



# AND12C275A-HB

## 12.1" SVGA Color TFT LCD Module

### Features

- 12.1" SVGA for FA use
- High Brightness 250cd/m<sup>2</sup> with 2-CCFL sidelight
- Wide viewing angle
- Long-life CCFLs
- Replaceable CCFL structure
- Mechanical & I/F pin assignment compatible with AND12C150 (XGA type)
- Applications: Display Terminals, Scientific Instruments, Medical Instruments, Test and Measurement Instruments, Process Control/Factory Automation Equipment, Office Automation Equipment

### Mechanical Specifications

Item	Specification	Unit
Outline Dimensions	290.0 (W) x 220.0 (H) x 15 max (D)	mm
Number of Pixels	800 (W) x 600 (H)	pixels
Active Area	246 (W) x 184.5 (H)	mm
Pixel Pitch	0.3075 (W) x 0.3075 (H)	mm
Weight (approx.)	900	gram
Backlight	2-CCFL, Sidelight type	-

### Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit
Supply Voltage	V <sub>DD</sub>	-0.3	7.0	V
	V <sub>FL</sub>	0	1500	Vrms
FL Driving Frequency	f <sub>FL</sub>	0	100	kHz
Input Signal Voltage	V <sub>IN</sub>	-0.3	V <sub>DD</sub> + 0.3	V
Operating Temperature	T <sub>op</sub>	0	50	°C
Storage Temperature	T <sub>stg</sub>	-20	60	°C
Humidity (Max. Wet bulb temp = 29°C)	-	10	90	%RH

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

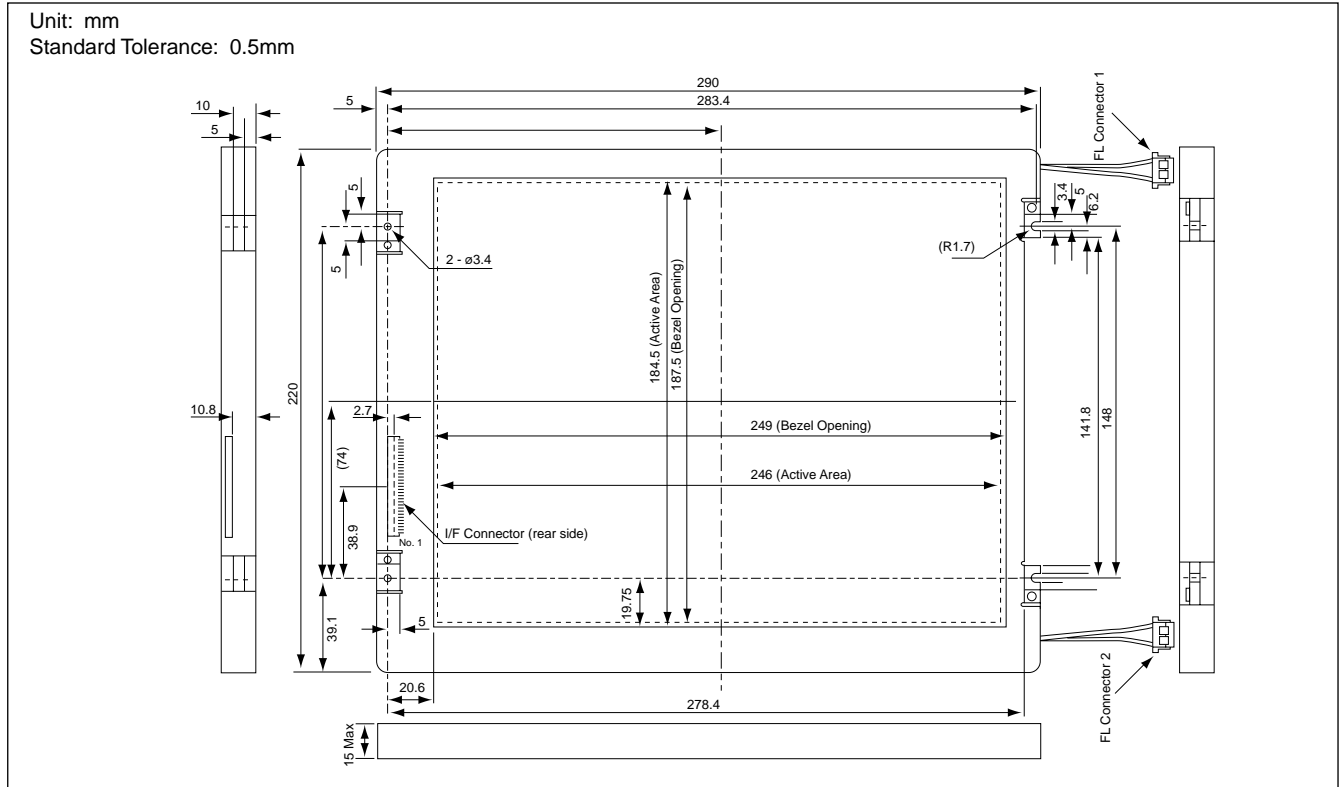
Item	Symbol	Min	Typ	Max	Unit
Supply Voltage (I <sub>FL</sub> =6mA)	V <sub>DD</sub>	4.75	5.0	5.25	V
	V <sub>FL</sub>	-	600	-	Vrms
FL Start Voltage (Ta = 0°C)		1400	-	1900	Vrms
High Level Input Voltage	V <sub>IH</sub>	0.8V <sub>DD</sub>	-	V <sub>DD</sub>	V
Low Level Input Voltage	V <sub>IL</sub>	0	-	0.2V <sub>DD</sub>	V
Current Consumption	I <sub>DD</sub> (*2)	-	300	-	mA
	I <sub>FL</sub>	3.0	5.0	6.0	mArms
Power Consumption (*1)	P	-	7.0	-	W

\*1: Before the efficiency loss of CCFL inverter

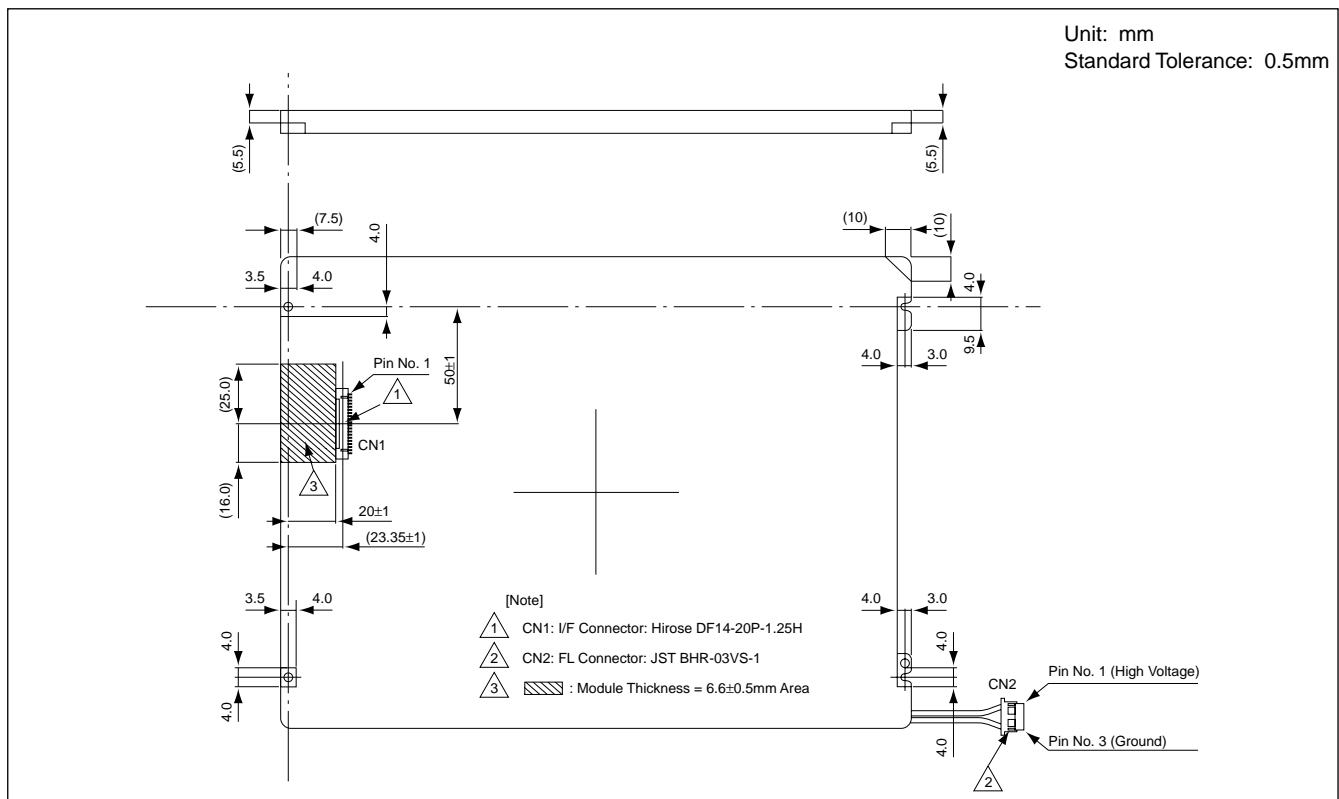
### Optical Specifications (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit
Contrast	CR	100	-	-	-
Response	t <sub>on</sub>	-	-	50	ms
	t <sub>off</sub>	-	-	50	ms
Luminance	L	-	250	-	cd/m <sup>2</sup>

Dimensional Outline (Front View)



Dimensional Outline (Back View)

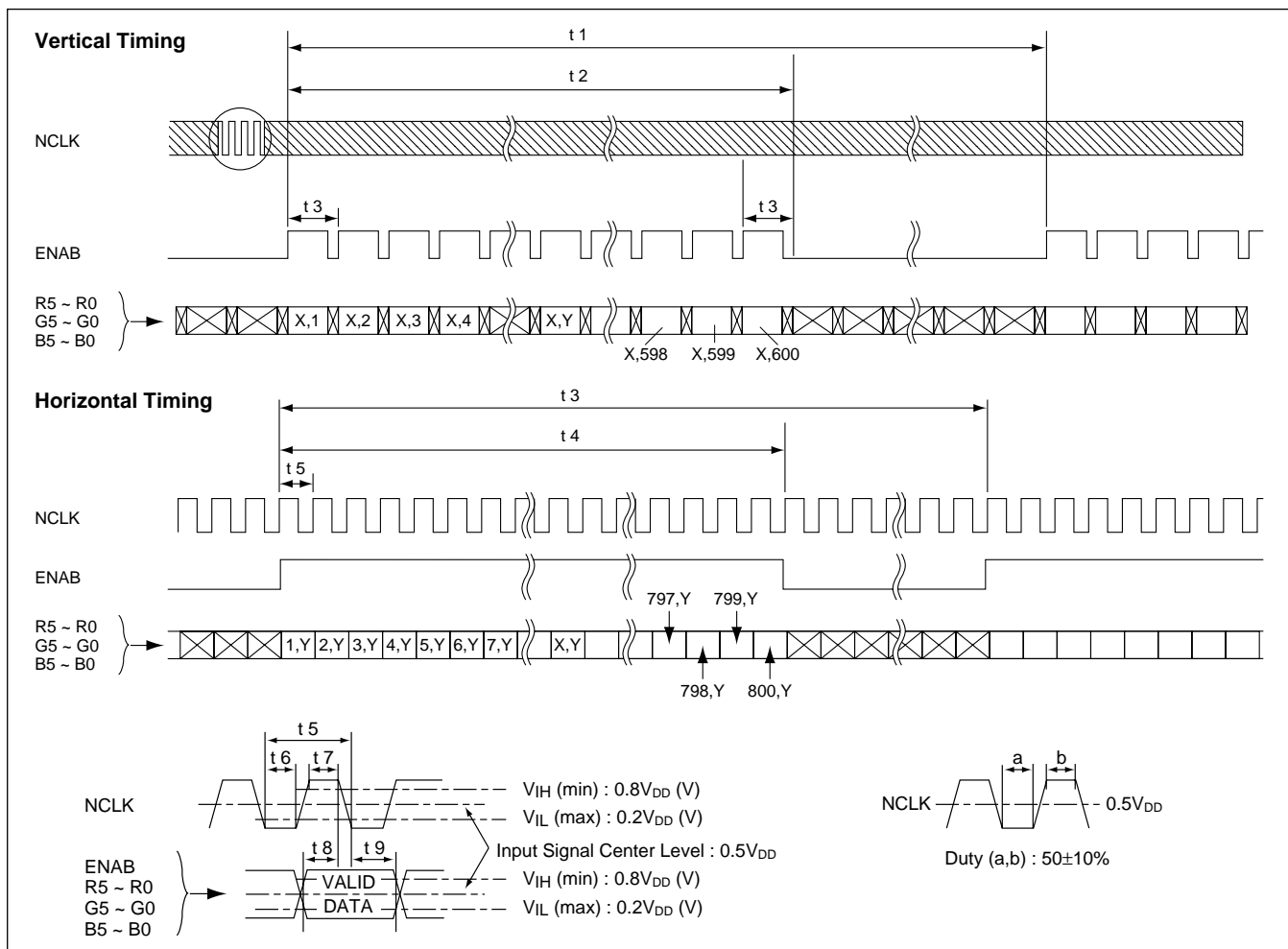


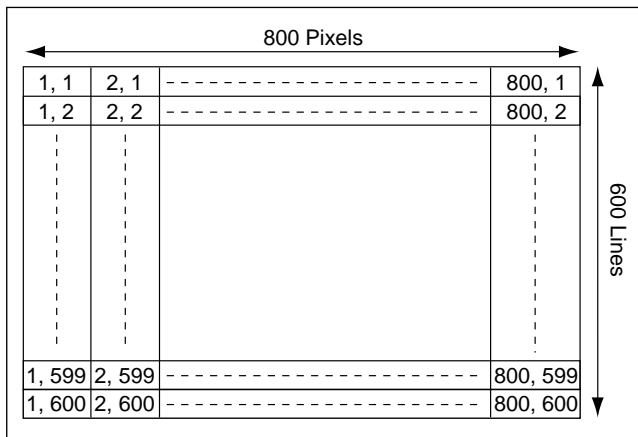
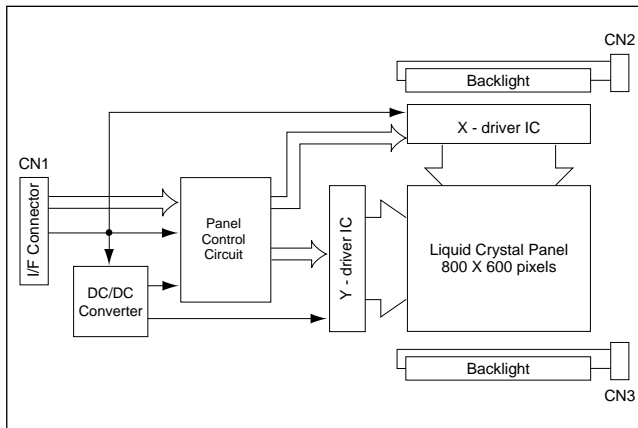
**Timing Specifications**

Item	Symbol	Min	Typ	Max	Unit
Frame Period	t1	604 x t3 -	625 x t3 17.78	628 x t3 17.86	- ms
Vertical Display Term	t2	600 x t3	600 x t3	600 x t3	t2 = N · t3
One Line Scanning Time	t3	844 x t5 26.4	1024 x t5 28.44	1056 x t5 -	- µs
Horizontal Display Period	t4	800 x t5	800 x t5	800 x t5	-
Clock Period	t5	25.00	30.77	33.00	ns
Clock "L" Time	t6	7.0	-	-	ns
Clock "H" Time	t7	7.0	-	-	ns
Set Up Time	t8	3.0	-	-	ns
Hold Time	t9	10.0	-	-	ns

Note 1: When ENAB is fixed to "H" level or "L" level after NCLK's input, the panel is displayed as a black. However, it may occur as a flicker on the display.

Note 2: Don't fix NCLK to "H" or "L" level while the V<sub>DD</sub> (+5V) is supplied. If NCLK is fixed to "H" or "L" level, the normal operating signal isn't supplied to LCD panel. This condition results the degradation of the LCD panel display quality.

**Timing Chart**


**Block Diagram – AND12C02S5**

**Connector Pin Assignment for Interface**
**CN2 CCFL Power Source**
**(BHR-03VS-1/Japan Solderless Terminal Mfg Co., Ltd.)**

Terminal No.	Symbol	Function
1	VL	CCFL Power Supply (High Voltage)
2	NC <sup>(1)</sup>	
3	GL	CCFL Power Supply (GND Side)

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Note 1: NC terminal is open. (Don't use.)

Note 2: See next page.

**CN1 Input Signal (1)**
**(DF9-31P-1V/Hirose Electric Co., Ltd.)**

Terminal No.	Symbol	Function
1	GND	
2	NCLK	Sampling Clock
3	NC <sup>(1)</sup>	
4	NC <sup>(1)</sup>	
5	GND	
6	R0 <sup>(2)</sup>	Red Display Data (LSB)
7	R1 <sup>(2)</sup>	Red Display Data
8	R2 <sup>(2)</sup>	Red Display Data
9	R3 <sup>(2)</sup>	Red Display Data
10	R4 <sup>(2)</sup>	Red Display Data
11	R5 <sup>(2)</sup>	Red Display Data (MSB)
12	GND	
13	G0 <sup>(2)</sup>	Green Display Data (LSB)
14	G1 <sup>(2)</sup>	Green Display Data
15	G2 <sup>(2)</sup>	Green Display Data
16	G3 <sup>(2)</sup>	Green Display Data
17	G4 <sup>(2)</sup>	Green Display Data
18	G5 <sup>(2)</sup>	Green Display Data (MSB)
19	GND	
20	B0 <sup>(2)</sup>	Blue Display Data (LSB)
21	B1 <sup>(2)</sup>	Blue Display Data
22	B2 <sup>(2)</sup>	Blue Display Data
23	B3 <sup>(2)</sup>	Blue Display Data
24	B4 <sup>(2)</sup>	Blue Display Data
25	B5 <sup>(2)</sup>	Blue Display Data (MSB)
26	ENAB	Compound Synchronization Signal
27	GND	
28	VDD	+5V Power Supply
29	VDD	+5V Power Supply
30	GND	



Note (2): 256 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
		:						:						:						
	↓	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
	Light	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
		L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	L62
	Light	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
		L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L62
	Light	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
		H	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	L62
	Light	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	White L63