



ELECTRONICS



# Product Information

**SAMSUNG TFT-LCD**  
**MODEL NO. : LTN133AT07-001**

LCD Development Team 3

Samsung Electronics Co . , LTD.



SAMSUNG TFT-LCD

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## GENERAL DESCRIPTION

### DESCRIPTION

LTN133AT07-001 is a color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching devices. This model is composed of a TFT LCD panel, a driver circuit and a backlight unit. The resolution of a 13.3" contains 1,280 x 800 pixels and can display up to 262,144 colors. 6 O'clock direction is the Optimum viewing angle.

### FEATURES

- High contrast ratio, high aperture structure
- 1280 x 800 pixels resolution
- Low power consumption
- Fast Response
- Single CCFL
- DE(Data enable) only mode
- 3.3V LVDS Interface
- Onboard EEDID chip

### APPLICATIONS

- Notebook PC
- If the usage of this product is not for PC application, but for others, please contact SEC

## GENERAL INFORMATION

Item	Specification	Unit	Note
Display area	268.08(H) x 178.80(V) (13.3" diagonal )	mm	
Driver element	a-Si TFT active matrix		
Display colors	262,144		
Number of pixel	1280 x RGB(3) x 800	pixel	16 : 10
Pixel arrangement	RGB vertical stripe		
Pixel pitch	0.2235(H) x 0.2235(V) (TYP.)	mm	113.6DPI
Display Mode	Normally white		
Surface treatment	Haze 0, Hard-Coating 3H		Glare

**MECHANICAL INFORMATION**

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal (H)	298.5	299.0	299.5	mm	
	Vertical (V)	194.5	195.0	195.5	mm	
	Depth (D)	-	-	5.5	mm	(1)
Weight		-	350	365	g	

Note (1) Measurement condition of outline dimension  
 . Equipment : Vernier Calipers  
 . Push Force : 500g ·f (minimum)

**1. ELECTRICAL ABSOLUTE RATINGS****(1) TFT LCD MODULE**

$$V_{DD} = 3.3V, V_{SS} = GND = 0V$$

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	$V_{DD}$	$V_{DD} - 0.3$	$V_{DD} + 0.3$	V	(1)
Logic Input Voltage	$V_{DD}$	$V_{DD} - 0.3$	$V_{DD} + 0.3$	V	(1)

Note (1) Within  $T_a$  ( $25 \pm 2$  °C )

**(2) BACK-LIGHT UNIT**

$$T_a = 25 \pm 2$$
 °C

Item	Symbol	Min.	Max.	Unit	Note
Lamp Current	$I_L$	3.0	7.0	mArms	(1)
Lamp frequency	$F_L$	50	80	kHz	(1)

Note 1) Permanent damage to the device may occur if maximum values are exceeded  
 Functional operation should be restricted to the conditions described under normal operating conditions.

## 2. OPTICAL CHARACTERISTICS

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state.

Measuring equipment : TOPCON BM-5A and PR-650

\* Ta = 25 ± 2 °C, VDD=3.3V, fv= 60Hz, fdCLK = 68.9MHz, IL = 6.0 mA

Item		Symbol	Condition	Min.	Typ.	Max	Unit
Contrast Ratio (5 Points)		CR		300	500	-	-
Response Time at Ta ( Rising + Falling )		T <sub>RT,BW</sub>		-	25	35	msec
Average Luminance of White (5 Points)		Y <sub>L,AVE</sub>		220	250	-	cd/m <sup>2</sup>
Color Chromaticity ( CIE )	Red	R <sub>X</sub>	Normal Viewing Angle φ = 0 θ = 0	0.550	0.580	0.610	-
		R <sub>Y</sub>		0.310	0.340	0.370	
	Green	G <sub>X</sub>		0.290	0.320	0.350	
		G <sub>Y</sub>		0.510	0.540	0.570	
	Blue	B <sub>X</sub>		0.135	0.155	0.185	
		B <sub>Y</sub>		0.095	0.125	0.155	
	White	W <sub>X</sub>		0.283	0.313	0.343	
		W <sub>Y</sub>		0.299	0.329	0.359	
Viewing Angle	Hor.	θ <sub>L</sub>	CR ≥ 10	40	45	-	Degrees
		θ <sub>H</sub>		40	45	-	
	Ver.	φ <sub>H</sub>		10	15	-	
		φ <sub>L</sub>		25	30	-	
13 Points White Variation		δ <sub>L</sub>		-	-	1.8	-

### 3. ELECTRICAL CHARACTERISTICS

#### 3.1 TFT LCD MODULE

Ta= 25 ± 2°C

Item	Symbol	Min.	Typ.	Max.	Unit	Note	
Voltage of Power Supply	V <sub>DD</sub>	3.0	3.3	3.6	V		
Differential Input Voltage for LVDS Receiver Threshold	High	V <sub>IH</sub>	-	-	+100	mV	V <sub>CM</sub> = +1.2V
	Low	V <sub>IL</sub>	-100	-	-	mV	
Vsync Frequency	f <sub>v</sub>	-	60	-	Hz		
Hsync Frequency	f <sub>h</sub>	-	49.38	-	KHz	f <sub>v</sub> *823	
Main Frequency	f <sub>DCLK</sub>	-	71.1	-	MHz	f <sub>h</sub> *1440	
Rush Current	I <sub>RUSH</sub>	-	-	1.5	A	(4)	
Current of Power Supply	White	I <sub>DD</sub>	-	280	-	mA	(2),(3)*a
	Mosaic		-	300	-	mA	(2),(3)*b
	V. stripe		-	350	400	mA	(2),(3)*c

Note (1) Display data pins and timing signal pins should be connected.( GND = 0V )

(2) f<sub>v</sub> = 60Hz, f<sub>DCLK</sub> = 68.9MHZ, V<sub>DD</sub> = 3.3V , DC Current.

(3) Power dissipation pattern

#### 3.2 BACK-LIGHT UNIT

The backlight system is an edge-lighting type with a single CCFT ( Cold Cathode Fluorescent Tube ).  
The characteristics of a single lamp are shown in the following table.

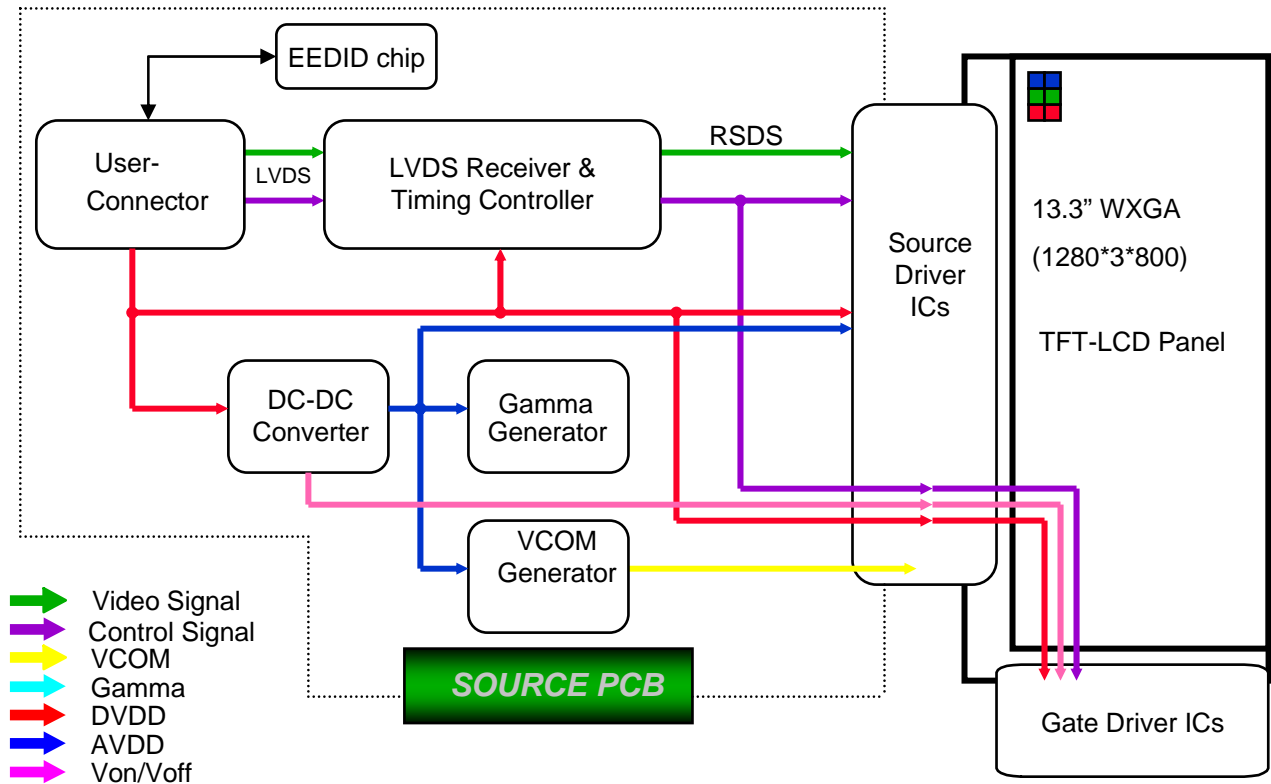
- INVERTER : SEM SIC 130T

Ta= 25 ± 2 °C

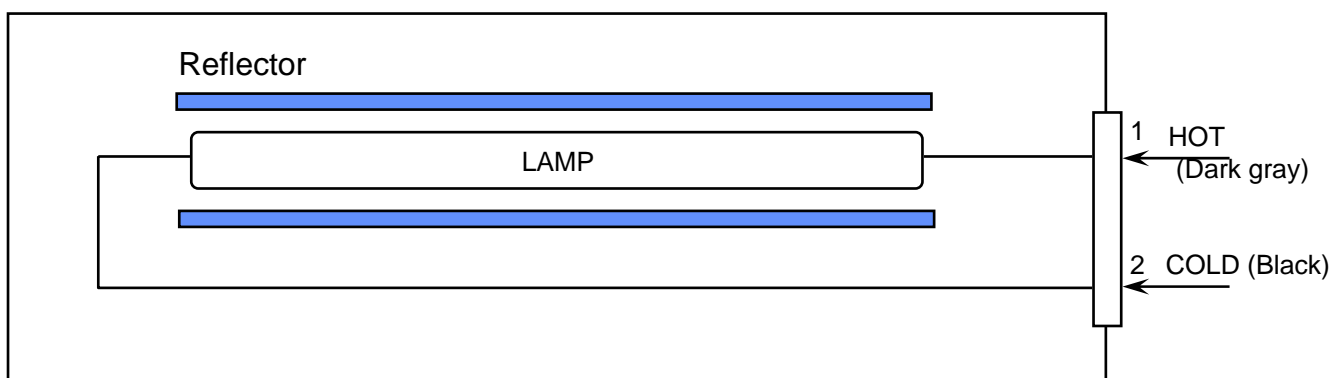
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Lamp Current	I <sub>L</sub>	3.0	6.0	6.5	mArms	
Lamp Voltage	V <sub>L</sub>	-	640	-	Vrms	I <sub>L</sub> = 6.0mA
Frequency	f <sub>L</sub>	50	60	65	KHz	
Power Consumption	P <sub>L</sub>	-	3.84	-	W	I <sub>L</sub> = 6.0mA
Operating Life Time	Hr	10,000	-	-		I <sub>L</sub> = 6.5mA
Startup Voltage	V <sub>s</sub>	-	-	1080	Vrms	25°C
				1295	Vrms	0°C

## 4. BLOCK DIAGRAM

### 4.1 TFT LCD Module



### 4.2 BACK-LIGHT UNIT



Note) The output of the inverter may change according to the material of the reflector.

## 5. INPUT TERMINAL PIN ASSIGNMENT

### 5.1. Input Signal & Power (LVDS, Connector : HIROSE DF-19KR-20P-1H)

No.	Symbol	Function	Polarity	Remarks
1	VSS	Ground		
2	VDD	POWER SUPPLY +3.3V		
3	VDD	POWER SUPPLY +3.3V		
4	VEEDID	DDC 3.3V Power		
5	NC	No Connection		
6	CLKEDID	DDC Clock		
7	DATAEDID	DDC data		
8	RxIN0-	LVDS Differential Data INPUT (R0-R5,G0)	Negative	
9	RxIN0+	LVDS Differential Data INPUT (R0-R5,G0)	Positive	
10	GND	Ground		
11	RxIN1-	LVDS Differential Data INPUT (G1-G5,B0-B1)	Negative	
12	RxIN1+	LVDS Differential Data INPUT (Odd G1-G5,B0-B1)	Positive	
13	GND	Ground		
14	RxIN2-	LVDS Differential Data INPUT (B2-B5,Sync,DE)	Negative	
15	RxIN2+	LVDS Differential Data INPUT (B2-B5,Sync,DE)	Positive	
16	GND	Ground		
17	RxCLK-	LVDS Differential Data INPUT	Negative	
18	RxCLK+	LVDS Differential Data INPUT	Positive	
19	GND	Ground		
20	GND	Ground		



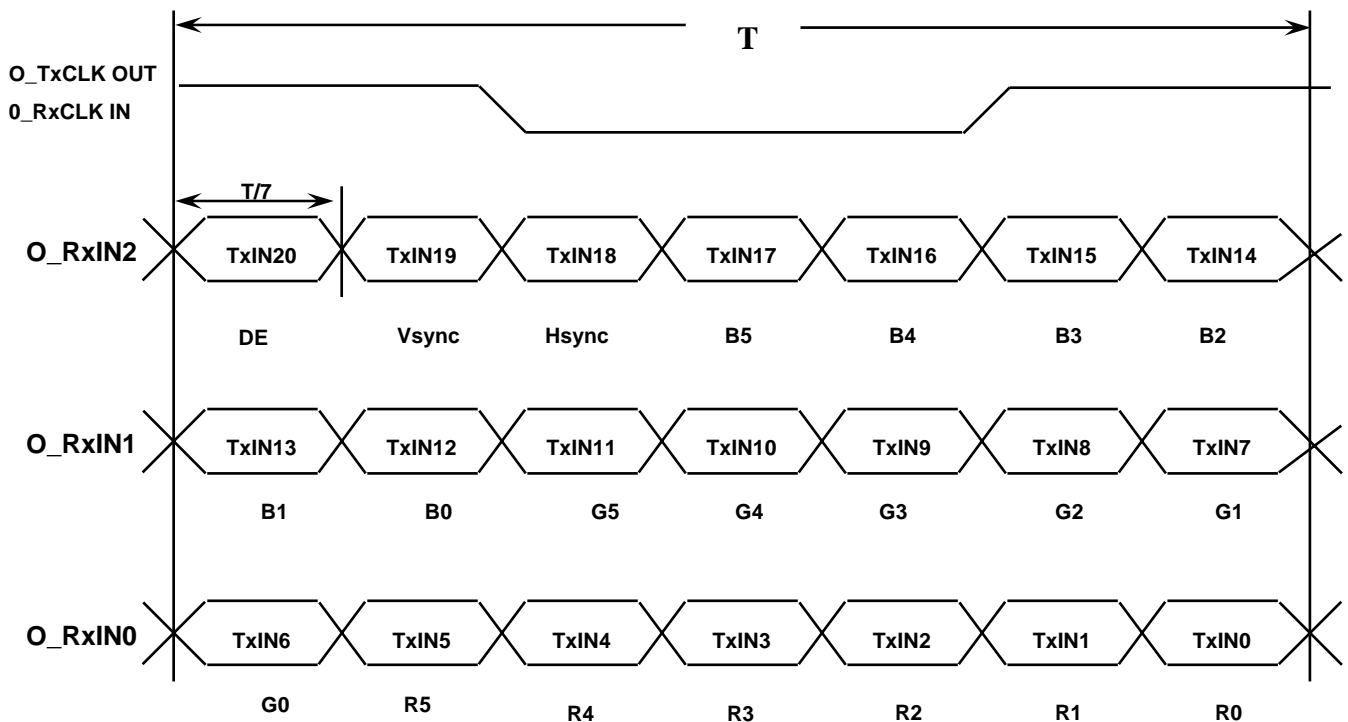
### 5.2 BACK LIGHT UNIT

Connector : JST BHSR - 02VS -1  
 Mating Connector : SM02B-BHSS-1(JST)

Pin NO.	Symbol	Color	Function
1	HOT	Dark gray	High Voltage
2	COLD	Black	Low Voltage

### 5.3 Timing Diagrams of LVDS For Transmission

LVDS Receiver : Integrated T-CON

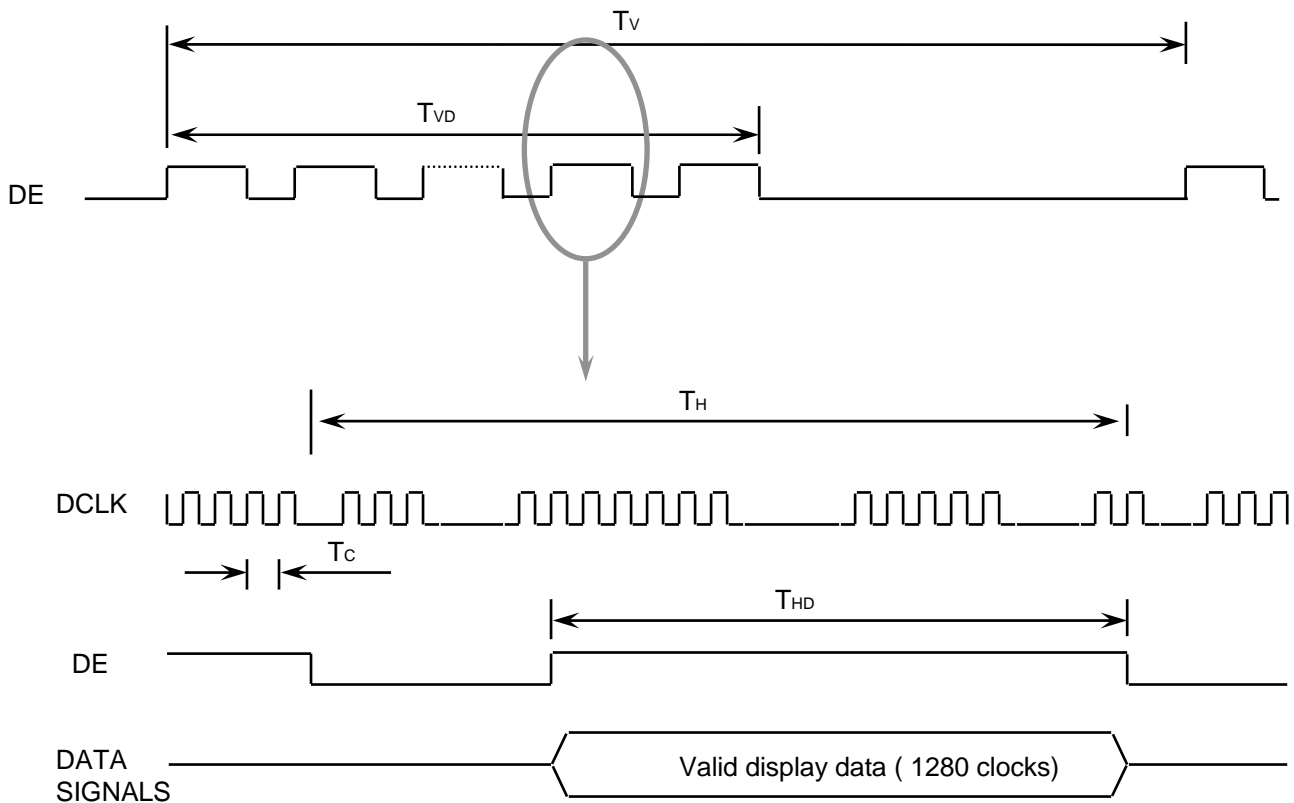


## 6. INTERFACE TIMING

### 6.1 Timing Parameters

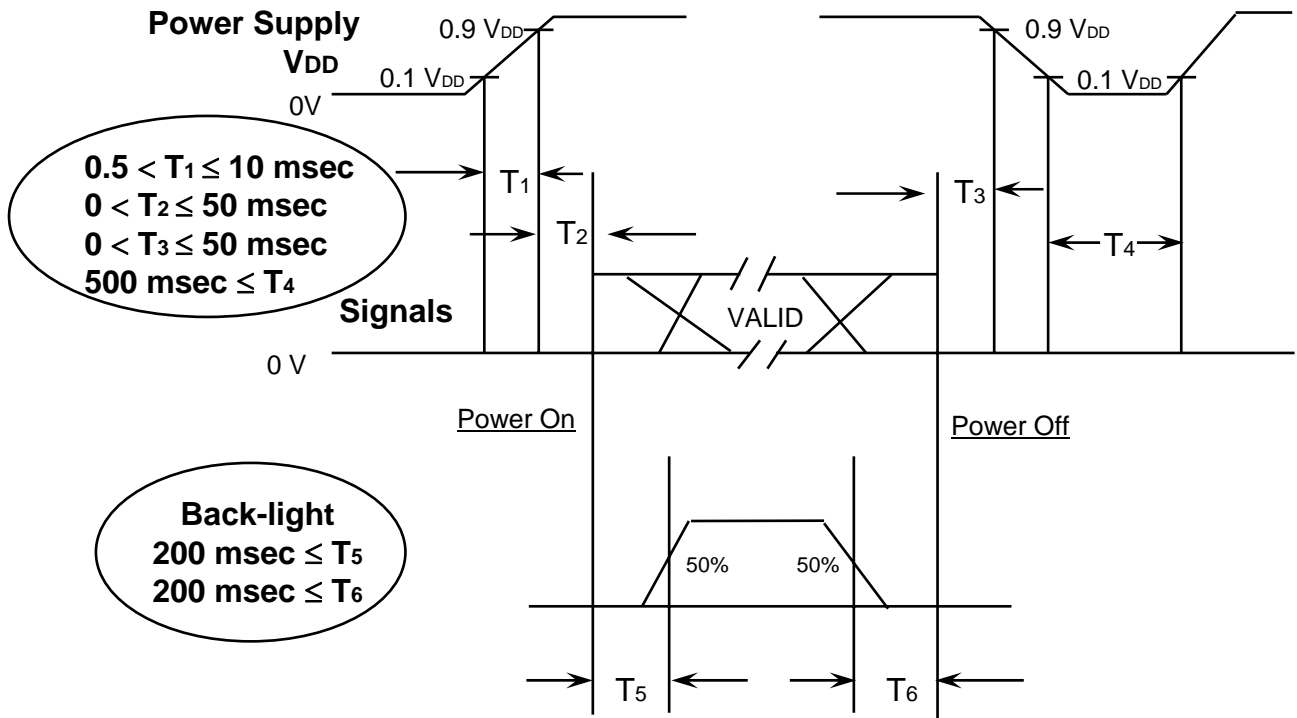
Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
Frame Frequency	Cycle	TV	804	823	833	Lines	
Vertical Active Display Term	Display Period	TVD	-	800	-	Lines	
One Line Scanning Time	Cycle	TH	1316	1440	1500	Clocks	
Horizontal Active Display Term	Display Period	THD	-	1280	-	Clocks	

### 6.2 Timing diagrams of interface signal



### 6.3 Power ON/OFF Sequence

: To prevent a latch-up or DC operation of the LCD module, the power on/off sequence should be as the diagram below.



Power ON/OFF Sequence

- T1 : Vdd rising time from 10% to 90%
- T2 : The time from Vdd to valid data at power ON.
- T3 : The time from valid data off to Vdd off at power Off.
- T4 : Vdd off time for Windows restart
- T5 : The time from valid data to B/L enable at power ON.
- T6 : The time from valid data off to B/L disable at power Off.

**NOTE.**

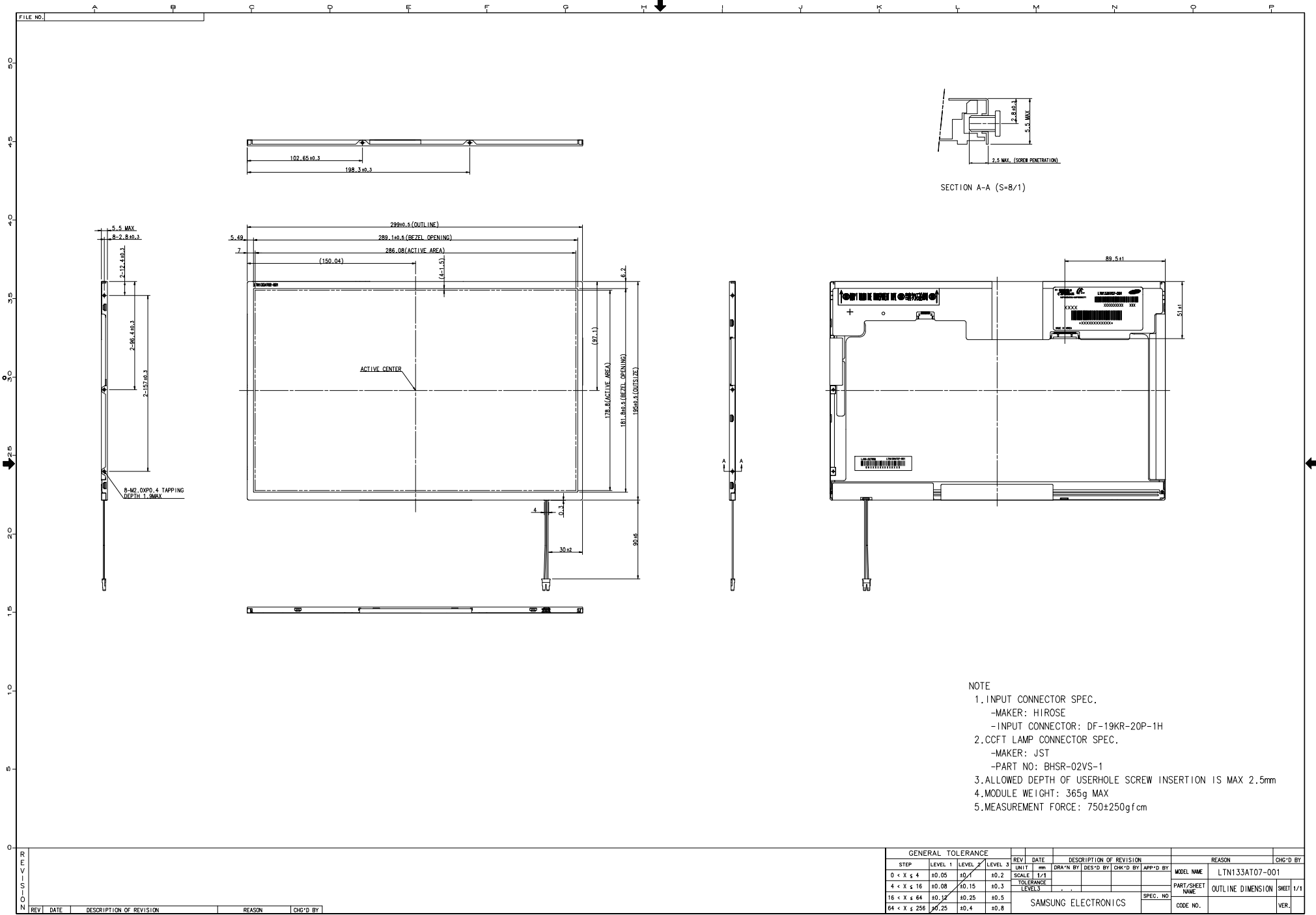
- (1) The supply voltage of the external system for the module input should be the same as the definition of VDD.
- (2) Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become white.
- (3) In case of VDD = off level, please keep the level of input signals on the low or keep a high impedance.
- (4) T4 should be measured after the module has been fully discharged between power off and on period.
- (5) Interface signal shall not be kept at high impedance when the power is on.

## 7. MECHANICAL OUTLINE DIMENSION

Product Information

[ Refer to the next page ]

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REVISION

REV	DATE	DESCRIPTION OF REVISION	REASON	CHG'D BY

GENERAL TOLERANCE				REV	DATE	DESCRIPTION OF REVISION			REASON		CHG'D BY
STEP	LEVEL 1	LEVEL 2	LEVEL 3	UNIT	APP'D BY	DRAWN BY	DES'D BY	CHK'D BY	APP'D BY	MODEL NAME	LTN133AT07-001
0 < X ≤ 4	±0.05	±0.1	±0.2	SCALE	1/1					PART/SHEET NAME	OUTLINE DIMENSION
4 < X ≤ 16	±0.08	±0.15	±0.3	TOLERANCE						SPEC. NO	SHEET 1/1
16 < X ≤ 64	±0.12	±0.25	±0.5							CODE NO.	VER.
64 < X ≤ 256	±0.25	±0.4	±0.8							SAMSUNG ELECTRONICS	