# AND1781BST2-CH

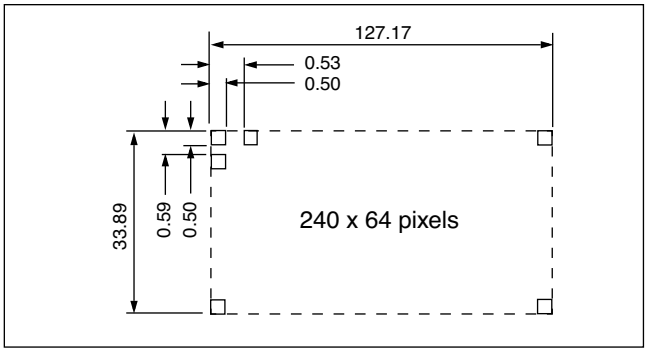
## 240 x 64 Dots
## Intelligent Graphics Display

The AND1781BST2-CH devices are compact, full dot matrix, with “white page” appearance, LCD modules that have an on-board LCD controller (T6963C) and display memory (RAM). The AND1781 can display TEXT information, numerals, letters and symbols, as well as GRAPHIC patterns. These devices are suitable for medical and measurement equipment, point-of-sale terminals, portable equipment, and marine instrumentation.

## Features

- Blue and white (BST) transmissive mode
- Built-in CCFL backlight
- RoHS compliant
- 40 characters x 8 line capability
- 240 x 64 dot graphic display
- Excellent readability and high-contrast ratio
- Built-in LCD controller (T6963C)
- Wide operating temperature range (0° to 50°C)
- User-selectable fonts: 6 x 8 or 8 x 8

**Dot Matrix Dimensions**




**Mechanical Characteristics**

| Item | Specification | Unit |
|---|---|---|
| Outline Dimensions | 180.0 (W) x 65.0 (H) x 9.7 Max (D) | mm |
| Number of Dots | 240 x 64 Dots | |
| # of Characters | 40 x 8 (480), 6 x 8 font | |
| Viewing Area | 127.16 (W) x 33.88 (H) | mm |
| Bezel Opening | 134.0 (W) x 52.4 (H) | mm |
| Dot Size | 0.49 (W) 0.49 (H) | mm |
| Dot Pitch | 0.53 (W) 0.53 (H) | mm |
| Weight (approx.) | 170 | gram |

Product specifications contained herein may be changed without prior notice. It is therefore advisable to contact Purdy Electronics before proceeding with the design of equipment incorporating this product.

**Absolute Maximum Ratings**

| Item | Symbol | Specifications | | Unit |
|---|---|---|---|---|
| | | Min | Max | |
| Power Supply fo Logic | $V_{DD}$ - $V_{SS}$ | -0.3 | 5.5 | V |
| Power Supply fo LCD | $V_{DD}$ - $V_{EE}$ | 0 | 24.0 | V |
| CCFL Input Current | $I_{FL}$ | – | 7.0 | mA |
| CCFL Driving Voltage(1) | $V_{FL}$ | – | 500 | $V_{rms}$ |
| CCFL Drive Frequency | $f_{FL}$ | – | 85 | kHz |
| Input Voltage | V1 | -0.3 | $V_{DD}$ | V |
| Storage Temperature | $T_{stg}$ | -20 | 70 | °C |
| Operating Temperature | $T_{OP}$ | 0 | 50 | °C |
| Humidity(2) | – | 10 | 80 | °/° RH |

1. 1 minute maximum.
2. Wet bulb temperature ≤50° C, no condensation of water.

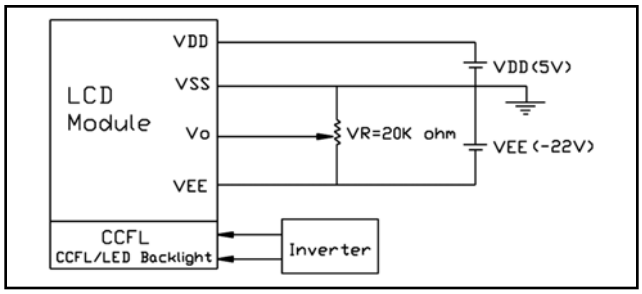
**Electrical Characteristics (TA = 25°C)**

| Item | Symbol | Cond. | Specifications | | | Unit |
|---|---|---|---|---|---|---|
| | | | Min. | Typ. | Max. | |
| Power Supply - Logic | $V_{DD}$-$V_{SS}$ | — | 4.5 | 5.0 | 5.5 | V |
| Input Voltage | $V_{IL}$ | L Level | 0 | — | 0.6 | V |
| | $V_{IH}$ | H Level | 2.8 | — | $V_{DD}$ | |
| | Ta = 25°C | 10.8 | 4.5 | 12.2 | 13.1 | |
| Power Supply Current for LCM | $I_{DD}$ | $V_{DD}$ = 5.0V $V_{DD}$-$V_{EE}$ = 12.2 V | — | 16.0 | 25.0 | mA |
| | $I_{EE}$ | | — | 2.4 | — | |
| CCFL Starting V | $V_{FLS}$ | — | — | 750 | — | V rms |
| CCFL Driving V | $V_{FLD}$ | — | — | 360 | — | |
| CCFL Driving Current | $I_{FLD}$ | $V_{FLD}$ = 450Vrms $f_{FL}$ = 30kHz | — | 5.0 | — | mA |
| CCFL Driving Freq. | $f_{FL}$ | | 15 | 30 | 85 | kHz |
| CCFL Saturation Time | $t_{SAT}$ | Ta=25°C | — | 1 | — | min. |

### Optical Characteristics (TA = 25°C, $\phi$ = 0°, $\theta$ = 0)

| Item | Symbol | Specifications | | | Unit |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| Viewing Angle Range | Φf (12 o'clock) | – | 20 | – | degree |
| | Φb (6 o'clock) | – | 40 | – | |
| | Φl (9 o'clock) | – | 30 | – | |
| | Φr (3 o'clock) | – | 30 | – | |
| Rise Time | Tr | – | 230 | – | mS |
| Fall Time | Tf | – | 250 | – | |
| Frame Freq. | Frm | – | 64 | – | Hz |
| Contrast | Cr | – | 1.5 | – | |

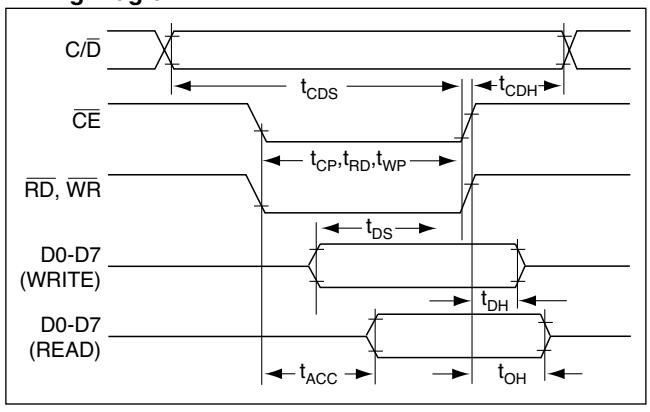
### Power Supply




### AC Characteristics ($V_{DD}$=5.0V±10%, $V_{SS}$=0V, Ta=0 to 50°C)

| Item | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| C/D Set Up Time | $t_{CDS}$ | 100 | – | ns |
| C/D Hold Time | $t_{CDH}$ | 10 | – | |
| $\overline{CE}$, $\overline{RD}$, $\overline{WR}$ Pulse Width | $t_{CDS}$ | 80 | – | |
| Data Set Up Time | $t_{DS}$ | 80 | – | |
| Data Hold Time | $t_{DH}$ | 40 | – | |
| Access Time | $t_{ACC}$ | – | 150 | |
| Output Hold Time | $t_{OH}$ | 10 | 50 | |

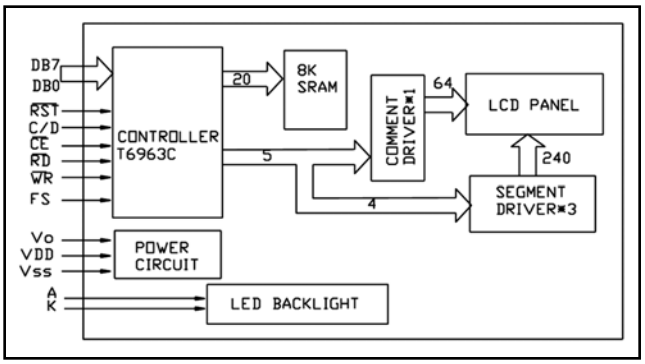
### Timing Diagram



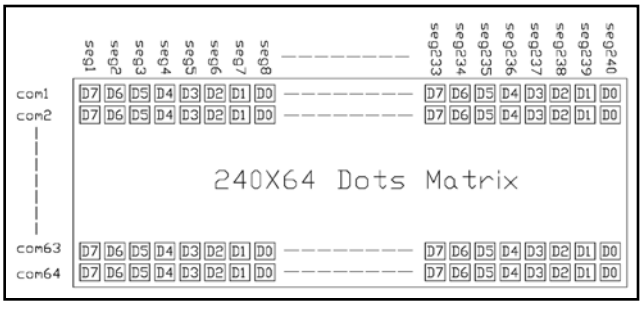

### Interface Pin Assignment

| Pin No. | Pin Out | Function Description |
|---|---|---|
| 1 | FGND | For GND |
| 2 | VSS | Power Supply Ground |
| 3 | VDD | Power Supply Voltage |
| 4 | Vo | Contrast Adjustment Voltage |
| 5 | /WR | Data Write |
| 6 | /RD | Data Read |
| 7 | /CE | Enable Signal |
| 8 | C/D | H : Data , L : Instruction Code |
| 9 | NC | No Connection |
| 10 | /RST | Reset Signal |
| 11 | DB0 | Data Bit 0 |
| 12 | DB1 | Data Bit 1 |
| 13 | DB2 | Data Bit 2 |
| 14 | DB3 | Data Bit 3 |
| 15 | DB4 | Data Bit 4 |
| 16 | DB5 | Data Bit 5 |
| 17 | DB6 | Data Bit 6 |
| 18 | DB7 | Data Bit 7 |
| 19 | FS | H : 6*8/L : 8*8 Select of Font |
| 20 | NC | No Connection |

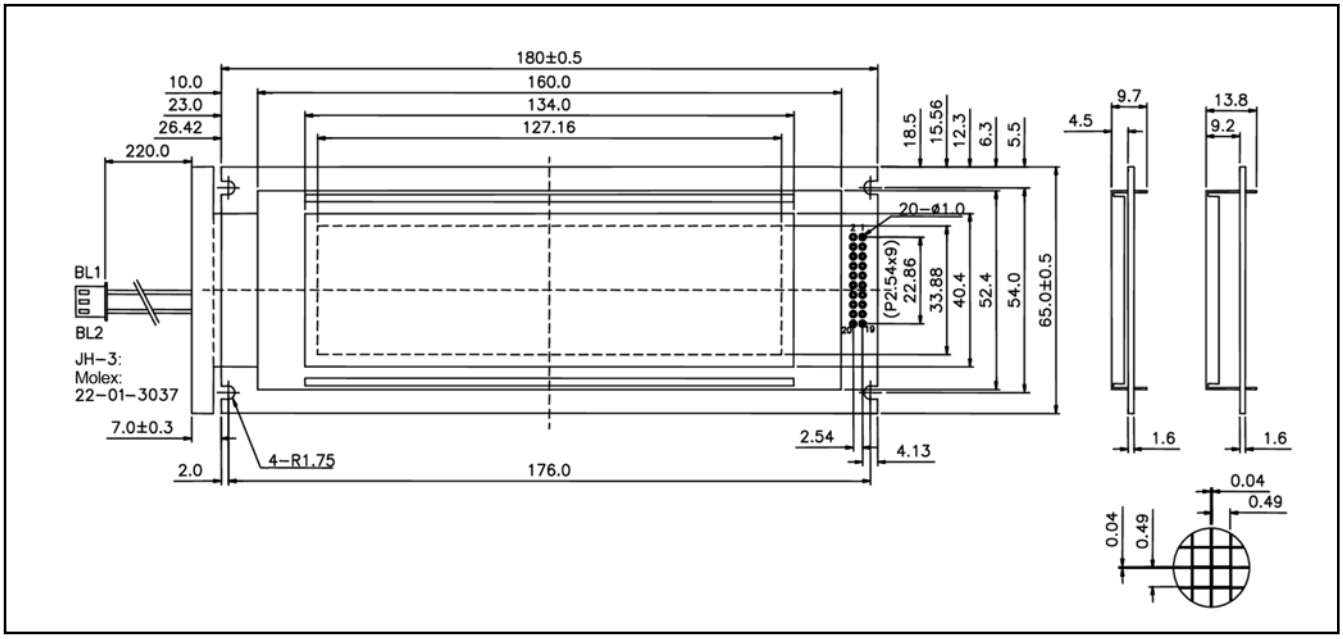
### Block Diagram



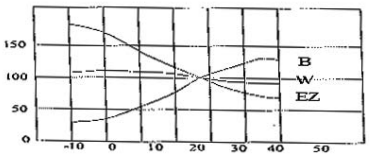

### Display Pattern



**Mechanical Drawing**




**CCFL Backlight**




**Temp (ºC)**

**B:** Brightness
**W:** Power Consumption
**EZ:** Breakdown Voltage

- **Luminous intensity:** 400 cd/$m^2$
- **Operating Voltage:** 1500 Vrms AC Max.
- **Power Consumption:** -1.7W (CCFL only)
- **Life:** 15k - 20k hours