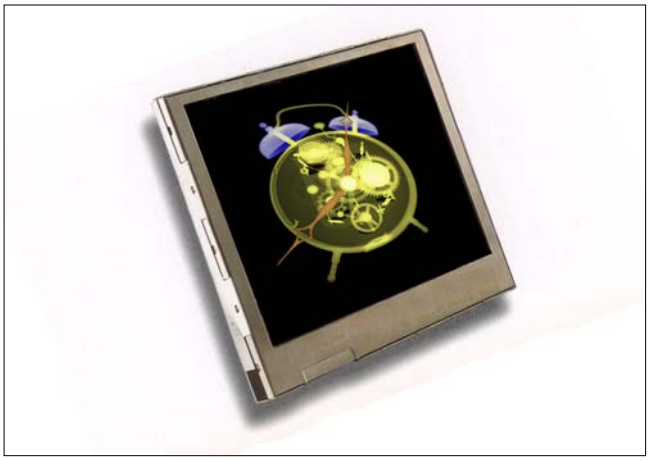
PRELIMINARY



AND-TFT-35VX-4HB

3.5" TFT LCD
LCD Color Monitor

The AND-TFT-35VX-4HB is a compact full color TFT LCD module, that is suitable for security, video games, door phones, video phones, portable TV and instrument displays and other media applications which require a high quality flat panel display. This device consists of an amorphous silicon TFT LCD panel with 12V CCFL backlightthat has 640 x 480 pixels on a 3.5 inch diagonal screen.

Features

- Amorphous silicon TFT LCD panel with CCFL B/L
- Module with resistive type touch panel
- Pixel in stripe configuration
- High Resolution: 262,144 Dots (640 x 480)
- Optimum viewing direction: 6 o'clock
- Auto-detect input signal when power on
- Input Signal: D-Sub VGA Signal, Dual Composite Video Channals and S-Video
- Operating Temperature: 0ºC ~ 60ºC
- Storage Temperature: -20ºC ~ 80ºC

Mechanical Characteristics

Item	Specification	Unit
Screen Size	3.5 inch diagonal	inch
Display Format	640 x (R, G, B) x 480	dot
Display Colors	262,144	–
Active Area	72 (W) x 52.56 (H)	mm
Pixel Pitch	0.1125 (W) x 0.1095 (H)	mm
Pixel Configuration	Stripe	–
Outline Dimension	84.25 (W) x 65.40 (H) x 4.45 (D) (Typ.)	mm
Weight	52 ± 5	g
Surface Treatment	AG	–
Surface Treatment of Touch Panel	3H	–

Absolute Maximum Rating VSS1 = VSS2 = GND =)V, Ta=25ºC

Item	Symbol	Remark	Min.	Max.	Unit
Supply Voltage	V_{DD1}	–	-0.3	2	V
	V_{CC}	–	-0.3	5	V
	V_{DD2}	–	-0.5	12.0	V
	V_{GG}	–	-0.3	40.0	V
	V_{GG}-V_{EE}	–	–	40.0	V
	V_{EE}	–	-20	0.3	V
Storage Temperature	T_{ST}	–	-20	+80	°C
Operation Temperature	T_{OP}	Note 1	0	+60	°C

Note 1: Operating Temperature defines that contrast, response time, other display optical character are Ta=+25.

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.

Power Consumption

Item	Symbol	Conditions	Specifications		Units
			Typ.	Max.	
Supply Current for Gate Driver (Hi level)	I_{GG}	V_{GG}=+17V	0.12	0.15	mA
Supply Current for Gate Drive (Low level)	I_{EE}	V_{EE}=-10V	0.15	0.19	mA
Supply Current for Source Driver (Digital)	I_{DD1}	$V_{DD1=}$+3.3V	4.8	8.0	mA
Supplly Current for Source Driver (Analog)	I_{DD2}	V_{DD2}=+10V	16.0	30.0	mA
Supply Current for Gate Driver (Digital)	I_{CC}	V_{CC}=+3.3V	0.17	0.21	mA
LCD Panel Power Consumption	–	–	180	332	mW
Backlight Power Consumption	P_{LED}	–	384	456	mW
Total Power Consumption	–	–	564	788	mW

Recommended Operating Conditions (VSS1 = VSS2 = GND = 0V, Ta = 25°C)

Item	Symbol	Specifications			Unit
		Min.	Typ.	Max.	
Supply Voltage for Source Driver	V_{DD1}	3.0	3.3	3.6	V
	V_{DD2}	9.5	10	10.5	V
Supply Voltage for Gate Driver	V_{GG}	–	+17	–	V
	V_{EE}	–	-10	–	V
	V_{CC}	3.0	3.3	3.6	V
Digital Input Voltage	V_{IH}	0.8 V_{DD1}	–	V_{DD1}	V
	V_{IL}	0	–	0.2 V_{DD1}	V

Recommended Driving Conditions for LED Backlight (GND= 0V, Ta=25ºC)

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Supply Voltage of CCFL Backlight	V_{LED}	–	12	–	V	I_L = 20MA
Supply Current of CCFLBacklight	I_{LED1}	–	20	–	mA	Note 1
	I_{LED2}					
Backlight Power Consumption	P_{LED}	360	384	456	mW	Note 2

Note 1: CCFL B/L applied information, please refer to the appendix at the end.
Note 2: $P_{LED} = V_{LED} * I_{LED1} + V_{LED} * I_{LED2}$.

Optical Specifications (Ta=25°C)

Item		Symbol	Conditions	Specifications			Unit
				Min.	Typ.	Max.	
Viewing Angle	Horizontal	θ	CR>10	± 45	± 50	–	deg
	Vertical	θ (to 12 o'clock)		10	15	–	
		θ (to 6 o'clock)		30	35	–	
Contrast Ratio Luminance when LCD is White Luminance when LCD is Black		CR	–	200	400	–	–
Response Time	Rise	Tr	θ =0°	–	15	30	ms
	Fall	Tf		–	25	50	
Brightness		LUM	θ =0°	–	1,000	–	cd/m^2
Uniformity		U	θ =0°	70	75	–	%
Cross Talk		–	θ =0°	–	–	3	%
White Chromaticity		X	–	0.28	0.31	0.34	–
		Y		0.30	0.33	0.36	
Lamp Life Time	Ta=25°C	–	–	–	10,000	–	hrs

Electronic Characteristics

Symbol	I/O	Conditions	Min.	Typ.	Max.	Unit
V in	I	DC(+)	4.8	5	5.2	V
I in		DC(+5V)	400	450	500	mA
P in				2.25		W

Touch Panel Characteristics - Electrical Performance

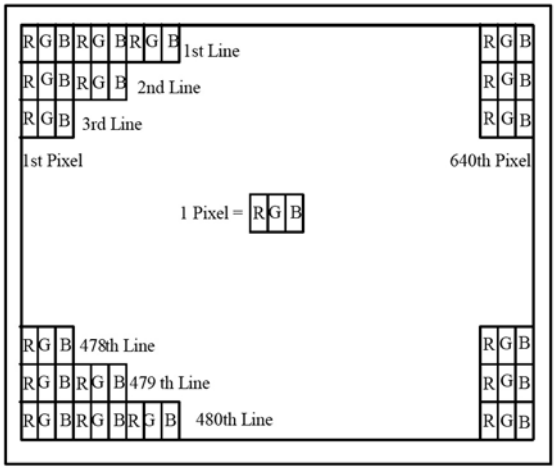
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Terminal Resistance	X	120	240	370	Ω	
	Y	280	570	860	Ω	
Input Voltage	VT	–	5.0	7.0	V	
Linearity (X, Y direction)		20		±1.5	%	
Insulation Impedance		20			MΩ	DC25V
Response Time				5	ms	
Operation Force				35	g	Note 1

Note 1: Input through 0.8R stylus or finger.

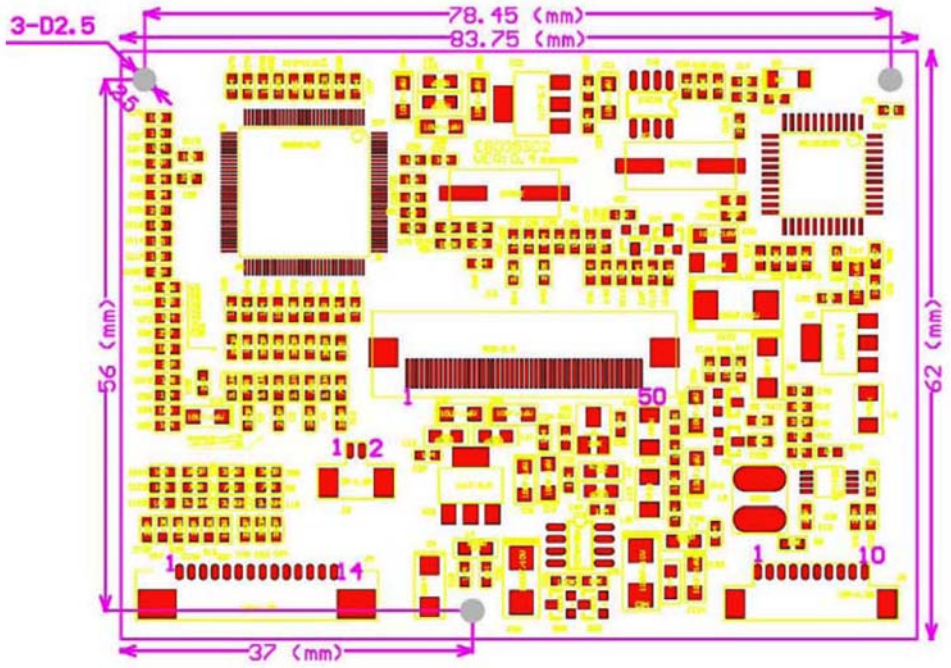
Touch Panel Characteristics - Durability Performance

Hitting Durability	At least 1,000,000 times with 48.0mm silicon rubber, 200g, 3 times/second.
Sliding Durability	At least 1,000,000 times with r0.8mm polyacetal stylus, 200g, 60mm/second.

Pixel Arrangement - The LCD module pixel arrangement is stripe.

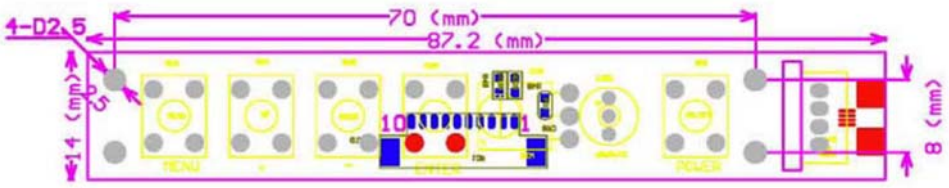


Driver Board Outline Drawing



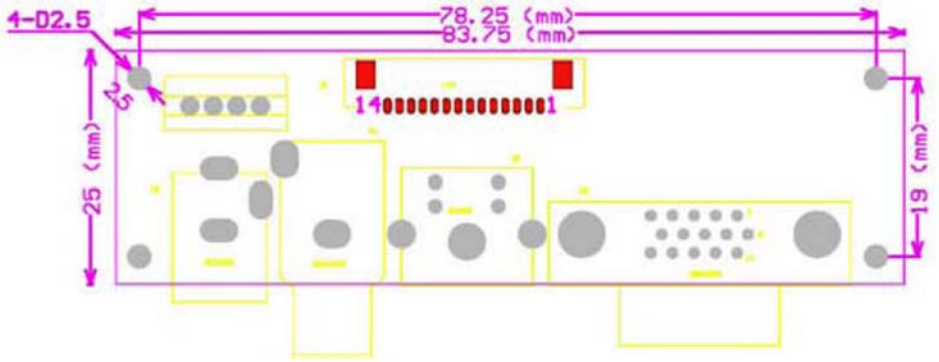
Description:
Outline: 83.75 x 62 x 7.2 mm
Top Layer High (Max): 6 mm
Board thickness: 1.2 mm
Three Screw Holes: Φ 2.5 mm

Keyboard Outline Drawing (Optional)



Description:
Outline: 87.2 x 14 x 12.7 mm
Top Layer High (Max): 8 mm
Bottom Layer High (Max): 3.5 mm
Board thickness: 1.2 mm
Four Screw Holes: Φ 2.5 mm

Demo Kit Outline Drawing (Optional)



Description:
Outline: 83.75 x 25 x 19.7 mm
Top Layer High (Max): 15 mm
Bottom Layer High (Max): 3.5 mm
Board thickness: 1.2 mm
Four Screw Holes: Φ 2.5 mm

Input/Output Terminals

J12 **Output to Panel Signal Terminal (50FPC)**

J4 **Outside Signal Input Terminal (14 pin)**

J5 **Control Signal Input Terminal (10 pin)**

J3 **Video 2 Input Terminal (2 pin) (Optional)**

J4 **Outside Signal Input Terminal**
Connector: Molex 53261-1471 or Compatible

Pin No.	Pin Name	I/O	Pni Description	Remarks
1	GND	I	Ground	–
2	VSYNC	I	VSYNC input for RGB input	–
3	HSYNC	I	HSYNC input for RGB input	–
4	GND	I	Ground	–
5	B	I	Video BLUE input	–
6	G	I	Video GREEN input	–
7	R	I	Video RED input	–
8	GND	I	Ground	–
9	S-C	I	S-video Chroma input	–
10	S-Y	I	S-video luma input	–
11	VIDEO1	I	Composite Video 1	–
12	GND	I	Ground	–
13	GND	I	Ground	–
14	V_{CC}	I	5V	4.8V – 5.2V

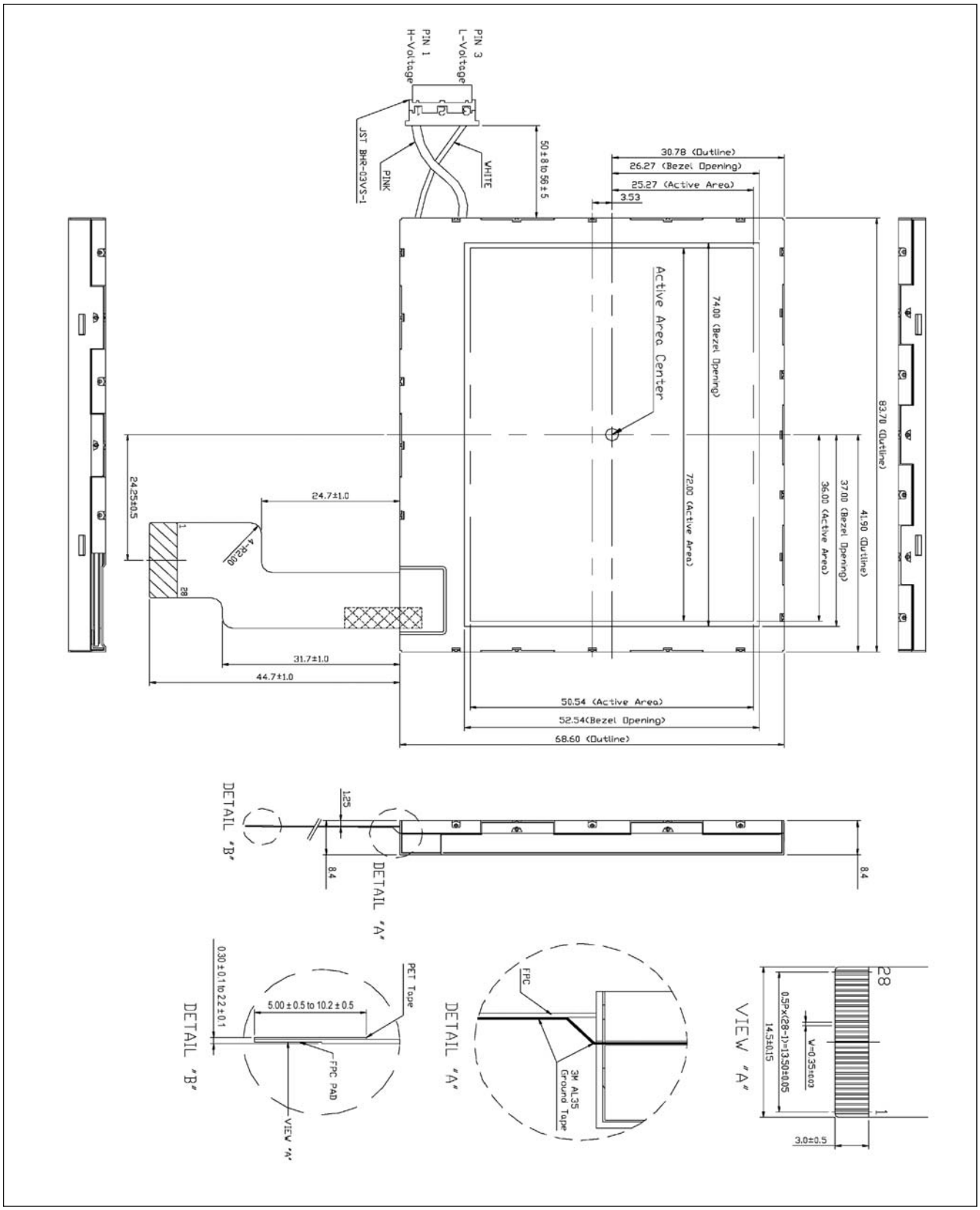
J5 **Control SIgnal Input/Output Terminal**
Connector: Molex 53261-1071 or Compatibility

Pin No.	Pin Name	I/O	Pin Description	Remarks
1	LED	O	Red Lamp	–
2	LED	O	Green Lamp	–
3	SENSOR	I	Remote Sensor	–
4	GND	I	Ground	–
5	3.3V	O	+3.3V	–
6	ON/OFF	I	Power On/Off	–
7	MENU	I	Menu	–
8	DOWN	I	Down	–
9	UP	I	Up	–
10	ENTER	I	Enter	–

J5 **Control SIgnal Input/Output Terminal**
Connector: Molex 53261-1071 or Compatibility

Pin No.	Pin Name	I/O	Pin Description	Remarks
1	GND	I	Ground	–
2	VIDEO2	I	Composite Video 2	–

Dimensional Outline



Timing Parameters - AC Electrical Characteristics (VCC=VDD1=3.3V, VDD2 = 10V, GND = VSS1 = VSS2 = 0V, Ta=25ºC)

Item	Symbol	Min.	Typ.	Max.	Unit
CLK Frequency	F_{CLK}	–	25	40	MHz
CLK Pulse Width	T_{CPH}	25	–	–	ns
Data Set-up Time	T_{SU}	4	–	–	ns
Data Hold Time	T_{HD}	2	–	–	ns
Propagation Delay of DIO2/1	T_{PHL}	6	10	15	ns
Time That The Last Data to LD	T_{LD}	1	–	–	T_{CPH}
Pulse Width of LD	T_{WLD}	2	–	–	T_{CPH}
Time That LD to DIO1/2	T_{LDS}	5	–	–	T_{CPH}
POL Set-up Time	T_{PSU}	6	–	–	ns
POL Hold Time	T_{PHD}	6	–	–	ns
OE Pulse Width	T_{OEV}	1	–	–	μs
CKV Pulse Width	T_{CKV}	500	–	–	ns
STV Set-up Time	T_{SUV}	400	–	–	ns
STV Hold Time	T_{HDV}	400	–	–	ns
Horizontal Display Period	T_{HDP}	–	640	–	T_{CPH}
Horizontal Period Timing Range	T_{HP}	–	800	–	T_{CPH}
Horizontal Lines Per Field	T_V	520	525	640	T_{HP}
Vertical Display Timing Range	T_{DV}	–	480	–	T_{HP}