

SP-331 thru SP-334 INFORMATION DISPLAYS



HORIZONTALLY STACKED DISPLAYS
DISPLAYS SHOWN ACTUAL SIZE

APPLICATION AND USE

The SP-330 Series Information Displays were designed for interfacing with MOS/LSI. These displays are recommended for use in all dc or multiplexed applications, with or without suppressed (blanked) zeros.

The SP-330 Series offers the user the advantage of improved electrical characteristics not previously available in displays of this type. These improvements include reduction of (1) the anode voltage required, (2) the cathode current required, and (3) the blanking requirements. In addition, a keep-alive cathode provides an internal ion source that reduces re-ionization time to less than 30 microseconds, allows zero suppression, and improves the operation of the display in dark environments and at low temperatures.

FEATURES

Character Height	0.330 inch
Character Centerline Spacing	0.375 inch
Color	Orange (Neon Glow)
Color Spectrum	5900, 6200, and 6500 Angstroms
Brightness	210 foot lamberts nominal*
Viewing Angle	130 degrees
Viewing Distance	20 feet
Life Expectancy	10 years
Lead Temperature (Solder)	250°C, 10 seconds

*Brightness is proportional to segment current, and values from less than 100 foot lamberts to greater than 500 foot lamberts can be achieved by adjusting the current.

SPECIFICATIONS

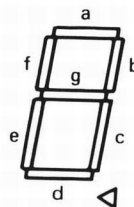
DC Characteristics	Minimum	Typical	Maximum
Anode Supply Voltage ⁽¹⁾	160 Vdc	180 Vdc	—
Anode-to-Anode Differential Voltage ⁽²⁾	—	—	14 Vdc
Anode-to-Cathode Voltage Drop ($i_{\text{segment}} = 180 \mu\text{A}$)	—	135 Vdc	—
Cathode Current — Per Segment ⁽³⁾	70 μA	180 μA	250 μA
Cathode Current — Decimal Point ⁽³⁾	50 μA	135 μA	185 μA
Cathode Current — Plus Sign	110 μA	290 μA	400 μA
Cathode Current — Minus Sign	50 μA	135 μA	185 μA
Cathode Voltage — Keep Alive	—	0 Vdc	—
Cathode Current — Keep Alive	10 μA	50 μA	—
Power Dissipation (With All Segments Lighted) ⁽³⁾	—	200 mW	—
Operating Temperature	0°C	—	70°C
Storage Temperature	-55°C	—	125°C
Multiplex Characteristics (See Note 4)	Minimum	Typical	Maximum
Digit On Time	80 μsec	200 μsec	—
Interdigit Blanking Time ($i_{\text{segment}} = 520 \mu\text{A}$)	35 μsec	50 μsec	—
Refresh Period	—	—	3 msec
Anode Supply Voltage	160 Vdc	180 Vdc	—

NOTES:

1. The minimum recommended anode voltage to fire the display is 160 volts dc. After the display has fired the voltage drop is 135 volts dc. Cathode current of 180 μA is assumed.
2. Lighted cathodes on all digits with independent current limiting. For bussed cathodes (multiplexed operation), 90 volts is permissible.
3. The lowest current for even glow on the largest segment is 70 μA . Currents up to 1.5 times the typical current can be used; however, operation at excessively high current levels may reduce the life expectancy of the display. For multiplexed operation (time shared) segment currents may be increased to 650 μA with 0.25 or smaller duty cycle.
4. Blanking requirements are strongly dependent upon the mode of multiplex operation and upon the segment current used. The maximum refresh rate is a variable dependent upon the duty cycle. Three milliseconds represents a minimum limit under worst case timing; longer refresh rates may be used with other timing.

SEGMENT DESIGNATIONS AND PIN CONNECTIONS

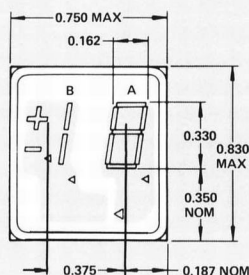
Segment	Pin Number
a	1
b	2
c	3
d	4
e	5
f	6
g	7
decimal	8
anode	9
keep-alive cathode	10



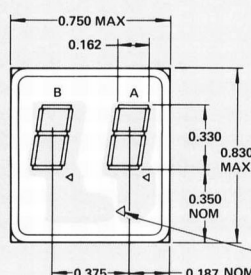
Pin connections and segment designations are identical for all SP-330 Series Displays.

DIGIT DESIGNATIONS

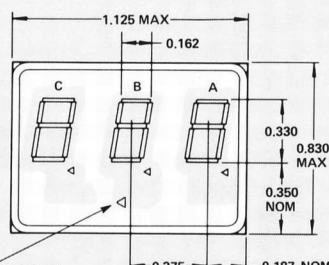
SP-331



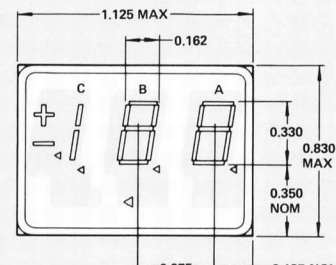
SP-332



SP-333



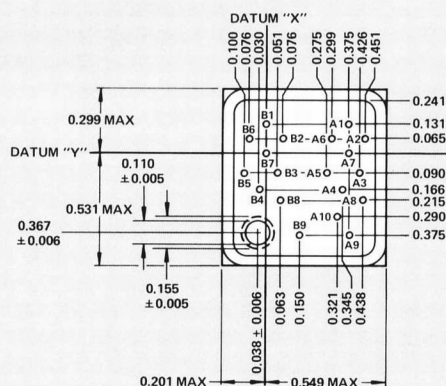
SP-334



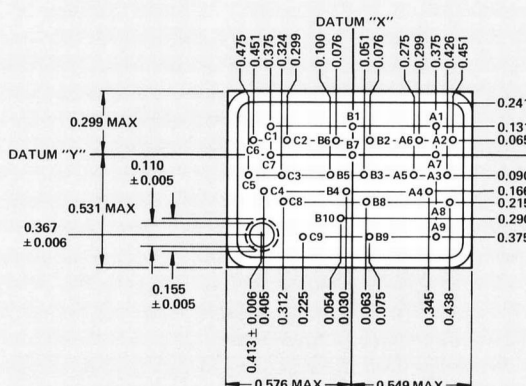
KEEP ALIVE PINS
(TYPICAL)

PIN DESIGNATIONS AND LOCATIONS

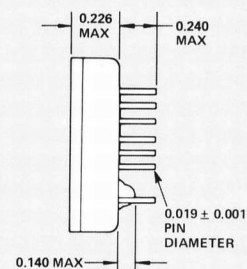
SP-331 AND SP-332



SP-333 AND SP-334



END VIEW



NOTES:

1. All digit and pin designations and pin locations are viewed from the front of the display. Shaded areas indicate anode patterns.
2. On Models SP-331 and SP-334, for the left-hand digit, a plus sign replaces segment 'f', a minus sign replaces segment 'e', and an extra decimal point replaces segment 'd'. Segments 'a' and 'g' are omitted; thus pins B1-C1 and B7-C7 are not used.
3. The keep-alive pin is Pin No. 10 on all models. Only one keep-alive cathode is used in the SP-330 Series.
4. Distance from digit centerline to edge of display is measured from Pin No. 7.
5. Pin locations shown are nominal (approximately ± 0.003 tolerance). Allowances should be made for location tolerance by size of pc board hole diameter.
6. For ease of insertion and solderability, recommend pc board hole diameter of 0.025—0.028.
7. For even centerline spacing of digits in separate envelopes, recommend that comparable pins on adjacent digits be spaced 0.375 inch minimum. Allow 0.020 inch between adjacent display envelopes for ease of insertability, and to compensate for vibration or shock during processing, or for tolerances in circuit board manufacture.