AND Displays

AND-TFT-5PA*

320 x 234 Pixels
LCD Color Monitor

The AND-TFT-5PA is a compact full color TFT LCD module, whose driving board is capable of converting composite video signals to the proper interface of LCD panel and is suitable for security, car TV, portable DVD and GPS applications. It can accept NTSC & PAL video signal input.

This device consists of a twisted nematic (TN) liquid crystal cell, that incorporates a TFT-array that has 320 x 234 pixels on a 5 inch diagonal screen, X and Y drivers, an LSI controller, and a built-in CCFL backlight and inverter (with optional board.)

Features

- Compatible with NTSC and PAL system
- Pixel in stripe configuration
- 5 inch (13 cm) diagonal screen
- High brightness CCFL backlight (400 Nits)
- Slim and compact
- Vcom Toggle
- Imager Reversion: Up/Down and Left/Right
- 1/4 VGA resolution
- High performance, low consumption
- **RoHS compliant**

***ALSO AVAILABLE:**
AND-TFT-5PA-DHB (high bright backlight installed- 500 nits)

Mechanical Characteristics

Item	Specification	Unit
Screen Size	5 inch (13 cm) diagonal	
Outline Dimensions	127.4 (W) x 92.8 (H) x 12.9 (D)(typ.)	mm
Active Area	102.72 (W) x 74.53 (H)	mm
Drive System	a-Si TFT Active matrix, a line at a time Non-Interlace Drive	
Weight	160 ± 10	g
Sub Pixel Arrangement	stripe	–
Pixel Pitch	0.107 (W) x 0.319 (H)	mm
Display Format	960 x 234	dot

Absolute Maximum Rating (GND = 0V, Ta = 25°C)

Item		Symbol	Remarks	Absolute Maximum Rating		Unit
				Min.	Max.	
Supply Voltage for Source Driver		V_{CC}		-0.5	7	V
		V_{DD}		-0.5	7	
Supply Voltage for Gate Driver		V_{GH}- V_{GL}		-0.3	40	V
	H Level	V_{GH}		0	40	
	L Level	V_{GL}		-20	0	
Analog Signal Input Level		V_R, V_G, V_B		-0.3	7.0	V
Digital Input Signals			$\overline{HSY}$, CSY, $\overline{VSY}$, CKC	-0.3	5.5	V
Digital Output Signals			$\overline{HSY}$, $\overline{VSY}$, PSI, PSC	-0.3	5.5	V
Storage Temperature				-30	+80	°C
Operation Temperature				-20	+70	°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.

Power Consumption (Ta = 25°C)

Item		Symbol	Conditions	Specifications			Units
				Min.	Typ.	Max.	
Supply Current for Gate Driver	Hi level	I_{GH}	V_{GH} = +17V	0.15	–	0.20	mA
	Low level	I_{GL}	V_{GL} = -15V	-10.0	–	-15.0	mA
Supply Current for Source Driver		I_{CC}	V_{CC} = +5V	17.0	–	20.0	mA
Supply Voltage for Controller		I_{DD}	V_{DD} = +5V	43.0	–	48.0	mA
LCD Panel Power Consumption (Note 1)		–	–	0.45	–	0.57	W
Backlight lamp Power Consumption (Note 2)		–	–	2.40	–	2.90	W

Note 1: The power consumption for backlight is not included

Note 2: Backlight lamp power consumption is calculated by I_L x V_L.

Recommended Operating Conditions (Driving for TFT-LCD Panel) **GND = OV, Ta = 25°C**

Item		Symbol	Specifications			Unit
			Min.	Typ.	Max.	
Supply Voltage for Source Driver	Analog	V_{CC}	4.5	5.0	5.5	V
	Logic	V_{DD}	4.5	5.0	5.5	
Supply Voltage for Gate Driver	H Level	V_{GH}	+15	+17	+19	V
	L Level	V_{GL}	-16	-15	-14	
Supply Voltage for Controller		V_{DD}	4.5	5.0	5.5	V
R, G, B Signal Level	Level	–	0.3	–	4.8	V
Digital Input Voltage	H Level	V_{IH}	0.7 V_{DD}	–	V_{DD}	V
	L Level	V_{IL}	-0.3	–	0.3 V_{DD}	
Digital Output Voltage	H Level	V_{OH}	0.7 V_{DD}	–	V_{DD}	V
	L Level	V_{OL}	-0.3	–	0.3 V_{DD}	

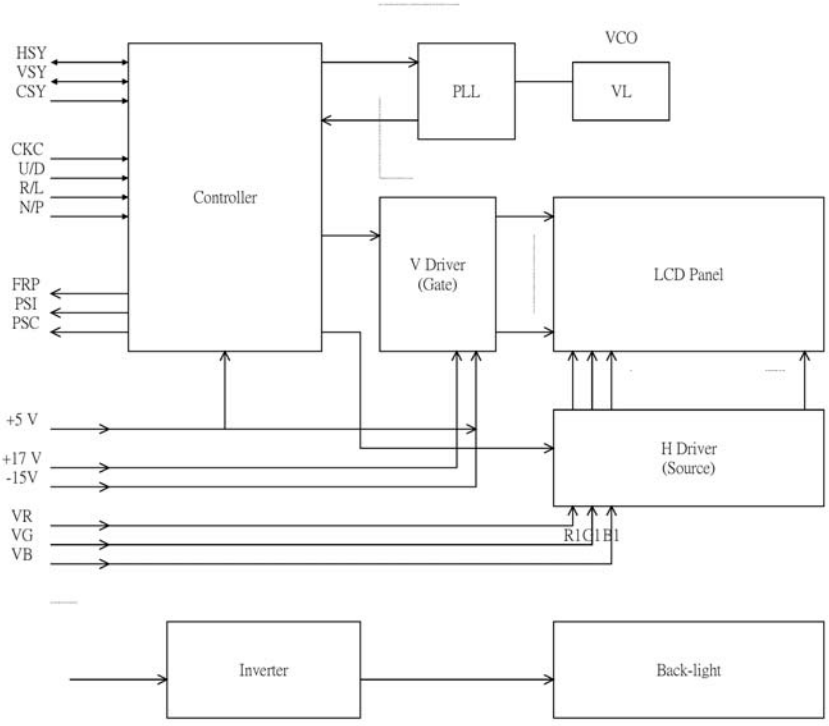
Optical Specifications (Ta = 25°C)

Item		Symbol	Conditions	Specifications			Unit
				Min.	Typ.	Max.	
Viewing Angle	Horizontal	θ = 21, θ = 22	CR ≥ 10	45	55	–	deg
	Vertical	θ = 11		30	35	–	
		θ = 12		10	15	–	
Contrast Ratio (Note 1)		CR	θ = 0	80	150	–	
Response Time	Rise	Tr	θ = 0	–	15	30	ms
	Fall	Tf		–	30	50	
Transmission Ratio		T	–	8.0	8.5	–	%
Uniformity		U	–	70	85	–	%
Luminance (Note 2)		LUM	θ = 0	350	400	–	cd/m^2
White Chromaticity		x	θ = 0	0.270	0.300	0.330	–
		y		0.320	0.350	0.380	
Lamp Life Time +25 °C		–	–	10,000	–	–	hr

Note 1: CR = Luminance when Testing point is White
Luminance when Testing point is Black
Contrast Ratio is measured in optimum common electrode voltage

Note 2: Topcon BM-7(fast) luminance meter 2° field of view is used in the testing (after 20~30 minutes operation). Lamp Current 6mA

Block Diagram



Recommended Operating Conditions (Driving for Backlight) **Ta = 25°C**

Item	Symbol	Remark	Specifications			Unit
			Min.	Typ.	Max.	
Lamp Voltage	V_L	I_L = 5 mA	432	480	528	Vrms
Lamp Current	I_L	–	4.5	5.0	5.5	mA
Lamp Frequency	P_L	Note 1	40	43	80	KHz
Kick-Off Voltage (25 °C)	V_S	Note 2	–	–	600	Vrms
Kick-Off Voltage (0 °C)	V_S		–	–	800	Vrms

Note 1: The wave form of lamp driving voltage should be as close to a perfect SIN wave as possible

Note 2: This value is not output voltage of inverter. The voltage of inverter must be larger than the starting voltage.

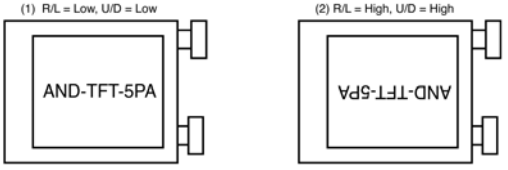
Interface Pin Assignment Connector:

Pin #.	Symbol	I/O	Function	Remark
1	$\overline{HSY}$	I/O	Horizontal Sync Input/Output	
2	FRP	O	Video Polarity Alternating Signal	
3	CSY/HSY	I	Composite Sync/Horizontal Sync. Signal	Note 1
4	V_{GH}	I	Supply Voltage for Gate Driver (Hi Level)	V_{GH} TYP. = +17V
5	V_{GL}	I	Supply Voltage for Gate Driver (Low Level)	V_{GL} TYP. = -15V
6	V_B	I	Video Signal (Blue)	
7	V_R	I	Video Signal (Red)	
8	V_G	I	Video Signal (Green)	
9	GND	I	Ground	
10	V_{DD}	I	Supply Voltage for Controller	V_{DD} TYP. = +5V
11	V_{CC}	I	Supply Voltage for Source Driver	V_{CC} TYP. = +5V
12	GND	I	Ground	
13	CKC	I	Control Pin for Select I/O Signal	Note 1
14	$\overline{VSY}$	I/O	Video Sync Input/Output	
15	PSI	O	Synchronize Pulse for Decoder	
16	PSC	O	Synchronize Pulse for DC-DC Converter	
17	NC/VSY	I	No Connection/Vertical Sync. Signal	Note 1
18	UD	I	UP/DOWN Control	Note 2
19	RL	I	Right/Left Shift Control	Note 2
20	NP	I/O	NTSC/PAL Selection Signal (Low: PAL, High: NTSC)	If using auto detect this pin is output, otherwise input

Note 1: This module can support 2 input mode. CKC of 13 pin select 2 input mode.

Parameter	Select pin (CKC)	Description	
	CKC (Pin 13)	CSY/HSY (Pin 3)	VSY (Pin 17)
Composite sync mode*	High	CSY (positive edge)	–
Sync separate mode**	Low	HSY (positive edge)	VSY (positive edge)
*Default mode of this module is composite sync mode (CKC=high)			
**If using sync sep. mode (CKC=low), please contact Purdy to modify some components of PCBA			

Note 2



Dimensional Outline

General mechanical tolerance = 0.5mm