



**Feature**

1. Built-in controller TOSHIBA (T6963C or equivalent)
2. +5V power supply
3. 1/128 duty cycle
4. Optional N/V
5. View angle 12°H only.

**Pin Assignment**

| Pin | Symbol | Function                    |
|-----|--------|-----------------------------|
| 1   | FG     | Frame ground                |
| 2   | Vss    | Power Supply (GND)          |
| 3   | Vdd    | Power Supply (+5V)          |
| 4   | Vadj   | Contrast Adjustment         |
| 5   | Vee    | Negative Voltage output     |
| 6   | WR     | Data write                  |
| 7   | RD     | Data read                   |
| 8   | CE     | Chip enable                 |
| 9   | C/D    | Command/data read/write     |
| 10  | HALT   | Clock operating stop signal |
| 11  | 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               |

**Mechanical Data**

| Item             | Standard Value | Unit |
|------------------|----------------|------|
| Module Dimension | 129.0 x 102.0  | mm   |
| Viewing Area     | 101.0 x 82.0   | mm   |
| Dot Size         | 0.54 x 0.54    | mm   |
| Dot Pitch        | 0.58 x 0.58    | mm   |
| Mounting Hole    | 122.0 x 96.2   | mm   |

**Absolute Maximum Rating**

| Item          | Symbol  | Standard Value |      |      | Unit |
|---------------|---------|----------------|------|------|------|
|               |         | min.           | typ. | max. |      |
| Power Supply  | VDD-VSS | 4.75           | 5.0  | 5.25 | V    |
| Input Voltage | VI      | -0.3           | --   | VDD  | V    |

Note: VSS=0 Volt, VDD=5.0 Volt.

**Electronical Characteristics**

| Item   | Symbol | Condition | Standard Value     |      |                    | Unit |
|--|--------|-----------|--------------------|------|--------------------|------|
|  |        |           | min.               | typ. | max.               |      |
| Input Voltage  | VDD    | L level   | 0.7V <sub>DD</sub> | --   | V <sub>DD</sub>    | V    |
|  | VIO    | H level   | 0                  | --   | 0.3V <sub>DD</sub> | V    |
| Supply Current   | IDD    | VDD=+5V   | --                 | 45   | 50                 | mA   |
| Recommended LC Driving Voltage for Normal Temp. Version module | VDD-V0 | -20°C     | 19.9               | 21.0 | 22.1               | V    |
|  |        | 0°C       | 19.0               | --   | 21.2               |      |
|  |        | 25°C      | 18.6               | 19.1 | 19.6               |      |
|  |        | 50°C      | 16.2               | 16.5 | 16.8               |      |
|  |        | 70°C      | 11.6               | 9.1  | 12.8               |      |
| CCFL Forward Voltage   | VF     | 25°C      | --                 | 256  | 560                | Vrms |
| CCFL Forward Current   | IF     | 25°C      | --                 | --   | 5.0                | mA   |
| LED Forward Voltage  | VF     | 25°C      | --                 | 4.6  | 4.6                | V    |
| LED Forward Current  | IF     | 25°C      | --                 | --   | 500                | mA   |