DATA IMAGE CORPORATION

TFT Module Specification

ITEM NO.: FG050052DSSWBG01

Table of Contents

Customer Companies	R&D Dept.	Q.C. Dept.	Eng. Dept.	Prod. Dept.
	Alex	*Eric*	*Paul*	*helen*
Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
	B	2009/02/09		24

2. RECORD OF REVISION

Rev	Date	Item	Page	Comment
1	27/MAR/08			Initial preliminary
2	22/MAY/08	4,5,6, 9.1.2, 9.4,10	3,7,10, 11,17	1. Add Weight data. 2. Add VLED absolute maximum rating. 3. Add Power Supply Current for LCD I_{CC} =95mA(typ),125mA(max). 4. Add Power Supply Current for LED I_{LED} =300mA(typ), 390mA(max). 5. Add LED life time data. 6. Modify CLK frequency FCPH and CLK period TCPH typical value. 7. Remove SPI register R1 data. 8. Add min .Viewing Angle data. 9. Add Chromaticity data.
3	22/JUL/08	1	1	1. Add Item 16 PACKAGE INFORMATION.
4	5/AUG/08	15	23	1. Modify OUTLINE DRAWING from Rev:1 to Rev: 2
A	27/AUG/08	15	23	1. Modify OUTLINE DRAWING from Rev:2 to Rev: A
B	09/FEB/09	16	24	Modify PACKAGE INFORMATION

3. APPLICATION

Digital equipments which need color display, such as P.O.S, medical equipments and industrial equipments.

4. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Display resolution	(800X R.G.B) (W) x480(H)	dot
Active area	108(W) x 64.8(H)	mm
Screen size	5.0(Diagonal)	inch
Dot pitch	0.045(W) x 0.135(H)	mm
Color configuration	R.G.B. Stripe	
Overall dimension	118.1(W) x 77(H) x 3.16 (T)	mm
Weight	62	g
Surface treatment	Anti-Glare	
View Angle direction	6 o'clock	
Our components and processes are compliant to RoHS standard		

5. ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	MIN.	MAX.	Unit	Remark
Power supply voltage	Vcc	-0.3	5.0	V	
Logic input voltage	VI	-0.3	5.0	V	
LED Power Supply voltage	V_{LED}	-0.3	6	V	
Operating temperature	Top	-20	+70	°C	Ambient temperature
Storage temperature	Tst	-30	+80	°C	Ambient temperature

## 6. ELECTRICAL CHARACTERISTICS

GND=0V,CLK=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}		95	125	mA	V_{CC} =3.3V
Power Supply voltage for LED	V_{LED}	4.5	5	5.5	V	
Power Supply Current for LED	I_{LED}	--	300	390	mA	V_{LED} =5.0V
Ripple voltage	V_{RF}	--	--	100	mV $_{P-P}$	
"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		--	50000	--	Hr	Note 1

Note 1: The "LED dice life time" is defined as the module brightness decrease to 50% original brightness that the ambient temperature is 25   and ADJ = 3.3V.

7. BLOCK DIAGRAM
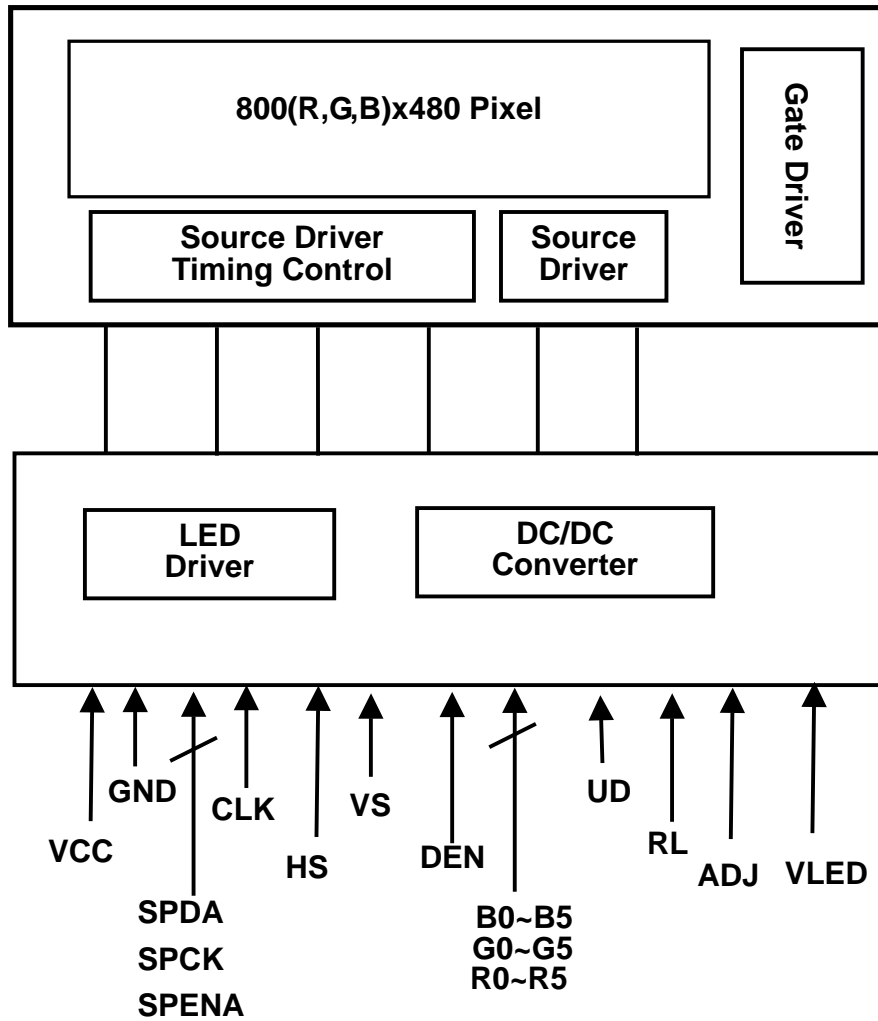
8. PIN CONNECTIONS

No	Symbol	I/O	Description
1	GND	I	Ground.
2	VCC	I	Digital power. 3V – 3.6V.
3	VCC	I	Digital power. 3V – 3.6V.
4	RESETB	I	Hardware global reset. Low active. Default pull high.
5	UD	I	UP/Down scan setting. When UD="H", down to up. When UD="L", up to down.
6	RL	I	The shift direction of device internal shift register is controlled by this Pin as shown below: RL="H", left to right RL="L", right to left
7	SPENA	I	Serial port data enable signal. Default pull high.
8	SPCK	I	Serial port clock. Default pull high.
9	SPDA	I	Serial port data input. Default pull high.
10	GND	I	Ground.
11	B5	I	Blue data(5:0). B5 is MSB, B0 is LSB.
12	B4	I	
13	B3	I	
14	B2	I	
15	B1	I	
16	B0	I	
17	GND	I	Ground.
18	G5	I	Green data (5:0).G5 is MSB, G0 is LSB..
19	G4	I	
20	G3	I	
21	G2	I	
22	G1	I	
23	G0	I	
24	GND	I	Ground.
25	R5	I	Red data (5:0).R5 is MSB, R0 is LSB.
26	R4	I	
27	R3	I	
28	R2	I	
29	R1	I	
30	R0	I	

No	Symbol	I/O	Description
31	GND	I	Ground.
32	CLK	I	Clock signal.
33	HS	I	Horizontal sync.
34	VS	I	Vertical sync.
35	DEN	I	Input data enable control. Normally pull low.
36	STB	I	Standby mode control. Default pull high When STB="L", TCON and source driver are off . When STB="H", all the functions are on.
37	VLED	I	Power supply of LED back light.
38	VLED	I	Power supply of LED back light.
39	ADJ	I	Brightness control for LED B/L.
40	GND	I	Ground.

Note1: ADJ is brightness control Pin. The larger of the pulse duty is, the higher of the brightness.
Note2: ADJ signal is 0~3.3V.Operation frequency is 20KHz.
Note3: GND PIN must be grounding, can not be floating.
Note 4: UD and LR control Function

LR	UD	Function
1	0	Normally display
0	0	Left and Right opposite
1	1	Up and Down opposite
0	1	Left and Right opposite Up and Down opposite

Note 5: If DEN signal is fixed low, SYNC mode is used. Otherwise, DE mode is used.

8.1 Power Signal Sequence

Remarks:
*1) Power Signal sequence:
t1 ≤10ms : 1 sec≤ t5
50ms≤ t2 : 200ms ≤t6
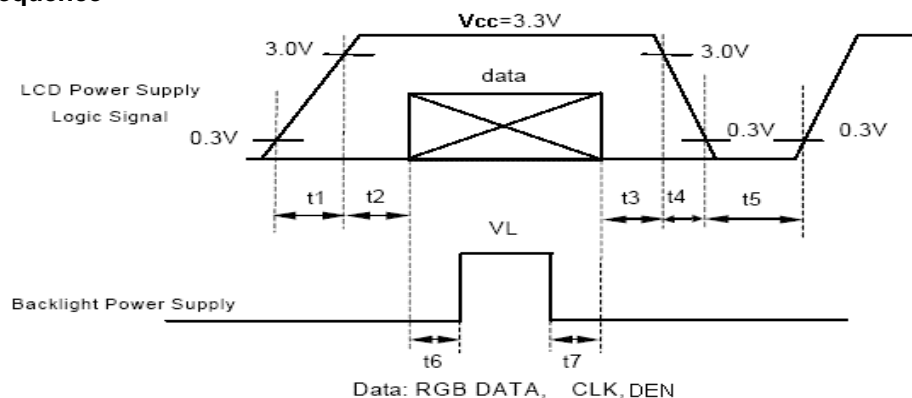0<t3 ≤50ms: 200ms≤ t7
0<t4 ≤10ms

*2) VCC-dip condition:
   (1) 2.7 V   ≤VCC <3.0V,td ≤ 10 ms
   (2) VCC   3.0V,VCC-dip
      condition should be the same
      with VCC-turn-on condition
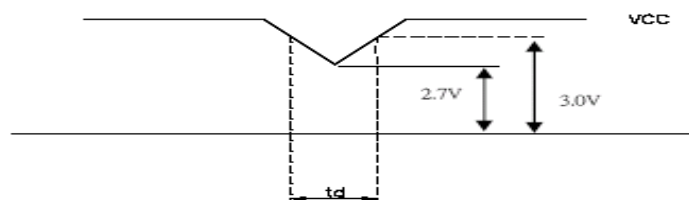
9. INTERFACE SPECIFICATIONS

9.1 Input Signal Characteristics

9.1.1 AC Electrical Characteristics

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
HS setup time	T_{hst}	6	-	-	ns
HS hold time	T_{nhd}	6	-	-	ns
VS setup time	T_{vst}	6	-	-	ns
VS hold time	T_{vhd}	6	-	-	ns
Data setup time	T_{dsu}	6	-	-	ns
Data hold time	T_{dhd}	6	-	-	ns
DEN setup time	T_{esu}	6	-	-	ns
DEN setup time	T_{esu}	6	-	-	ns

9.1.2 Resolution

Sync mode

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
CLK frequency	F_{CPH}	-	33.26	-	MHz
CLK period	T_{CPH}	-	30.06	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
HS period	T_H	-	1056	-	T_{CPH}
HS pulse width	T_{WH}	1	128	-	T_{CPH}
HS-first horizontal data time	T_{HS}	STHD[7:0]+88(i)			T_{CPH}
HS Active Time	T_{HA}	-	800	-	T_{CPH}
VS period	T_V	-	525	-	T_H
VS pulse width	T_{WV}	1	2	-	T_H
VS-DEN time	T_{VS}	STVD[6:0]+8			T_H
VS Active Time	T_{VA}	-	480	-	T_H

● **DE mode**

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

(i)$T_{VS} + T_{VA} < T_H$

9.2 Timing Controller Timing Chart
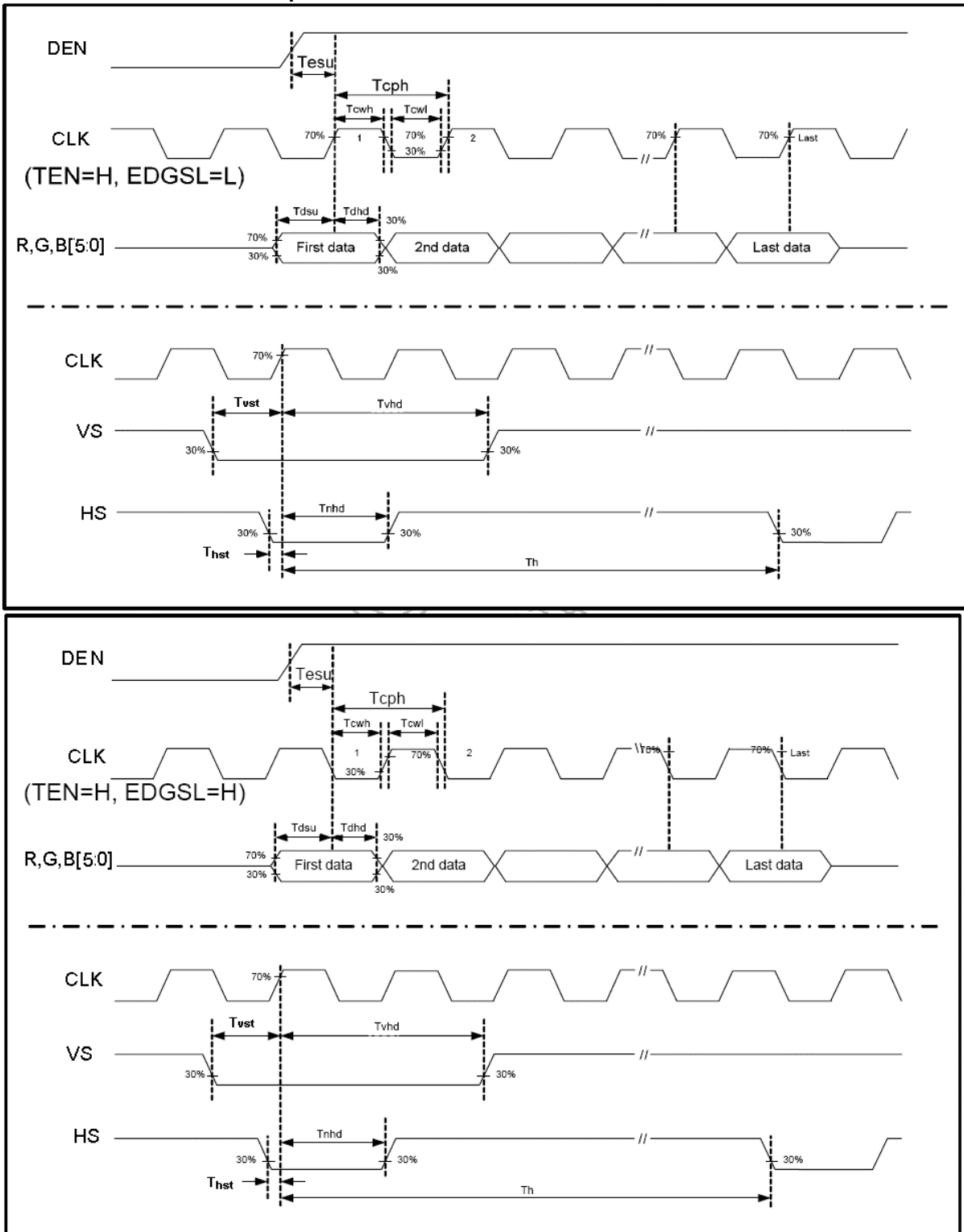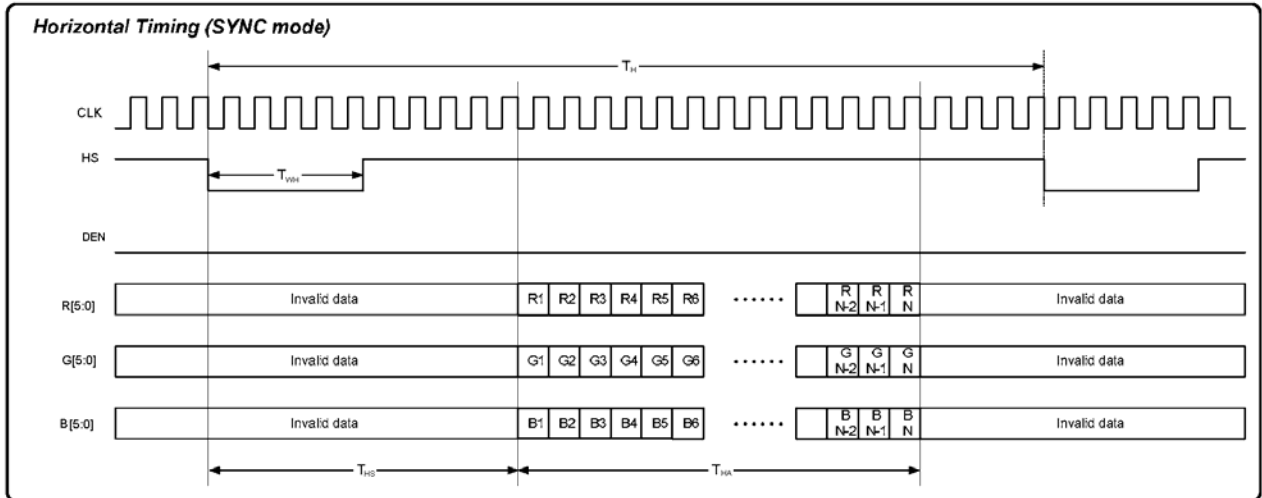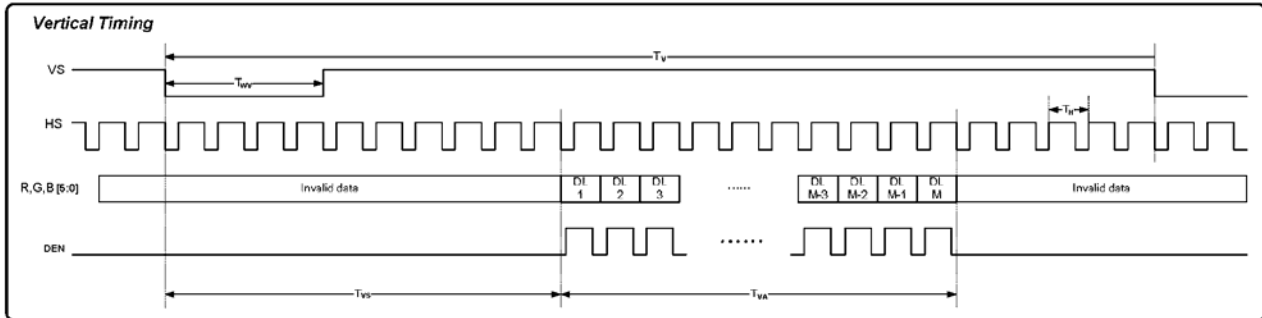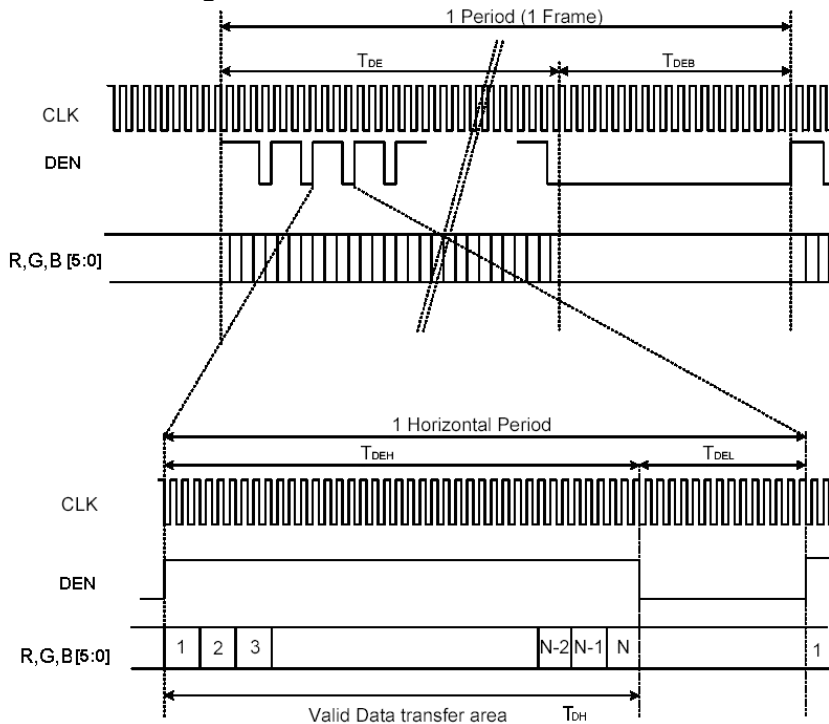### 9.2.1 Clock and Data Input Waveforms

Figure 1 Clock and Data input waveforms.

9.2.2 Data input format

Figure 2 SYNC Mode Horizontal Data Format

Figure 3 SYNC Mode Vertical Data Format

Figure 4 DE Mode Data Format

9.3 SPI Timing Characteristics

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
SPCK period	T_{CK}	60	-	-	ns
SPCK high width	T_{CKH}	30	-	-	ns
SPCK low width	T_{CKL}	30	-	-	ns
Data setup time	T_{SU1}	12	-	-	ns
Data hold time	T_{HD1}	12	-	-	ns
SPENA to SPCK setup time	T_{CS}	20	-	-	ns
SPENA to SPDA hold time	T_{CE}	20	-	-	ns
SPENA high pulse width	T_{CD}	50	-	-	ns

9.3.1 SPI Timing (Write Data)

● SPI timing
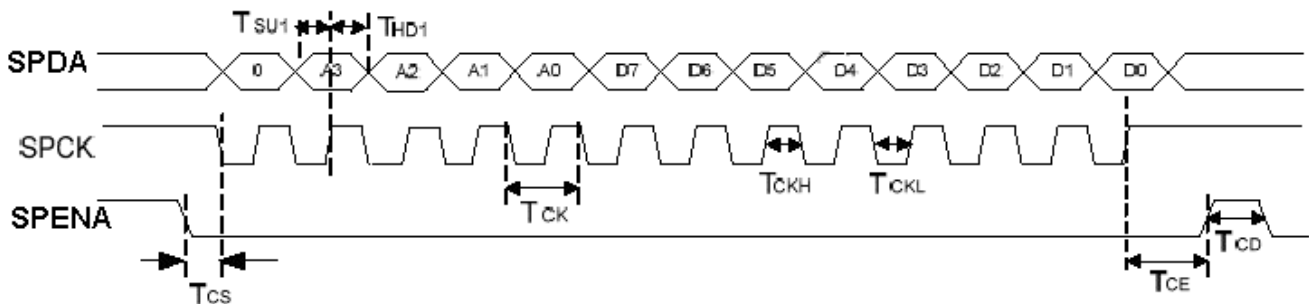
Figure 5 SPEN must keep low more than 13 clock after SDI starting to write data.

9.4 SPI Register Description

Register Name	Test	Address				Data							
	RW	A3	A2	A1	A0	D7	D6	D5	D4	D3	D2	D1	D0
R0	0	0	0	0	0						PSC	STB	RESETB
											0	0	1
R2	0	0	0	1	0	STHD7	STHD6	STHD5	STHD4	STHD3	STHD2	STHD1	STHD0
						1	0	0	0	0	0	0	0
R3	0	0	0	1	1		STVD6	STVD5	STVD4	STVD3	STVD2	STVD1	STVD0
							0	0	1	1	0	1	1
R4	0	0	1	0	0		EDGSL	LR	UD	CS	FRC	VS_POL	HS_POL
							0	1	0	1	1	0	0
R5	0	0	1	0	1				A_TIME1	A_TIME0	B_TIME2	B_TIME1	B_TIME0
									0	1	0	1	0

RW must always keep low.
"_"= don`t care.

● **Register R0**

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	reserved	reserved	reserved	reserved	reserved	PSC	STB	RESETB
Default	-	-	-	-	-	0	0	1

Table 1 Register R0 setting

PSC: Operating mode setting by input pin or SPI register.
    PSC="L", set STB, CS ,RESL[2:0], EDGSL, LR, UD by input pin.
    PSC="H", set STB, CS ,RESL[2:0], EDGSL, LR, UD by SPI register.
STB: Standby mode setting.
    STB="L", TCON and source driver are off.
    STB="H", all the functions are on.
RESETB: Global reset.
    RESETB="L", global reset the whole chip.
    RESETB="H", Normal operation.

● **Register R2**

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	STHD7	STHD6	STHD5	STHD4	STHD3	STHD2	STHD1	STHD0
Default	1	0	0	0	0	0	0	0

Table 2 Register R2 setting

STHD [7:0]: adjust first dot data position, $T_{HS}=$ **STHD [7:0]+ N (N depend on resolution).**

STHD7	STHD6	STHD5	STHD4	STHD3	STHD2	STHD1	STHD0	STH position adjust	Unit
0	0	0	0	0	0	0	0	0	T_{CPH}
0	0	0	0	0	0	0	1	1	T_{CPH}
0	0	0	0	0	0	1	0	2	T_{CPH}
0	0	0	0	0	0	1	1	3	T_{CPH}
0	0	0	0	0	1	0	0	4	T_{CPH}
0	0	0	0	0	1	0	1	5	T_{CPH}
0	0	0	0	0	1	1	0	6	T_{CPH}
0	0	0	0	0	1	1	1	7	T_{CPH}
0	1	0	1	1	0	0	0	88	T_{CPH}
0	1	0	1	1	0	0	1	89	T_{CPH}
0	1	0	1	1	0	1	0	90	T_{CPH}
0	1	1	1	1	1	1	0	126	T_{CPH}
0	1	1	1	1	1	1	1	127	T_{CPH}
1	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*128*	*T_{CPH}*
1	1	1	1	1	0	0	0	248	T_{CPH}
1	1	1	1	1	0	0	1	249	T_{CPH}
1	1	1	1	1	0	1	0	250	T_{CPH}
1	1	1	1	1	0	1	1	251	T_{CPH}
1	1	1	1	1	1	0	0	252	T_{CPH}
1	1	1	1	1	1	0	1	253	T_{CPH}
1	1	1	1	1	1	1	0	254	T_{CPH}
1	1	1	1	1	1	1	1	255	T_{CPH}

Table 3 Adjust start pulse position by dot

- **Register R3**

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	reserved	STVD6	STVD5	STVD4	STVD3	STVD2	STVD1	STVD0
Default		0	0	1	1	0	1	1

Table 4 Register R3 setting

STVD [6:0]: adjust first line position, T_{VS}= **STVD [6:0] + N (N depend on resolution)**.

STVD6	STVD5	STVD4	STVD3	STVD2	STVD1	STVD0	STV position adjust	Unit
0	0	0	0	0	0	0	0	T_H
0	0	0	0	0	0	1	1	T_H
0	0	0	0	0	1	0	2	T_H
0	0	0	0	0	1	1	3	T_H
0	0	0	0	1	0	0	4	T_H
0	0	0	0	1	0	1	5	T_H
0	0	0	0	1	1	0	6	T_H
0	0	0	0	1	1	1	7	T_H
0	0	1	1	0	0	0	24	T_H
0	0	1	1	0	0	1	25	T_H
0	0	1	1	0	1	0	26	T_H
0	*0*	*1*	*1*	*0*	*1*	*1*	*27*	*T_H*
0	0	1	1	1	0	0	28	T_H
0	0	1	1	1	0	1	29	T_H
0	0	1	1	1	1	0	30	T_H
0	0	1	1	1	1	1	31	T_H
1	1	1	1	0	0	0	120	T_H
1	1	1	1	0	0	1	121	T_H
1	1	1	1	0	1	0	122	T_H
1	1	1	1	0	1	1	123	T_H
1	1	1	1	1	0	0	124	T_H
1	1	1	1	1	0	1	125	T_H
1	1	1	1	1	1	0	126	T_H
1	1	1	1	1	1	1	127	T_H

Table 5 Adjust first line position by line

● **Register R4**

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	reserved	EDGSL	LR	UD	CS	FRC	VS_POL	HS_POL
Default		0	1	0	1	1	0	0

Table 6 Register R4 setting

EDGSL: Define input clock polarity.
EDGSL="L", CLK polarity is not inverted, latch data at CLK rising edge.
EDGSL="H", CLK polarity is inverted, latch data at CLK falling edge.
LR: Shift direction control.
LR=H: DIO1->SO1->•••••->SO1200->DIO2
LR=L: DIO2->SO1200->•••••->SO1->DIO1
UD: Gate Driver Up/down scan setting.
UD=H, reverse scan.
UD=L, normal scan.
CS: Charge share function control.
CS=L, disable charge share function.
CS=H, enable charge share function.
FRC: Dithering ON/OFF control.
FRC=L, Dithering function disable.
FRC=H, Dithering function enable
VS_POL: VS polarity setting.
VS_POL=L, negative polarity.
VS_POL=H, positive polarity.
HS_POL: HS polarity setting.
HS_POL=L, negative polarity.
HS_POL=H, positive polarity.

● **Register R5**

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	reserved	reserved	reserved	A_TIME1	A_TIME0	B_TIME2	B_TIME1	B_TIME0
Default				0	1	0	1	0

Table 7 Register R5 setting

A_TIME [1:0]: The blank image display time is decided by A_TIME

00: blank image display time is 4 VS time.

01: blank image display time is 8 VS time.

10: blank image display time is 16 VS time.

11: blank image display time is 32 VS time.

B_TIME [2:0]: When into STB mode, the blank image display time is decided by B_TIME.

000: blank image display time is 3 VS time.

001: blank image display time is 4 VS time.

010: blank image display time is 5 VS time.

011: blank image display time is 6 VS time.

100: blank image display time is 7 VS time.

101: blank image display time is 8 VS time.

110: blank image display time is 9 VS time.

111: blank image display time is 10 VS time

9.5 Color Data Input Assignment

Color		Data Signal																	
		Red						Green						Blue					
		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

10. OPTICAL CHARACTERISTIC

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ_x+	Center CR≥10	60	70	--	deg	Note 1,4
		θ_x-		60	70	--		
	Vertical	θ_Y+		40	50	--		
		θ_Y-		60	70	--		
Contrast Ratio		CR	at optimized viewing angle	300	400			Note 1,3
Response time	Rise	Tr	Center	-	15	30	ms	Note 1,6
	Fall	Tf	$\theta x=\theta y =0°$	-	35	50	ms	
Uniformity		B-uni	$\theta x=\theta y =0°$	70	80	--	%	Note1,5
Center Brightness		L	$\theta x=\theta y =0°$ ADJ=3.3V	360	400	--	cd/	Note 1,2
Chromaticity		x_W	Center $\theta x=\theta y =0°$	0.273	0.323	0.373		Note 1,7
		y_W		0.267	0.317	0.367		
		x_R		0.569	0.619	0.669		
		y_R		0.303	0.353	0.403		
		x_G		0.307	0.357	0.407		
		y_G		0.473	0.523	0.573		
		x_B		0.100	0.150	0.200		
		y_B		0.050	0.100	0.150		
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:
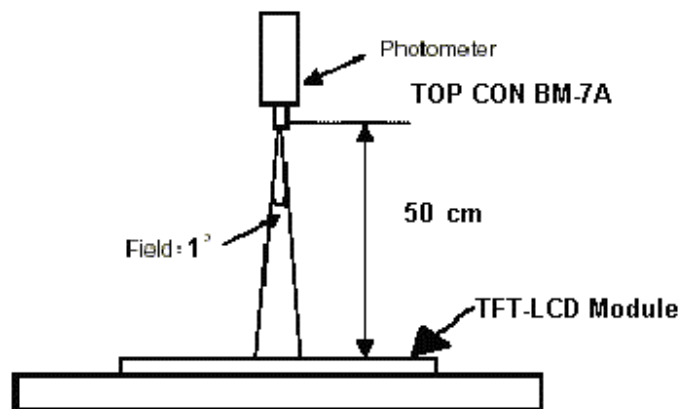
Note2: Measured at the center area of the panel and at the viewing angle of the $\theta x = \theta y = 0°$

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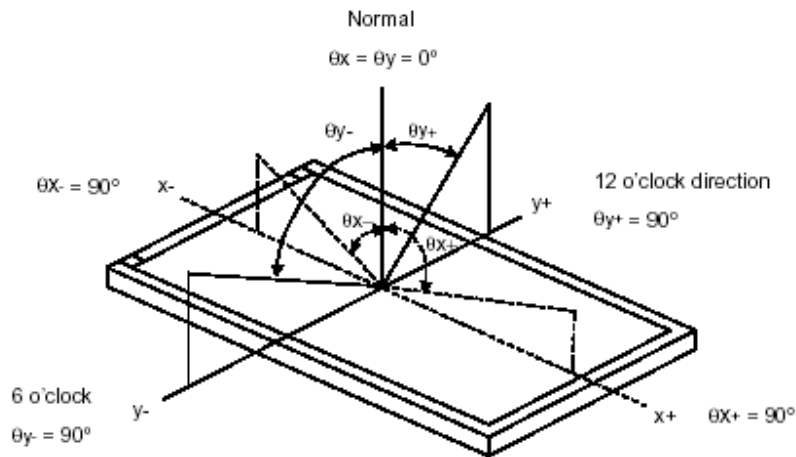
Note 5: Definition of Brightness Uniformity (B-uni):
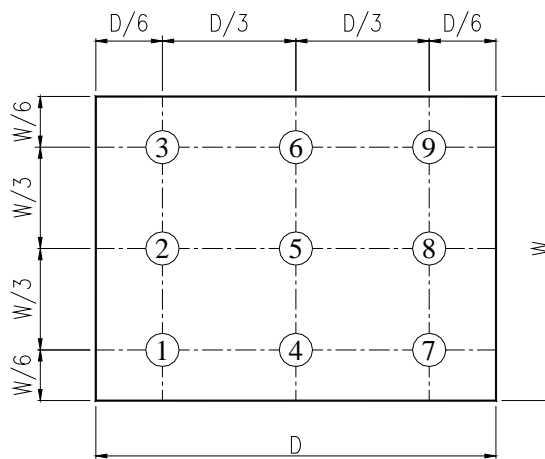
$$\text{B-uni} \quad \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9points}} \quad \text{(Note 5).}$$

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.
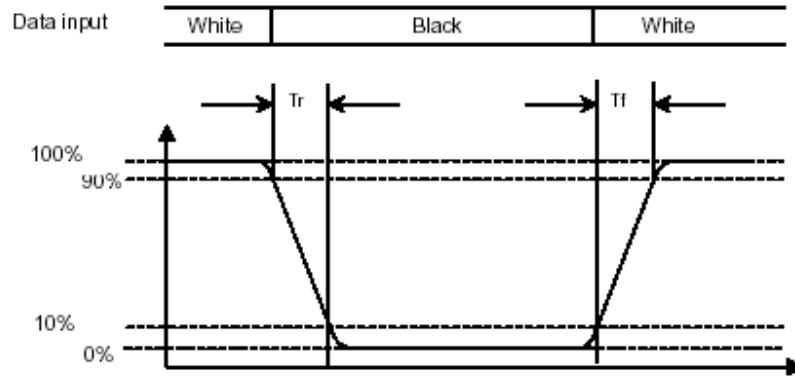
Note 7: Definition of Chromaticity:

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
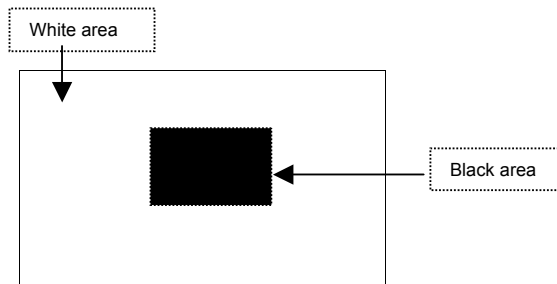
11. QUALITY ASSURANCE
11.1 Test Condition

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

No.	Reliability Test Item & Level	Test Level
1	High Temperature Storage Test	T=80°C,240hrs
2	Low Temperature Storage Test	T=-30°C,240hrs
3	High Temperature Operation Test	T=70°C,240hrs
4	Low Temperature Operation Test	T=-20°C,240hrs
5	High Temperature and High Humidity Operation Test	T=60°C,90% RH,240hrs
6	Thermal Cycling Test (No operation)	-30°C → +25°C → +80°C,200 Cycles 30 min 5min 30 min
7	Vibration Test (No operation)	Frequency:0 ~ 55 Hz Amplitude:1.5 mm Sweep Time:11min Test Period:6 Cycles for each Direction of X,Y,Z
8	Electrostatic Discharge Test (No operation)	150pF,330Ω Air:$\pm$ 15KV;Contact: $\pm$8KV 10 times/point;4 points/panel face

12. LOT NUMBERING SYSTEM

9	7	4	2

Production week number

Production year

13. LCM NUMBERING SYSTEM

FG 050052 D S S W B 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

D–Top View & Wide temp.

J–Bottom view 6H & Super Wide temp.

Backlight Color

W –White   Y – Yellow Green

G - green

Backlight

C–CCFL B/L

S- LED B/L

LCD Polarize type

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

M–transmissive   F– transflective

LCD type

A –TFT analog

D –TFT digital

Series code

050052–, 5.0 inch

Model type

FG–Standard TFT Module

FX–Custom TFT Module

14. PRECAUTION FOR USING 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

Note:
1. Center Brightness : 360 cd/m^2 (Min.); 400 cd/m^2 (Typ.)
2. Uniformity : 70% min.
3. 40 Pin Match Connector: Molex: 51296-4094 or Equivalent.
4. Tolerance is ±0.3 unless otherwise noted.
5. For RoHS.

Dimensions and labels on drawing:
118.1±0.5(Module); 110.8 (Bezel opening); 108 (LCD A.A.); 57.6±0.5; 2.2; 3.6; 3.3; 1.9; 35.7±0.5; 0.045; 0.135; Scale 50/1; RGB; Peeling Tape; 800 RGB 480 dots; 64.8 (LCD A.A.); 67.6 (Bezel opening); 77±0.5(Module); 50±0.5; 4±0.5 Bending area; 30±1 Area where can't be crooked; Component Area & mylar tape H= 2.0mm MAX.; (26); (30); (23.05); mylar tape; 5±0.5; 57.6±1; (91.2)

3.16±0.3; Up Bezel; Down Bezel; Housing; Reflector; Light guide; Diffuser; Thin BEF; DBEF II; LCD; PLR; IC; LED Dice; LED FPC; LCD FPC; Cover Tape; Stiffener; Contact side; 0.3±0.05

Bar-Code; 10±3; 10±3; 1 40 A

Detail A Scale 2/1; 0.1; 0.5; 0.125; 0.35 +0.04 -0.03; P 0.5*(40-1)=19.5±0.1; 20.5±0.1; 0.5±0.1

40 PIN FUNCTIONS							
1	GND	11	B5	21	G2	31	GND
2	VCC	12	B4	22	G1	32	CLK
3	VCC	13	B3	23	G0	33	HS
4	RESETB	14	B2	24	GND	34	VS
5	UD	15	B1	25	R5	35	DEN
6	RL	16	B0	26	R4	36	STB
7	SPENA	17	GND	27	R3	37	VLED
8	SPCK	18	G5	28	R2	38	VLED
9	SPDA	19	G4	29	R1	39	ADJ
10	GND	20	G3	30	R0	40	GND

DATE:	02/27/08'	TITLE:
DRAWN:		LCM OUTLINE DIMENSION
CHECK:		DWG. NO. FG050052S-01
APPROVE:		UNITS M M REV. A

AUTH	DESCRIPTION	DATE	APPROVED
	REVISIONS		

SCALE 1 / 1   SHEET 1 OF 1

DATA IMAGE

16. PACKAGE INFORMATION

Form

Antistatic bag
Antirust
Drier
Cover tray
(Antistatic tray)
Antistatic form
LCM
Antistatic tray

Antistatic bag

Antirust
Drier
Form

Carton

Material

1 Carton + 2 Anti-static bag + 1 Form(35mm) + 1 Form(15mm)

+ 19 Anti-static tray + 2 Drier + 2 Antirust

Total pcs

1 Antistatic tray = 6 pcs

1 Anti-static bag = 9 Anti-static tray + cover tray = 9*6 +1*0 = 54 pcs

1 Anti-static bag = 8 Anti-static tray + cover tray = 8*6 +1*0 = 48 pcs

1 Carton = 2 Anti-static bag = 54 + 48 = 102 pcs

Carton size : 482L x 282W x 279H (mm)

Total Weight ÷ 10 kgw

FG05005(X) TFT LCM PACKING