

DISPLAY SYSTEMS INCORPORATED
 2050 MARTIN AVENUE
 SANTA CLARA, CALIFORNIA 95050
 TEL. 408/727-8521

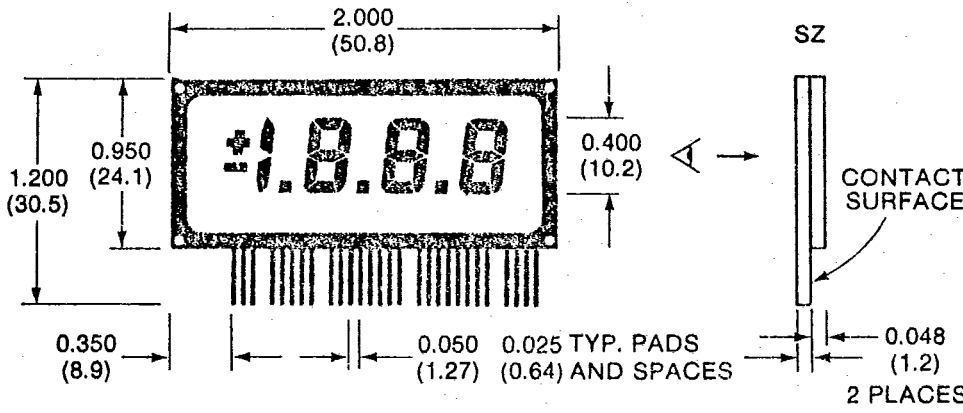
LIQUID CRYSTAL DISPLAYS

**STANDARD: 3½ DIGIT
 DIMENSIONAL OUTLINE**

FEATURES: 3½ digit LADs for general purpose applications in instrument with + sign, low battery and over-range arrow indicators. Available as shown for single/dual zebra or single/dual pin connection.

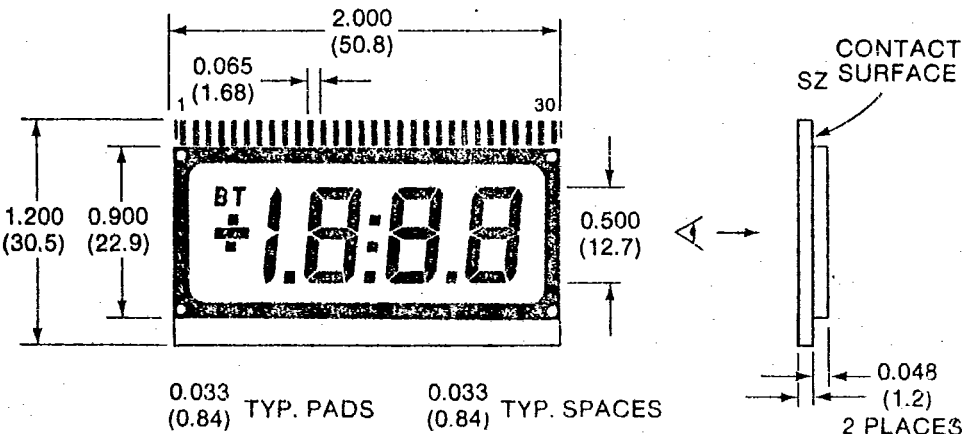
LAD-201

TERMINAL IDENTIFICATION



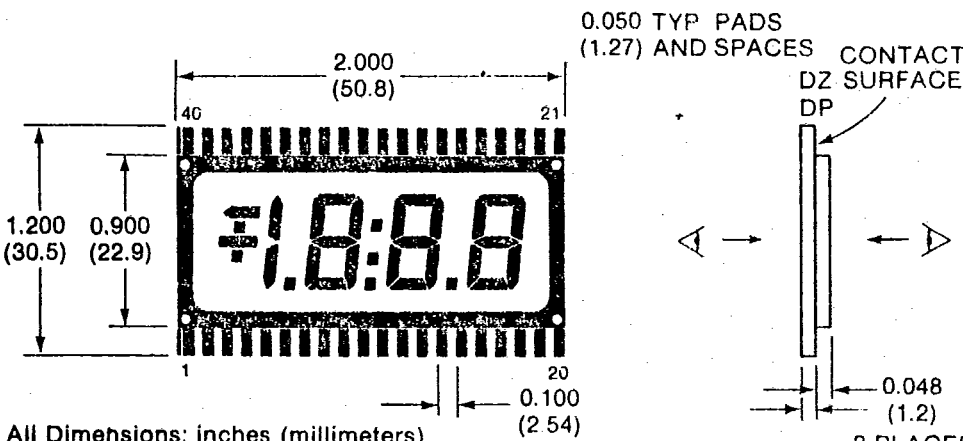
SEGMENT	PAD NUMBER
A	7, 16, 25
B	14, 23, 32
C	12, 21, 30
D	11, 20, 29
E	9, 18, 27
F	8, 17, 26
G	13, 22, 31
1	5
D.P. 1	6
D.P. 2	15
D.P. 3	24
Plus (+)	2
Minus (-)	3
Common	1

LAD-202



SEGMENT	PAD NUMBER
A	10, 19, 27
B	5, 11, 20, 28
C	5, 12, 21, 29
D	13, 22, 30
E	7, 16, 24
F	9, 18, 26
G	8, 17, 25
Common	1
Colon	15
D.P. 1	6
D.P. 2	14
D.P. 3	23
BT	2
Plus (+)	4 & 3
Minus (-)	4

LAD-203 (Equivalent: Hamlin 3902, Crystaloid H5535, LXD 7543)



SEGMENT	PAD NUMBER
A	21, 25, 30
B	20, 24, 29
C	11, 15, 19
D	10, 14, 18
E	9, 13, 17
F	22, 26, 31
G	23, 27, 32
1	3
Common	1, 40
Plus (+)	39
Minus (-)	2
Arrow	38
D.P. 1	8
D.P. 2	12
D.P. 3	16

All Dimensions: inches (millimeters)
 Tolerance ± 0.005 (0.127) non-cumulative

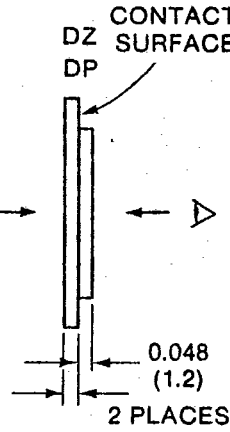
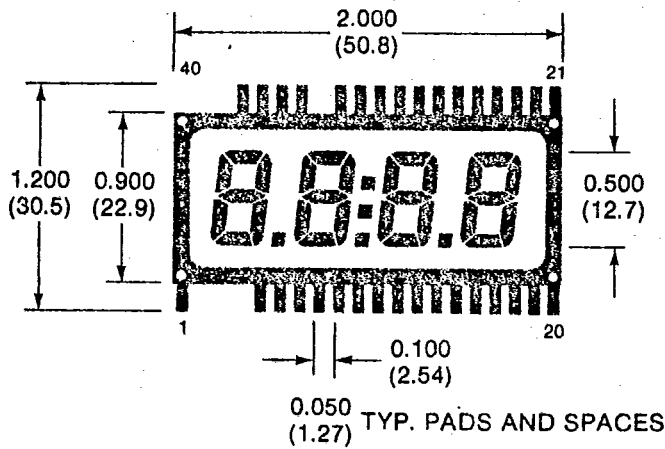
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LIQUID CRYSTAL DISPLAYS

**STANDARD: 4 AND 4½ DIGIT
 DIMENSIONAL OUTLINE**

FEATURES: 4 and 4½ digit LADs for general purpose applications in instruments with + sign, and over-range arrow indicators. Available as shown for dual zebra or dual pin connection.

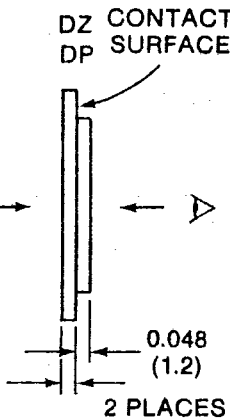
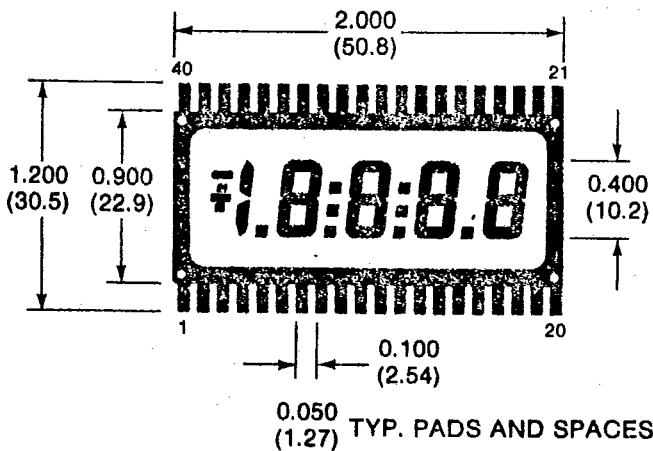
LAD-204 (Equivalent: Hamlin 3906, Crystaloid H5540, LXD 7544)



TERMINAL IDENTIFICATION

SEGMENT	PAD NUMBER
A	20, 25, 30, 35
B	20, 24, 29, 34
C	7, 11, 15, 19
D	6, 11, 14, 18
E	5, 9, 13, 17
F	22, 26, 31, 36
G	23, 27, 32, 37
Common	1, 40
Colon	38
D.P. 1	8
D.P. 2	12
D.P. 3	16

LAD-205 (Equivalent: Hamlin 3909, Crystaloid H5545, LXD 7547)



SEGMENT	PAD NUMBER
A	21, 25, 30, 35
B	20, 24, 29, 34
C	7, 11, 15, 19
D	6, 10, 14, 18
E	5, 9, 13, 17
F	22, 26, 31, 36
G	23, 27, 32, 37
1	3
Common	1, 40
Colon 1	33
Colon 2	28
D.P. 1	4
D.P. 2	8
D.P. 3	12
D.P. 4	16
Arrow	38
Plus (+)	2, 39
Minus (-)	2

All Dimensions: inches (millimeters)
 Tolerance ± 0.005 (0.127) non-cumulative

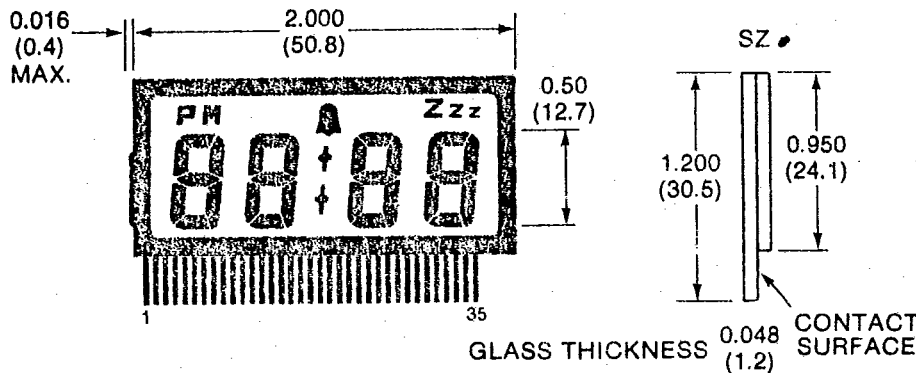
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LIQUID CRYSTAL DISPLAYS

**STANDARD: 4 DIGIT CLOCK-TIMER
 DIMENSIONAL OUTLINE**

FEATURES: 4 digit LADs for clock and other timing applications with snooze alarm and AM/PM indicators. Available as shown in single and dual zebra connections.

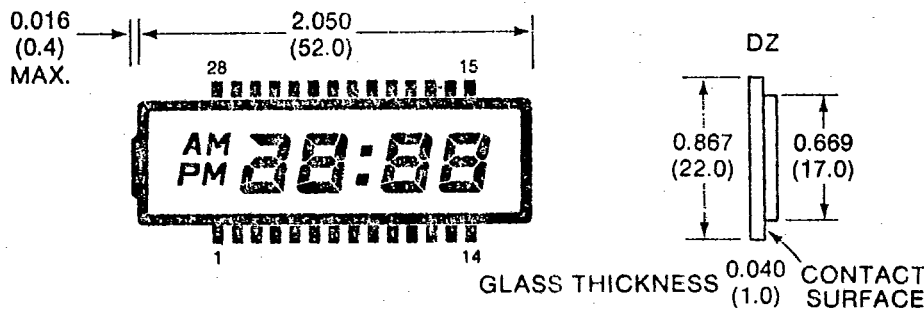
LAD-001 (Equivalent: Timex TI1001)



TERMINAL IDENTIFICATION

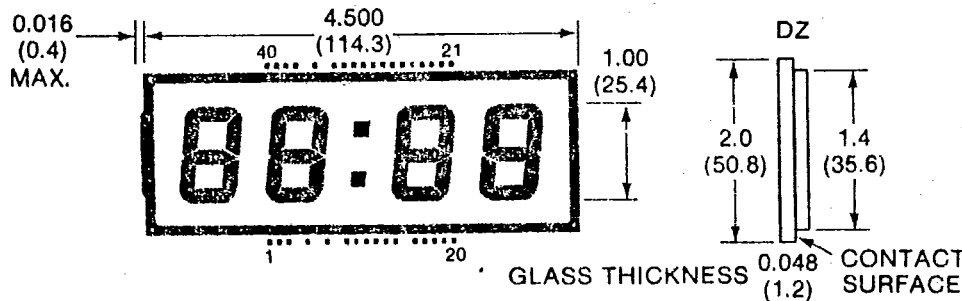
SEGMENT	PAD NUMBER
A	9, 18, 26, 33
B	8, 17, 25, 32
C	7, 16, 24, 31
D	6, 13, 23, 30
E	5, 12, 22, 29
F	3, 10, 20, 27
G	4, 11, 21, 28
PM	2
Bell	34
Zzz	35
Common	1
Colon	19

LAD-002 (Equivalent: Optrex FRS4051)



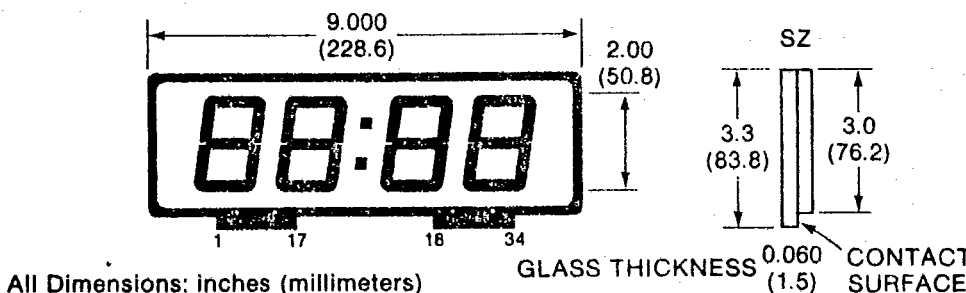
SEGMENT	PAD NUMBER
A	3, 19, 23, 27
B	16, 20, 24, 28
C	4, 7, 11, 14
D	3, 6, 10, 13
E	3, 5, 9, 12
F	18, 22, 26
G	3, 17, 21, 25
Common	1
Colon	8
AM	15
PM	2

LAD-003



SEGMENT	PAD NUMBER
A	23, 29, 33
B	22, 27, 32
C	8, 13, 19
D	7, 12, 18
E	5, 11, 17
F	25, 30, 36
G	4, 10, 15
Common	1, 20, 21, 40
Colon	9, 31

LAD-004



SEGMENT	PAD NUMBER
A	6, 16, 25, 33
B	7, 15, 24, 32
C	6, 14, 23, 31
D	4, 12, 21, 29
E	3, 11, 20, 28
F	1, 9, 18, 26
G	2, 10, 19, 27
Common	5, 13, 22, 30
Colon	17

All Dimensions: inches (millimeters)

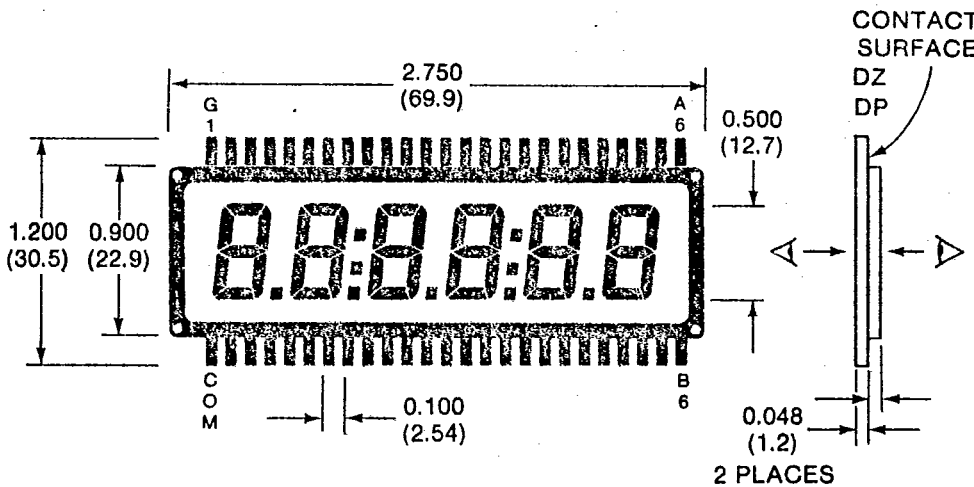
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LIQUID CRYSTAL DISPLAYS

**STANDARD: 6 DIGIT
 DIMENSIONAL OUTLINE**

FEATURES: 6 digit LADs for general purpose applications in instruments. Available as shown with dual zebra or dual pin connections.

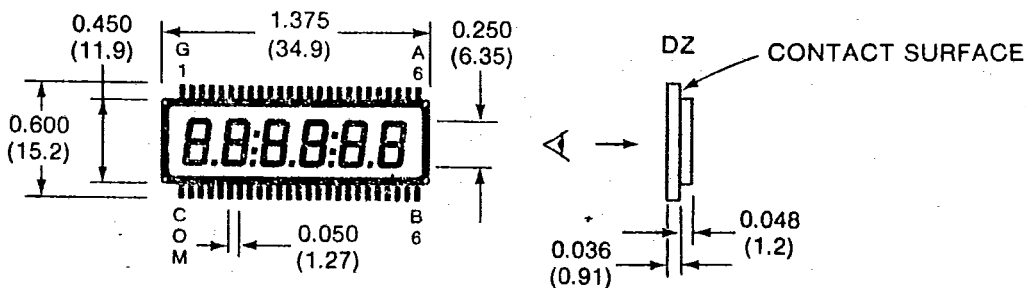
LAD-206 (Equivalent: Hamlin 3918, Crystaloid K5560, LXD 7560)



TERMINAL IDENTIFICATION

SEGMENT	PAD NUMBER
A	26, 30, 35, 39, 44, 48
B	25, 29, 34, 38, 43, 47
C	4, 8, 12, 16, 20, 24
D	3, 7, 11, 15, 19, 23
E	2, 6, 10, 14, 18, 22
F	27, 31, 36, 40, 45, 49
G	28, 32, 37, 41, 46, 50
D.P. 1	5
D.P. 2	9
D.P. 3	13
D.P. 4	17
D.P. 5	21
Colon 1	42
Colon 2	33
Common	1

LAD-207



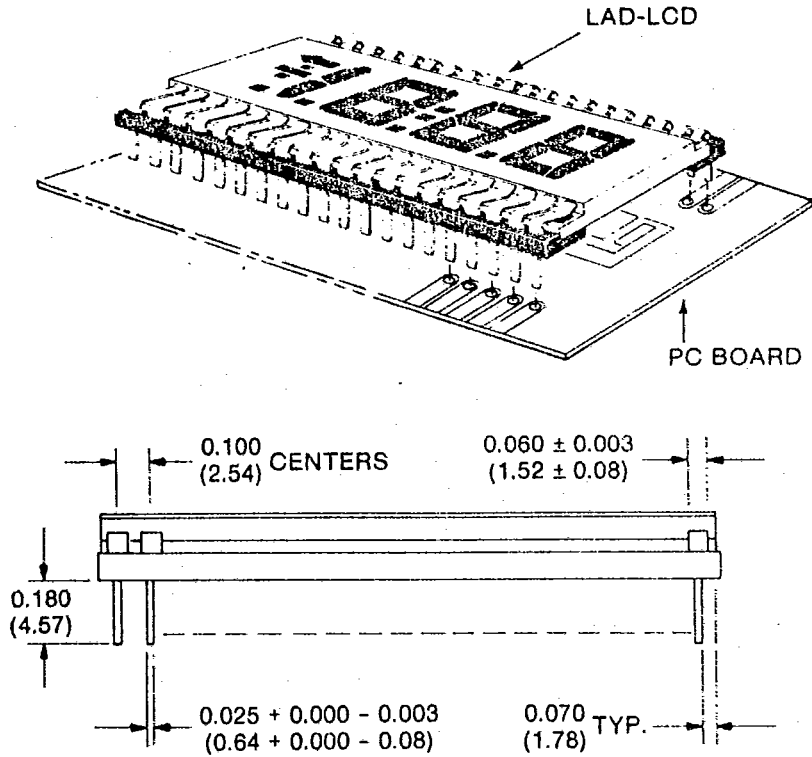
All Dimensions: inches (millimeters)
 Tolerance: ± 0.005 (0.127) non-cumulative

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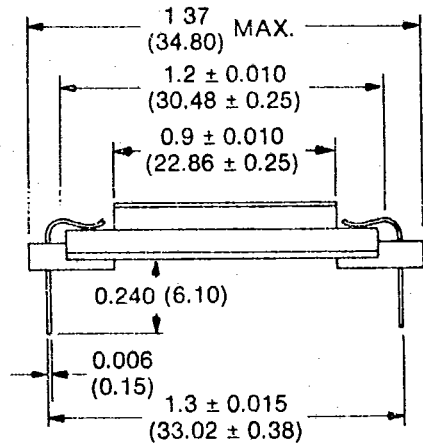
LIQUID CRYSTAL DISPLAYS

MECHANICAL CONNECTIONS

DUAL IN-LINE PINS

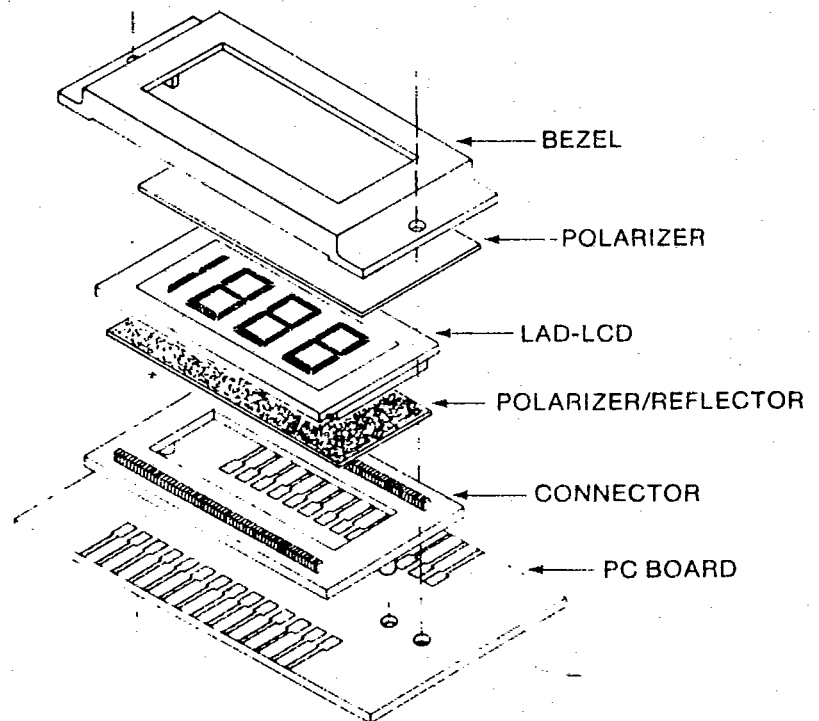


Using Edge Clip Connector to make a dual in-line pin package for direct insertion into the P.C. Board.
 Available from Teledyne Kinetics Solana Beach, CA.



All Dimensions: inches (millimeters)

ZEBRA ELASTOMER



Using Flat Mounted Zebra Connectors.
 Available from Technical Wire Products Inc. Cranford, NJ.

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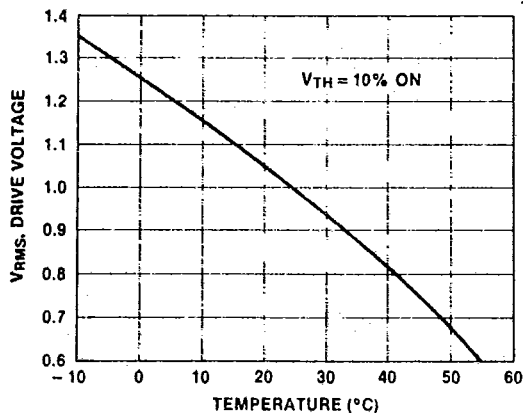
ELECTRO-OPTICAL CHARACTERISTICS

OPERATING CHARACTERISTICS ($f_D = 32 \text{ Hz}$, $T_A = 25^\circ\text{C}$, $V_D = 4.0 \text{ V}$)

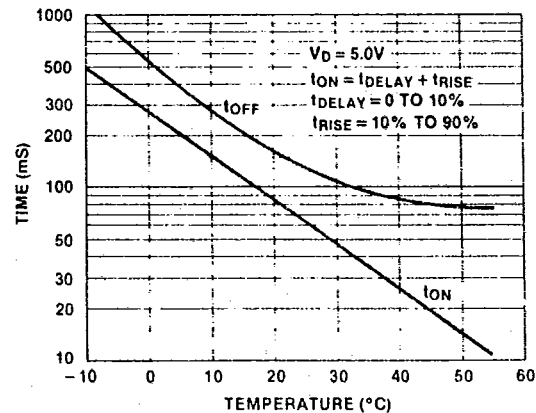
CHARACTERISTIC	SYMBOL	MIN	TYP	MAX	UNIT
Operating Voltage	V_D	3.0	4.5	12	Volts
Drive Current	I_D	—	—	5.0	μA
Turn-On Time (Note 1)	t_{on}	—	100	250	ms
Turn-Off Time (Note 1)	t_{off}	—	150	250	ms
Threshold Voltage (10% on visual) (90% on visual)	V_{TH}	—	1.1 1.7	—	V_{RMS}
Operating Frequency	f_D	25	32	100	Hz
Capacitance — Per Segment	—	—	60	—	pF
Peak Operating Voltage	V_M	—	—	12	V
Operating Temperature Range	T_A	-10	25	80	$^\circ\text{C}$
Storage Temperature Range @ 50% RH with Polarizer @ 60% max without Polarizer	—	-40 -40	25 25	70 80	$^\circ\text{C}$
Contrast Ratio (Note 2)	CR	—	20:1	—	—
Lifetime	—	—	50,000	—	Hrs
Maximum Allowable DC Voltage	—	—	—	25	mV/DC

NOTES: 1. Turn on time = t_{delay} plus t_{rise} where delay time = 0 to 10% and rise time = 10% to 90%.
 2. $CR = I_{TR(off)}/I_{TR(on)}$ where I_{TR} = Transmission Intensity.

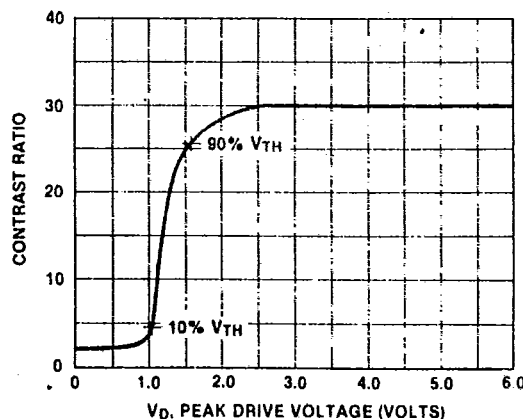
THRESHOLD VOLTAGE VS. TEMPERATURE



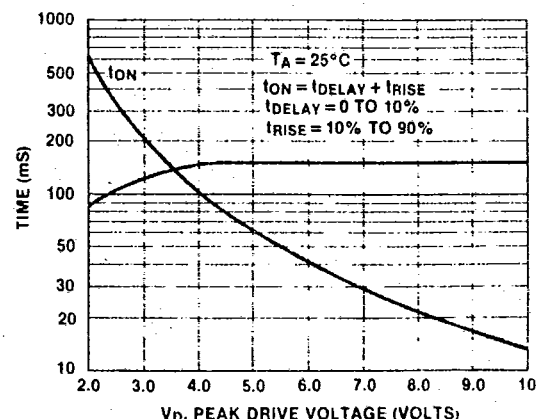
SWITCHING TIME VS. TEMPERATURE



CONTRAST VS. DRIVE VOLTAGE



SWITCHING TIME VS. DRIVE VOLTAGE

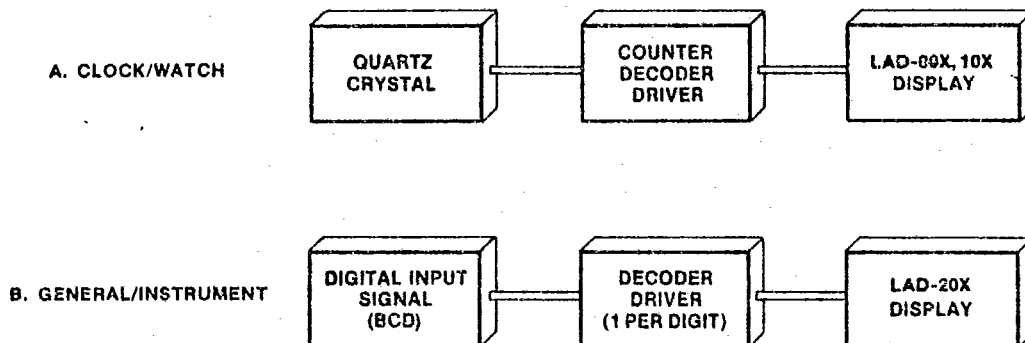


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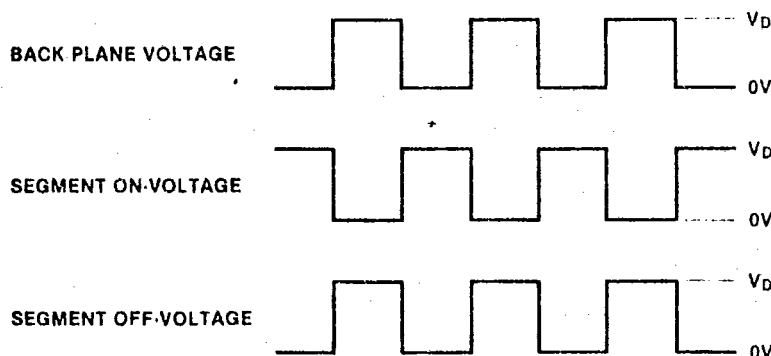
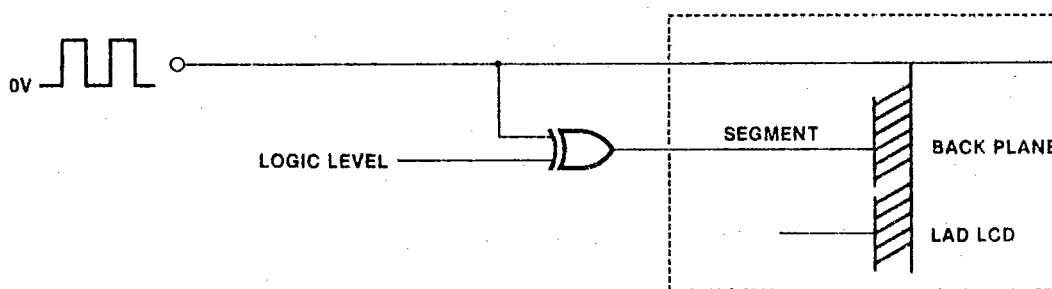
LIQUID CRYSTAL DISPLAYS

DIGITAL READOUT AND DRIVING SYSTEMS FOR LAD-LCDs

TYPICAL DIGITAL READOUT SYSTEMS



TYPICAL DRIVING CIRCUIT AND WAVEFORM



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LIQUID CRYSTAL DISPLAYS

**ENVIRONMENTAL TESTING
 AND ORDERING INFORMATION/SELECTION GUIDE**

LADCOR LIQUID CRYSTAL DISPLAYS WILL MEET, OR EXCEED THE FOLLOWING QUALIFICATION SPECIFICATIONS:

UV EXPOSURE

The operating parameters of the display shall not change by more than 25% after direct exposure to sunlight, or equivalent source of UV radiation for 1500 hours @ 25°C. Polarizer shall be UV absorbing.

HIGH TEMPERATURE STORAGE

The operating parameters of the display shall not change more than 25% after 1500 hours in storage at 95% relative humidity and 45°C in the unactivated mode.

TEMPERATURE CYCLE

The LCD, excluding polarizers, shall withstand 12 temperature cycles of 1 hour @ 80°C and 1 hour @ -20°C per cycle.

THERMAL SHOCK

The LCD, excluding polarizers shall withstand 12 cycles of 5 minute extremes of 0°C and 45°C with a maximum of 60 seconds of transition.

CURRENT DRAIN

The operating current of the display shall not change by more than 10% after operation at 12V for 1500 hours @ 25°C.

AQL REQUIREMENTS (Ref. MIL-STD-805E and 105D)

All LAD-LCD prices quoted to 1.0% overall AQL regarding: Electrical and Mechanical inspection criterion, and 2.5% AQL regarding Visual inspection criterion, unless otherwise specified.

ORDERING INFORMATION AND SELECTION GUIDE

LAD — XXX — X — XX

BASIC MODEL NUMBER
 LAD-0XX - Clock Series
 LAD-1XX - Watch Series
 LAD-2XX - General Series

POLARIZER CODE
 R - Reflective
 T - Transmissive
 F - Transflective
 S - Special
 N - No Polarizers

MECHANICAL CONNECTION
 SZ - Single Zebra
 DZ - Dual Zebra
 SP - Single in-line Pin
 DP - Dual in-line Pin