HEWLETT hp PACKARD

COMPONENTS

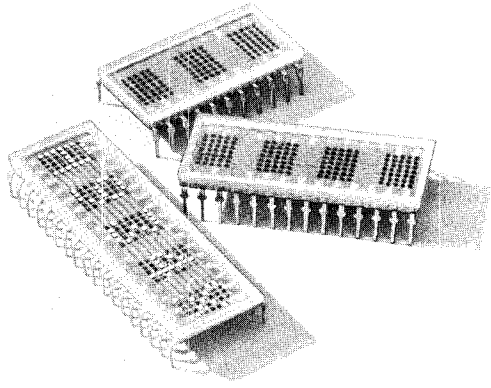
LED SOLID STATE ALPHANUMERIC INDICATOR

5082-7100
5082-7101
5082-7102

TECHNICAL DATA APRIL 1976

Features

- **5 x 7 LED MATRIX CHARACTER**
  Human Factors Engineered
- **BRIGHTNESS CONTROLLABLE**
- **IC COMPATIBLE**
- **SMALL SIZE**
  Standard 15.24mm (.600 inch) Dual In-Line Package; 6.9mm (.27 inch) Character Height
- **WIDE VIEWING ANGLE**
- **RUGGED, SHOCK RESISTANT**
  Hermetically Sealed
  Designed to Meet MIL Standards
- **LONG OPERATING LIFE**



Description

The Hewlett-Packard 5082-7100 Series is an X-Y addressable, 5 x 7 LED Matrix capable of displaying the full alphanumeric character set. This alphanumeric indicator series is available in 3, 4, or 5 character end-stackable clusters. The clusters permit compact presentation of information, ease of character alignment, minimum number of interconnections, and compatibility with multiplexing driving schemes.

Alphanumeric applications include computer terminals, calculators, military equipment and space flight readouts.

The **5082-7100** is a three character cluster.
The **5082-7101** is a four character cluster.
The **5082-7102** is a five character cluster.

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Peak Forward Current Per LED (Duration < 1ms)	I_{PEAK}		100	mA
Average Current Per LED	I_{AVG}		10	mA
Power Dissipation Per Character (All diodes lit) [1]	P_D		700	mW
Operating Temperature, Case	T_C	–55	95	°C
Storage Temperature	T_S	–55	100	°C
Reverse Voltage Per LED	V_R		4	V

Note 1: At 25°C Case Temperature; derate 8.5mW/°C above 25°C.

Electrical / Optical Characteristics at $T_C = 25°C$

Parameter	Symbol	Min.	Typ.	Max.	Units
Peak Luminous Intensity Per LED (Character Average) @ Pulse Current of 100mA/LED	$I_{V\ (PEAK)}$	1.0	2.2		mcd
Reverse Current Per LED @ $V_R = 4V$	I_R		10		μA
Peak Forward Voltage @ Pulse Current of 50mA/LED	V_F		1.7	2.0	V
Peak Wavelength	λ_{PEAK}		655		nm
Spectral Line Halfwidth	$\Delta\lambda_{1/2}$		30		nm
Rise and Fall Times [1]	t_r, t_f		10		ns

Note 1. Time for a 10% - 90% change of light intensity for step change in current.

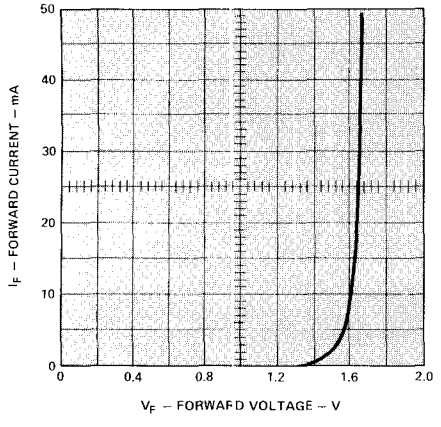


Figure 1. Forward Current-Voltage Characteristic.

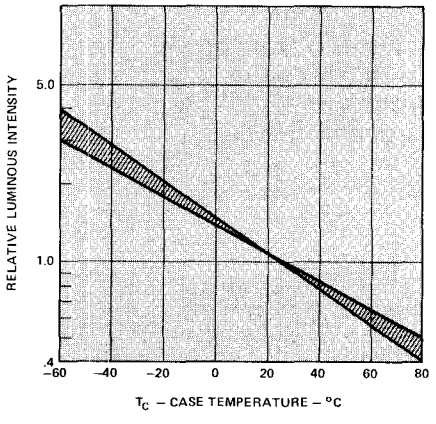


Figure 2. Relative Luminous Intensity vs. Case Temperature at Fixed Current Level.

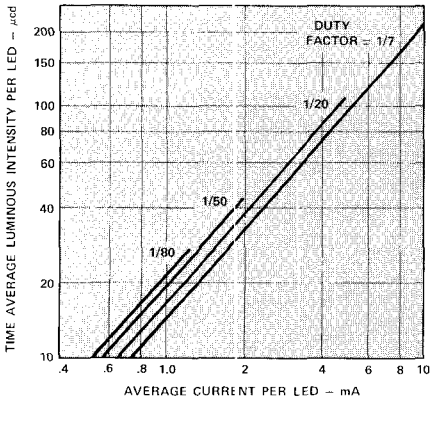


Figure 3. Typical Time Average Luminous Intensity per LED vs. Average Current per LED.

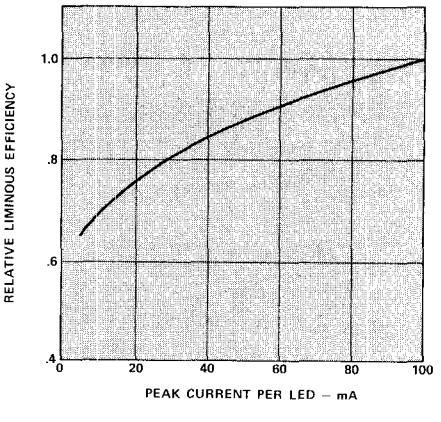
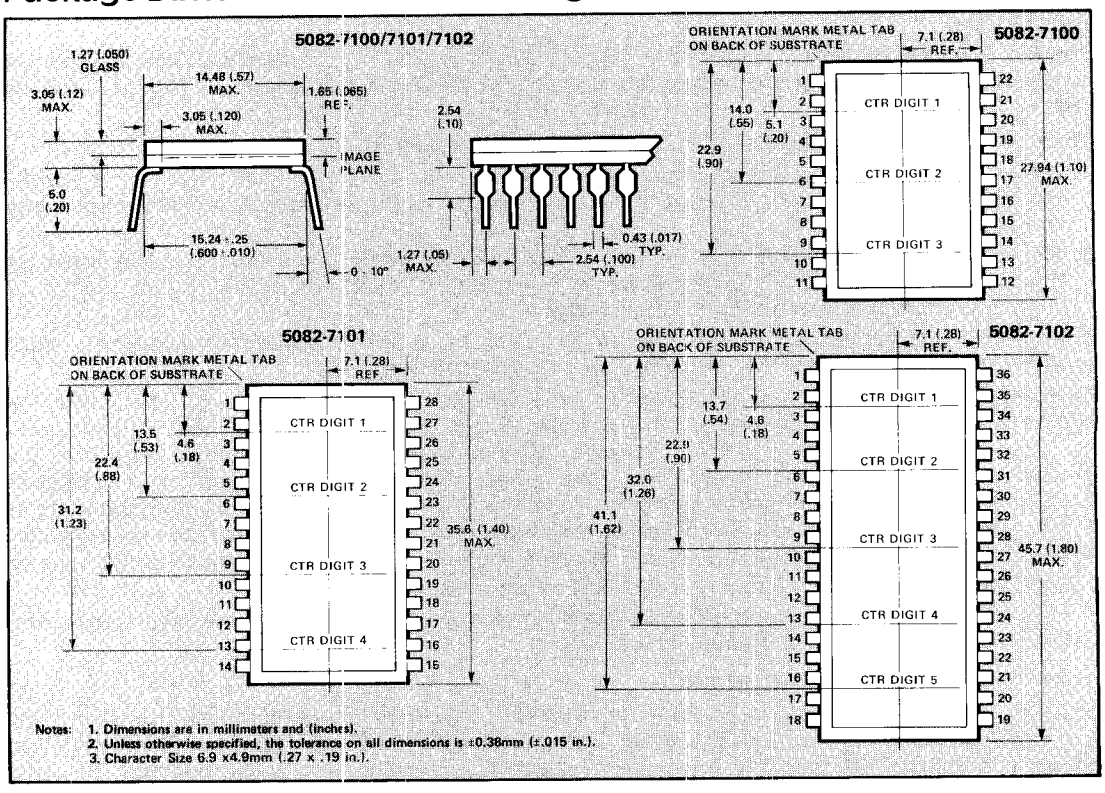


Figure 4. Typical Relative Luminous Efficiency vs. Peak Current per LED.

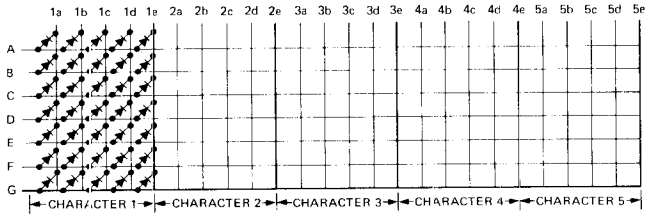
Package Dimensions and Pin Configurations



Notes:
1. Dimensions are in millimeters and (inches).
2. Unless otherwise specified, the tolerance on all dimensions is ±0.38mm (±.015 in.).
3. Character Size 6.9 x4.9mm (.27 x .19 in.).

Device Pin Description

5082-7100				5082-7101				5082-7102			
Pin	Function	Pin	Function	Pin	Function	Pin	Function	Pin	Function	Pin	Function
1	Anode G	12	Anode B	1	N/C	15	Anode C	1	N/C	19	5e
2	1c	13	3d	2	1c	16	4c	2	1c	20	5c
3	1d	14	3b	3	1e	17	4a	3	1e	21	5a
4	Anode F	15	Anode A	4	Anode G	18	Anode B	4	Anode F	22	Anode D
5	Anode E	16	2e	5	2b	19	3e	5	2b	23	4e
6	2b	17	2c	6	2d	20	3b	6	2d	24	4c
7	2d	18	2a	7	Anode D	21	3a	7	2e	25	N/C
8	Anode C	19	Anode D	8	Anode E	22	2e	8	Anode E	26	Anode C
9	3a	20	1e	9	3c	23	2c	9	3c	27	3d
10	3c	21	1b	10	3d	24	2a	10	3e	28	3b
11	3e	22	1a	11	Anode F	25	Anode A	11	Anode G	29	3a
				12	4b	26	1d	12	4a	30	Anode B
				13	4d	27	1b	13	4b	31	2c
				14	4e	28	1a	14	4d	32	2a
								15	N/C	33	Anode A
								16	5b	34	1d
								17	5d	35	1b
								18	N/C	36	1a



5082-7100/7101/7102
Schematic Wiring Diagram

Operating Considerations

ELECTRICAL

The 5 x 7 matrix of LED's, which make up each character, are X-Y addressable. This allows for a simple addressing, decoding and driving scheme between the display module and customer furnished logic.

There are three main advantages to the use of this type of X-Y addressable array:

1. It is an elementary addressing scheme and provides the least number of interconnection pins for the number of diodes addressed. Thus, it offers maximum flexibility toward integrating the display into particular applications.
2. This method of addressing offers the advantage of sharing the Read-Only-Memory character generator among several display elements. One character generating ROM can be shared over 25 or more 5 x 7 dot matrix characters with substantial cost savings.
3. In many cases equipments will already have a portion of the required decoder/driver (timing and clock circuitry plus buffer storage) logic circuitry available for the display.

To form alphanumeric characters a method called "scanning" or "strobing" is used. Information is addressed to the display by selecting one row of diodes at a time, energizing the appropriate diodes in that row and then proceeding to the next row. After all rows have been excited one at a time, the process is repeated. By scanning through all rows at least 100 times a second, a flicker free character can be produced. When information moves sequentially from row to row of the display (top to bottom) this is row scanning, as illustrated in Figure 5. Information can also be moved from column to column (left to right across the display) in a column scanning mode. For most applications (5 or more characters to share the same ROM) it is more economical to use row scanning.

A much more detailed description of general scanning techniques along with specific circuit recommendations is contained in HP Application Note 931.

MECHANICAL/THERMAL MOUNTING

The solid state display typically operates with 200 mW power dissipation per character. However, if the operating conditions are such that the power dissipation exceeds the derated maximum allowable value, the device should be heat sunk. The usual mounting technique combines mechanical support and thermal heat sinking in a common structure. A metal strap or bar can be mounted behind the display using silicone grease to insure good thermal control. A well-designed heat sink can limit the case temperature to within 10°C of ambient.

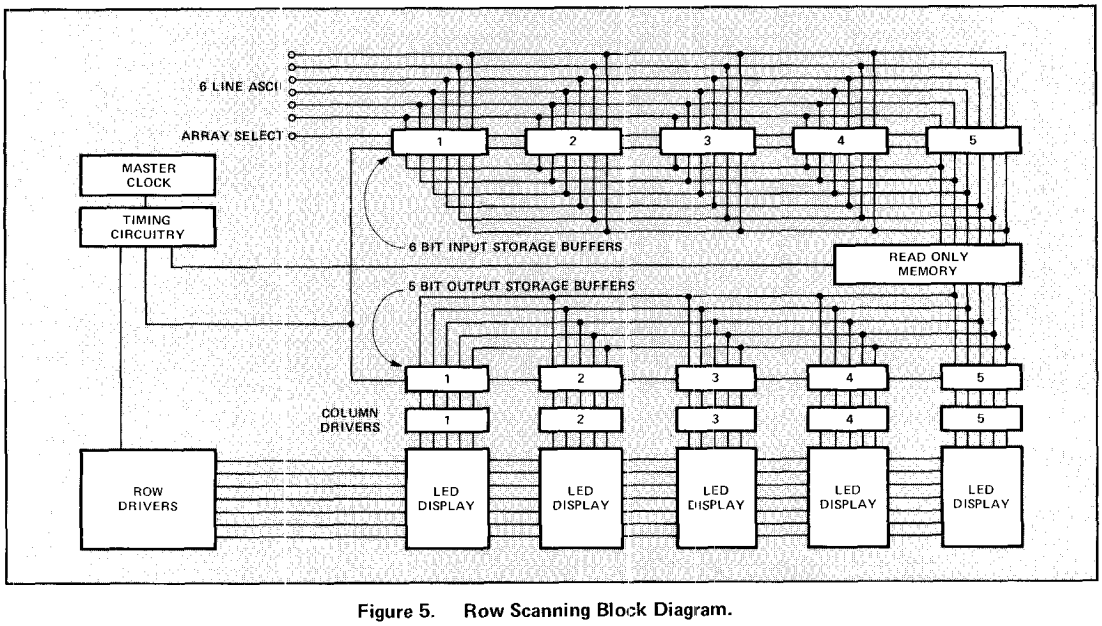


Figure 5. Row Scanning Block Diagram.