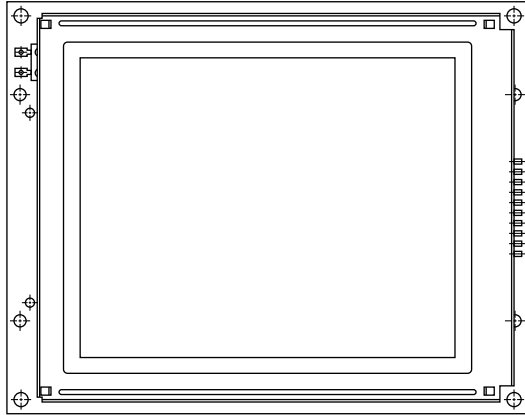


## 160 x 128 Graphic LCD



### FEATURES

- Type: Graphic
- Display format: 160 x 128 dots
- Built-in controller: RA6963
- Duty cycle: 1/128
- Optional N.V.
- + 5 V power supply
- View angle 12° horizontal only
- Material categorization: For definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

| MECHANICAL DATA  |                |      |
|------------------|----------------|------|
| ITEM             | STANDARD VALUE | UNIT |
| Module Dimension | 129.0 x 102.0  | mm   |
| Viewing Area     | 101.0 x 82.0   |      |
| Dot Size         | 0.54 x 0.54    |      |
| Dot Pitch        | 0.58 x 0.58    |      |
| Mounting Hole    | 122.0 x 96.2   |      |
| Character Size   | N/a            |      |

| ABSOLUTE MAXIMUM RATINGS |                      |                |      |          |      |
|--------------------------|----------------------|----------------|------|----------|------|
| ITEM                     | SYMBOL               | STANDARD VALUE |      |          | UNIT |
|                          |                      | MIN.           | TYP. | MAX.     |      |
| Power Supply             | $V_{DD}$ to $V_{SS}$ | 4.75           | 5.0  | 5.25     | V    |
| Input Voltage            | $V_I$                | - 0.3          | -    | $V_{DD}$ |      |

#### Note

- $V_{SS} = 0$  V,  $V_{DD} = 5.0$  V

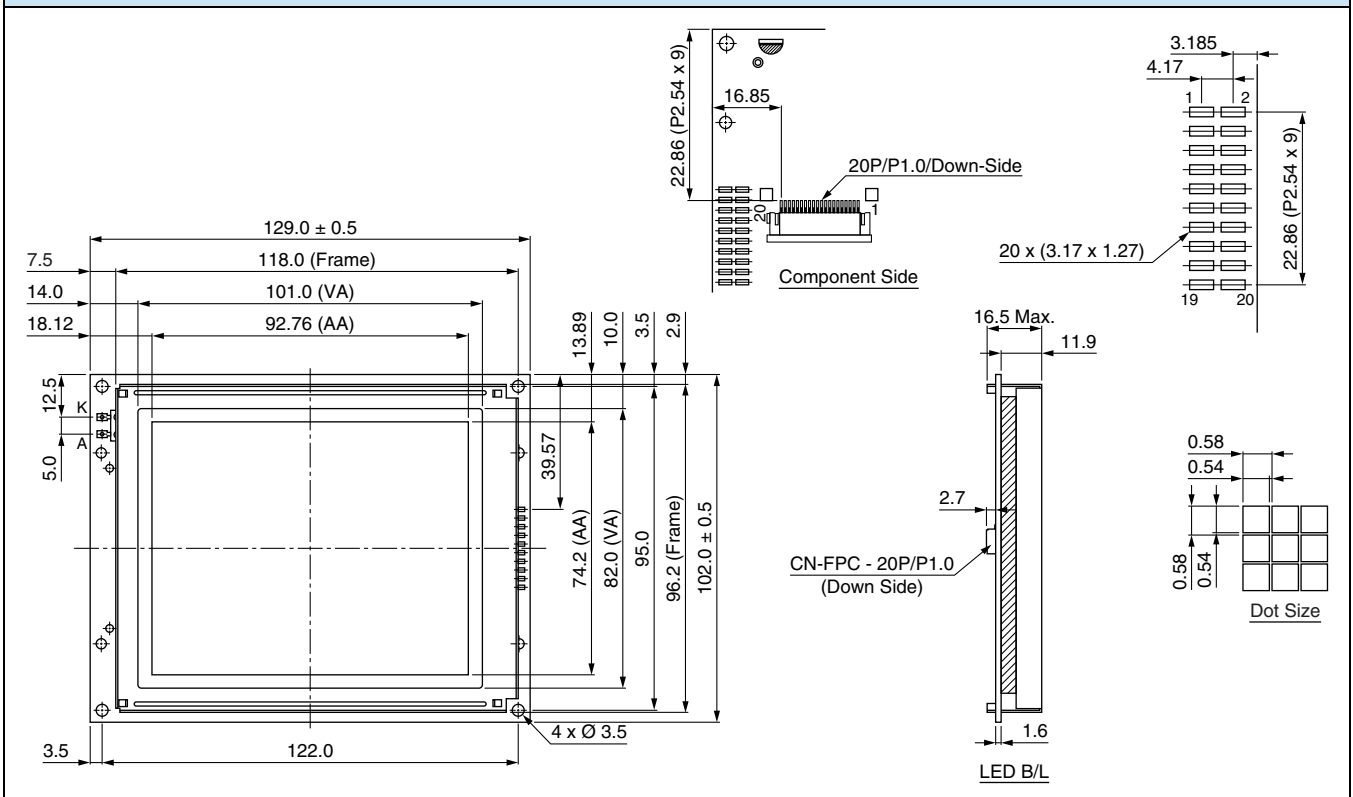
| ELECTRICAL CHARACTERISTICS   |                   |                                   |                |      |      |           |
|--|-------------------|-----------------------------------|----------------|------|------|-----------|
| ITEM   | SYMBOL            | CONDITION                         | STANDARD VALUE |      |      | UNIT      |
|  |                   |                                   | MIN.           | TYP. | MAX. |           |
| Input Voltage  | $V_{DD}$          | -                                 | 4.75           | 5.0  | 5.25 | V         |
| Supply Current   | $I_{DD}$          | $V_{DD} = +5$ V                   | -              | 45.0 | 50.0 | mA        |
| Recommended LC Driving Voltage for Normal Temperature Version Module | $V_{DD}$ to $V_0$ | - 20 °C                           | 19.9           | 21.0 | 22.1 | V         |
|  |                   | 25 °C                             | 18.6           | 19.1 | 19.6 |           |
|  |                   | 70 °C                             | 11.6           | 9.1  | 12.8 |           |
| CCFL Starting Voltage  | $V_{FLS}$         | 25 °C                             | -              | -    | -    | $V_{RMS}$ |
| CCFL Driving Voltage   | $V_{FLD}$         | 25 °C                             | -              | 256  | 560  | $V_{RMS}$ |
| CCFL Driving Current   | $I_{FLD}$         | $V_{FQ} = 450$ $V_{RMS}$ , 30 kHz | -              | -    | 5.0  | mA        |
| LED Forward Voltage  | $V_F$             | 25 °C                             | -              | 4.6  | 4.6  | V         |
| LED Forward Current  | $I_F$             | 25 °C                             | -              | -    | 500  | mA        |
| EL Power Supply Current  | $I_{EL}$          | $V_{EL} = 110$ $V_{AC}$ , 400 Hz  | -              | -    | 5.0  | mA        |

| OPTIONS       |          |            |          |          |           |           |     |    |      |
|---------------|----------|------------|----------|----------|-----------|-----------|-----|----|------|
| PROCESS COLOR |          |            |          |          |           | BACKLIGHT |     |    |      |
| TN            | STN GRAY | STN YELLOW | STN BLUE | FSTN B&W | STN COLOR | NONE      | LED | EL | CCFL |
|               | x        | x          | x        | x        |           | x         | x   | x  | x    |

For detailed information, please see the "Product Numbering System" document.

**INTERFACE PIN FUNCTION**

| PIN NO. | SYMBOL             | FUNCTION                    |
|---------|--------------------|-----------------------------|
| 1       | FG                 | Frame ground                |
| 2       | V <sub>SS</sub>    | Power supply (Ground)       |
| 3       | V <sub>DD</sub>    | Power supply (+ 5 V)        |
| 4       | V <sub>ADJ</sub>   | Contrast adjustment         |
| 5       | V <sub>EE</sub>    | Negative voltage output     |
| 6       | $\overline{WR}$    | Data write                  |
| 7       | $\overline{RD}$    | Data read                   |
| 8       | $\overline{CE}$    | Chip enable                 |
| 9       | $\overline{C/D}$   | Command/data read/write     |
| 10      | $\overline{HALT}$  | Clock operating stop signal |
| 11      | $\overline{Reset}$ | Reset signal                |
| 12      | DB0                | Data bus line               |
| 13      | DB1                | Data bus line               |
| 14      | DB2                | Data bus line               |
| 15      | DB3                | Data bus line               |
| 16      | DB4                | Data bus line               |
| 17      | DB5                | Data bus line               |
| 18      | DB6                | Data bus line               |
| 19      | DB7                | Data bus line               |
| 20      | NC                 | No connection               |

**DIMENSIONS** in millimeters




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