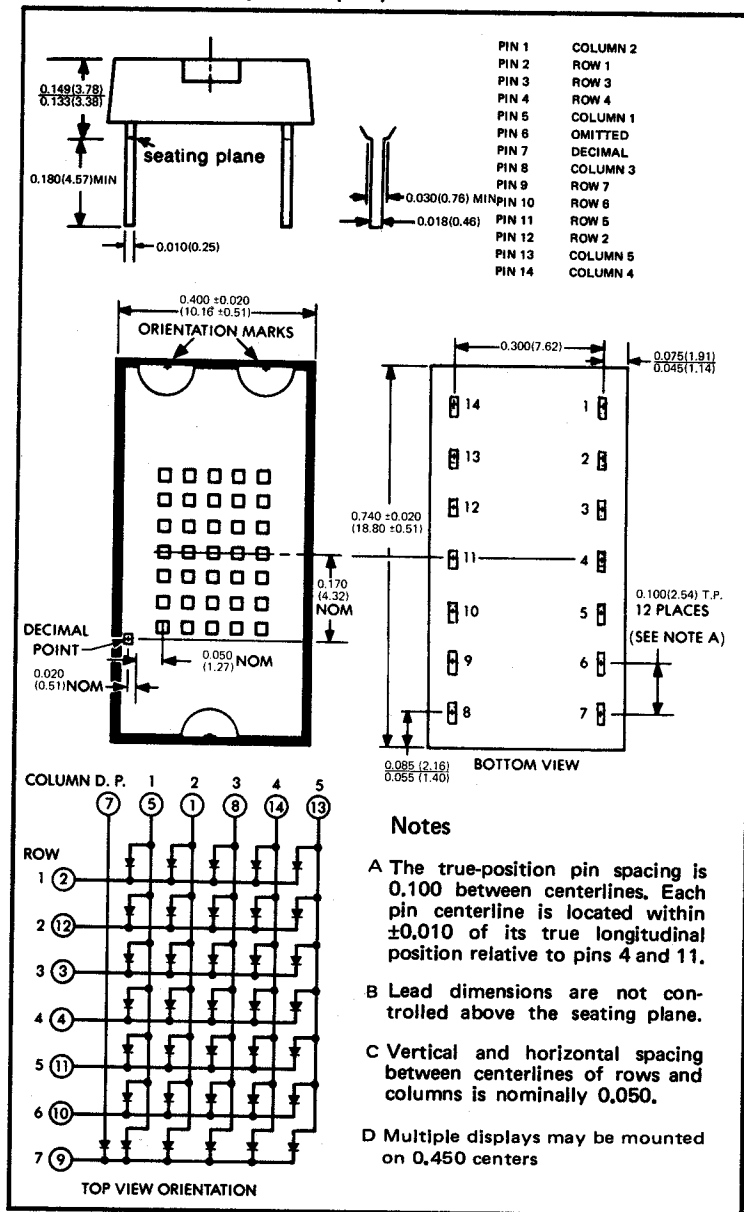


## solid state LED

5 x 7 Dot Matrix Alpha-Numeric Display  
character height: .300"

745-0005

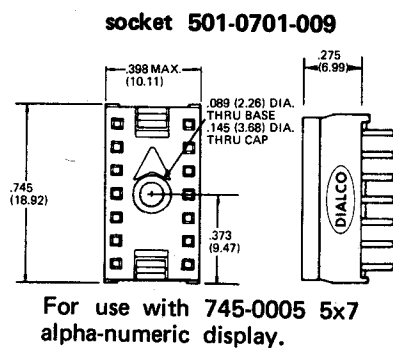
The display is made of Gallium Arsenide Phosphide and is mounted on a 14 pin dual in-line substrate and cast within an electrically nonconductive transparent epoxy.



( ) Metric dimension in mm.

### Features

- Solid state visible display with clear transparent plastic encapsulation.
- 0.3 inch high character.
- High brightness.
- Low power requirements.
- Single plane, wide-angle visibility.
- 5 x 7 array with X-Y select and decimal.
- Compatible with USASCII and EBCDIC codes.
- Left hand decimal point.
- Displays available in a bezel assembly without decoder/driver (series 749-1900).
- Drive circuitry available upon request.



Dialight reserves the right to make changes at anytime in order to improve design and to supply the best product possible.

# operating specifications 745-0005

absolute maximum ratings at 25° C ambient temperature

|                                                     |                  |
|-----------------------------------------------------|------------------|
| Reverse Voltage .....                               | 3 V              |
| Peak Forward Current, Each Diode (See Note 1) ..... | 100 mA           |
| Continuous Forward Current: (See Note 2)            |                  |
| Each Diode .....                                    | 20 mA            |
| Total .....                                         | 400 mA           |
| Average Power Dissipation Total Package .....       | 750 mW           |
| Ambient Temperature Range .....                     | 0°C to 70°C      |
| Storage Temperature Range .....                     | -55° C to 100° C |

NOTE 1: This value applies for pulse width  $\leq 50 \mu s$ , duty cycle  $\leq 20\%$ . NOTE 2: This value applies for averaging time  $\leq 250 \mu s$ .

## operating characteristics of each diode 25° C ambient temperature (unless otherwise noted)

| PARAMETER                                                              | TEST CONDITIONS                                                       | MIN | TYP  | MAX | UNIT                       |
|------------------------------------------------------------------------|-----------------------------------------------------------------------|-----|------|-----|----------------------------|
| $I_V$ Luminous Intensity                                               | $I_F = 10 \text{ mA}$                                                 | 40  | 110  |     | $\mu\text{cd}$             |
| $\lambda_{\text{peak}}$ Wavelength at Peak Emission                    |                                                                       | 630 | 650  | 670 | nm                         |
| $BW_\lambda$ Spectral Bandwidth between Half-Power Points              |                                                                       |     | 20   |     | nm                         |
| $V_F$ Static Forward Voltage                                           |                                                                       | 1.5 | 1.6  | 2.0 | V                          |
| $\alpha V_F$ Average Temperature Coefficient of Static Forward Voltage | $I_F = 10 \text{ mA}$ , $T_A = 0^\circ\text{C}$ to $70^\circ\text{C}$ |     | -1.4 |     | $\text{mV}/^\circ\text{C}$ |
| $I_R$ Static Reverse Current                                           | $V_R = 3 \text{ V}$                                                   |     |      | 100 | $\mu\text{A}$              |
| C Anode-to-Cathode Capacitance                                         | $V_R = 0$ , $f = 1 \text{ MHz}$                                       |     | 80   |     | PF                         |

## typical characteristics

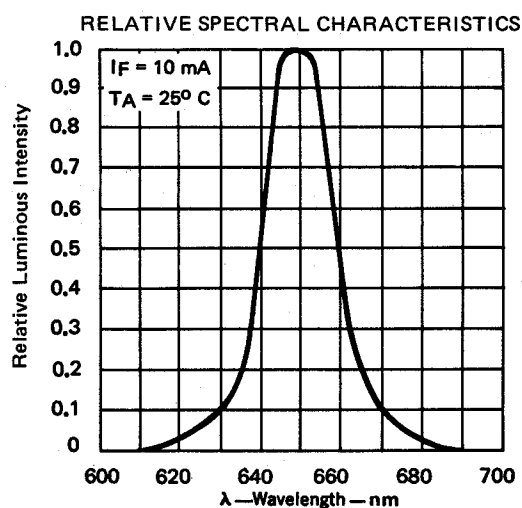


Figure 1

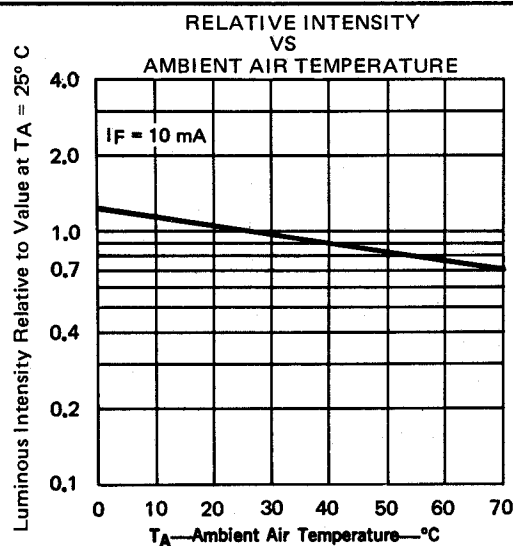


Figure 2

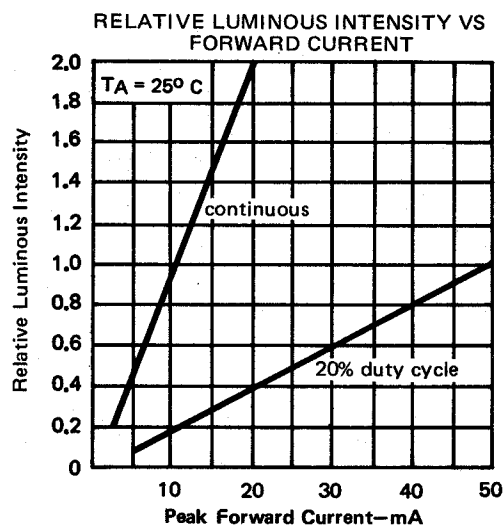


Figure 3

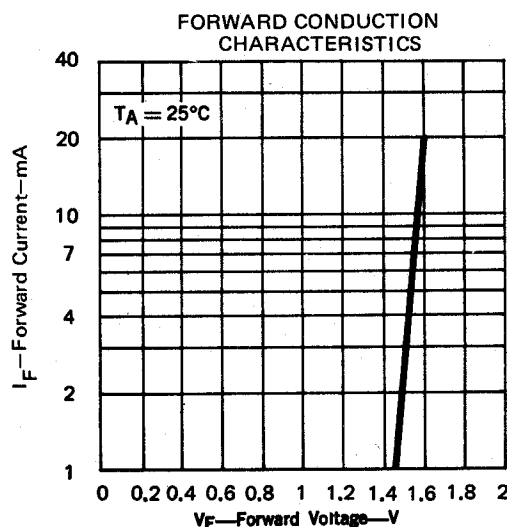


Figure 4

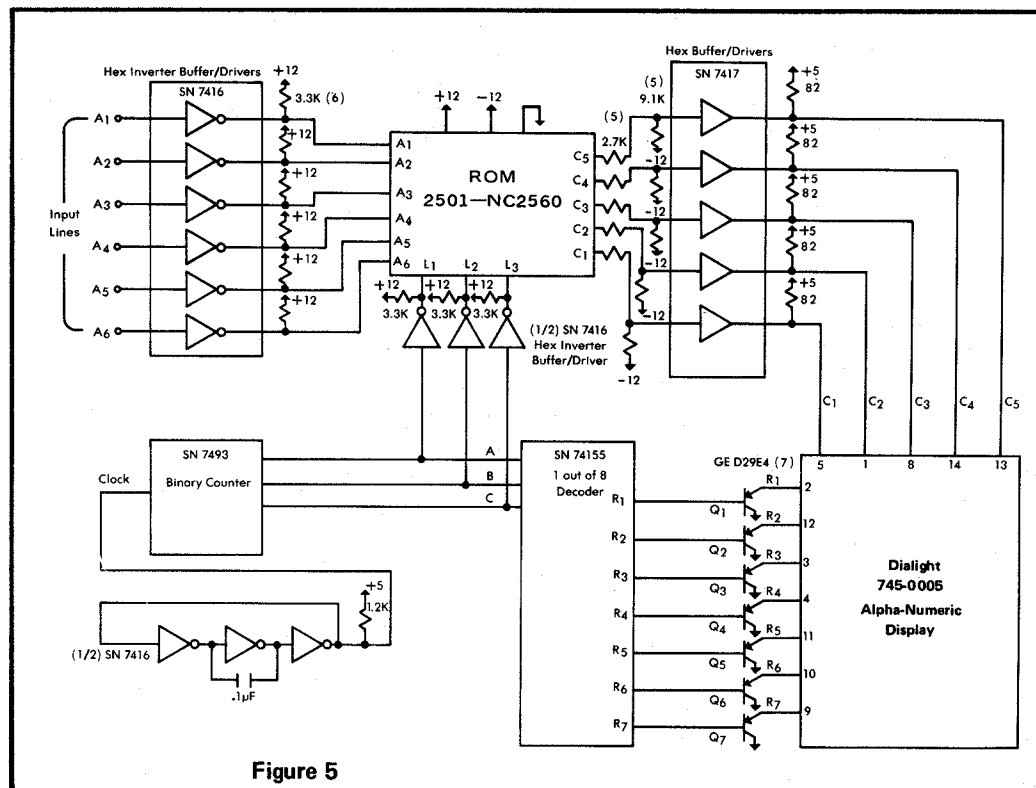


Figure 5

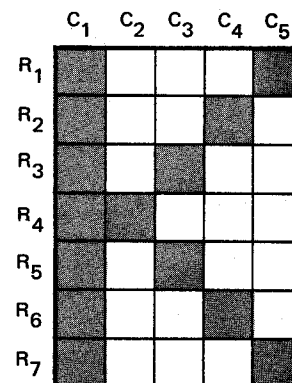


Figure 6

| A <sub>6</sub> | A <sub>5</sub> | A <sub>4</sub> | A <sub>3</sub> | A <sub>2</sub> | A <sub>1</sub> | Resultant Display | A <sub>6</sub> | A <sub>5</sub> | A <sub>4</sub> | A <sub>3</sub> | A <sub>2</sub> | A <sub>1</sub> | Resultant Display |
|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|----------------|----------------|----------------|----------------|----------------|----------------|-------------------|
| 0              | 0              | 0              | 0              | 0              | 0              | @                 | 1              | 0              | 0              | 0              | 0              | 0              |                   |
| 0              | 0              | 0              | 0              | 0              | 1              | A                 | 1              | 0              | 0              | 0              | 0              | 1              | !                 |
| 0              | 0              | 0              | 0              | 1              | 0              | B                 | 1              | 0              | 0              | 0              | 1              | 0              | "                 |
| 0              | 0              | 0              | 0              | 1              | 1              | C                 | 1              | 0              | 0              | 0              | 1              | 1              | #                 |
| 0              | 0              | 0              | 1              | 0              | 0              | D                 | 1              | 0              | 0              | 1              | 0              | 0              | \$                |
| 0              | 0              | 0              | 1              | 0              | 1              | E                 | 1              | 0              | 0              | 1              | 0              | 1              | %                 |
| 0              | 0              | 0              | 1              | 1              | 0              | F                 | 1              | 0              | 0              | 1              | 1              | 0              | &                 |
| 0              | 0              | 0              | 1              | 1              | 1              | G                 | 1              | 0              | 0              | 1              | 1              | 1              | '                 |
| 0              | 0              | 1              | 0              | 0              | 0              | H                 | 1              | 0              | 1              | 0              | 0              | 0              | (                 |
| 0              | 0              | 1              | 0              | 0              | 1              | I                 | 1              | 0              | 1              | 0              | 0              | 1              | )                 |
| 0              | 0              | 1              | 0              | 1              | 0              | J                 | 1              | 0              | 1              | 0              | 1              | 0              | *                 |
| 0              | 0              | 1              | 0              | 1              | 1              | K                 | 1              | 0              | 1              | 0              | 1              | 1              | +                 |
| 0              | 0              | 1              | 1              | 0              | 0              | L                 | 1              | 0              | 1              | 1              | 0              | 0              | ,                 |
| 0              | 0              | 1              | 1              | 0              | 1              | M                 | 1              | 0              | 1              | 1              | 0              | 1              | -                 |
| 0              | 0              | 1              | 1              | 1              | 0              | N                 | 1              | 0              | 1              | 1              | 1              | 0              | .                 |
| 0              | 0              | 1              | 1              | 1              | 1              | O                 | 1              | 0              | 1              | 1              | 1              | 1              | /                 |
| 0              | 1              | 0              | 0              | 0              | 0              | P                 | 1              | 1              | 0              | 0              | 0              | 0              | φ                 |
| 0              | 1              | 0              | 0              | 0              | 1              | Q                 | 1              | 1              | 0              | 0              | 0              | 1              | 1                 |
| 0              | 1              | 0              | 0              | 1              | 0              | R                 | 1              | 1              | 0              | 0              | 1              | 0              | 2                 |
| 0              | 1              | 0              | 0              | 1              | 1              | S                 | 1              | 1              | 0              | 0              | 1              | 1              | 3                 |
| 0              | 1              | 0              | 1              | 0              | 0              | T                 | 1              | 1              | 0              | 1              | 0              | 0              | 4                 |
| 0              | 1              | 0              | 1              | 0              | 1              | U                 | 1              | 1              | 0              | 1              | 0              | 1              | 5                 |
| 0              | 1              | 0              | 1              | 1              | 0              | V                 | 1              | 1              | 0              | 1              | 1              | 0              | 6                 |
| 0              | 1              | 0              | 1              | 1              | 1              | W                 | 1              | 1              | 0              | 1              | 1              | 1              | 7                 |
| 0              | 1              | 1              | 0              | 0              | 0              | X                 | 1              | 1              | 1              | 0              | 0              | 0              | 8                 |
| 0              | 1              | 1              | 0              | 0              | 1              | Y                 | 1              | 1              | 1              | 0              | 0              | 1              | 9                 |
| 0              | 1              | 1              | 0              | 1              | 0              | Z                 | 1              | 1              | 1              | 0              | 1              | 0              | :                 |
| 0              | 1              | 1              | 0              | 1              | 1              | [                 | 1              | 1              | 1              | 0              | 1              | 1              | ;                 |
| 0              | 1              | 1              | 1              | 0              | 0              | \                 | 1              | 1              | 1              | 1              | 0              | 0              | <                 |
| 0              | 1              | 1              | 1              | 0              | 1              | ]                 | 1              | 1              | 1              | 1              | 0              | 1              | =                 |
| 0              | 1              | 1              | 1              | 1              | 0              | ^                 | 1              | 1              | 1              | 1              | 1              | 0              | >                 |
| 0              | 1              | 1              | 1              | 1              | 1              | ~                 | 1              | 1              | 1              | 1              | 1              | 1              | ?                 |

Figure 7 - Resultant displays of alpha-numeric device in conjunction with the ASCII ROM.

The alpha-numeric display with its driving circuitry is illustrated in Figure 5. The character displayed is a function of six input lines A<sub>1</sub> through A<sub>6</sub>. The seven rows are scanned sequentially one at a time. The timing is controlled by the clock which drives a binary counter, whose outputs ABC control the row to be selected. This ensures that the read-only-memory's (ROM) five outputs C<sub>1</sub>-C<sub>5</sub> correspond to the row of dots which are enabled by the 1 out of 8 decoder. The SN74155 is a dual 2 to 4 line decoder, used here as a 1 out of 8 decoder.

For example, let's assume that the letter K is to be displayed. K in a 5x7 array of dots looks as depicted in Figure 6. The ASCII code A<sub>1</sub>-A<sub>6</sub> for selecting K is 001011. The SN7416 inverter buffer/drivers and the SN7417 buffer/driver are used to interface the inputs and outputs of the ROM. The binary counter's outputs ABC continuously cycle from 000 to 111 and back to 000. When ABC equals 000, then through the row inputs L<sub>1</sub>, L<sub>2</sub>, L<sub>3</sub> the ROM outputs C<sub>1</sub> and C<sub>5</sub> will be "high" and C<sub>2</sub>, C<sub>3</sub>, and C<sub>4</sub> will be "low" as shown in Figure 6. Simultaneously the 1 out of 8 decoder drives Q<sub>1</sub> "on" and this enables the first and fifth dots of the first row to be illuminated. On the next clock pulse, the counter advances to 001. C<sub>1</sub> and C<sub>4</sub> will become "high" and Q<sub>2</sub> will be driven "on" thereby illuminating the first and fourth dots of the second row. This process is continued and repeated rapidly, so that the final result appears to be the letter K.

The 745-0005 in conjunction with any suitable ASCII ROM will display 64 alpha-numeric characters. These are shown in Figure 7 as a function of the six bit inputs A<sub>1</sub>-A<sub>6</sub>.