## $320 \times 240$ Graphic LCD



| MECHANICAL DATA |  |  |
| :--- | :---: | :---: |
| ITEM | STANDARD VALUE | UNIT |
| Module Dimension | $148.02 \times 120.24$ |  |
| Viewing Area | $120.14 \times 92.14$ | mm |
| Dot Size | $0.34 \times 0.34$ |  |
| Dot Pitch | $0.36 \times 0.36$ |  |
| Mounting Hole | $139.98 \times 116.61$ |  |
| Character Size | $\mathrm{N} / \mathrm{a}$ |  |

## FEATURES

- Type: Graphic
- Display format: $320 \times 240$ dots
- Built-in controller: RA8835 and SRAM
- Duty cycle: 1/240
- Built-in N.V.
- Touch screen option (analog type)
- Temperature compensation option
- Compliant to RoHS directive 2002/95/EC


## ABSOLUTE MAXIMUM RATINGS

| ITEM | SYMBOL | STANDARD VALUE |  |  | UNIT |
| :--- | :---: | :---: | :---: | :---: | :---: |
|  |  | MIN. | TYP. | MAX. |  |
| Power Supply | $\mathrm{V}_{\mathrm{DD}}$ to $\mathrm{V}_{\mathrm{SS}}$ | 4.75 | 5.0 | 5.25 | V |
| Input Voltage | $\mathrm{V}_{\mathrm{I}}$ | -0.3 | - | $\mathrm{V}_{\mathrm{DD}}$ |  |

Note

- $\mathrm{V}_{\mathrm{SS}}=0 \mathrm{~V}, \mathrm{~V}_{\mathrm{DD}}=5.0 \mathrm{~V}$


## ELECTRICAL CHARACTERISTICS

| ITEM | SYMBOL | CONDITION | STANDARD VALUE |  |  | UNIT |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | MIN. | TYP. | MAX. |  |
| Input Voltage | $V_{\text {DD }}$ | L level | $0.7 \mathrm{~V}_{\mathrm{DD}}$ | - | $V_{\text {DD }}$ | V |
|  | $\mathrm{V}_{10}$ | H level | 0 | - | $0.3 \mathrm{~V}_{\mathrm{DD}}$ |  |
| Supply Current | $\mathrm{I}_{\mathrm{DD}}$ | $\mathrm{V}_{\mathrm{DD}}=+5.0 \mathrm{~V}$ | - | 100 | 105 | mA |
| Recommended LC Driving Voltage for Normal Temperature Version Module | $\mathrm{V}_{0}$ to $\mathrm{V}_{\text {Ss }}$ | $-20^{\circ} \mathrm{C}$ | - | - | 26.1 | V |
|  |  | $25^{\circ} \mathrm{C}$ | - | 23.8 | - |  |
|  |  | $70^{\circ} \mathrm{C}$ | 20.9 | - | - |  |
| CCFL Starting Voltage | $\mathrm{V}_{\text {FLS }}$ | $25^{\circ} \mathrm{C}$ | - | 600 | - | $\mathrm{V}_{\text {RMS }}$ |
| CCFL Driving Voltage | $\mathrm{V}_{\text {FLD }}$ | $25^{\circ} \mathrm{C}$ | - | 268 | - | $\mathrm{V}_{\text {RMS }}$ |
| CCFL Driving Current | $\mathrm{I}_{\text {FLD }}$ | $\mathrm{V}_{\mathrm{FQ}}=450 \mathrm{~V}_{\text {RMS }}, 30 \mathrm{kHz}$ | - | 5.0 | - | $\mathrm{mA}_{\text {RMS }}$ |
| LED Forward Voltage | $\mathrm{V}_{\mathrm{F}}$ | $25^{\circ} \mathrm{C}$ | - | 4.2 | 4.6 | V |
| LED Forward Current | $\mathrm{I}_{\mathrm{F}}$ | $25^{\circ} \mathrm{C}$ | - | 180 | 360 | mA |
| EL Power Supply Current | $\mathrm{I}_{\mathrm{EF}}$ | $\mathrm{V}_{\mathrm{EL}}=110 \mathrm{~V}_{\mathrm{AC}}, 400 \mathrm{~Hz}$ | - | - | 5.0 | mA |


| OPTIONS |  |  |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| PROCESS COLOR |  |  |  |  |  | BACKLIGHT |  |  |  |
| TN | $\begin{aligned} & \text { STN } \\ & \text { Gray } \end{aligned}$ | $\begin{gathered} \text { STN } \\ \text { Yellow } \end{gathered}$ | $\begin{aligned} & \text { STN } \\ & \text { Blue } \end{aligned}$ | $\begin{aligned} & \hline \text { FSTN } \\ & \text { B\&W } \end{aligned}$ | $\begin{aligned} & \text { STN } \\ & \text { Color } \end{aligned}$ | None | LED | EL | CCFL |
|  |  |  |  |  |  |  |  |  |  |

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

| INTERFACE PIN FUNCTION |  |  |
| :---: | :---: | :---: |
| PIN NO. | SYMBOL | FUNCTION |
| 1 | $\mathrm{V}_{\text {SS }}$ | Ground |
| 2 | $\mathrm{V}_{\mathrm{DD}}$ | Power supply for logic |
| 3 | $\mathrm{V}_{0}$ | Driving voltage for LCD |
| 4 | $\overline{\mathrm{RD}}$ | 8080 family: Read signal/6800 family: Enable clock |
| 5 | $\overline{\mathrm{WR}}$ | 8080 family: Write signal/6800 family: R/W signal |
| 6 | $\mathrm{A}_{0}$ | Data type select <br> For 80 family: <br> RD $=\mathrm{L}, \mathrm{WR}=\mathrm{H} ; \mathrm{AO}=\mathrm{L}$ : Data read, $\mathrm{AO}=\mathrm{H}$ : Status read <br> $R D=H, W R=L ; A O=L$ : Data write, $A O=H: C o m m a n d$ write <br> For 68 family: <br> $\mathrm{R} / \mathrm{W}=\mathrm{L} ; \mathrm{AO}=\mathrm{H}$ : Command write, $\mathrm{AO}=\mathrm{L}$ : Data write <br> R/W = H; AO = H: Status read, AO = L: Data read |
| 7 | DB0 | Date bus line |
| 8 | DB1 | Date bus line |
| 9 | DB2 | Date bus line |
| 10 | DB3 | Date bus line |
| 11 | $\overline{\text { DB4 }}$ | Date bus line |
| 12 | $\overline{\text { DB5 }}$ | Date bus line |
| 13 | DB6 | Date bus line |
| 14 | DB7 | Date bus line |
| 15 | CS | Chip select, active L |
| 16 | RES | Controller reset signal, active L |
| 17 | $\mathrm{V}_{\text {EE }}$ | Negative voltage output (optional) |
| 18 | $\mathrm{F}_{\text {GND }}$ | Frame ground |
| 19 | NC | No connection |
| 20 | NC | No connection |

## DIMENSIONS in millimeters



CCFL B/L or LED B/L

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