



## TFT GRAPHIC DISPLAY MODULE DATASHEET



Datasheet Release Date 2023-05-09  
for

**CFAF1024600B0-070SC**

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## 1. General Information

### Datasheet Revision History

Datasheet Release: 2023-05-09  
Datasheet for the CFAF1024600B0-070SC TFT graphic display module.

### Product Change Notifications

You can check for or subscribe to [Part Change Notices](#) for this display module on our website.

### Variations

Slight variations between lots are normal (e.g., contrast, color, or intensity).

### Volatility

This display module has volatile memory.

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## 2. Module Description

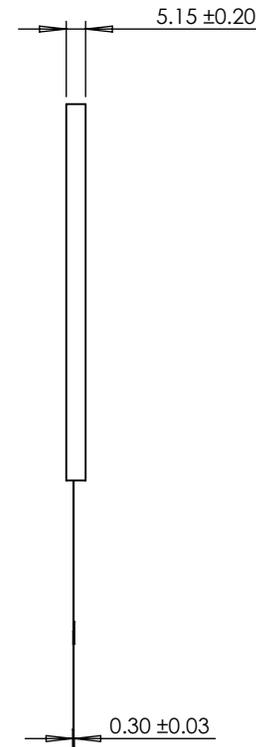
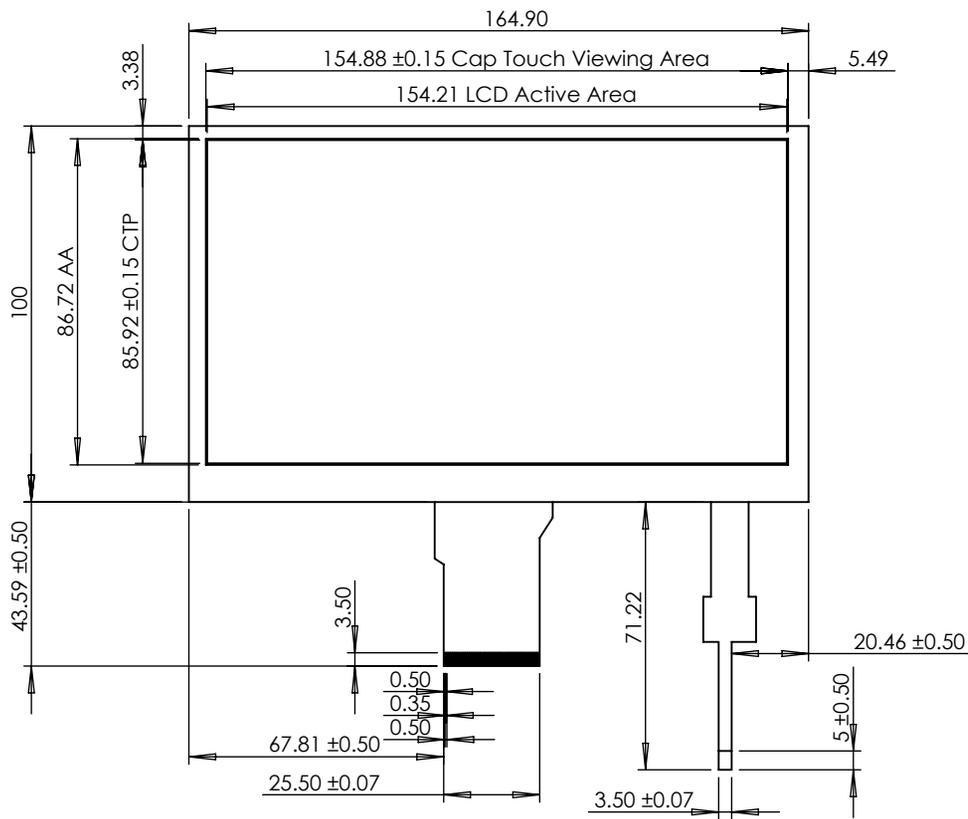
This TFT display modules has 24-bit RGB color, uses in-plane switching (IPS) technology for wide viewing angles, and is high bright. The capacitive touch panel can recognize five simultaneous distinct touches. This display has a built in FT5316 touch driver.

## 3. Features

- 1024\*600 Dot Matrix
- In-plane switching
- Operating Temperature: -20 – 70°C
- Storage Temperature: -30 – 80°C
- Interface: 24-bit RGB

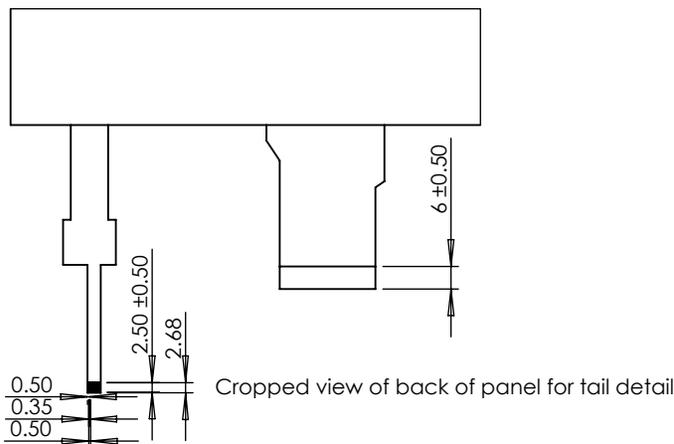
## 4. Mechanical Data

Item	Specification (mm)	Specification (inch, reference)
Overall Width and Height	164.90 x 100.00 x 5.15	6.49 x 3.94 x 0.20
Cap Touch Area	154.88 x 86.72	6.10 x 3.41
LCD Active Area	154.21 x 85.92	6.07 x 3.38
Pixel Pitch	0.05 x 0.14	0.002 x 0.006
Weight (Typical)	146 grams	5.15



Touch Pin	Function
1	VLogic
2	RESET
3	INT
4	SCL
5	SDA
6	GND

Pin	Function
1-2	LEDA
3-4	LEDK
5	GND
6	VCOM
7	VLogic
8	MODE
9	DE
10	VSYNC
11	HSYNC
12-19	B7-B0
20-27	G7-G0
28-35	R7-R0
36	GND
37	DCLK
38	GND
39	L/R
40	U/D
41	VGH
42	VGL
43	AVDD
44	RES
45	NC
46	VOM
47	DITHB
48	GND
49-50	NC



Display Controller	EK79001HN, EK73215BCGA
Touch Controller	FT5316
Viewing Direction	ALL (IPS)
Operating Temperature	-20 to 70 °C
Voltage Levels	3.3v Logic 19.2V Backlight

Units: millimeters  
Tolerance: ±0.3

Cropped view of back of panel for tail detail



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Part Number:

CFAF1024600B0-070SC

Date:

2023-05-08

Filename:

CFAF1024600B0-070SC mm.pdf

Revision:

v1.1

Web:

www.crystalfontz.com/product/cfaf1024600B0070SC

Sheet:

1 of 1



## 6. Interface Pin Function

PIN No.	Symbol	Function
1-2	LEDA	Backlight anode.
3-4	LEDK	Backlight cathode
5	GND	Ground
6	VCOM	Power supply for the TFT-LCD common electrode
7	V <sub>Logic</sub>	Power supply for logic
8	MODE	DE/SYNC mode select
9	DE	Data input enable. Display access is enabled when DE is pulled high.
10	VS <sub>YNC</sub>	Vertical sync input
11	HS <sub>YNC</sub>	Horizontal sync input
12-19	B7-B0	Blue data input
20-27	G7-G0	Green data input
28-35	R7-R0	Red data input
36	GND	Ground
37	DCLK	Pixel clock input
38	GND	Ground
39	L/R	Horizontal (left/right) shift direction (source output) selection
40	U/D	Vertical (up/down) shift direction (gate output) selection
41	V <sub>GH</sub>	Positive power supply for gate driver
42	V <sub>GL</sub>	Negative power supply for gate driver
43	AVDD	DC/DC converter for positive source Op-amp driver
44	RES	Reset signal, must be applied to initialize the chip. Active low.
45	NC	Not connected
46	VCOM	Power supply for the TFT-LCD common electrode
47	DITHB	Dithering function enable control. Normally pull high
48	GND	Ground
49-50	NC	Not connected

## 7. Touch Pin Function

PIN No.	Symbol	Function
1	V <sub>Logic</sub>	Power supply for logic
2	RES	Reset signal, must be applied to initialize the chip. Active low.
3	Int	Interrupt output pin
4	SCL	Serial clock
5	SDA	Serial data input
6	GND	Ground



## 8. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage for Logic	V <sub>Logic</sub>	-0.3	3.6	V
Input Voltage	V <sub>IN</sub>	-0.3	V <sub>Logic</sub> +0.3	V
Operating Temperature	T <sub>OP</sub>	-20	70	°C
Storage Temperature	T <sub>STG</sub>	-30	80	°C
Humidity	RH	--	90% (Max 40°C)	RH

**Notes:**

- (1) These are stress ratings only. Extended exposure to the absolute maximum ratings listed above may affect device reliability or cause permanent damage.
- (2) Functional operation should be restricted to the limits in the Electrical Characteristics table below.

## 9. Electrical Characteristics

Item	Symbol	Min	Typ	Max	Unit
Supply Voltage for Logic	V <sub>Logic</sub>	2.3	3.3	3.6	V
High-level Input	V <sub>IH</sub>	0.7V <sub>Logic</sub>	-	V <sub>Logic</sub>	V
Low-level Input	V <sub>IL</sub>	GND	-	0.3 V <sub>Logic</sub>	V
High-level Output	V <sub>OH</sub>	0.8 V <sub>Logic</sub>	-	V <sub>Logic</sub>	V
Low-level Output	V <sub>OL</sub>	GND	-	0.2 V <sub>Logic</sub>	V
Power for Analog Circuit	AVDD	-	9.6	-	V
TFT Gate ON Voltage	VGH	-	18	-	V
TFT Gate OFF Voltage	VGL	-	-6	-	V
TFT Common Electrode Voltage	V <sub>COMH</sub>	-	3.3	-	V
	V <sub>COML</sub>	-	3.1	-	V

## 10. Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	(V)θ	CR>10	-	170	-	deg
	(H)φ	CR>10	-	170	-	deg
Contrast Ratio	CR	Dark	-	800	-	-
Response Time	T <sub>rise</sub> +T <sub>fall</sub>	T <sub>a</sub> =25°C	-	30	40	ms
Cell Transmittance		T <sub>r</sub>	4.8	5.0	-	%
Color Chromacity (CIE1931)	CIEx (White)		Typ-0.03	0.308	Typ+0.03	
	CIEy (White)			0.336		
	CIEx (Red)			0.599		
	CIEy (Red)			0.338		
	CIEx (Green)			0.299		
	CIEy (Green)			0.550		
	CIEx (Blue)			0.139		
	CIEy (Blue)			0.131		



## 11. Backlight Characteristics

Item	Symbol	Min	Typ	Max	Unit
Forward Current	$I_f$	180	200	220	mA
Forward Voltage	$V_f$	16.8	19.2	20.4	V
LCM Brightness	-	-	850	-	cd/m <sup>2</sup>
LED Lifetime	-	-	40,000	-	Hr.
Backlight comprises 30 chip-white LEDs					

**Notes:**

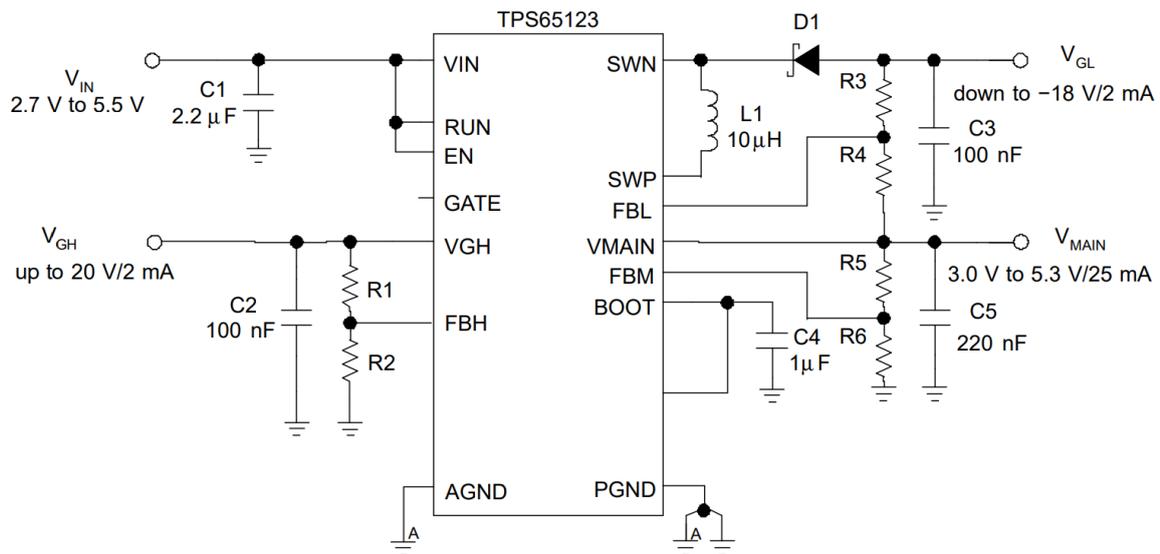
- (1) Forward voltage is provided for reference only. A stable forward current should be input for the backlight.
- (2) If the backlight is driven by high current or in high ambient temperatures or humidity conditions, the lifetime of the backlight will be reduced. Operating lifetime measures the amount of time prior to the brightness being reduced by 50% from the initial brightness. Operating lifetime is estimated.

## 12. External Power Supplies

This display requires external power supplies for the following power supplies:

- VGH: +18v ~2mA
- AVDD: +9.6v ~50mA
- VCOM: +3.2v ~10mA
- VGL: -6v ~2mA
- Backlight, constant current, 200mA max, 16~19v

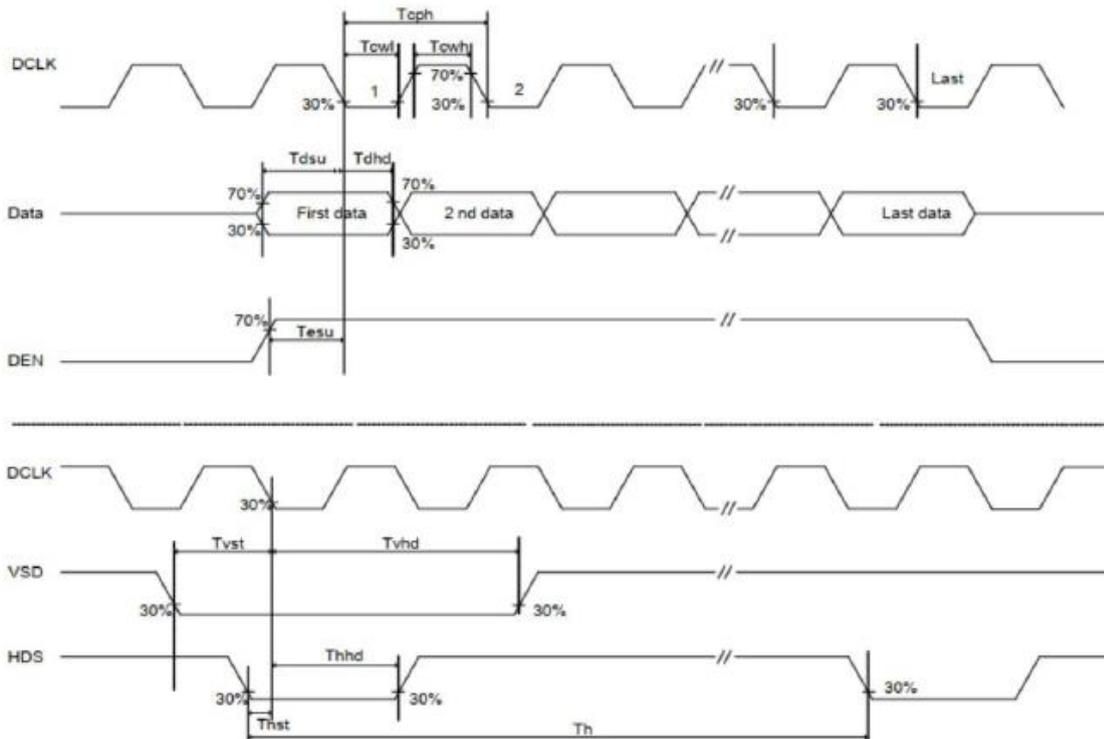
In order to supply the required voltages for this display, Crystalfontz recommends using a power supply chip such as the Texas Instruments [TPS6512x](#) and their suggested circuit:





### 13. Read/Write Timing

Item	Symbol	Condition	Min	Typ	Max	Unit
V <sub>Logic</sub> Power On Slew Rate	T <sub>POR</sub>	From 0v to 90% V <sub>Logic</sub>	1	-	20	ms
RST pulse Width	T <sub>RST</sub>	DCLK=65MHz	50	-	-	ns
DCLK Cycle Time	T <sub>CPH</sub>		14	-	-	ns
DCLK Pulse Duty	T <sub>CWH</sub>		40	50	60	%
VSD Setup Time	T <sub>VST</sub>		5	-	-	ns
VSD Hold Time	T <sub>VHD</sub>		5	-	-	ns
HSD Setup Time	T <sub>HST</sub>		5	-	-	ns
HSD Hold Time	T <sub>HHD</sub>		5	-	-	ns
Data Setup Time	T <sub>DSU</sub>		5	-	-	ns
Data Hold Time	T <sub>DHD</sub>		5	-	-	ns
DE Setup Time	T <sub>ESU</sub>		5	-	-	ns
DE Hold Time	T <sub>EHD</sub>		5	-	-	ns
Output Stable Time	T <sub>SST</sub>	Dual gate	-	-	3	μs



Parallel Input Clock and Data timing



## 14. LCD Module Precautions

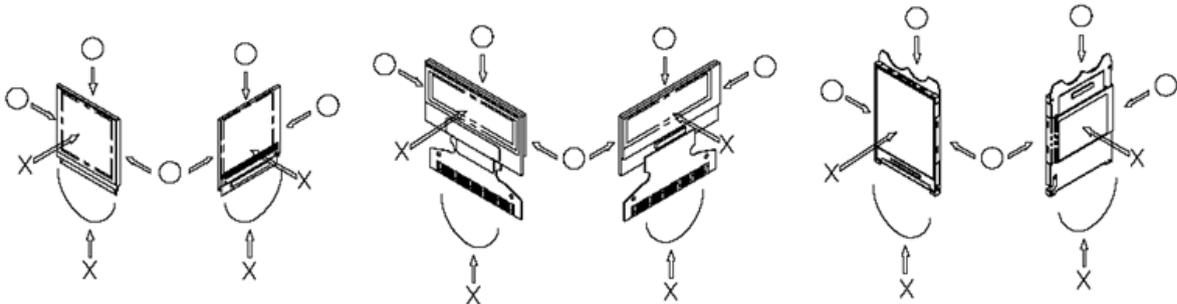
These precautions help ensure personal safety, module performance, and compliance of environmental regulations when using an LCD module.

### 14.1. Modules

- Avoid excessive physical and electrical shocks to module.
- Do not drop, bend, or twist the LCD display module.
- Do not make extra holes, modify the shape, or change the components of the printed circuit board.
- Do not disassemble the LCD display module.
- Do not operate the LCD display module outside the absolute maximum rating.
- Only solder to the I/O terminals.
- Store in an anti-static electricity container and clean environment.
- Do not display static information for long periods of time to avoid burn in.
- Crystalfontz has the right to change passive components on the display module. Resistors, capacitors and other passive components may have different appearance and color.
- Crystalfontz has the right to change the PCB revision/version in order to satisfy the supply stability, management optimization, the best product performance, etc., under the premise of not affecting the electrical characteristics and external dimensions.

### 14.2. Handling Precautions

- The display panel is made of glass. Do not apply mechanical impacts, stress or pressure to the LCD display module.
- Pressure applied to or near the display surface may damage the cell structure.
- If the display panel is accidentally broken and the internal organic substance leaks out, do not inhale or touch the organic substance.
- The polarizer covering the surface of the LCD display module is soft and can be easily scratched. Cover the polarizer in the final design.
- Clean the surface of the polarizer using Scotch Mending Tape No. 810 or an equivalent
  - Never breathe on the surface or wipe the surface using a cloth containing solvent such as ethyl alcohol, as the surface of the polarizer will become cloudy.
  - Water, ketone, and aromatic solvents may ruin the polarizer.
- Do not over bend the film with electrode pattern layouts. This can effect the display performance.



- Do not apply stress to the LSI chips and the surrounding molded sections.
- Do not apply input signals while the logic power is off.
- Prevent damage by electrostatic discharge (ESD) when handling the LCD display module:
  - Ground personnel handling LCD display modules.
  - Ground tools used for assembly such as soldering irons.
  - To suppress generation of ESD, avoid carrying out assembly work under dry environments.
  - Remove the protective film applied to the display panel slowly as ESD may be generated when removing the film.
- Protective film is applied to the surface of the display panel. Remove the film before assembly. If the LCD display module has been stored for a long period of time, residue adhesive material of the protection film may remain on the surface of the display panel after the film has been removed. In such a case, remove the residue material as discussed above.

### 14.3. Storing Precautions

- Store the LCD display modules in ESD preventative bags. Avoid exposure to direct sunlight and fluorescent lamps. Avoid high temperature and high humidity environments and low temperature (less



than 0°C) environments. We recommend storing these modules in the packaged state in which they were shipped from Crystalfontz.

- Do not let water drops or dew adhere to the packages or bags.
- If electric current is applied when water is on the surface of the LCD display module, the module may become dewed. If a dewed LCD display module is placed under high humidity environments the electrodes may become corroded.

#### 14.4. Designing Precautions

- The absolute maximum ratings cannot be exceeded for LCD display module. If these values are exceeded, panel damage may happen.
- Satisfy the VIL and VIH specifications and, ensure the signal line cable is as short as possible to avoid signal noise.
- Install excess current preventative unit (fuses, etc.) to the power circuit. Recommend value: 0.5A
- Avoid occurrence of mutual noise interference with the neighboring devices.
- When fastening the LCD display module, fasten the external plastic housing section.  
If the power supply to the LCD display module is forcibly shut down, by such errors as taking out the main battery while the LCD display panel is in operation, we cannot guarantee the quality of this LCD display module.
- Connection (contact) to any other potential than the above may lead to rupture of the IC.

#### 14.5. Disposing Precautions

- Request qualified companies handle the industrial waste when disposing of the LCD display modules. Observe all relevant laws and regulations.

#### 14.6. Other Precautions

- When an LCD display module is operated for a long period of time with a fixed pattern, the fixed pattern may remain as an after image or a slight contrast deviation may occur.
  - If the operation is interrupted and left unused for a while, normal state can be restored.
  - This will not cause a problem in the reliability of the module.
- To protect the LCD display module from performance drops by static electricity rapture, etc., do not touch the following sections whenever possible while handling the LCD display modules.
  - Pins and electrodes
  - Pattern layouts such as the TCP & FPC
- With this LCD display module, the LCD driver is exposed. If this LCD driver is exposed to light, malfunctioning may occur. Design the product and installation method so that the LCD driver may be shielded from light in actual usage and during the inspection processes.
- Although this LCD display module stores the operation state data by the commands and the indication data, when excessive external noise, etc. enters into the module, the internal status may be changed. Therefore, it is necessary to take appropriate measures to suppress noise generation or to protect from influences of noise on the system design.
- Periodically refresh the operation statuses in the software (reset the commands and retransfer the display data), to cope with catastrophic noise.
- Resistors, capacitors, and other passive components will have different appearance and color caused by the different supplier.
- Crystalfontz has the right to upgrade and modify the product function.
- The limitation of FPC bending:

