



TO : Toshiba

DATE : February. 8, 2012

**SAMSUNG TFT-LCD****MODEL NO : LTN173KT02-T01**

NOTE : Extension code [-T01]  
→ LTN173KT02-T01  
Surface type [ Glare ]

*Any Modification of Spec is not allowed without SEC's permission.*

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**Application Engineering Group, LCD Division  
Samsung Electronics Co., Ltd.**

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# REVISION HISTORY

Approval

Date	Revision No.	Page	Summary
2011. Nov. 7	A00	All	The LTN173KT02-T01 model's Approval spec was issued first.
2012 Feb. 8	A01	P.10	Hsync/Main Frequency Min. and Max. value were added.

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**Doc.No.**

LTN173KT02-T01

**Rev.No**

04-A01-G-120208

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## GENERAL DESCRIPTION

### DESCRIPTION

LTN173KT02-T01 is a color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as switching devices. This model is composed of a TFT LCD panel, a driver circuit and a backlight system. The resolution of a 17.3" contains 1600 x 900 pixels and can display up to 262,144 colors. 6 O'clock direction is the Optimum viewing angle.

### FEATURES

- Thin and light weight
- High contrast ratio, high aperture structure
- 1600 x 900 pixels resolution (16:9)
- Fast Response Time
- Low power consumption
- LED BLU Structure
- DE (Data enable) only mode
- 3.3V LVDS Interface
- On board EDID chip
- Pb-free product

### 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	382.08(H) x 214.92 (V) (17.3 "diagonal)	mm	
Driver element	a-Si TFT active matrix		
Display colors	262,144		
Number of pixel	1600 x 900	pixel	16 : 9
Pixel arrangement	RGB vertical stripe		
Pixel pitch	0.2388 (H) x 0.2388 (V) (TYP.)	mm	
Display Mode	Normally white		
Surface treatment	Haze 0, Hardness 3H		Glare

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## Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal (H)	397.6	398.1	398.6	mm	
	Vertical (V)	232.3	232.8	233.3	mm	
	Depth (D)	-	-	6.0	mm	(1)
Weight		-	-	570	g	

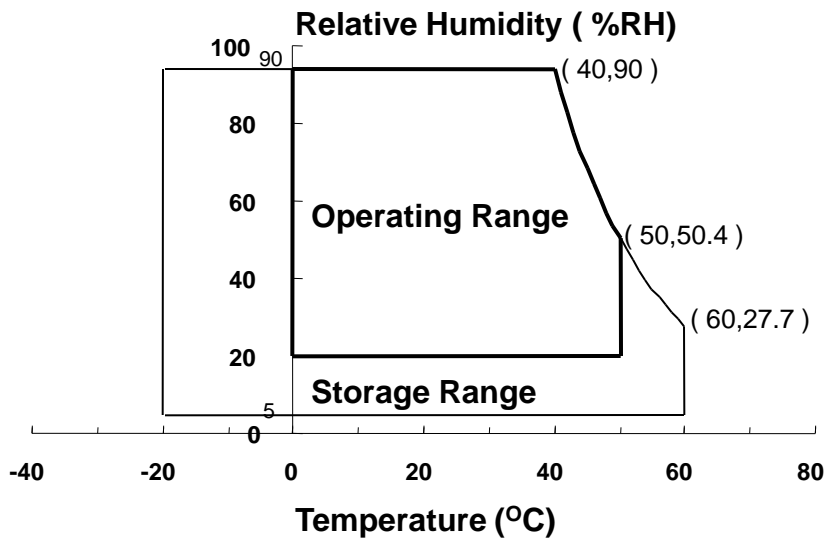
Note (1) Measurement condition of outline dimension  
 . Equipment : Vernier Calipers  
 . Push Force : 500g · f (minimum)

## 1. ABSOLUTE MAXIMUM RATINGS

### 1.1 ENVIRONMENTAL ABSOLUTE RATINGS

Item	Symbol	Min.	Max.	Unit	Note
Storage temperate	TSTG	-20	60	°C	(1)
Operating temperate (Temperature of glass surface)	TOPR	0	50	°C	(1)
Shock ( non-operating )	Snop	-	240	G	(2),(4)
Vibration (non-operating)	Vnop	-	2.41	G	(3),(4)

Note (1) Temperature and relative humidity range are shown in the figure below.  
 95 % RH Max. ( $40\text{ }^{\circ}\text{C} \geq T_a$ )  
 Maximum wet - bulb temperature at  $39\text{ }^{\circ}\text{C}$  or less. ( $T_a > 40\text{ }^{\circ}\text{C}$ ) No condensation



- (2) 2ms, half sine wave, one time for  $\pm X, \pm Y, \pm Z$ .  
 (3) 5 - 500 Hz, random vibration, 30min for X, Y, Z.  
 (4) At testing Vibration and Shock, the fixture in holding the Module to be tested have to be hard and rigid enough so that the Module would not be twisted or bent by the fixture.

## 1.2 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. OPTICAL CHARACTERISTICS

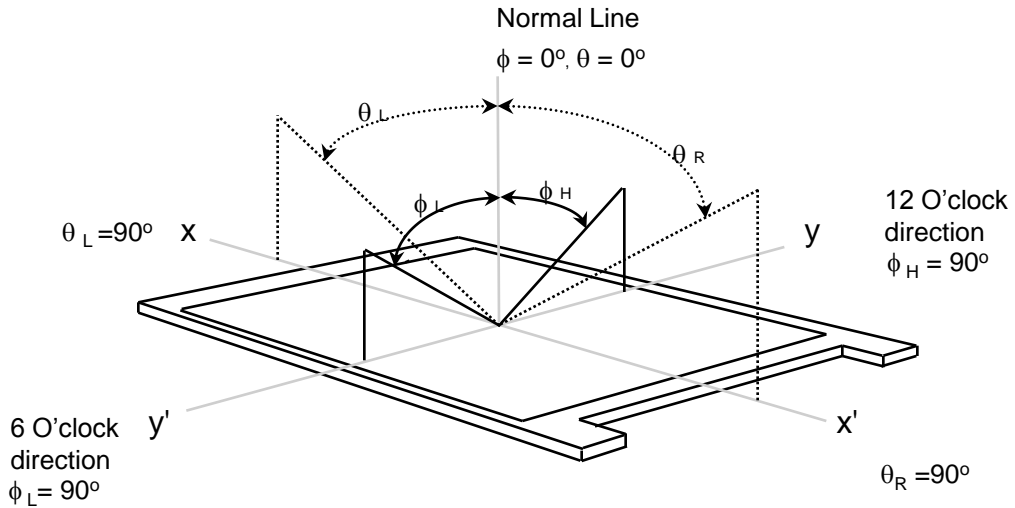
The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note (5).  
Measuring equipment : TOPCON SR-3

\*  $T_a = 25 \pm 2 \text{ }^\circ\text{C}$ ,  $V_{DD}=3.3\text{V}$ ,  $f_v=60\text{Hz}$ ,  $f_{DCLK}=51.89\text{MHz}$ ,  $I_L=27\text{mA}$

Item		Symbol	Condition	Min.	Typ.	Max	Unit	Note
Contrast Ratio (5 Points)		CR	Normal Viewing Angle $\phi = 0$ $\theta = 0$	300	-	-	-	(1), (2), (5)
Response Time at $T_a$ ( Rising + Falling )		$T_{RT}$		-	16	25	msec	(1), (3)
Average Luminance of White (5 Points)		$Y_{L,AVE}$		185	220	-	cd/m <sup>2</sup>	$I_L=27\text{mA}$ (1), (4)
Color Chromaticity ( CIE )	Red	$R_X$		0.585	0.615	0.645	-	
		$R_Y$		0.332	0.362	0.392		
	Green	$G_X$		0.318	0.348	0.378		
		$G_Y$		0.570	0.600	0.630		
	Blue	$B_X$		0.116	0.146	0.176		
		$B_Y$		0.045	0.075	0.105		
	White	$W_X$		0.283	0.313	0.343		
		$W_Y$	0.299	0.329	0.359			
Viewing Angle	Hor.	$\theta_L$	CR $\geq$ 10	30	45	-	Degrees	(1), (5) SR-3
		$\theta_R$		30	45	-		
	Ver.	$\phi_H$		10	15	-		
		$\phi_L$		20	30	-		
Color Gamut				-	60	-	%	
13 Points White Variation		$\delta_L$		-	-	1.7	-	(6)

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Note 1) Definition of Viewing Angle : Viewing angle range( $10 \leq C/R$ )

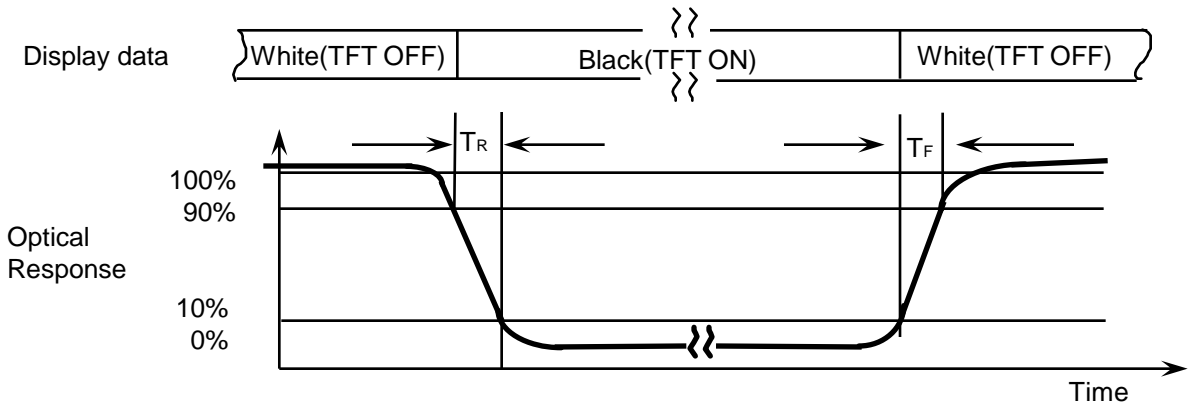


Note 2) Definition of Contrast Ratio (CR) : Ratio of gray max (Gmax) ,gray min (Gmin) at 5 points(4, 5, 7, 9, 10)

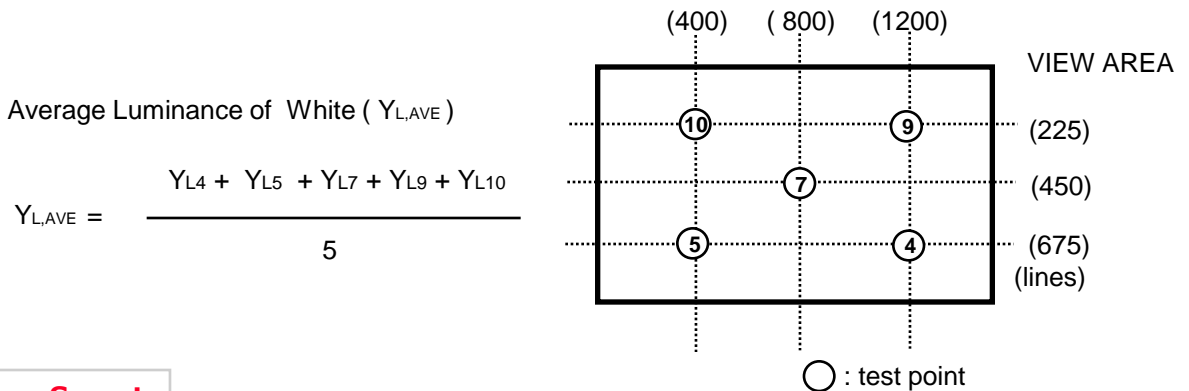
$$CR = \frac{CR(4) + CR(5) + CR(7) + CR(9) + CR(10)}{5}$$

Points : (4) , (5) , (7) , (9) , (10) at the figure of Note (6).

Note 3) Definition of Response time :

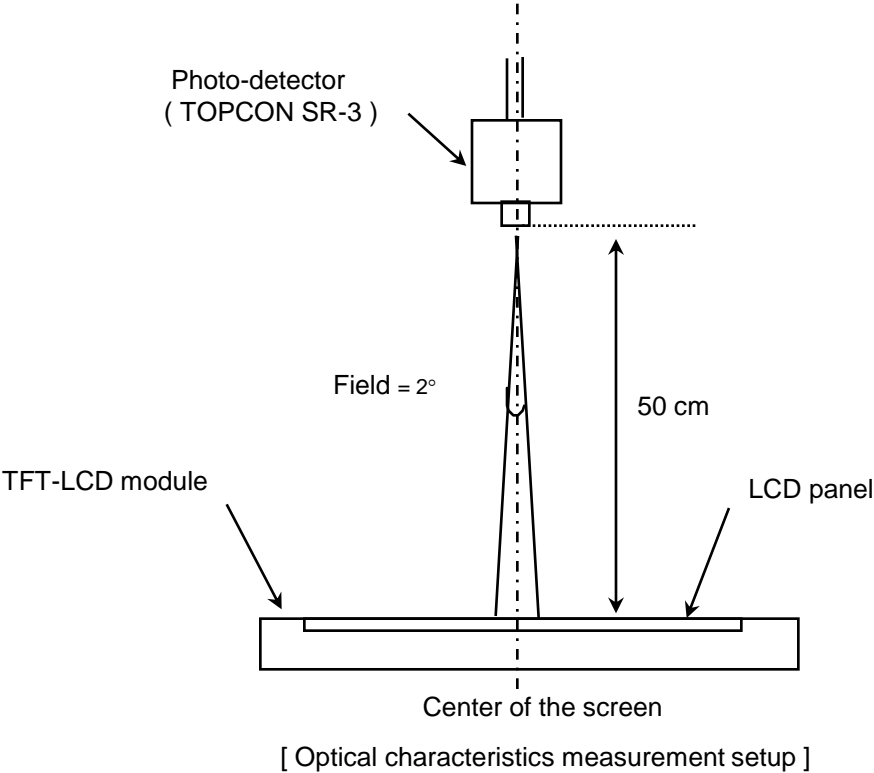


Note 4) Definition of Average Luminance of White : measure the luminance of white at 5 points.



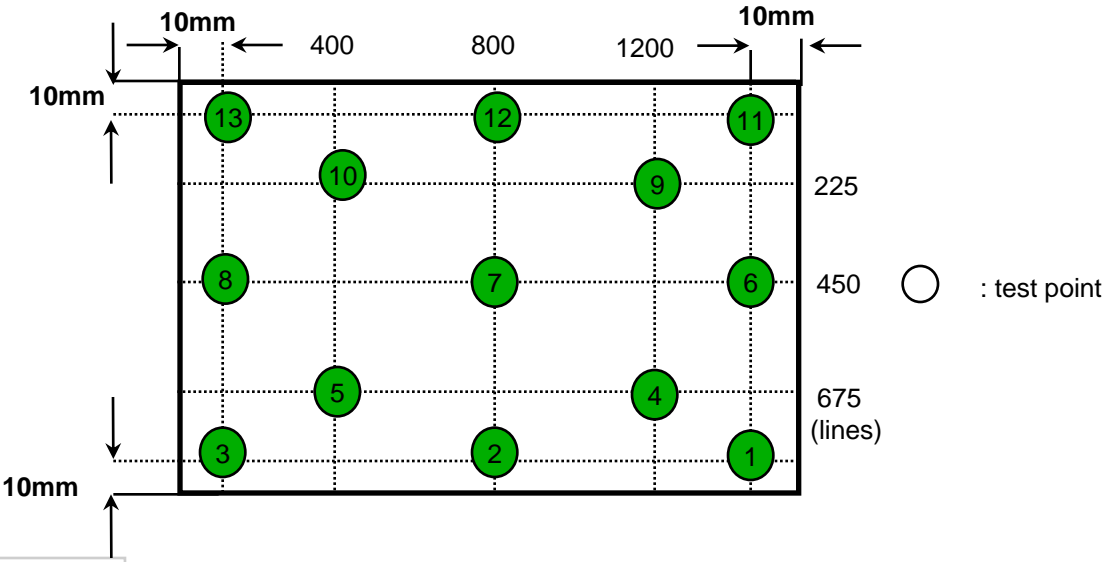


Note 5) After stabilizing and leaving the panel alone at a given temperature for 30 min , the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. 30 min after lighting the backlight. This should be measured in the center of screen.  
 LED current : 20 mA  
 Environment condition :  $T_a = 25 \pm 2 \text{ }^\circ\text{C}$



Note 6) Definition of 13 points white variation ( $\delta L$ ), [ ① ~ ⑬ ]

$$\delta L = \frac{\text{Maximum luminance of 13 points}}{\text{Minimum luminance of 13 points}}$$



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### 3. ELECTRICAL CHARACTERISTICS

#### 3.1 TFT LCD MODULE

Ta= 25 ± 2°C

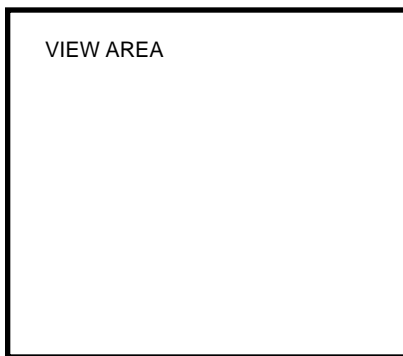
Item	Symbol	Min.	Typ.	Max.	Unit	Note	
Voltage of Power Supply	V <sub>DD</sub>	3.0	3.3	3.6	V		
Differential Input Voltage for LVDS Receiver Threshold	High	V <sub>IH</sub>	-	-	+100	mV	V <sub>CM</sub> = +1.2V
	Low	V <sub>IL</sub>	-100	-	-	mV	
Vsync Frequency	f <sub>v</sub>	-	60	-	Hz		
Hsync Frequency	f <sub>H</sub>	53.1	55.8	58.5	KHz		
Main Frequency	f <sub>DCLK</sub>	47.0	51.89	57.0	MHz	@ 2CH	
Rush Current	I <sub>RUSH</sub>	-	-	1.5	A	(4)	
Current of Power Supply	White	I <sub>DD</sub>	-	510	530	mA	(2),(3)*a
	Mosaic		-	485	500	mA	(2),(3)*b
	V. Stripe		-	650	670	mA	(2),(3)*c

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

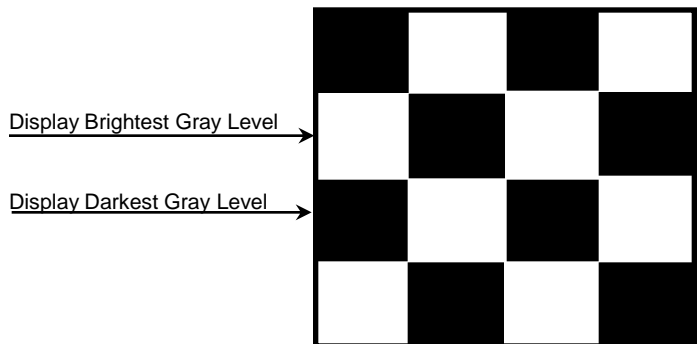
(2) f<sub>v</sub> = 60Hz, f<sub>DCLK</sub> = 51.89 MHz, V<sub>DD</sub> = 3.3V , DC Current.

(3) Power dissipation pattern

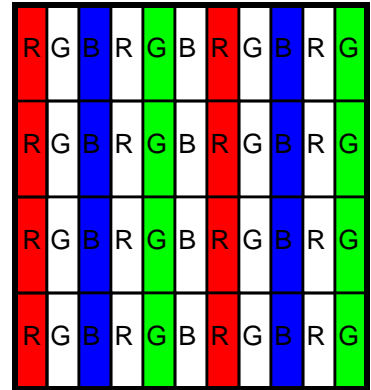
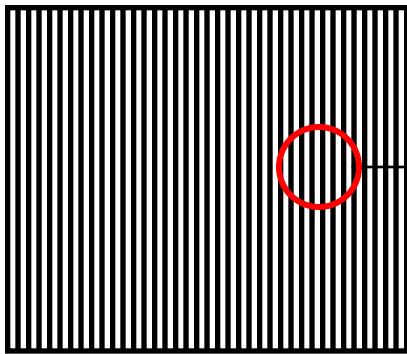
\*a) White Pattern



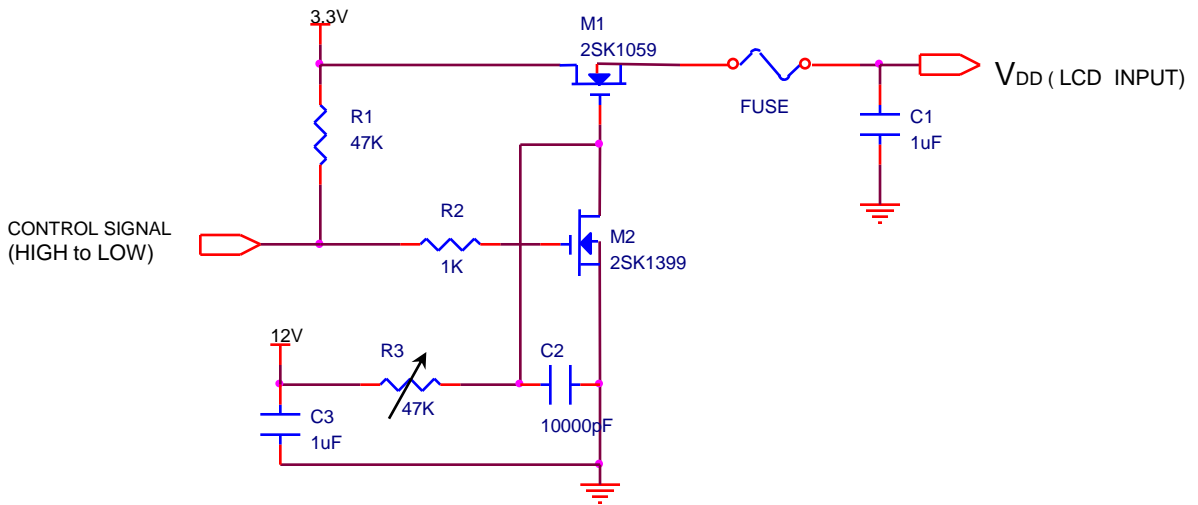
\*b) Mosaic Pattern



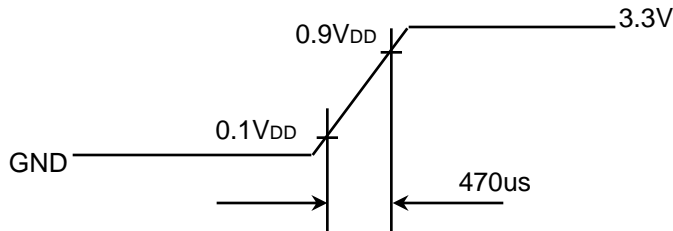
\*c) 1dot Vertical stripe pattern



4) Rush current measurement condition



V<sub>DD</sub> rising time is 470us



## 3.2 BACK-LIGHT UNIT

Ta= 25 ± 2 °C

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED Forward Current	IF	-	27	-	mA	
LED Forward Voltage	VF	3.0	-	3.4	V	IF=27mA
LED Array Voltage	VP	30.0	-	34.0	V	VF X 10 LEDs (IF=27mA)
Power Consumption	P	-	-	4.5	W	IF X VF X 40 LEDs (w/o Converter) (IF=27mA)

## 3.3 LED Driver

- LED Driver Manufacturer : RICHTEK

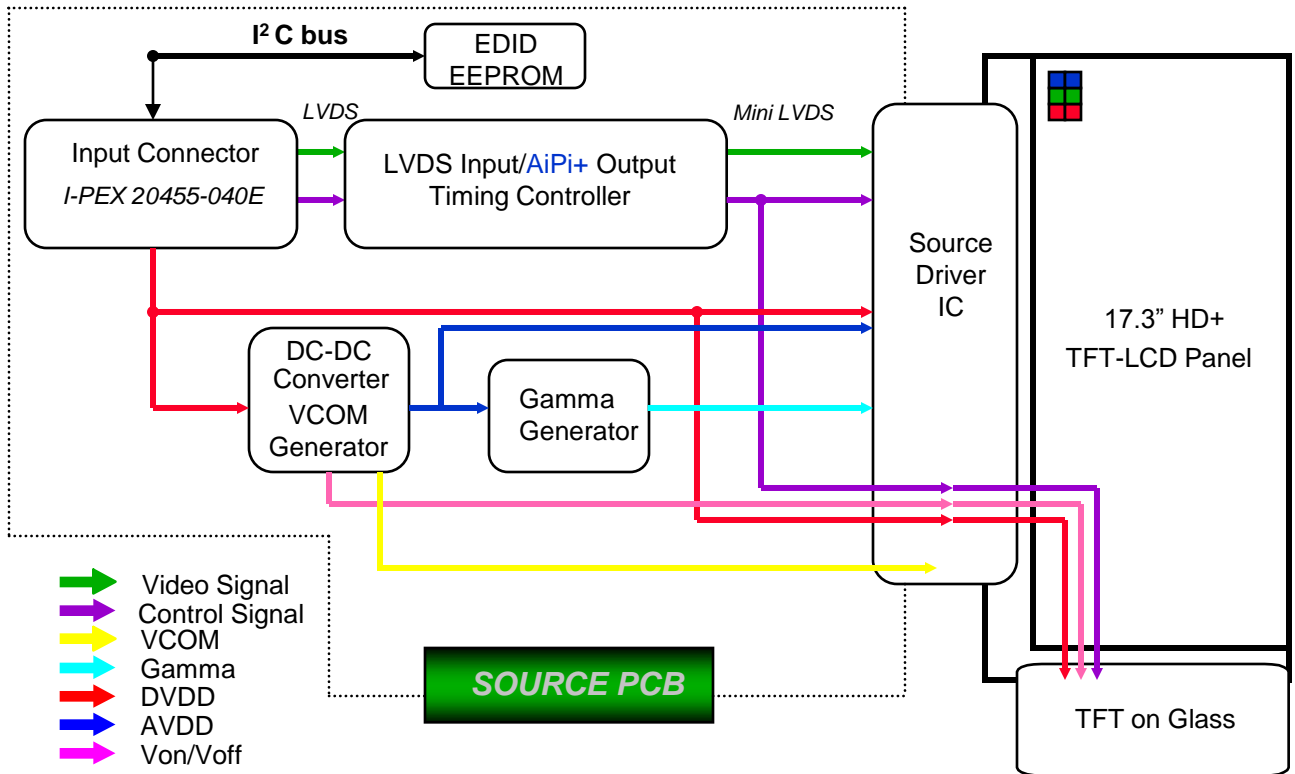
Ta= 25 ± 2 °C

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Input Voltage	Vin	7	-	21	V	
Input Current	I	-	-	80	mA	
Input Power	Pin	-	-	1.923	W	Pin = Vin x I
Operating Frequency	Fo	0.8	1	1.2	MHz	
Output PWM Frequency	FPWM	0.1	-	10	KHz	
Burst Ratio	D	1	-	100	%	PWM freq : 100Hz~300Hz
		5	-			PWM freq : 300Hz~1KHz
		10	-			PWM freq : 1KHz~30KHz
Output Current (each LED string)	Iout	19	20	21	mA	Vin=7.5~21V, BLIM=100% ALC=0V, ISET=4.75KΩ
Output Power	Pout	-	2.64	2.77	W	BLIM=100% Pout=IoutX3.3X40ea
Efficiency	η	-	80	-	%	BLIM=100%

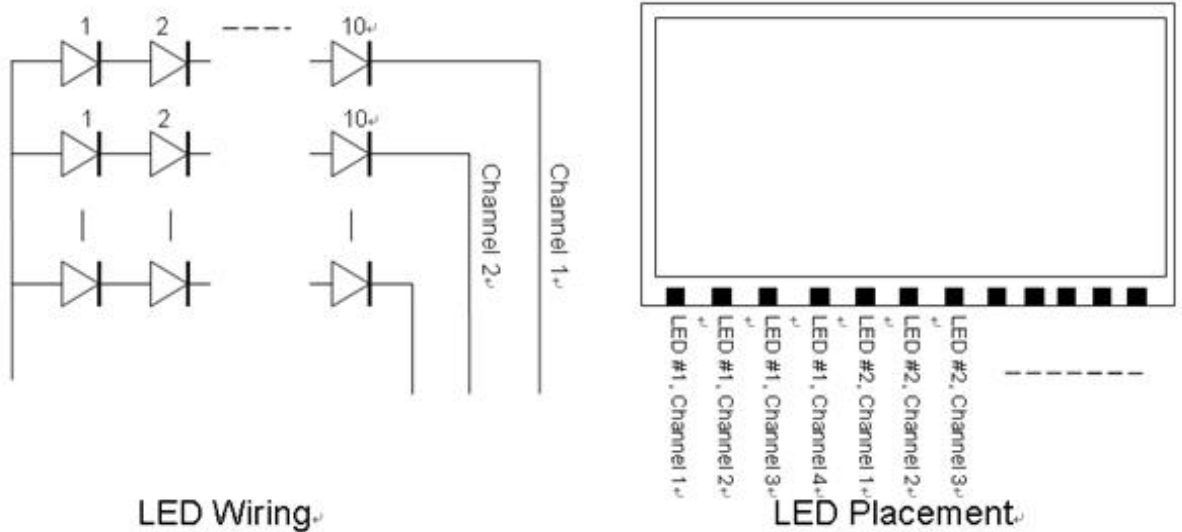
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## 4. BLOCK DIAGRAM

### 4.1 TFT LCD Module



### 4.2 LED connection and placement



## 5. INPUT TERMINAL PIN ASSIGNMENT

Approval

### 5.1. Input Signal & Power (LVDS, Connector : I-PEX 20455-040E )

PIN #	Symbol	Description
1	NC	Not connected
2	VDD	Power Supply, 3.3 V (typical)
3	VDD	Power Supply, 3.3 V (typical)
4	V EEDID	DDC 3.3V power
5	WPN	WPN
6	Clk EEDID	DDC Clock
7	DATA EEDID	DDC Data
8	Odd_Rin0-	- LVDS differential data input (R0-R5, G0) (odd pixels)
9	Odd_Rin0+	+ LVDS differential data input (R0-R5, G0) (odd pixels)
10	VSS	Ground – Shield
11	Odd_Rin1-	- LVDS differential data input (G1-G5, B0-B1) (odd pixels)
12	Odd_Rin1+	+ LVDS differential data input (G1-G5, B0-B1) (odd pixels)
13	VSS	Ground – Shield
14	Odd_Rin2-	- LVDS differential data input (B2-B5, HS, VS, DE) (odd pixels)
15	Odd_Rin2+	+ LVDS differential data input (B2-B5, HS, VS, DE) (odd pixels)
16	VSS	Ground – Shield
17	Odd_ClkIN-	- LVDS differential clock input (odd pixels)
18	Odd_ClkIN+	+ LVDS differential clock input (odd pixels)
19	VSS	Ground – Shield
20	Even_Rin0-	- LVDS differential data input (R0-R5, G0) (even pixels)
21	Even_Rin0+	+ LVDS differential data input (R0-R5, G0) (even pixels)
22	VSS	Ground – Shield
23	Even_Rin1-	- LVDS differential data input (G1-G5, B0-B1) (even pixels)
24	Even_Rin1+	+ LVDS differential data input (G1-G5, B0-B1) (even pixels)
25	VSS	Ground – Shield
26	Even_Rin2-	- LVDS differential data input (B2-B5, HS, VS, DE) (even pixels)
27	Even_Rin2+	+ LVDS differential data input (B2-B5, HS, VS, DE) (even pixels)
28	VSS	Ground – Shield
29	Even_ClkIN-	- LVDS differential clock input (even pixels)
30	Even_ClkIN+	+ LVDS differential clock input (even pixels)
31	VSSLED	Ground – LED
32	VSSLED	Ground – LED
33	VSSLED	Ground – LED
34	NC	Not connected
35	PWM	System PWM Signal Input (+3.3V Swing)
36	LED_EN	LED enable pin (+3.3V Input)
37	NC	Not connected
38	VDDLED	7.0V – 21V LED power
39	VDDLED	7.0V – 21V LED power
40	VDDLED	7.0V – 21V LED power

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## 5.2 LVDS Interface : Transmitter DS90CF363 or Compatible

## LVDS for Odd pixel

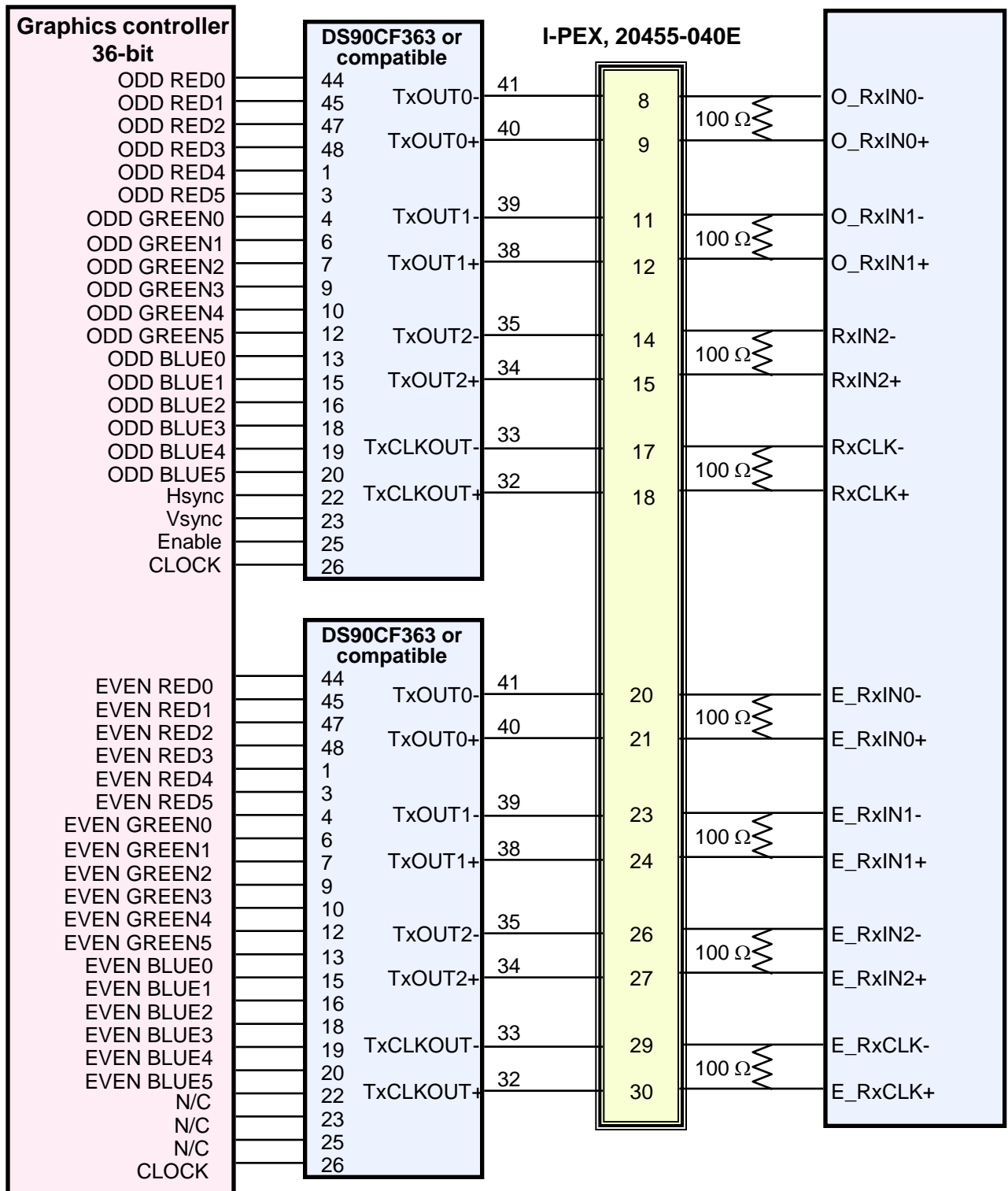
Pin No.	Name	RGB Signal	Pin No.	Name	RGB Signal
44	TxIN0	RO0	12	TxIN11	GO5
45	TxIN1	RO1	13	TxIN12	BO0
47	TxIN2	RO2	15	TxIN13	BO1
48	TxIN3	RO3	16	TxIN14	BO2
1	TxIN4	RO4	18	TxIN15	BO3
3	TxIN5	RO5	19	TxIN16	BO4
4	TxIN6	GO0	20	TxIN17	BO5
6	TxIN7	GO1	22	TxIN18	Hsync
7	TxIN8	GO2	23	TxIN19	Vsync
9	TxIN9	GO3	25	TxIN20	DE
10	TxIN10	GO4	26	TxCLK IN	Clock

## LVDS for Even pixel

Pin No.	Name	RGB Signal	Pin No.	Name	RGB Signal
44	TxIN0	RE0	12	TxIN11	GE5
45	TxIN1	RE1	13	TxIN12	BE0
47	TxIN2	RE2	15	TxIN13	BE1
48	TxIN3	RE3	16	TxIN14	BE2
1	TxIN4	RE4	18	TxIN15	BE3
3	TxIN5	RE5	19	TxIN16	BE4
4	TxIN6	GE0	20	TxIN17	BE5
6	TxIN7	GE1	22	TxIN18	N/C
7	TxIN8	GE2	23	TxIN19	N/C
9	TxIN9	GE3	25	TxIN20	N/C
10	TxIN10	GE4	26	TxCLK IN	Clock

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## LVDS Interface

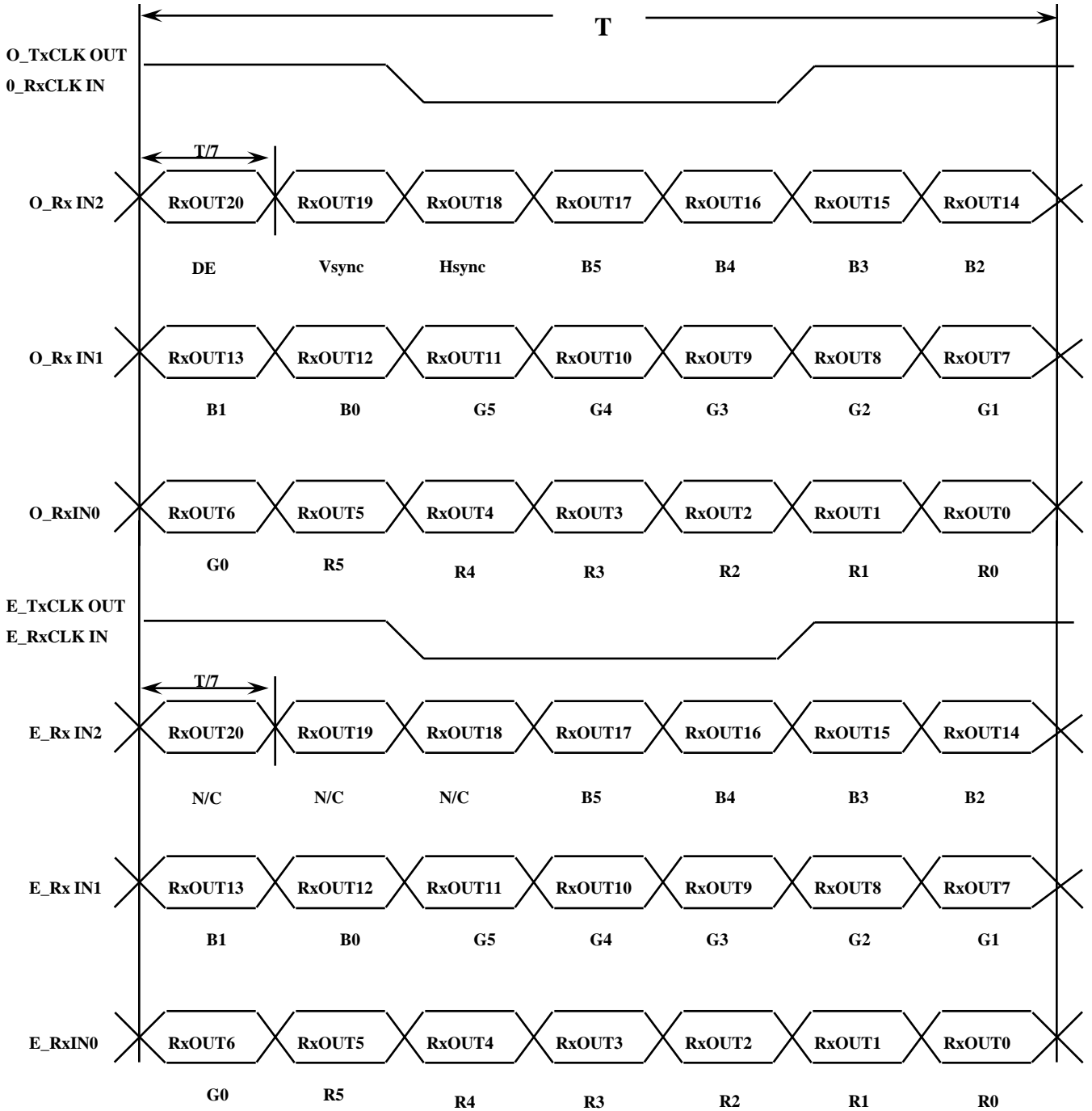


Note : The LCD Module uses a 100ohm resistor between positive and negative lines of each receiver input.



### 5.3 Timing Diagrams of LVDS For Transmission

#### LVDS Receiver : Integrated T-CON



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## 5.4 Input Signals, Basic Display Colors and Gray Scale of Each Color

Color	Display	Data Signal																	Gray Scale Level	
		Red					Green					Blue								
		R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	45		B5
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	-
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	-
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	-
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	-
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1	-
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	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	-
Gray Scale Of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R0	
	Dark	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1	
	↑	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R2	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	R3~R60	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
	↓	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	R61	
	Light	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	R62	
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	R63	
Gray Scale Of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	G0	
	Dark	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	G1	
	↑	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	G2	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	G3~G60	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
	↓	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	G61	
	Light	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	G62	
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	G63	
Gray Scale Of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	B0	
	Dark	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	B1	
	↑	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	B2	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	B3~B60	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
	↓	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	B61	
	Light	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	B62	
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	B63	

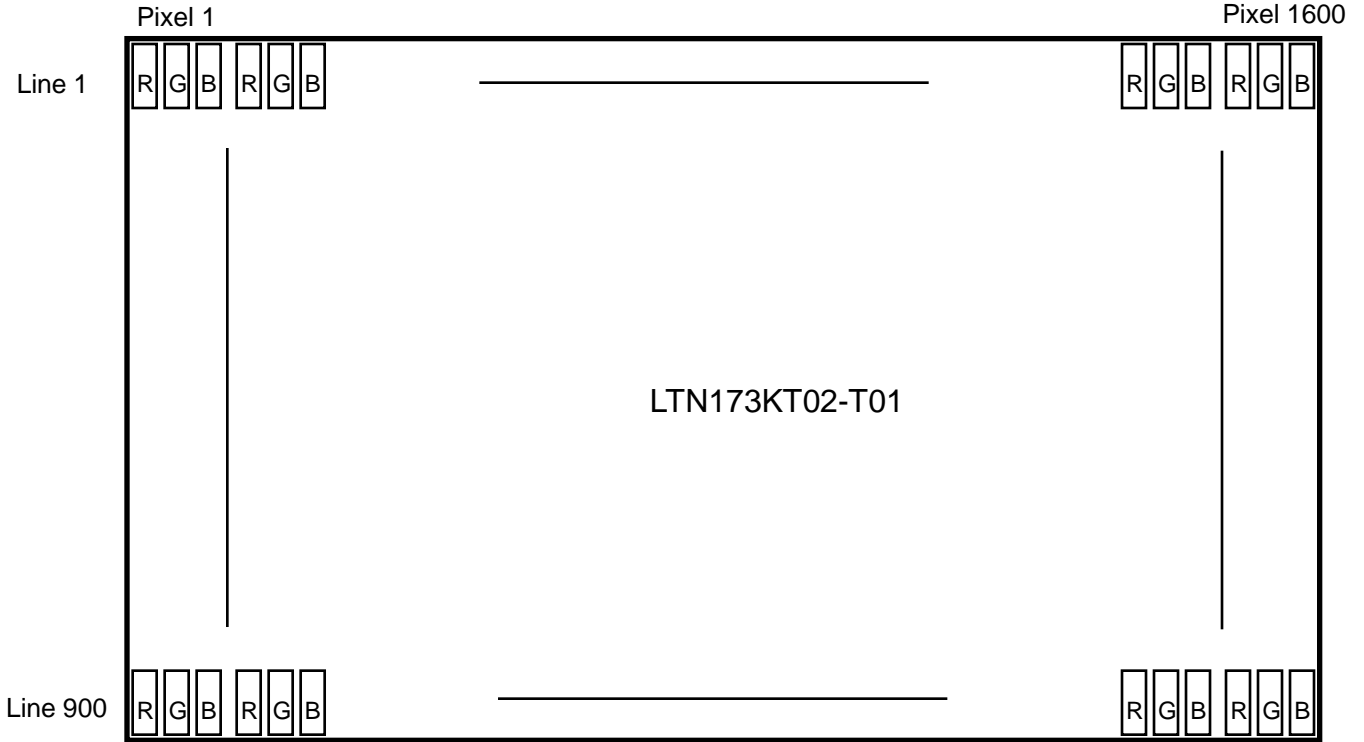
Note 1) Definition of gray :

Rn: Red gray, Gn: Green gray, Bn: Blue gray (n=gray level)

Note 2) Input signal: 0 =Low level voltage, 1=High level voltage

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### 5.5 Pixel Format in the display



### 5.6 DVR Address

Slave address of DVR is 9Eh and 9Fh

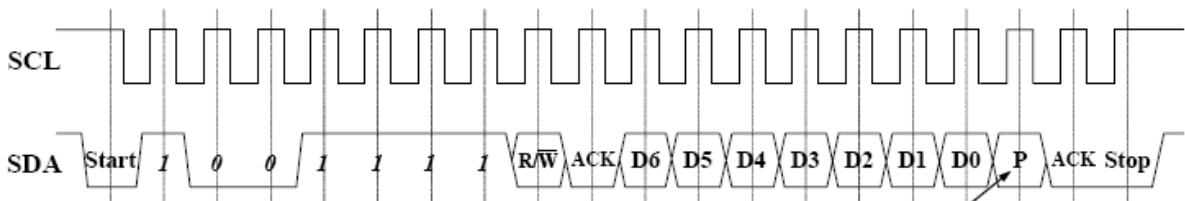
- . 9Eh : reading
- . 9Fh : writing

### I<sup>2</sup>C Bus Format

Start	Slave Address							W R	ACK	Data							ACK	Stop	
	1	0	0	1	1	1	1			D6	D5	D4	D3	D2	D1	D0	P		

ACK → Acknowledge

P → Program



(1) When READ operation, P = don't-care.

(2) When WRITE operation,

P = 1 → Register Writing

P = 0 → E<sup>2</sup>PROM CELL Writing (Program)

[DVR Sub Address]

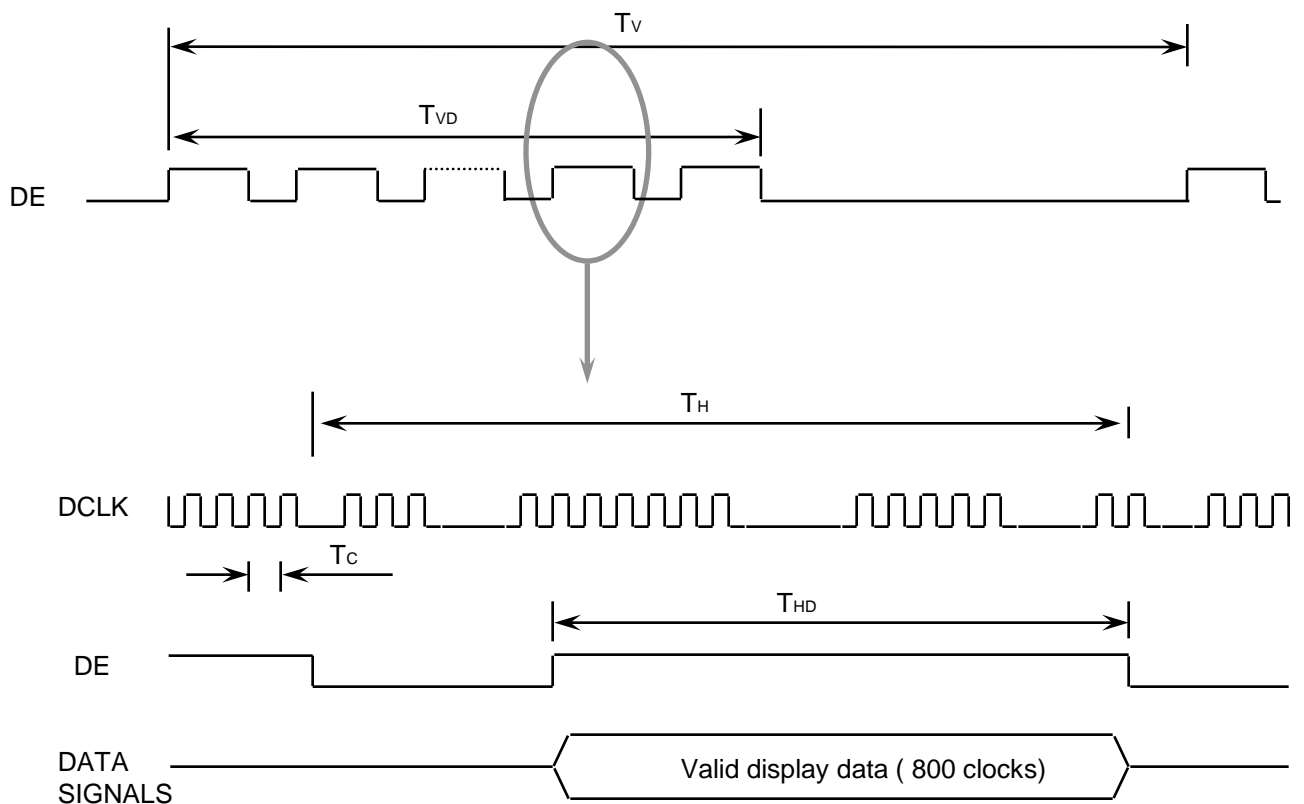
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## 6. INTERFACE TIMING

### 6.1 Timing Parameters

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
Frame Frequency	Cycle	TV	885	930	975	Lines	-
Vertical Active Display Term	Display Period	TVD	-	900	-	Lines	-
One Line Scanning Time	Cycle	TH	885	930	975	Clocks	2ch
Horizontal Active Display Term	Display Period	THD	-	800	-	Clocks	2ch

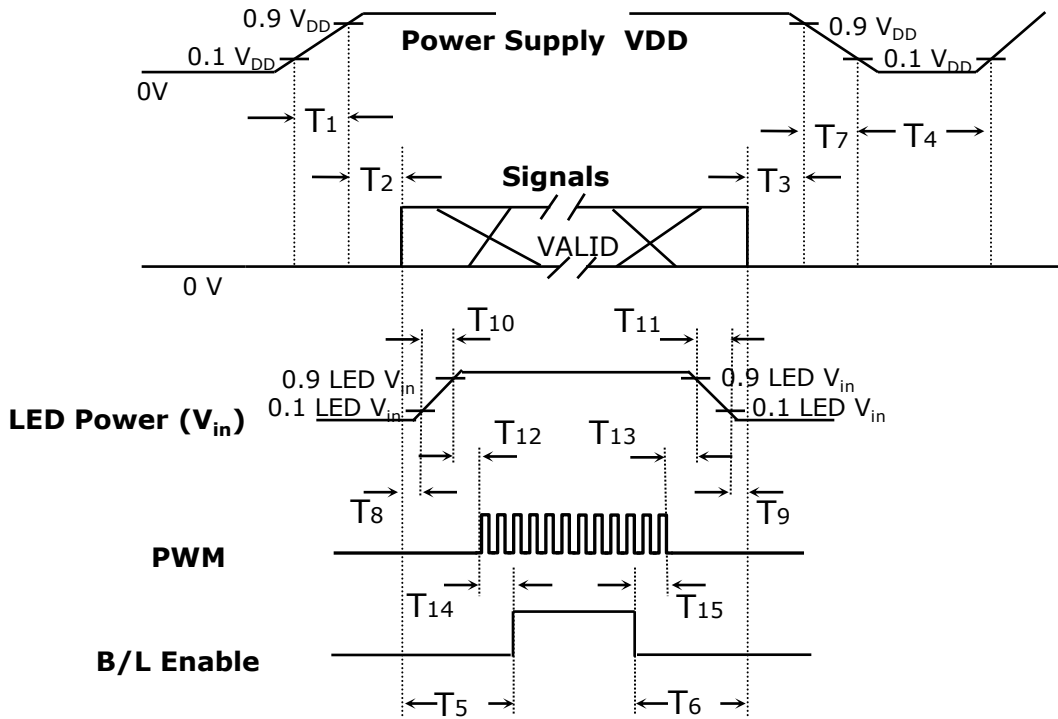
### 6.2 Timing diagrams of interface signal



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: 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**



Timing (ms)	Remarks
$0.5 < T_1 \leq 10$	V <sub>DD</sub> rising time from 10% to 90%
$0 < T_2 \leq 50$	Delay from V <sub>DD</sub> to valid data at power ON
$0 < T_3 \leq 50$	Delay from valid data OFF to V <sub>DD</sub> OFF at power Off
$500 \leq T_4$	V <sub>DD</sub> OFF time for Windows restart
$200 \leq T_5$	Delay from valid data to B/L enable at power ON
$200 \leq T_6$	Delay from valid data off to B/L disable at power Off
$0 < T_7 \leq 10$	V <sub>DD</sub> falling time from 90% to 10%
$10 < T_8$	Delay from valid data on to LED driver Vin rising time 10%
$10 < T_9$	Delay from LED driver Vin falling time 10% to valid data Off
$0.5 < T_{10} \leq 10$	LED V <sub>in</sub> rising time from 10% to 90%
$0.5 < T_{11} \leq 10$	LED V <sub>in</sub> falling time from 90% to 10%
$10 < T_{12}$	Delay from LED driver Vin rising time 90% to PWM ON
$10 < T_{13}$	Delay from PWM Off to LED driver Vin falling time 10%
$10 < T_{14}$	Delay from PWM ON to B/L Enable ON
$10 < T_{15}$	Delay from B/L Enable Off to PWM Off

**Timing Parameters and definition**

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## 7. MECHANICAL OUTLINE DIMENSION

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It will be attached with PDF file

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**Doc.No.**

LTN173KT02-T01

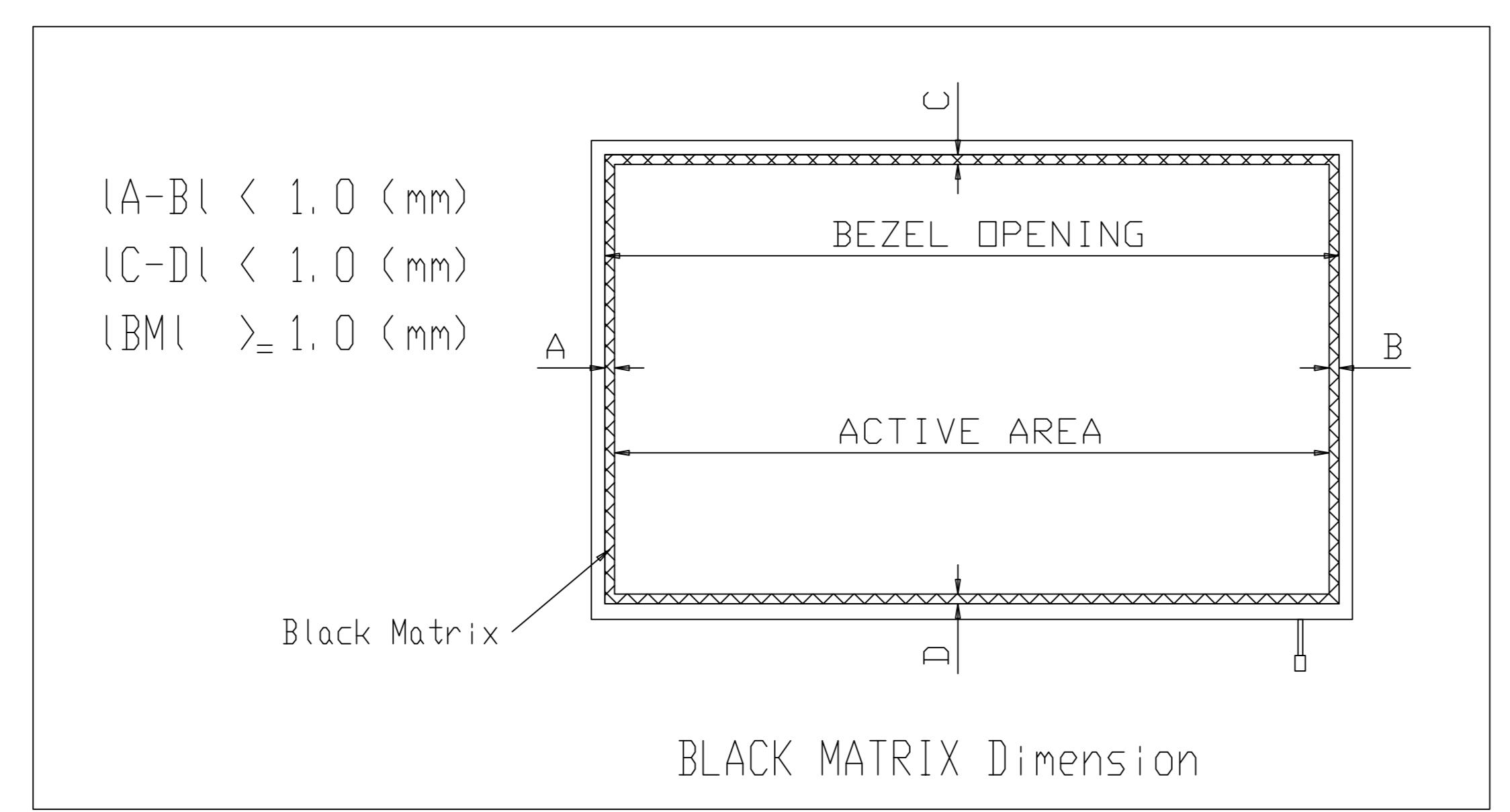
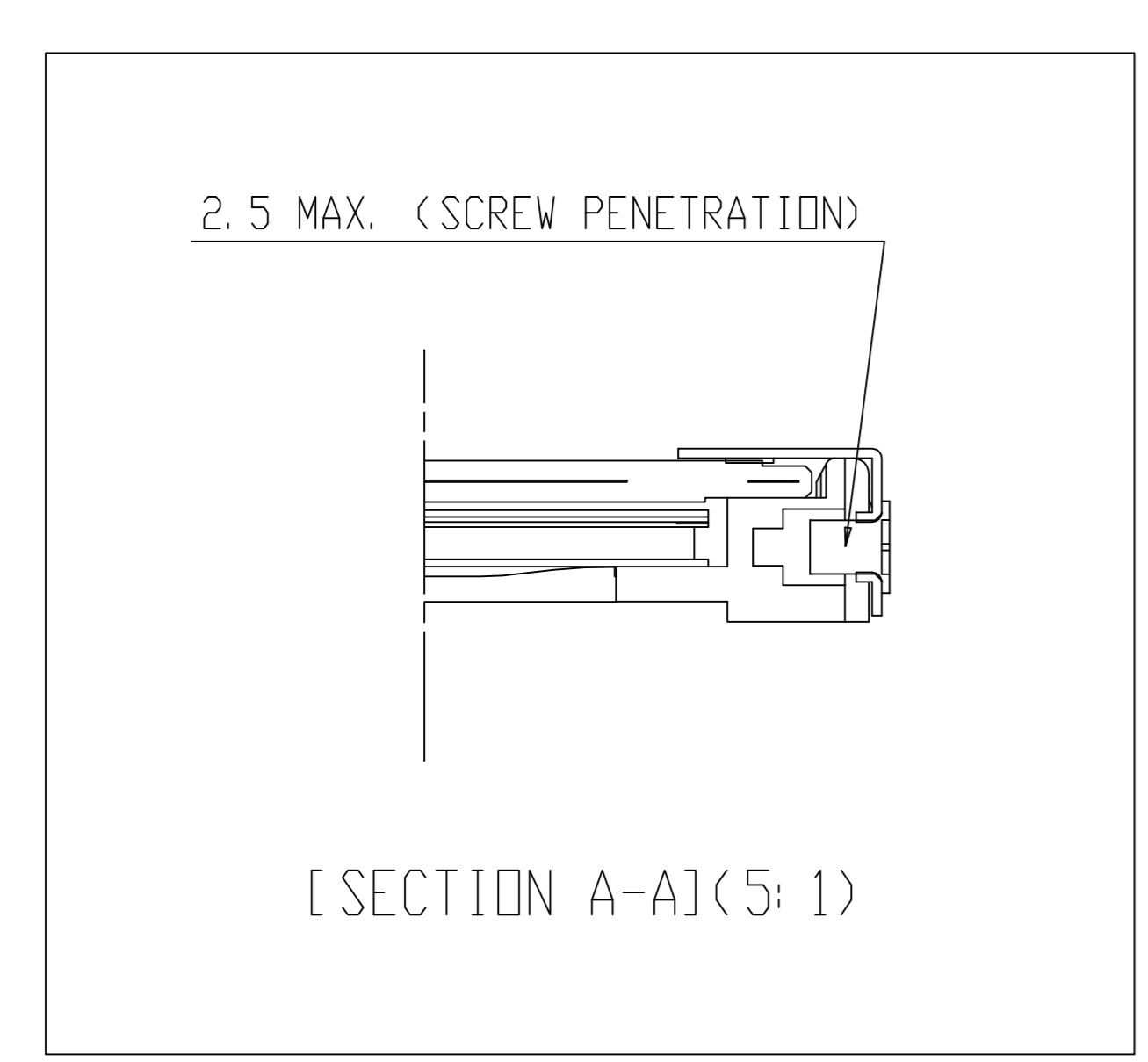
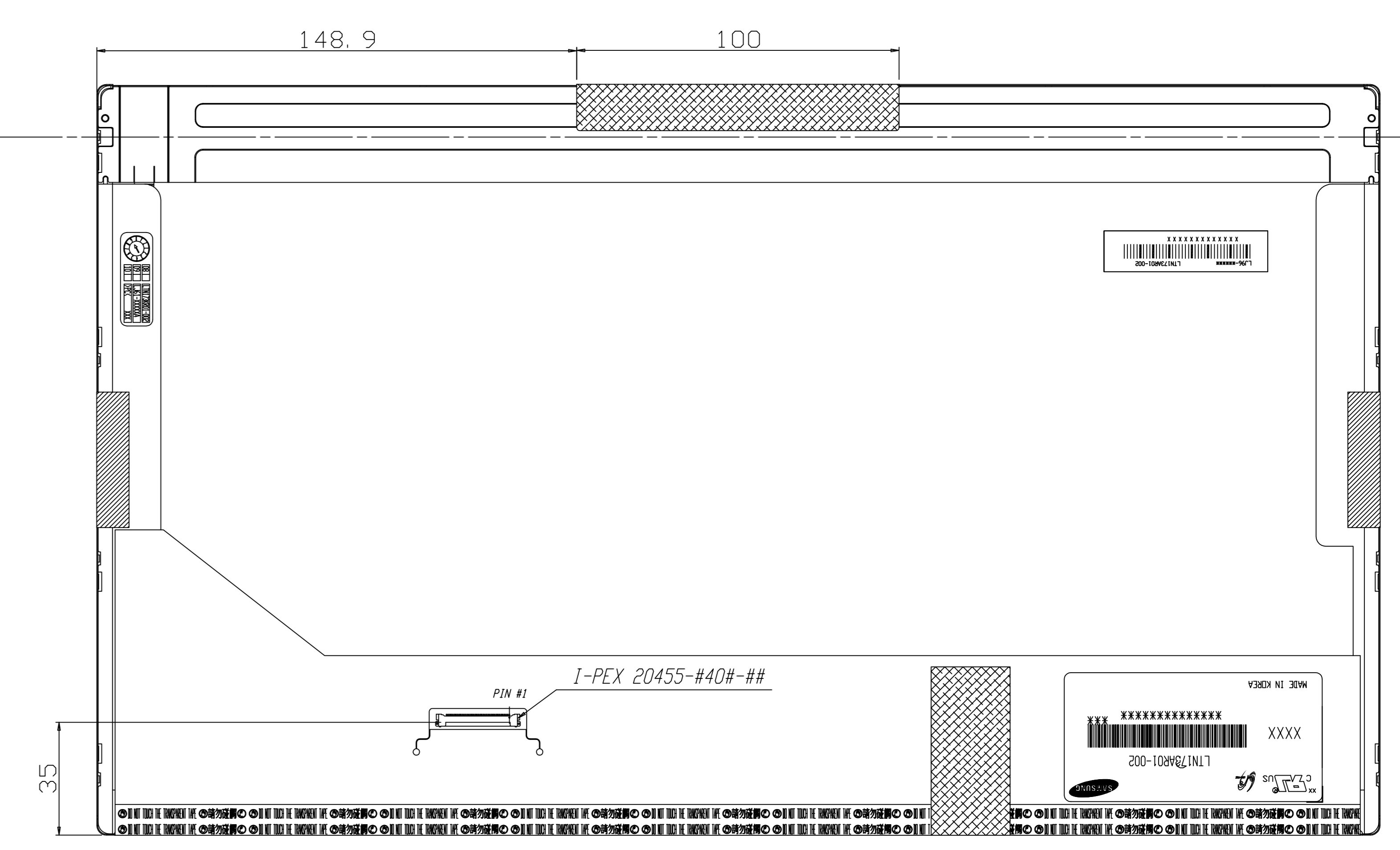
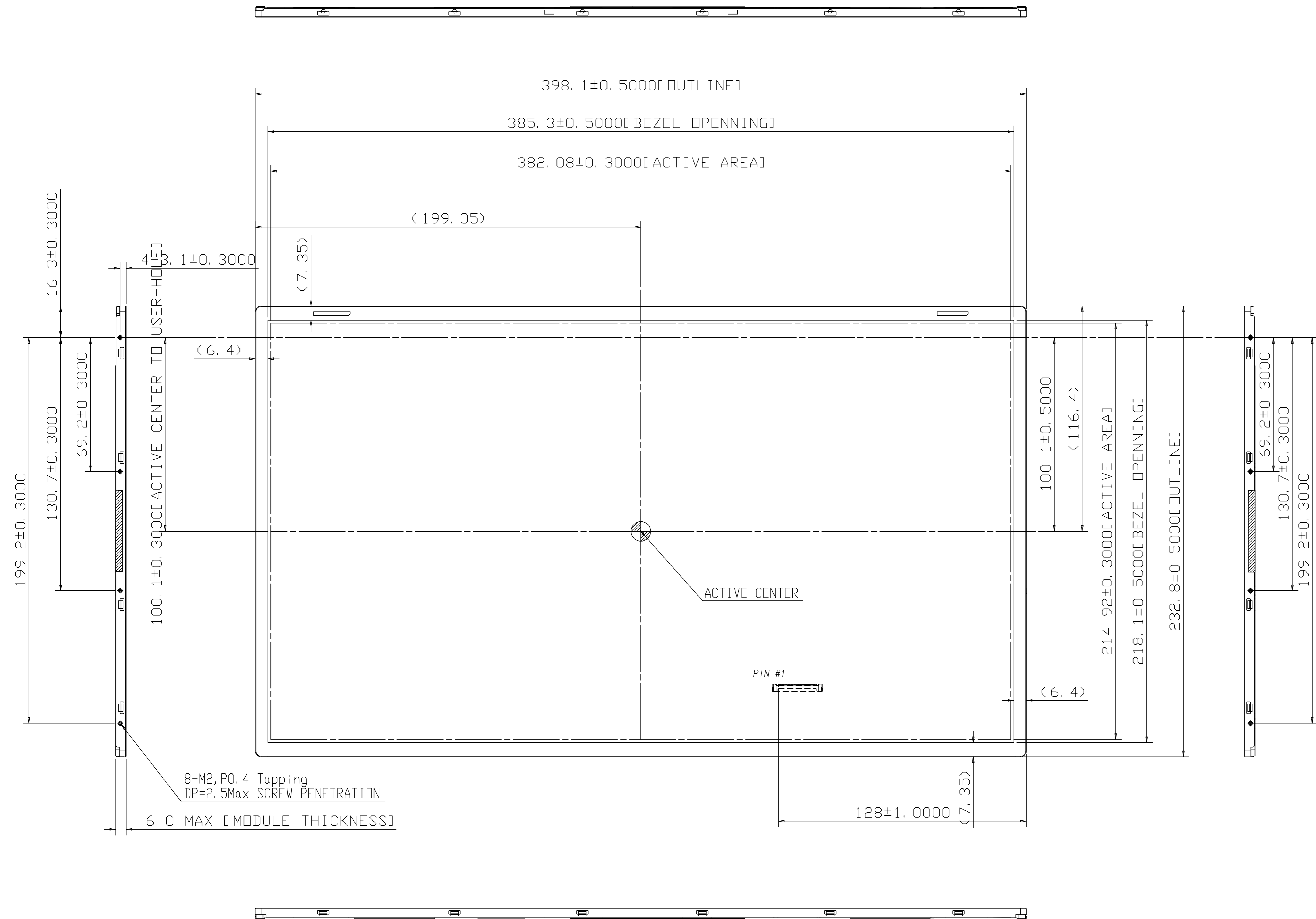
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04-A01-G-120208

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NO	PART NAME	CODE NO	SPECIFICATION	QTY	SPEC NO	REMARK
1	OUTLINE					



\* NOTE

- SIGNAL INTERFACE CONNECTOR TO BE SPECIFIED AS BELOW.  
- MAKER : I-PEX  
- PART NO : 20455-040E-02
- LED CONNECTOR FOR BACKLIGHT TO BE SPECIFIED AS BELOW.  
- MAKER : UJU  
- PART NO : PF050-010B-C11
- CALIFERS MEASURING FORCE : 750 ± 250 gf
- ALLOWED DEPTH OF USERHOLE SCREW INSERTION IS 2.5mm MAX
- WEIGHT: 570g MAX.
- IN ORDER TO AVOID IC DAMAGE, IT IS NOT ALLOWED TO HAVE SUCH OVERLAPPINGS AS CABLES OR ANTENNAS, CAMERA, WLAN, WWAN OVER THESE COF LOCATIONS.

REV	DATE	DESCRIPTION OF REVISION	REASON	CHK'D BY
1	2010.09.15	J.N LEE	M.S. KIM	

UNIT	MM	DRW'N BY	J.N LEE	CHK'D BY	M.S. KIM	MODEL NAME	LTN173KR01-002
SCALE	1/1	GENERAL DIMENSION	2010.09.15	PART/SHEET NAME	OUTLINE DIMENSION	SHEET	1/1
SAMSUNG ELECTRONICS						CODE NO.	-
						VER.	000

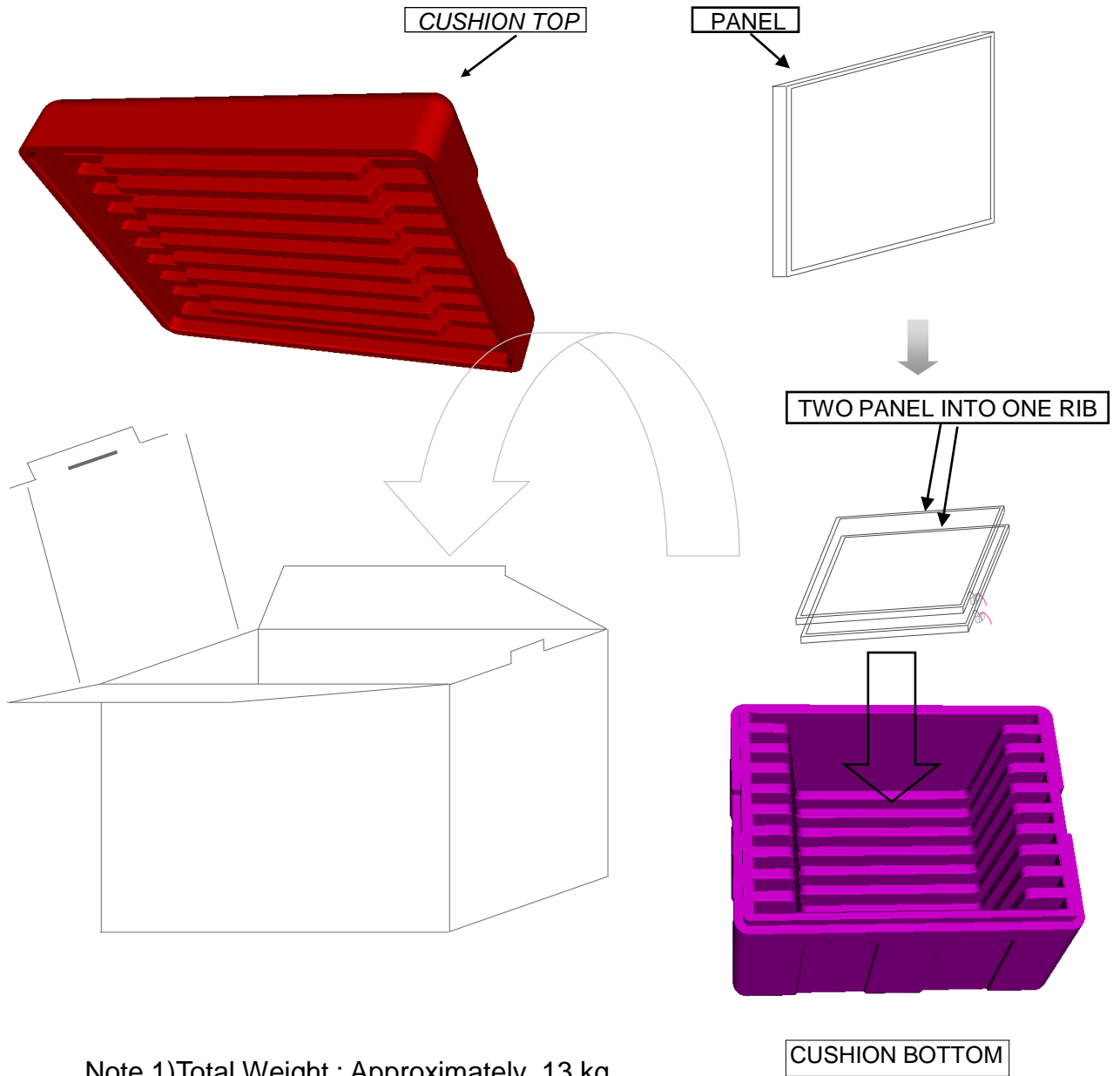
### 8. PACKING

#### 1. CARTON(Internal Package)

##### (1) Packing Form

Corrugated Cardboard box and Corrupad form as shock absorber

##### (2) Packing Method



- Note 1) Total Weight : Approximately 13 kg
- 2) Acceptance number of piling : 20 EA
- 3) Carton size : W359\*L463\*H333

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## (3)Packing Material

No	Part name	Quantity
1	Static electric protective sack	20 pcs
2	Packing case (Inner box) included shock absorber	1 set
3	Pictorial marking	2 pcs
4	Carton	1 set

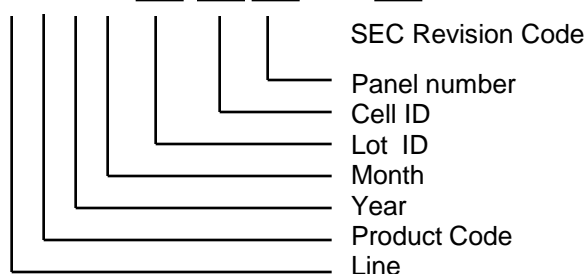
## 9. MARKINGS &amp; OTHERS

A nameplate bearing followed by is affixed to a shipped product at the specified location on each product.

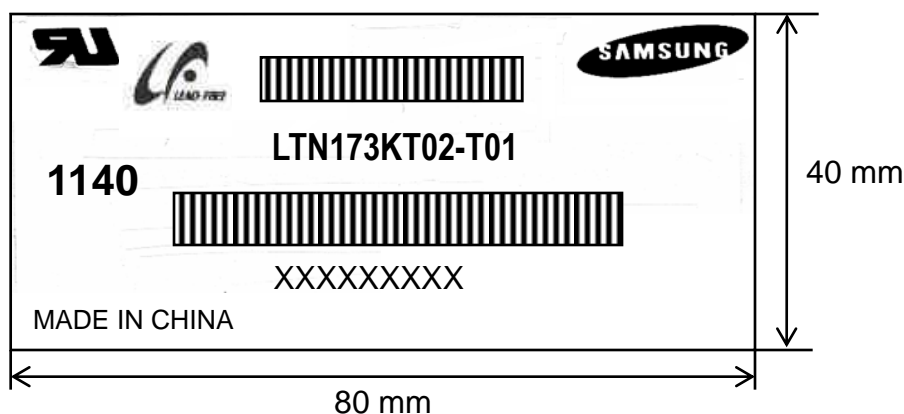
(1)Parts number : LTN173KT02

(2)Revision code : 3 letters

(3)Lot number : X X X X XX XX XX T01



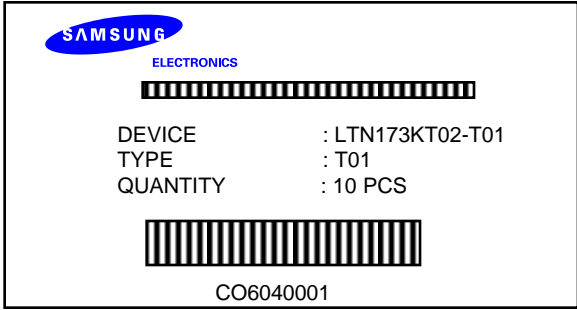
## (4) Nameplate Indication



Parts name : LTN173KT02  
Lot number : XXXXXXXXXXXX  
Inspected work week : 1140(2011 year 40th week)  
Product Revision Code : T01

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(5) Packing small box attachment



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## 10. GENERAL PRECAUTIONS

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### 1. Handling

- (a) When the module is assembled, It should be attached to the system firmly using every mounting holes. Be careful not to twist and bend the modules.
- (b) Refrain from strong mechanical shock and / or any force to the module. In addition to damage, this may cause improper operation or damage to the module.
- (c) Note that polarizers are very fragile and could be easily damaged. Do not press or scratch the surface harder than a HB pencil lead.
- (d) Wipe off water droplets or oil immediately. If you leave the droplets for a long time, Staining and discoloration may occur.
- (e) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
- (f) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Do not use Ketone type materials(ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
- (g) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth . In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.
- (h) Protect the module from static , it may cause damage to the C-MOS Gate Array IC.
- (i) Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (j) Do not disassemble the module.
- (k) Do not pull or fold the lamp wire.
- (l) Do not adjust the variable resistor which is located on the back side.
- (m) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
- (n) Pins of I/F connector shall not be touched directly with bare hands.

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## 2. STORAGE

We highly recommend to comply with the criteria in the table below.

ITEM	Unit	Min.	Max.
Storage Temperature	(°C)	5	40
Storage Humidity	(%rH)	35	75
Storage life	12 months		
Storage Condition	<ul style="list-style-type: none"> <li>- The storage room should provide good ventilation and temperature control.</li> <li>- Products should not be placed on the floor, but on the Pallet away from a wall.</li> <li>- Prevent products from direct sunlight, moisture nor water; Be cautious of a build up of condensation.</li> <li>- Avoid other hazardous environment while storing goods.</li> <li>- If products delivered or kept in conditions of over the storage period of 3 months, the recommended temperature or humidity range, we recommend you leave them at a temperature of 20 °C and a humidity of 50% for 24 hours.</li> </ul>		

## 3. OPERATION

- (a) Do not connect, disconnect the module in the “ Power On” condition.
- (b) Power supply should always be turned on/off by following item 6.3 “ Power on/off sequence “.
- (c) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
- (d) The standard limited warranty is only applicable when the module is used for general notebook applications. If used for purposes other than as specified, SEC is not to be held reliable for the defective operations. It is strongly recommended to contact SEC to find out fitness for a particular purpose.

## 4. OTHERS

- (a) Ultra-violet ray filter is necessary for outdoor operation.
- (b) Avoid condensation of water. It may result in improper operation or disconnection of electrode.
- (c) Do not exceed the absolute maximum rating value. ( the supply voltage variation, input voltage variation, variation in part contents and environmental temperature, so on) Otherwise the module may be damaged.
- (d) If the module displays the same pattern continuously for a long period of time, it can be the situation when the image “sticks” to the screen.
- (e) This module has its circuitry PCB’s on the rear side and should be handled carefully in order not to be stressed.

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# 11. EDID

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LTN173KT02-T01 EDID Sheet

Address (HEX)	FUNCTION	Value	BIN	DEC	ASCII or Data	Notes
		HEX				
00	Header	00	00000000	0		EDID Header
01		FF	11111111	255		
02		FF	11111111	255		
03		FF	11111111	255		
04		FF	11111111	255		
05		FF	11111111	255		
06		FF	11111111	255		
07		00	00000000	0		
08	ID Manufacturer Name	4C	01001100	76	S E C	3 character ID
09		A3	10100011	163	C	"SEC"
0A		ID Product Code	4B	01001011	75	[K]
0B	50		01010000	80	[P]	
0C	32-bit serial no.	00	00000000	0		
0D		00	00000000	0		
0E		00	00000000	0		
0F		00	00000000	0		
10	Week of manufacture	00	00000000	0		
11	Year of manufacture	15	00010101	21	2011	2011
12	EDID Structure Ver.	01	00000001	1	1	EDID Ver. 1.0
13	EDID revision #	03	00000011	3	3	EDID Rev. 3
14	Video input definition	80	10000000	128		
15	Max H image size	26	00100110	38	38	38 cm(approx)
16	Max V image size	15	00010101	21	21	21 cm(approx)
17	Display Gamma	78	01111000	120	2.2	Gamma 2.2
18	Feature support	0A	00001010	10		
19	Red/green low bits	B3	10110011	179		10001111
1A	Blue/white low bits	95	10010101	149		11111110
1B	Red x/ high bits	9D	10011101	157	0.615	Red x 0.615= 10011101
1C	Red y	5C	01011100	92	0.362	Red y 0.362= 01011100
1D	Green x	59	01011001	89	0.348	Green x 0.348= 01011001
1E	Green y	9F	10011111	159	0.624	Green y 0.624= 10011111
1F	Blue x	25	00100101	37	0.146	Blue x 0.146= 00100101
20	Blue y	13	00010011	19	0.075	Blue y 0.075= 00010011
21	White x	50	01010000	80	0.313	White x 0.313= 01010000
22	White y	54	01010100	84	0.329	White y 0.329= 01010100
23	Established timing 1	00	00000000	0		
24	Established timing 2	00	00000000	0		
25	Established timing 3	00	00000000	0		
26	Standard timing #1	01	00000001	1		not used
27		01	00000001	1		
28	Standard timing #2	01	00000001	1		not used
29		01	00000001	1		
2A	Standard timing #3	01	00000001	1		not used
2B		01	00000001	1		

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2C	Standard timing #4	01	00000001	1		not used
2D		01	00000001	1		
2E	Standard timing #5	01	00000001	1		not used
2F		01	00000001	1		
30	Standard timing #6	01	00000001	1		not used
31		01	00000001	1		
32	Standard timing #7	01	00000001	1		not used
33		01	00000001	1		
34	Standard timing #8	01	00000001	1		not used
35		01	00000001	1		
36	Detailed timing/monitor descriptor #1	8B	10001011	139	103.79	Main clock= 103.79 MHz
37		28	00101000	40		
38		40	01000000	64	1600	Hor active=1600 pixels
39		04	00000100	4	260	Hor blanking=260 pixels
3A		61	01100001	97		4bit : 4bit
3B		84	10000100	132	900	Vertical active=900 lines
3C		1E	00011110	30	30	Vertical blanking=30 lines
3D		30	00110000	48		4bit : 4bit
3E		30	00110000	48	48	
3F		20	00100000	32	32	H sync. Width=32 pixels
40		26	00100110	38	2 6	V sync. Offset=2 lines V sync. Width=6 lines
41		00	00000000	0		2bit : 2bit :2bit :2bit
42		7E	01111110	126	382	H image size= 382 mm(approx)
43		D7	11010111	215	215	V image size = 215 mm(approx)
44		10	00010000	16		
45		00	00000000	0		No Horizontal Border
46		00	00000000	0		No Vertical Border
47	19	00011001	25			
48	Detailed timing/monitor descriptor #2	00	00000000	0		Manufacturer Specified (Timing)
49		00	00000000	0		
4A		00	00000000	0		
4B		0F	00001111	15		
4C		00	00000000	0		
4D		00	00000000	0		Value=HSPWmin / 2
4E		00	00000000	0		Value=HSPWmax / 2
4F		00	00000000	0		Value=Thbpmin /2
50		00	00000000	0		Value=Thbpmax /2
51		00	00000000	0		Value=VSPWmin /2
52		00	00000000	0		Value=VSPWmax /2
53		00	00000000	0		Value=Tvbpmin / 2
54		00	00000000	0		Value=Tvbpmax / 2
55	69	01101001	105		Thpmin=value*2 + HA pixelclks	
56	91	10010001	145		Thpmax=value*2 + HA pixelclks	
57	05	00000101	5		Tvpmin=value*2 + VA lines	
58	19	00011001	25		Tvpmax=value*2 + VA lines	
59	00	00000000	0		Module revision	

5A	Detailed timing/monitor descriptor #3	00	00000000	0		ASCII Data String Tag
5B		00	00000000	0		
5C		00	00000000	0		
5D		FE	11111110	254		
5E		00	00000000	0		
5F		53	01010011	83	[S]	
60		41	01000001	65	[A]	
61		4D	01001101	77	[M]	
62		53	01010011	83	[S]	
63		55	01010101	85	[U]	
64		4E	01001110	78	[N]	
65		47	01000111	71	[G]	
66		0A	00001010	10	[*]	
67		20	00100000	32	[ ]	
68		20	00100000	32	[ ]	
69	20	00100000	32	[ ]		
6A	20	00100000	32	[ ]		
6B	20	00100000	32	[ ]		
6C	Detailed timing/monitor descriptor #4	00	00000000	0		Monitor Name Tag (ASCII)
6D		00	00000000	0		
6E		00	00000000	0		
6F		FE	11111110	254		
70		00	00000000	0		
71		31	00110001	49	[1]	
72		37	00110111	55	[7]	
73		33	00110011	51	[3]	
74		4B	01001011	75	[K]	
75		54	01010100	84	[T]	
76		30	00110000	48	[0]	
77		32	00110010	50	[2]	
78		2D	00101101	45	[-]	
79		54	01010100	84	[T]	
7A		30	00110000	48	[0]	
7B	31	00110001	49	[1]		
7C	0A	00001010	10	[*]		
7D	20	00100000	32	[ ]		
7E	Extension Flag	00	00000000	0		
7F	Checksum	50	01010000	80		

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