AND150X4L06-HB

15.0” XGA Color TFT LCD Module

Features

- 15.0” XGA color display (1024 x 768 pixels) that can displays 16.2M colors
- DE (Data Enable) only mode
- LVDS Interface with 1 pixel/clock
- Optimum viewing angle is at 6 o’clock direction
- 2 CCFL Backlight units
- Applications: Desktop monitorst

Mechanical Specifications

Item	Specification	Unit
Bezel Opening Area	307.5 (W) x 231.4 (H)	mm
Number of Pixels	1024 (W) x R.G.B x 768 (H)	pixels
Active Area	304.128 (W) x 228.096 (H) x 15 max (D)	mm
Pixel Pitch	0.297 (W) x 0.297 (H)	mm
Pixel Arrangement	RGB vertical stripe	–
Driver Element	a-Si TFT active matrix	
Display Colors	16,194,277	color
Transmissive Mode	Normally white	–

Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit
Operation Humidity	H_{OP}	10	90	%
Shock (Non-Operating)	S_{NOP}	–	50	G
FL Driving Frequency	f_{FL}	0	100	kHz
Vibration (Non-Operating)	V_{NOP}	–	1.5	G
Operating Ambient Temperature	T_{op}	0	50	°C
Storage Temperature	T_{st}	-20	60	°C
Storage Humidity (Max. wet bulb temp = 39°C)	–	10	90	%RH

Mechanical Specifications

Item		Min.	Typ.	Max.	Unit
Module Size	Horizontal (H)	320.5	321.0	321.5	mm
	Vertical (V)	244.9	245.4	245.9	mm
	Depth (D)	–	9.7	10	mm
Weight		–	–	930	g

Electrical Specifications (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit
Power Supply Voltage	V_{DD}	-0.3	–	4.0	V
Backlight Lamp Voltage	V_L	–	–	2.5K	V(rms)
Backlight Lamp Current	I_L	–	–	8.5	mA(rms)
Backlight Lamp Frequency	F_L	–	–	80	KHz

Electrical Characteristics for TFT LCD Module

Item	Symbol	Value			Unit
		Min.	Typ.	Max.	
Power Supply Voltage	V_{DD}	3.0	3.3	3.6	V
Ripple Voltage	V_{RP}	–	–	100	mVp-p
Rush Current	I_{RUSH}	–	–	2.0	A
Power Supply Current (White)	I_{CC}	–	400	–	mA
Power Supply Current (Black)		–	550	–	mA
Diff. Input Voltage for LVDS Receiver Threshold - H Level	V_{IH}	–	–	100	mV
Diff. Input Voltage for LVDS Receiver Threshold - L Level	V_{IL}	-100	–	–	mV
Terminating Resistor	R_T	–	100	–	Ohm

Optical Specifications (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit
Contrast	CR	200	350	–	–
Response	T_R	–	6	10	ms
	T_F	–	17	25	ms
Luminance	L	200	250	–	cd/m^2

Optical Specifications *(continued)*

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
White Variation		δW		–	1.25	1.40	–
Color Chromaticity	Red	Rx	$\theta_x = 0°, \theta_y = 0°$ Viewing Normal Angle	0.603	0.633	0.663	–
		Ry		0.327	0.357	0.387	–
	Green	Gx		0.270	0.300	0.330	–
		Gy		0.556	0.586	0.616	–
	Blue	Bx		0.112	0.142	0.172	–
		By		0.064	0.094	0.124	–
	White	Wx		0.283	0.313	0.343	–
		Wy		0.299	0.329	0.359	–
Viewing Angle	Horizontal	θ_x +	CR ≥ 10	50	60	–	Deg.
		θ_x -		50	60	–	
	Vertical	θ_y +		30	40	–	
		θ_y -		50	60	–	

Backlight Unit

Item	Symbol	Value			Unit
		Min.	Typ.	Max	
Lamp Input Voltage	V_L	522	585	644	V_{RMS}
Lamp Current	I_L	2.0	8.0	8.5	mA_{RMS}
Lamp Turn On Voltage	V_S	–	–	1180 (25 °C)	V_{RMS}
		–	–	1350 (0 °C)	V_{RMS}
Operating Frequency	F_L	40	50	80	KHz
Lamp Life Time	L_{BL}	40,000	–	–	Hrs
Power Consumption	P_L	–	9.36	–	mW

Optical Characteristics - Test Conditions

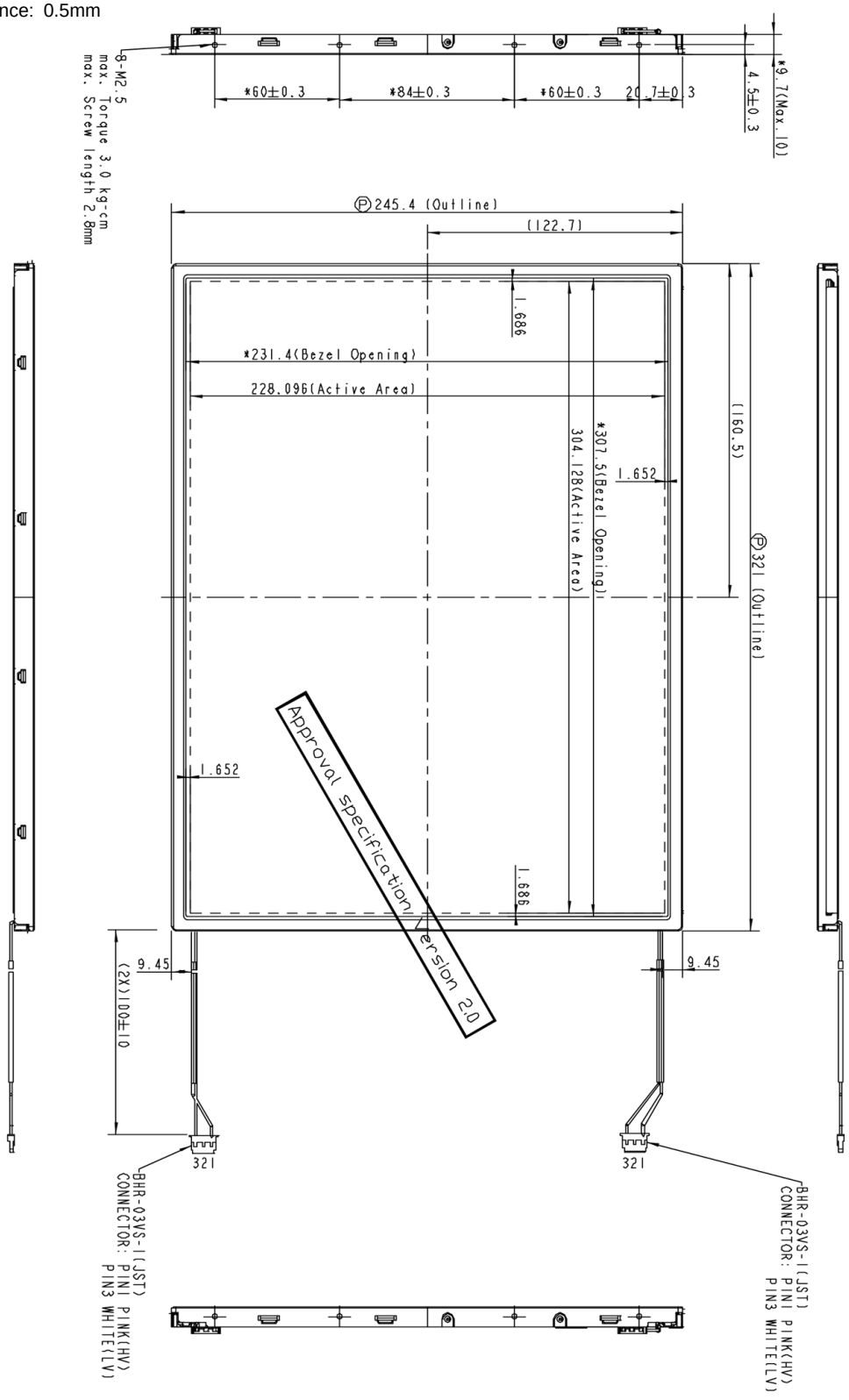
Item	Symbol	Value	Unit
Ambient Temperature	Ta	25 ± 2	°C
Ambient Humidity	Ha	50 ± 10	%RH
Supply Voltage	V_{DD}	3.3	V
Input Signal	According to typical value in ELECTRIC CHARACTERISTICS		
Inverter Current	I_L	8.0	mA

Input Signal Timing Specifications

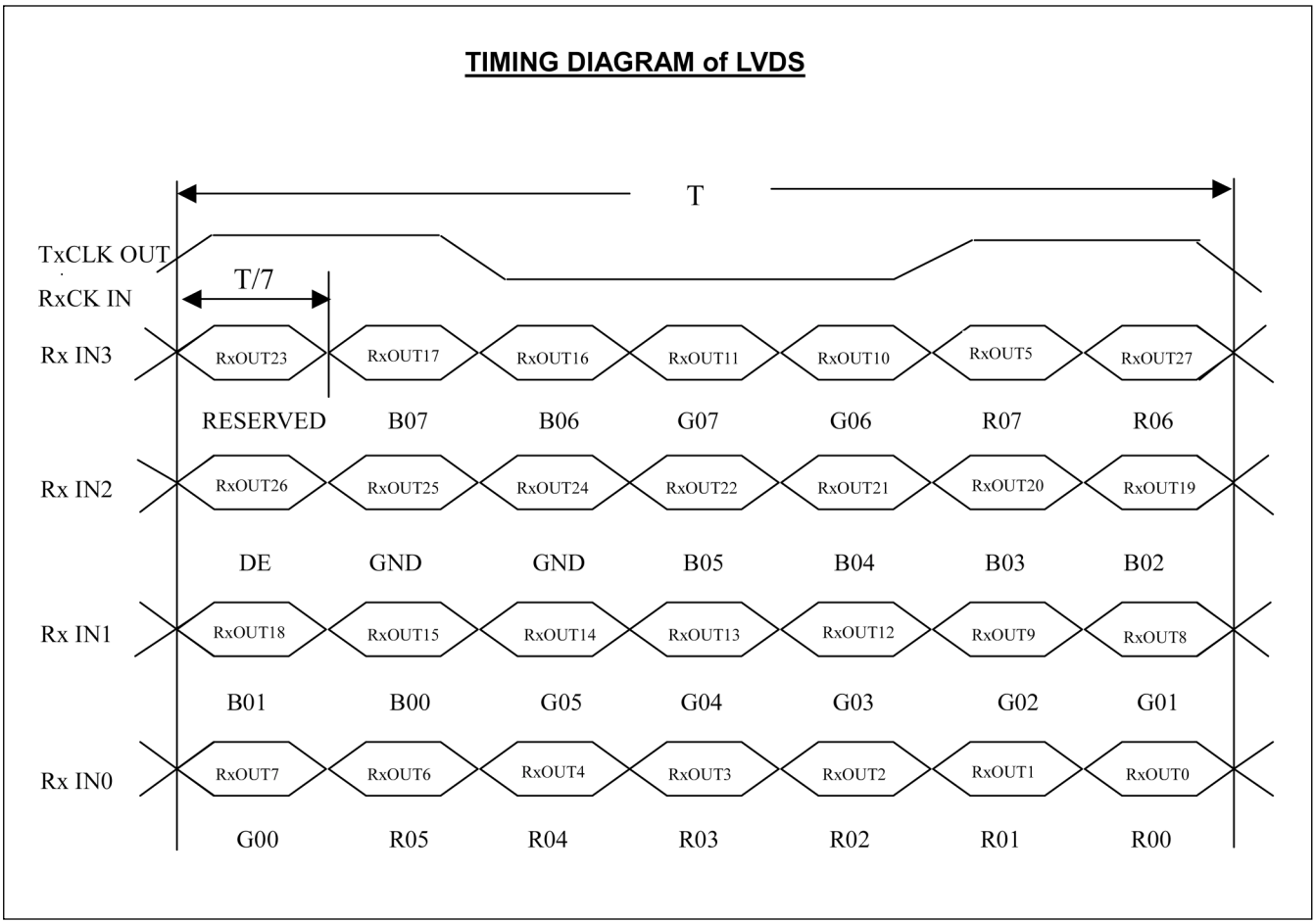
Signal	Item	Symbol	Min.	Typ.	Max.	Unit
DCLK	Pixel Clock	$1/T_C$	–	65	80	MHz
DE	Vertical Total Time	T_V	769	806	1200	T_H
	Vertical Address Time	T_{VD}	768	768	768	T_H
	Horizontal Total Time	T_H	1120	1344	1600	T_C
	Horizontal Address Time	T_{HD}	1024	1024	1024	T_C

Dimensional Outline

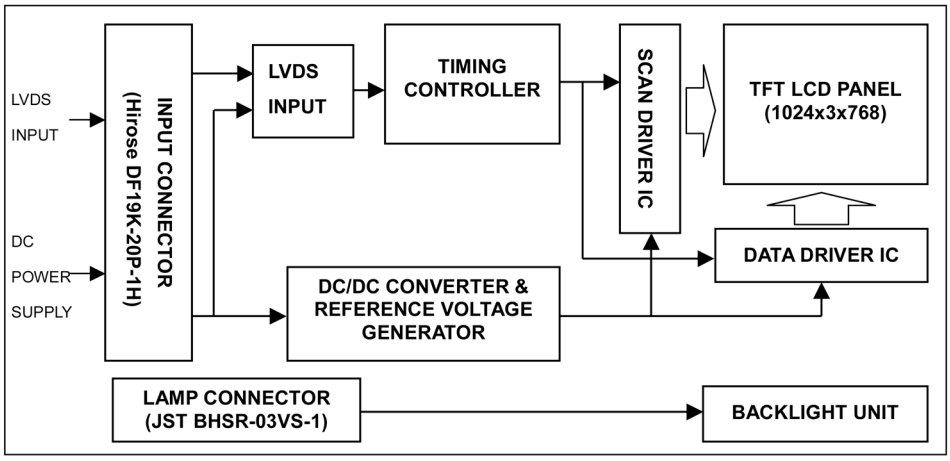
Unit: mm
Standard Tolerance: 0.5mm



Timing Chart



Block Diagram



Color Data Input Assignment

The brightness of each primary color (red, green & blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color vs. data input. (0: Low Level Voltage, 1: High Level Voltage

Color		Data Signal																									
		Red								Green								Blue									
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0		
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0		
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0		
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
Gray Scale of Red	Red (0)/ Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red (1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red (2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	:	:								:								:									
	:	:								:								:									
	Red (252)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red (252)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Red (252)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Gray Scale of Green	Green(0)/ Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Green (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0		
	Green (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0		
	:	:								:								:									
	:	:								:								:									
	Green (252)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0		
	Green (252)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0		
	Green (252)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0		
Gray Scale of Blue	Blue (0)/ Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	Blue (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1		
	Blue (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0		
	:	:								:								:									
	:	:								:								:									
	Blue (252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1		
	Blue (252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0		
	Blue (252)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1		

Input Terminal Pin Assignment (See NOTES Below)
TFT LCD Module

Pin No.	Symbol	Function	Polarity
1	VDD	Power Supply +3.3V (typical)	
2	VDD	Power Supply +3.3V (typical)	
3	GND	Ground	
4	GND	Ground	
5	RX0-	LVDS Differential Data Input	Negative
6	RX0+	LVDS Differential Data Input	Positive
7	GND	Ground	
8	RX01-	LVDS Differential Data Input	Negative
9	RX1+	LVDS Differential Data Input	Positive
10	GND	Ground	
11	RX2-	LVDS Differential Data Input	Negative
12	RX2+	LVDS Differential Data Input	Positive
13	GND	Ground	
14	RXCLK-	LVDS Differential Data Input	Negative
15	RXCLK+	LVDS Differential Data Input	Positive
16	GND	Ground	
17	RX3-	LVDS Differential Data Input	Negative
18	RX3+	LVDS Differential Data Input	Positive
19	GND	Ground	
20	NC	Reserved	

Backlight Unit

Pin	Symbol	Description	Color
1	HV1	High Voltage	Pink/Blue
3	LV	Ground	White/Black

NOTES
TFT LCD MODULE:
Connector Part No.: [Hirose] DF19K-20P-1H
Matching Socket Part No.: [Hirose] DF19-20S-1C

BACKLIGHT UNIT
Connector Part No.: BHR-03VS-1 (JST) or equivalent
Matching Connector Part No.: SM02B-BHS-1-TB (JST) or equivalent