AND Displays

ANDpSi104EA5S-HB

10.4” XGA Color p-Si TFT LCD Module

The ANDpSi104EA5S-HB 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. This reduces the thickness, weight and overall size of the display. The LVDS interface allows fast data transfer for 6-bit or 8-bit operation. The single tube CCFL backlight offers a very thin, low power, and bright display that can be dimmed to save power. This makes the display ideal for portable, battery-operated applications.

Features

• RoHS Compliant

- p-Si construction with drivers on glass
- High luminance
- Single CCFL backlight
- 6-bit (256K) or 8-bit (16.7M)
- Slim (5.2mm MAX) and lightweight design
- 10.4” XGA (1024 x 768 pixels color display)
- LVDS Interface system
- Applications: Notebook PC, Display Terminals; Scientific, Medical, Test & Measurement Instruments; Office Automation Equipment

Mechanical Characteristics

Item	Specification	Unit
Outline Dimensions	237.7 (W) x 173.2 (H) x 4.9 max (D)	mm
Number of Pixels	1024 (W) x 768 (H)	pixels
Active Area	210.432 (W) x 157.824 (H)	mm
Pixel Pitch	0.2055 (W) x 0.2055 (H)	mm
Weight (approx.)	190	gram
Backlight	CCFL, Side-light type (1 lamp)	–

Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Supply Voltage	V_{DD}	-0.3	4.0	V
	V_{FL}	0	2.0	kVrms
FL Driving Frequency	f_{FL}	–	100	kHz
Input Signal Voltage	V_{IN}	-0.3	V_{DD} + 0.3	V
Operating Temperature	T_{op}	0	50	°C
Storage Temperature	T_{stg}	-20	60	°C
Humidity	–	10	90	% RH

Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage I_{FL}=5 mA(rms)	V_{DD}	3.0	3.3	3.6	V
	V_{FL}	–	(600)	–	V(rms)
FL Start Voltage (Ta = 0°C)	–	1200	–	–	V(rms)
Differential Input High Threshold	V_{IH}	(V_{IS})+ 0.1	–	–	V
Differential Input Center Threshold	V_{IS}	0.5	1.2	1.5	V
Differential Input Low Threshold	V_{IL}	–	–	(V_{IS}) -0.1	V
Current Consumption	I_{DD} (*2)	–	250	–	mA(rms)
	I_{FL} (*3)	2.0	–	4.5	
Power Consumption (*2, *3) @180cd/m^2	–	–	(3.7)	–	W

*1: Refer to “Timing Chart” and LVDS (THC63LVDF84A-85) specfications by Thine Electronics, Inc. corporation.
*2: 8 color bars pattern
*3: Excepting the efficiency FL inverter

Optical Characteristics (Ta = 25˚C)

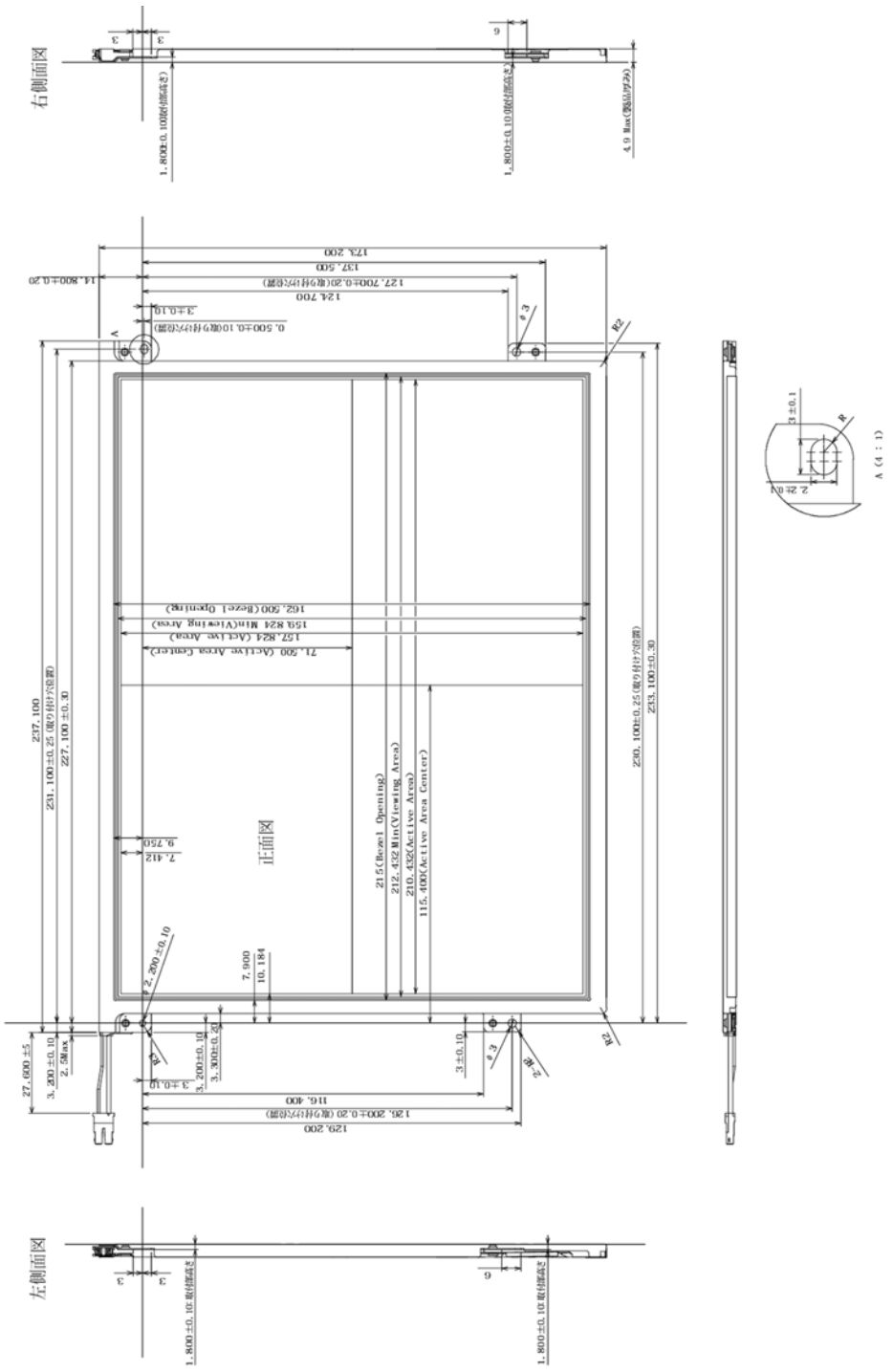
Item	Symbol	Min.	Typ.	Max.	Unit
Contrast	CR	100	250	–	–
Response	t_{on}	–	–	50	ms
	t_{off}	–	–	50	ms
Luminance I_{FL} =5 mA(rms)	L	140	180	–	cd/m^2

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.

Dimensional Outline

Front View

Unit: mm
Standard Tolerance: 0.5mm



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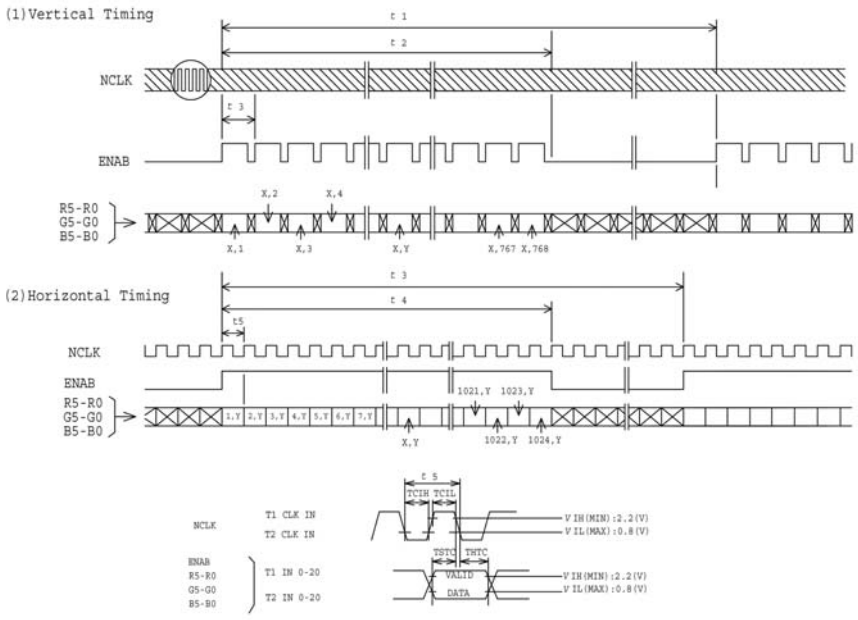
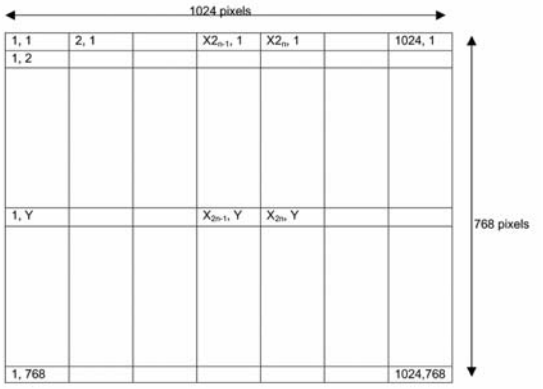
Timing Specifications

Item	Symbol	Min	Typ	Max	Unit
Frame Period	t1	778 x t4 –	– –	860 x t4 –	– ms
Vertical Display Term	t2	768 x t4	768 x t4	768 x t4	–
Vertical Blanking Term	t3	10 x t4	–	92 x t4	–
1 Line Scanning Time	t4	1319 x t7 20.04	– –	1600 x t7 –	 us
Horizontal Display Term	t5	1024 x t7	1024 x t7	1024 x t7	–
Horizontal Blanking Term	t6	295 x t7	–	500 x t7	–
Clock Period	t7	15	15.38	–	ns
V-Sync Pulse Width	tvw	3 x t4	–	7 x t4	–
V-Sync Set up Time	tvsu	8 x t7	–	–	–
V-Sync Hold Time	tvhd	thbp+16 x t7	–	–	–
Vertical Front Porch	tvfp	2 x t4	–	–	–
Vertical Back Porch	tvbp	6 x t4	–	–	–
Horizontal Period	th	1319 x t7 20.04	–	1600 x t7 –	– us
H-Sync Pulse Width	thw	8 x t7	–	–	–
Horizontal Front Porch	thfp	4 x t7	–	500 x t7	–
Horizontal Back Porch	thbp	8 x t7	–	492 x t7	–
thw+thbp		16 x t7	–	500 x t7	–
DE Pulse Width	twde	1024 x t7	1024 x t7	1024 x t7	–

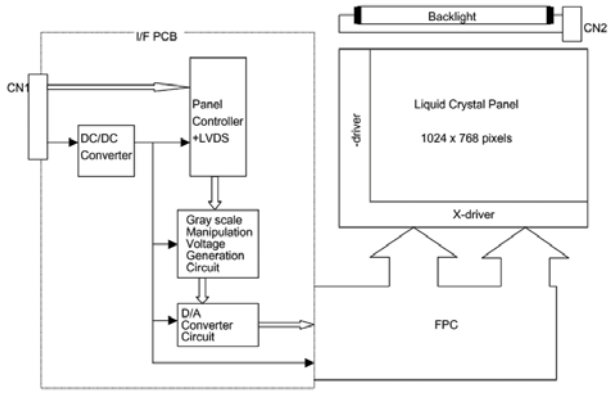
Timing Chart





Recommended Inverter:

Block Diagram



1) Drivers are fabricated on the LCD glass

2) Connectors
DF19L-14P-1H/Hirose Electric Co., Ltd.
Mating Connector - DF19G-14S-11C/Hirose

HV-2S-C1/Japan Aviation Electronics Industry., Ltd.
Mating Connector - HV-2P-HF/JAEI

Connector Pin Assignment for Interface

CN1 Input Signal (1)

Terminal No.	Symbol	Function
1	V_{DD}	+3.3V Power Supply
2	V_{DD}	+3.3V Power Supply
3	GND	Ground
4	GND	Ground
5	IN0-	Trans Data of Pixels 0 (Negative : -)
6	IN0+	Trans Data of Pixels 0 (Positive : +)
7	IN1-	Trans Data of Pixels 1 (Negative : -)
8	IN1+	Trans Data of Pixels 1 (Positive : +)
9	IN2-	Trans Data of Pixels 2 (Negative : -)
10	IN2+	Trans Data of Pixels 2 (Positive : +)
11	CLK-	Sampling Clock (Negative : -)
12	CLK+	Sampling Clock (Positive : +)
13	GND	Ground
14	GND	Ground

CN2 CCFL Power Source

Terminal No.	Symbol	Function
1	V_{FLL}	CCFL Power Supply (Low Voltage)
2	V_{FLH}	CCFL Power Supply (High Voltage)

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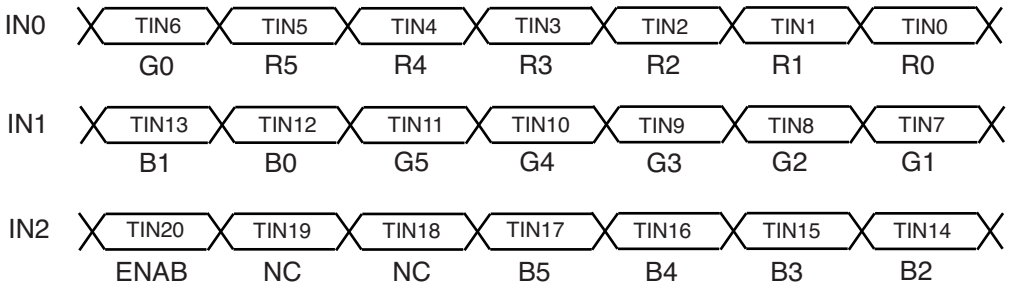
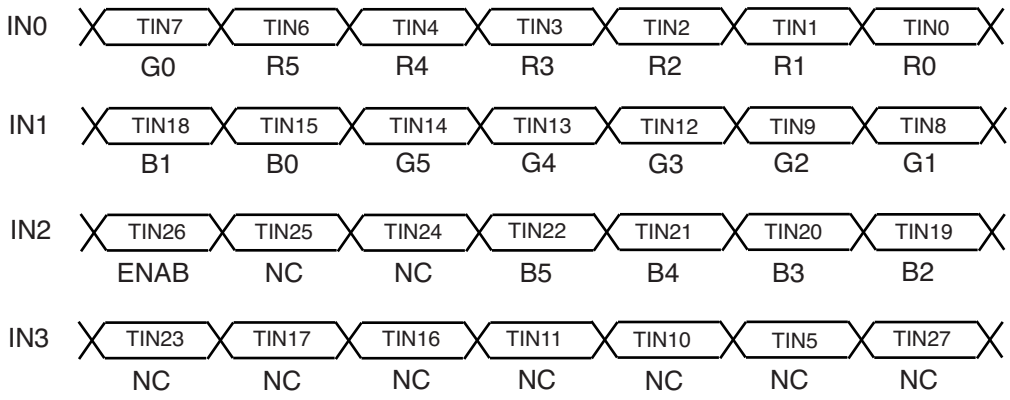
Recommended Transmitter (DS90CF363) to AND10pSi104EAS-HB Interface Assignment: 6-bit Transmitter

DS90CF363					ANDpSi10C313U	
Input Terminal No.		Input Signal (Graphics controller output signal)		Output Signal Symbol	Interface (CN1)	
Symbol	DS90CF363	Symbol	Function		Terminal	Symbol
TIN0	44	R0	Red Pixels Display Data (LSB)	TOUT0- TOUT0+	No.5 No.6	IN0- IN0+
TIN1	45	R1	Red Pixels Display Data			
TIN2	47	R2	Red Pixels Display Data			
TIN3	48	R3	Red Pixels Display Data			
TIN4	1	R4	Red Pixels Display Data			
TIN5	3	R5	Red Pixels Display Data (MSB)			
TIN6	4	G0	Green Pixels Display Data (LSB)			
TIN7	6	G1	Green Pixels Display Data	TOUT1- TOUT1+	No.7 No.8	IN1- IN1+
TIN8	7	G2	Green Pixels Display Data			
TIN9	9	G3	Green Pixels Display Data			
TIN10	10	G4	Green Pixels Display Data			
TIN11	12	G5	Green Pixels Display Data (MSB)			
TIN12	13	B0	Blue Pixels Display Data (LSB)			
TIN13	15	B1	Blue Pixels Display Data			
TIN14	16	B2	Blue Pixels Display Data	TOUT2- TOUT2+	No.9 No.10	IN2- IN2+
TIN15	18	B3	Blue Pixels Display Data			
TIN16	19	B4	Blue Pixels Display Data			
TIN17	20	B5	Blue Pixels Display Data (MSB)			
TIN18	22	NC	Non Connection (open)			
TIN19	23	NC	Non Connection (open)			
TIN20	25	ENAB	Compound Synchronization Signal			
CLK IN	26	NCLK	Data Sampling Clock	TCLK OUT- TCLK OUT+	No.11 No.12	CLK IN- CLK IN+



Recommended Transmitter (DS90CF383) to AND10pSi104EAS-HB Interface Assignment: 8-bit Transmitter

DS90CF383					ANDpSi10C313U	
Input Terminal No.		Input Signal (Graphics controller output signal)		Output Signal Symbol	Interface (CN1)	
Symbol	DS90CF383	Symbol	Function		Terminal	Symbol
TIN0	51	R0	Red Pixels Display Data (LSB)	TOUT0- TOUT0+	No.12 No.11	IN0- IN0+
TIN1	52	R1	Red Pixels Display Data			
TIN2	54	R2	Red Pixels Display Data			
TIN3	55	R3	Red Pixels Display Data			
TIN4	56	R4	Red Pixels Display Data			
TIN6	3	R5	Red Pixels Display Data (MSB)			
TIN7	4	G0	Green Pixels Display Data (LSB)			
TIN8	6	G1	Green Pixels Display Data	TOUT1- TOUT1+	No.10 No.9	IN1- IN1+
TIN9	7	G2	Green Pixels Display Data			
TIN12	11	G3	Green Pixels Display Data			
TIN13	12	G4	Green Pixels Display Data			
TIN14	14	G5	Green Pixels Display Data (MSB)			
TIN15	15	B0	Blue Pixels Display Data (LSB)			
TIN18	19	B1	Blue Pixels Display Data			
TIN19	20	B2	Blue Pixels Display Data	TOUT2- TOUT2+	No.8 No.7	IN2- IN2+
TIN20	22	B3	Blue Pixels Display Data			
TIN21	23	B4	Blue Pixels Display Data			
TIN22	24	B5	Blue Pixels Display Data (MSB)			
TIN24	27	NC	Non Connection (open)			
TIN25	28	NC	Non Connection (open)			
TIN26	30	ENAB	Compound Synchronization Signal			
TIN27	50	NC	Non Connection (open)	TOUT3- TOUT3+	–	–
TIN5	2	NC	Non Connection (open)			
TIN10	8	NC	Non Connection (open)			
TIN11	10	NC	Non Connection (open)			
TIN16	16	NC	Non Connection (open)			
TIN17	18	NC	Non Connection (open)			
TIN23	25	NC	Non Connection (open)			
CLK IN	31	NCLK	Data Sampling Clock	TCLK OUT- TCLK OUT+	No.6 No.5	CLK IN- CLK IN+



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		–
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
					:						:						:			
		H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L61
	Light	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
					:						:						:			
		L	L	L	L	L	L	H	H	H	H	L	H	L	L	L	L	L	L	L61
	Light	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
					:						:						:			
		L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	L	H	L61
	Light	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
					:						:						:			
		H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	H	L61
	Light	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