



# SmarterGlass

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ELECTRONICS

Approval



DATE : Mar. 24, 2010

**SAMSUNG TFT-LCD**  
**MODEL NO. : LTN140AT07-B/W01**

NOTE : Extension code [ -B/W ]  
→ LTN140AT07  
Surface type [ **Glare** ]

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

APPROVED BY : \_\_\_\_\_

PREPARED BY : Thomas Oh

**Technical Customer Support Team, LCD Division**  
**Samsung Electronics Co., Ltd.**



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# REVISION HISTORY

Approval

Date	Revision No.	Page	Summary
Feb. 24, 2010	A00	All	The approval specification was issued first.

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## GENERAL DESCRIPTION

### DESCRIPTION

LTN140AT07 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 unit. The resolution of a 14.0" contains 1366 x 768 pixels and can display up to 262,144 colors. 6 O'clock direction is the optimum viewing angle.

### FEATURES

- High contrast ratio
- HD (1366 x 768 pixels ) resolution
- Low power consumption
- Fast response time
- LED Back Light with embedded LED Driver
- DE (Data enable) only mode
- 3.3V LVDS Interface
- Onboard EEDID chip
- Green product (RoHS compliant)

### 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	309.399(H) x 173.952(V) ( 14.0" HD diagonal )	mm	
Driver element	a-Si TFT active matrix		
Display colors	262,144		
Number of pixel	1366 x 768	pixel	16:9
Pixel arrangement	RGB vertical stripe		
Pixel pitch	0.2265(H) x 0.2265(V) (TYP.)	mm	
Display Mode	Normally white		
Surface treatment	Haze 0%, Hard-Coating 3H		

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## Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal (H)	323.0	323.5	324.0	mm	
	Vertical (V)	191.5	192.0	192.5	mm	
	Depth (D)	-	-	5.2	mm	(1)
Weight		-	330	350	g	

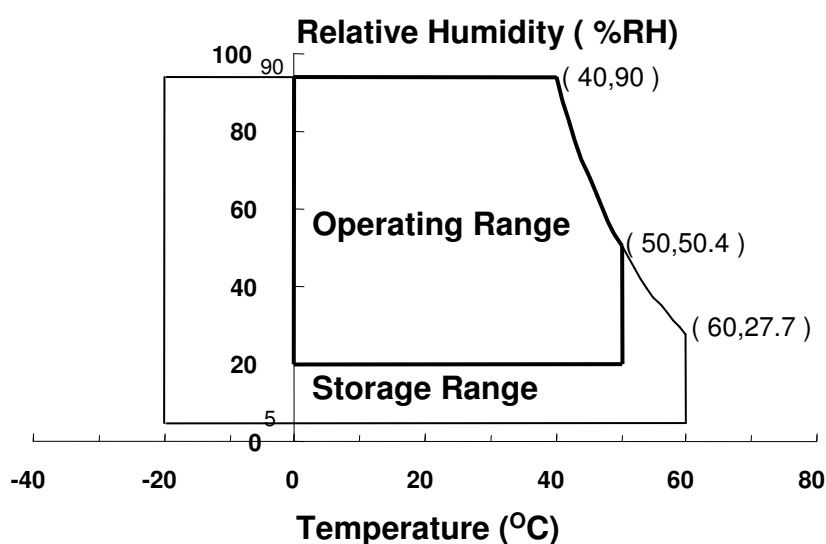
Note (1) Measurement condition of outline dimension  
 . Equipment : Bernier Calipers  
 . Push Force : 500g · f (minimum)

## 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. ( $40\text{ °C} \geq T_a$ )  
 Maximum wet - bulb temperature at  $39\text{ °C}$  or less. ( $T_a > 40\text{ °C}$ ) 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.

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## 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	$V_{IN}$	$V_{DD} - 0.3$	$V_{DD} + 0.3$	V	(1)

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

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## 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

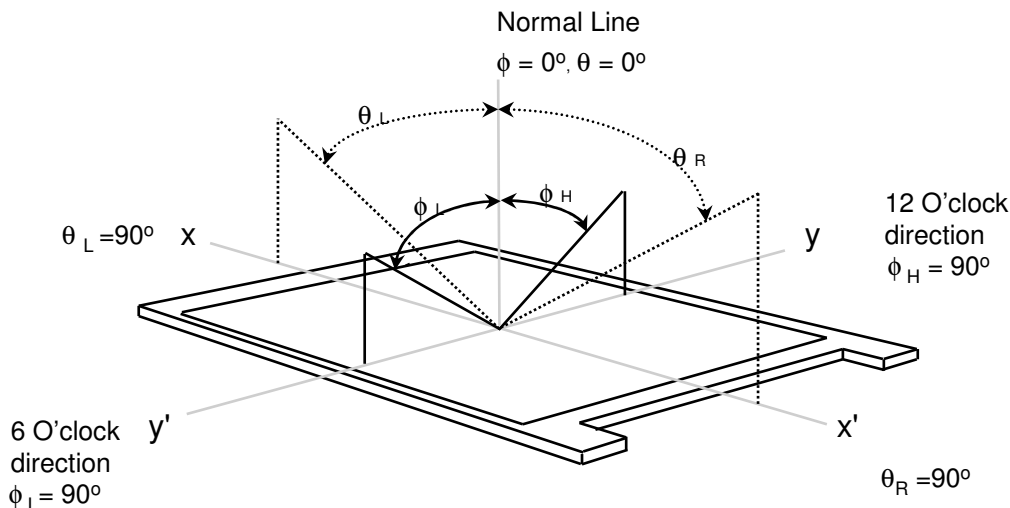
\* Ta = 25 ± 2 °C, V<sub>DD</sub>=3.3V, fv= 60Hz, f<sub>DCLK</sub> = 69.3MHz, IF = 20.0 mA

Item		Symbol	Condition	Min.	Typ.	Max	Unit	Note
Contrast Ratio (5 Points)		CR	Normal Viewing Angle $\phi = 0$ $\theta = 0$	500	-	-	-	(1), (2), (5)
Response Time at Ta ( Rising + Falling )		T <sub>RT</sub>		-	8	16	msec	(1), (3)
Average Luminance of White (5 Points)		Y <sub>L,AVE</sub>		170	200	-	cd/m <sup>2</sup>	IF=20.0mA (1), (4)
Color Chromaticity ( CIE )	Red	R <sub>X</sub>		0.580	0.610	0.640	-	(1), (5) SR-3
		R <sub>Y</sub>		0.310	0.340	0.370		
	Green	G <sub>X</sub>		0.305	0.335	0.365		
		G <sub>Y</sub>		0.560	0.590	0.620		
	Blue	B <sub>X</sub>		0.120	0.150	0.180		
		B <sub>Y</sub>		0.055	0.085	0.115		
	White	W <sub>X</sub>		0.283	0.313	0.343		
		W <sub>Y</sub>	0.299	0.329	0.359			
Viewing Angle	Hor.	$\theta_L$	CR ≥ 10 At center	30	45	-	Degrees	(1), (5) SR-3
		$\theta_H$		30	45	-		
	Ver.	$\phi_H$		10	15	-		
		$\phi_L$		20	35	-		
13 Points White Variation		$\delta_L$	-	1.4	1.6	-	(6)	

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

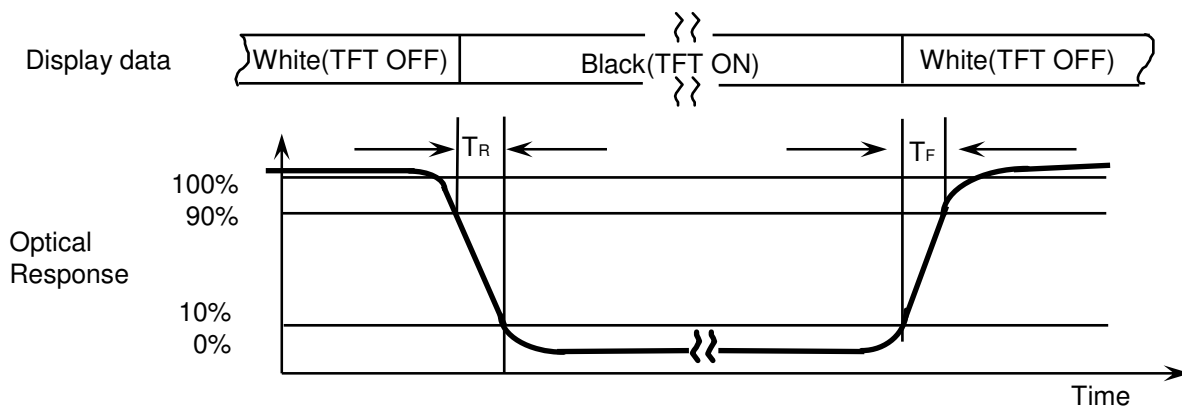


Note 2) Definition of Contrast Ratio (CR) : Ratio of gray max (Gmax) ,gray min (Gmin) at 5 points(4, 5, 7, 9, 10)

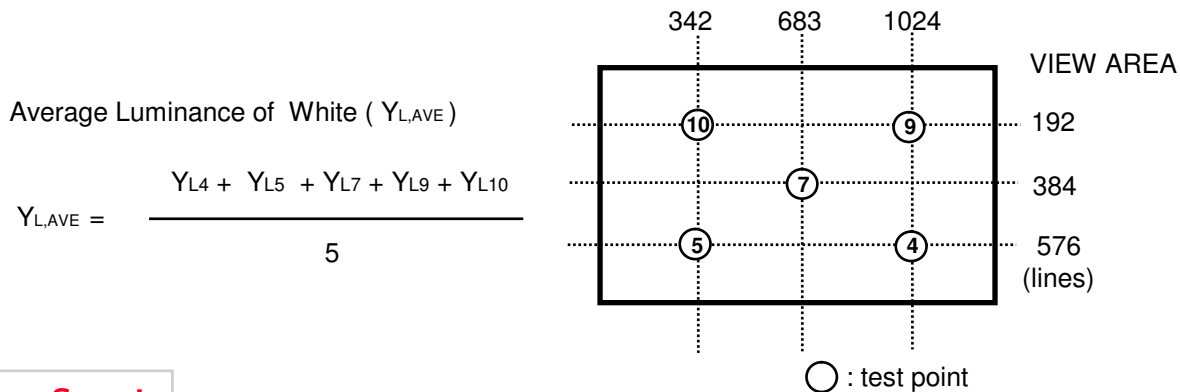
$$CR = \frac{CR(4) + CR(5) + CR(7) + CR(9) + CR(10)}{5}$$

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

Note 3) Definition of Response time :



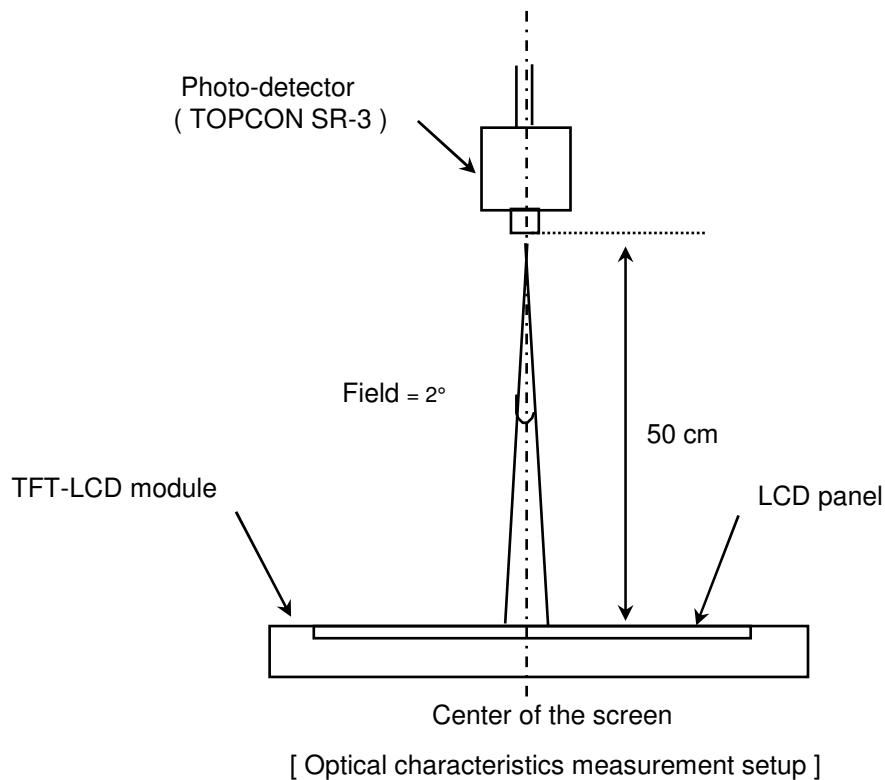
Note 4) Definition of Average Luminance of White : measure the luminance of white at 5 points.



Average Luminance of White ( $Y_{L,AVE}$ )

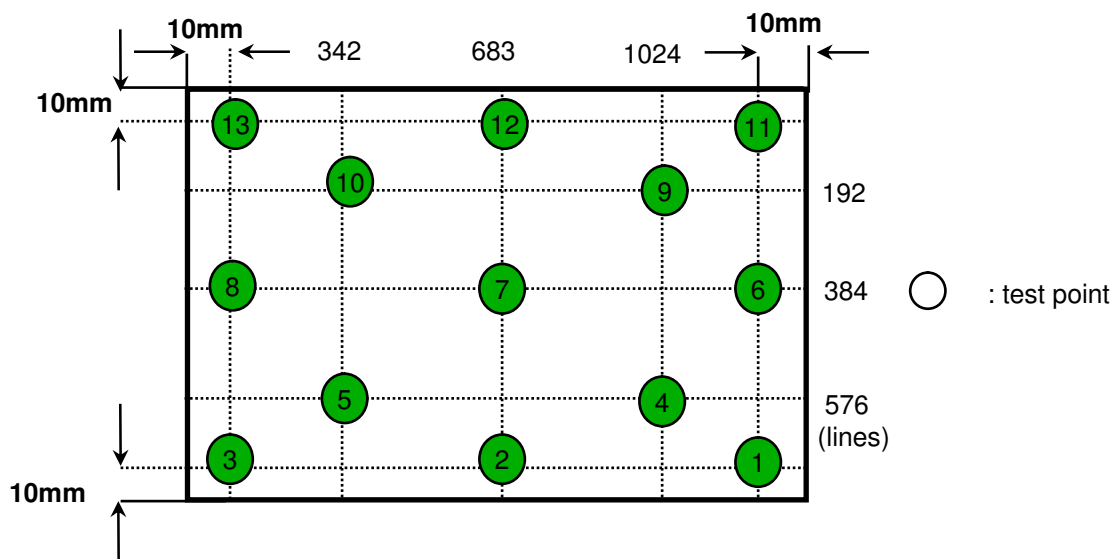
$$Y_{L,AVE} = \frac{Y_{L4} + Y_{L5} + Y_{L7} + Y_{L9} + Y_{L10}}{5}$$

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.  
 IF current : 20.0mA  
 Environment condition : Ta = 25 ± 2 °C



Note 6) Definition of 13 points white variation ( $\delta L$ ), CR variation( $C_{VER}$ ) [ ① ~ ⑬ ]

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



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### 3. ELECTRICAL CHARACTERISTICS

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#### 3.1 TFT LCD MODULE

Ta= 25 ± 2°C

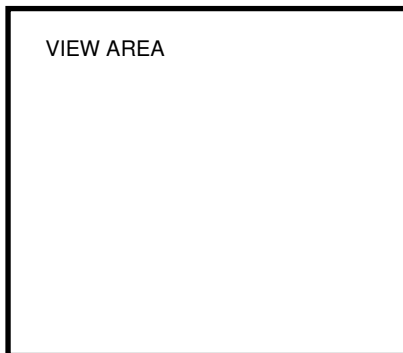
Item	Symbol	Min.	Typ.	Max.	Unit	Note	
Voltage of Power Supply	V <sub>DD</sub>	3.0	3.3	3.6	V		
Differential Input Voltage for LVDS Receiver Threshold	High	V <sub>IH</sub>	-	-	+100	mV	V <sub>CM</sub> = +1.2V
	Low	V <sub>IL</sub>	-100	-	-	mV	
Vsync Frequency	f <sub>v</sub>	-	60	-	Hz		
Hsync Frequency	f <sub>H</sub>	-	46.8	-	KHz		
Main Frequency	f <sub>DCLK</sub>	67.2	69.3	70.6	MHz		
Rush Current	I <sub>RUSH</sub>	-	-	1.5	A	(4)	
Current of Power Supply	White	I <sub>DD</sub>	-	300	-	mA	(2),(3)*a
	Mosaic		-	350	-	mA	(2),(3)*b
	V. stripe		-	450	485	mA	(2),(3)*c

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

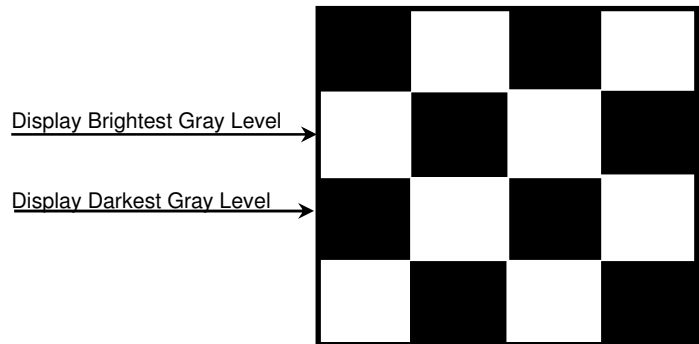
(2) f<sub>v</sub> = 60Hz, f<sub>DCLK</sub> = 69.3MHZ, V<sub>DD</sub> = 3.3V , DC Current.

(3) Power dissipation pattern

\*a) White Pattern

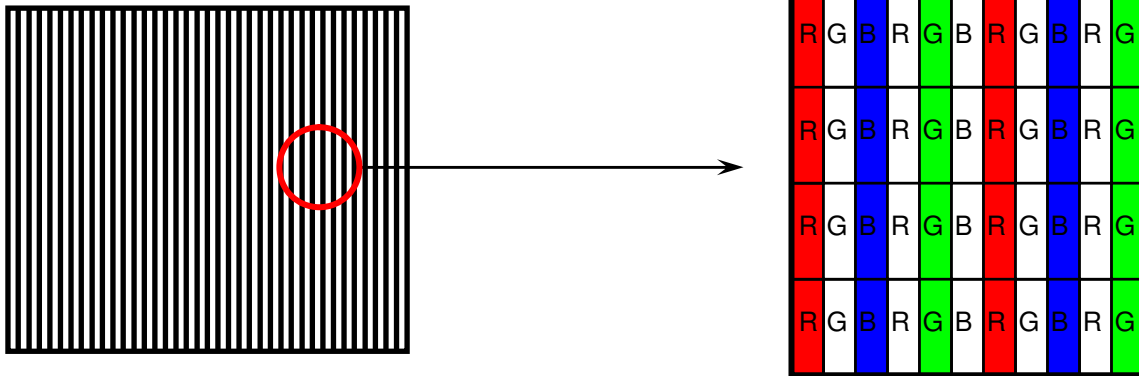


\*b) Mosaic Pattern

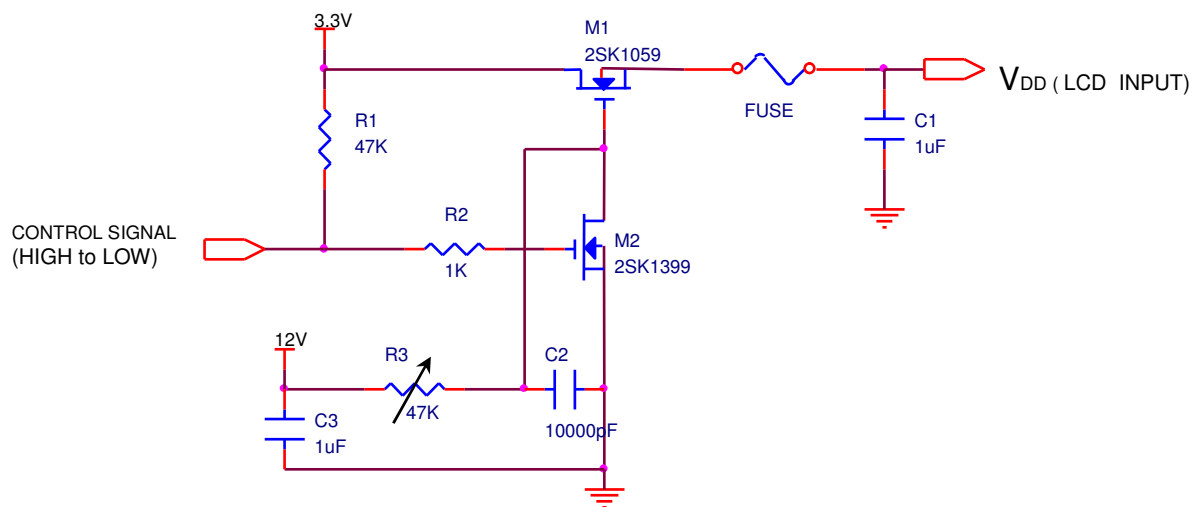


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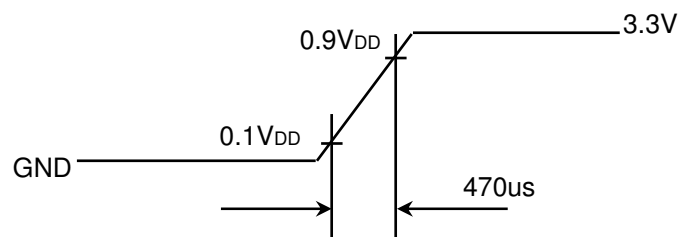
\*c) 1dot Vertical stripe pattern



4) Rush current measurement condition



$V_{DD}$  rising time is 470us



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## 3.2 BACK-LIGHT UNIT

Ta= 25 ± 2 °C

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED Forward Current	IF	19	20	21	mA	
LED Forward Voltage	VF	-	3.2	-	V	
LED Array Voltage	VP	-	22.4	-	V	VF X 7 LEDs
Power Consumption	P	-	-	3.2	W	IF X VF X 42LEDs
Operating Life Time	Hr	12,000	-	-	Hour	(1)

Note (1) Life time (Hr) of LEDs can be defined as the time in which it continues to operate under the condition Ta= 25 ± 2 °C and IF = 20.0 mArms until one of the following event occurs.

1. When the brightness becomes 50% or lower than the original.

## 3.3 LED Driver

- On board LED Driver (Manufacturer : Richtek)

Ta= 25 ± 2 °C

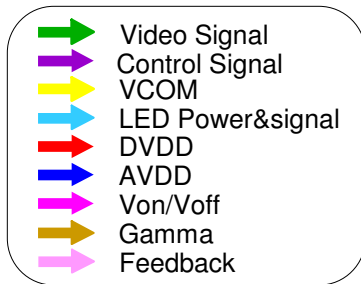
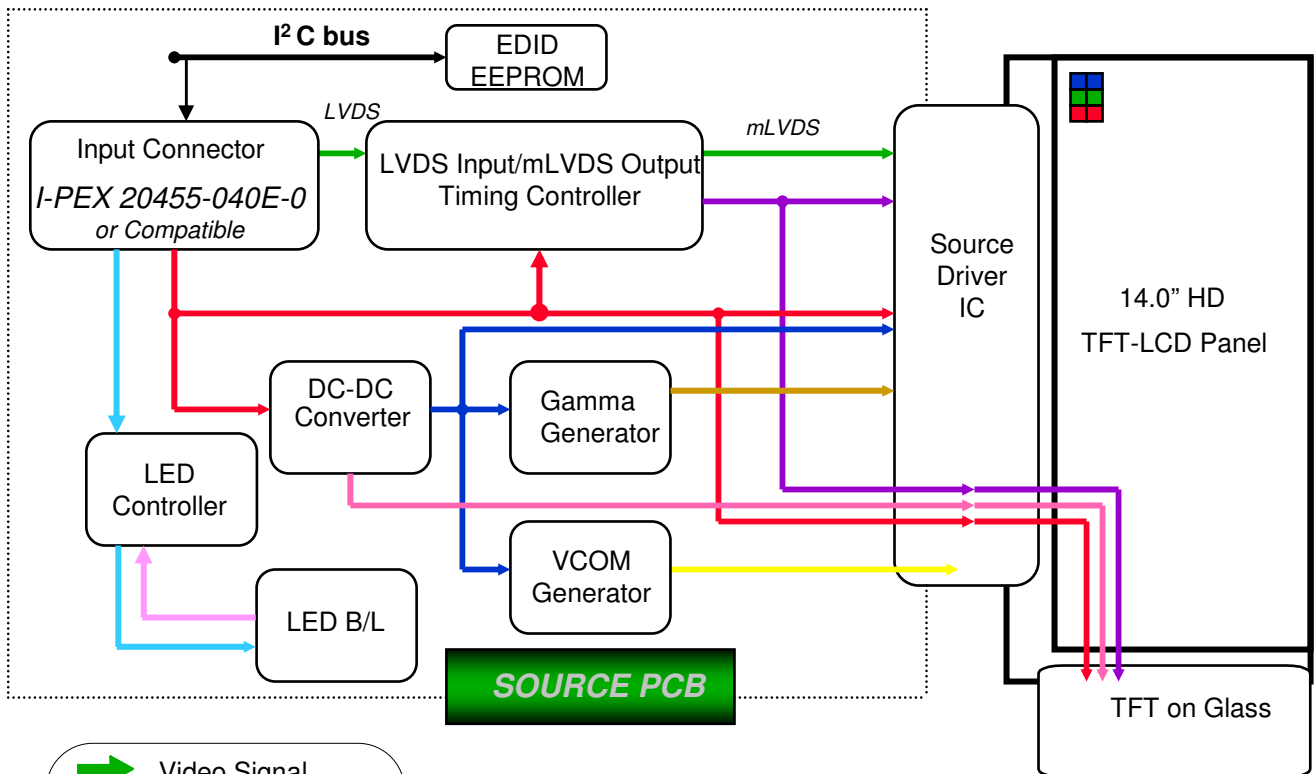
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Input Voltage	V <sub>in</sub>	6	12	20	V	
Enable Control Level	V	0	-	5	V	ON Level : 2.5V~5V OFF Level : 0V ~ 0.5V
PWM Control Level	V <sub>PWM</sub>	0		5	V	High Level : 2.7V~5V Low Level : 0V ~ 0.3V
PWM Control Duty Ratio	%	10	-	100	%	
PWM Input Frequency	BLIM	0.2	-	1	KHz	

Note - Test Equipment : Fluke 45

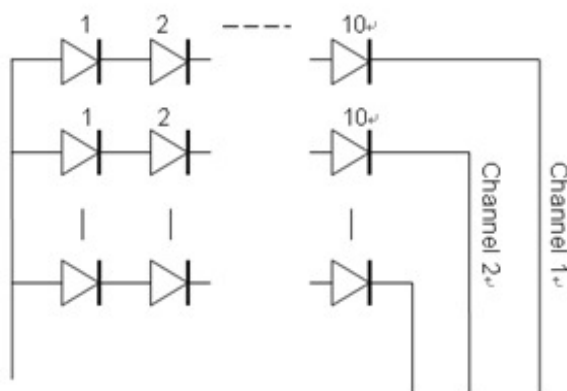
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## 4. BLOCK DIAGRAM

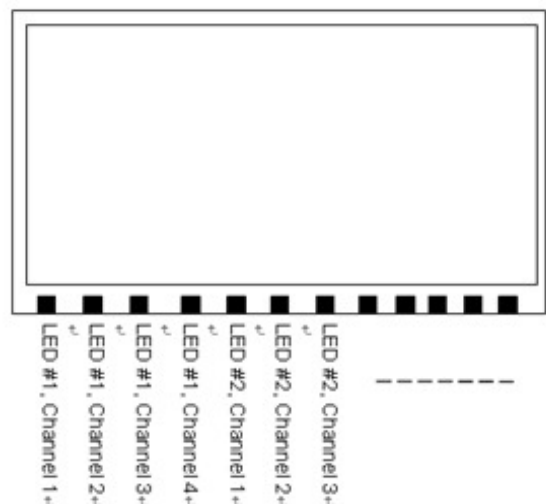
### 4.1 TFT LCD Module



### 4.2 LED connection and placement



LED Wiring



LED Placement

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## 5. INPUT TERMINAL PIN ASSIGNMENT

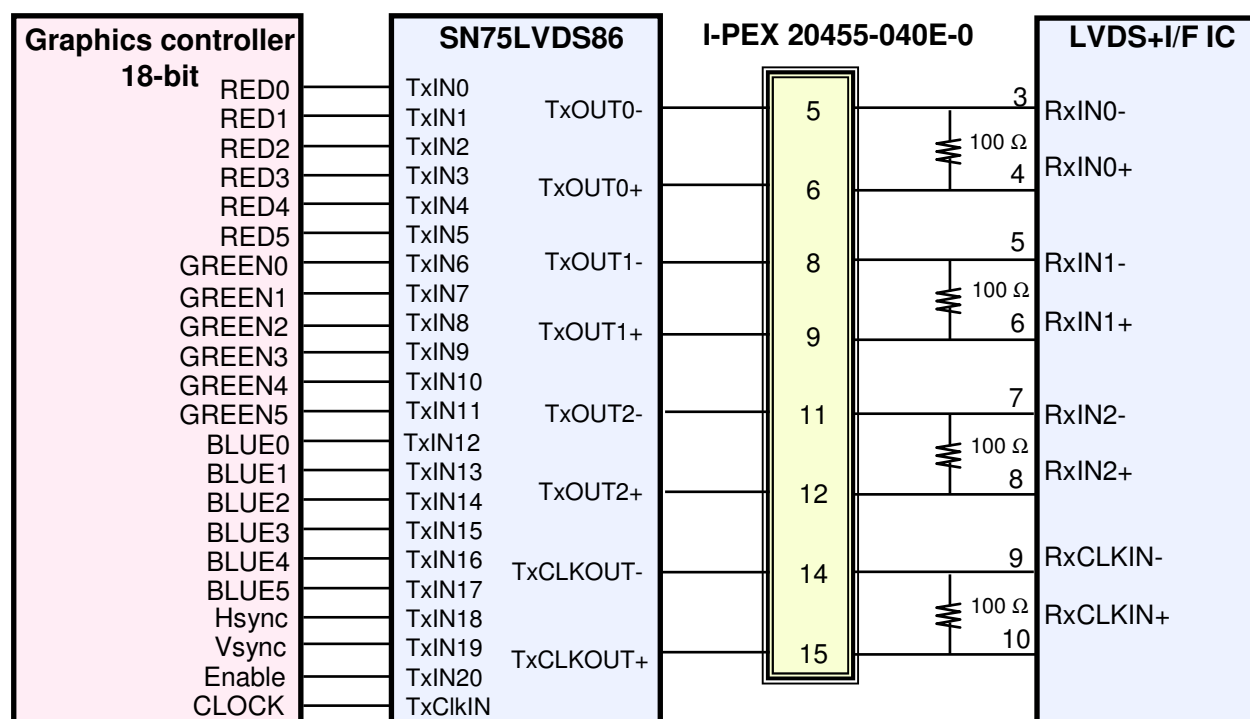
### 5.1. Input Signal & Power (LVDS, Connector : 20455-040E-0 by I-PEX or equivalent )

No.	Signal	Description
1	NC	No Connection
2~3	AVDD	Power Supply, 3.3V ( typical)
4	DVDD	DDC 3.3V power
5	NC	No Connection
6	SCL	DDC Clock
7	SDA	DDC Data
8	Rin0-	-LVDS differential data input (R0-R5, G0)
9	Rin0+	+LVDS differential data input (R0-R5, G0)
10	GND	Ground
11	Rin1-	-LVDS differential data input (G1-G5, B0-B1)
12	Rin1+	+LVDS differential data input (G1-G5, B0-B1)
13	GND	Ground
14	Rin2-	-LVDS differential data input (B2-B5, HS, VS, DE)
15	Rin2+	+LVDS differential data input (B2-B5, HS, VS, DE)
16	GND	Ground
17	ClkIN-	-LVDS differential clock input
18	ClkIN+	+LVDS differential clock input
19	GND	Ground
20~21	NC	No Connection
22	GND	Ground
23~24	NC	No Connection
25	GND	Ground
26~27	NC	No Connection
28	GND	Ground
29~30	NC	No Connection
31~33	VBL-	LED Ground
34	NC	No Connection
35	BLIM	PWM for luminance control (200~1KHz, 3.3V, 10~100%)
36	BL_Enable	BL On/Off (On:2.0~3.3V, Off: 0~0.5V)
37	NC	No Connection
38~40	VBL+	LED Power Supply 6V~20V

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## 5.2 LVDS Interface : Transmitter SN75LVDS86 or Compatible

Pin No.	Name	RGB Signal	Pin No.	Name	RGB Signal
44	TxIN0	R0	12	TxIN11	G5
45	TxIN1	R1	13	TxIN12	B0
47	TxIN2	R2	15	TxIN13	B1
48	TxIN3	R3	16	TxIN14	B2
1	TxIN4	R4	18	TxIN15	B3
3	TxIN5	R5	19	TxIN16	B4
4	TxIN6	G0	20	TxIN17	B5
6	TxIN7	G1	22	TxIN18	Hsync
7	TxIN8	G2	23	TxIN19	Vsync
9	TxIN9	G3	25	TxIN20	DE
10	TxIN10	G4	26	TxCLKIN	Clock

**LVDS INTERFACE**

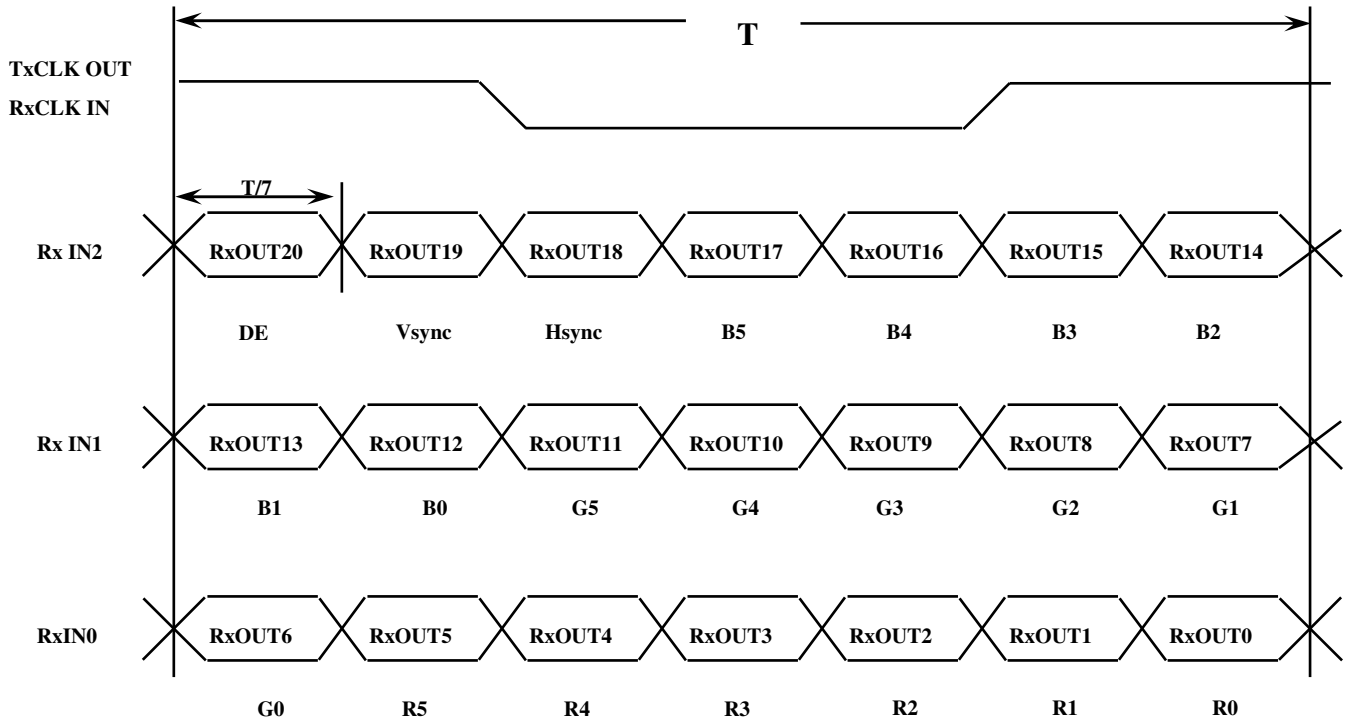
Note : The LCD Module uses a 100ohm resistor between positive and negative lines of each receiver input.

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### 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	
Basic Colors	Black	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	-
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	-
	Cyan	0	0	0	0	0	0	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	-
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	-
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	-
	White	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	R0	
	Dark	1	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	R2	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	R3~R60	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
	↓	1	0	1	1	1	1	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	R62	
	Red	1	1	1	1	1	1	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	G0	
	Dark	0	0	0	0	0	0	1	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	G2	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	G3~G60	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
	↓	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	G61	
	Light	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	G62	
	Green	0	0	0	0	0	0	1	1	1	1	1	1	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	B0	
	Dark	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	B1	
	↑	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	B2	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	B3~B60	
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
	↓	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	B61	
	Light	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	B62	
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	B63	

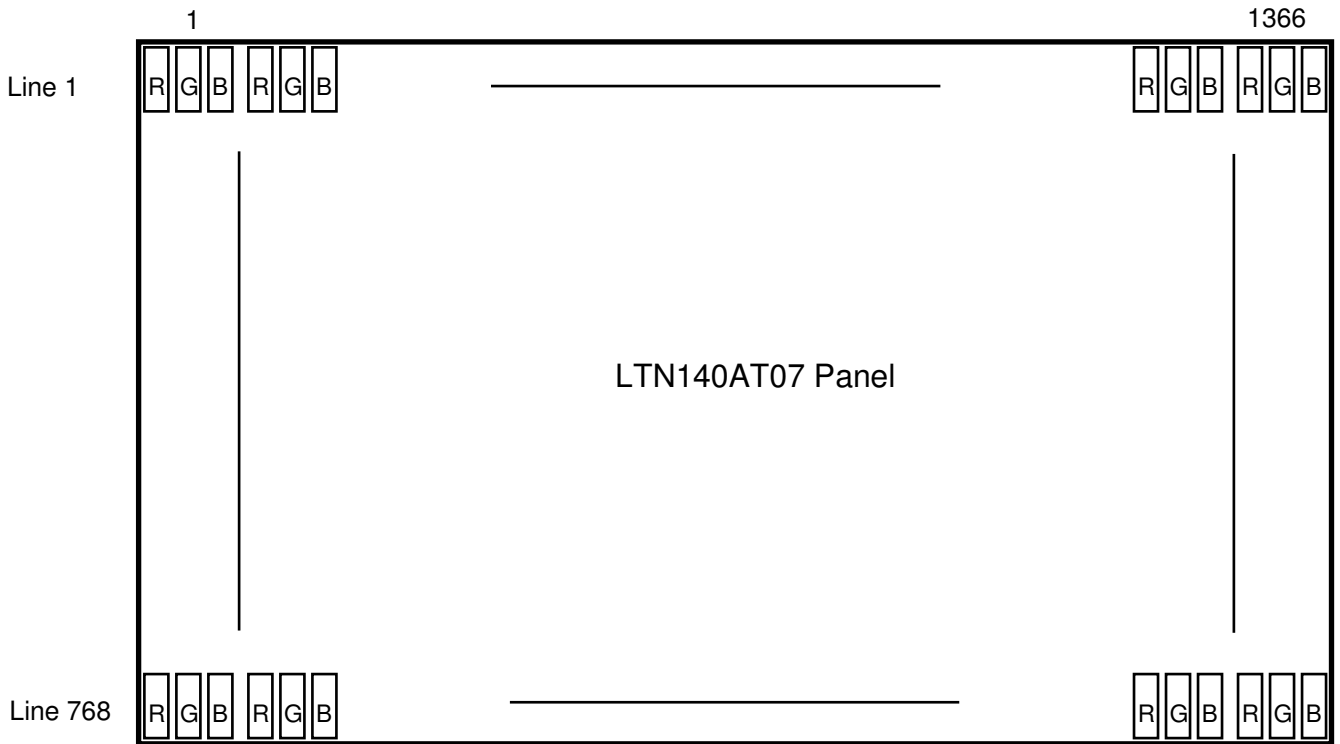
Note 1) Definition of gray :

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



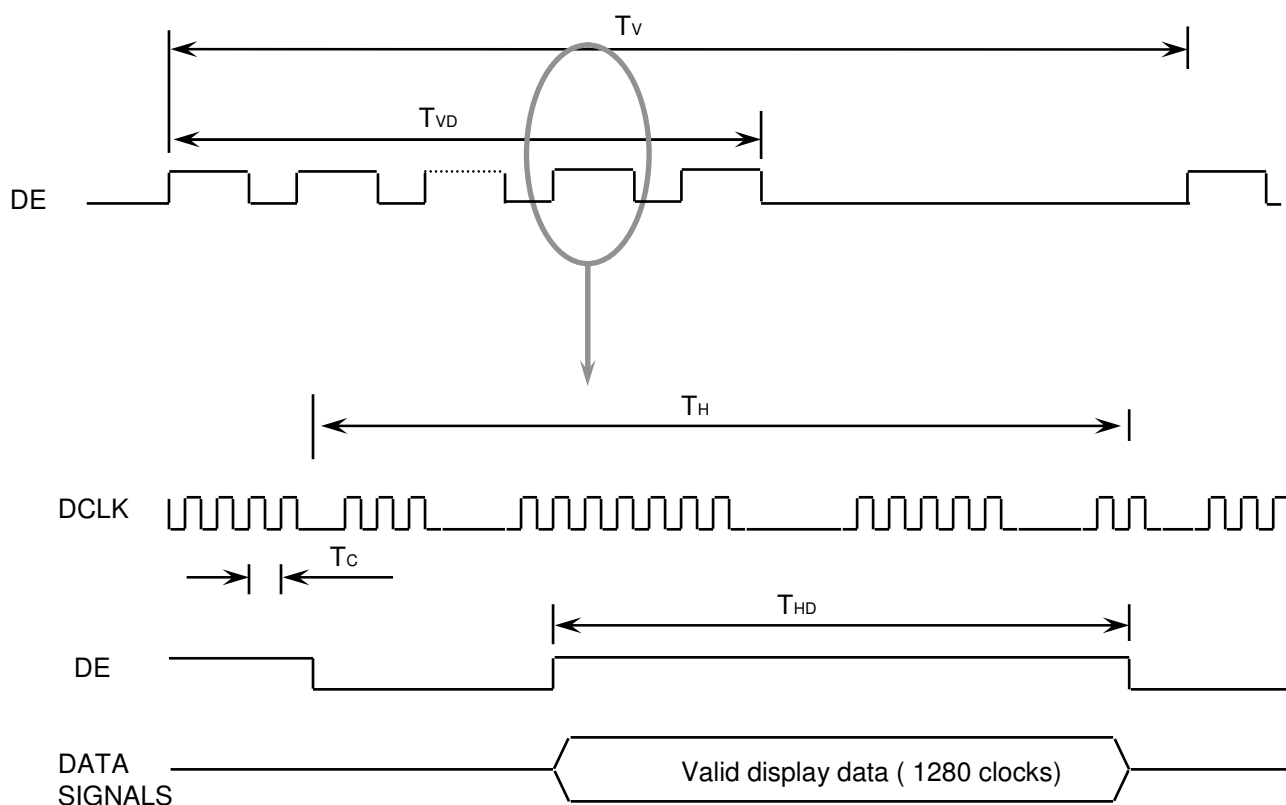
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## 6. INTERFACE TIMING

### 6.1 Timing Parameters

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
Frame Frequency	Cycle	TV	774	780	810	Lines	
Vertical Active Display Term	Display Period	TVD	-	768	-	Lines	
One Line Scanning Time	Cycle	TH	1430	1480	1530	Clocks	
Horizontal Active Display Term	Display Period	THD	-	1366	-	Clocks	

### 6.2 Timing diagrams of interface signal

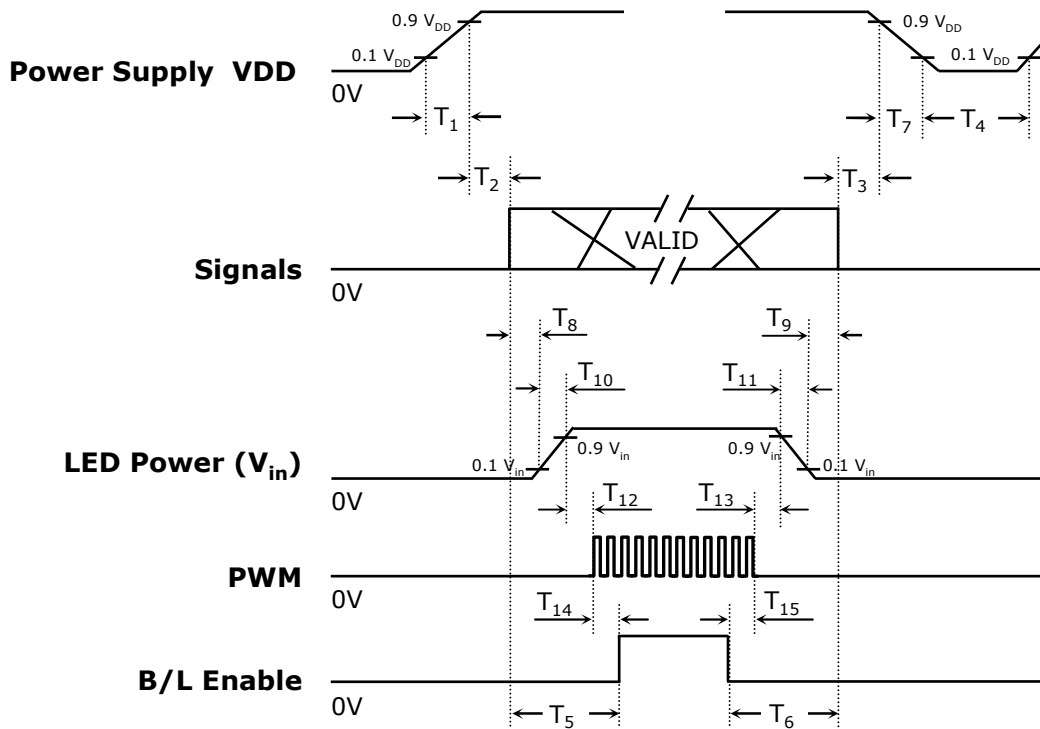


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### 6.3 Power ON/OFF Sequence

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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.



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 V <sub>in</sub> rising time 10%
$10 < T_9$	Delay from LED driver V <sub>in</sub> 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 V <sub>in</sub> rising time 90% to PWM ON
$10 < T_{13}$	Delay from PWM Off to LED driver V <sub>in</sub> 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

Note : Backlight may flash if interface signal remains floating state at invalid period.

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## 7. Mechanical Outline Dimension

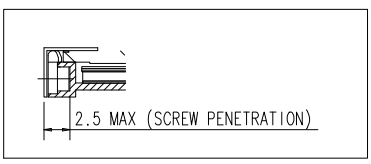
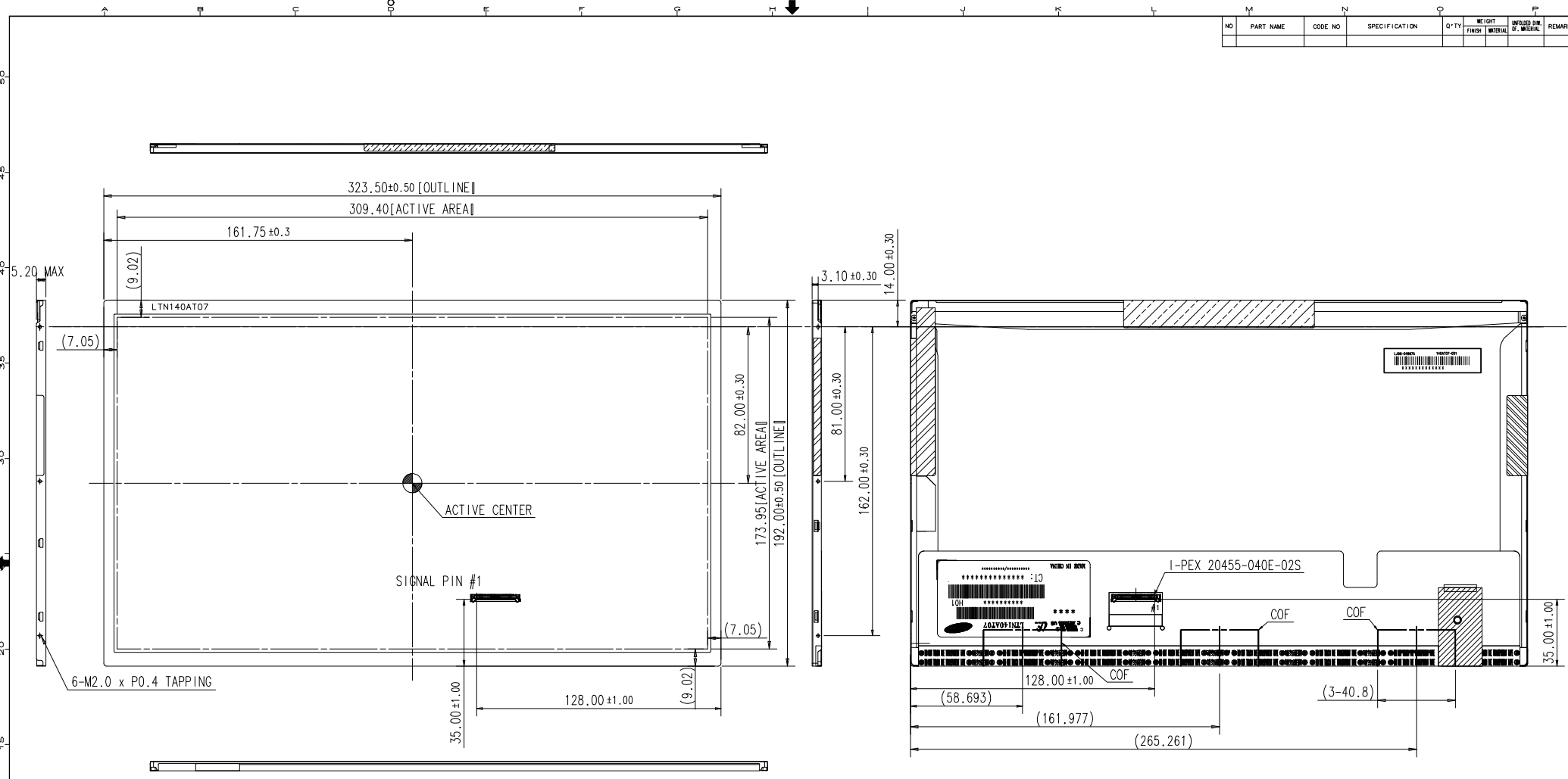
Approval

Refer to the next page

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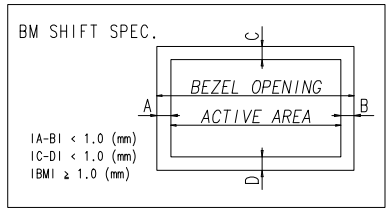
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NO	PART NAME	CODE NO	SPECIFICATION	Q'TY	WEIGHT	FINISH	INFLUENCED BY	REMARK



<USER HOLE SCREW PENETRATION DEPTH>

LTN140AT07-H01  
SAMSUNG CONFIDENTIAL



- \* NOTE
- SIGNAL INTERFACE CONNECTOR TO BE SPECIFIED AS BELOW.  
- MAKER : I-PEX  
- PART NO : 20455-040E-02S
  - CALIFERS MEASURING FORCE : 750 ± 150 gf
  - USER HOLE TORQUE SPEC : 2.5kgf-cm Max (5TIMES)
  - WEIGHT SPEC : 350g MAX
  - In order to avoid IC damage, it is not allow that overlapping of cables or antennas, camera ,WLAN,WWAN over these COF locations

NO. 010-11-11-11

REV	DATE	DESCRIPTION OF REVISION	REASON	CHK'D BY

UNIT	mm	DRA'N BY	DES'D BY	CHK'D BY	APP'D BY	MODEL NAME	LTN140AT07-H01	
SCALE	1/1	J.H.SHIN				PARTY/SHEET NAME	OUTLINE DIMENSION	
TOLERANCE	0.2	09.08.03				SPEC. NO		
SAMSUNG ELECTRONICS							CODE NO.	
							SHEET	1/1
							VER.	000

## 8. PACKING

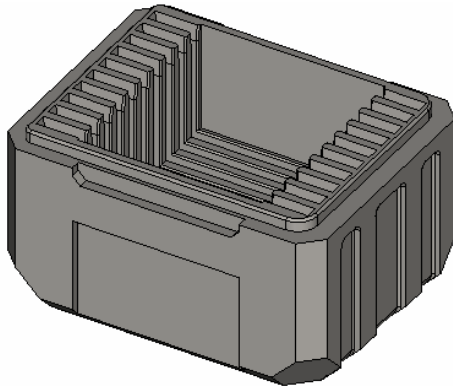
### 1. CARTON(Internal Package)

#### (1) Packing Form

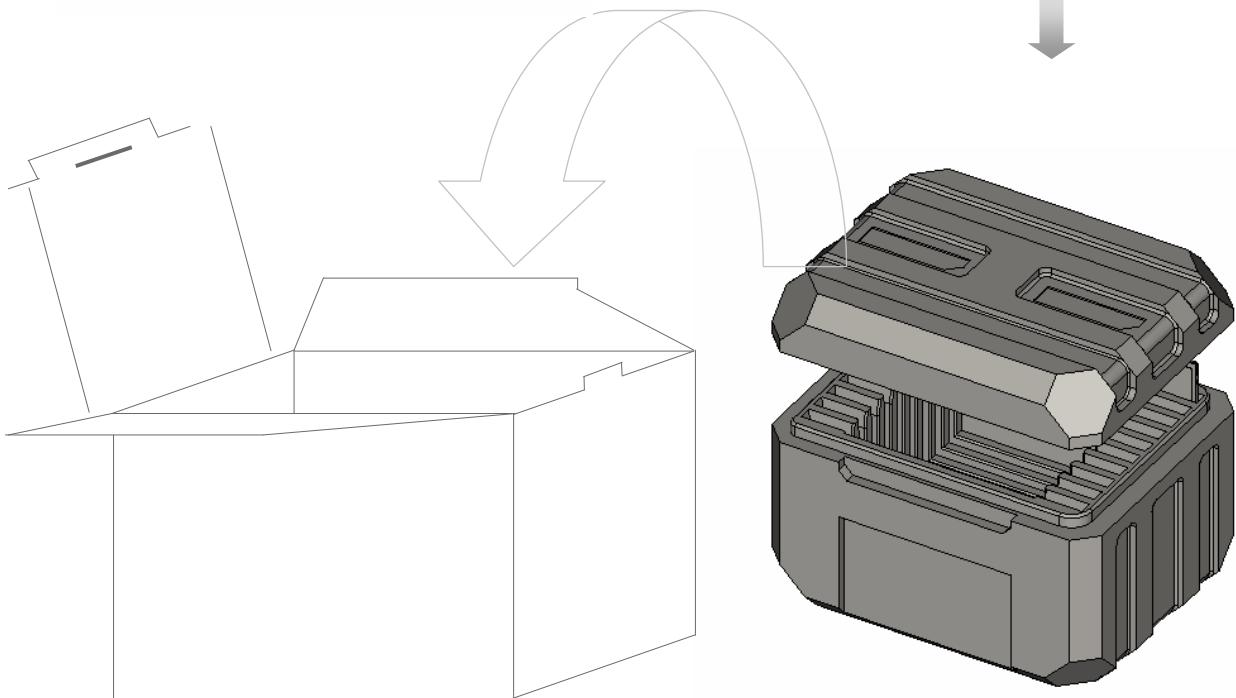
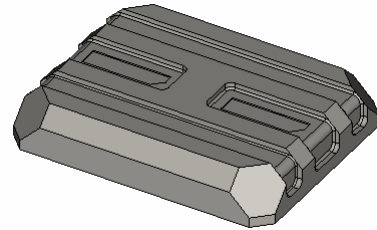
Corrugated Cardboard box and EPS form as shock absorber

#### (2) Packing Method

CUSHION BOTTOM



CUSHION TOP



*Note* (1) Total : Approx. 4.6 Kg

(2) Acceptance number of piling : 10 sets

(3) Carton size : 408(W) X 325(D) X 288(H)

(4) MAX accumulation quantity : 6 cartons

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## (3)Packing Material

No	Part name	Quantity
1	Static electric protective sack	10
2	Packing case (Inner box) included shock absorber	1 set
3	Pictorial marking	2 pcs
4	Carton	1 set

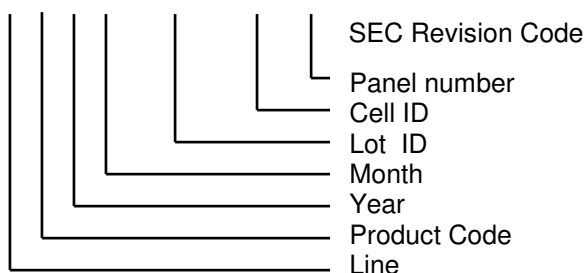
## 9. MARKINGS &amp; OTHERS

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

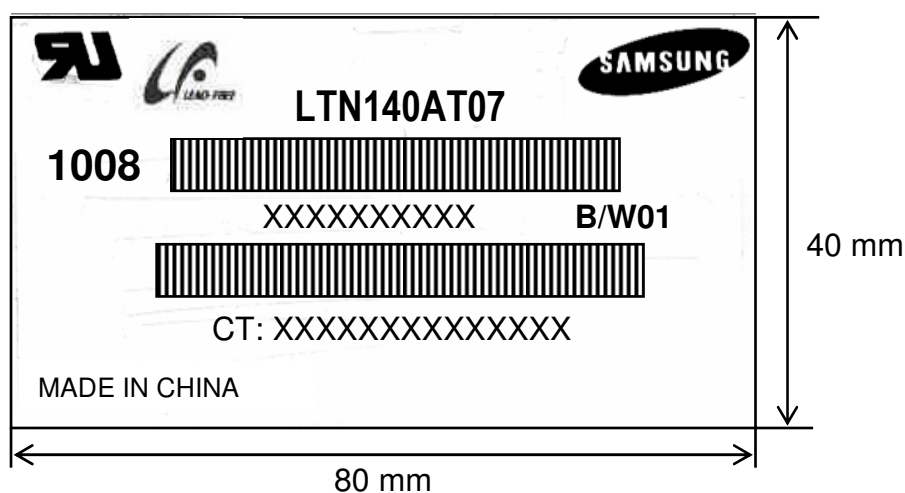
(1)Parts number : LTN140AT07

(2)Revision code : 3 letters

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



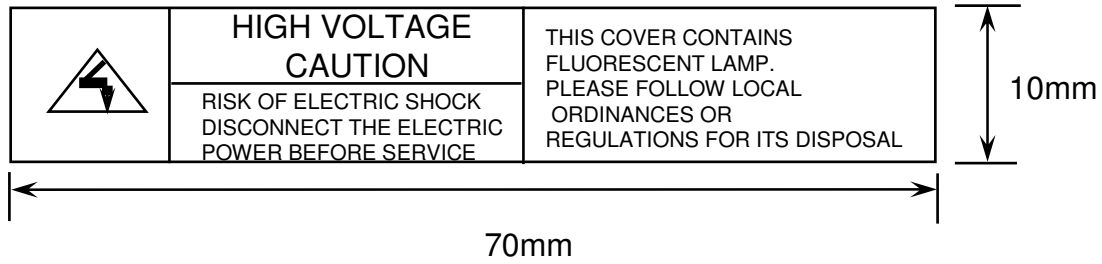
## (4) Nameplate Indication



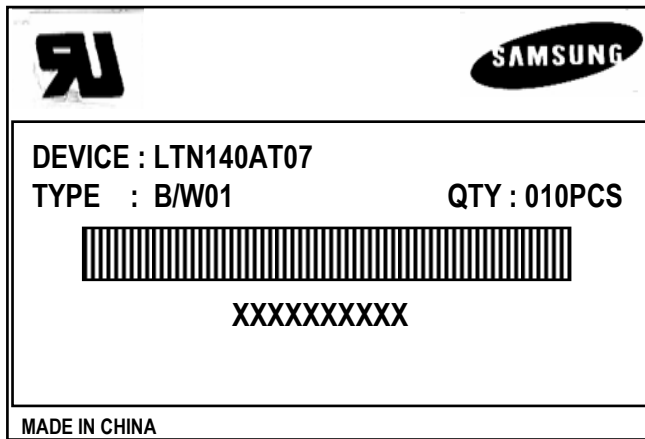
Parts name : LTN140AT07  
Lot number : XXXXXXXXXXXX  
Inspected work week : 1008 (2010 year 8rd week)  
Product Revision Code : **B/W01**  
CT code : XXXXXXXXXXXXXXXX (Released after HP's approval)

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(5) High voltage caution notice



(6) Packing small box attach



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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

- (a) Do not leave the module in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%.
- (b) Do not store the TFT-LCD module in direct sunlight.
- (c) The module shall be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during the store.

## 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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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	3 character ID
09		A3	10100011	163	E C	"SEC"
0A	ID Product Code	42	01000010	66	[B]	
0B		38	00111000	56	[8]	
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	12	00010010	18	2008	2008
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	1F	00011111	31	31	31 cm(approx)
16	Max V image size	11	00010001	17	17	17 cm(approx)
17	Display Gamma	78	01111000	120	2.2	Gamma 2.2
18	Feature support	0A	00001010	10		
19	Red/green low bits	85	10000101	133		10000111
1A	Blue/white low bits	95	10010101	149		11111110
1B	Red x/ high bits	99	10011001	153	0.600	Red x0.600= 10011001
1C	Red y	57	01010111	87	0.340	Red y0.340= 01010111
1D	Green x	4F	01001111	79	0.310	Green x0.310= 01001111
1E	Green y	8F	10001111	143	0.560	Green y0.560= 10001111
1F	Blue x	26	00100110	38	0.150	Blue x0.150= 00100110
20	Blue y	21	00100001	33	0.130	Blue y0.130= 00100001
21	White x	50	01010000	80	0.313	White x0.313= 01010000
22	White y	54	01010100	84	0.329	White y0.329= 01010100
23	Established timing 1	00	00000000	0		
24	Established timing 2	00	00000000	0		
25	Established timing 3	00	00000000	0		

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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			
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	12	00010010	18	69.3	Main clock= 69.3 MHz	
37		1B	00011011	27			
38		56	01010110	86	1366	Hor active=1366 pixels	
39		72	01110010	114	114	Hor blanking=114 pixels	
3A		50	01010000	80		4bit : 4bit	
3B		00	00000000	0	768	Vertical active=768 lines	
3C		0C	00001100	12	12	Vertical blanking=12 lines	
3D		30	00110000	48		4bit : 4bit	
3E		30	00110000	48	48	H sync. Offset=48 pixels	
3F		20	00100000	32	32	H sync. Width=32 pixels	
40		Detailed timing/monitor descriptor #1	25	00100101	37	2 5	V sync. Offset=2 lines V sync. Width=5 lines
41			00	00000000	0		2bit : 2bit :2bit :2bit
42		35	00110101	53	309	H image size= 309 mm(approx)	
43		AE	10101110	174	174	Vimage size = 174 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=Tvbpmmin / 2	
54		00	00000000	0		Value=Tvbpmmax / 2	
55		1E	00011110	30		Thpmin=value*2 + HA pixelclks	
56		B4	10110100	180		Thpmax=value*2 + HA pixelclks	
57		02	00000010	2		Tvpmin=value*2 + VA lines	
58		74	01110100	116		Tvpmax=value*2 + VA lines	
59	00	00000000	0		Module revision		

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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		34	00110100	52	[4]	
73		30	00110000	48	[0]	
74		41	01000001	65	[A]	
75		54	01010100	84	[T]	
76		30	00110000	48	[0]	
77		37	00110111	55	[7]	
78		2D	00101101	45	[-]	
79		48	01001000	72	[H]	
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	C4	11000100	196		

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