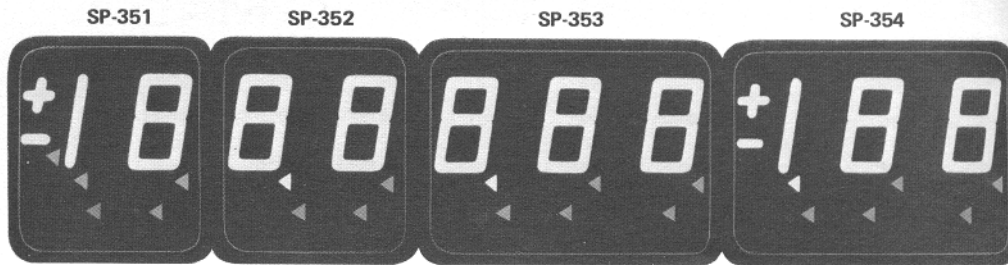


SP-351 thru SP-354 INFORMATION DISPLAYS



HORIZONTALLY STACKED DISPLAYS
DISPLAYS SHOWN ACTUAL SIZE

APPLICATION AND USE

The SP-350 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-350 Series offers the user the advantage of improved electrical characteristics not previously available in displays of this type. These improvements include reduction (1) of the anode voltage required, (2) of the cathode current required, and (3) of the blanking requirements. In addition, a keep-alive cathode provides an internal ion source that reduces reionization 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	0.550 inch
Color	Orange (Neon Glow)
Brightness	210 foot lamberts nominal
Viewing Angle	130 degrees
Viewing Distance	40 feet
Life Expectancy	10 years

SPECIFICATIONS

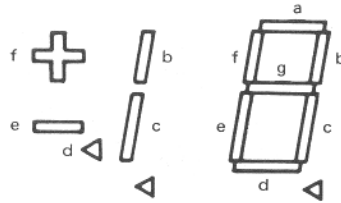
DC Characteristics	Minimum	Typical	Maximum
Display Supply Voltage ⁽¹⁾	160 Vdc	180 Vdc	Note 2
Anode-to-Anode Differential Voltage ⁽³⁾	—	—	14 Vdc
Anode-to-Cathode Voltage Drop ($i_{\text{segment}} = 330 \mu\text{A}$)	—	135 Vdc	—
Cathode Current — Per Segment ⁽⁴⁾	130 μA	330 μA	420 μA
Cathode Current — Decimal Point ⁽⁴⁾	65 μA	135 μA	190 μA
Cathode Current — Plus Sign ⁽⁴⁾	260 μA	585 μA	820 μA
Cathode Current — Minus Sign ⁽⁴⁾	120 μA	270 μA	380 μA
Cathode Current — Keep Alive	10 μA	50 μA	—
Power Dissipation (With All Segments Lighted @ 330 μA typical) ⁽⁴⁾	—	350 mW	—
Operating Temperature	0°C	—	70°C
Storage Temperature	-55°C	—	125°C
Multiplex Characteristics	Minimum	Typical	Maximum
Anode On Time ⁽⁶⁾	80 μsec	200 μsec	—
Interdigit Blanking Time ($i_{\text{segment}} = 850 \mu\text{A}$ @ 180 V) ⁽⁵⁾	40 μsec	55 μsec	—
Refresh Period	—	—	Note 7
Display Supply Voltage	160 Vdc	180 Vdc	Note 2
Anode Voltage Swing	30 Vdc	45 Vdc	90 Vdc
Cathode Voltage Swing ⁽⁸⁾	30 Vdc ⁽⁹⁾	50 Vdc	125 Vdc
Cathode Bias Voltage ("On" Anode to "Off" Cathode Voltage) ⁽⁸⁾	90 Vdc	115 Vdc	125 Vdc

NOTES:

- The minimum recommended voltage required to ionize the display is 160 volts dc. After the display has ionized, the voltage drop is approximately 135 volts. Typical cathode current of 330 μA is assumed.
- Display supply voltage (including ripple) should not exceed 200 Vdc when display is used with DD-700 or DD-702 Decoder/Driver. Higher display supply voltages are acceptable when DD-700 or DD-702 are not used, if current is limited as specified.
- Lighted cathodes on all digits with independent current limiting. For bussed cathodes (multiplexed operation), 90 volts is permissible.
- The lowest current for even glow on the largest segment is 130 μA . Currents up to 1.5 times the typical current may be used, however, life expectancy may be reduced by operation at excessively higher currents. For multiplexed operation (time shared) segment currents may be increased to 1.25 mA with 0.25 or smaller duty cycles.
- Blanking requirements are strongly dependent upon the mode of multiplex operation and upon the segment current used. (See page 35.)
- Anode On Time assumes typical keep-alive current and typical anode supply voltages. (See page 36.)
- Keep-alive is recommended in all multiplexed applications. Three (3) milliseconds is maximum without keep-alive. Ten (10) milliseconds is typical with keep-alive.
- The combination of Cathode Bias Voltage and Cathode Voltage Swing must be within recommended display supply voltage.
- Under specific conditions, Cathode Voltage Swings of as low as 30 volts are acceptable.

SEGMENT DESIGNATIONS AND PIN CONNECTIONS

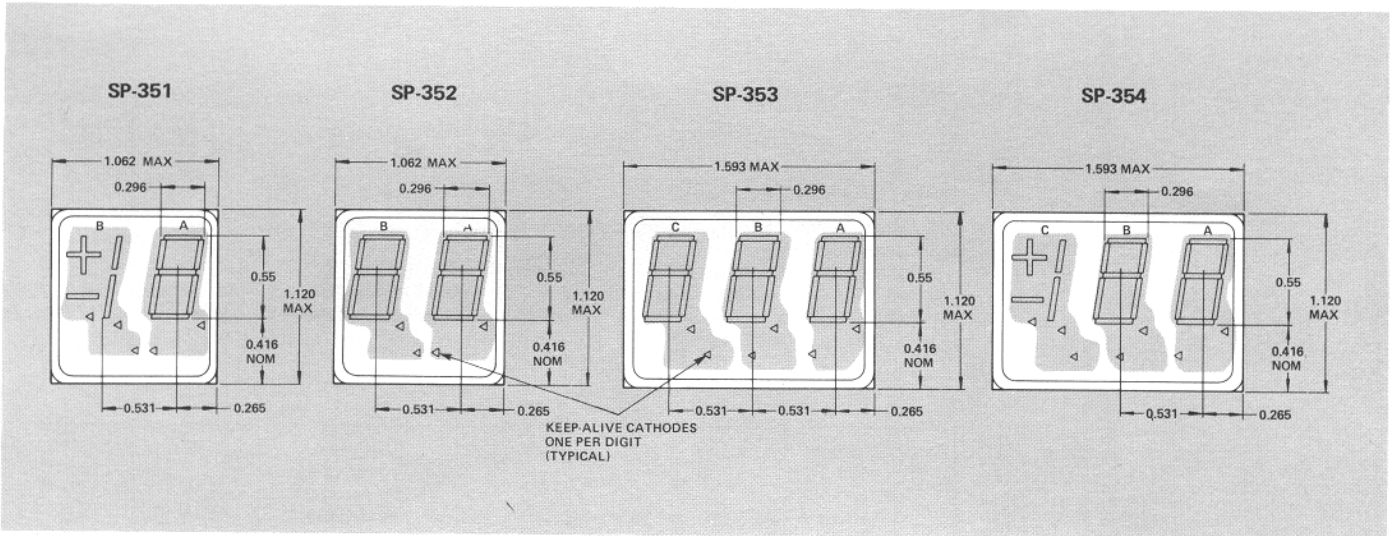
Pin connections and segment designations are identical for all SP-350 Series Displays.



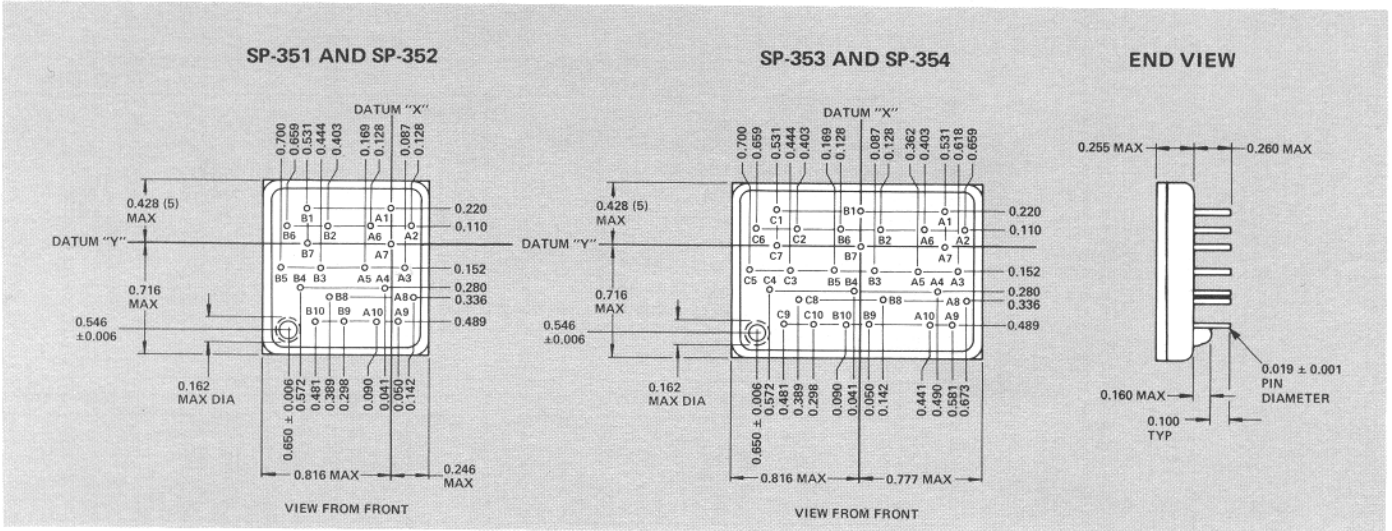
Segment/Symbol	Pin Number
a*	1
b/b	2
c/c	3
d/decimal	4
e/minus sign	5
f/plus sign	6
g*	7
decimal	8
anode	9
keep-alive cathode	10

*Not used in half digit

DIGIT DESIGNATIONS



PIN DESIGNATIONS AND LOCATIONS



NOTES:

1. All digit and pin designations and pin locations are viewed from the front of the display. Shaded areas indicate anode patterns.
2. Distance from digit centerline to edge of display is measured from pin No. 7.
3. Pin locations shown are nominal (approximately $\pm 0.003''$ tolerance). Allowances should be made for location tolerance by size of pc board hole diameter. For ease of insertion and solderability, recommend pc board hole diameter of 0.028 – 0.031.
4. For even centerline spacing of digits in separate envelopes, recommend that comparable pins on adjacent digits should be spaced 0.531 inch minimum. Allow 0.020 inch between adjacent display envelopes for ease of insertion, and to compensate for tolerances in circuit board manufacture.
5. Both maximum dimensions cannot occur simultaneously. The 0.120" overall height applies.