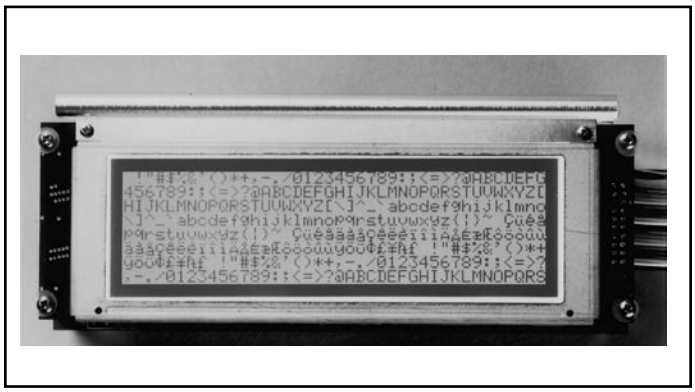

Product specifications contained herein may be changed without prior notice. It is therefore advisable to contact Purdy Electronics before proceeding with the design of equipment incorporating this product.

# AND1781FST-LED

## Intelligent Character Display

The AND1781FST-LED is an FSTN, Transflective, Positive, Normal Temperature liquid crystal display. It has a transflective rear polarizer, white LED backlight, 6 o-clock viewing direction.

## Features

- FSTN, Transflective, Positive, Extended Temperature
- 240 x 64 Dots
- White LED Backlight
- 6 O'clock Viewing Direction
- Normal Temperature Range
- LCD Module 1/64 Duty
- **ROHS Compliant**

## Mechanical Characteristics

| Item | Standard Value | Unit |
|---|---|---|
| Number of Characters | 240 x 64 | dots |
| Outline Dimensions | 180.0 (W) * 65.0 (H) * 12.3 (D) max | mm |
| Viewing Area | 133.0 x 39.0 | mm |
| Active Area | 127.16 x 33.88 | mm |
| Dot Size | 0.49 x 0.49 | mm |
| Dot Pitch | 0.53 x 0.53 | mm |
| LCD Type | FSTN, Positive, Transflective | |
| Duty | 1/64 | |
| View Direction | 6 o'clock | |
| Backlight Type | LED, White | |

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## Absolute Maximum Ratings

| Item | Symbol | Min. | Max. | Unit |
|---|---|---|---|---|
| Operating Temperature | TOP | -20 | 70 | ºC |
| Storage Temperature | TST | -30 | +80 | ºC |
| Input Voltage | V1 | VSS | VDD | V |
| Supply Voltage | VDD-VSS | -0.3 | +7 | V |
| Supply Voltage for LCD | VDD-V0 | 0 | 15 | V |

## Electrical Characteristics

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Supply Voltage for Logic | VDD-VSS | – | 4.75 | 5.0 | 5.25 | V |
| Supply Voltage for LCD | VDD-V0 | Ta = -20ºC | — | — | 13.9 | V |
| | | Ta = 25ºC | 12.1 | 12.5 | 12.9 | V |
| | | Ta = +70ºC | 10.1 | — | — | V |
| Input High Voltage | VIH | — | VDD-2.2 | — | VDD | V |
| Input Low Voltage | VIL | — | 0 | — | 0.8 | V |
| Output High Voltage | VOH | — | VDD-0.3 | — | VDD | V |
| Output Low Voltage | VOL | — | 0 | — | 0.3 | V |
| Supply Current | IDD | VDD=5V | 12 | 16 | 20 | mA |

## Optical Specifications

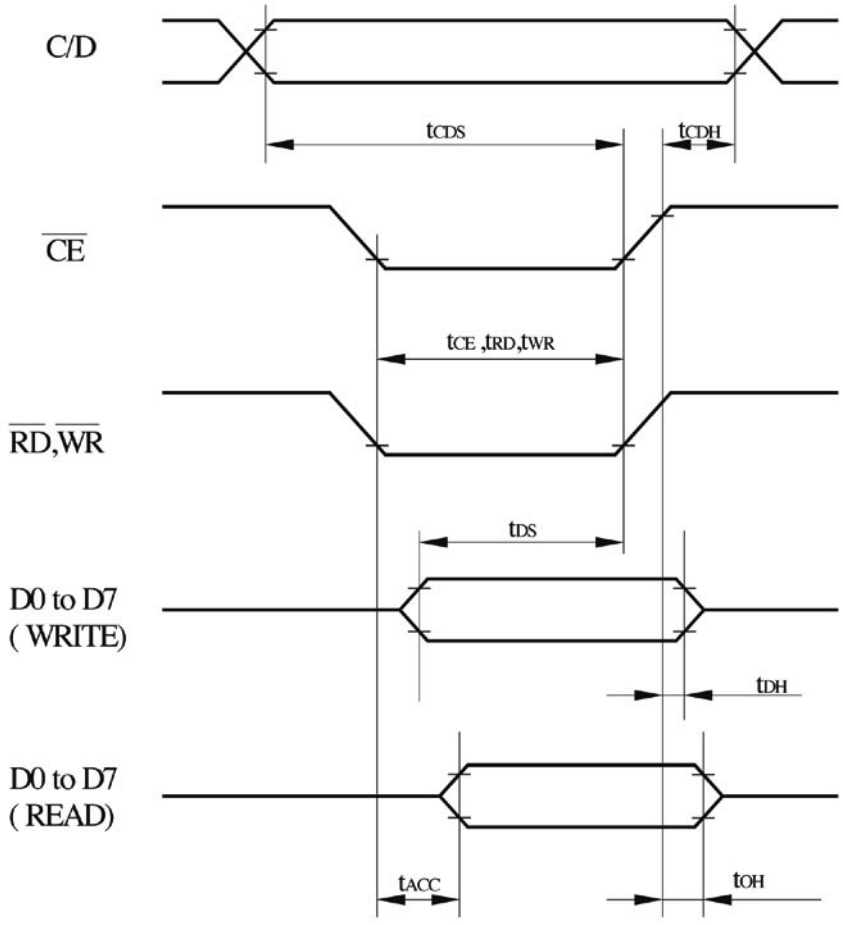
| Item | Symbol | Condition | Min. | Typ. | Max. | Degree |
|---|---|---|---|---|---|---|
| Viewing Angle Range | (V) θ | Cr ≥ 2 | 30 | — | 60 | degree |
| | (H) ψ | | -45 | — | 45 | degree |
| Contrast Ratio | CR | | — | 5 | — | |
| Response Time | T rise | | — | 200 | 300 | ms |
| | T fall | | — | 200 | 300 | ms |

## Interface Pin Assignment

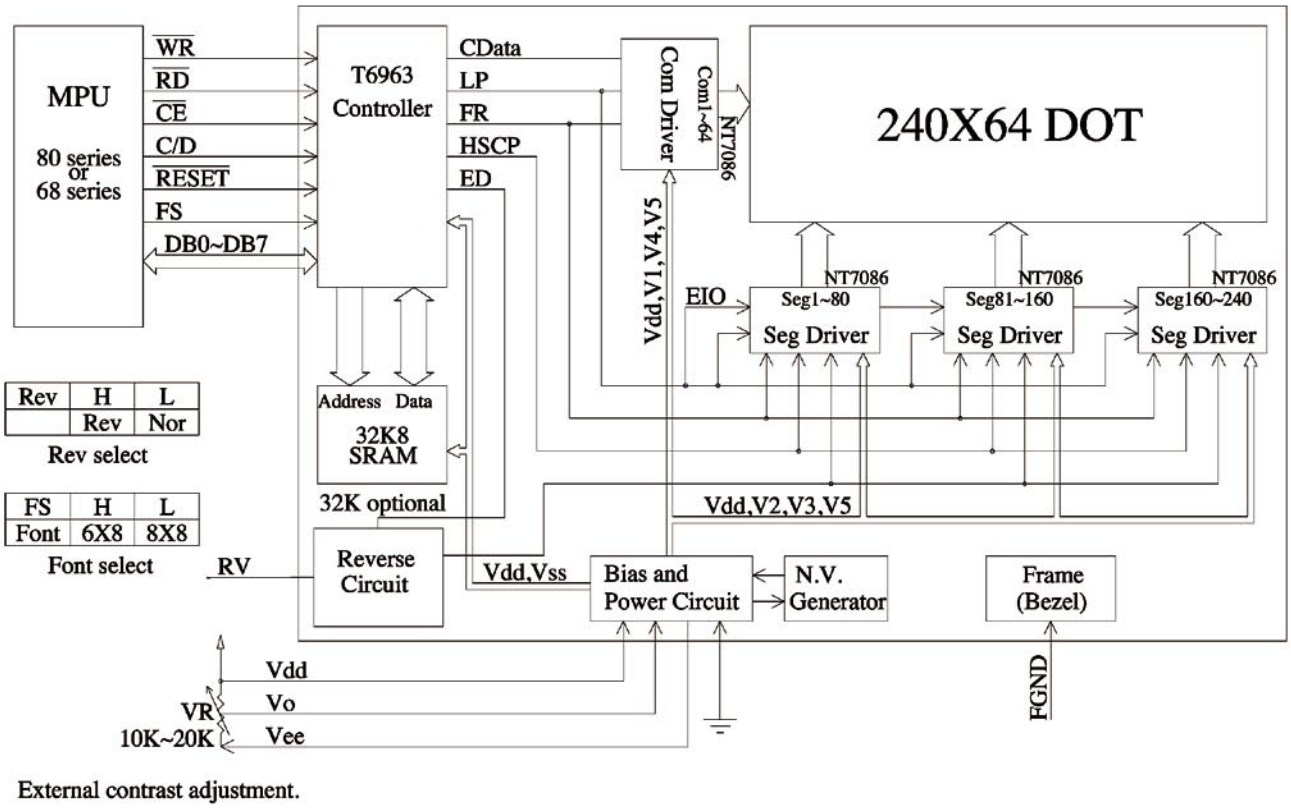
| Pin No. | Pin Out | Function Description | Level | | Pin No | Pin Out | Function Description | Level |
|---|---|---|---|---|---|---|---|---|
| 1 | FG | Frame Ground (Connected to bezel) | — | | 11 | DB0 | Data Bus Line | H/L |
| 2 | VSS | Ground | — | | 12 | DB1 | Data Bus Line | H/L |
| 3 | VDD | Power Supply | — | | 13 | DB2 | Data Bus Line | H/L |
| 4 | V0 | Power Supply for LCD Driver | — | | 14 | DB3 | Data Bus Line | H/L |
| 5 | WR | Data write. Write data into T6963 when WR=L | L | | 15 | DB4 | Data Bus Line | H/L |
| 6 | RD | Data read. Read data from T6963 when RD=L | L | | 16 | DB5 | Data Bus Line | H/L |
| 7 | CE | L: Chip Enable | L | | 17 | DB6 | Data Bus Line | H/L |
| 8 | C/D | Wr = "l", C/D = "H": Command Write; WR = "L", C/D = "L:": Data Write; RD = "L", C/D = "H": Status Read; RD = "L", C/D = "L": Data Read | H/L | | 18 | DB7 | Data Bus Line | H/L |
| 9 | Vee | Negative Voltage | — | | 19 | FS | H:Pins for selection of font; H: 6*8, L: 8*8 | H/L |
| 10 | RESET | H: Normal; L: Initialize T6963 | H/L | | 20 | N/C | No connection | — |

## Timing Characteristics - Bus Timing (Vss=0V, VDD=5V)

| Item | Symbol | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| C/D Set-up Time | tCDS | 100 | — | — | ns |
| C/D Hold Time | tCDH | 10 | — | — | ns |
| CE, RD, WR Pulse Width | tCDS, tRD, tWR | 80 | — | — | ns |
| Data Set-Up Time | tDS | 80 | — | — | ns |
| Data Hold Time | tDH | 40 | — | — | ns |
| Access Time | tACC | — | — | 150 | ns |
| Output Hold Time | tOH | 10 | — | 50 | ns |



## Power Supply




External contrast adjustment.

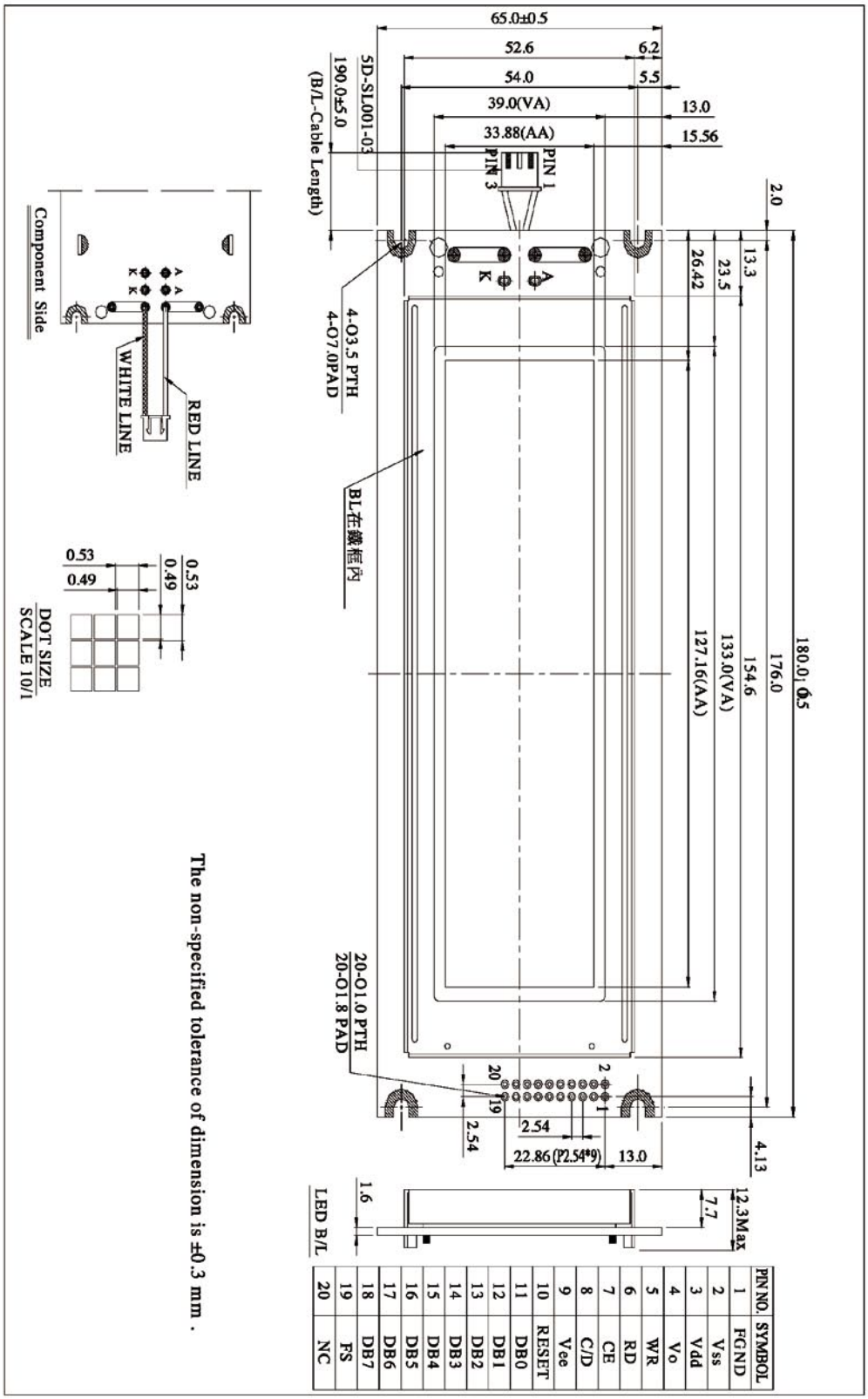
## Backlight Specifications

| Item | Symbol | Condition | Min. | Typ. | Max. | Degree |
|---|---|---|---|---|---|---|
| Supply Current | ILED | V = 3.5V | — | 80 | 100 | mA |
| Supply Voltage | V | | 3.4 | 3.5 | 3.6 | V |
| Reverse Voltage | VR | | — | — | 5 | V |
| Luminance | IV | ILED = 80 mA | 520 | 650 | — | cd/m$^2$ |
| LED Life Time | | ILED = 80 mA 25ºC, 50-60 %RH, Note1 | — | 50K | — | Hr |
| Color | White | | | | | |

Note: The LED of B/L is drive by current only, drive voltage is for reference only. Drive voltage can make driving current under safety area (current between minimum and maimum).

Note 1: 50K hours is only an estimate for reference.

## Power Supply




| PIN NO. | SYMBOL |
|---|---|
| 1 | FGND |
| 2 | Vss |
| 3 | Vdd |
| 4 | Vo |
| 5 | WR |
| 6 | RD |
| 7 | CE |
| 8 | C/D |
| 9 | Vee |
| 10 | RESET |
| 11 | DB0 |
| 12 | DB1 |
| 13 | DB2 |
| 14 | DB3 |
| 15 | DB4 |
| 16 | DB5 |
| 17 | DB6 |
| 18 | DB7 |
| 19 | FS |
| 20 | NC |