

## **WVGA-TFT-PCAP-Modul Datenblatt**

Modell SCF0700G12GGU00

### **Kurzdaten**

Hersteller	Data Image
Diagonale	7,0" / 17,8 cm
Format	wide
Auflösung	800 x 480
Backlight	LED / 330 cd/m <sup>2</sup>
Interface	TTL
Touchscreen	ja
Temperatur	-20... +60°C (Betrieb)



Confidential Document

# DATA IMAGE CORPORATION

## TFT Module Specification

Preliminary

ITEM NO.: SCF0700G12GGU00

### Table of Contents

1. COVER & CONTENTS .....	1
2. RECORD OF REVISION .....	2
3. APPLICATION.....	3
4. GENERAL SPECIFICATIONS .....	3
5. ABSOLUTE MAXIMUM RATINGS .....	3
6. ELECTRICAL CHARACTERISTICS .....	4
7. TIMING SPECIFICATIONS .....	5
8. OPTICAL CHARACTERISTIC .....	8
9. PIN CONNECTIONS .....	13
10. BLOCK DIAGRAM .....	15
11. QUALITY ASSURANCE .....	16
12. CTP LCM NUMBERING SYSTEM .....	21
13. PRECAUTIONS IN USE LCM .....	23
14. OUTLINE DRAWING .....	24
15. PACKAGE INFORMATION.....	25

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	3	14/OCT/10'		25



### 3. APPLICATION

DVD player, Car TV, UMPC, POS

### 4. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Screen Size	7 (diagonal)	inch
Display Format	800(H) x (R,G,B) x 480(V)	dot
Active Area	152.4(H) x 91.44(V)	mm
Dot Pitch	0.0635 (H) x 0.1905 (V)	mm
Pixel Configuration	Stripe	
Outline Dimension	174.4(W) x 113.44(H) x 6.15(D)	mm
Surface treatment	Anti-glare	
Back-light	LED	
Display mode	Normally Black	
Weight	188	g
View Angle direction	Wide View	

### 5. ABSOLUTE MAXIMUM RATINGS

#### 5.1 LCM Absolute Maximum Rating

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Power supply voltage	V <sub>cc</sub>	-0.3	5.0	V	Ta=25°C
Logic input voltage	V <sub>I</sub>	-0.3	V <sub>cc</sub> +0.3	V	
Operating temperature	T <sub>op</sub>	-20	60	°C	Module surface*
Storage temperature	T <sub>st</sub>	-30	70	°C	-
Humidity	Operation	10%~80% relative humidity			Ta<=38°C
	Non Operation	50%~80% relative humidity			Ta<=38°C

#### 5.2 CTP Absolute Maximum Rating

Symbol	Description	Min	Typ	Max	Unit	Notes
V <sub>dd</sub>	Supply voltage	-0.5	-	6.0	V	
V <sub>io</sub>	DC input voltage	V <sub>ss</sub> -0.5	-	V <sub>dd</sub> +0.5	V	
I <sub>mio</sub>	Maximum input current	-25	-	50	mA	
ESD	Electrostatic discharge voltage	2000	-	-	V	

## 6. ELECTRICAL CHARACTERISTICS

### 6.1 LCM Electrical Characteristic

fH=30KHz, fV=60Hz, fCLK=27MHz, Ta=25°C

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage for LCD	V <sub>CC</sub>	+3.0	+3.3	+3.6	V	
Power Supply Current for LCD	I <sub>CC</sub>		150	200	mA	V <sub>CC</sub> =3.3V
Power Supply voltage for LED	V <sub>DD</sub>	3.0	3.3	5.5	V	
Power Supply Current for LED	I <sub>DD</sub>		650	850	mA	V <sub>DD</sub> =3.3V
	I <sub>DD</sub>		400	550	mA	V <sub>DD</sub> =5.0V
Ripple voltage	V <sub>RF</sub>	-	-	100	mV <sub>P-P</sub>	
“H” level logical input voltage	V <sub>IH</sub>	0.7V <sub>CC</sub>	--	V <sub>CC</sub>	V	
“L” level logical input voltage	V <sub>IL</sub>	0	--	0.3V <sub>CC</sub>	V	
ADJ frequency		19K	20K	21K	Hz	
ADJ input voltage	V <sub>IH</sub>	3.0	-	3.3	V	
	V <sub>IL</sub>	0	-	0.3	V	
LED dice life time			30000		Hr	Note 1

Note 1: The “LED dice life time” is defined as the brightness decrease to 50% original brightness that the ambient temperature is 18 ~28 and LED dice current=20mA.

### 6.2 CTP Electrical Characteristic

Symbol	Description	Min	Typ	Max	Unit	Notes
V <sub>DD</sub>	Supply voltage	3.0	3.3	5.25	V	
I	Supply current	-	8	14	mA	At V <sub>DD</sub> =3.3V
I <sub>SLEEP</sub>	Sleep mode current	-	4	25	uA	At V <sub>DD</sub> =3.3V

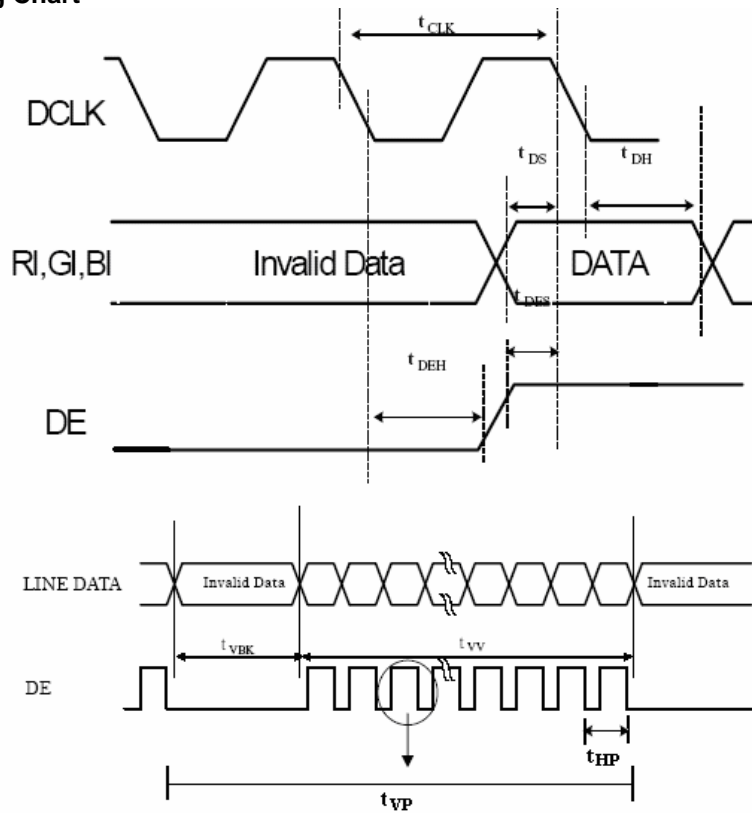
## 7. TIMING SPECIFICATIONS

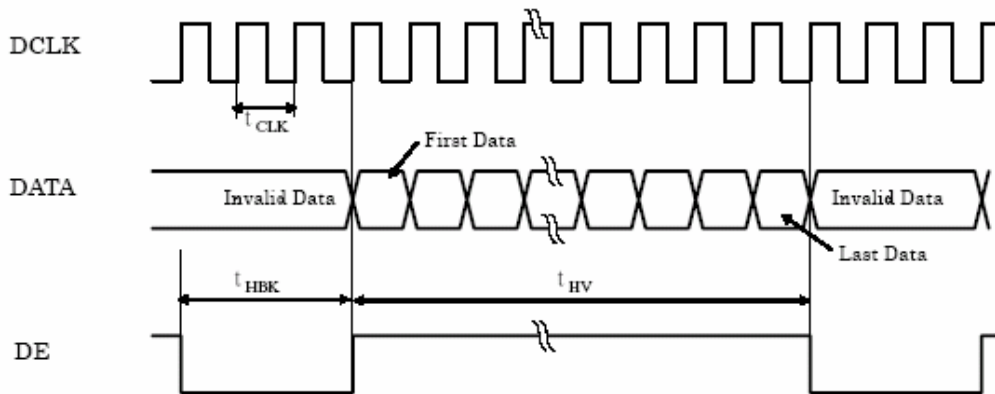
ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT
DCLK	Period	t <sub>CLK</sub>	31	37.0	40.0	ns
	Dot Clock	f <sub>CLK</sub>	25	27	32.11	MHz
	Low Level Width	t <sub>WCL</sub>	8	-	-	ns
	High Level Width	t <sub>WCH</sub>	8	-	-	
DE	Setup Time	t <sub>DES</sub>	5	-	-	ns
	Hold time	t <sub>DEH</sub>	10	-	-	
	Horizontal Period	t <sub>HP</sub>	850	900	950	
	Horizontal Valid	t <sub>HV</sub>	800			
	Horizontal Blank	t <sub>HBK</sub>	50	100	150	
	Vertical Period	t <sub>VP</sub>	490	500	520	t <sub>HP</sub>
	Vertical Valid	t <sub>VV</sub>	480			
	Vertical Blank	t <sub>VBK</sub>	10	20	40	
	Vertical Frequency	f <sub>V</sub>	55	60	65	
DATA	Setup Time	t <sub>DS</sub>	5	-	-	ns
	Hold Time	t <sub>DH</sub>	10	-	-	

Note: High level of T-CON logic signal is 80%  
 Low level of T-CON logic signal is 20%

### 7.1 LCM TIMING CHARACTERISTIC :

LCM Timing Chart

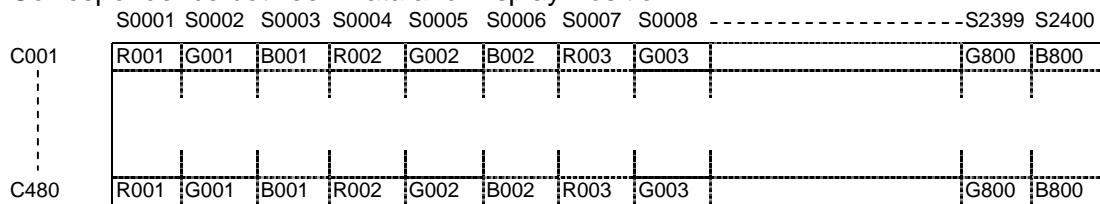




### 7.2 LCM Color Data Input Assignment

		Data Signal																	
		Red						Green						Blue					
Color		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	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
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	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	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Green(0)/ Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray Scale of Blue	Blue(0)/ Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue (1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue (2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue (61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	Blue (62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue (63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

### Correspondence between Data and Display Position



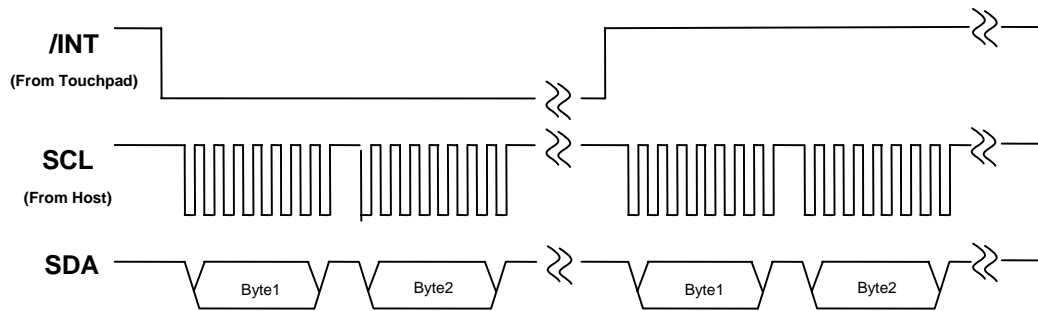
### 7.3 CTP Interface and Data Format (Slave address is 0x20)



Communication protocol : I<sup>2</sup>C

Clock frequency : 100Khz

Report Rate : 60Hz



**Write Bytes to I<sup>2</sup>C Slave :**

	Slave addr			Data addr n		Data n		Data n+1		...	Data n+x		
s	6 5 4 3 2 1 0	W	A	7 6 5 4 3 2 1 0	A	7 6 5 4 3 2 1 0	A	7 6 5 4 3 2 1 0	A	...	7 6 5 4 3 2 1 0	A	P

**Read Bytes from I<sup>2</sup>C Slave :**

**Set Slave Data Pointer**

	Slave addr			Data addr n		
s	6 5 4 3 2 1 0	W	A	7 6 5 4 3 2 1 0	A	P

**Read Bytes from Slave**

	Slave addr			Data n		Data n+1		Data n+2		...	Data n+x		
s	6 5 4 3 2 1 0	R	A	7 6 5 4 3 2 1 0	A	7 6 5 4 3 2 1 0	A	7 6 5 4 3 2 1 0	A	...	7 6 5 4 3 2 1 0	N	P

Note :

S : Start ; P : Stop ; R : Read ; W : Write ; A : Acknowledge ; N : No acknowledge

Master	Slave
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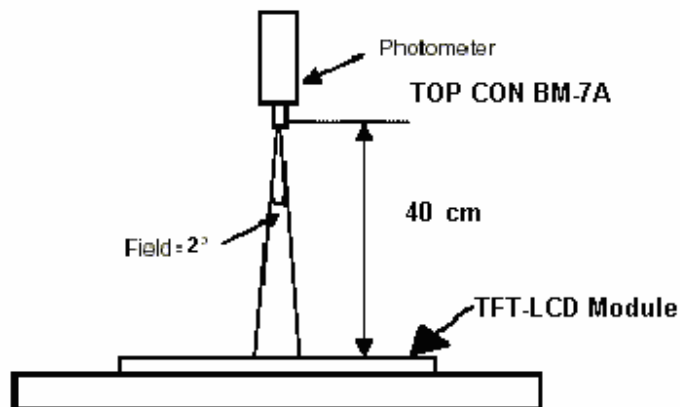
Register	R/W	Function	Content
0 X 00	R	Touch panel status	0 x 00 : No finger 0 x 01 : One finger 0 x 02 : Two fingers Interrupt behavior : Data change then interrupt active low about 40 us width.
0 X 01	R	X1 coordinate high byte	0 x 0000 ~ 0 x 031F (0 ~799)
0 X 02	R	X1 coordinate low byte	
0 X 03	R	Y1 coordinate high byte	0 x 0000 ~ 0 x 01DF (0 ~479)
0 X 04	R	Y1 coordinate low byte	
0 X 05	R	Button	0 x 01 : LeftBTN 0 x 02 : RightBTN 0 x 01 : MidBTN
0 X 06	R	Movement	+1 : Zoom in/cw ; -1 : Zoom out/ccw
0 X 09	R	Gesture function	0 x 00 : None ; 0 x 01 : Zoom In 0 x 02 : Zoom Out ; 0 x 04 : ST_Rotate Cw 0 x 08 : ST_Rotate Ccw ; 0 x 03 : ST_Pan_Up 0 x 05 : ST_Pan_Right ; 0 x 06 : ST_Pan_Down 0 x 07 : ST_Pan_Left ; 0 x 09 : ST_Click 0 x 0A : MT_Pan_Up ; 0 x 0B : MT_Pan_Right 0 x 0C : MT_Pan_Down ; 0 x 0D : MT_Pan_Left 0 x 0E : ST_Double_Click ; 0 x 0F : MT_Click
0 X 0A	W	Sleep mode	Suspend : 0 x 01 to enter sleep mode(I <sup>2</sup> C bus is still valid in sleep mode) Wake up : 0 x 00 escape from sleep mode
0 X 0B	R/W	Sensitivity setting	TBD
0 X 0C	R	Firmware version	Ex. 0x10 is Version 1.0

### 8. OPTICAL CHARACTERISTIC

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	$\theta_{x+}$	Center CR $\geq$ 10	--	(80)	--	deg	Note 1,4
		$\theta_{x-}$		--	(80)	--		
	Vertical	$\theta_{y+}$		--	(80)	--		
		$\theta_{y-}$		--	(80)	--		
Contrast Ratio		CR	at optimized viewing angle	(300)	(400)			Note 1,3
Response time	Rise	Tr	Center	-	5	10	ms	Note 1,6
	Fall	Tf	$\theta_x=\theta_y=0^\circ$	-	15	20	ms	
Uniformity		B-uni	$\theta_x=\theta_y=0^\circ$	70	70	80	--	Note1,5
Brightness		L	$\theta_x=\theta_y=0^\circ$ ADJ=3.3V	(260)	(330)	--	cd/m <sup>2</sup>	Note 1,2
Chromaticity	$x_W$	Center $\theta_x=\theta_y=0^\circ$	(0.267)	(0.307)	(0.347)		Note 1,7	
	$y_W$		(0.299)	(0.339)	(0.379)			
	$x_R$		(0.562)	(0.602)	(0.642)			
	$y_R$		(0.314)	(0.354)	(0.394)			
	$x_G$		(0.278)	(0.318)	(0.358)			
	$y_G$		(0.496)	(0.536)	(0.576)			
	$x_B$		(0.104)	(0.144)	(0.184)			
	$y_B$		(0.089)	(0.129)	(0.169)			
Image sticking		tis	2 hours			2	Sec	Note 8

The following optical specifications shall be measured in a darkroom or equivalent state (ambient luminance  $\leq$ 1 lux, and at room temperature). The operation temperature is 25°C $\pm$ 2°C. The measurement method is shown in Note1.

Note1: The method of optical measurement:

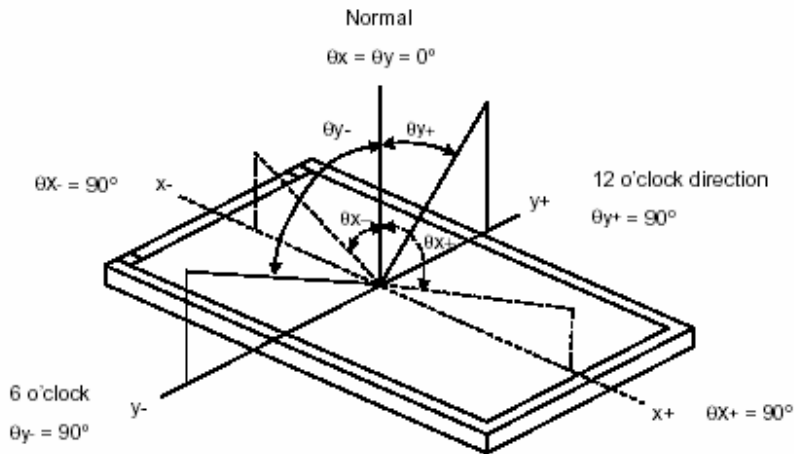


Note2: Measured at the center area of the panel and at the viewing angle of the  $\theta_x = \theta_y = 0^\circ$

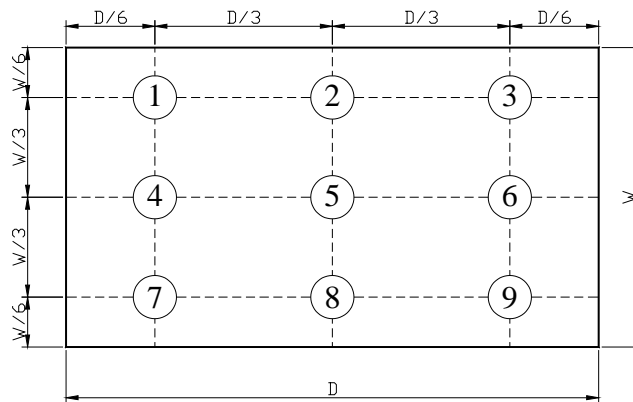
Note3: Definition of Contrast Ratio (CR):

$$CR = \frac{\text{Luminance with all pixels in white state}}{\text{Luminance with all pixels in Black state}}$$

Note4: Definition of Viewing Angle



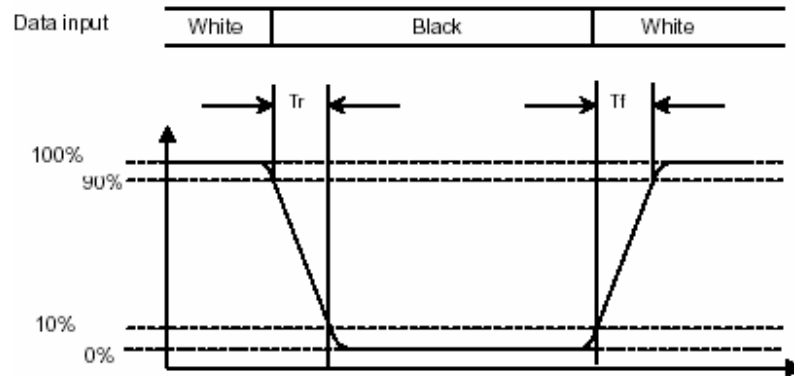
Note 5: Definition of Brightness Uniformity (B-uni):



$$B\text{-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9 points}} \quad (\text{Note 5}).$$

Note6: Definition of Response Time:

The Response Time is set initially by defining the "Rising Time ( $T_r$ )" and the "Falling Time ( $T_f$ )" respectively.  $T_r$  and  $T_f$  are defined as following figure.



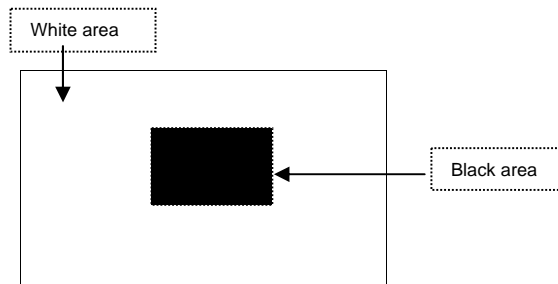
Note 7: Definition of Chromaticity:

The color coordinates  $(x_w, y_w)$ ,  $(x_r, y_r)$ ,  $(x_g, y_g)$ , and  $(x_b, y_b)$  are obtained with all pixels in the viewing field at white, red, green, and blue states, respectively.

Note 8: Definition of Image sticking (tis):

Continuously display the test pattern shown in the figure below for 2 hours. Then display a completely white screen. The previous image shall not persist more than 2 sec at 25 °C

**Image sticking pattern**



## 9. PIN CONNECTIONS

### 9.1 LCM Pin Connections

Pin NO.	SYMBOL	DESCRIPTION
1	V <sub>ss</sub>	Power Ground
2	V <sub>ss</sub>	Power Ground
3	ADJ	Brightness control for LED B/L
4	VDD	Power Supply for LED Driver circuit
5	VDD	Power Supply for LED Driver circuit
6	VDD	Power Supply for LED Driver circuit
7	V <sub>cc</sub>	Power Supply for Digital Circuit
8	V <sub>cc</sub>	Power Supply for Digital Circuit
9	DE	Data Enable
10	V <sub>ss</sub>	Power Ground
11	V <sub>ss</sub>	Power Ground
12	V <sub>ss</sub>	Power Ground
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	V <sub>ss</sub>	Power Ground
17	B2	Blue Data 2
18	B1	Blue Data 1
19	B0	Blue Data 0 (LSB)
20	V <sub>ss</sub>	Power Ground
21	G5	Green Data 5 (MSB)
22	G4	Green Data 4
23	G3	Green Data 3
24	V <sub>ss</sub>	Power Ground
25	G2	Green Data 2
26	G1	Green Data 1
27	G0	Green Data 0 (LSB)
28	V <sub>ss</sub>	Power Ground
29	R5	Red Data 5 (MSB)
30	R4	Red Data 4
31	R3	Red Data 3
32	V <sub>ss</sub>	Power Ground
33	R2	Red Data 2
34	R1	Red Data 1
35	R0	Red Data 0
36	V <sub>ss</sub>	Power Ground
37	V <sub>ss</sub>	Power Ground
38	DCLK	Clock Signals ; Latch Data at the Falling Edge
39	V <sub>ss</sub>	Power Ground
40	V <sub>ss</sub>	Power Ground

Remarks :

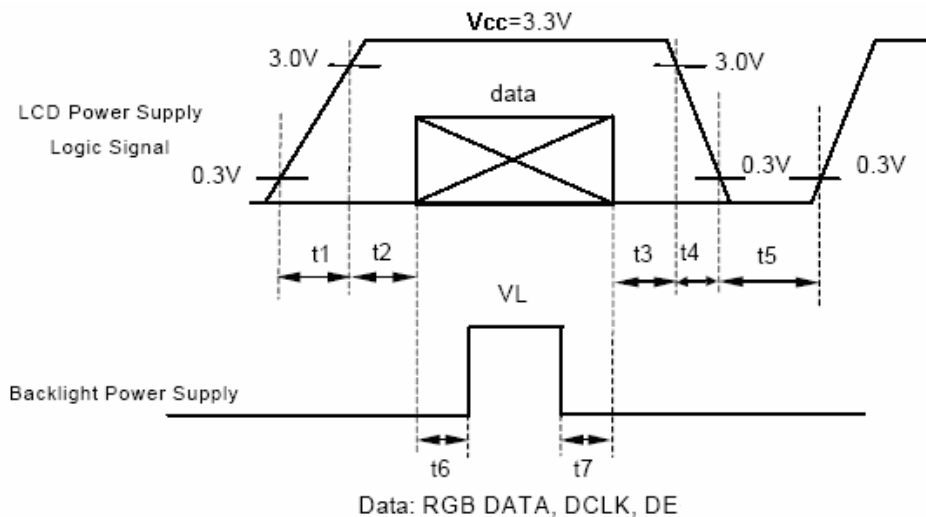
- 1) ADJ is brightness control Pin. The larger of the pulse duty is, the higher of the brightness.
- 2) ADJ signal is 0~3.3V. Operation frequency is 20KHz
- 3) VSS PIN must be grounding, can not be floating.

## 9.2 CTP Pin Connections

No.	Name	I/O	Description
1	VDD	-	Power; VDD=3.3V(typ.)
2	GND	-	Ground
3	RST	-	NC pin; please keep floating
4	SCL	I	Clock; 100KHz
5	SDA	I/O	Serial data access
6	INT	O	Active low when data output from touch panel
7	None		keep floating
8	None		keep floating

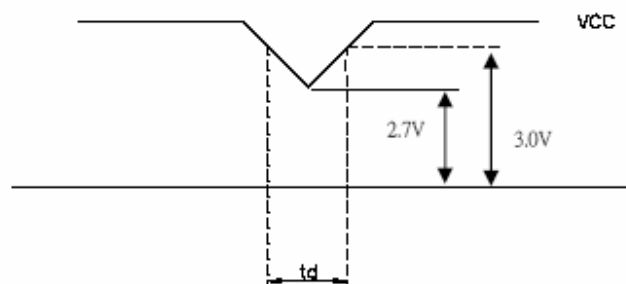
## Remarks:

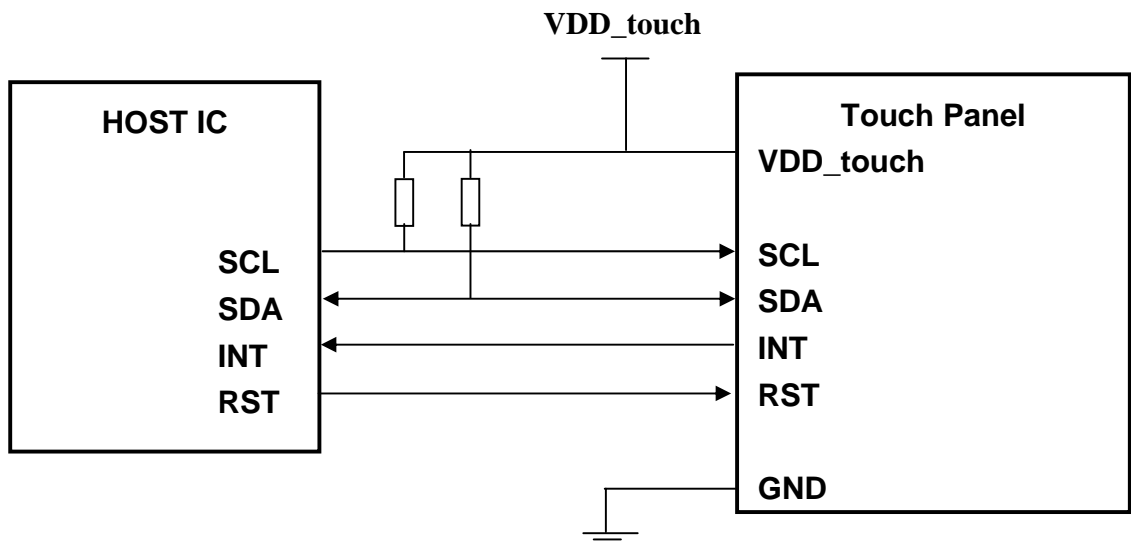
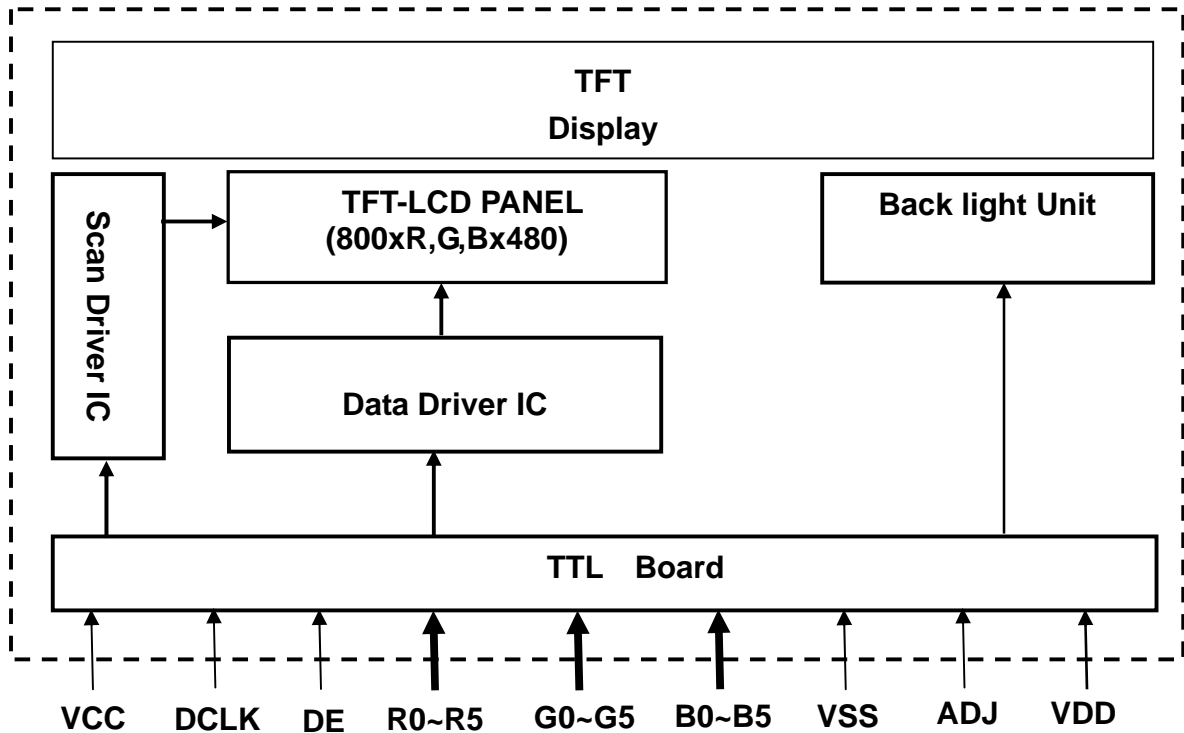
Power Signal sequence:

 $t1 \leq 10\text{ms}$  ;  $1 \text{ sec} \leq t5$ 
 $50\text{ms} \leq t2$  ;  $200\text{ms} \leq t6$ 
 $0 < t3 \leq 50\text{ms}$  ;  $200\text{ms} \leq t7$ 
 $0 < t4 \leq 10\text{ms}$ 


## VCC-dip condition:

 (1)  $2.7 \text{ V} \leq VCC < 3.0\text{V}$ ,  $t_d \leq 10 \text{ ms}$ 

 (2)  $VCC > 3.0\text{V}$ , VCC-dip condition should be the same with VCC-turn-on condition.


**10. BLOCK DIAGRAM**


NOTE : 1. USE APPROPRIATE RESISTOR VALUE DURING HIGH SPEED SCL CLOCK.

SUGGESTION : RESISTOR RECOMMENDATION : 1K ohm.

2. To reduce the noise from the power, we suggest you use the independent power for the touch panel (VDD\_touch)



## 11. QUALITY ASSURANCE

### 11.1 Test Condition

#### 11.1.1 Temperature and Humidity(Ambient Temperature)

Temperature :  $25 \pm 5^{\circ}\text{C}$

Humidity :  $65 \pm 5\%$

#### 11.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

#### 11.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

#### 11.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

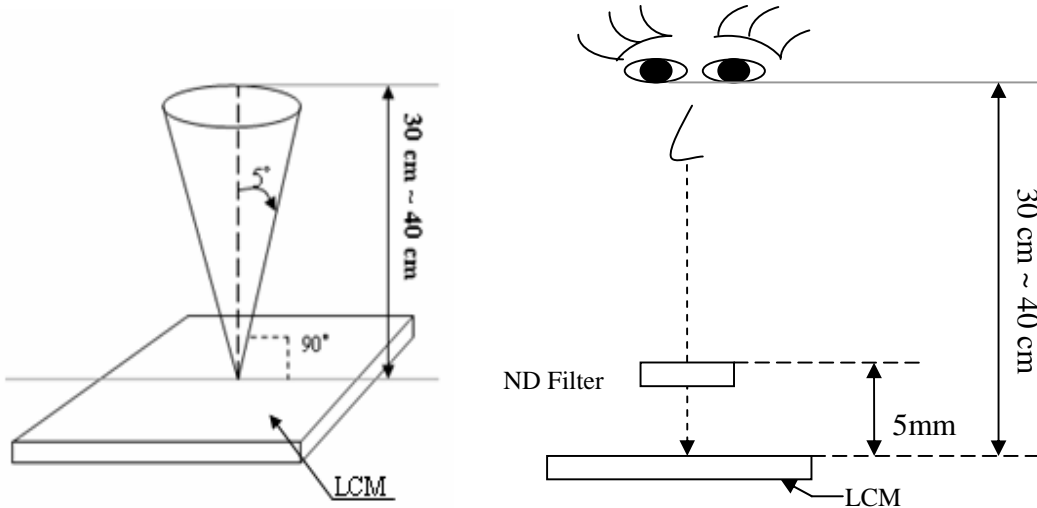
#### 11.1.5 Test Method

Reliability Test Item & Level		Test Level
No.	Test Item	
1.	High Temperature Storage Test	T= 70 ,120hrs after 1 hrs at room temperature and test.
2.	Low Temperature Storage Test	T= -30 ,120hrs after 1 hrs at room temperature and test.
3.	High Temperature Operation Test	T= 60 , 120hrs after 1 hrs at room temperature and test.
4.	Low Temperature Operation Test	T= -20 , 120hrs after 1 hrs at room temperature and test.
5.	High Temperature and High Humidity Operation Test	T= 40 ,80%RH,120hrs after 24 hrs at room temperature and test.
6.	Thermal Cycling Test (No operation)	-20 °C 30min ~ 60 °C 30 min , 10 Cycles after 24 hrs at room temperature and test.
7.	Surface Hardness	Pencil Hardness 7H
8.	Vibration Test (No operation)	Frequency :10 ~ 55 Hz Amplitude :1.5 mm Sweep time : 11 mins Test Period: 6 Cycles for each direction of X, Y, Z
9.	ESD TEST	Air Discharge : $\pm 15$ KV charge & discharge Contact Discharge : $\pm 2$ KV charge & discharge

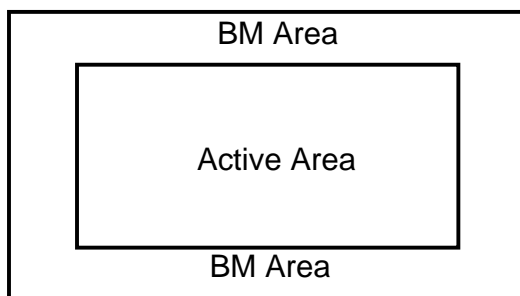
## 12. Appearance Specification

### 12.1 Inspection and Environment conditions


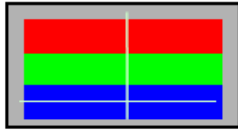

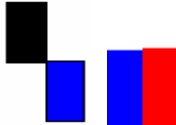
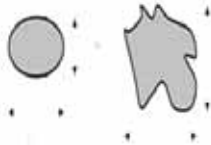
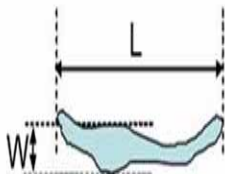
- 12.1.1 Temperature:  $25 \pm 5$
- 12.1.2 Humidity:  $55 \pm 10\%$  RH
- 12.1.3 Light source: Fluorescent Light
- 12.1.4 Inspection: Viewing distance:  $35 \pm 5$ cm
- 12.1.5 Ambient Illumination:
  - (1) Cosmetic Inspection: 500 ~ 800 lux
  - (2) Functional Inspection: 400 ~ 600 lux
- 12.1.6 Inspection View angle:
  - (1) Inspection under operating condition :  $\pm 5^\circ$
  - (2) Inspection under non-operating condition :  $\pm 45^\circ$

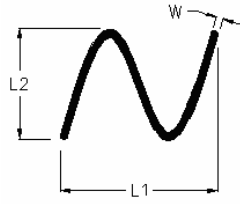
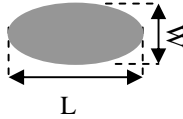
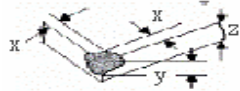
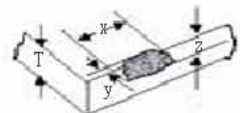



### 12.2 Definition of applicable Zones



### 12.3 Cosmetic Specification and Inspection Items

Inspection Item	Inspection Criteria	Illustration													
Display function	No Display malfunction														
Contrast ratio	Does not meet specified range in the spec.	(Major) (Note:2)													
Line Defect	No obvious Vertical and Horizontal line defect in black and White.														
Point Defect	<table border="1"> <thead> <tr> <th rowspan="2">Item</th> <th>Acceptable number</th> <th rowspan="2">Total</th> </tr> <tr> <th>Active Area</th> </tr> </thead> <tbody> <tr> <td>Bright</td> <td>2</td> <td rowspan="2">5</td> </tr> <tr> <td>Dark</td> <td>4</td> </tr> <tr> <td>Two adjacent dot</td> <td>2</td> <td>2</td> </tr> </tbody> </table>	Item	Acceptable number	Total	Active Area	Bright	2	5	Dark	4	Two adjacent dot	2	2	<p>One Dot</p>  <p>Two adjacent dot</p> 	
Item	Acceptable number		Total												
	Active Area														
Bright	2	5													
Dark	4														
Two adjacent dot	2	2													
Foreign material (Black or White spots shape)	<table border="1"> <thead> <tr> <th>Zone</th> <th>Acceptable number</th> <th>Class of Defects</th> </tr> </thead> <tbody> <tr> <td>Dimension</td> <td></td> <td></td> </tr> <tr> <td>D &gt; 0.8 mm</td> <td>0</td> <td rowspan="3">Minor</td> </tr> <tr> <td>0.3mm D 0.8 mm</td> <td>5</td> </tr> <tr> <td>D &lt; 0.3mm</td> <td>*</td> </tr> </tbody> </table>	Zone	Acceptable number	Class of Defects	Dimension			D > 0.8 mm	0	Minor	0.3mm D 0.8 mm	5	D < 0.3mm	*	 <p><math>D = (L + W) / 2</math></p>
Zone	Acceptable number	Class of Defects													
Dimension															
D > 0.8 mm	0	Minor													
0.3mm D 0.8 mm	5														
D < 0.3mm	*														
Foreign Material ( Line shape)	<table border="1"> <thead> <tr> <th>Zone</th> <th>Acceptable number</th> <th>Class of Defects</th> </tr> </thead> <tbody> <tr> <td>Dimension</td> <td></td> <td></td> </tr> <tr> <td>W &gt; 0.1mm or L &gt; 10mm</td> <td>0</td> <td rowspan="3">Minor</td> </tr> <tr> <td>0.05 mm W 0.1 mm L 10mm</td> <td>5</td> </tr> <tr> <td>W &lt; 0.05mm</td> <td>*</td> </tr> </tbody> </table>	Zone	Acceptable number	Class of Defects	Dimension			W > 0.1mm or L > 10mm	0	Minor	0.05 mm W 0.1 mm L 10mm	5	W < 0.05mm	*	 <p>L : Long W : Width</p>
Zone	Acceptable number	Class of Defects													
Dimension															
W > 0.1mm or L > 10mm	0	Minor													
0.05 mm W 0.1 mm L 10mm	5														
W < 0.05mm	*														
Non-uniformity	Visible through 5 %ND filter White, R, G, B and gray 50% pattern.	(Minor)													
Dimension	Outline	(Major)													
Bezel appearance	uneven	(Minor)													

Scratch on the Touch panel	<table border="1"> <tr> <th>Zone</th> <th>Acceptable number</th> <th>Class of Defects</th> </tr> <tr> <td>Dimension</td> <td></td> <td></td> </tr> <tr> <td><math>W &gt; 0.1\text{mm}</math> or <math>L &gt; 10\text{mm}</math></td> <td>0</td> <td rowspan="2">Minor</td> </tr> <tr> <td><math>W \leq 0.1\text{mm}</math> <math>L \leq 10\text{mm}</math></td> <td>5</td> </tr> </table>	Zone	Acceptable number	Class of Defects	Dimension			$W > 0.1\text{mm}$ or $L > 10\text{mm}$	0	Minor	$W \leq 0.1\text{mm}$ $L \leq 10\text{mm}$	5	
	Zone	Acceptable number	Class of Defects										
	Dimension												
$W > 0.1\text{mm}$ or $L > 10\text{mm}$	0	Minor											
$W \leq 0.1\text{mm}$ $L \leq 10\text{mm}$	5												
<table border="1"> <tr> <th>Zone</th> <th>Acceptable number</th> <th>Class of Defects</th> </tr> <tr> <td>Dimension</td> <td></td> <td></td> </tr> <tr> <td><math>D &gt; 0.5\text{mm}</math></td> <td>0</td> <td rowspan="2">Minor</td> </tr> <tr> <td><math>0.3\text{mm} &lt; D \leq 0.5\text{mm}</math></td> <td>5</td> </tr> </table>	Zone	Acceptable number	Class of Defects	Dimension			$D > 0.5\text{mm}$	0	Minor	$0.3\text{mm} < D \leq 0.5\text{mm}$	5	 <p><math>D = (L + W) / 2</math></p>	
Zone	Acceptable number	Class of Defects											
Dimension													
$D > 0.5\text{mm}$	0	Minor											
$0.3\text{mm} < D \leq 0.5\text{mm}$	5												
Polarizer flaw or leak out resin	Defect is defined as the active area.												
Corner Chipping	$X < 3\text{mm}$ , $Y < 3\text{mm}$ , $Z < \text{Glass thickness}$												
Edge Chipping	$X < 3\text{mm}$ , $Y < 3\text{mm}$ , $Z < \text{Glass thickness}$												
Crack	reject												
													

### 12.4 Sampling Condition

Unless otherwise agree in written, the sampling inspection shall be applied to the incoming inspection of customer.

Lot size: Quantity of shipment lot per model.

Sampling type: normal inspection, single sampling

Sampling table: MIL-STD-105E

Inspection level: Level II

Class of defects	Definition		
	Major	AQL 0.65%	It is a defect that is likely to result in failure or to reduce materially the usability of the product for the intended function.
Minor	AQL 1.5%	It is a defect that will not result in functioning problem with deviation classified.	

Note:1.(a)Bright point defect is defined as point defect of R,G,B with area  $> 1/2$  pixel respectively

(b)Dark point defect is defined as visible in full white pattern.

(c)Definition of distribution of point defect is as follows:

-minumum separation between dark point defects should be larger than 5mm.

-minimum separation between bright point defects should be larger than 5mm.

(d) Definition of joined bright point defect and joined dark point defect are as follows:

- Three or more joined bright point defects must be nil.

- Three joined dark point defects must be nil.

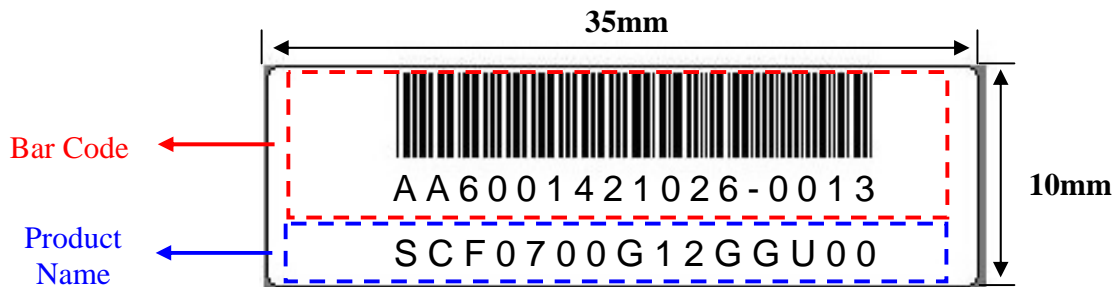
- Two Joined dark point is counted as two dark points with 2 pair maximum.

(e) Line defect is defined as visible by using 5 % ND filter.

Note:2 Luminance measurement for contrast ratio is at the distance  $50 \pm 5$  cm between the detective head and the panel with ambient illuminance less than 1 lux. Contrast ratio is obtained at optimum view angle

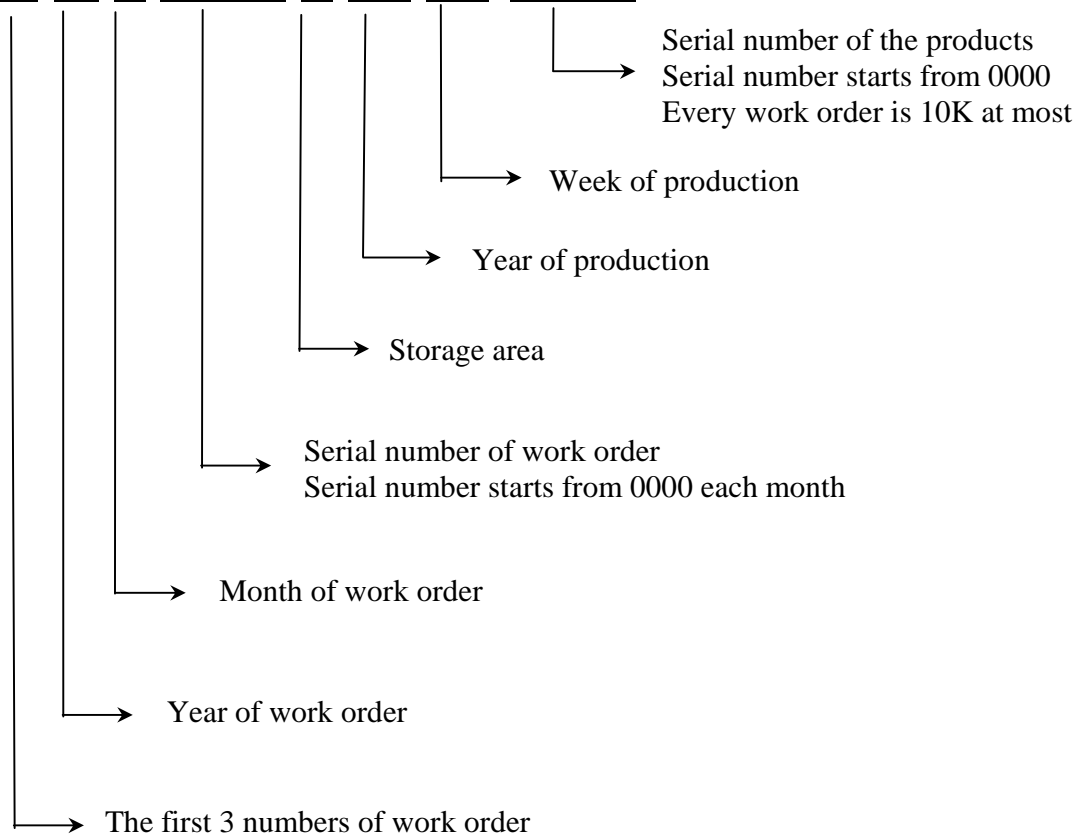
### 13. CTP LCM PRODUCT LABEL DEFINE

#### CTP LCM Product Label style:

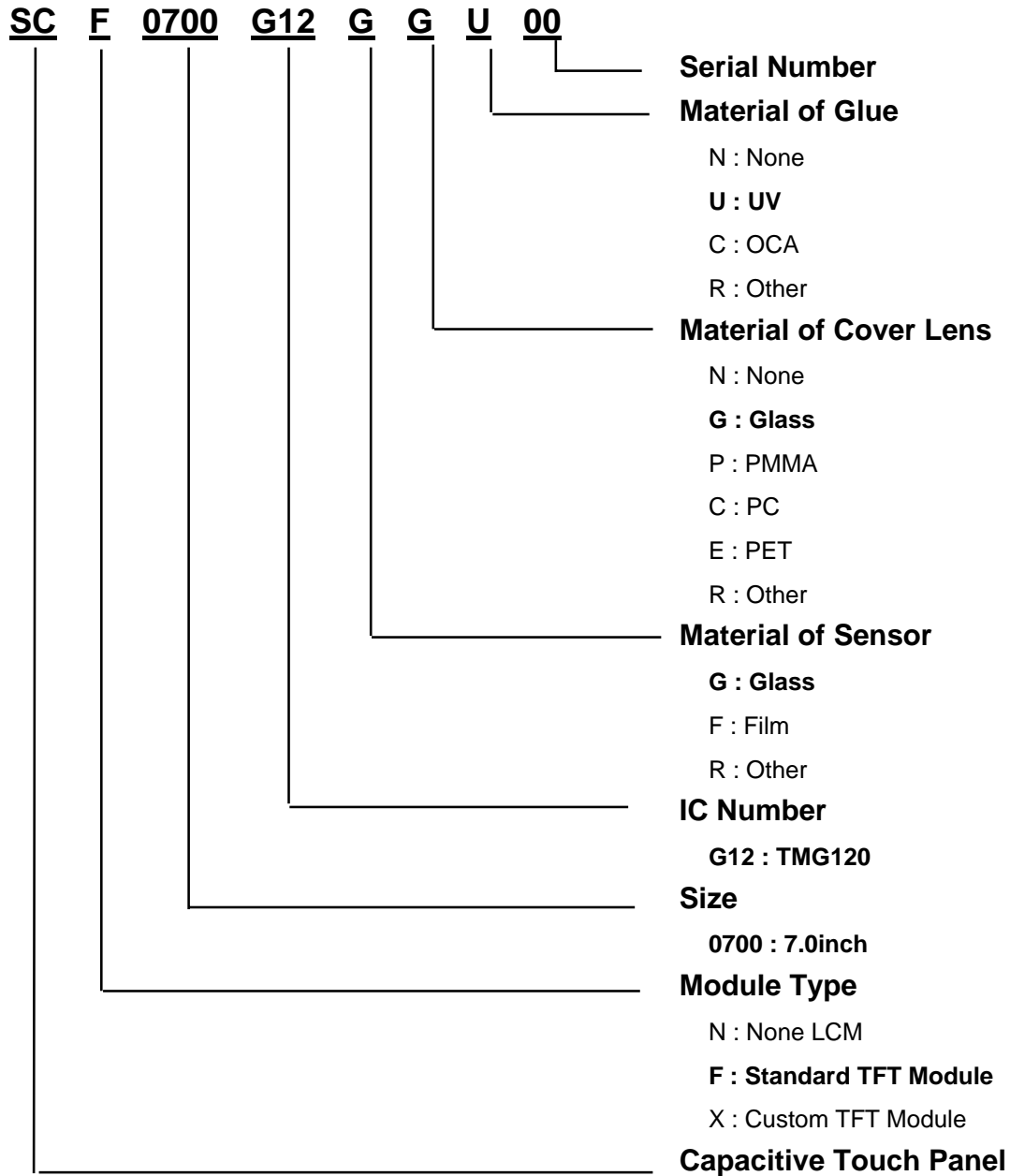


#### BarCode Define:

**A A 6 0014 2 10 26-0013**



**Product Name Define:**



## 14. PRECAUTIONS IN USE LCM

### 1. ASSEMBLY PRECAUTIONS

- (1) You must mount a module using holes arranged in four corners or four sides.
- (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.
- (4) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (5) Do not open the case because inside circuits do not have sufficient strength.
- (6) Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.
- (7) Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.
- (8) Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.
- (9) Please excessive force or strain to the panel or tail is prohibited.
- (10) Use clean sacks or glove to prevent fingerprints and/or stains left on the panel. Extra attention and carefulness should be taken while handling the glass edge.
- (11) Avoid touching the viewing area before installation /integration.

### 2. OPERATING PRECAUTIONS

- (1) Please be sure to turn off the power supply before connecting and disconnecting signal input cable.
- (2) Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification
- (3) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (4) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (5) 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.
- (6) Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.
- (7) Touch the panel with your finger or stylus only to assure normal operation. Any sharp edged or hard objects are prohibited.
- (8) Operate the panel in a steady environment. Abrupt variation on temperature and humidity may cause malfunction of the panel.

### 3. ELECTROSTATIC DISCHARGE CONTROL

- (1) The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any parts of the human body.

- (2) The modules should be kept in antistatic bags or other containers resistant to static for storage.
- (3) Only properly grounded soldering irons should be used.
- (4) If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.
- (5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended
- (6) Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

### 4. STORAGE PRECAUTIONS

- (1) When you store LCDs and touch panel for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.
- (2) Please do not leave the LCDs and touch panel in the environment of high humidity and high temperature such as 60°C 90%RH
- (3) Please do not leave the LCDs and touch panel in the environment of low temperature; below -20°C.

### 5. OTHERS

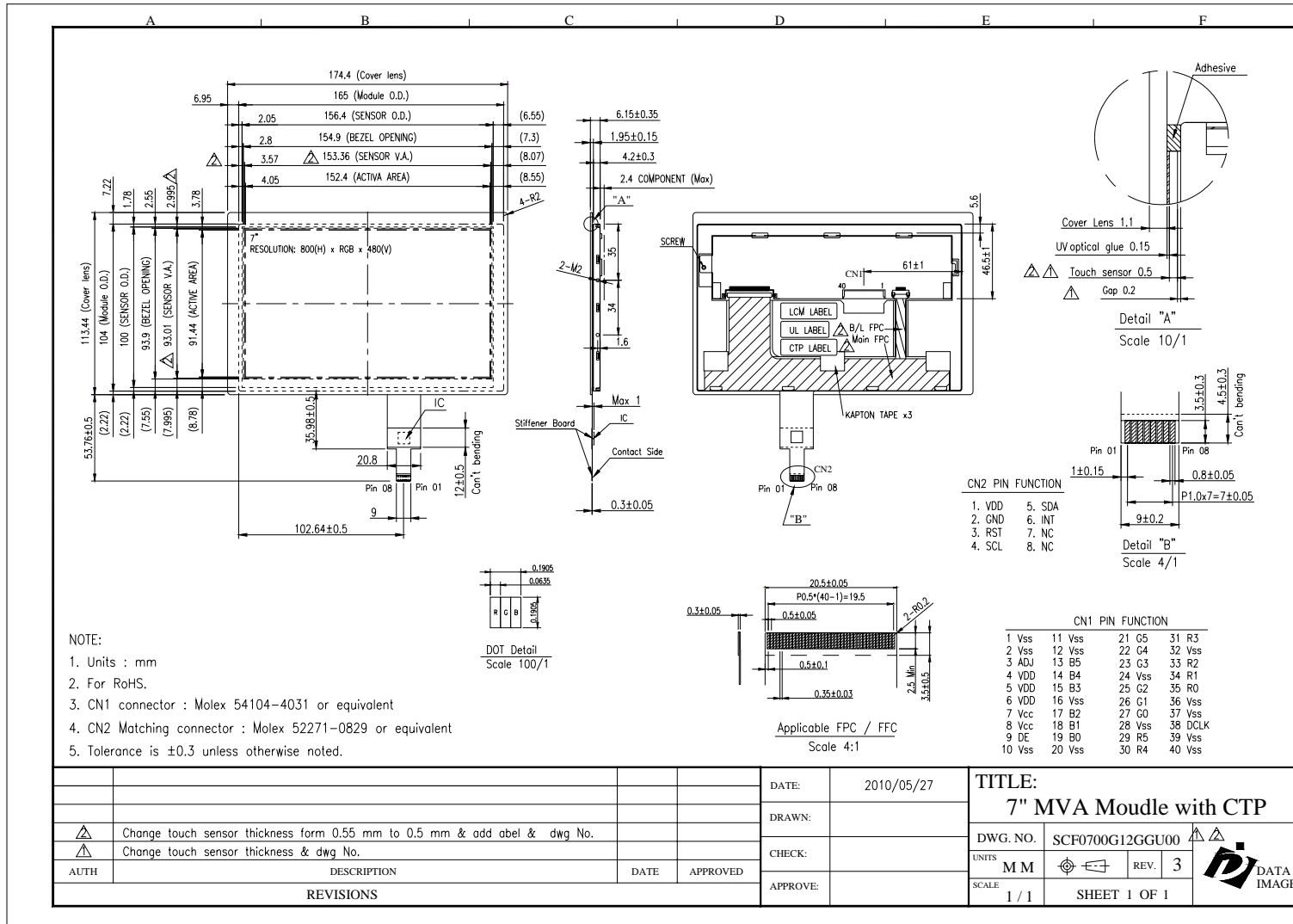
- (1) A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight and strong UV rays
- (2) Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.
- (3) For the packaging box, please pay attention to the followings:
  - a. Please do not pile them up more than 5 boxes. (They are not designed so.) And please do not turn over.
  - b. Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.
  - c. Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

### 6. LIMITED WARRANTY

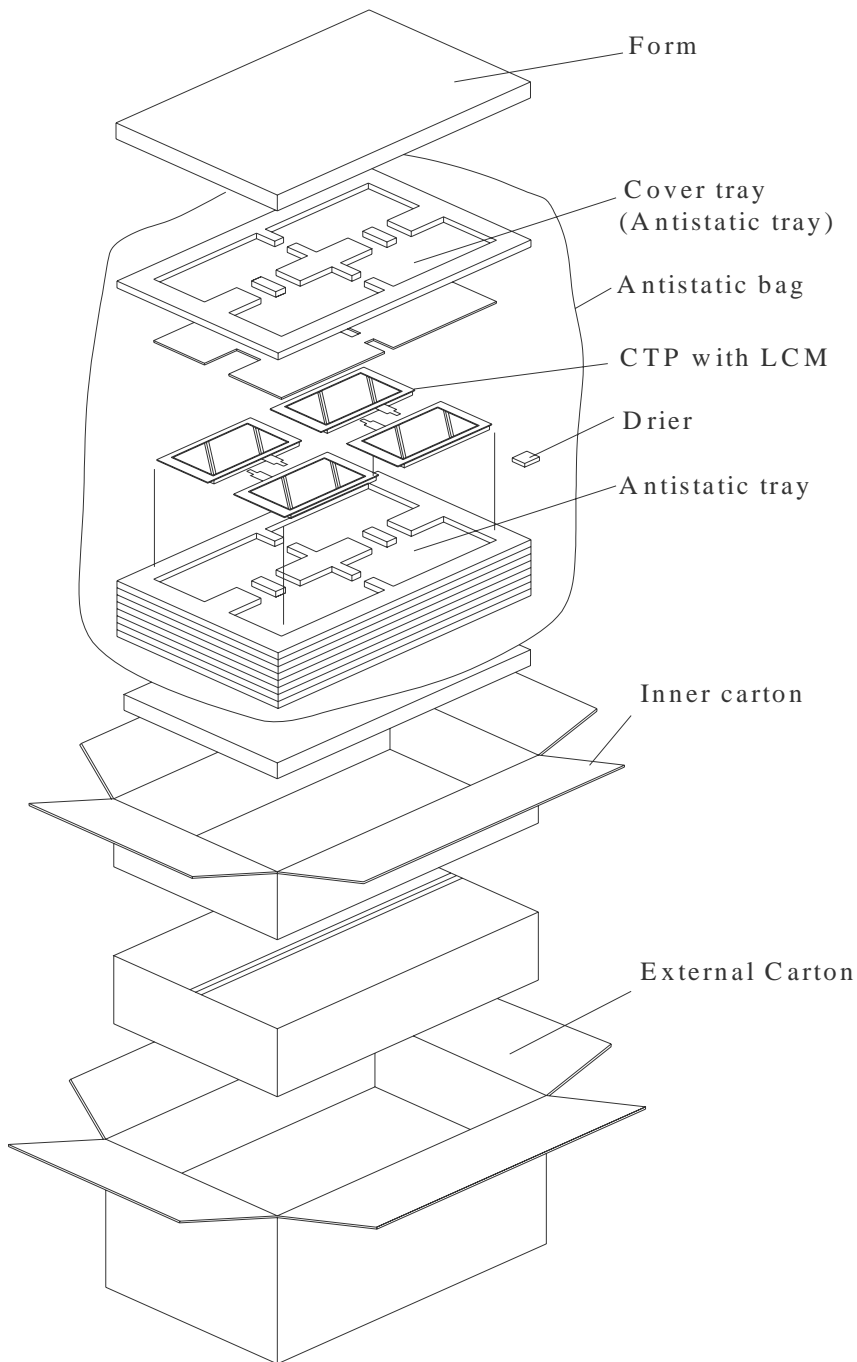
Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.



Confidential Document  
**15. OUTLINE DRAWING**



## 16.PACKAGE INFORMATION



1 Antistatic tray = 4 pcs

1 Inner Carton = 4 x 8 = 32 pcs

1 External Carton = 2 x Inner carton = 2 x 32 = 64 pcs

Carton size : 465L x 380W x 390H (mm)

Total Weight  $\approx$  18.3 kgw