



Features

- Pixel in stripe configuration
- 7.0 inch (16 cm) diagonal screen
- High brightness CCFL backlight (350 Nits)
- Slim and compact
- Amorphous silicon TFT-LCD with B/L unit
- Imager Reversion: Up/Down and Left/Right
- Support multi display mode
- High performance, low power consumption

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-7PA

1440 x 234 Pixels LCD Color Monitor

The AND-TFT-7PA 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 car TV, portable DVD and GPS, multimedia applications and other AV systems.

This device consists of amorphous silicon TFT liquid crystal display with B/L unit. The display has 1440 x 234 pixels on a 7.0 inch diagonal screen. X and Y drivers, LSI controller, and a built-in CCFL backlight inverter (with optional board.)

Mechanical Characteristics

Item	Specification	Unit
Screen Size	7.0 inch (16.9 cm) diagonal	—
Outline Dimensions	166.0 (W) x 100.0 (H) x 7.2 (D)	mm
Active Area	154.08 (W) x 86.58 (H)	mm
Surface Treatment	Anti-glare and hard coating	—
Weight	164 ± 10	g
Pixel Arrangement	stripe	—
Pixel Pitch	0.107 (W) x 0.370 (H)	mm
Display Format	1440 x 234	dot

Absolute Maximum Rating

Item	Symbol	Remarks	Absolute Maximum Rating		Unit
			Min.	Max.	
Supply Voltage for Source Driver	AV_{DD}		-0.3	+7.0	V
	V_{CC2}		-0.3	+6.0	
Supply Voltage for Gate Driver	V_{CC1}		-0.3	+6.0	V
	H Level V_{GH}		-0.3	+30	
	L Level V_{GL}		-20	+0.3	
	$V_{GH} - V_{GL}$		-0.3	+40	
Analog Signal Input Level	V_R, V_G, V_B	Analog Input Voltage means V_R, V_G, V_B	-0.3	$AV_{DD} + 0.3$	V
Storage Temperature	—		-20	+70	°C
Operation Temperature	—	Note 1	-0	+60	°C

Note 1: Optical characteristics are measured under $T_a = +25^\circ\text{C}$.

Power Consumption (Ta = 25°C)

Item		Symbol	Conditions	Specifications		Units
				Typ.	Max.	
Supply Current for Gate Driver	Hi level	I _{GH}	V _{GH} = +17V	0.6	0.9	mA
	Low level	I _{GL}	V _{GL} = -12V	1.5	1.9	mA
Supply Current for Source Driver	Analog	I _{DD}	AV _{DD} = +5V	10.5	15	mA
	Digital	I _{CC2}	V _{CC2} = +3.3V	1.1	1.35	mA
Supply Current for Gate Driver	Digital	I _{CC1}	V _{CC1} = +3.3V	0.2	0.5	mA
LCD Panel Power Consumption (Note 1)		—	—	85	120	mW
Backlight lamp Power Consumption (Note 2)		—	—	3.3	—	W

Note 1: The power consumption for backlight is not included.

Note 2: Backlight lamp power consumption is calculated by $I_L \times V_L$.

Recommended Driving Conditions for TFT-LCD Panel
GND = 0V, Ta = 25°

Item		Symbol	Specifications			Unit	Remark
			Min.	Typ.	Max.		
Supply Voltage for Source Driver	Analog	AV_{DD}	4.5	5.0	5.5	V	—
	Logic	V_{CC2}	3.0	3.3	3.6		—
Supply Voltage for Gate Driver	H Level	V_{GH}	+15	+17	+19	V	—
	L Level	$V_{GL\ DC}$	-13	-12	-10.5		DC component
		$V_{GL\ AC}$	—	5.0	—		AC component
	Logic	V_{CC1}	3.0	3.3	3.6	V	—
Analog Input Signal Voltage	V_{iAC}	V_{iAC}	—	4.0	4.2	V	AC component
	V_{iDC}	V_{iDC}	—	2.5	—	V	DC component
Digital Input Voltage	H Level	V_{IH}	$0.7\ V_{CC}$	—	V_{CC}	V	—
	L Level	V_{IL}	0	—	$0.3\ V_{CC}$		—
Digital Output Voltage	H Level	V_{OH}	$0.7\ V_{CC}$	—	V_{CC}	V	—
	L Level	V_{OL}	0	—	$0.3\ V_{CC}$		—
V_{COM}		$V_{COM\ AC}$	—	5.0	—	V_{p-p}	AC component of V_{COM}
		$V_{COM\ DC}^*$	—	1.6	—	V	DC component of V_{COM}

*Purdy strongly suggests that the $V_{COM\ DC}$ level shall be adjustable, and the adjustable level range is $1.6V \pm 1V$, every module's $V_{COM\ DC}$ level shall be carefully adjusted to show a best image performance.

Recommended Driving Conditions for Backlight

Item	Symbol	Min.	Typ.	Max.	Unit	Remarks
Lamp Voltage	V_L	474	527	580	Vrms	IL=6mA
Lamp Current	I_L	3	6	8	MA	Note 1
Lamp Frequency	P_L	40	55	80	KHz	Note 2
Kick-off Voltage (25° C) (Reference Value)	V_S	–	–	630	Vrms	Note 3
Kick-off Voltage (0° C) (Reference Value)	V_S	–	–	890	Vrms	Note 3

Note 1: In order to satisfy the quality of B/L, no matter use what kind of inverter, the output lamp current must be between Min. and Max. to avoid the abnormal display image caused by B/L.

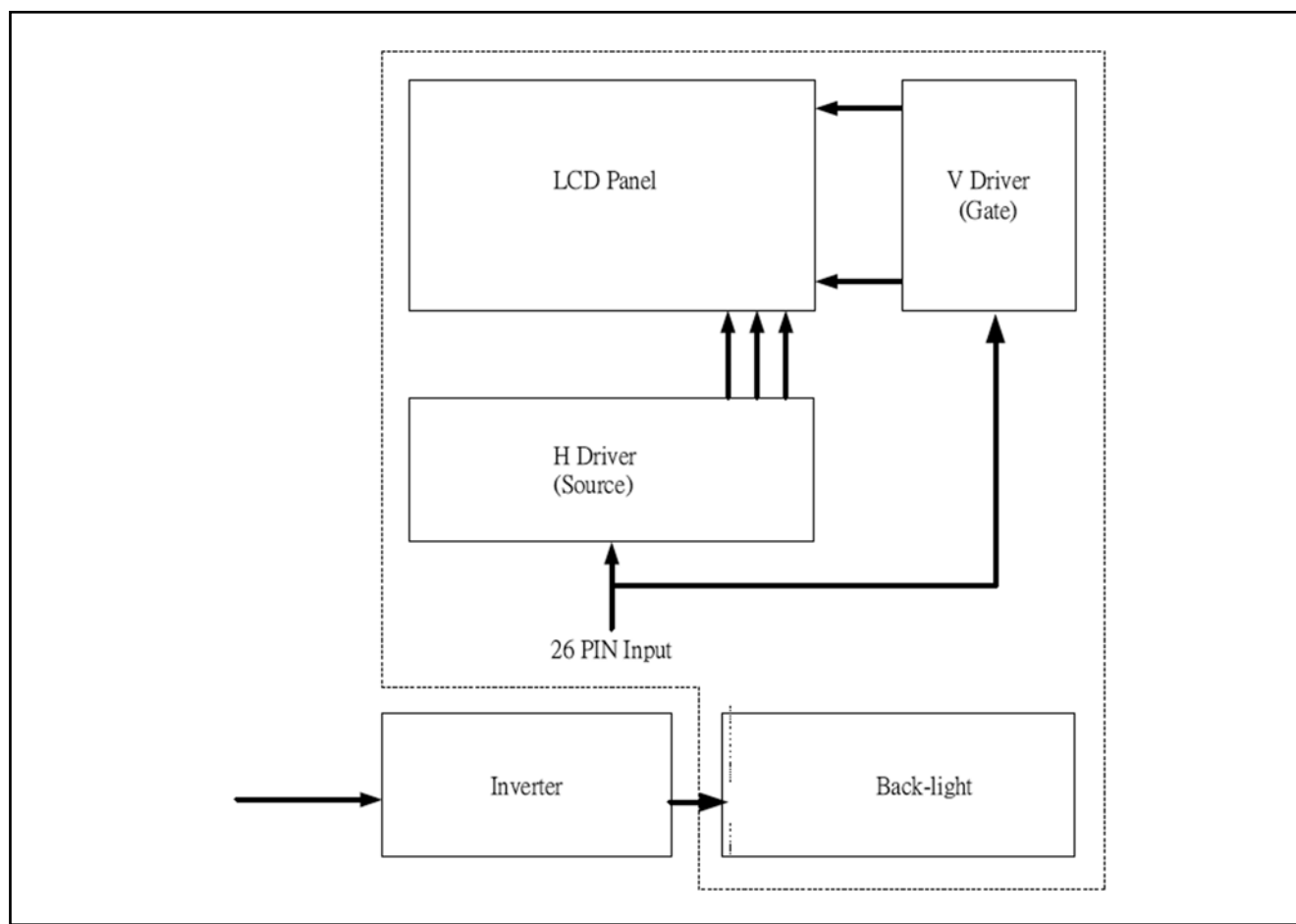
Note 2: The waveform of lamp driving voltage should be as close to a perfect sine wave as possible.

The kick-off times ≥ 1 sec.

Backlight Connector: JST BHSR-02VS-1, Pin No.:2, Pitch: 3.5mm

Pin No.	Symbol	Description	Remarks
1	VL1	Input terminal (Hi voltage side)	–
2	VL2	Input terminal (Low voltage side)	Note 1

Note 1: Low voltage side of backlight inverter connects with Ground of inverter circuits.

Block Diagram


Input/Output Terminals LCD Module Connector FPC Down Connect, 26 pins, Pitch: 0.5 mm

Pin #.	Symbol	I/O	Function	Remark
1	GND	–	Ground for logic circuit	
2	V _{CC1}	I	Supply voltage of logic control circuit for scan driver	
3	V _{GL}	–	Negative power for scan driver	
4	V _{GH}	I	Positive power for scan driver	
5	STVD	I/O	Vertical start pulse	Note 1
6	STVU	I/O	Vertical start pulse	Note 1
7	CKV	I	Shift clock for scan driver	
8	U/D	I	Up/Down scan control input	Note 1
9	OE _V	I	Output enable control for scan driver	
10	V _{COM}	I	Common electrode driving signal	
11	V _{COM}	I	Common electrode driving signal	
12	L/R	I	Left/Right control	Note 2
13	MOD	I	Sequential sampling & simultaneous sampling setting	Note 3
14	OE _H	I	Output enable control for data driver	
15	STHL	I/O	Start pulse for horizontal scan line	Note 2
16	STHR	I/O	Start pulse for horizontal scan line	Note 2
17	CPH3	I	Sampling and shifting clock for data driver	
18	CPH2	I	Sampling and shifting clock for data driver	
19	CPH1	I	Sampling and shifting clock for data driver	
20	V _{CC2}	I	Supply voltage of logic control circuit for data driver	
21	GND	–	Ground for logic circuit	
22	VR	I	Alternated video signal (Red)	
23	VG	I	Alternated video signal (Green)	
24	VB	I	Alternated video signal (Blue)	
25	AV _{SS}	I	Supply voltage for analog circuit	
26	AV _{SS}	I	Ground for analog circuit	

Note 1

U/D	STVD	STVU	Scanning direction
VCC	Input	Output	Down to up
GND	Output	Input	Up to down

Note 2

R/L	STHL	STHR	Scanning direction
VCC	Output	Input	Left to right
GND	Input	Output	Right to left

Note 3

MOD=H Simultaneous sampling
MOD=L Sequential sampling
Please set CPH2 & CPH3 to GND when MOD=H

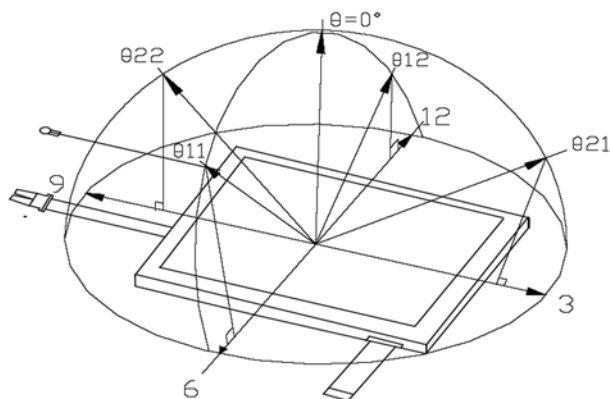
Timing Characteristics of Input Signals

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Remarks
Rising time	t_r	–	–	10	ns	–
Falling time	t_f	–	–	10	ns	–
High and low level pulse width	t_{CPH}	9.2	9.6	10.0	MAz	CPH1~CPH3
CPH pulse duty	t_{CWH}	30	50	70	%	CPH1~CPH3
STH setup time	t_{SUH}	20	–	–	ns	STHR, STHL
STH hold time	t_{HDH}	20	–	–	ns	STHR, STHL
STH pulse width	t_{STH}	–	1	–	tCPH	STHR, STHL
STH period	t_H	61.5	63.5	65.5	μs	STHR, STHL
OEH pulse width	t_{OEH}	–	1.40	–	μs	OEH
Sample and hold disable time	t_{DIS1}	–	7.43	–	μs	–
OEV pulse width	t_{OEV}	–	18	–	μs	OEV
CKV pulse width	t_{CKV}	–	31.75	–	μs	CKV
Clean enable time	t_{DIS2}	–	9.0	–	μs	–
Horizontal display start	t_{SH}	–	0	–	$t_{CPH}/3$	–
Horizontal display timing range	t_{DH}	–	480	–	t_{CPH}	–
STV setup time	t_{SUV}	400	–	–	Ns	STVR, STVL
STV hold time	t_{HDV}	400	–	–	Ns	STVR, STVL
STV pulse width	t_{STV}	–	–	1	t_H	STVR, STVL
Horizontal lines per field	t_V	256	262	268	t_H	–
Vertical display start	t_{SV}	–	3	–	t_H	–
Vertical display timing range	t_{DV}	–	234	–	t_H	–
VCOM rising time	t_{rCOM}	–	–	5	Ms	–
VCOM falling time	t_{fCOM}	–	–	5	Ms	–
VCOM delay time	t_{DCOM}	–	–	3	Ms	–
RGB delay time	t_{DRGB}	–	–	1	Ms	–

Optical Specifications (Ta = 25°C)

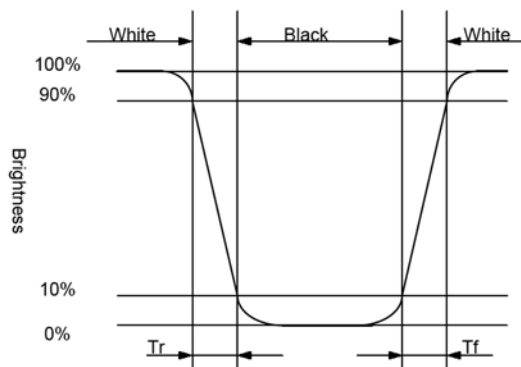
Item		Symbol	Conditions	Specifications			Unit
				Min.	Typ.	Max.	
Viewing Angle (Note 1)	Horizontal	$\theta = 21, \theta = 22$	$CR \geq 10$	45	55	–	deg
	Vertical	$\theta = 12$		10	15	–	
		$\theta = 11$		30	35	–	
Contrast Ratio (Note 2)		CR	At optimized viewing angle	200	350	–	–
Response Time (Note 3)	Rise	Tr	$\theta = 0$	–	15	30	ms
	Fall	Tf		–	25	50	
Luminance (Note 4)		L	$\theta = 0$	300	350	–	cd/m ²
Uniformity (Note 5)		U	–	70	75	–	%
White Chromaticity (Note 4)		x	$\theta = 0$	0.28	0.31	0.34	–
		y		0.30	0.33	0.36	
Lamp Life Time +25 °C		–	–	–	40,000	–	hr

Note 1 : The definitions of viewing angles



Note 2 : $CR = \frac{\text{Luminance when Testing point is White}}{\text{Luminance when Testing point is Black}}$
Contrast Ratio is measured in optimum common electrode voltage.

Note 3 : The definition of response time:

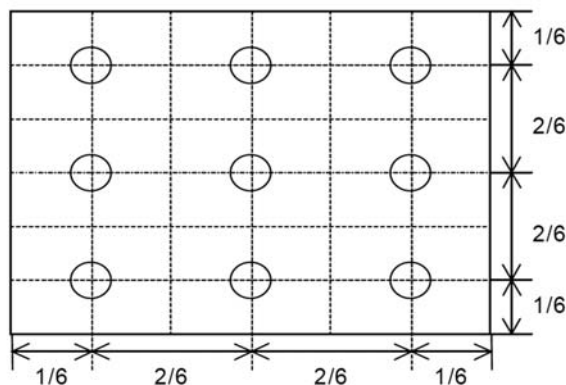


Note 4 : 1.Topcon BM-7(fast) luminance meter 1° field of view is used in the testing (after 20~30 minutes operation).
2.Lamp current : 6 mA
3.Inverter model : TDK-347

Note 5 : The uniformity of LCD is defined as

$U = \frac{\text{The Minimum Brightness of the 9 testing Points}}{\text{The Maximum Brightness of the 9 testing Points}}$
Luminance meter : BM-5A or BM-7 fast (TOPCON)
Measurement distance : 500 mm +/- 50 mm
Ambient illumination : < 1 Lux
Measuring direction : Perpendicular to the surface of module

The test pattern is white (Gray Level 63).



Dimensional Outline

