



## ANDpSi121GAOS-HB-KIT 12.1" XGA Color p-Si TFT LCD Module

The ANDpSi121GAOS-HB-KIT is 1024 x 768 Color TFT display that utilizes new poly-silicon (p-Si) technology to provide a brighter, thinner and lighter display with high-resolution. The p-Si TFT technology allows the row and column LCD drivers to be fabricated directly on the LCD glass. This eliminates the need for discrete TAB drivers and also reduces the thickness, weight and overall size of the display. The 12.1" XGA resolution expands applications in such areas as electronic books and personal digital-picture viewers.

### Features

- High Luminance
- Built-in Long Life Lamps (MTTF: 50,000 h)
- Replaceable structure of lamp units
- Analog scaling board attachable to LCD backward
- Recommendable inverter attachable to LCD backward
- XGA (1024 x 768 pixels color display)
- Reverse Scan function
- Applications: electronic books and personal digital-picture viewers

### Mechanical Characteristics

Item	Specification	Unit
Outline Dimensions	278.3 (H) x 209.0 (V) x 12.0 max (D)	mm
Number of Pixels	1024 (H) x 768 (V)	pixels
Active Area	245.8 (H) x 184.3 (V)	mm
Viewing Area	247.8 (H) x 186.3 (V)	
Pixel Pitch	0.24 (H) x 0.24 (V)	mm
Weight (approx.)	685	gram
Backlight	Twin CCFL, Sidelight type	-

### Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Supply Voltage	$V_{DD}$	-0.3	4.0	V
	$V_{FL}$	0	2.0	kV(rms)
FL Driving Frequency	$f_{FL}$	(0)	(100)	kHz
Input Signal Voltage	$V_{IN}$	-0.3	$V_{DD} + 0.3$	V
Operating Ambient Temp.	$T_{op}$	0	50	°C
Operating Temp. for Panel		0	60	°C
Storage Temperature	$T_{stg}$	-20	60	°C
Storage Humidity (Max. Wet bulb temp = 39°C)	-	10	90	%(RH)

### Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage $I_{FL}=6.0\text{mA(rms)}$	$V_{DD}$	3.0	3.3	3.6	V
	$V_{FL}$	TBD	(580)	TBD	V(rms)
FL Start Voltage (Ta = 0°C)	-	1400	-	-	V(rms)
Differential Input Voltage	$V_{ID}$	100	-	600	mV
Common Mode Input Voltage	$V_{CM}$	1.0	-	2.4- ( $V_{ID}$ )/2	V
Current Consumption	$I_{DD}^*$	-	(220)	TBD	mA
	$I_{FL}^{**}$	3.0	-	6.0	mA(rms)
Pwr Consumption $I_{FL}=6.0\text{mA(rms)}$	P	-	(7.7)	-	W

\*: 8 color bars pattern

\*\* : Except the efficiency of FL inverter

### Optical Characteristics (Ta = 25°C)

Item	Sym.	Min.	Typ.	Max.	Unit
Contrast Ratio	CR	100	250	-	-
Viewing Angle (CR ≥ 10)	(Upper+Lower)	TBD	100	-	°
	(Left+Right)	TBD	120	-	°
Response Time	( $t_{ON}$ )	$t_{on}$	-	50	ms
	( $t_{OFF}$ )	$t_{off}$	-	50	ms
Luminance $I_{FL}=6.0\text{mA(rms)}$	L	(280)	(350)	-	cd/m <sup>2</sup>
Lamp Life Time (Notes 1,2)	MTBF	50,000			h

Note 1: Conditions: Ta = 25°C,  $I_{FL}=6.0\text{mA(rms)}$ , continuous lighting

Note 2: Definitions of failure:

- LCD luminance becomes half of the minimum value.
- Lamp doesn't light normally.

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.

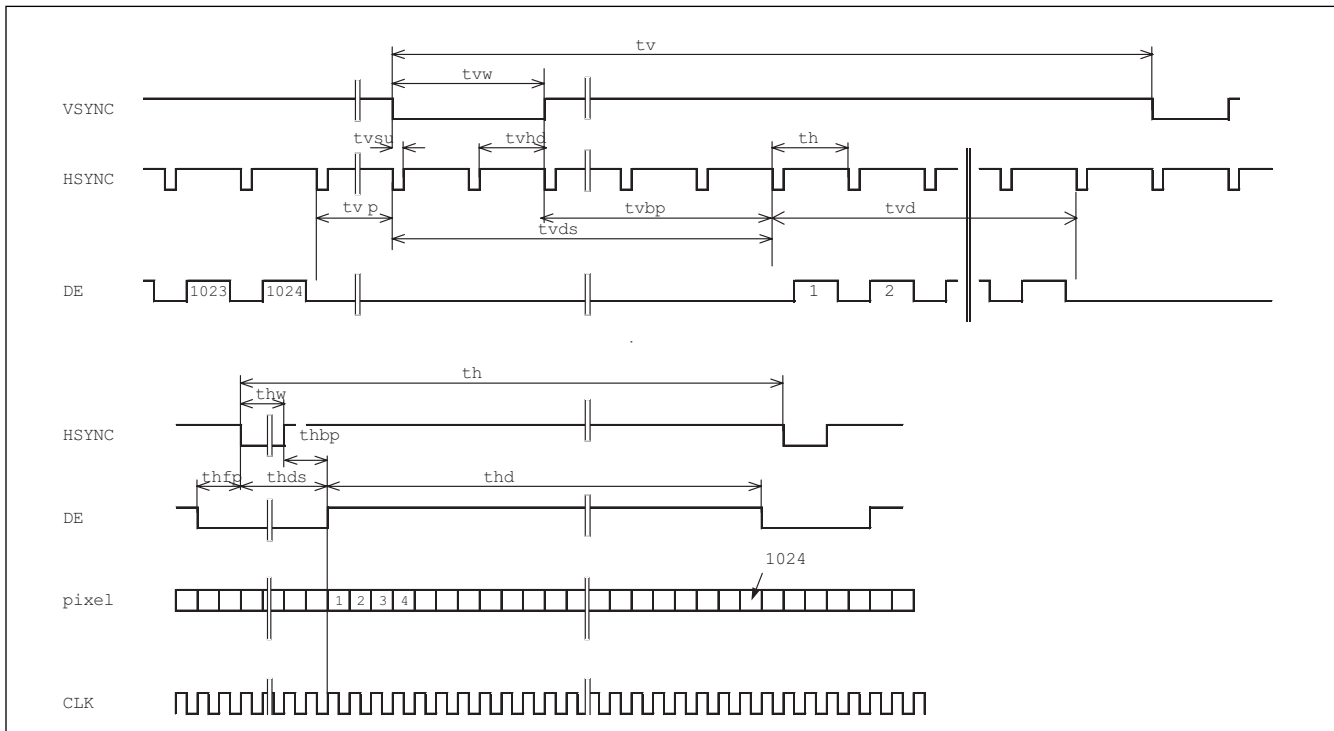


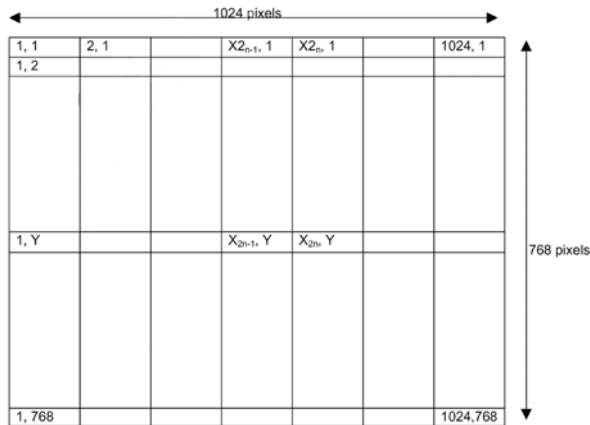
**Timing Specifications** (see Notes below)

Item	Symbol	Min	Typ	Max	Unit
Horizontal Scanning Term	$t_h$	$1334 \times t_c$	$1344 \times t_c$	–	clock
H-sync Pulse Width	$t_{hw}$	$4 \times t_c$	$136 \times t_c$	–	clock
Horizontal Front Porch	$t_{hfp}$	$4 \times t_c$	$24 \times t_c$	–	clock
Horizontal Back Porch	$t_{hbp}$	$24 \times t_c$	$160 \times t_c$	–	clock
Horizontal Data Sync Period	$t_{hds}$	$32 \times t_c$	$296 \times t_c$	–	clock
Horizontal Display Term	$t_{hd}$	$1024 \times t_c$	$1024 \times t_c$	$1024 \times t_c$	clock
Frame Period	$t_v$	$778 \times t_h$	$806 \times t_h$	$860 \times t_h$	line
V-sync Pulse Width	$t_{vw}$	$2 \times t_h$	$6 \times t_h$	–	line
V-sync Set up Time (to H-sync)	$t_{vsu}$	$8 \times t_c$	–	–	clock
V-sync Hold Time	$t_{vhd}$	$(t_{hbp}+16) \times t_c$	–	–	clock
Vertical Front Porch	$t_{vfp}$	$1 \times t_h$	$3 \times t_h$	–	line
Vertical Back Porch	$t_{vbp}$	$2 \times t_h$	$29 \times t_h$	–	line
Vertical Data Sync Period	$t_{vds}$	$8 \times t_h$	$35 \times t_h$	–	line
Vertical Display Time	$t_{vd}$	$768 \times t_h$	$768 \times t_h$	$768 \times t_h$	line
Clock Period	$t_c$	15.0	15.38	–	ns

**Notes:**

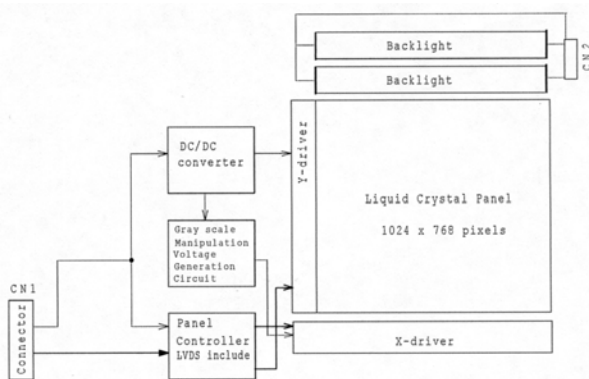
Refer to "Timing Chart" below. If DE is fixed to "H" or "L" level for certain period while NCLK is supplied, the panel displays black w/some flicker. If NCLK is fixed to "H" or "L" level for certain period while DE is supplied, the panel may be damaged. Please adjust LCD operating signal timing and FL driving frequency, to optimize the display quality. There is a possibility that flicker is observed by the interference of LCD operating signal timing and FL driving condition (especially driving frequency), even if the condition satisfies above timing specifications and recommended operating conditions. Do not make  $t_v$ ,  $t_{vhd}$  and  $t_{vds}$  fluctuate. If  $t_v$ ,  $t_{vhd}$ , and  $t_{vds}$  are fluctuate, the panel display black. In case of using the long frame period, the deterioration of display quality, noise, etc. may be occurred. NCLK count of each Horizontal Scanning Time should be always the same. V-Blanking period should be 'n' X "Horizontal Scanning Time". (n:integer) Frame period should be always the same.

**Timing Chart**




Recommended Inverter:

## Block Diagram



1) Drivers are fabricated on the LCD glass

## 2) Connectors

**CN1: DF19L-20P-1H / Hirose Electric Co., Ltd.**

**Mating Connector - DF19G-20S-1F (FPC) / DF19G-20S-1C (Cable)**

**CN2: BHR-04VS-1/Japan Solderless Terminal Mfg. Co., Ltd.**

**Mating Connector - SM04(4.0)B-BHS-1 / JST**

## Connector Pin Assignment for Interface

**CN1 Input Signal** (see Notes below)

**DF19L-20P-1H / Hirose Electric Co., Ltd.**

Terminal No.	Symbol	Function
1	V <sub>DD</sub>	Power Supply: +3.3V
2	V <sub>DD</sub>	Power Supply: +3.3V
3	V <sub>SS</sub>	Ground
4	V <sub>SS</sub>	Ground
5	RxIN0-	Neg. LVDS differential data input (R0-R5, G0)
6	RxIN0+	Pos. LVDS differential data input (R0-R5, G0)
7	V <sub>SS</sub>	Ground
8	RxIN1-	Neg. LVDS differential data input (G1-G5, B0-B1)
9	RxIN1+	Pos. LVDS differential data input (G1-G5, B0-B1)
10	V <sub>SS</sub>	Ground
11	RxIN2-	Neg. LVDS differential data input (B1-B5,HS,VS,DE)
12	RxIN2+	Pos. LVDS differential data input (B1-B5,HS,VS,DE)
13	V <sub>SS</sub>	Ground
14	CLK-	Clock Signal (-)
15	CLK+	Clock Signal (+)
16	V <sub>SS</sub>	Ground
17	U/D	Vert. Rev. ("L" level or Open; Normal, "H" level: Rev.)
18	L/R	Horiz. Rev. ("L" level or Open; Normal, "H" level: Rev.)
19	V <sub>SS</sub>	Ground
20	V <sub>SS</sub>	Ground

## CN2 CCFL Power Source

**BHR-04VS-1/Japan Solderless Terminal Mfg. Co., Ltd**

Terminal No.	Symbol	Function
1	VFLH1	CCFL Power Supply (High Voltage)
2	VFLH2	CCFL Power Supply (Low Voltage)
3	NC	Non Connection (open)
4	VFLL	CCFL Power Supply (Low Voltage)

Notes:

Please connect GND pin to ground. Don't use it as no-connect nor connection with high impedance. NC terminal should be open. Take away terminal No. 3 of the mating connector. If does not take away, it may cause smoke burn of electrical parts by high voltage.

Note (2): 256K colors are displayed by the combinations of 18 data bits.

	Display	R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0	Gray Scale Level
Basic Color	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	-
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	-
	Green	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	-
	Lt. Blue	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	-
	Red	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	-
	Purple	H	H	H	H	H	H	L	L	L	L	L	L	H	H	H	H	H	H	-
	Yellow	H	H	H	H	H	H	H	H	H	H	H	H	L	L	L	L	L	L	-
White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	-	
Gray Scale of Red	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L1
		L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L2
	↕	:						:						:						L3~L60
		:						:						:						
	Light	H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L61
		H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L62
Red	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	Red L63	
Gray Scale of Green	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L1
		L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L2
	↕	:						:						:						L3~L60
		:						:						:						
	Light	L	L	L	L	L	L	H	H	H	H	L	H	L	L	L	L	L	L	L61
		L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	L62
Green	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	Green L63	
Gray Scale of Blue	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L2
	↕	:						:						:						L3~L60
		:						:						:						
	Light	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	L	H	L61
		L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L62
Blue	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	Blue L63	
Gray Scale of White & Black	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	H	L	L	L	L	L	H	L	L	L	L	L	H	L1
		L	L	L	L	H	L	L	L	L	L	H	L	L	L	L	L	H	L	L2
	↕	:						:						:						L3~L60
		:						:						:						
	Light	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	H	L61
		H	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	L62
White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	White L63	