



Texas Optoelectronics, Inc.

4N57 Numeric Display With Logic

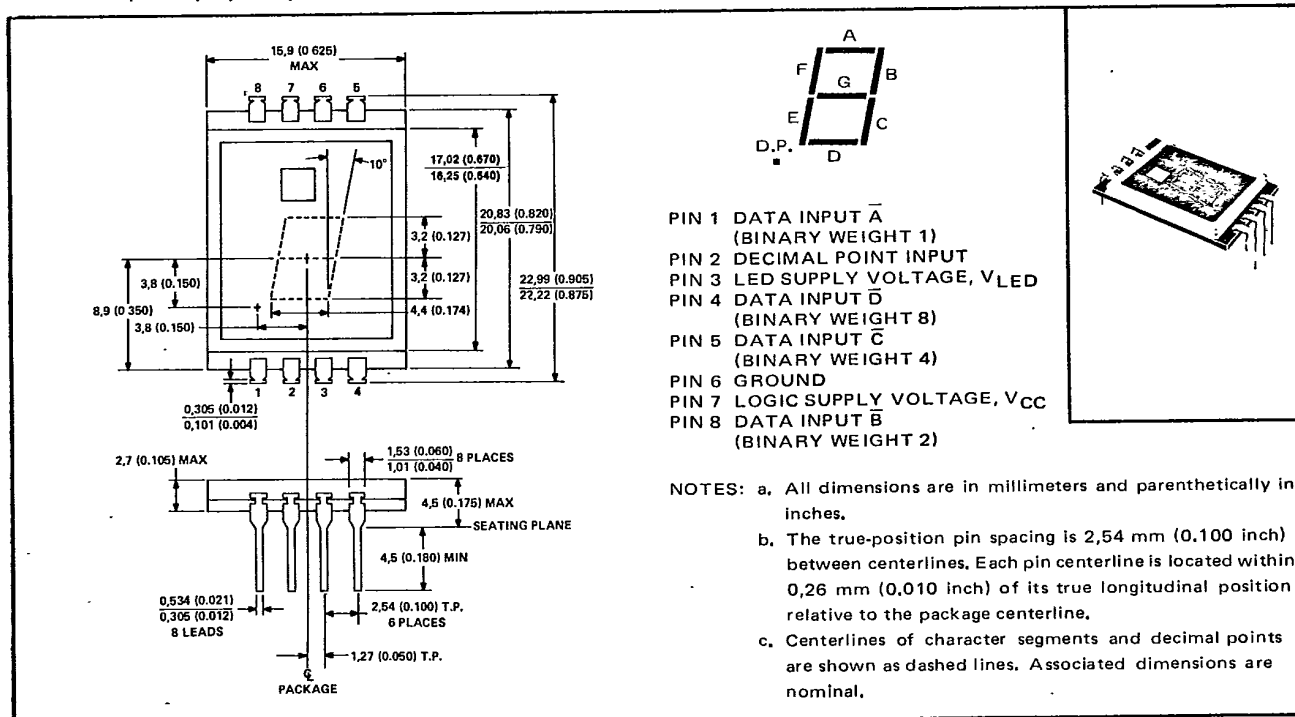
HERMETICALLY SEALED SOLID-STATE SEVEN-SEGMENT DISPLAY WITH TTL DECODER/DRIVER

T-41-37

- Withstands Military Environmental Conditions
- 7,62-mm (0.300-Inch) Character Height
- Internal TTL MSI Chip with Decoder and Driver
- BCD Four-Line Input
- Wide Viewing Angle
- High Luminous Intensity
- Left-Hand Decimal
- Constant-Current Drive for Light-Emitting Diodes
- Compatible with Most TTL Circuits

*mechanical data

The display and TTL logic chip are mounted on a ceramic header, which is then hermetically sealed to a glass window. Multiple displays may be mounted on 15.9-mm (0.625-inch) centers.



*description

The 4N57 contains a seven-segment numeric display with left-hand decimal and a TTL MSI BCD-to-seven-segment decoder and driver. It accepts four-line binary-coded-decimal (BCD) input in negative logic and displays the decimal number in a seven-segment format. Invalid inputs are automatically blanked (see function table). A low-logic-level voltage (≤ 0.8 V) at the decimal point input turns on the decimal independently of the BCD inputs. The decimal point, as well as each segment, is driven by a constant current from the logic chip. Varying the LED supply voltage will not significantly affect the brightness of the display. The brightness may be controlled by pulse-width modulation of the BCD inputs alternating between a valid code and an invalid code (e.g., all inputs low).

*JEDEC registered data. This data sheet contains all applicable registered data in effect at the time of publication.



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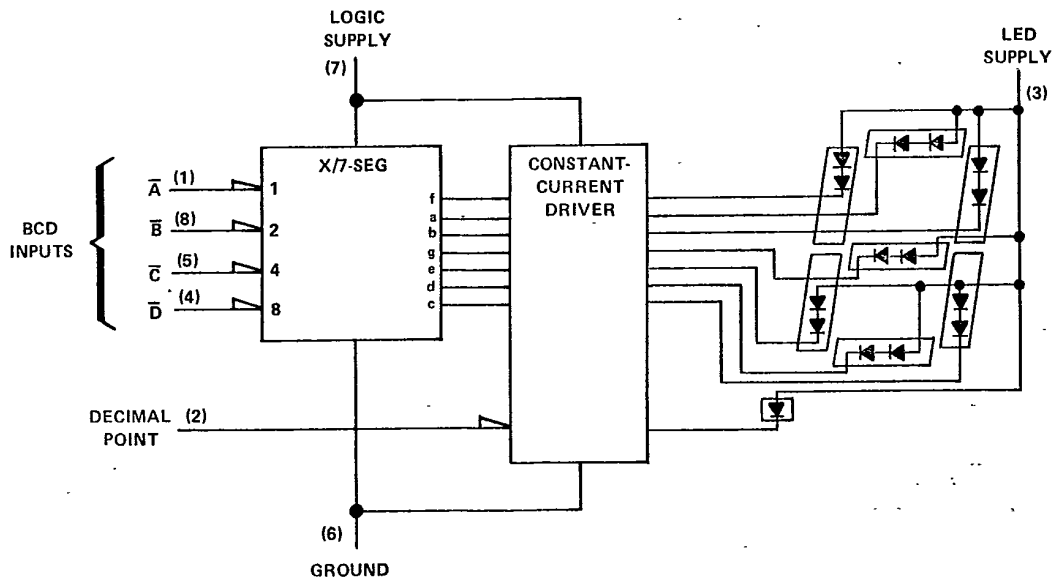
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FUNCTION TABLE

FUNCTION	DATA INPUTS					DISPLAY
	$\overline{D}$	$\overline{C}$	$\overline{B}$	$\overline{A}$	$\overline{DP}$	
0	H	H	H	H	H	0
1	H	H	H	L	L	1
2	H	H	L	H	H	2
3	H	H	L	L	L	3
4	H	L	H	H	H	4
5	H	L	H	L	L	5
6	H	L	L	H	H	6
7	H	L	L	L	L	7
8	L	H	H	H	H	8
9	L	H	H	L	L	9
BLANK	L	H	L	H	H	.
BLANK	L	H	L	L	L	.
BLANK	L	L	H	H	H	.
BLANK	L	L	H	L	L	.
BLANK	L	L	L	H	H	.
BLANK	L	L	L	L	L	.

H = high logic level, L = low logic level
 $\overline{DP}$ input has arbitrarily been shown activated (low) on every other line of the table.

*functional block diagram



*JEDEC registered data.



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Numeric Display With Logic

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

Logic Supply Voltage, V_{CC} (See Note 1)	7 V
LED Supply Voltage, V_{LED} , at (or below) 70°C Free-Air Temperature (See Note 2)	5.5 V
Data Input Voltage	5.5 V
Operating Free-Air Temperature Range	-55°C to 100°C
Storage Temperature Range	-65°C to 125°C

NOTES: 1. Voltage values are with respect to the ground terminal.

2. For operation above 70°C free-air temperature, refer to LED Supply Voltage Derating Curve, Figure 1.

*recommended operating conditions

	MIN	NOM	MAX	UNIT
Logic Supply Voltage, V_{CC}	4.5	5	5.5	V
LED Supply Voltage, V_{LED} (See Figure 1)	4	4.6	5	V
High-Level Input Voltage, V_{IH}	2			V
Low-Level Input Voltage, V_{IL}			0.8	V
Operating Free-Air Temperature, T_A	-55		100	°C

LED SUPPLY VOLTAGE DERATING CURVE

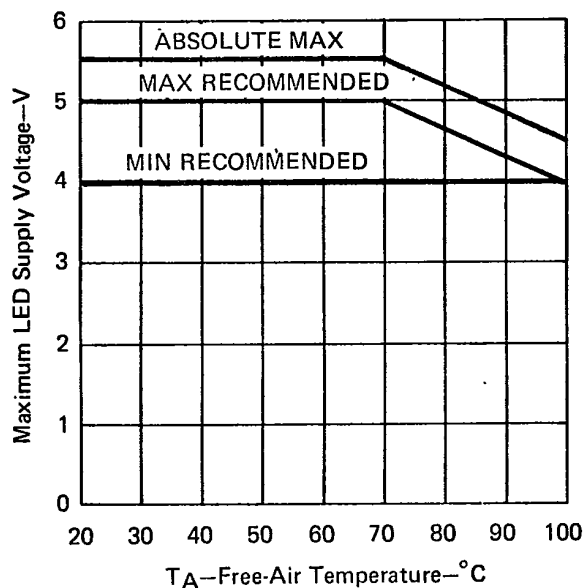


FIGURE 1

*operating characteristics at 25°C free-air temperature

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
I_V Luminous Intensity (See Note 3)	Figure 8	$V_{CC} = 5 V$, $V_{LED} = 4.6 V$, See Note 4	700			μcd
	Decimal Point		40			
λ_p Wavelength at Peak Emission			640	660	680	nm
$\Delta\lambda$ Spectral Bandwidth				20		nm
V_{IK} Input Clamp Voltage		$V_{CC} = 4.5 V$, $I_I = -12 mA$			-1.5	V
I_I Input Current at Maximum Input Voltage		$V_{CC} = 5.5 V$, $V_I = 5.5 V$			1	mA
I_{IH} High-Level Input Current		$V_{CC} = 5.5 V$, $V_I = 2.4 V$			20	μA
I_{IL} Low-Level Input Current		$V_{CC} = 5.5 V$, $V_I = 0.4 V$			-0.8	mA
I_{CC} Logic Supply Current		$V_{CC} = 5.5 V$, $V_{LED} = 5 V$			75	mA
I_{LED} LED Supply Current		DP at 5 V, Other inputs at 0 V			160	mA

NOTES: 3. Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (International Commission on Illumination) eye-response curve.

4. These parameters were measured with all LED segments and the decimal point on.

*JEDEC registered data.