

DATA IMAGE CORPORATION

TFT Module Specification

Preliminary

ITEM NO.: FG040346DSSWBG03

Table of Contents

1.	COVER & CONTENTS	1
2.	RECORD OF REVISION	2
3.	FEATURE ·····	3
4.	GENERAL SPECIFICATIONS	3
5.	ELECTRICAL CHARACTERISTICS	3
6.	BLOCK DIAGRAM ······	4
7.	PIN CONNECTIONS	5
8.	AC CHARACTERISTICS	6
9.	OPTICAL CHARACTERISTIC	9
10.	QUALITY ASSURANCE	11
11.	LCM PRODUCT LABEL DEFINE	12
12.	PRECAUTIONS IN USE LCM	14
13.	OUTLINE DRAWING	15
14	PACKAGE INFORMATION	16

Customer Companies	R&D Dept.	Q.C. Dept.	Eng. Dept.	Prod. Dept.
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Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
	1	02/DEC/11'		16



2. RECORD OF REVISION

Rev	Date	Item	Page	Comment
1	02/DEC/11'			Initial preliminary



3. FEATURE

• 64 gray level with 2 bit dithering function to realize 16M colors

4. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Display resolution	480X R.G.B x 272	dot
Active area	95.04(W) x 53.856(H)	mm
Screen size	4.3(Diagonal)	inch
Dot pitch	0.066 (W) x 0.198(H)	mm
Color configuration	R.G.B. Stripe	
Overall dimension	105.5 (W) x 67.2(H) x 3.1(D)	mm
Weight	56	g
Surface treatment	Clear	
View Angle direction	6 o'clock	
Our components and processes are	e compliant to RoHS standard	

5. ELECTRICAL CHARACTERISTICS

GND=0V,Ta=25°C

Parameter	Symbol	MIN.	Тур.	MAX.	Unit	Remark
Power Supply voltage	V_{DD}	3.0	3.3	3.6	V	Note1
Power Supply Current	I _{DD}		21	30	mA	$V_{DD} = 3.3V$
Ripple Voltage	V_{RPVDD}			100	mVp-p	
"H" level logical input voltage	V _{IH}	0.7VDD		VDD	٧	
"L" level logical input voltage	V _{IL}	0	-	0.3VDD	V	
Operating temperature	Тора	-20		70	°C	Ambient temperature
Storage temperature	Tstg	-30		80	°C	Ambient temperature

Note1: VDD Absolute Maximum Ratings -0.3V~+5V

5.1 Backlight driving for power conditions

Ta= 25 °C

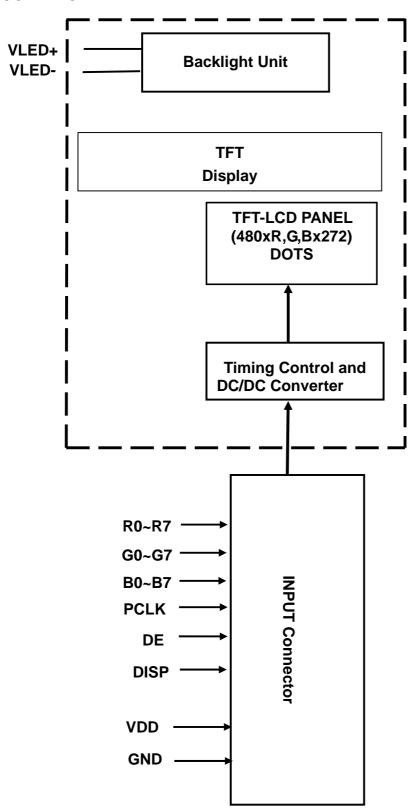
Page: 3 /16

Parameter	Symbol	Min.	Тур.	Max.	Unit	Remark
LED current	Ι _L		20		mA	
VLED voltage	V_L	21	23.1	25.2	V	I _{L=20} Ma
LED dice life time		20,000	30,000		Hours	Note 1

Note 1: The "LED dice life time" is defined as the brightness decrease to 50% original brightness that the ambient temperature is 25 and LED dice current=20mA



6. BLOCK DIAGRAM





7. PIN CONNECTIONS

7.1 Input Pins Connection

Pin No	Symbol	Function	Remark
1	VLED-	LED Power Supply Cathode.	
2	VLED+	LED Power Supply Anode.	
3	NC	No Connection	
4	VDD	Power Supply: +3.3V	
5	R0		
6	R1		
7	R2		
8	R3	Digital data input. R0 is LSB and R7 is MSB	
9	R4		
10	R5		
11	R6		
12	R7		
13	G0		
14	G1		
15	G2		
16	G3	Digital data input. G0 is LSB and G7 is MSB	
17	G4		
18	G5		
19	G6		
20	G7		
21	В0		
22	B1	1	
23	B2		
24	В3	Digital data input. B0 is LSB and B7 is MSB	
25	B4		
26	B5		
27	В6	1	
28	B7	1	
29	GND	Ground	
30	PCLK	clock signal to sample each data	
31	DISP	Display ON/OFF Control ON=H(VDD), OFF=L(GND)	
32	HSYNC	Horizontal synchronous signal or NC	
33	VSYNC	Vertical synchronous signal or NC	
34	DE	Data enable single	
35	NC	No Connection	
36	GND	Ground	
37	NC(XR)	No Connection (Touch panel Right)	
38	NC(YD)	No Connection (Touch panel Down)	
39	NC(XL)	No Connection (Touch panel Left)	
40	NC(YU)	No Connection (Touch panel Up)	



8. AC CHARACTERISTICS

8.1 Input Timing Requirement (480RGBx272, Ta =25°C, VCC=3.3V GND= 0V)

, ,					
Parameter	Symbol	Min.	Typ. Value	Max.	Unit
CK frequency	fclk	5	9	12	MHz
DE set-up time	Tdesu	12	-	-	ns
DE hold time	Tdehd	12	-	-	ns

Clock and data input timing

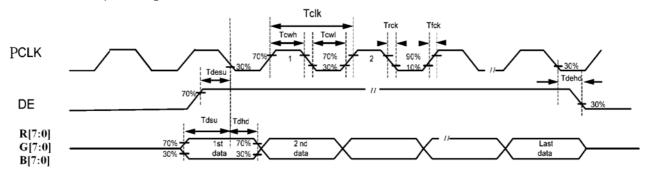


Fig 1. Parallel RGB input timing

8.2 Input Setup Timing Requirement (VCC = 3.0 to 3.6V, GND=0V, TA=-20 to +85)

Parameters	Symbol	Min.	Тур.	Max.	Unit	Conditions
CK clock time	Tclk	33.3	-	-	ns	CK =30MHz
CK clock low period	Tcwl	40	-	60	%	
CK clock high period	Tcwh	40	-	60	%	
Clock rising time	Trck	9	-	-	ns	
Clock falling time	Tfck	9	-	-	ns	
Data setup time	Tdasu	12	-	-	ns	
Data hold time	Tdahd	12	-	-	ns	

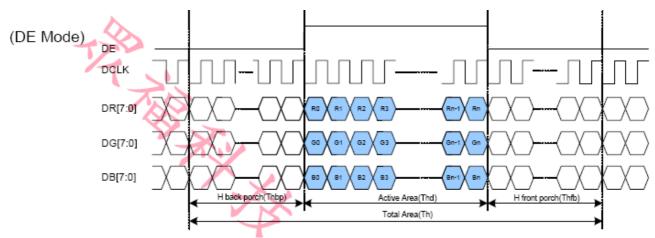
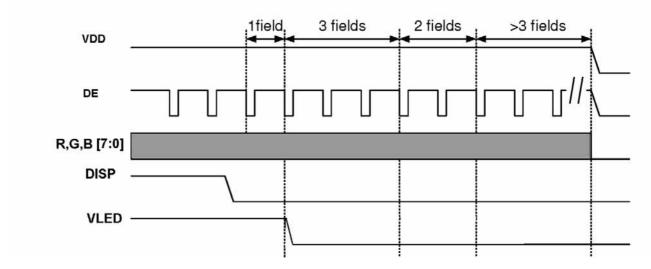


Fig 2. Input setup timing requirement

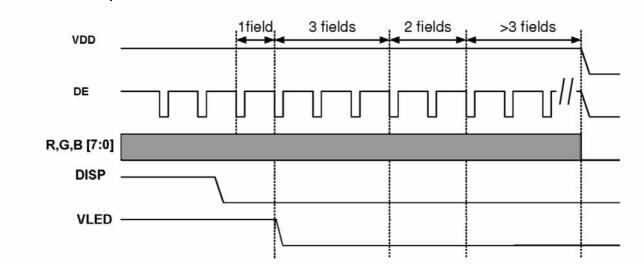
8.3 Power on/off sequence:

Power on sequence





Power off sequence

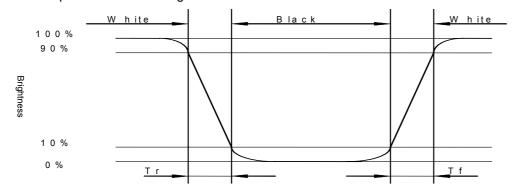


9. Optical Characteristics

Item Symbol Cond		Condition	Min.	Тур.	Max.	Unit	Remark		
Respons	se time	Tr+Tf	<i>θ</i> = 0 °	-	25	-	ms	Note 4	
Contras	t ratio	CR	At optimized viewing angle	100	400			Note 5	
	Тор			40	50	-			
Viewing	Bottom		CR≥10	60	70	-	Dog	Note 6	
angle	Left		GR≥10	60	70	-	Deg.	Note o	
	Right			60	70	-			
Luminance	of white		0.00	320	400		cd/m2	Note 7,8	
Uniformity			θ= 0 °	70			%	Note 8,9	
Whi		Х	θ=0°	0.27	0.32	0.37		Note 7	
chroma	aticity	у	0–0	0.28	0.33	0.38		note /	

- Note 1: Ambient temperature =25°C. LED current I_L = 20 mA.
- Note 2: To be measured in the dark room.
- Note 3: To be measured on the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7A, after 2 minutes operation.
- Note 4: Definition of response time:

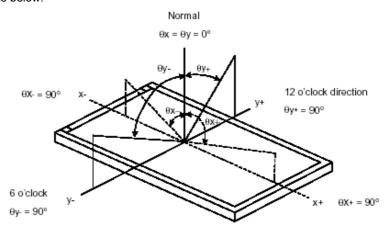
The output signals of photo-detector are measured when the input signals are changed from "white" to "black" (rising time) and from "black" to "white" (falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as shown below.



Note5: Definition of contrast ratio:

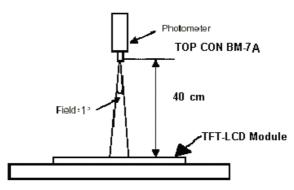
 $\label{lem:contrast} \mbox{Contrast ratio is calculated with the following formula.}$

Contrast ratio (CR)= Photo-detector output when LCD is at "White" state
Photo-detector output when LCD is at "Black" state

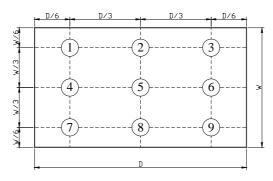


Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note8: The method of optical measurement



Note 9: Definition of Brightness Uniformity (B-uni):



B-uni = Minimum luminance of 9 points

Maximum luminance of 9points





10. QUALITY ASSURANCE 11.1 Test Condition

11.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : $25 \pm 5^{\circ}$ 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	T=60°C 009/ DH 240bro			
5	Humidity Operation Test	T=60°C,90% RH,240hrs			
6	Thermal Cycling Test	-30°C → $+25$ °C → $+80$ °C,200 Cycles			
U	(No operation)	30 min 5min 30 min			
		Frequency:0 ~ 55 Hz Amplitude:1.5 mm			
7	Vibration Test	Sweep Time:11min			
'	(No operation)	Test Period:6 Cycles for each Direction of X,Y,Z			
	Flacture to the Dischause Test	150pF,330Ω			
8	Electrostatic Discharge Test	Air:± 15KV;Contact: ± 8KV			
	(No operation)	10 times/point;4 points/panel face			

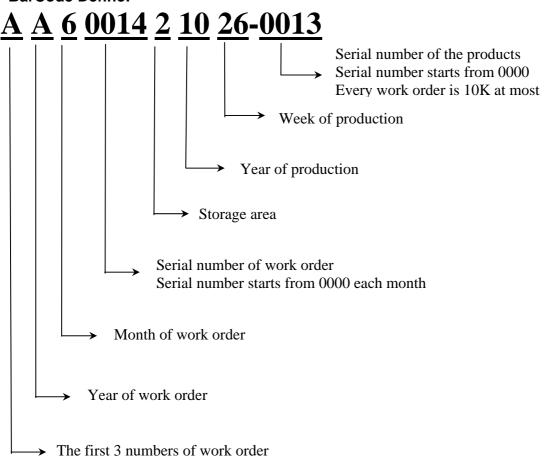


11. LCM PRODUCT LABEL DEFINE

Product Label style:

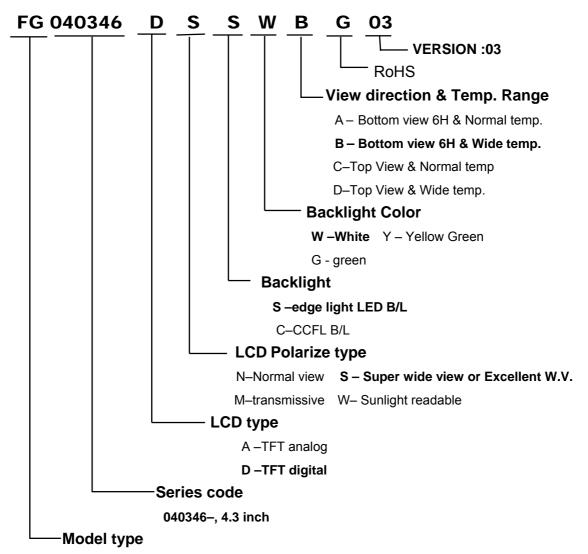


BarCode Define:





Product Name Define:



FG-Standard TFT Module

FX-Custom TFT Module



12. 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 degredation, 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.

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- (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 : $280^{\circ}\text{C} \pm 10^{\circ}\text{C}$
- (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.

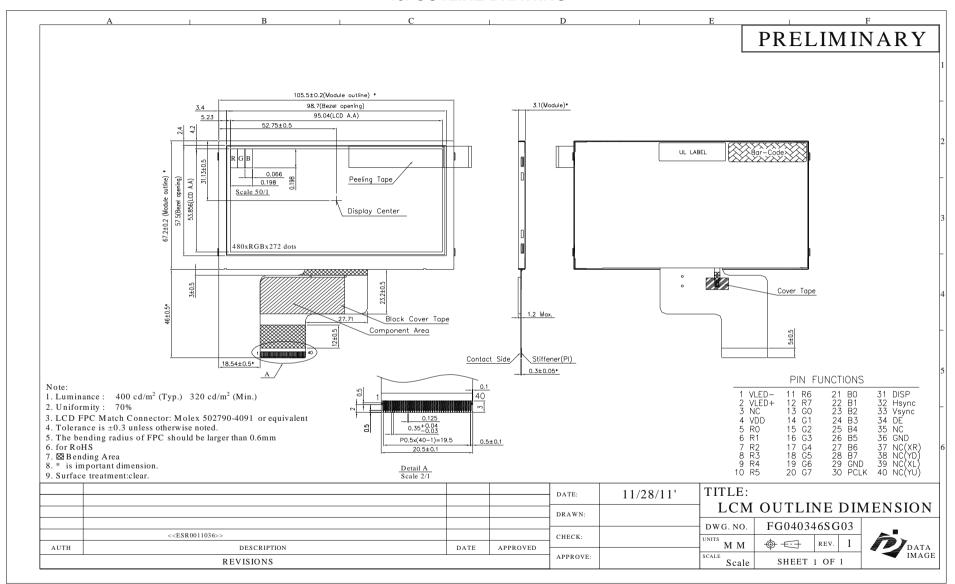
2.6 Limited Warranty

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.

Page: 14 /16



13. OUTLINE DRAWING





14.PACKAGE INFORMATION

-Form(35mm) .Carton

Antistatic bag

Antistatic tray

Material

1 Carton + 1 Form (15mm) + 2 Anti-static bag + 20 Anti-static tray + 2 Drier + 2 Antirust + 1 Form (35mm)

Total pcs

Anti-static bag = 9 Anti-static tray + cover tray = 9*9 + 1*0 = 81 pcs Antistatic tray = 9 pcs (modules)

Carton = 2 Anti-static bag = 2*81 = 162 pcs

Carton = 162 pcs

Total Weight = 9.6 kgwCarton size : 465L x 380W x 395H (mm)

FG040344 TFT LCM PACKING

FG040346DSSWBG03 REV:1

Page: 16 /16

Drier Antirust

Antistatic bag

Antistatic tray

-Cover tray (Antistatic tray)

Antistatic form

Ŕ

Antirust

Form(15mm)