TFT-Display Datenblatt

Modell   FG0700K5DSSWBGT5

Kurzdaten

Hersteller	Data Image
Diagonale	7,0" / 17,8 cm
Format	wide
Auflösung	800 x 480
Backlight	LED / 265 cd/m²
Interface	RGB
Touchscreen	resistive
Temperatur	-20… +70°C (Betrieb)

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DATA IMAGE   CORPORATION

TFT Module Specification
Preliminary
ITEM NO.:   FG0700K5DSSWBGT5

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2. RECORD OF REVISION

Rev	Date	Item	Page	Comment
1	05/JUL/13'			Initial Preliminary
2	13/AUG/13'	15	18	Modify touch panel tail length 199.5mm into 195mm.

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	165(W) x 104.44(H) x 11.26 Max (D)	mm
Surface treatment	Anti-glare	
Back-light	LED	
Display mode	Normally white	
Weight	TBD	g
View Angle direction	6 o'clock	

5. ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	MIN.	MAX.	Unit	Remark
Power supply voltage		V_{CC}, V_{DD}	-0.3	6.0	V	Ta=25°C
Logic input voltage		VI	-0.3	V_{CC}+0.3	V	
Operating temperature		Top	-20	70	°C	Module surface*
Storage temperature		Tst	-30	85	°C	-
Humidity	Operation		20%~90% relative humidity			Ta<=38°C
	Non Operation		5%~90% relative humidity			Ta<=38°C

6. ELECTRICAL CHARACTERISTICS

fH=30KHz, fv=60Hz, fCLK=33.26MHz,Ta=25°C

Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Remark
Power Supply voltage for LCD	V_{CC}	3.0	3.3	3.6	V	
Power Supply Current for LCD	I_{CC}		150	200	mA	V_{CC} =3.3V
Power Supply voltage for LED	V_{DD}	3.0	3.3	5.5	V	
Power Supply Current for LED	I_{DD}	--	650	850	mA	V_{DD} =3.3V
		--	400	550	mA	V_{DD} =5.0V
"H" level logical input voltage	V_{IH}	0.7Vcc	--	Vcc	V	
"L" level logical input voltage	V_{IL}	0	--	0.3Vcc	V	
ADJ frequency		19K	20K	21K	Hz	
ADJ input voltage	VIH	3.0	-	3.3	V	
	VIL	0	-	0.3	V	
LED dice life time			30,000		Hr	Note 1,2

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

Note2: The LED Dice's Ambient Temp. vs. Allowable Forward Current Curve.
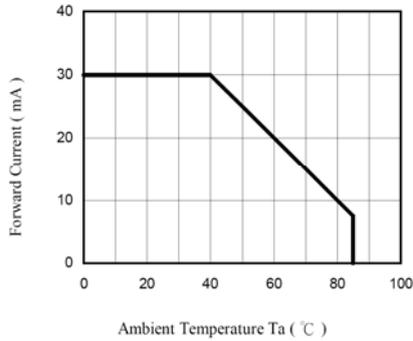
7. INPUT SIGNAL CHARACTERISTICS
7.1 AC Characteristics
7.1.1 AC Electrical Characteristics

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Data setup time	T_{dsu}	6	-	-	ns
Data hold time	T_{dhd}	6	-	-	ns
DE setup time	T_{esu}	6	-	-	ns

7.1.2 Resolution：800x480

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
DCLK frequency	F_{CPH}	-	33.26	-	MHz
DCLK period	T_{CPH}	-	30.06	-	ns
DCLK pulse duty	T_{CWH}	40	50	60	%
DE period	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}
DE pulse width	T_{DEH}	-	800	-	T_{CPH}
DE frame blanking	T_{DEB}	10	45	110	$T_{DEH}+T_{DEL}$
DE frame width	T_{DE}	-	480	-	$T_{DEH}+T_{DEL}$

7.2 Timing Controller Timing Chart
7.2.1 Clock and Data input waveforms
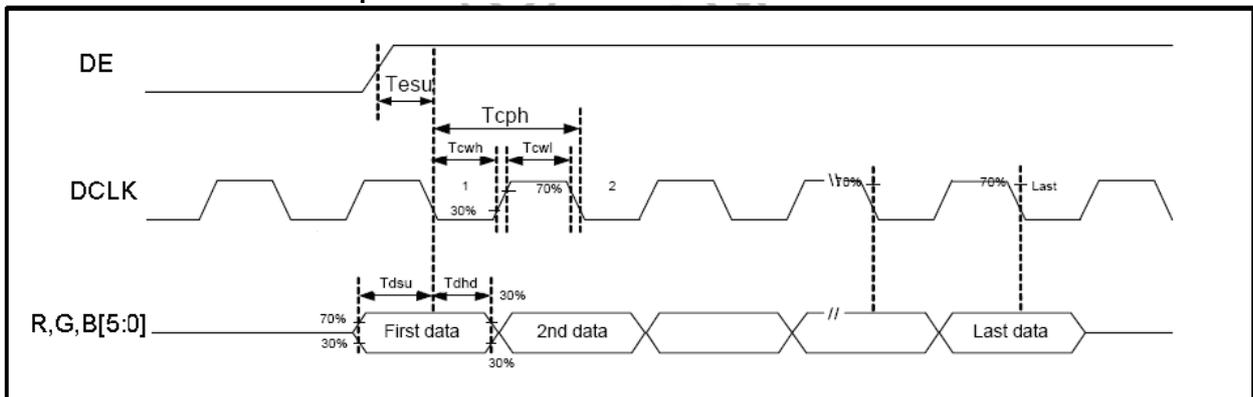
Figure 1 Clock and Data input waveforms.

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DATA
IMAGE

1 Period (1 Frame)

T_{DE}

T_{DEB}

DCLK

DE

R,G,B[5:0]

1 Horizontal Period

T_{DEH}

T_{DEL}

DCLK

DE

R,G,B[5:0]

| 1 | 2 | 3 | | N-2 | N-1 | N | | 1 |

Valid Data transfer area T_{DH}
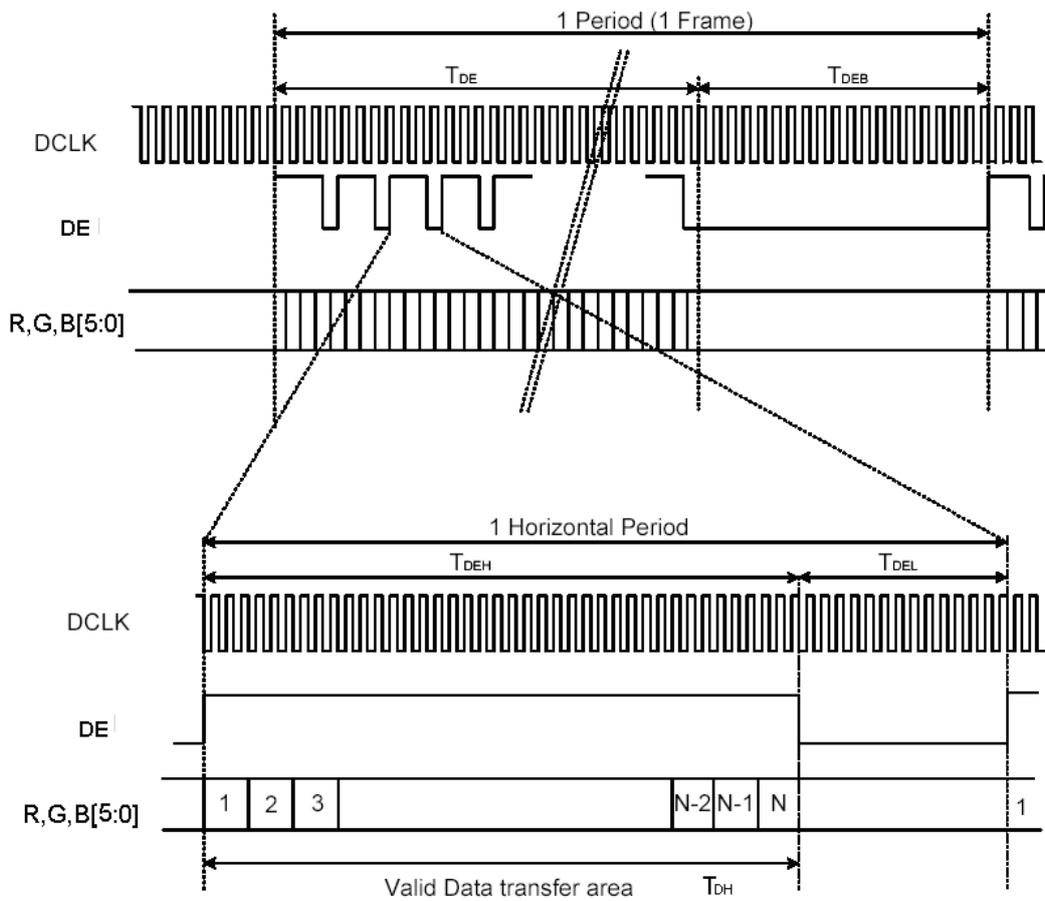
7.3 Color Data Input Assignment

Color		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
		Data Signal																	
		Red						Green						Blue					
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

	S0001	S0002	S0003	S0004	S0005	S0006	S0007	S0008	- - - - - - - - - -	S2399	S2400
C001	R001	G001	B001	R002	G002	B002	R003	G003		G800	B800
:											
C480	R001	G001	B001	R002	G002	B002	R003	G003		G800	B800

8. OPTICAL CHARACTERISTIC

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ_x+	Center CR$\geq$10	65	70	--	deg	Note 1,4
		θ_x-		65	70	--		
	Vertical	θ_Y+		55	60	--		
		θ_Y-		55	60	--		
Contrast Ratio		CR	at optimized viewing angle	250	400	--		Note 1,3
Response time	Rise	Tr	Center	-	5	10	ms	Note 1,6
	Fall	Tf	$\theta x=\theta y =0°$	-	11	16	ms	
Uniformity		B-uni	$\theta x=\theta y =0°$	70	80	--	%	Note1,5
Brightness		L	$\theta x=\theta y =0°$	210	265	--	cd/㎡	Note 1,2
Chromaticity		x_W	Center $\theta x=\theta y =0°$	0.26	0.31	0.36		Note 1,7
		y_W		0.28	0.33	0.38		
		x_R		0.52	0.57	0.62		
		y_R		0.31	0.36	0.41		
		x_G		0.30	0.35	0.40		
		y_G		0.53	0.58	0.63		
		x_B		0.10	0.15	0.20		
		y_B		0.09	0.14	0.19		
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 and LED Backlight Current IL=160mA. The measurement method is shown in Note1.

Note1: The method of optical measurement:
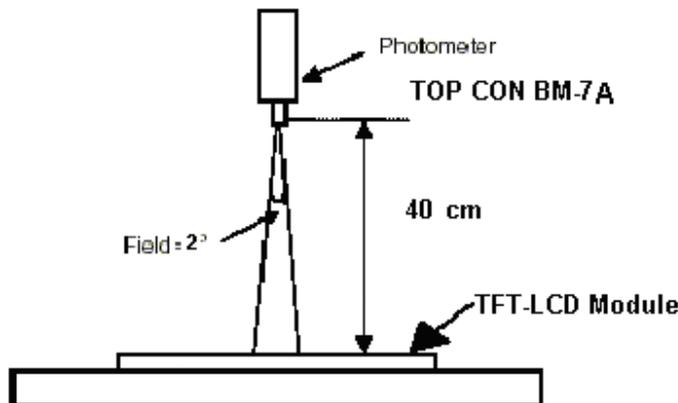
Note2: Measured at the center area of the panel and at the viewing angle of the $\theta x = \theta y = 0°$
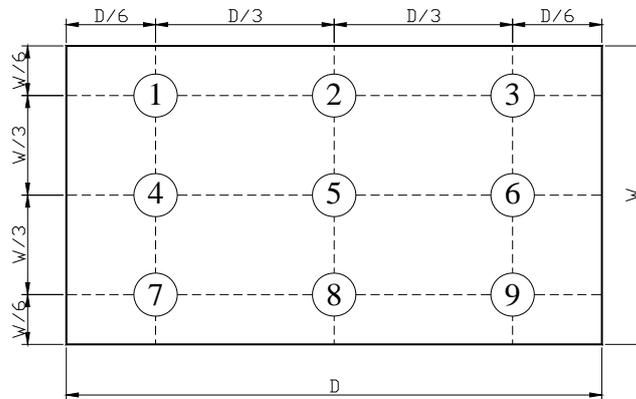
Note3: Definition of Contrast Ratio (CR):

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

Note4: Definition of Viewing Angle

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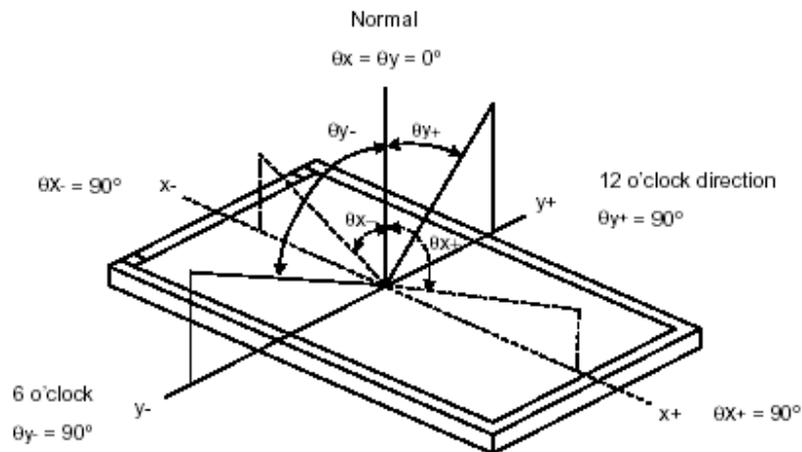
Note 5: Definition of Brightness Uniformity (B-uni):

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

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Note6: Definition of Response Time:

The Response Time is set initially by defining the "Rising Time (Tr)" and the "Falling Time (Tf)" respectively. Tr and Tf are defined as following figure.
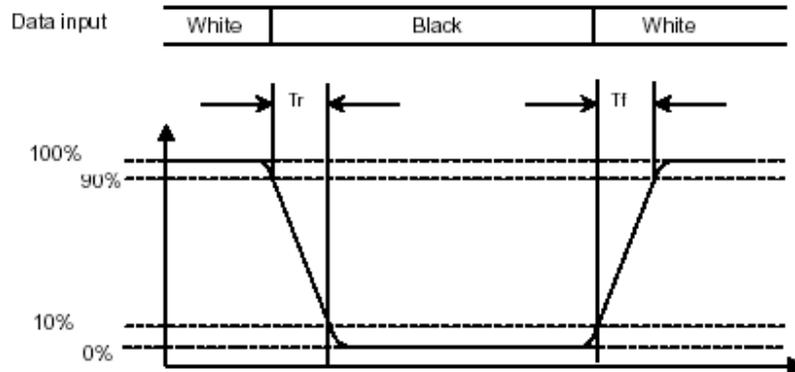
Note 7: Definition of Chromaticity:

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

FG0700K5DSSWBGT5   REV:2
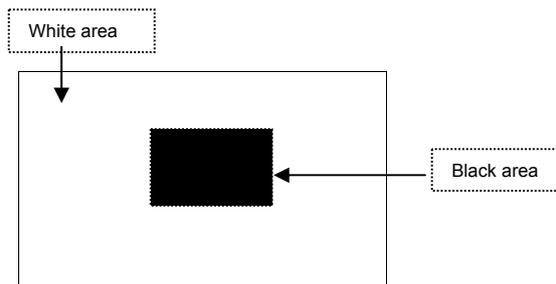
9. PIN CONNECTIONS

| Pin NO.	SYMBOL	DESCRIPTION
1	Vss	Power Ground
2	Vss	Power Ground
3	ADJ	Brightness control for LED B/L
4	VDD	Power Supply for LED Driver
5	VDD	Power Supply for LED Driver
6	VDD	Power Supply for LED Driver
7	Vcc	Power Supply for Digital Circuit
8	Vcc	Power Supply for Digital Circuit
9	DE	Data Enable
10	Vss	Power Ground
11	Vss	Power Ground
12	Vss	Power Ground
13	B5	Blue Data 5 (MSB)
14	B4	Blue Data 4
15	B3	Blue Data 3
16	Vss	Power Ground
17	B2	Blue Data 2
18	B1	Blue Data 1
19	B0	Blue Data 0 (LSB)
20	Vss	Power Ground
21	G5	Green Data 5 (MSB)
22	G4	Green Data 4
23	G3	Green Data 3
24	Vss	Power Ground
25	G2	Green Data 2
26	G1	Green Data 1
27	G0	Green Data 0 (LSB)
28	Vss	Power Ground
29	R5	Red Data 5 (MSB)
30	R4	Red Data 4
31	R3	Red Data 3
32	Vss	Power Ground
33	R2	Red Data 2
34	R1	Red Data 1
35	R0	Red Data 0
36	Vss	Power Ground
37	Vss	Power Ground
38	DCLK	Clock Signals ; Latch Data at the Falling Edge
39	Vss	Power Ground
40	Vss	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
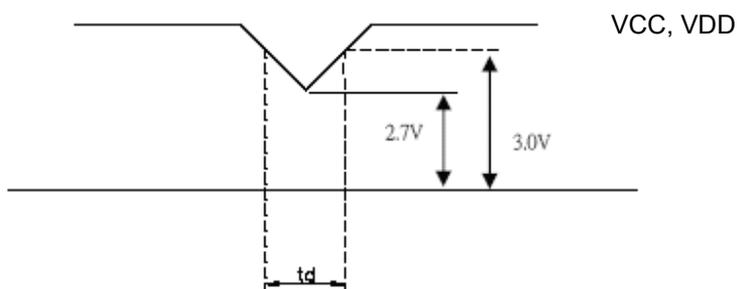3) VSS PIN must be grounding, can not be floating.

Remarks:

Power Signal sequence**:**

t1 $\leq$ 10ms   **;** 1 sec $\leq$ t5

50ms $\leq$ t2   **;** 200ms $\leq$ t6

0< t3 $\leq$ 50ms **;** 200ms $\leq$ t7

0< t4 $\leq$10ms

Data: RGB DATA, DCLK, DE
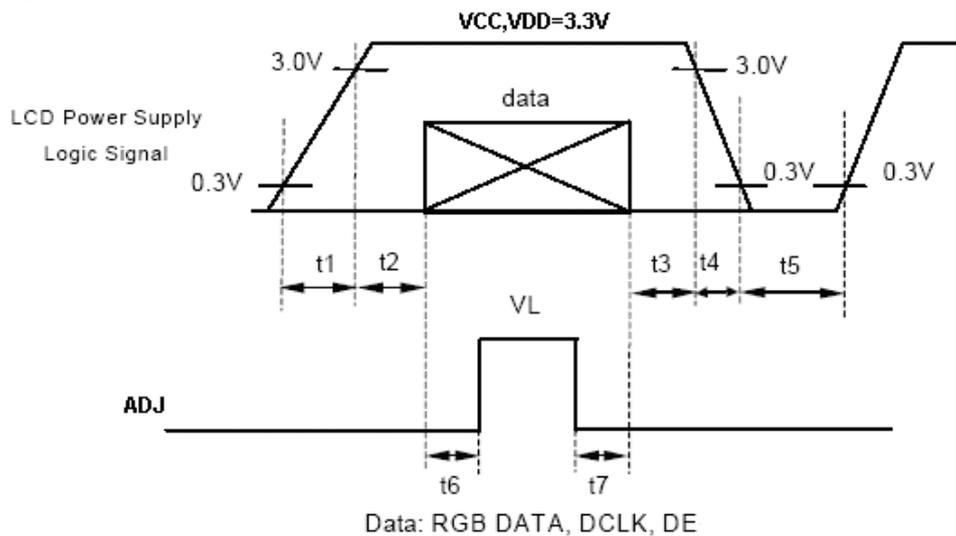
VCC, VDD -dip condition**:**

(1) 2.7V $\leq$ VCC, VDD $\leq$ 3.0V: td $\leq$ 10ms

(2) VCC, VDD > 3.0V: VCC, VDD -dip condition should be the same with VCC, VDD-turn-on condition.

10. BLOCK DIAGRAM

**TFT
Display**

Scan Driver IC

**TFT-LCD PANEL
(800xR,G,Bx480)**

**Back light
Unit**

**Data Driver IC
(With TCON)**

VCC

DCLK

DE

R0~R5

G0~G5

B0~B5

VSS

VDD

ADJ

INPUT Connector

**DC/DC Converter
& Reference
Voltage Generator**

LED Converter
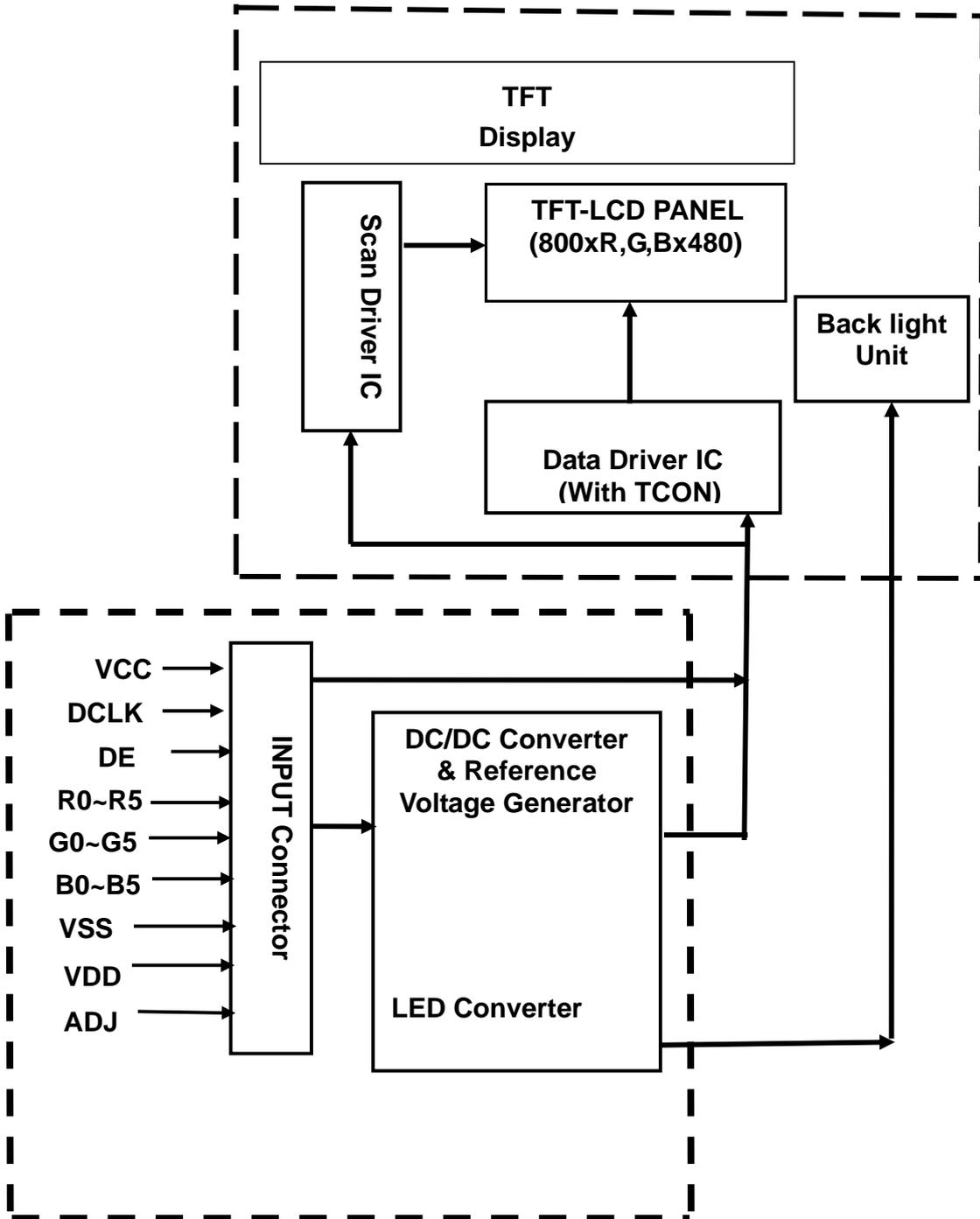
11. TOUCH PANEL CHARACTERISTICS

1. Input Method and Activation Force

Input Method	Activation Force
0.8mm dia. Delrin Polyacetal stylus	30~120gf
8.0mm dia. Silicon " finger "	30~120gf

2. Typical Optical Characteristics

ITEM	Parameter
Visible Light Transmission	≥78% typ.
Surface Hardness	>3H

3. Electrical Specification

ITEM		Parameter
Operating Voltage		DC 5V
Circuit close resistance	X	200~1000Ω
	Y	150~630Ω
Circuit open resistance		>10MΩ (DC 25V)
Contact bounce		15ms Max

4. Linearity

ITEM		Parameter
Linear Test Specification Direction	X	$\leqq$ 1.5%
	Y	$\leqq$ 1.5%

5. Specification

| ITEM	Parameter
Operating Temperature	-30°C~+85°C
Storage Temperature	-40°C~+85°C

6. Durability test:

6.1 Touch panel is hit 1 millions times with a silicone rubber of R8 finger, hitting rate is by 250g at 2 times per second. The measurement must satisfy the following:
- Circuit close resistance: x 200~1000Ω ;
  y 150~630Ω
- Circuit open resistance: >10MΩ (DC 25V)
- Linearity test: $\leqq$ 3%

6.2 Stylus writing
Touch panel is drawn 100,000 times by R0.8 plastic stylus pen, at 250g forces, Speed is 60mm/sec, each sliding length 30mm.
- Circuit close resistance: x 200~1000Ω ;
  y 150~630Ω
- Circuit open resistance: >10MΩ (DC 25V)
- Linearity test: $\leqq$ 3%

Silicone Rubber (R=8.0mm dia.)

Touch Panel

Stylus Pen (R=0.8mm dia.)

Touch Panel
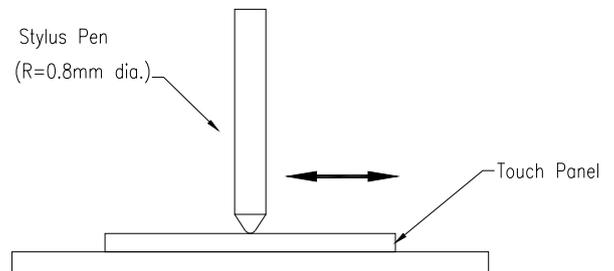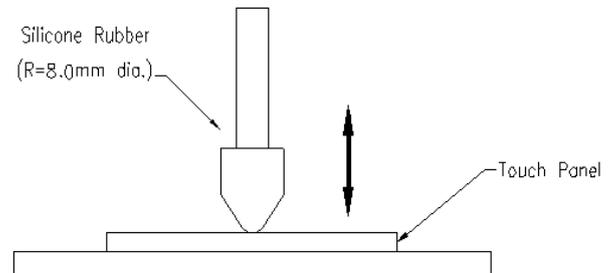
12. QUALITY ASSURANCE
12.1 Test Condition

12.1.1 Temperature and Humidity(Ambient Temperature)
Temperature   :   20 ± 5°C
Humidity   :   60 ± 5%RH

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

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

12.1.4 Test Frequency

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

12.1.5 Test Method

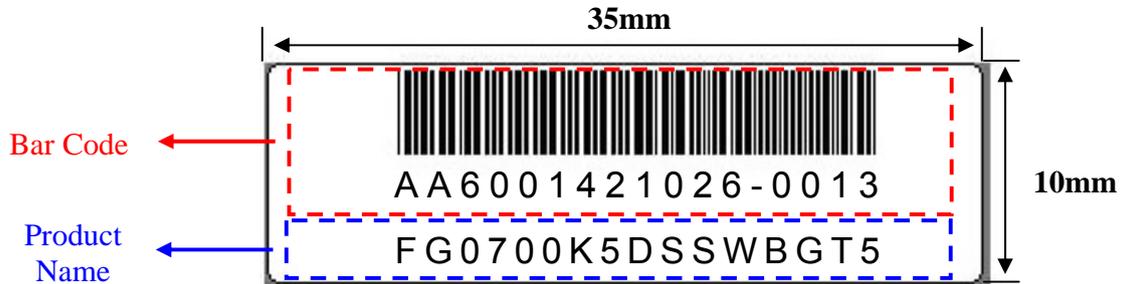| No.	Reliability Test Item & Level	Test Level
	Test Item	
1	High Temperature Storage Test	T=+80℃,240hrs
2	Low Temperature Storage Test	T=-30℃,240hrs
3	High Temperature Operation Test	T=+70℃,240hrs
4	Low Temperature Operation Test	T=-20℃,240hrs
5	High Temperature and High Humidity (No operation)	T=40℃,95%RH,240hrs
6	Thermal Cycling Test (No operation)	-20℃ → +25℃ → +70℃, 100 Cycles 30 min 5 min 30 min
7	Vibration Test (No operation)	Frequency :10 ~ 55 H$_Z$ Amplitude :1.5 mm Sweep time : 11 mins Test Period: 6 Cycles for each direction of X, Y, Z

12.2 Judgment standard
The Judgment of the above test should be made as follow:
Pass: Normal display image with no obvious non-uniformity and no line defect. Partial transformation of the module parts should be ignored.
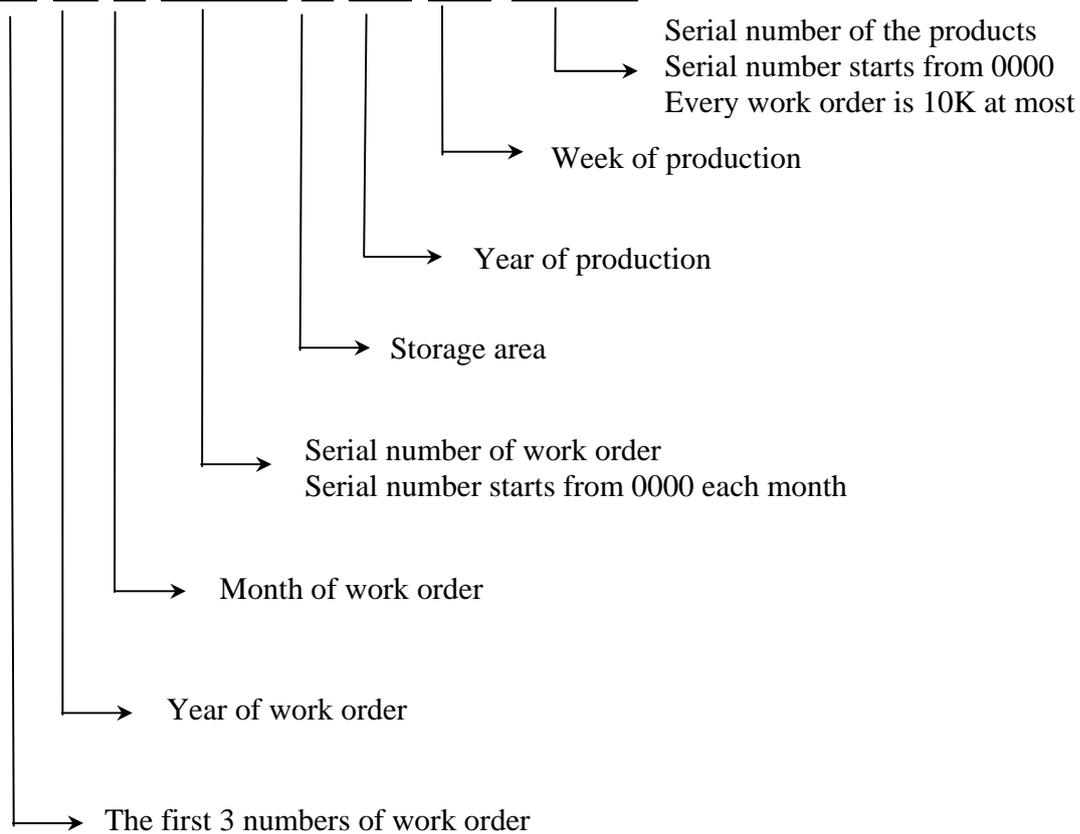Fail: No display image, obvious non-uniformity, or line defect.
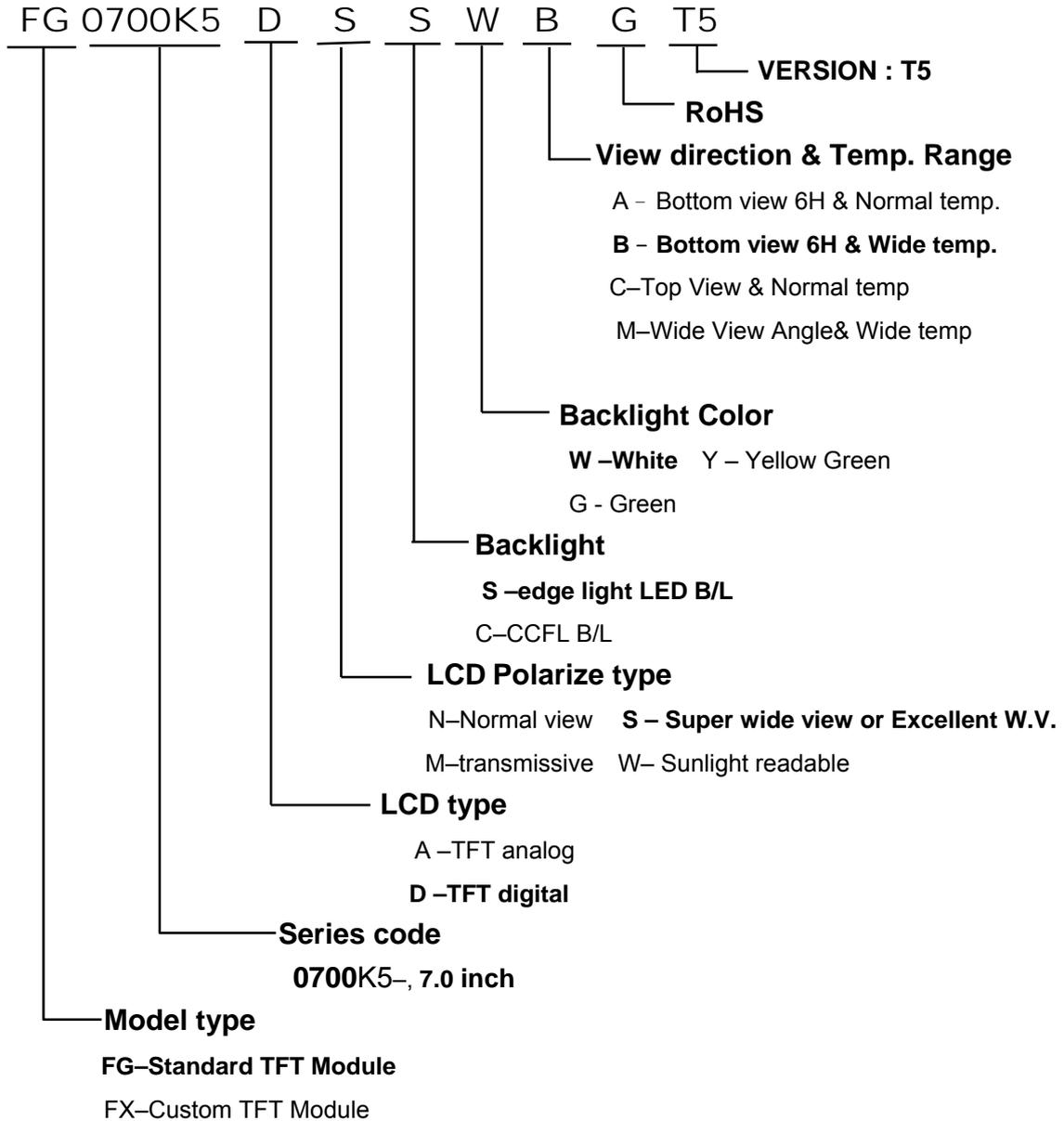
13. LCM PRODUCT LABEL DEFINE

Product Label style:

35mm

Bar Code ← A A 6 0 0 1 4 2 1 0 2 6 - 0 0 1 3

Product Name ← F G 0 7 0 0 K 5 D S S W B G T 5

10mm

BarCode Define:

A A 6 0014 2 10 26-0013

Serial number of the products
Serial number starts from 0000
Every work order is 10K at most

Week of production

Year of production

Storage area

Serial number of work order
Serial number starts from 0000 each month

Month of work order

Year of work order

The first 3 numbers of work order

Product Name Define:

FG 0700K5 D S S W B G T5

```
VERSION : T5

RoHS

View direction & Temp. Range

    A – Bottom view 6H & Normal temp.

    B – Bottom view 6H & Wide temp.

    C–Top View & Normal temp

    M–Wide View Angle& Wide temp

Backlight Color

    W –White    Y – Yellow Green

    G - Green

Backlight

    S –edge light LED B/L

    C–CCFL B/L

LCD Polarize type

    N–Normal view    S – Super wide view or Excellent W.V.

    M–transmissive    W– Sunlight readable

LCD type

    A –TFT analog

    D –TFT digital

Series code

    0700K5–, 7.0 inch

Model type

    FG–Standard TFT Module

    FX–Custom TFT Module
```

14. PRECAUTIONS IN USE LCM

1.   LIQUID CRYSTAL DISPLAY (LCD)

LCD is made up of glass, organic sealant, organic fluid, and polymer based polarizers. The following precautions should be taken when handing,

(1). Keep the temperature within range of use and storage. Excessive temperature and humidity could cause polarization degradation, polarizer peel off or bubble.

(2). Do not contact the exposed polarizers with anything harder than an HB pencil lead.   To clean dust off the display surface, wipe gently with cotton, chamois or other soft material soaked in petroleum benzin.

(3). Wipe off saliva or water drops immediately. Contact with water over a long period of time may cause polarizer deformation or color fading, while an active LCD with water condensation on its surface will cause corrosion of ITO electrodes.

(4). Glass can be easily chipped or cracked from rough handling, especially at corners and edges.

(5). Do not drive LCD with DC voltage.

2.   Liquid Crystal Display Modules

2.1   Mechanical Considerations

LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modifications. The following should be noted.

(1). Do not tamper in any way with the tabs on the metal frame.

(2). Do not modify the PCB by drilling extra holes, changing its outline, moving its components or modifying its pattern.

(3). Do not touch the elastomer connector, especially insert an backlight panel (for example, EL).

(4). When mounting a LCM make sure that the PCB is not under any stress such as bending or twisting . Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.

(5). Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels.

2.2.   Static Electricity

LCM contains CMOS LSI's and the same precaution for such devices should apply, namely

(1). The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, 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.

2.3   Soldering

(1). Solder only to the I/O terminals.

(2). Use only soldering irons with proper grounding and no leakage.

(3). Soldering temperature : $280°C \pm 10°C$

(4). Soldering time: 3 to 4 sec.

(5). Use eutectic solder with resin flux fill.

(6). If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed after wards.

2.4   Operation

(1). The viewing angle can be adjusted by varying the LCD driving voltage V0.

(2). Driving voltage should be kept within specified range; excess voltage shortens display life.

(3). Response time increases with decrease in temperature.

(4). Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear "fractured".

(5). Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured".

2.5 Storage

If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.
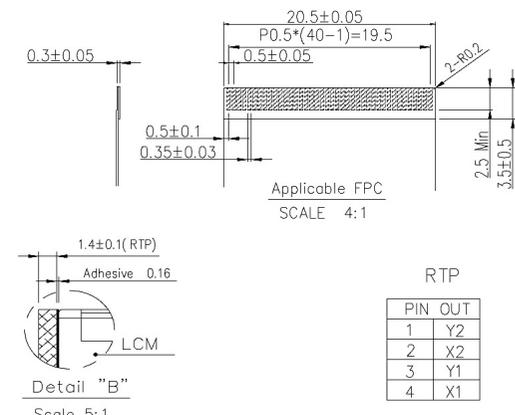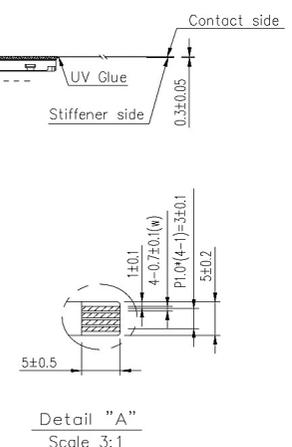
2.6   Limited Warranty

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.
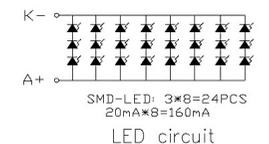
15. OUTLINE DRAWING

PRELIMINARY
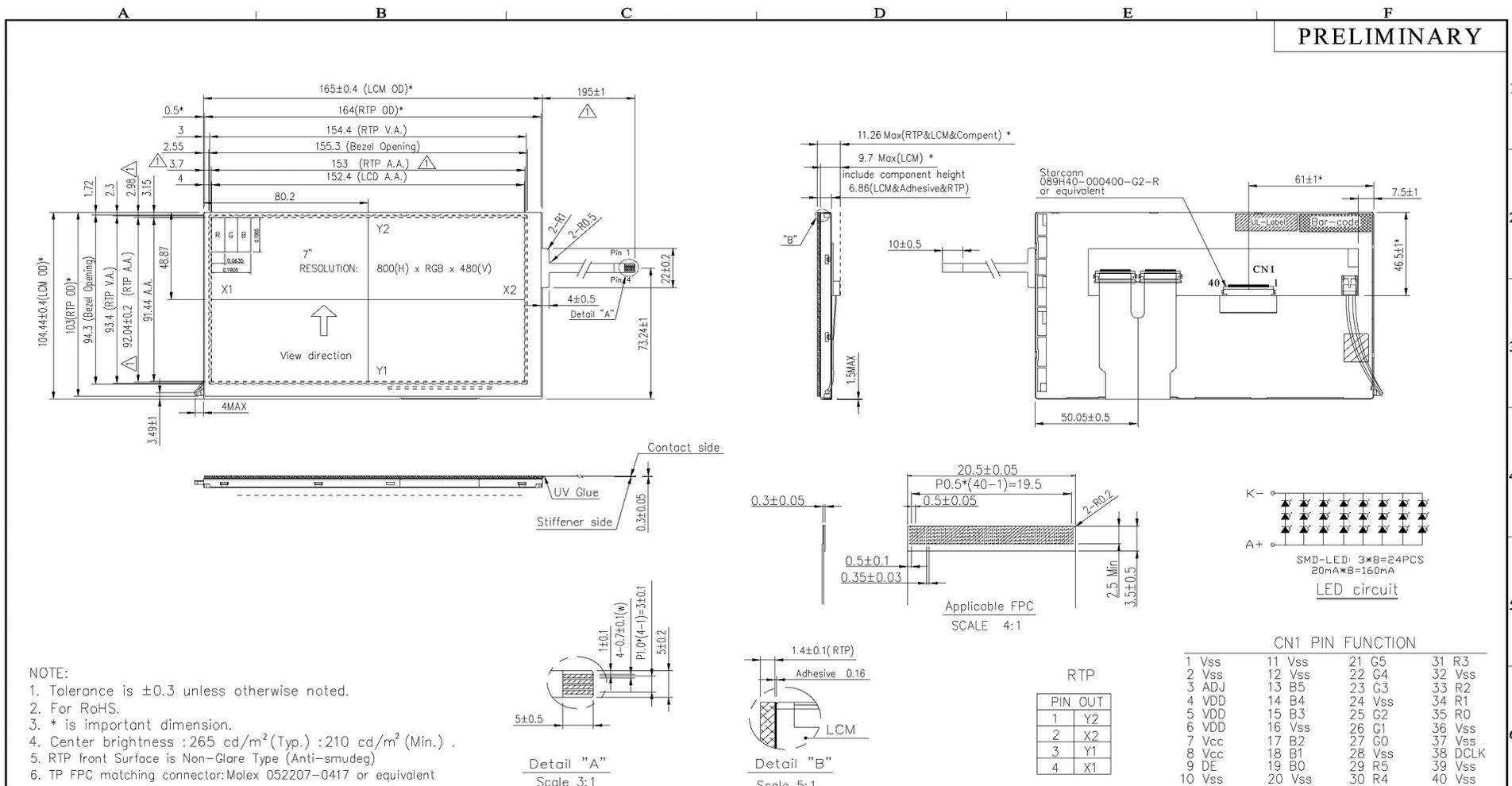
NOTE:
1. Tolerance is ±0.3 unless otherwise noted.
2. For RoHS.
3. * is important dimension.
4. Center brightness : 265 cd/m² (Typ.) : 210 cd/m² (Min.) .
5. RTP front Surface is Non-Glare Type (Anti-smudeg)
6. TP FPC matching connector: Molex 052207-0417 or equivalent

CN1 PIN FUNCTION

1	Vss	11	Vss	21	G5	31	R3
2	Vss	12	Vss	22	G4	32	Vss
3	ADJ	13	B5	23	G3	33	R2
4	VDD	14	B4	24	Vss	34	R1
5	VDD	15	B3	25	G2	35	R0
6	VDD	16	Vss	26	G1	36	Vss
7	Vcc	17	B2	27	G0	37	Vss
8	Vcc	18	B1	28	Vss	38	DCLK
9	DE	19	B0	29	R5	39	Vss
10	Vss	20	Vss	30	R4	40	Vss

RTP

PIN OUT	
1	Y2
2	X2
3	Y1
4	X1

Detail "A"
Scale 3:1

Detail "B"
Scale 5:1

Applicable FPC
SCALE 4:1

LED circuit

SMD-LED: 3*8=24PCS
20mA*8=160mA

7"
RESOLUTION: 800(H) x RGB x 480(V)

View direction

Contact side
UV Glue
Stiffener side

				DATE:	2013/08/13	TITLE:
				DRAWN:		7" TFT Outline Dimension
⚠	Change the RTP dimension.	<<ECR110-C40004>>	2012/06/05	DWG. NO.	FG0700K5SGT4	
	ESR 0012021			CHECK:		
AUTH	DESCRIPTION	DATE	APPROVED		UNITS MM	REV. 2
	REVISIONS			APPROVE:	SCALE 1/1	SHEET 1 OF 1

DATA IMAGE

16. PACKAGE INFORMATION

TBD