

**SPECIFICATION**  
For  
LCD Module  
**CFAF240320E-T**

<b>MODULE:</b>	<b>CFAF240320E-T</b>
<b>CUSTOMER:</b>	

<b>REV</b>	<b>DESCRIPTION</b>	<b>DATE</b>
<b>1</b>	<b>FIRST ISSUE</b>	<b>2008.12.02</b>

<b>TZD</b>	<b>INITIAL</b>	<b>DATE</b>
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<b>CHECKED BY</b>		
<b>APPROVED BY</b>		

<b>CUSTOMER</b>	<b>INITIAL</b>	<b>DATE</b>
<b>APPROVED BY</b>		

## Revision History

Data	Rev. No.	Page	Summary
2008-12-02	1		First issue
2010-02-17	2		<b>Modified drawing to reflect backlight tray changes. No change to active area, or other critical dimensions.</b>

PRELIMINARY DATASHEET

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PRELIMINARY  
DATASHEET

## General Description

### \* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 2.2" TFT-LCD contains 240 x 320 pixels, and can display up to 262K colors.

### \* Features

- Low Input Voltage: VCC: 2.5~3.3V
- Display Colors of TFT LCD: 262K colors
- CPU Interface: 8080 parallel 8 bit
- Internal Power Supply Circuit.

General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	33.48(H) *44.64(V) (2.2 inch )	mm	-
Driver element	a-Si TFT active matrix	-	-
Display colors	262K	colors	-
Number of pixels	240(RGB) *320	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.1395(H) *0.1395(V)	mm	-
Viewing angle	12	o'clock	-
Drive IC	ILI9325	-	-
Display mode	Transmissive/ Normally White	-	-
Operating temperature	-30~+75℃	-	-
Storage temperature	-40~+85℃	-	-

### ● Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		41.70		mm	-
	Vertical(V)	-	56.16	-	mm	-
	Depth(D)			2.5	mm	-
Weight		-	TBD	-	g	-

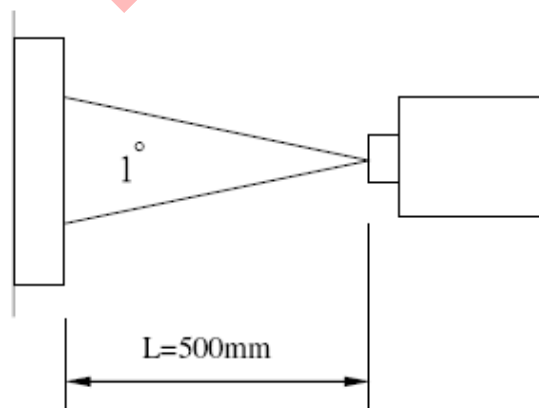
# 1. Optical Characteristics

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK		
Transmittance	T			(5.0)		%			
Contrast Ratio	CR	*1)		(300)	-	--	Note 3		
Response Time	Tr+ Tf	*3)	-	(30)	(40)	ms	Note 4		
Viewing Angle	Vertical	$\theta$ *2)	CR $\geq$ 10	(50)	(60)	-	Cell		
				(40)	(50)	-	Cell	Note 5	
	Horizontal			$\phi$ *2)	(55)	(65)	-	Cell	
					(55)	(65)	-	Cell	
Color Filter Chromacicity	White	x y Y	$\theta = \phi = 0^\circ$	(0.290)	(0.310)	(0.330)	Cell		
				(0.323)	(0.343)	(0.363)	Cell	Note 6	
				(29)	(33.0)	(37)	Cell		
	Red	x y Y	$\theta = \phi = 0^\circ$	(0.584)	(0.604)	(0.624)	Cell		
				(0.305)	(0.325)	(0.345)	Cell		
				(20.0)	(23.0)	(26.0)	Cell		
	Green	x y Y	$\theta = \phi = 0^\circ$	(0.279)	(0.299)	(0.319)	Cell		
				(0.547)	(0.567)	(0.587)	Cell		
				(55.3)	(59.3)	(63.3)	Cell		
	Blue	x y Y	$\theta = \phi = 0^\circ$	(0.115)	(0.135)	(0.155)	Cell		
				(0.127)	(0.147)	(0.167)	Cell		
				(13.6)	(16.6)	(19.6)	Cell		
NTSC	Gamut			(53%)	-				

Note 1. Ambient condition : 25°C ± 2°C , 60 ± 10% RH , under 10 Lux in the darkroom .

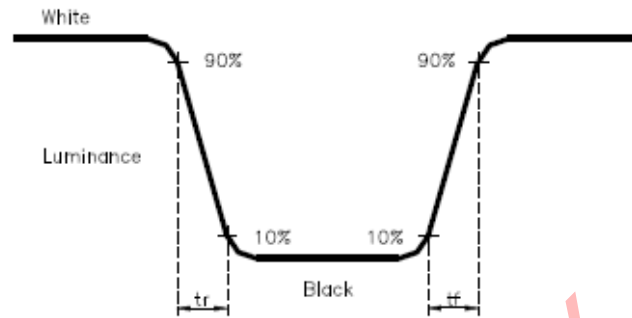
Note 2. Measure device : BM-5A (TOPCON) , viewing cone= 1° , I<sub>t</sub>=20mA .



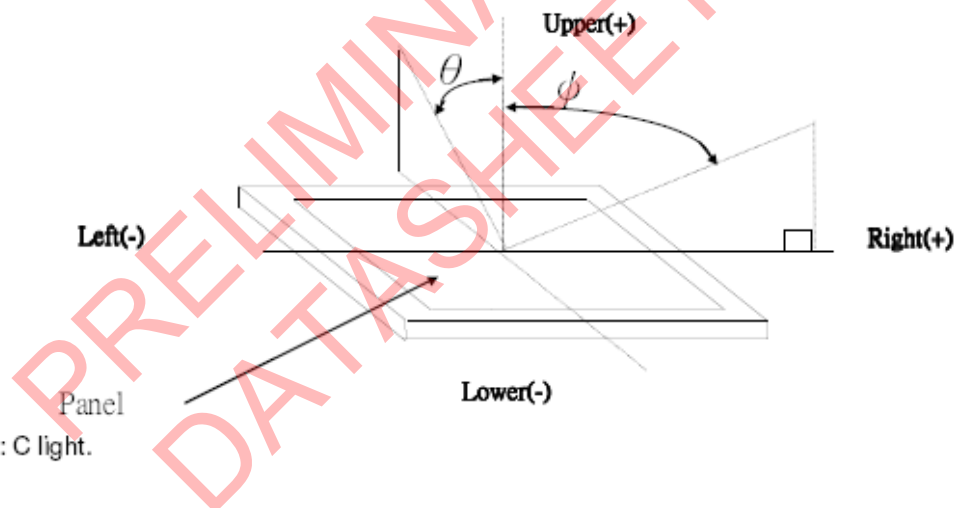
Note 3. Definition of Contrast Ratio :

$$CR = \text{White Luminance (ON)} / \text{Black Luminance (OFF)}$$

Note 4. Definition of response time : The response time is defined as the time interval between the 10% and 90% amplitudes.



Note 5. Definition of view angle( $\theta$  ,  $\psi$ ) :



Note 6. Light source: C light.

## 2. Electrical Characteristics

### 2.1 ABSOLUTE MAXIMUM RATING (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
SYSTEM voltage	VCC	-0.3	2.9	+ 4.6	V	-
Supply voltage (Digital)	VCCIO	-0.3	1.8	+ 4.6	V	-
Supply voltage (Logic)	VCCIO	-0.3	-	+ 4.6	V	-
Operating temperature	T <sub>OP</sub>	-20	-	+70	°C	1,
Storage temperature	T <sub>ST</sub>	-30	-	+80	°C	2

Note1: Background color changes slightly depending on ambient temperature. This phenomenon is reversible. Ta70°C: 75%RH max

Ta>70°C: absolute humidity must be lower than the humidity of 75%RH at 70°C

Note2: Ta at -30°C will be <48hrs, at 80°C will be <120hrs

### 2.2 DC Electrical Characteristics

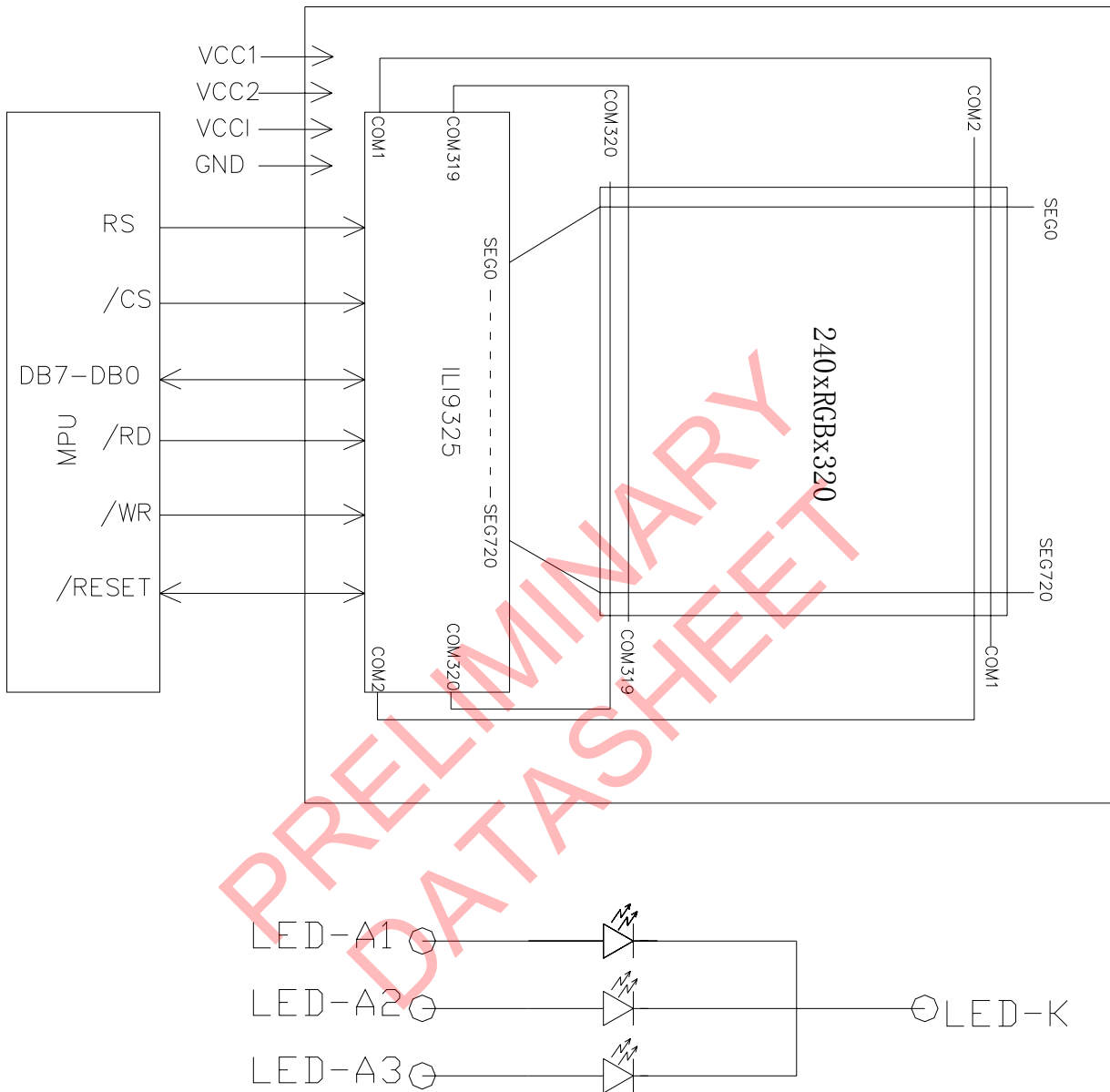
Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
SYSTEM voltage	VCC	2.5		3.3	V	-
Digital & Logic operation Supply voltage	VCCIO	1.65		3.3	V	-
Normal mode Current consumption	VCC		5		mA	-
	VCCIO		5		mA	-
Sleep-in mode Current consumption	VCC <sub>1</sub>		10		uA	-
	VCCIO		10		uA	-
Level input voltage	V <sub>IH</sub>	0.8 VCCIO	-	VCCIO	V	-
	V <sub>IL</sub>	GND	-	0.2 VCCIO	V	-
Level output voltage	V <sub>OH</sub>	0.8VCCIO	-	VCCIO	V	-
	V <sub>OL</sub>	GND	-	0.2 VCCIO	V	-

### 2.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 3chips White LED in parallel

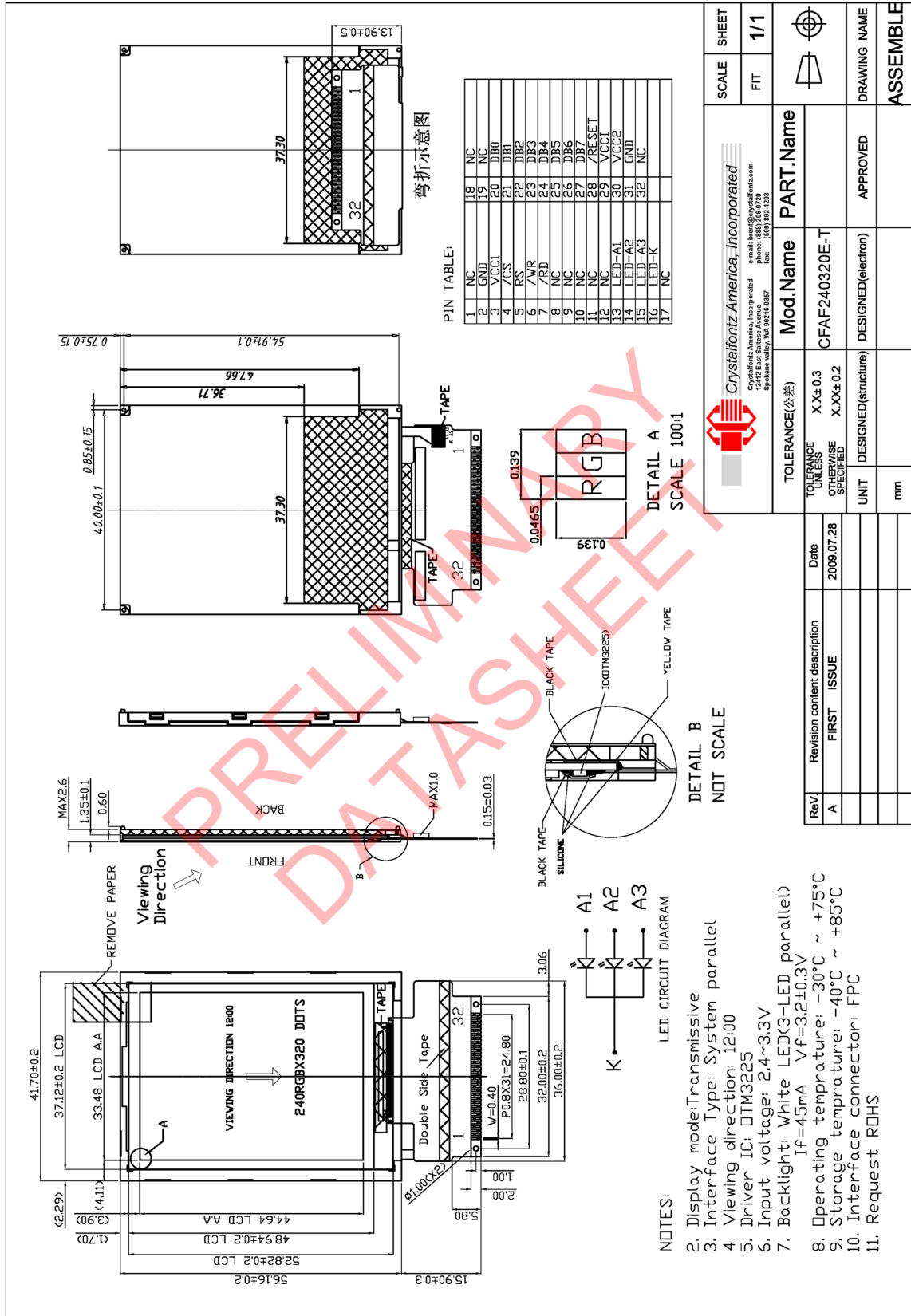
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I <sub>F</sub>	-	45	-	mA	
Forward Voltage	V <sub>F</sub>		3.2		V	-
LCM Luminance	L <sub>V</sub>		180	-	cd/m <sup>2</sup>	
Uniformity	A <sub>Vg</sub>	80	-	-	%	-

### 3. Block Diagram





### 4. Outline dimension



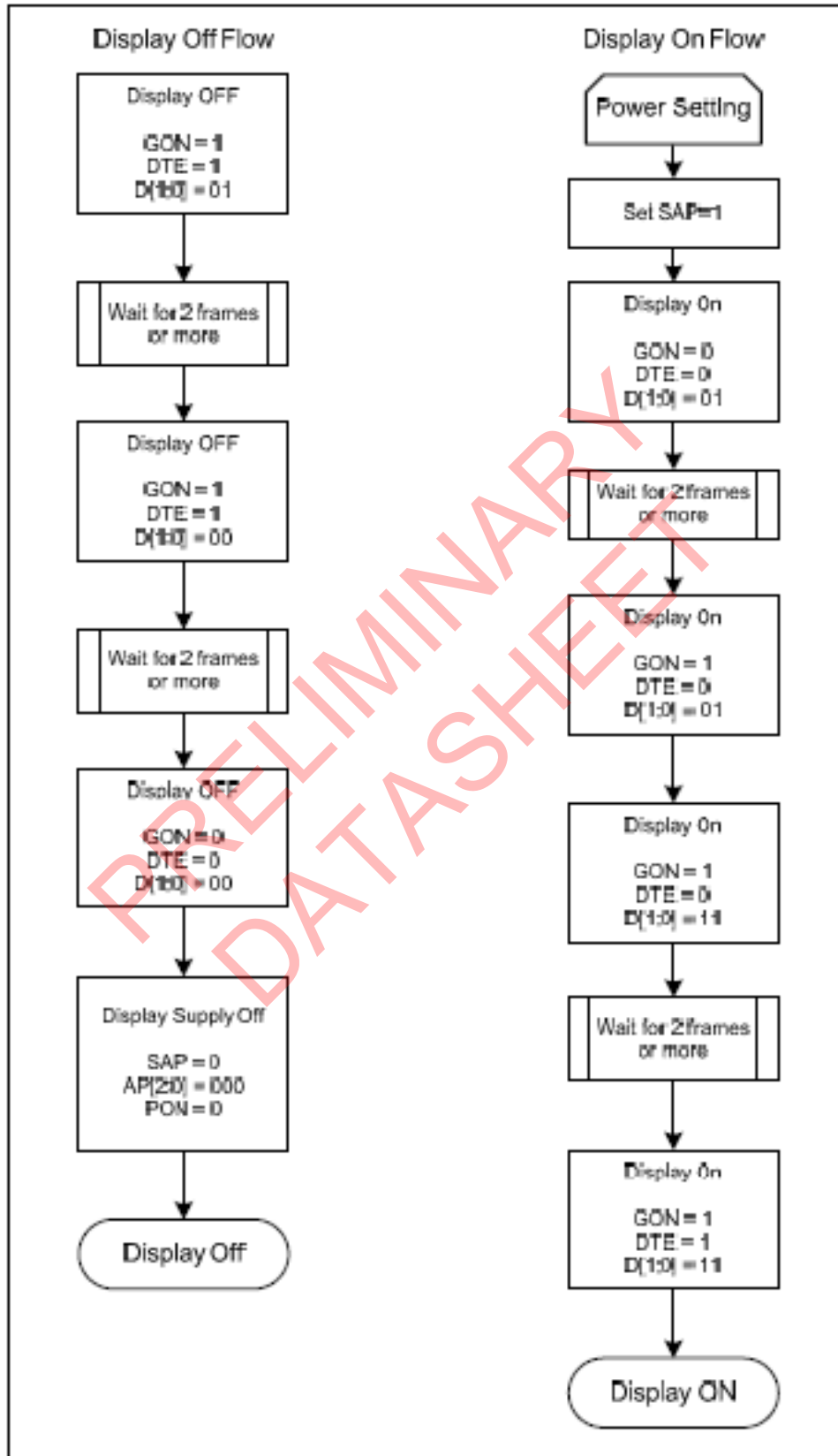
Crystalfontz America, Incorporated email: sales@crystalfontz.com Spokane Valley, WA 99216-4357 Fax: (509) 892-1200		SCALE	SHEET
TOLERANCE (公差)		FIT	1/1
TOLERANCE UNLESS OTHERWISE SPECIFIED	X.X±0.3	DRIVING NAME	ASSEMBLE
UNIT	mm	APPROVED	
DESIGNED(structure)	DESIGNED(electron)		
Mod.Name	PART.Name		
CFAF240320E-T			
Date	2009.07.28		
Revision content description	FIRST ISSUE		

## 5. Input terminal Pin Assignment

Pin NO.	Symbol	Level	Function
1	NC		No connection
2	GND	L	Ground
3	VCCI	H	Power supply
4	/CS	H/L	Chip select input pin
5	RS	H/L	A register select signal
6	/WR	H/L	Write enable clock input pin
7	/RD	H/L	Read enable clock pin
8	NC		No connection
9	NC		No connection
10	NC		No connection
11	NC		No connection
12	NC		No connection
13	LED-A1	H	Backlight+
14	LED-A2	H	Backlight+
15	LED-A3	H	Backlight+
16	LED-K	L	Backlight-
17	NC		No connection
18	NC		No connection
19	NC		No connection
20	DB0	H/L	DATA BUS DB0
21	DB1	H/L	DATA BUS DB1
22	DB2	H/L	DATA BUS DB2
23	DB3	H/L	DATA BUS DB3
24	DB4	H/L	DATA BUS DB4
25	DB5	H/L	DATA BUS DB5
26	DB6	H/L	DATA BUS DB6
27	DB7	H/L	DATA BUS DB7
28	/RESET	H/L	Hardware reset pin
29	VCCI	H	Power supply
30	VCC2	H	Power supply
31	GND	L	Ground
32	NC		No connection



## 7. Display ON/OFF Sequence



## 8. Reliability Test Result

### 8.1 Condition

Item	Condition	Sample Size	Test Result	Note
Low Temperature Operating Life test	-20 °C , 96HR	3ea	pass	-
Thermal Humidity Operating Life test	40 °C , 90%RH, 96HR	3ea	pass	-
Temperature Cycle ON/OFF test	-20 °C ↔ 70 °C , ON/OFF, 20CYC	3ea	pass	(1)
High Temperature Storage test	80 °C , 96HR	3ea	pass	-
Low Temperature Storage test	- 30 °C , 96HR	3ea	pass	-
Thermal Shock Resistance	The sample should be allowed to stand the following 5 cycles of operation: TSTL for 30 minutes -> normal temperature for 5 minutes -> TSTH for 30 minutes -> normal temperature for 5 minutes, as one cycle, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours	3ea	pass	
Box Drop Test	1 Corner 3 Edges 6 faces, 66cm(MEDIUM BOX)	1box	pass	-

Note (1) ON Time over 10 seconds, OFF Time under 10 seconds

## 9. Cautions and Handling Precautions

### 9.1 Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.

Do not warp or twist the module during assembly work.

(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

(3) Note that polarizers are very fragile and could be easily damaged. Do not press or scratch the surface.

(4) Do not allow drops of water or chemicals to remain on the display surface.

If you have the droplets for a long time, staining and discoloration may occur.

(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.

Do not use ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth.

In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.

(8) Protect the module from static; it may cause damage to the CMOS ICs.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(10) Do not disassemble the module.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(12) Pins of I/F connector shall not be touched directly with bare hands.

(13) Do not connect, disconnect the module in the "Power ON" condition.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

### 9.2 Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.

It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%

(2) Do not store the TFT-LCD module in direct sunlight.

(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.

In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.

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