

## AND104X02-HB

### Color Active Matrix TFT LCD Module

The AND104X02-HP is a 10.4" AFFS+ TFT-LCD is a color active matrix TFT LCD module using amorphous silicon TFT's (Thin Film Transistors) as active switching devices. This module has a 10.4 inch diagonally measured active area with XGA resolutions (1024 horizontal by 768 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 262,144 colors. The TFT-LCD panel used for this module is a low reflection and higher color type.

### Features

- 1 Ch LVDS Interface with 1 pixel/clock
- 6-bit color depth, Display 262,144 colors
- High luminance and contrast ratio, low reflection and wide viewing angle
- Front Mounting Frame
- DE (Data Enable) mode only
- SLG (Single Level Gate) function use
- SMD LED Array
- Onboard EDID
- **ROHS Compliant**

### Applications

- Pen Type and Tablet PC

### Mechanical Characteristics

Item	Standard Value	Unit
Active Area	210.432 x 157.824	mm
Number of Pixels	1024 (H) x 768 (V)	pixels
Pixel Pitch	0.2055 (H) x 0.205 (V)	mm
Pixel Arrangement	RGB Vertical Stripe	—
Display Colors	262,144	colors
Display Mode	Normally Black	
Dimensional Outline	238.6 ±0.5 (H) x 173.2 ±0.5 (V) x 4.3 max LCM Height: 4.3mm max (LED), 6.8 mm max (Component)	mm
Weight	210 Typ. / 220 Max.	gram
Backlight	SMD LED Array	
Surface Treatment	Anti-Glare	

### Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Power Supply (Ta = 25 ± 2 °C)	VDD	VSS-0.3	4.0	V
Logic Input Voltage	VIN	VSS-0.3	VDD + 0.3	V
Backlight Power Supply Voltage	HVDD	-0.3	40	V
Backlight LED Current (25 °C)	ILED	—	30	mA
Backlight LED Current (50 °C)	ILED	—	20	mA
Backlight LED Reverse Voltage	VR	—	5	V
Operating Temperature	TOP	-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.

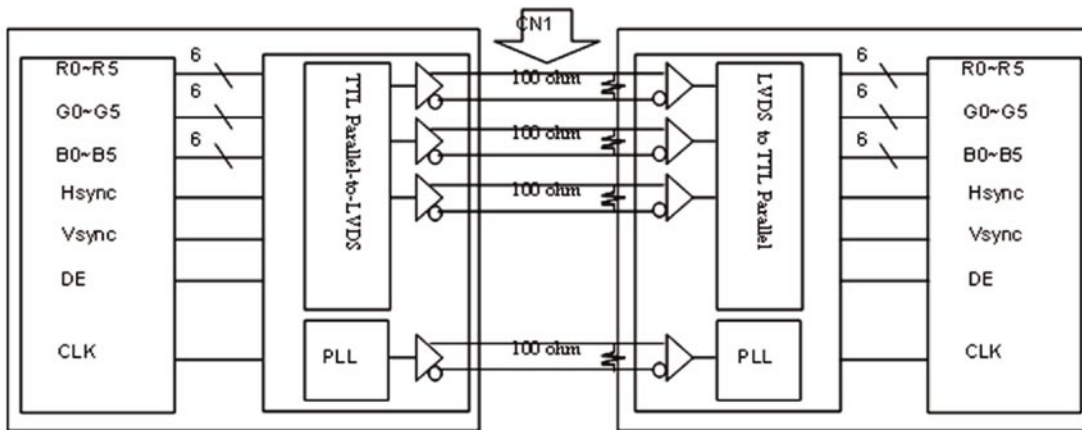
**Electrical Specifications**

Item	Symbol	Min.	Typ.	Max.	Unit
Logic Power Supply Voltage	VDD	3.0	3.3	3.6	V
Logic Power Supply Current	IDD	—	270	300	mA
Backlight Power Supply Voltage	HVDD	7.0	12.0	20	V
Backlight Power Supply Current	IHVDD	—	246	283	mA
Backlight Power Consumption	PBL	—	2.95	3.39	W
LED Driver's Efficiency	n	—	82	—	%
Backlight PWM Frequency	FPWM	200	320	350	Hz
High Level PWM Signal Voltage	VPWMH	2.1	3.3	5.0	V
Low Level PWM Signal Voltage	VPWML	—	0	0.6	V
High Level Differential Input Signal Voltage	VIH	—	—	+100	mV
Low Level Differential Input Signal Voltage	VIL	-100	—	—	mV
Backlight LED Voltage / Backlight LED Total Voltage	VLED / VBL	—	3.2 / 22.4	3.4 / 23.8	V
Backlight LED Current / Backlight LED Total Current	ILED / IBL	—	19.0 / 114.0	20.0 / 120.0	mA
Life Time		12,000	—	—	Hrs
Power Consumption	PD	—	0.90	1.00	W
	PLED	—	2.55	2.85	W
	Ptotal	—	3.45	3.85	W

**Optical Characteristics**

Item		Symbol	Condition	Min.	Typ.	Max.	Degree
Viewing Angle Range	Horizontal	θ 3	When Cr ≥ 10	—	89	—	degree
		θ 9		—	89	—	
	Vertical	θ 12		—	89	—	
		θ 6		—	89	—	
Luminance Contrast Ratio		CR	θ = 0°	400	600	—	
Luminance of White	Center	Yw	θ = 0°	290	340		cd/m <sup>2</sup>
White Luminance Uniformity	5 Points	Δ Y5		80	—	—	
	13 Points	Δ Y13		65	—	—	Hz
White Chromaticity		Xw	θ = 0°	0.273	0.313	0.353	
		Yw		0.289	0.329	0.369	
Reproduction of Color	Red	Xr	θ = 0°	0.521	0.561	0.601	
		Yr		0.282	0.322	0.362	
	Green	Xg		0.317	0.357	0.397	
		Yg		0.516	0.556	0.596	
	Blue	Xb		0.117	0.157	0.197	
		Yb		0.093	0.133	0.173	
Color Reproduction				—	40	—	%
Response Time		Tr + Td	Ta = 25°C, θ = 0°	—	36	—	ms
Cross Talk		CT	θ = 0°	—	—	2.0	%

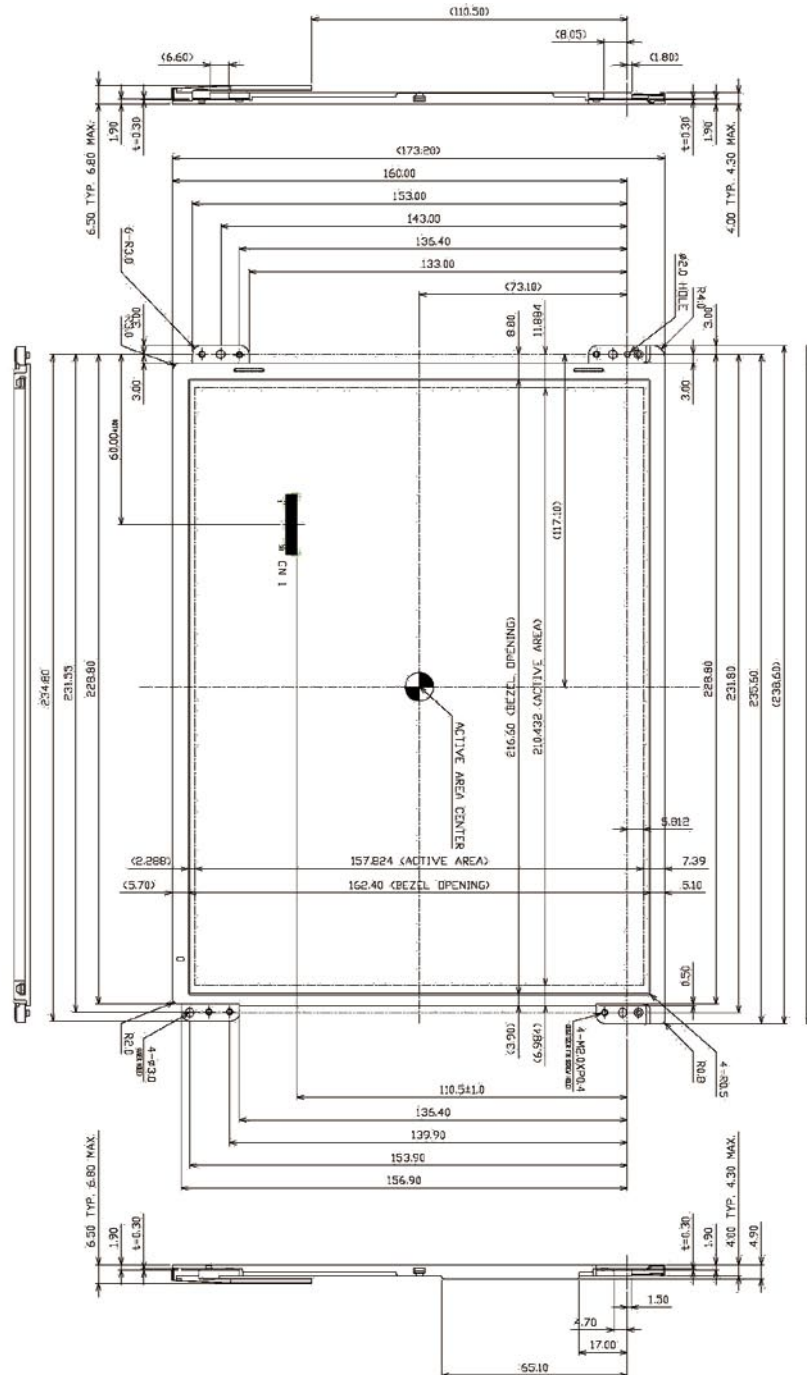
### LVDS Block Diagram



**Electrical Interface Connection (CN1: Interface Connector: 20455-030E-02 (I-PEX) or equivalent; User Side Connector: 20453-030T (I-PEX) or equivalent)**

Pin No.	Pin Out	Function Description	Pin No	Pin Out	Function Description
1	VSS	Ground	16	VSS	Ground
2	VDD1	Power Supply: +3.3V	17	RCLKIN-	LVDS Negative Clock Signal (-)
3	VDD2	Power Supply: +3.3V	18	RCLKIN+	LVDS Positive Clock Signal (+)
4	EDID 3.3V	EDID +3.3V	19	VSS	Ground
5	NC	Reserved	20	VDIM	PWM Brightness Control
6	EDID CLK	EDID CLK	21	VSW	LED On/Off Control
7	EDID DATA	EDID DATA	22	VSS	Ground
8	RIN0-	LVDS Negative Data Signal (-)	23	VSS	Ground
9	RIN0+	LVDS Positive Data Signal (+)	24	VSS	Ground
10	VSS	Ground	25	VSS	Ground
11	RIN1-	LVDS Negative Data Signal (-)	26	VCD1	Backlight Power Supply: +12V
12	RIN1+	LVDS Positive Data Signal (+)	27	VCD2	Backlight Power Supply: +12V
13	VSS	Ground	28	VCD3	Backlight Power Supply: +12V
14	RIN2-	LVDS Negative Data Signal (-)	29	VCD4	Backlight Power Supply: +12V
15	RIN2+	LVDS Positive Data Signal (+)	30	VSS	Ground

## Mechanical Drawing



## Reliability Test

No	Test Items	Conditions
1	High temperature storage test	Ta = 80 °C, 240 hrs
2	Low temperature storage test	Ta = -20 °C, 240 hrs
3	High temperature & high humidity operation test	Ta = 50 °C, 80% RH, 240 hrs
4	High temperature operation test	Ta = 70 °C, 240 hrs
5	Low temperature operation test	Ta = 0 °C, 240 hrs
6	Thermal shock	Ta = -20 °C ~ 80 °C (0.5 H), 100 cycle
7	Vibration test (non-operating)	Frequency: 10~500Hz; Gravity/AMP: 1.5G; Period: X,Y,Z 30 min
8	Shock test (non-operating)	Gravity: 220G; Pulse width: 2ms, half sine wave $\pm X$ , $\pm Y$ , $\pm Z$ Once for each direction
9	Electro-Static discharge test (non-operating)	Air: 150pF, 300 ohm, 15KV; Contact: 150pF, 330ohm, 8KV

## Signal Timing Waveforms of Interface Signal (De Mode)

