DATA IMAGE CORPORATION

TFT Module Specification
Preliminary
ITEM NO.: FG0700M1DSSWMG01

Table of Contents

Customer Companies	R&D Dept.	Q.C. Dept.	Eng. Dept.	Prod. Dept.
	JACK	ERIC	PAUL	HELEN
Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
	2	22/SEP/11'		19

2. RECORD OF REVISION

Rev	Date	Item	Page	Comment
1	8/NOV/10'			Initial PRELIMINARY
2	22/SEP/11'	4	3	1. Modify the Surface treatment & add weight.
		6	3	2. Modify the Power Supply Current (I_{CC}).
		13	17	3. Modify PRECAUTIONS IN USE LCM

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(H) x 4.2(D)	mm
Surface treatment	Glare	
Back-light	LED	
Display mode	Normally Black	
Weight	110	g
View Angle direction	Wide View	

5. ABSOLUTE MAXIMUM RATINGS

Parameter		Symbol	MIN.	MAX.	Unit	Remark
Power supply voltage		Vcc	-0.3	5.0	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	80	°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=27MHz,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}		220	300	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
	I_{DD}		400	550	mA	V_{DD} =5.0V
Ripple voltage	V_{RF}	-	-	100	mV_{P-P}	
Differential Input High Threshold	VTH	-	-	100	[mV]	VCM=1.2V
Differential input Low Threshold	VTL	-100	-	-	[mV]	Note 1
ADJ frequency		19K	20K	21K	Hz	
ADJ input voltage	VIH	3.0	-	3.3	V	
	VIL	0	-	0.3	V	
LED dice life time		20000	30000		Hr	Note 2

Note 1: LVDS Signal Waveform.

Differential Signal

VP-VN=|VID|>VTH="High"

VN

VTH

VTL

VP

| VID |

VP-VN=-|VID|<VTL="Low"

VCM

0 V
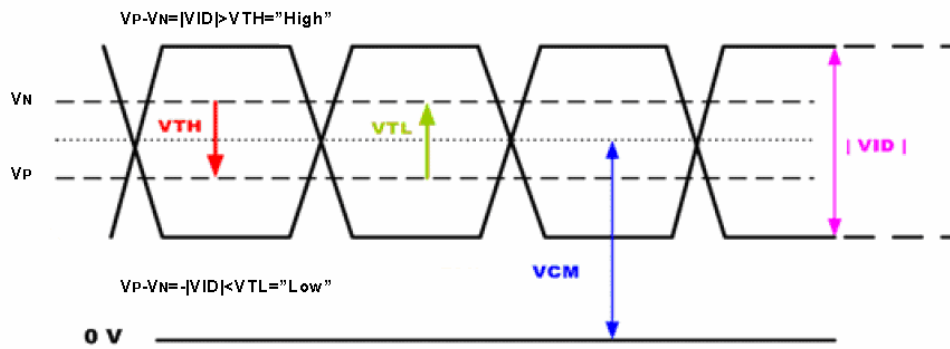
Note 2: The "LED dice life time" is defined as the brightness decrease to 50% original brightness that the ambient temperature is 18℃~28℃ and LED dice current=20mA.

7. TIMING SPECIFICATIONS

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

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

7.1 TIMING CHARACTERISTIC :
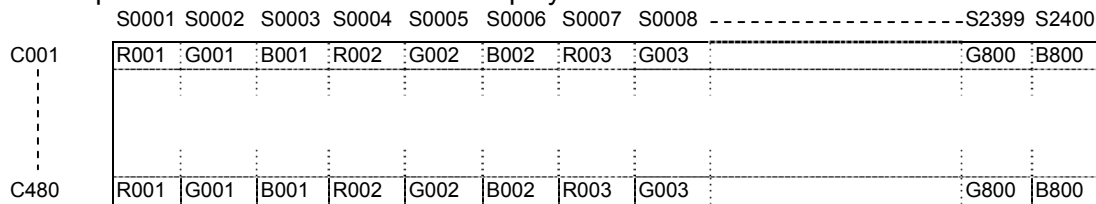
7.1.1 TTL Timing Chart

7.1.2 LVDS Timing Chart

-0.4nS < tRIP1 < 0.4nS

25nS < T < 40nS
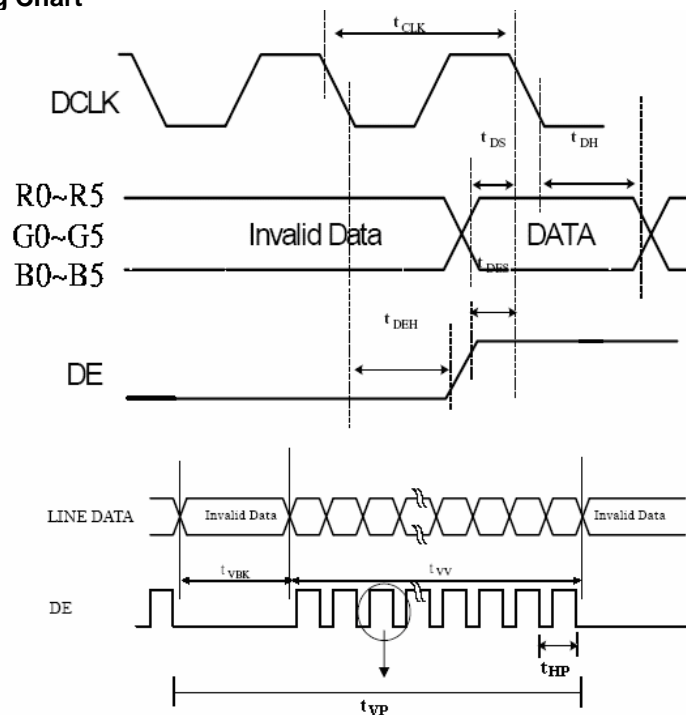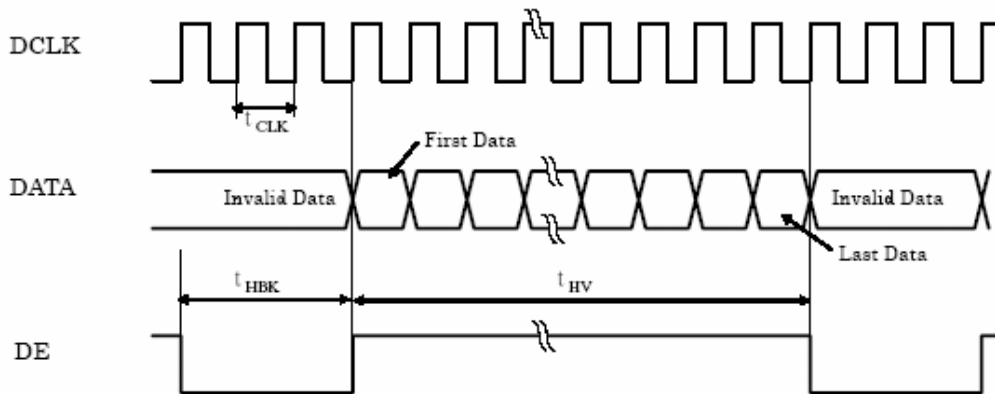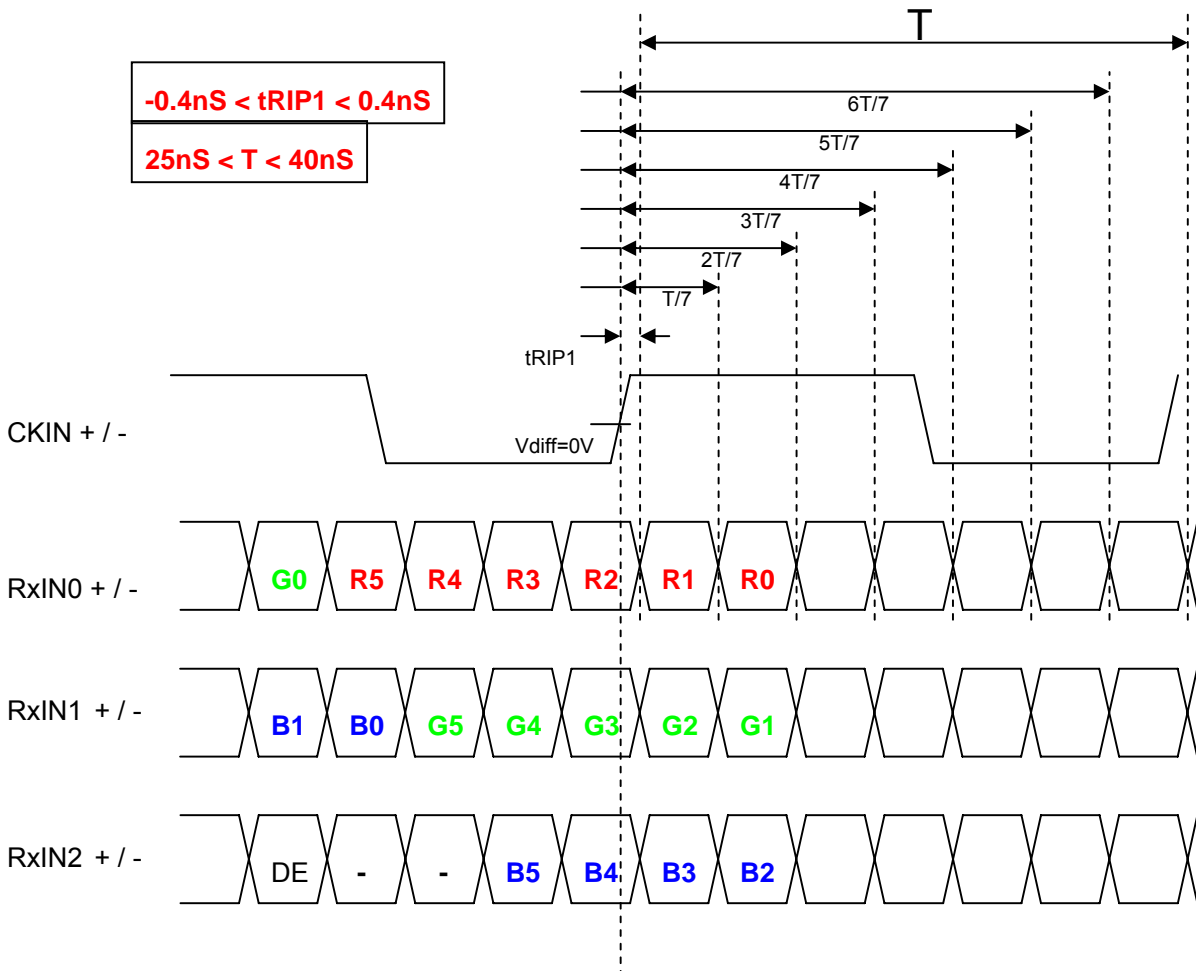
7.2 Color Data Input Assignment

Color		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0

		Data Signal																	
		Red						Green						Blue					
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

	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	70	80	--	deg	Note 1,4
		θ_x-		70	80	--		
	Vertical	θ_Y+		70	80	--		
		θ_Y-		70	80	--		
Contrast Ratio		CR	at optimized viewing angle	300	400			Note 1,3
Response time	Rise	Tr	Center	-	20	--	ms	Note 1,6
	Fall	Tf	$\theta x=\theta y =0°$	-	10	--	ms	
Uniformity		B-uni	$\theta x=\theta y =0°$	70	80	--	%	Note1,5
Brightness		L	$\theta x=\theta y =0°$ ADJ=3.3V	320	400	--	cd/m^2	Note 1,2
Chromaticity		x_W	Center $\theta x=\theta y =0°$	0.257	0.307	0.357		Note 1,7
		y_W		0.289	0.339	0.389		
		x_R		0.552	0.602	0.652		
		y_R		0.304	0.354	0.404		
		x_G		0.305	0.352	0.402		
		y_G		0.525	0.575	0.625		
		x_B		0.094	0.144	0.194		
		y_B		0.049	0.0979	0.149		
Image sticking		tis	2 hours			2	Sec	Note 8

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

Note1: The method of optical measurement:
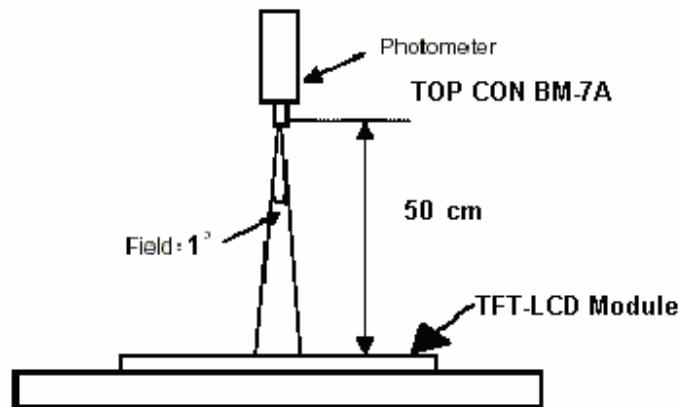
Note2: Measured at the center area of the panel and at the viewing angle of the $\theta x = \theta y = 0°$

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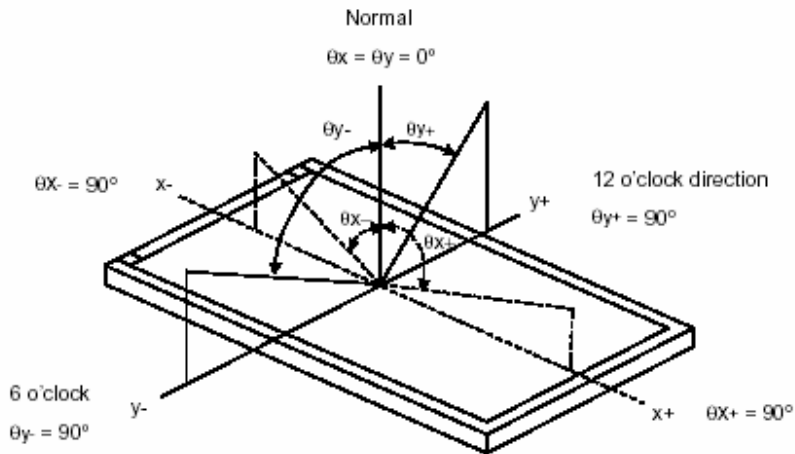
Note 5: Definition of Brightness Uniformity (B-uni):
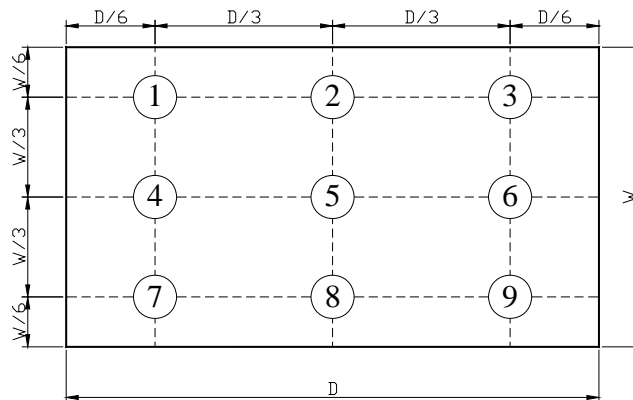
$$B\text{-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9points}} \quad \text{(Note 5).}$$

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.
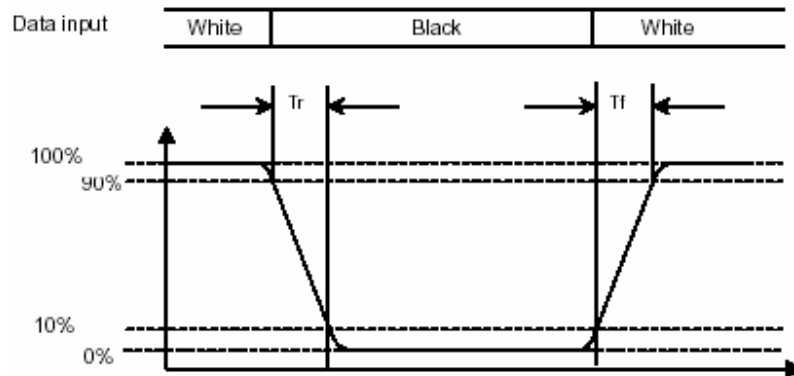
Note 7: Definition of Chromaticity:

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
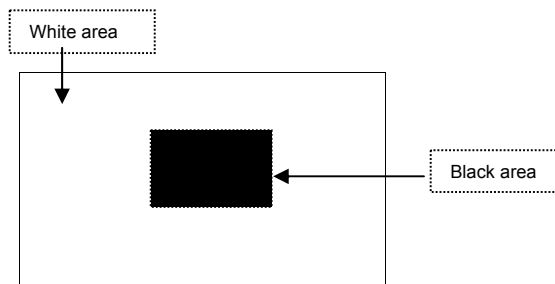
9. PIN CONNECTIONS

Pin No	Symbol	Function	Remark
1	VCC	power supply for Digital Circuit	
2	VCC	power supply for Digital Circuit	
3	GND	Ground	
4	GND	Ground	
5	RxIN0-	Differential Data Input ,CH0(Negative)	
6	RxIN0+	Differential Data Input ,CH0(Positive)	
7	GND	Ground	
8	RxIN1-	Differential Data Input ,CH1(Negative)	
9	RxIN1+	Differential Data Input ,CH1(Positive)	
10	GND	Ground	
11	RxIN2-	Differential Data Input ,CH2(Negative)	
12	RxIN2+	Differential Data Input ,CH2(Positive)	
13	GND	Ground	
14	CKIN-	Differential Clock Input (Negative)	
15	CKIN+	Differential Clock Input (Positive)	
16	GND	Ground	
17	VDD	Power Supply for LED Driver Circuit	
18	VDD	Power Supply for LED Driver Circuit	
19	GND	Ground	
20	ADJ	Brightness control for LED B/L	

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) GND 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
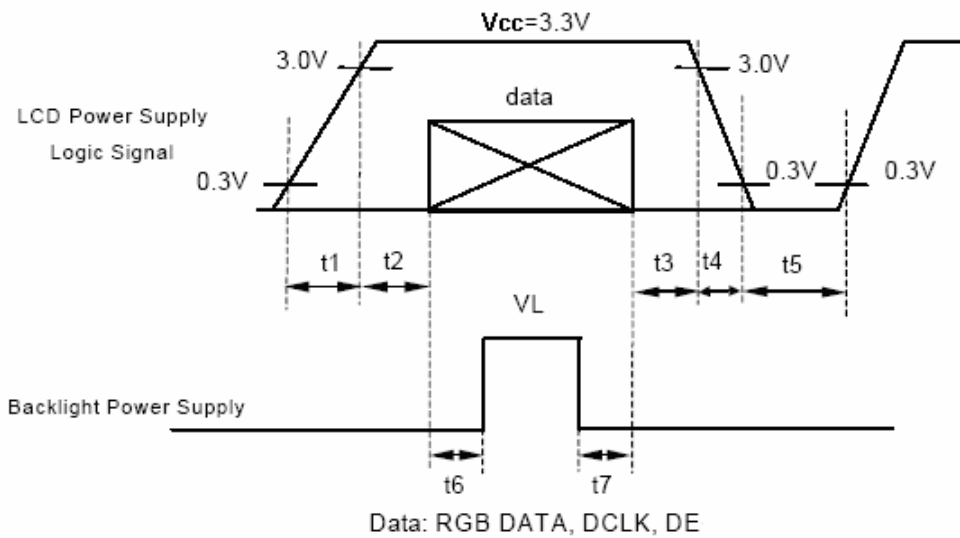
VCC-dip condition**:**
(1) 2.7 V $\leq$VCC <3.0V,td $\leq$ 10 ms
(2) VCC>3.0V,VCC-dip condition should be the same with VCC-turn-on condition。

10. BLOCK DIAGRAM

TFT Display

Scan Driver IC

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

Back light Unit

Data Driver IC

RxIN0(+/-)
RxIN1(+/-)
RxIN2(+/-)
CKIN(+/-)
VDD
VCC
GND
ADJ

INPUT Connector

DC/DC Converter & Reference Voltage Generator

LVDS INPUT/ Timing Control

LED Converter(Driver)
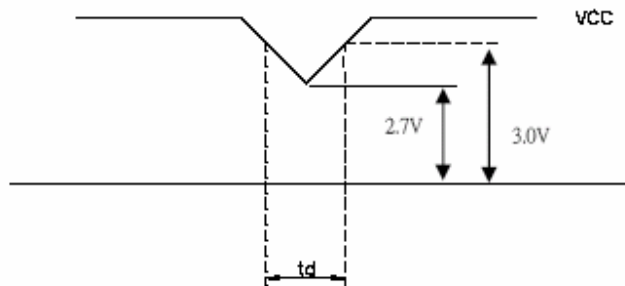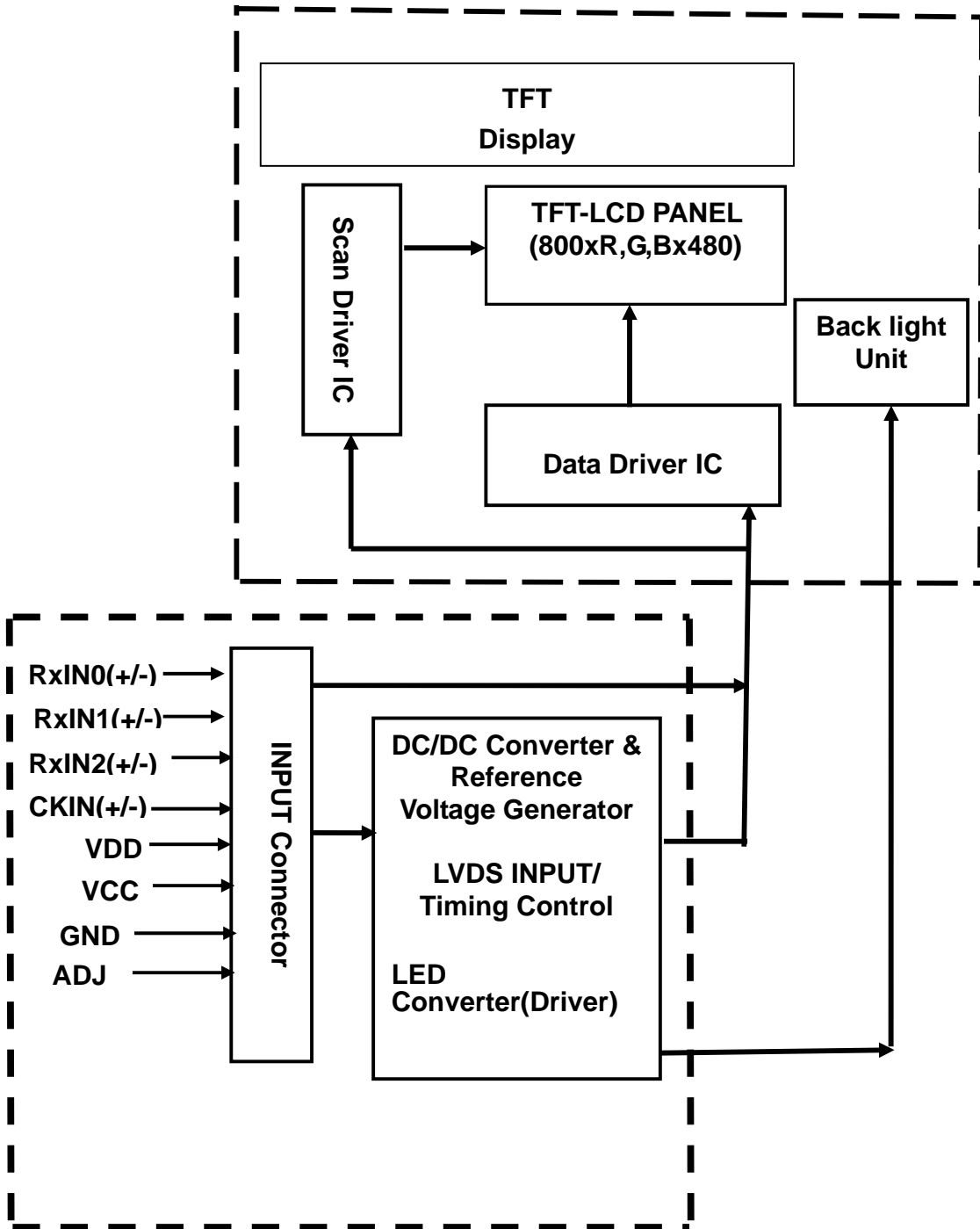
11. QUALITY   ASSURANCE
11.1 Test Condition

11.1.1 Temperature and Humidity(Ambient Temperature)
Temperature   : $25 \pm 5°C$
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=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 Operation Test	T=60℃,90%RH,240hrs
6	Thermal Cycling Test (No operation)	-30℃ → +25℃ → +80℃, 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

11.2 Judgment standard
The Judgment of the above test should be made after exposure in room temperature for two hours 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.

12. 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

10mm

Product Name ← F G 0 7 0 0 M 1 D S S W M G 0 1
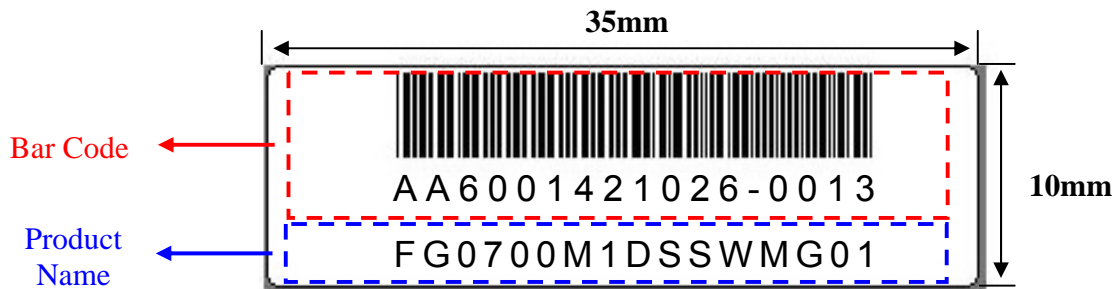
BarCode Define:

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 0700M1 D S S W M G 01

VERSION :01

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

0700M1–, 7.0 inch

Model type

FG–Standard TFT Module

FX–Custom TFT Module

14. OUTLINE DRAWING

PRELIMINARY

Section A-A

4.2±0.3 *

35

2-M2

34

1.6

165±0.4 *

154.9 (Bezel opening)

152.4 (LCD A.A.)

2.8

4.05

2.55

3.78

80.25±0.5

Peeling Tape

104±0.4 *

93.9 (Bezel opening)

91.44 (LCD A.A.)

49.5±0.5

R G B

0.1905
0.0635
0.1905

Scale 100:1

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

LCD A.A. CENTER

SCREW

A
A

CN1

61±1

1   20

5.6

46.5±1

LABEL
UL LABEL

B/L FPC
Main FPC

KAPTON TAPE
15*12mm*3pcs

6.86 W/COMPONENT (MAX)

1±0.3

1

3

Parts above PCB
2.8 mm(Max)

PCB t=0.6mm
(PCB inside)

Module

Section A-A
Scale 2:1

NOTE:

1. Tolerance is ±0.3 unless otherwise noted.
2. CN1 connector: Hirose DF14A-20P-1.25H or equivalent,
   matching side connector: Hirose DF14-20S-1.25C or equivalent.
3. For RoHS.
4. Center brightness: 400 cd/m^2 (Typ.)
5. Uniformity: 70% (Min.)
6. * is important dimension.

CN1 PIN FUNCTION

1 Vcc	6 RxIN0+	11 RxIN2-	16 GND
2 Vcc	7 GND	12 RxIN2+	17 VDD
3 GND	8 RxIN1-	13 GND	18 VDD
4 GND	9 RxIN1+	14 CKIN-	19 GND
5 RxIN0-	10 GND	15 CKIN+	20 ADJ

DATE:	11/01/10'	TITLE: 7" TFT Outline Dimension
DRAWN:		
CHECK:		DWG. NO. FG0700M1SG01
		UNITS M M REV. 1
APPROVE:		SCALE 1 / 1 SHEET 1 OF 1

ESR 9910011

AUTH	DESCRIPTION	DATE	APPROVED
	REVISIONS		

DATA IMAGE

15.PACKAGE INFORMATION

TBD