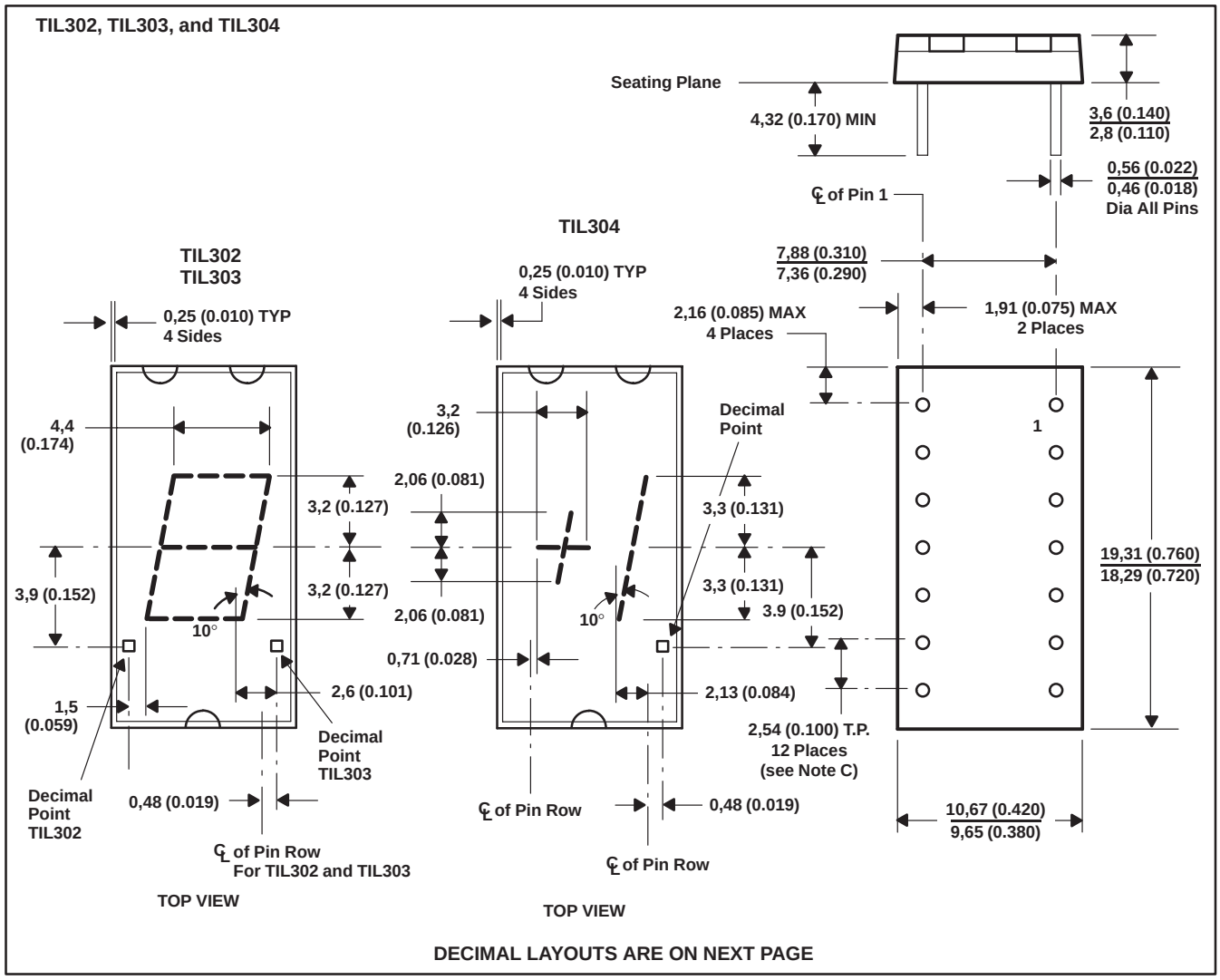
SOES010A, APRIL 1971 – REVISED DECEMBER 1993

- **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

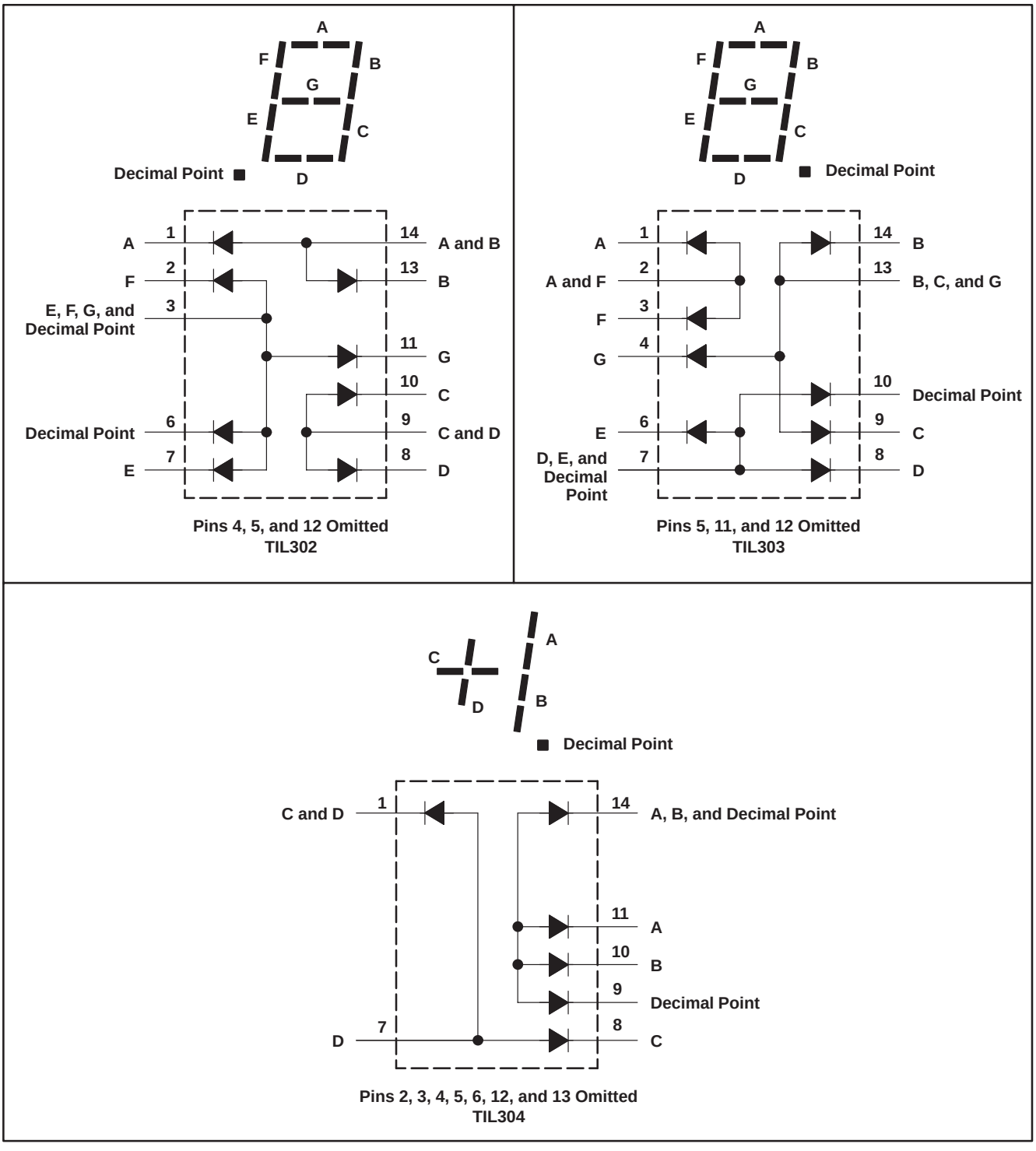
These assemblies consist of display chips mounted on a header with molded plastic body. Multiple displays may be mounted on 11,43-mm (0.450-inch) centers.



DECIMAL LAYOUTS ARE ON NEXT PAGE

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.

pin layouts


A
F
B
G
E
C
D
Decimal Point
A
1
F
2
E, F, G, and Decimal Point
3
Decimal Point
6
E
7
14
A and B
13
B
11
G
10
C
9
C and D
8
D
Pins 4, 5, and 12 Omitted
TIL302
A
F
B
G
E
C
D
Decimal Point
A
1
A and F
2
F
3
G
4
E
6
D, E, and Decimal Point
7
14
B
13
B, C, and G
10
Decimal Point
9
C
8
D
Pins 5, 11, and 12 Omitted
TIL303
C
A
D
B
Decimal Point
C and D
1
14
A, B, and Decimal Point
11
A
10
B
9
Decimal Point
D
7
8
C
Pins 2, 3, 4, 5, 6, 12, and 13 Omitted
TIL304

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 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_{VF}	Average temperature coefficient of static forward voltage	I_F = 20 mA, T_A = 0°C to 70°C		–2.7		mV/°C
I_R	Static reverse current	V_R = 6 V			100	µA
C	Anode-to-cathode capacitance	V_R = 0, f = 1 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 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_{VF}	Average temperature coefficient of static forward voltage	I_F = 20 mA, T_A = 0°C to 70°C		–1.4		mV/°C
I_R	Static reverse current	V_R = 3 V			100	µA
C	Anode-to-cathode capacitance	V_R = 0, f = 1 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

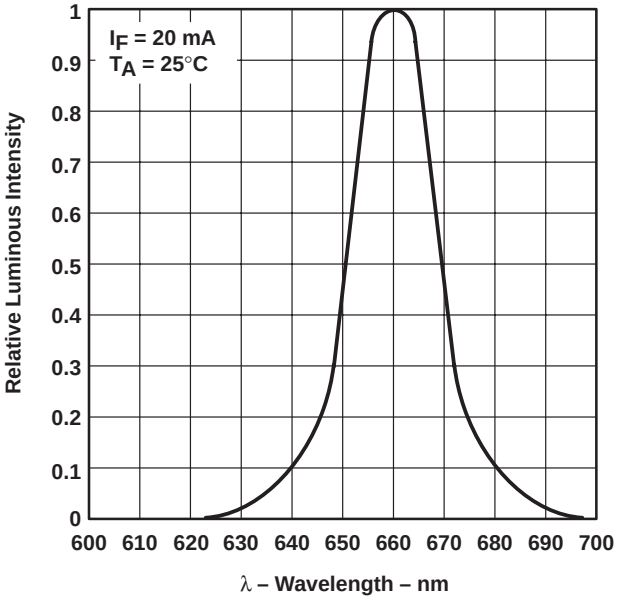


Figure 1

RELATIVE LUMINOUS INTENSITY vs FREE-AIR TEMPERATURE

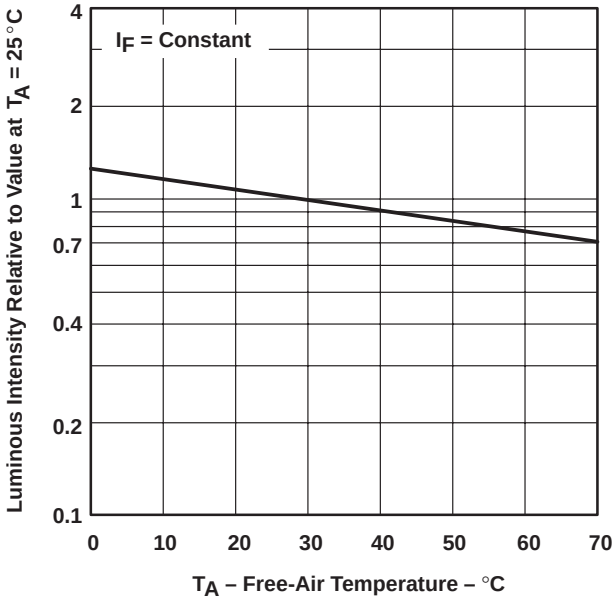


Figure 2

RELATIVE LUMINOUS INTENSITY vs FORWARD CURRENT

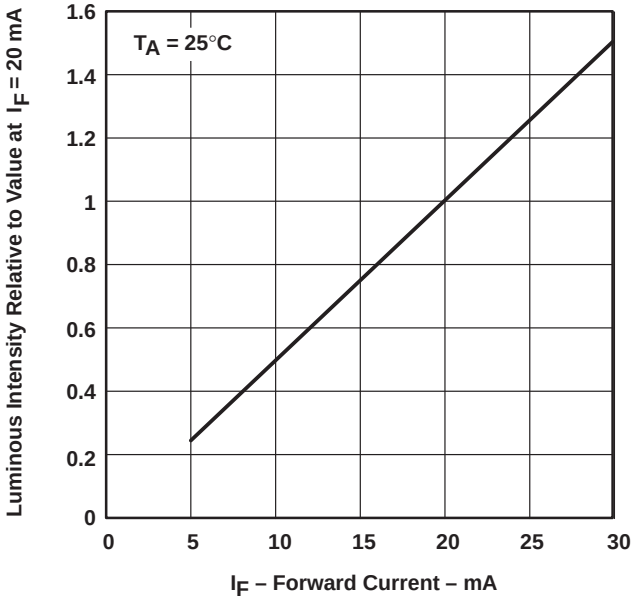


Figure 3

FORWARD-CONDUCTION CHARACTERISTICS

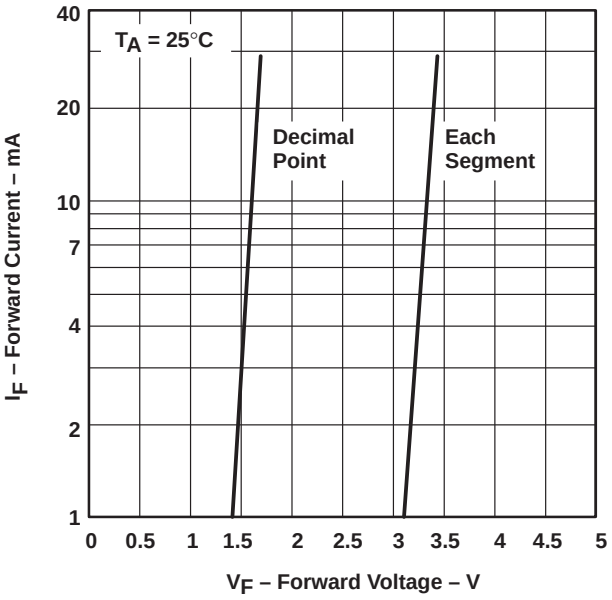
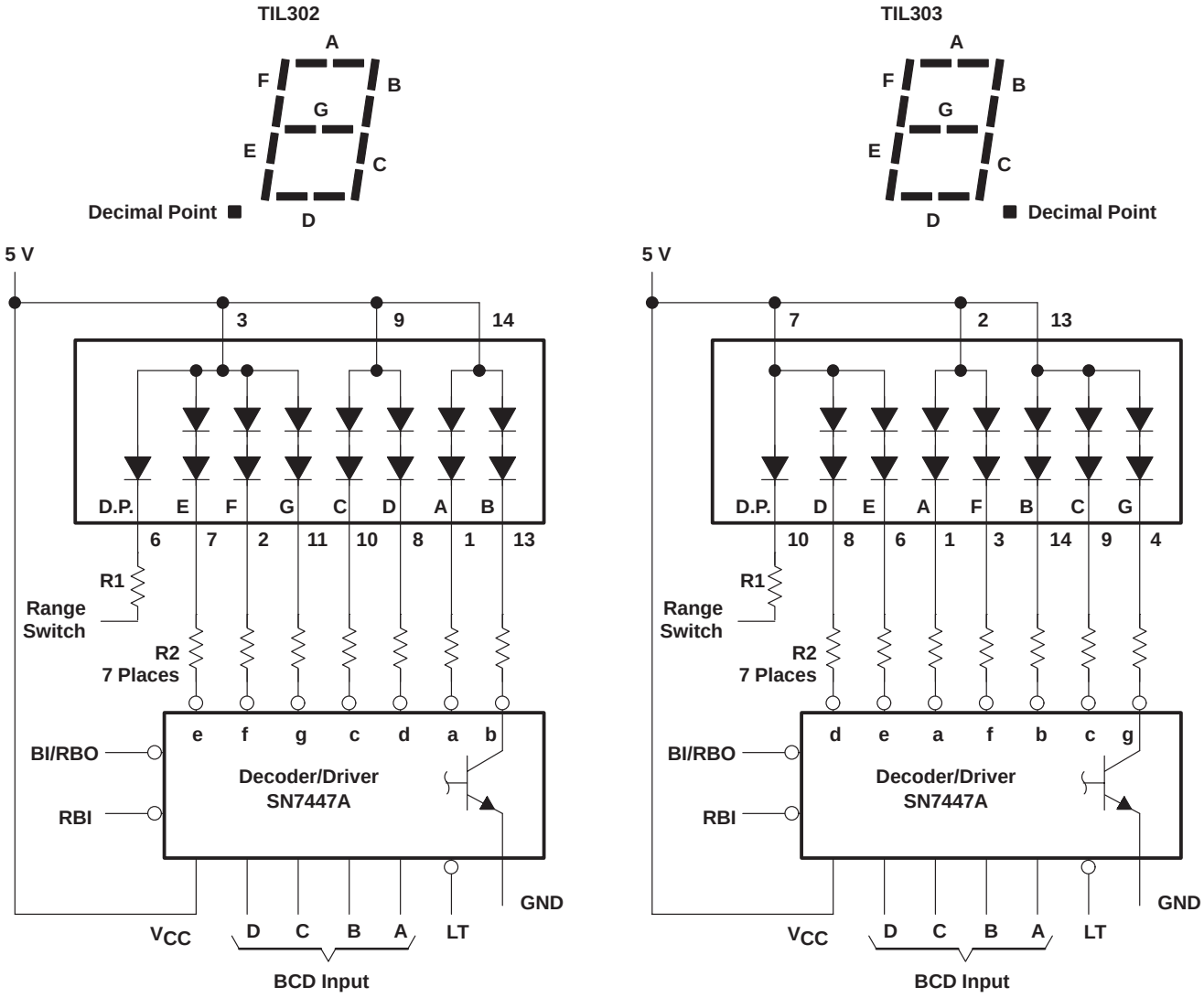


Figure 4

APPLICATION INFORMATION



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

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

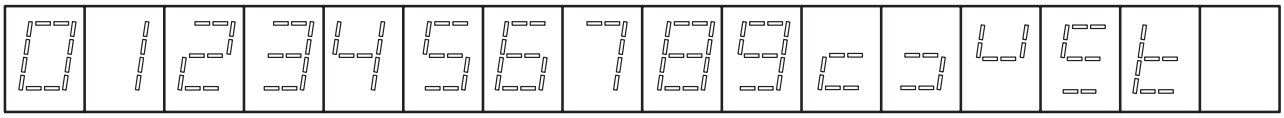
† BI/RBO is a wire-AND logic serving as a blanking input (BI) and/or ripple-blanking output (RBO).

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

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)
TIL302	OBSOLETE			14		TBD	Call TI	Call TI
TIL303	OBSOLETE			14		TBD	Call TI	Call TI
TIL303	OBSOLETE			14		TBD	Call TI	Call TI
TIL304	OBSOLETE			14		TBD	Call TI	Call TI
TIL304	OBSOLETE			14		TBD	Call TI	Call TI

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check http://www.ti.com/productcontent for the latest availability information and additional product content details.
TBD: The Pb-Free/Green conversion plan has not been defined.
Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

(3) MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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