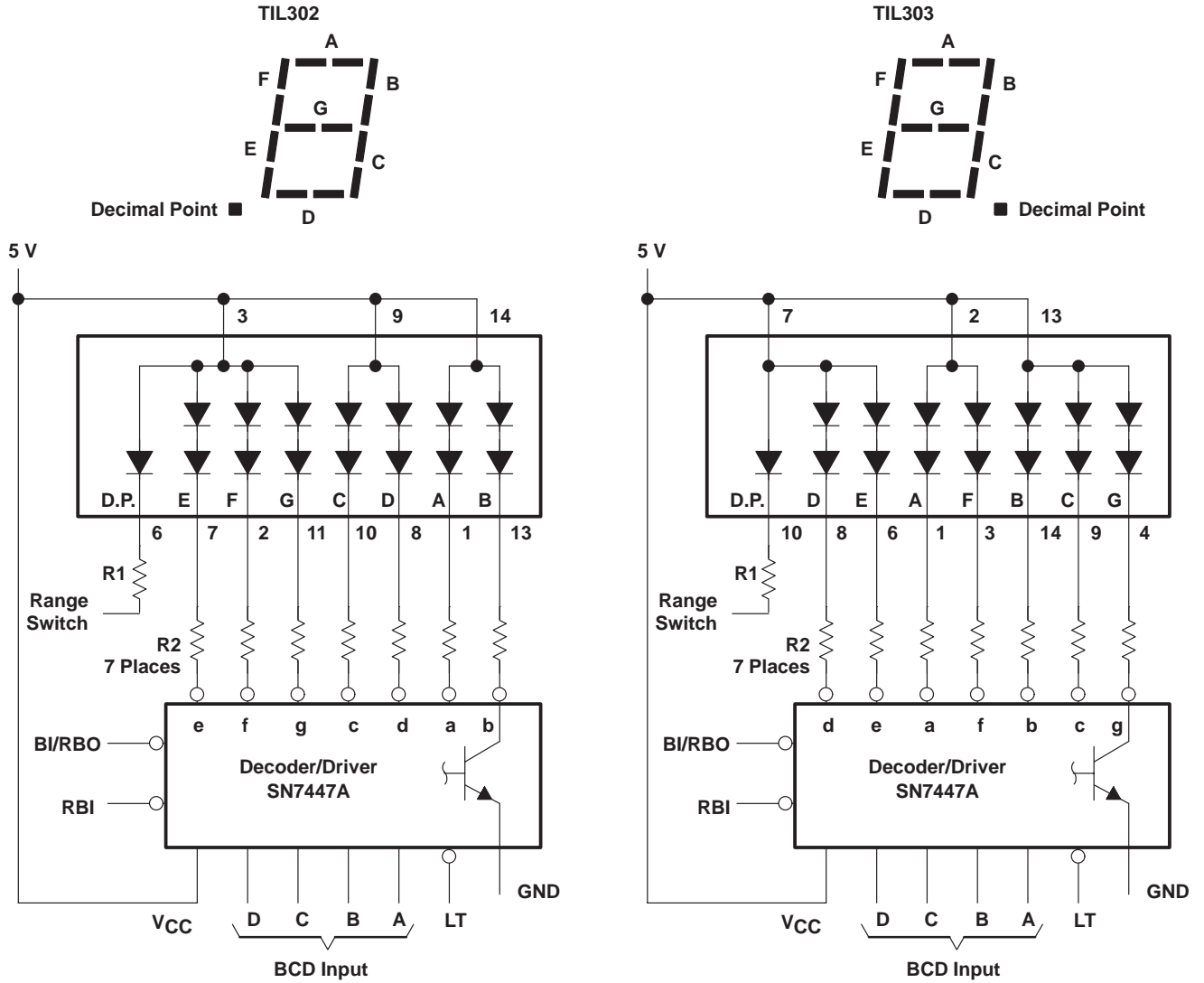


Figure 4

APPLICATION INFORMATION



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

TIL302, TIL303, TIL304 NUMERIC DISPLAYS

SOES010A, APRIL 1971 – REVISED DECEMBER 1993

APPLICATION INFORMATION

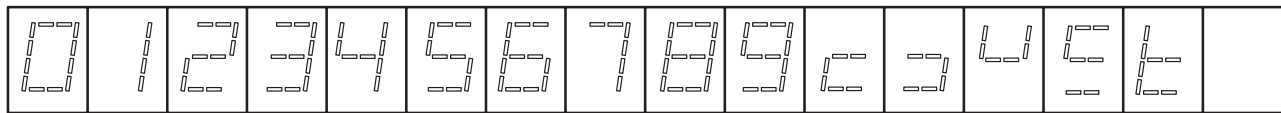
FUNCTION TABLE
SN7447A

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

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.