

Fema Part Number

GM800600A-84-TTX3NLW-H	
Description	8.4" Full Color TFT LCD
	800x600 Resolution
	Brightness = 1000 nits (Typical)
	Optional Touch Panel Available

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2. General Description

2.1, Overview

GM800600A-84-TTX3NLW-H is a Color Active Matrix Liquid Crystal Display composed of a TFT-LCD display, a driver circuit, and a backlight system. The screen format is intended to support SVGA(800(H) x 600(V)) screen and 16.2M (RGB 8-bits) or 262k colors (RGB 6-bits). All input signals are LVDS interface compatible.

2.2 Features

- Sunlight readable display, 1000nits.
- LED backlight
- Wide operation temperature
- RoHS Compliance

2.3 Application

Industrial Application.

2.4 Display Specifications

Items	Unit	Specification
Screen Diagonal	inch	8.4 (213.4 mm)
Active Area	mm	170.4(H) x 127.8(V)
Pixels H x V	pixels	800x3(RGB) x 600
Pixels Pitch	um	213 (per one triad) x 213
Pixel Arrangement		RGB Vertical stripe
Display mode		TN mode, normally white
White luminance (center)	Cd/m ²	1000 (Typ.)
Contrast ratio		600 (Typ.)
Optical Response Time	msec	35 ms (Typ. on/off)
Normal Input Voltage VDD	Volt	3.3
Power Consumption (VDD Line + LED Lines)	Watt	5.2 (TBD)
Weight	Grams	250 typ.
Physical size	mm	203.0(H)x 142.5(V) x 8.0(D) (typ.)
Electrical Interface		1 Chanel LVDS
Support Colors		262k(6-bits) / 16.2 M (8-bits)
Surface Treatment		Anti-Glare, 3H
Temperature range		
Operating	°C	-30 ~ 85(LCD surface temperature)
Storage (Shipping)	°C	-30 ~ 85
RoHS Compliance		RoHS Compliance

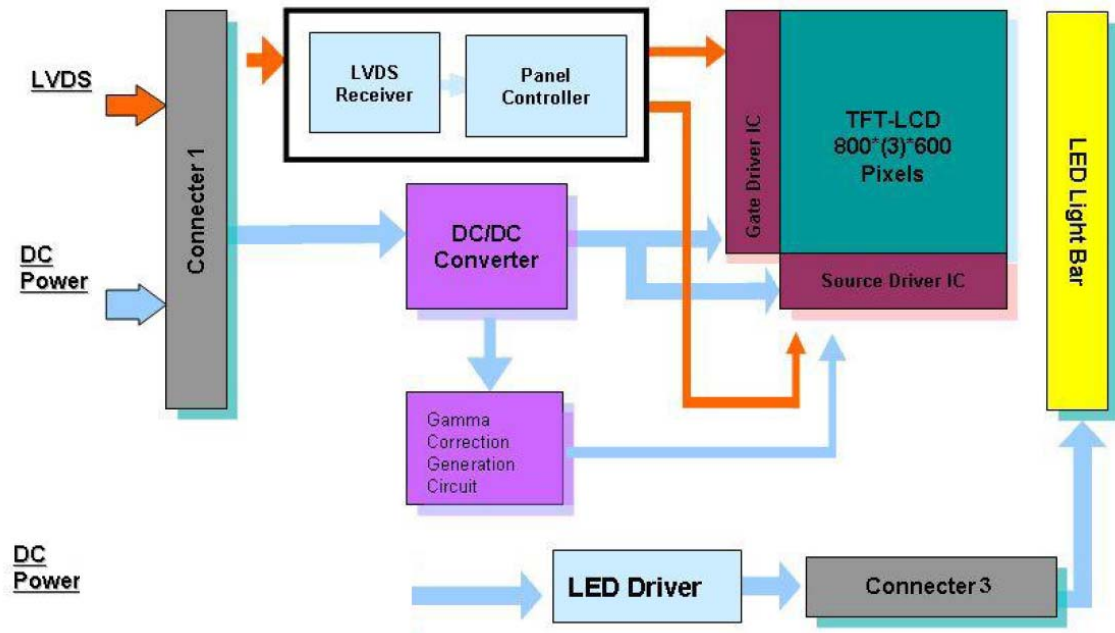
2.5 Optical Characteristics

The following optical characteristics are measured under stable condition at 25 °C

Items	Unit	Conditions	Min.	Typ.	Max.	Note
Viewing angle	Deg.	Horizontal (Right) CR=10 (Left)	140	160		2
		Vertical (Up) CR=10 (Down)	120	140		
Contrast Ratio		Normal Direction		600		3
Response Time	msec	Raising time (T_{rR})		20		4
		Falling time (T_{rF})		10		
		Raising + Falling		30		
Color / Chromaticity Coordinates (CIE)		Red x	-0.03	TBD	+0.03	5
		Red y		TBD		
		Green x		TBD		
		Green y		TBD		
		Blue x		TBD		
		Blue y		TBD		
Color coordinates (CIE) White		White x		0.31		
		White y		0.33		
Center Luminance	Cd/m ²		850	1000		6
Luminance Uniformity	%			65		7
Crosstalk (in 60 Hz)	%				1.2	
Flicker	dB				-20	

3. Functional Block Diagram

The following diagram shows the functional block of the 8.4 inches Color TFT-LCD Module:



4. Absolute Maximum Ratings

Absolute maximum ratings of the module are as following:

4.1 TFT LCD Module

Items	Symbol	Min	Max	Unit	Conditions
Logic/ LCD drive voltage	V _{in}	-0.3	3.6	Volt	Note 1, 2

4.2 Backlight unit

Items	Symbol	Min	Max	Unit	Conditions
LED Current	I _{LED}		400	mA	Note 1, 2

4.3 Absolute Ratings of Environment

Items	Symbol	Values			Unit	Conditions
		Min.	Typ.	Max.		
Operation temperature	T _{OP}	-30	-	85	°C	Note 3
Operation Humidity	H _{OP}	8		90	%	
Storage temperature	T _{ST}	-30		85	°C	
Storage Humidity	H _{ST}	8		90	%	

Note 1: With in T_a= 25°C

Note 2: Permanent damage to the device may occur if exceed maximum values

Note 3: For quality performance, please refer to IIS (Incoming Inspection Standard).

5. Electrical characteristics

5.1 TFT LCD Module

5.1.1 Power Specification

Input power specifications are as follows

Symbol	Parameter	Min	Typ.	Max	Unit	Conditions
VDD	Logic/ LCD Drive Voltage	3	3.3	3.6	Volt	+/- 10%
IDD	Input current		270	300	mA	VDD=3.3V, All black pattern.
PDD	VDD power		0.9	1.2	W	VDD=3.3V, All black pattern.
IRush	Inrush current			3	A	

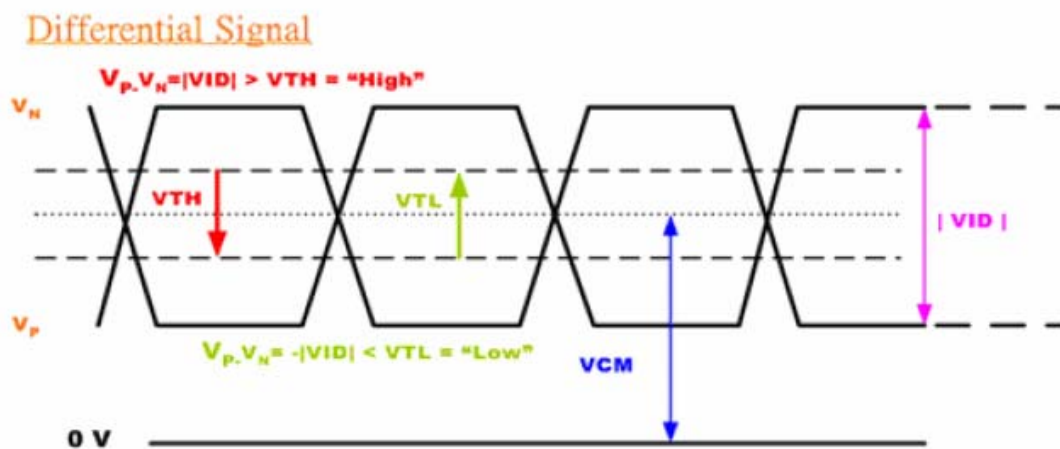
5.1.2 Signal Electrical Characteristics

Input signal shall be low or Hi-Z state when VDD is off.

Characteristics of each signal are as following:

Symbol	Parameter	Min	Typ	Max	Unit	Condition
VTH	Differential Input High Threshold			+100	mV	VICM = 1.2V
VTL	Differential Input Low Threshold	-100			mV	VICM = 1.2V
VID	Input Differential Voltage	100	400	600	mV	
VICM	Differential Input Common Mode Voltage	+1.1		+1.6	V	VTH/VTl = 100mV

Note: LVDS Signal Waveform.



5.2 Backlight Unit

Parameter guideline is under stable conditions at 25°C (Room Temperature):

Parameter	Min	Typ	Max	Unit	Note
LED voltage (VL)		19.8	21.5	[V]	2
LED current (IL)		200	300	[mA]	2,
LED Life Time(LTLED)		50,000		[Hour]	1

Note 1: The “LED lift time” is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25°C and typical LED Current at 250 mA.

Note 2: The LED driving condition is defined for each LED module.(5 LED Serial, a LED includes 6 Chips).

Following figure shows the relationship of the input signals and LCD pixel format.

[illegible]

6.2 Signal Description

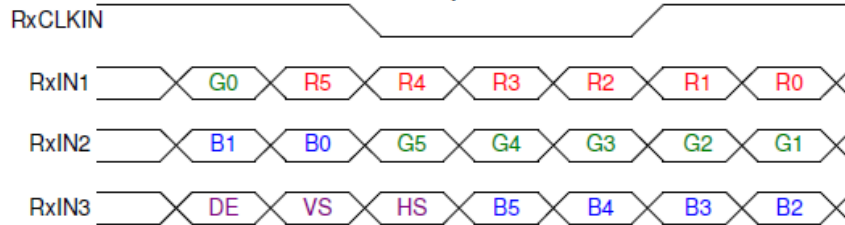
LVDS is a differential signal technology for LCD interface and high speed data transfer device. The connector pin definition is as below.

Pin No.	Symbol	Description
1	VDD	Power Supply, 3.3V (typical)
2	VDD	Power Supply, 3.3V (typical)
3	UD	Vertical Reverse Scan Control, Low or NC → Normal Mode. High → Vertical Reverse Scan. ^{Note}
4	LR	Vertical Reverse Scan Control, Low or NC → Normal Mode. High → Vertical Reverse Scan. ^{Note}
5	RxIN0-	LVDS differential data input Pair 0
6	RxIN0+	
7	GND	Ground
8	RxIN1-	LVDS differential data input Pair 1
9	RxIN1+	
10	GND	Ground
11	RxIN2-	LVDS differential data input Pair 2
12	RxIN2+	
13	GND	Ground
14	RXCLKIN-	LVDS differential Clock input Pair
15	RXCLKIN+	
16	GND	Ground
17	SEL 68	LVDS 6/8 bit select function control, Low or NC → 6 Bit Input Mode. High → 8 Bit Input Mode. ^{Note}
18	NC	NC
19	RxIN3-	LVDS differential data input Pair 3. Must be tied to Ground in 6 bit input mode.
20	RxIN3+	

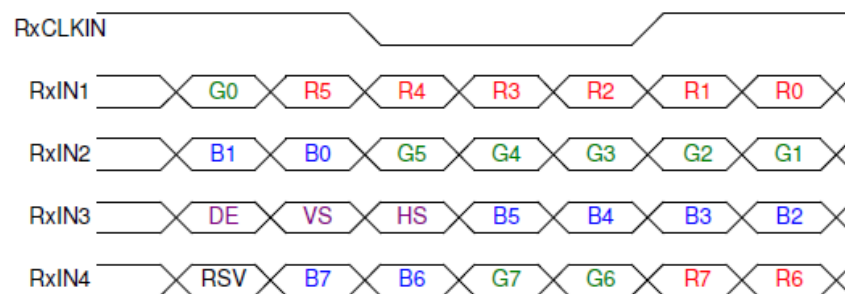
6.4 The Input Data Format

6.4.1 SEL68

SEL68 = "Low" or "NC" for 6 bits LVDS Input



SEL68 = "High" for 8 bits LVDS Input



Note1: Please follow PSWG.

Note2: R/G/B data 7:MSB, R/G/B data 0:LSB

Signal Name	Description	Remark
R7 R6 R5 R4 R3 R2 R1 R0	Red Data 7 (MSB) Red Data 6 Red Data 5 Red Data 4 Red Data 3 Red Data 2 Red Data 1 Red Data 0 (LSB)	Red-pixel Data Each red pixel's brightness data consists of these 8 bits pixel data.
G7 G6 G5 G4 G3 G2 G1 G0	Green Data 7 (MSB) GreenData 6 GreenData 5 GreenData 4 GreenData 3 GreenData 2 GreenData 1 GreenData 0 (LSB)	Green-pixel Data Each green pixel's brightness data consists of these 8 bits pixel data.
B7 B6 B5 B4 B3 B2 B1 B0	Blue Data 7 (MSB) Blue Data 6 Blue Data 5 Blue Data 4 Blue Data 3 Blue Data 2 Blue Data 1 Blue Data 0 (LSB)	Blue-pixel Data Each blue pixel's brightness data consists of these 8 bits pixel data.
RXCLKIN+ RXCLKIN-	LVDS Clock Input	
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	

Note: Output signals from any system shall be low or Hi-Z state when VDD is off.

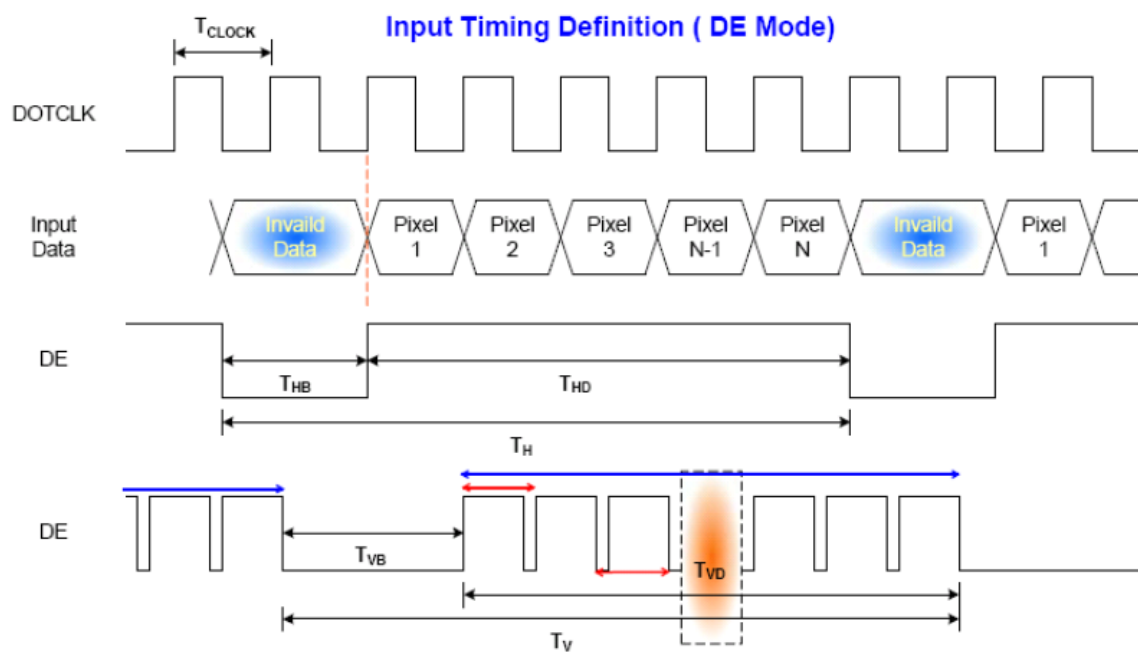
6.5 Interface Timing

6.5.1 Timing Characteristics

DE mode only

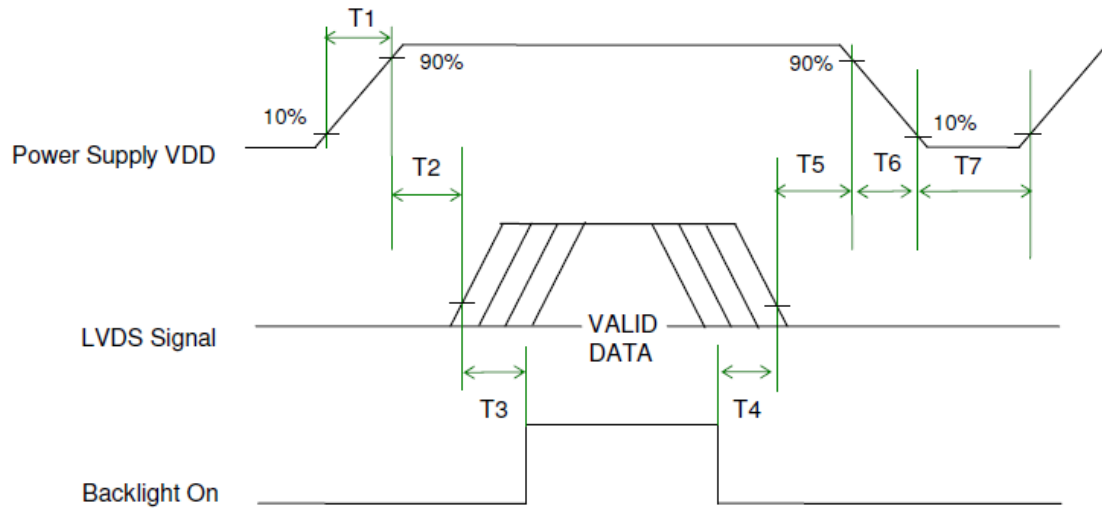
Parameter		Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency		$1/T_{\text{Clock}}$	33.6	39.8	48.3	MHz	
Vertical Section	Period	T_V	608	628	650	T_H	
	Active	T_{VD}	600	600	600		
	Blanking	T_{VB}	8	28	50		
Horizontal Section	Period	T_H	920	1056	1240	T_{Clock}	
	Active	T_{HD}	800	800	800		
	Blanking	T_{HB}	120	256	440		

6.5.2 Input Timing Diagram



6.6 Power ON/OFF Sequence

VDD power and lamp on/off sequence is as below. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Power ON/OFF sequence timing

Parameter	Value			Units
	Min.	Typ.	Max.	
T1	0.5	-	10	ms
T2	0	40	50	ms
T3	200	-	-	ms
T4	200	-	-	ms
T5	0	16	50	ms
T6	0	-	10	ms
T7	1000	-	-	ms

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector

7.0 Connector & Pin Assignment

Physical interface is described as for the connector on module. These connectors are capable of accommodating the following signals and will be following components.

7.1 TFT LCD Module

Connector Name / Designation	Signal Connector
Manufacturer	STM, Hirose or compatible
Connector Model Number	STM -MSB24013P20HA, Hirose- DF19LA-20P-1H or compatible
Mating Model Number	STM-P24013P20, Hirose-DF19-20S-1C or compatible

Pin No.	Signal Name	Pin No.	Signal Name
1	VDD	2	VDD
3	UD	4	LR
5	RxIN1-	6	RxIN1+
7	GND	8	RxIN2-
9	RxIN2+	10	GND
11	RxIN3-	12	RxIN3+
13	GND	14	RxCKIN-
15	RxCKIN+	16	GND
17	SEL 68	18	NC
19	RxIN4-	20	RxIN4+

7.2 Backlight Unit: LED Connector (TBD)

Physical interface is described as for the connector on module. These connectors are capable of accommodating the following signals and will be following components.

Connector Name / Designation	LED Light Bar Connector / Backlight lamp
Manufacturer	TKP TERMINAL/ TKP HOVSING
Type Part Number	TKP TERMINAL 8820T/ TKP HOVSING 8821-03
Mating Type Part Number	Wire VL 1007 24 AWG

8. Reliability Test

Environment test conditions are listed as following table.

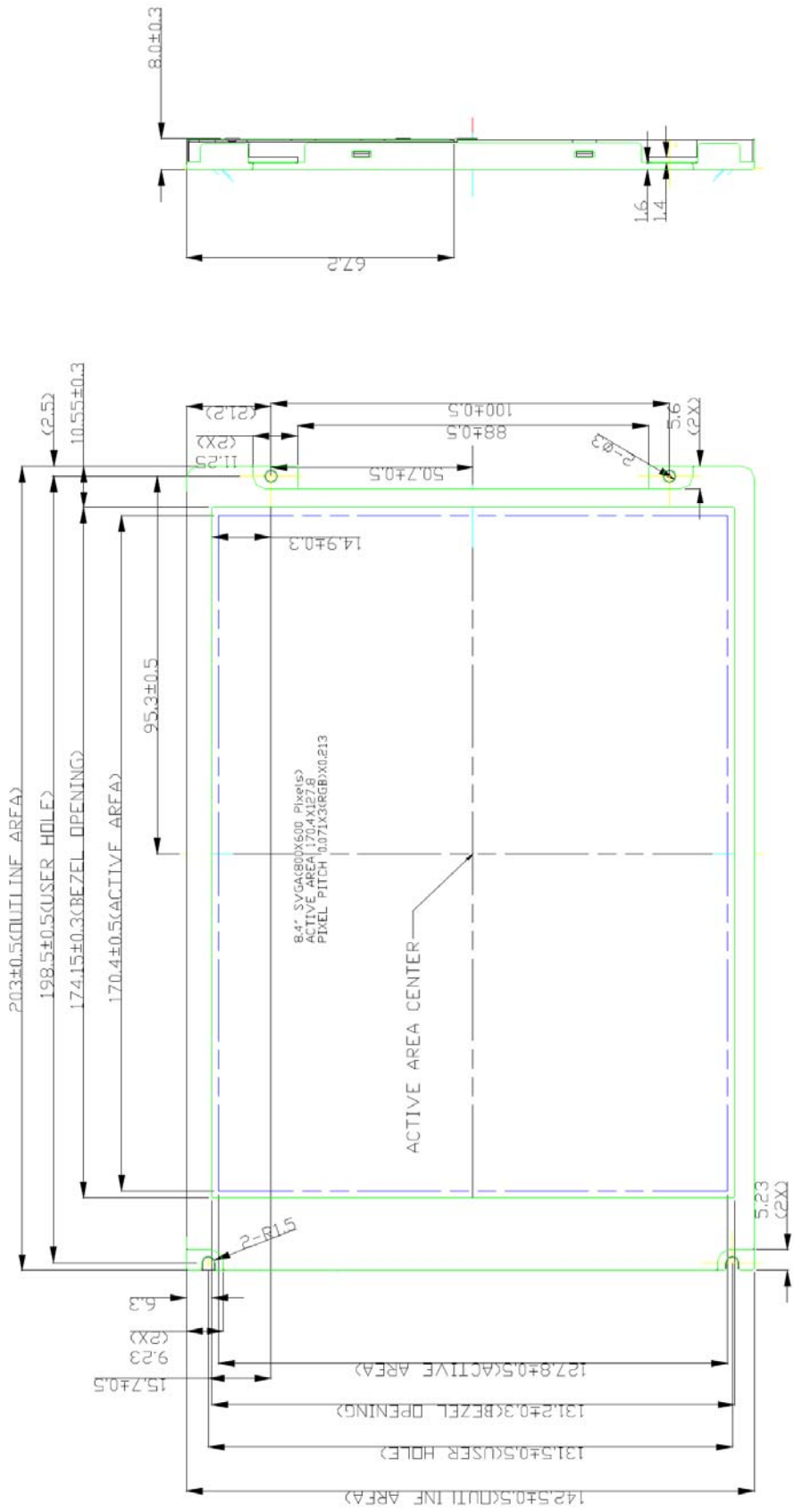
Items	Required Condition	Note
Temperature Humidity Bias (THB)	Ta= 40℃ , 90%RH, 300hours	
High Temperature Operation (HTO)	Ta= 85℃ , 50%RH, 300hours	3
Low Temperature Operation (LTO)	Ta= -30℃ , 300hours	
High Temperature Storage (HTS)	Ta= 85℃ , 300hours	
Low Temperature Storage (LTS)	Ta= -30℃ , 300hours	
Drop Test	Height: 60 cm, package test	
Thermal Shock Test (TST)	-20℃/30min, 60℃/30min, 100 cycles	1
On/Off Test	On/10sec, Off/10sec, 30,000 cycles	
ESD (ElectroStatic Discharge)	Contact Discharge: \pm 8KV, 150pF(330 Ω) 1sec, 9 points, 25 times/ point.	2
	Air Discharge: \pm 15KV, 150pF(330 Ω) 1sec 9 points, 25 times/ point.	2

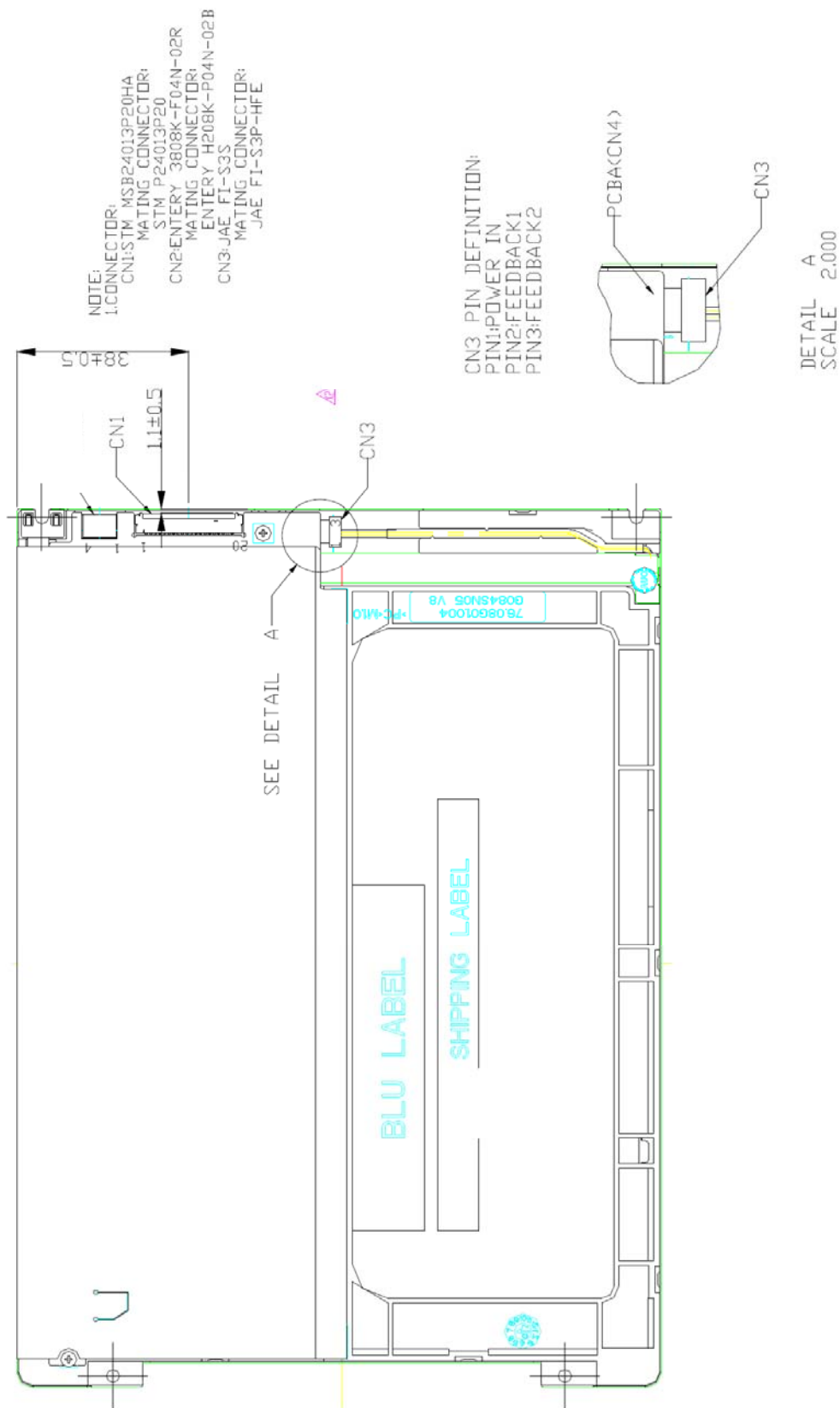
Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20℃ to 60℃, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 2: According to EN61000-4-2 , ESD class B: Some performance degradation allowed. No data lost. Self-recoverable. No hardware failures.

Note 3: The test items are tested by open frame type chassis.

10. Mechanical Characteristic





(Note: the LED backlight power cord is not shown)