



## AND-TFT-35XS-LED-KIT

### 3.5" TFT LCD

### LCD Color Monitor

The AND-TFT-35XS-LED-KIT is a compact full color TFT LCD module, that is suitable for camcorder, digital camera applications and other electronic products which require high quality flat panel displays. This device consists of a twisted nematic (TN) liquid crystal cell, that incorporates a TFT-array that has 320 x 234 pixels on a 3.5 inch diagonal screen, X and Y drivers, an LSI controller, and a built-in CCFL backlight.

#### Features

- Long life LED backlight
- No controller chip is necessary
- Compatible with NTSC or PAL system (switchable)
- High Resolution: 112,320 dots
- Optimum viewing direction: 6 o'clock
- Up/Down and Left/Right image inversion
- RoHS compliant

#### Mechanical Characteristics

Item	Specification	Unit
Screen Size	3.5 inch diagonal	inch
Outline Dimensions	83.5 (W) x 63.1 (H) x 3.6 (D)	mm
Active Area	71.6 (W) x 52.65 (H)	mm
Surface Treatment	Anti-Glare	-
Pixel Number (RGB trio)	320 (W) x 234 (H)	-
Pixel Configuration	Delta	-
Dot Pitch	0.074 (W) x 0.225 (H)	mm
Weight	58 ± 5	g

#### Absolute Maximum Rating

Item			Symbol	Conditions	Absolute Maximum Rating		Unit
					Min.	Max.	
Supply Voltage	for Source Driver	Analog	$V_{DD}$	$T_a = 25^\circ\text{C}$	-0.3	+7.0	V
		Digital	$V_{DD}$		-0.3	+7.0	
	for Gate Driver	Positive	$V_{GH}$		-0.3	+45	
		Negative	$V_{GL}$		-2.3	+0.3	
			$V_{GH} - V_{GL}$		+15	+40	
Analog Input Voltage ( means $V_R, V_G, V_B$ )			$V_{VIDEO}$		-0.3	+7.3	V
Operating Temperature (define that contrast, response time, other display optical characters are $T_a=+25$ )			Top	-	0	+60	$^\circ\text{C}$
Storage Temperature			Tstg	-	-20	+70	$^\circ\text{C}$

NOTES: GND = 0V,  $T_a = 25^\circ\text{C}$

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.



# AND-TFT-35XS-LED-KIT

## Power Consumption (Ta =25°C)

Item	Symbol	Remarks	Specifications	Units
			Typ.	
LCD Panel Power Consumption	–	Power consumption for backlight is not included	33.5	mW
Backlight Lamp Power Consumption	–	calculated by $I_L \times V_L$ .	0.65	W
Total Power Consumption	–	–	0.69	W

## Backlight Connector

JST BHR-03VS-1

## Recommended Operating Conditions

Item	Symbol	Remarks	Specifications			Unit
			Min.	Typ.	Max.	
Power Supply (Ta = 25°C)	V <sub>CC</sub>		+4.5	+5.0	+5.5	V
	V <sub>DD</sub>		+3.0	+3.3	+3.6	
	AV <sub>DD</sub>		+4.5	+5.0	+5.5	
	V <sub>GH</sub>		+14.5	+15.0	+15.5	
	V <sub>EE</sub>		-15.5	-15.0	-14.5	
	V <sub>GL AC</sub>	AC Component of V <sub>GL</sub>	–	+6.0	–	V <sub>P-P</sub>
	V <sub>GL DC</sub>	DC Component of V <sub>GL</sub>	-12.5	-11.0	-9.5	V
Video Signal (V <sub>R</sub> , V <sub>G</sub> , V <sub>B</sub> )	V <sub>I AC</sub>	AC Component, Note 2	–	+4.0	+4.2	V <sub>P-P</sub>
	V <sub>I DC</sub>	DC Component	–	+2.5	–	V
V <sub>COM</sub>	V <sub>COM AC</sub>	AC Component of V <sub>COMM</sub>	–	+6.0	–	V <sub>P-P</sub>
	V <sub>COM DC</sub>	DC Component of V <sub>COMM</sub>	+0.9	+1.0	+1.1	V
H Level	V <sub>IH</sub>	Note 1	+0.7 V <sub>DD</sub>	–	–	V
L Level	V <sub>IL</sub>		–	–	+0.3 V <sub>DD</sub>	

Note 1: STH1, STH2, CPH1, CPH2, CPH3, Q2H, INH, CPV, XOE, DIO1, DIO2

Note 2: Both NTSC & PAL system Video Signal input waveform is based on 8 steps gray scale.

## Optical Specifications

Item	Symbol	Conditions	Specifications			Unit	
			Min.	Typ.	Max.		
Viewing Angle	Horizontal	$\theta$	CR $\geq$ 10	$\pm 45$	$\pm 50$	–	deg
	Vertical	$\theta$ (to 12 o'clock)		10	15	–	
		$\theta$ (to 6 o'clock)		30	35	–	
Contrast Ratio Luminance when LCD is White Luminance when LCD is Black	CR	At optimized viewing angle	110	150	–	–	
Response Time	Rise	Tr	$\theta = 0^\circ$	–	15	30	ms
	Fall	Tf	$\phi = 0^\circ$	–	25	50	
Transmission	Ratio	T	–	7.5	8.0	8.5	%
Uniformity	U	–	–	65	70	–	–
Brightness	LUM	–	–	200	250	–	cd/m <sup>2</sup>
White Chromaticity	X	$\theta = 0^\circ$	–	0.280	0.310	0.340	–
	Y			0.310	0.340	0.370	
	Tc			6650	6850	7050	
Lamp Life Time	+25°C	–	decay to 75%	10,000	–	–	hr



Interface Pin Assignment

Pin No.	Symbol	Function	Input/Output	Remark
1	STH1	Start pulse for source driver	I/O	Note 1
2	AV <sub>SS</sub>	Analog GND for source driver	I	-
3	AV <sub>DD</sub>	Analog power input for source driver	I	Note 2
4	V <sub>B</sub>	Video Input B	I	Note 4
5	V <sub>G</sub>	Video Input G	I	Note 4
6	V <sub>R</sub>	Video Input R	I	Note 4
7	V <sub>SS</sub>	Digital GND	I	
8	V <sub>DD</sub>	Digital power input	I	Note 3
9	CPH1	Sampling and shift clock for source driver	I	
10	CPH2	Sampling and shift clock for source driver	I	
11	CPH3	Sampling and shift clock for source driver	I	
12	STH2	Start pulse for source driver	I/O	Note 1
13	Q2H	Video input rotation control	I	
14	INH	Output enable for source driver	I	
15	R/L	Left/Right Control for source driver	I	
16	V <sub>COM</sub>	Common electrode voltage	I	Note 4
17	V <sub>COM</sub>	Common electrode voltage	I	Note 4
18	XOE	Output enable for gate driver	I	
19	CPV	Clock input for gate driver	I	
20	U/D	Up/Down Control for gate driver	I	
21	DIO2	Vertical start pulse	I/O	Note 5
22	DIO1	Vertical start pulse	I/O	Note 5
23	V <sub>GL</sub>	Gate off voltage (alternative every 1-H)	I	Note 4
24	V <sub>EE</sub>	Gate driver negative voltage	I	Note 6
25	V <sub>SS</sub>	GND	I	
26	V <sub>CC</sub>	Logic power for gate driver	I	Note 3
27	V <sub>GH</sub>	Gate on voltage	I	Note 7
28	NC	No connection	-	

Note 1: STHL, STHR and R/L mode

R/L	STHL	STHR	Remarks
High (VDD)	Input	Output	Left to Right
Low (0 Volt.)	Output	Input	Right to Left

Note 2: AV<sub>DD</sub> = +5V (Typ.)

Note 3: V<sub>DD</sub>, V<sub>CC</sub> = +5V (Typ.)

Note 4: V<sub>COM</sub> = 6V<sub>PP</sub>

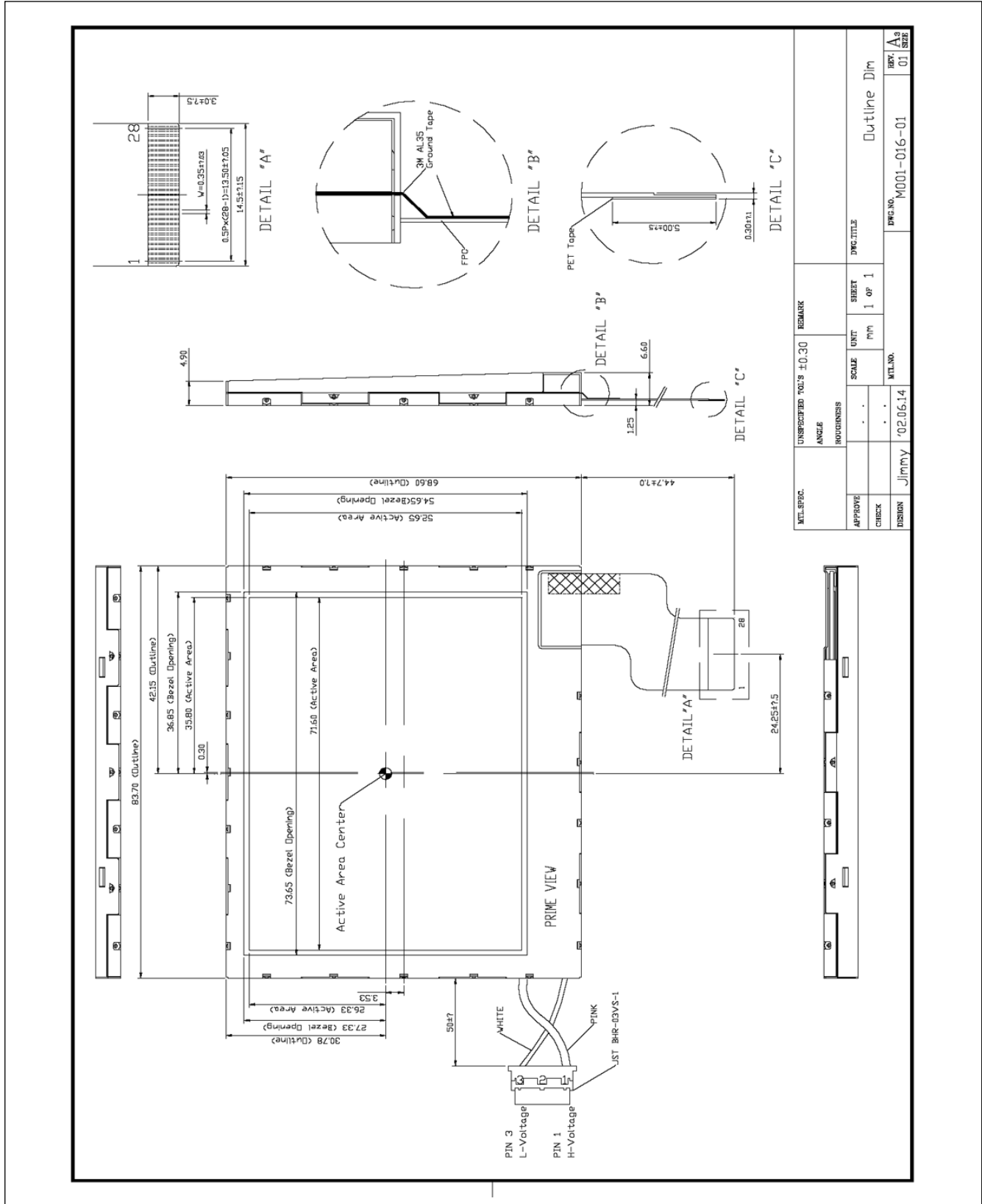
Note 5: Dio1, DIO2 and U/D mode

U/D	DIO1	DIO2	Remarks
High (VDD)	Input	Output	Down to Up
Low (0 Volt.)	Output	Input	Up to Down

Note 6: V<sub>EE</sub> = -15V (Typ.)

Note 7: V<sub>GH</sub> = -15V (Typ.)

Dimensional Outline





# PC-TFT-35XS-LED

## Interface Board

### Features

- Used for TFT-LCD display: 3.5" AND-TFT-35XS-LED
- Ultra compact, light, thin and small
- DC/DC DC/AC Video Decoder all in one
- NTSC/PAL Video Input Switch
- Up/Down, Left/Right Display Reverse
- Composite Video RGB Mode Switchable
- RoHS Compliant

The PC-TFT-35XS-LED is designed to work with the AND-TFT-35XS-LED color TFT display which is suitable for security, video game, door phone, video phone, portable TV and instrument display applications.

Do not use for products which demand extremely high performance in terms of functionality, reliability, or accuracy. Products such as: aerospace equipment, control equipment for nuclear power industry or medical equipment related to life support.

### Mechanical Characteristics

Item	Specification	Unit
Outline Dimension	62.5 (W) x 52 (H) x 7.5 (D)	mm
Weight	20	g

### Absolute Maximum Rating

Item	Symbol	Conditions	Min.	Max.	Unit
Operating Temperature	Top	–	0	60	°C
Storage Temperature	Tstg	–	-30	80	°C

### DC to DC Converter

Voltage (V)	Current (mA)	Total Regulation			Ripple & Noise (mV)
		Min.	Typ.	Max.	
+5V	50-100	4.8	5.0	5.1	50
+7.5V	6~10	7	9.1	9.5	200
+15V	5~5	12	15	16	200
-12V	2-5	-9	-12	-15	200

### Input

#### Characteristics:

**Typical Input Voltage:** 8V DC

**Input Voltage Range:** 6VDC to 15 VDC

**Input Current:** 150mA, Typical at 12VDC with panel load.

**Inrush Current Max:** 250mA at 6VDC, 130mA at 15VDC Cold start at 25C, 5.0VDC with panel load.

**Sync. Pulse:** 60KHz Typical



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Pin No.	Symbol	I/O	Description	Remarks
1	+5V	O	5.0V output	-
2	COL	I	color adj.	-
3	BRT	I	brightness adj.	-
4	CNT	I	contrast adj.	-
5	Video	I	composite video signal	The signal resistance is 75Ω, 1V p-p.
6	U/P	I	up/down scan control	+5V or GND
7	R/L	I	left/right scan control	+5V or GND
8	GND	I	ground	-
9	GND	I	ground	-
10	+12V	I	+12V DC power input	-
11	HSY	O	HSY output	-
12	VSY	O	VSY output	-

e

**Connector:**

**Pin No:** FC12D (Bottom Contact)

**Pitch:** FC 1.0mm

**Output Characteristics:**

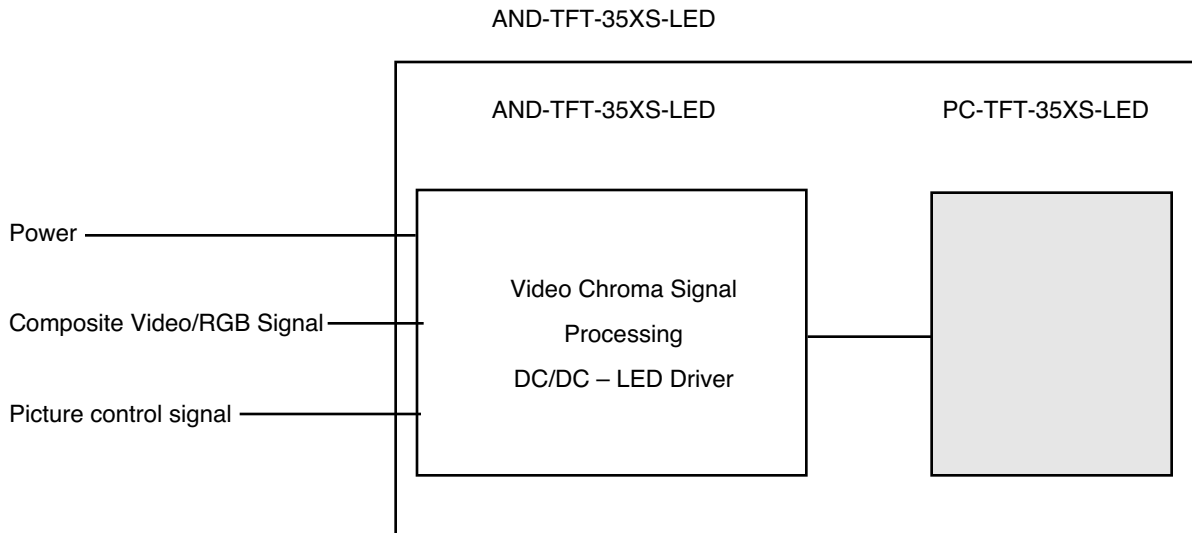
**DC to DC Backlight Inverter:**

**Starting Voltage:** 15.8VDC, typical at 6.0 VDC

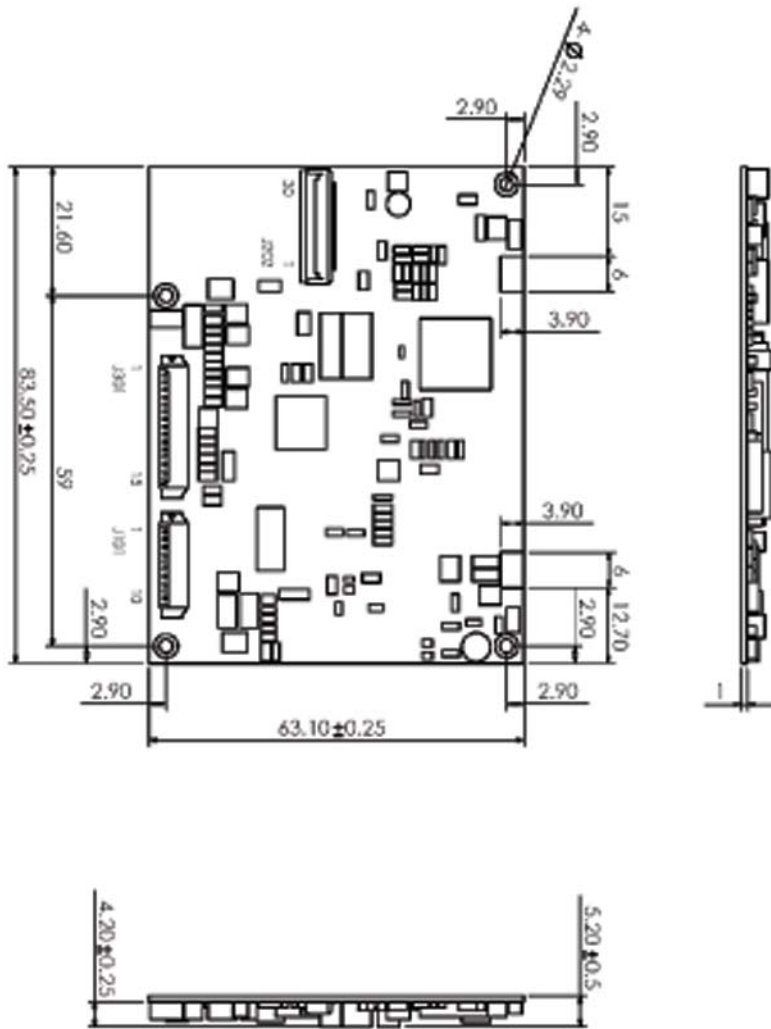
**Working Voltage:** 16.0 VDC, typical at 15 VDC

**Working Current:** DC 10mA ± 20% typical for general application.

**Block Diagram**



Dimensional Outline



Dimensional Outline

