Crystalfontz America, Incorporated

LCD MODULE SPECIFICATIONS

CFAF480800T07-043T-TS

Crystalfontz America, Incorporated
12412 East Saltese Avenue
Spokane Valley, WA 99216-0357

Phone: (888) 206-9720
Fax: (509) 892-1203
Email: techinfo@crystalfontz.com
URL: www.crystalfontz.com

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1.1 Caution

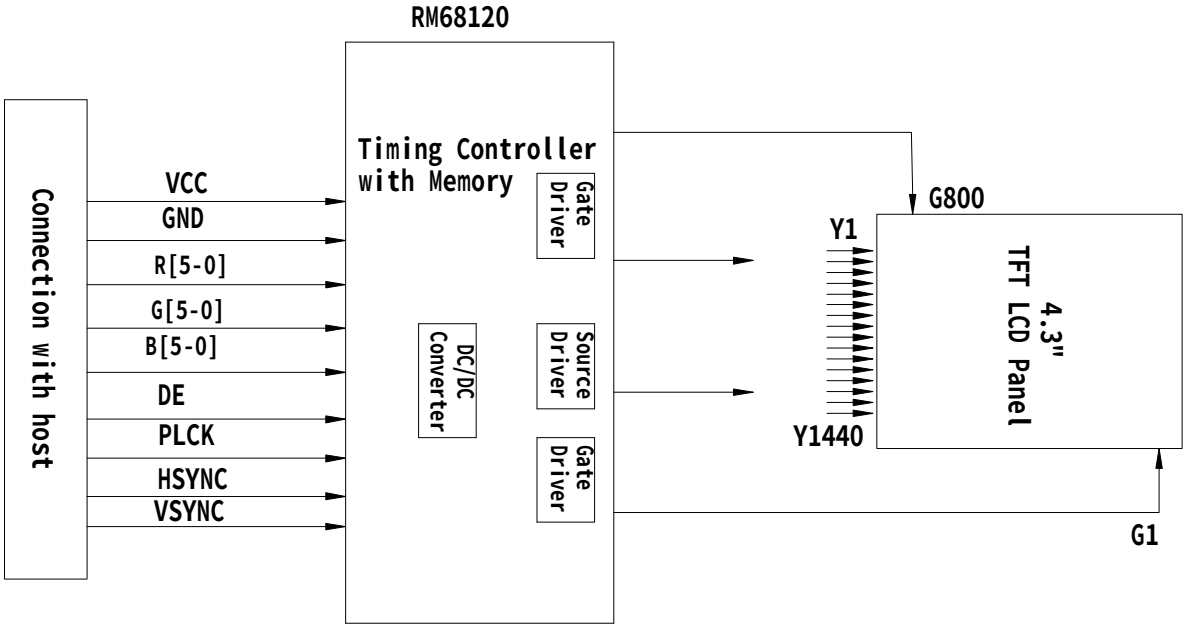
1. This LCD module has been specifically designed for use only in Electronic devices in the areas of mobile and handheld equipment. The module should not be used in applications where panel failure could result in physical harm or loss of life, and we expressly disclaim any and all liability relating in any way to the use of the module in such applications.

2. Customer agrees to indemnity, defend and hold harmless from and against any and all actions, claims, losses, damages, liabilities, awards, costs, and expenses, including legal fees, resulting from or arising out of Customer's use, or sale for use, of module in applications.

1.2 Description

This module is a transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is composed of a TFT-LCD module , a driver circuit and back-light unit. The resolution of 4.3” contains 480*800 pixels and can display up to 262K colors.

1.3 Block diagram



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1.4 General Specifications

ITEM	Specification	
LCD Mode	TFT; RGB Color; Normal Black; Transmissive	
Controllable Color	Indication data: Red-6bit, Green-6bit, Blue-6bit gradation control	262K Colors
Background Color	Indication data: Red (1,1,1,1,1,1) / Green(1,1,1,1,1,1) / Blue (1,1,1,1,1,1)	White
Viewing direction	VA mode	
Backlight	LED white colored Backlight (LED unit, 8chip LED)	
Driver IC	RM68120	
Mounting methods	COG	
Operating temperature	-20℃~70℃	
Storage temperature	-30℃~80℃	
Operating humidity	Temp.≦40℃,85％RH MAX. Temp.＞40℃,Absolute humidity shall be less than 85%RH at 40℃	
Storage humidity	Temp.≦40℃,85％RH MAX. Temp.＞40℃,Absolute humidity shall be less than 85%RH at 40℃	

(Note) Color tone is slightly changed by temperature and driving voltage.
This product measure up Rohs standard.

1.5 Mechanical Specifications

ITEM	Specification
Outline Dimension	According to the annexed outline drawing No.CFAF480800T07043TTS
Dots Matrix	(480×3) (W) × 800(H) Dots
Glass Area(mm)	59.56*102.4
Active Area (mm)	56.16*93.6
Mass	TBD

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1.6 Terminal Functions

NO	Symbol	Function	I/O
1	GND	Ground(0V)	-
2	GND	Ground(0V)	-
3	XR	Signal for touch panel	I
4	YD	Signal for touch panel	I
5	XL	Signal for touch panel	I
6	YU	Signal for touch panel	I
7	GND	Ground(0V)	-
8	R5	Red data pin	I
9	R4	Red data pin	I
10	R3	Red data pin	I
11	R2	Red data pin	I
12	R1	Red data pin	I
13	R0	Red data pin	I
14	G5	Green data pin	I
15	G4	Green data pin	I
16	G3	Green data pin	I
17	G2	Green data pin	I
18	G1	Green data pin	I
19	G0	Green data pin	I
20	B4	Blue data pin	I
21	B4	Blue data pin	I
22	B3	Blue data pin	I
23	B2	Blue data pin	I
24	B1	Blue data pin	I
25	B0	Blue data pin	I
26	GND	Ground(0V)	-
27	DE	Data enable signal in RGB I/F mode.	I
28	PCLK	Pixel clock signal in RGB I/F mode	I
29	HSYNC	Horizontal sync. Signal in RGB I/F.	I
30	VSYNC	Vertical sync. Signal in RGB I/F.	I
31	GND	Ground(0V)	-
32	BL-EN	Backlight Enable pin(1.4V-5.5V), If use the backlight pulse control, please open this pin.	-
33	PWM	Backlight pulse control pin, please open this pin if not used.	-
34	GND	Ground(0V)	-
35	5V	Backlight Supply Power(5V)	P
36	5V	Backlight Supply Power(5V)	P
37	GND	Ground(0V)	-
38	VCC(3.3V)	Power supply((VDD=2.5V ~ 3.3V))	P
39	VCC(3.3V)	Power supply((VDD=2.5V ~ 3.3V))	P
40	GND	Ground(0V)	-

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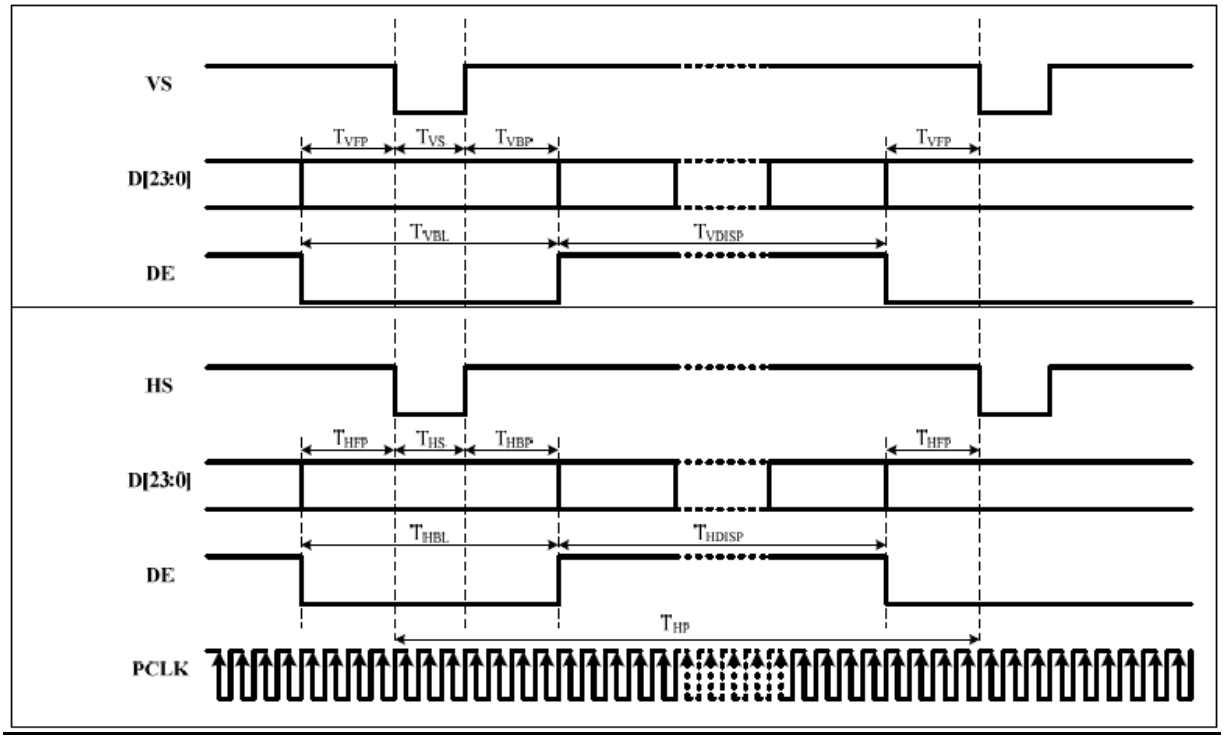
2.1 Timing Chart

2.1.1-1 RGB Vertical and Horizontal Timing

Item	Symbol	Condition	Min	Typ	Max	Unit
Vertical Timing						
Vertical cycle period	TVP	480x800	810			HS
Vertical low pulse width	Tvs		2			HS
Vertical front porch	T_{VFP}		3		255	HS
Vertical back porch	T_{VBP}		5		255	HS
Vertical data start line		$T_{VS}+T_{VBP}$	7			HS
Vertical blanking period	T_{VBL}	$T_{VS}+T_{VBP}+T_{VFP}$	10			HS
Vertical active area	T_{VDISP}			864		HS
				854		HS
				800		HS
Horizontal Timing						
Horizontal cycle period	T_{HP}		496			PCLK
Horizontal low pulse width	T_{HS}		2			PCLK
Horizontal front porch	T_{HFP}		2		255	PCLK
Horizontal back porch	T_{HBP}		12		255	PCLK
Horizontal data start line		$T_{HS}+T_{HBP}$	14			PCLK
Horizontal blanking period	T_{HBL}	$T_{HS}+T_{HBP}+T_{HFP}$	16			PCLK
Horizontal active area	T_{HDISP}			480		PCLK
Pixel clock cycle	$f_{PCLKSYS}$		8		30	MHz



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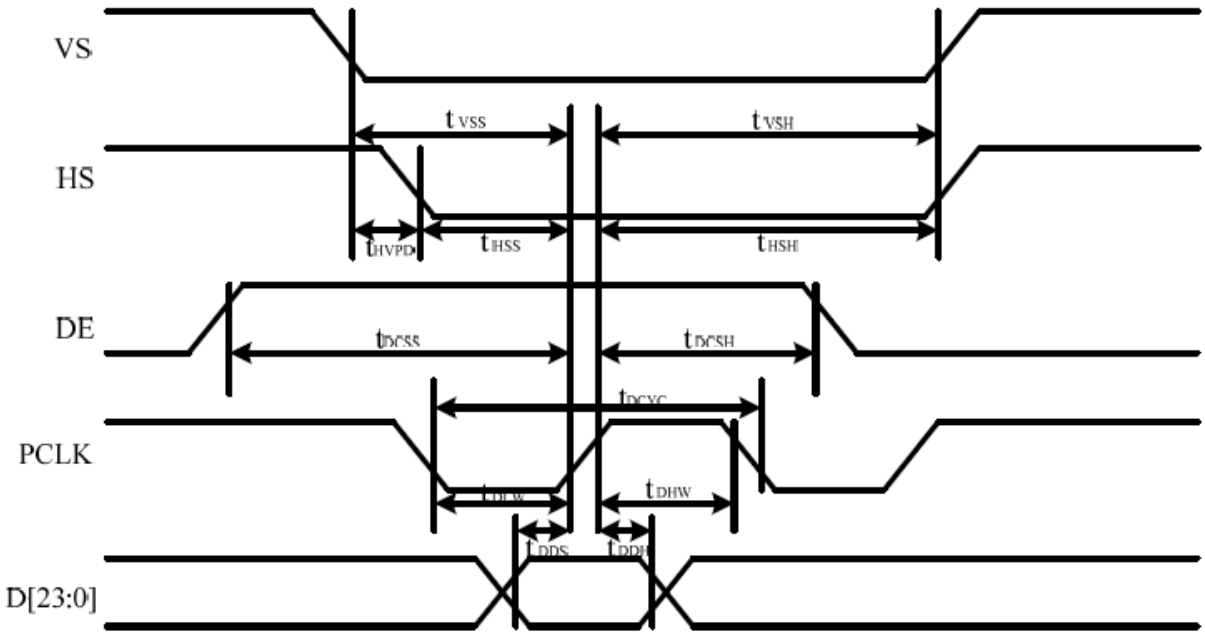
2.1.1-2 RGB Interface Timing Characteristics



Signal	Symbol	Parameter	MIN	TYP	MAX	Unit
VS	t_{VSS}	VS setup time	10	-	-	ns
	t_{VSH}	VS hold time	10	-	-	ns
HS	t_{HSS}	HS setup time	10	-	-	ns
	t_{HSH}	HS hold time	10	-	-	ns
	t_{HVPD}	HS to VS falling edge	400	-	-	ns
PCLK	t_{DCYC}	PCLK cycle time	33	-	125	ns
	t_{DLW}	PCLK low pulse width	11	-	-	ns
	t_{DHW}	PCLK high pulse width	11	-	-	ns
	f_{DFREQ}	PCLK frequency	8	-	30	MHz
DE	t_{DCSS}	DE setup time	10	-	-	ns
	t_{DCSH}	DE hold time	10	-	-	ns
D[23:0]	t_{DDS}	Data setup time	10	-	-	ns
	t_{DDH}	Data hold time	10	-	-	ns

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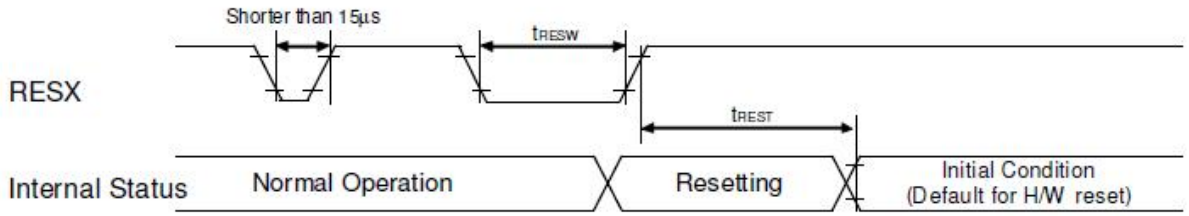
2.1.2 Reset timing



Symbol	Parameter	Related Pins	MIN	TYP	MAX	Note	Unit
t_{RESW}	*1) Reset low pulse width	RESX	15	-	-	-	µs
t_{REST}	*2) Reset complete time	-	-	-	5	When reset applied during Sleep in mode	ms
		-		-	120	When reset applied during Sleep out mode	ms

2.2 Absolute maximum ratings

Item	Symbol	Value	Unit
Operation Temperature	Top	-20~70	℃
Storage Temperature	Tstr	-30~80	℃
Power supply voltage	V_{DD}	2.5~3.3	V

2.3 LED back light specification (per a Chip)

Item	Symbol	Condition	Min	Type	Max	Unit
Forward voltage	V_f	I_f=20mA /1-chip	25.6	26	26.4	V
Forward current	I_{pn}		-	20	-	mA
Reverse voltage	V_r	per chip	-	-	4.0	V
Reverse Current	I_r	V_r=4V	-	-	15	uA
Uniformity (with L/G)	-	I_f=20mA	80	-	-	%
Module brightness	Lv	I_f=20mA	-	250	-	cd/m2
Luminous color	White					

2.4 Electrical characteristics

Item	Symbol	Condition	Min	Type	Max	Unit
Input high voltage	Vih		0.8 V_{DD}	-	V_{DD}	V
Input low voltage	Vil		-0.3	-	0.2 V_{DD}	V
Output high voltage	Voh	Ioh=-0.1mA	0.8 V_{DD}	-	-	V
Output low voltage	Vol	Iol=0.1mA	-	-	0.2 V_{DD}	V
Input leakage current	Iil	Vin=0--Vdd	-1.0	-	1.0	uA
Current consumption	Idd	-	-	-	25.0	mA

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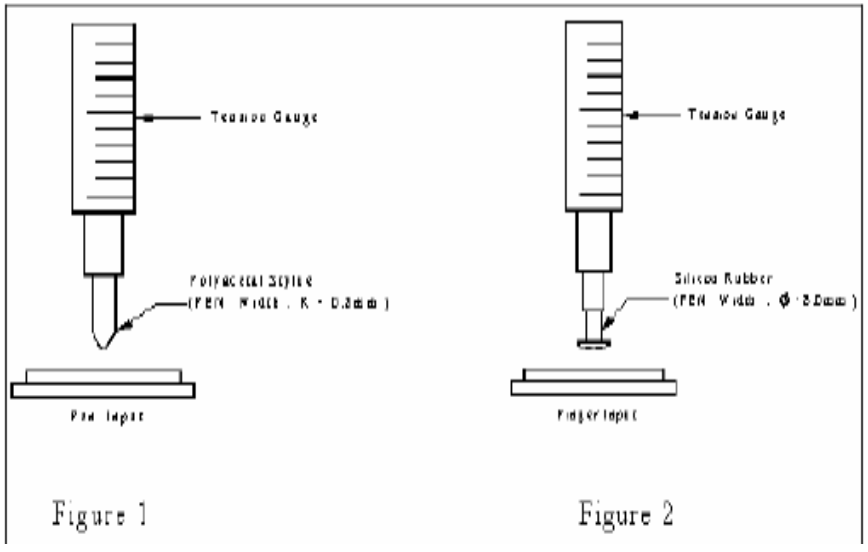
2.5 Touch Panel Specification

Item	Descripton
2.5.1 Rating	
The maximum voltage	DC5V Max
Operating temperature range	-20℃～60℃: -20℃～40℃ 90%RH or less 40℃～60℃ 60%RH or less
Storage temperature range	-40℃～70℃: -40℃～40℃ 90%RH or less 40℃～60℃ 60%RH or less 60℃～70℃ 50%RH or less and 168 hours or less Avoid storage in high temperature and high humidity. When long-term storage is required. Keep the panels at a temperature of 15℃ to 35℃ and a relative humidity of 60%RH or less.
2.5.2 Electrical	
Resistance between leads	Direction ”X” (Film side): 200～900Ω Direction ”Y” (Glass side): 200～900Ω
Linearity	±1.5%, Measured per appendix A
Insulation resistance	20MΩ or more, Apply DC 25V between upper and lower electrodes.
Chattering time	10 msec or less
2.5.3 Mechanical	
Activation force	Input with pen 10～80g (Use R0.8, Polyacetal stylus) see Figure 1 Input with finger 20g Min. (Use R8, HS40°Silicon Rubber) see Figure 2  Figure 1 Figure 2
Surface hardness	3 H min. (Pencil test per JISK5600)
FPC peeling strength	300g/cm at speed 100mm/min upward 90°

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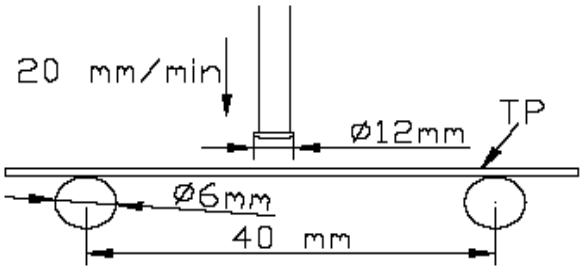
Static load test	Min.5kg at speed 20 mm/min, 
2.5.4 Optical	
Light Transparency	80%Min., Total light Transparency according to JISK7105
2.5.5 Durability	
Knocking life	1,000,000 time, The test shall be done at the load of 250g, 5Hz with 0.8R polyacetal stylus. After test, there is no pitting allowed on the product.
Pen sliding resistance	100,000 cycles, The test shall be done at least 5mm from A/A edge, Using R0.8 polyacetal stylus on the load of 250g and with a stylus change after every 10,000 cycles, one cycle is a 35mm straight line in one direction @60 mm/sec. No visible scratches when viewed with the naked eye, using office lighting conditions, at a distance of 6 inches and at viewing angles of 90 and 45 degrees with the backlight off.

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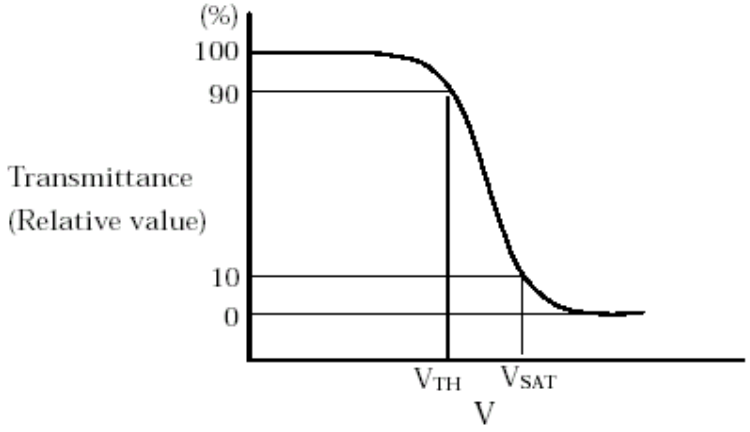
3.1 Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Response Time	Rise	Tr	θ=0°	--	20	30	ms
	Fall	Tf		--	15	20	ms
Contrast ratio		CR	At optimized viewing angle	650	800	--	
NTSC		%	θ=0°	60	70	--	
Viewing Angle	Top		CR≧10	60	70	80	deg.
	Bottom			60	70	80	
	Left			60	70	80	
	Right			60	70	80	
Transmittance		%		4.05	4.47	--	
Chromaticity	White	X	θ=0°	(0.270)	(0.310)	(0.350)	
		Y	θ=0°	(0.290)	(0.330)	(0.370)	
	Red	X	θ=0°	(0.620)	(0.650)	(0.680)	
		Y	θ=0°	(0.310)	(0.340)	(0.370)	
	Green	X	θ=0°	(0.285)	(0.315)	(0.345)	
		Y	θ=0°	(0.595)	(0.625)	(0.655)	
	Blue	X	θ=0°	(0.115)	(0.145)	(0.175)	
		Y	θ=0°	(0.080)	(0.110)	(0.140)	

3.2 Definition of Optical Characteristics

3.2.1 Definition of Threshold voltage and Saturation voltage



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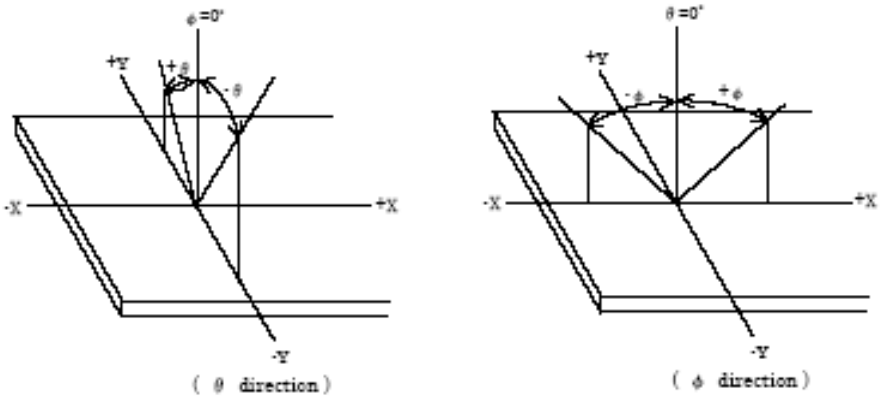
3.2.2 Definition of Viewing Angle



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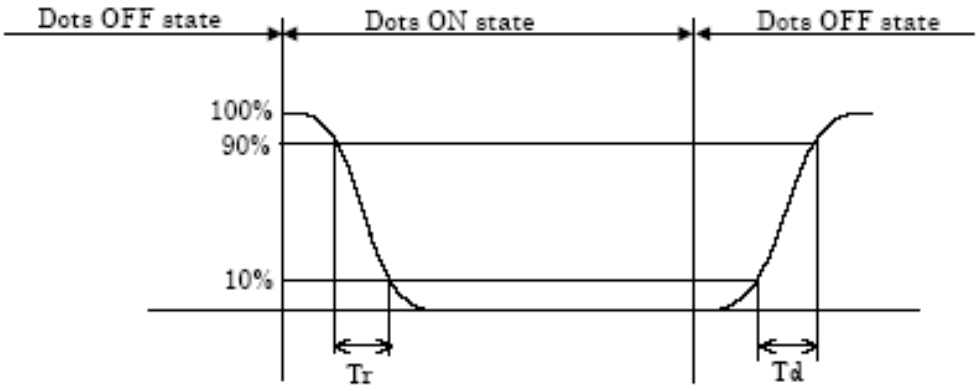
θ

3.2.3 Definition of Response Time



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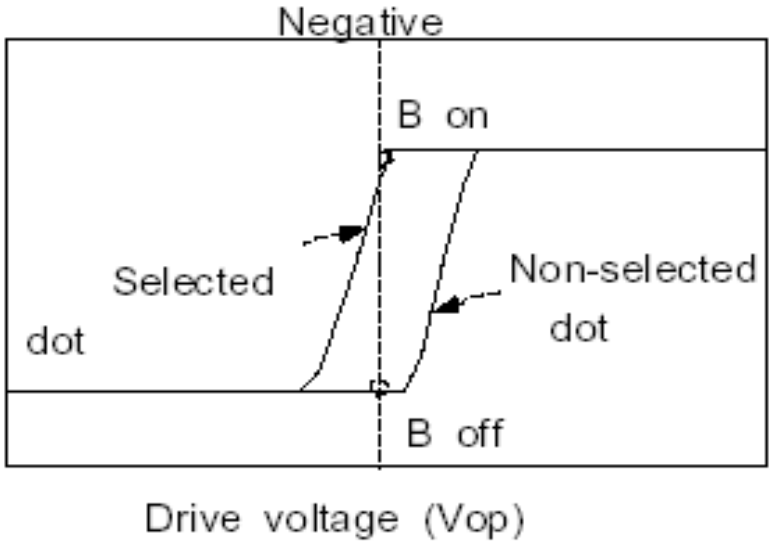
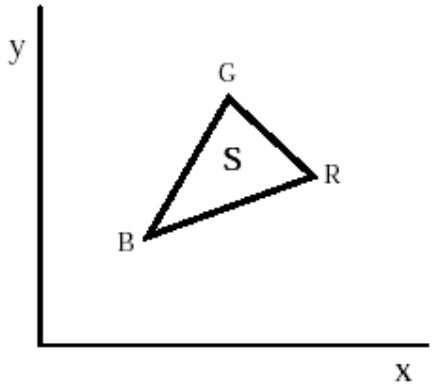
3.2.4 Definition of Contrast Ratio



$$\text{Contrast Ratio} = \frac{\text{Brightness of all pixel white}}{\text{Brightness of all pixel black}}$$

3.2.5 Definition of Color gamut

Color gamut: S= (RGB triangle Area / NTSC triangle Area) × 100



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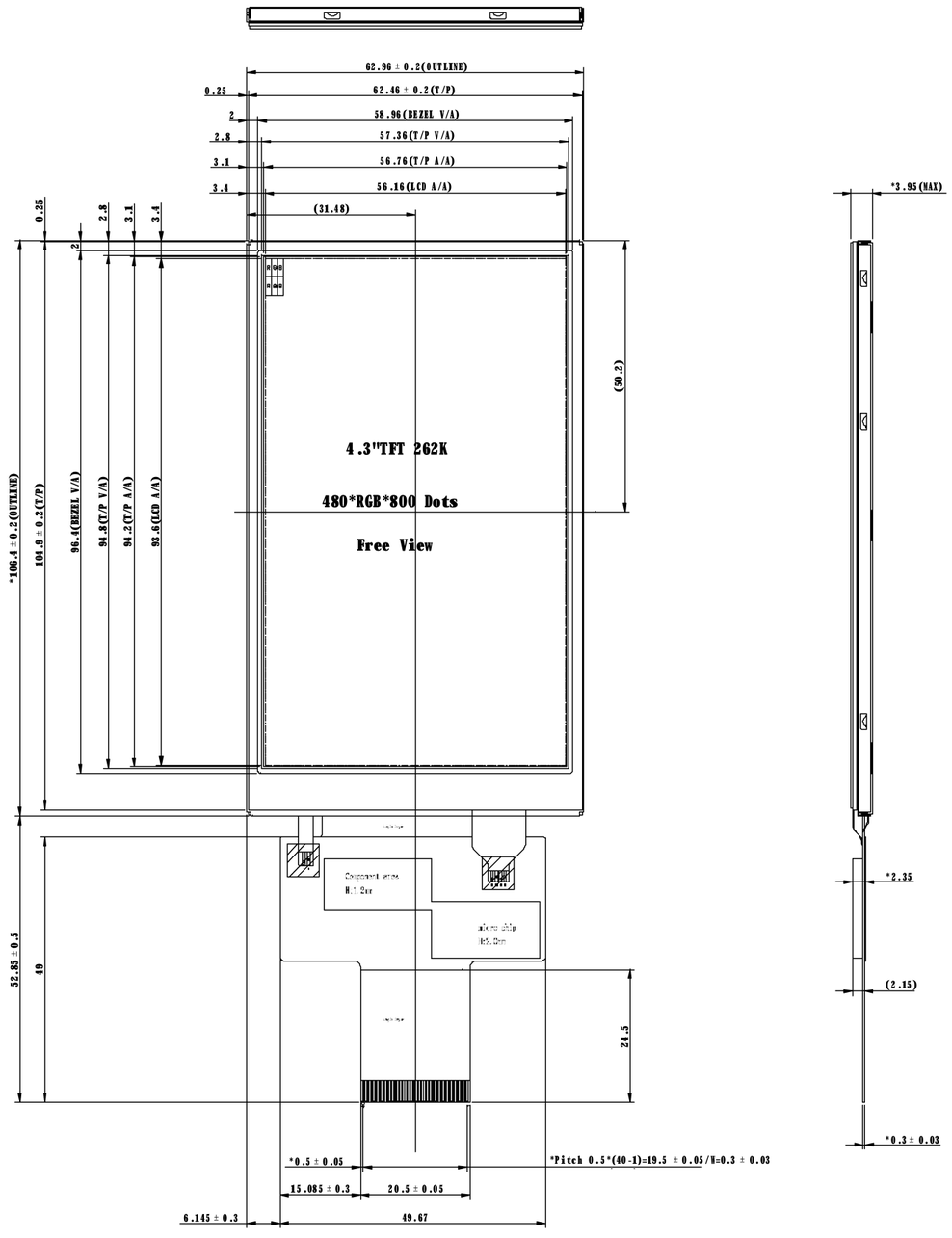
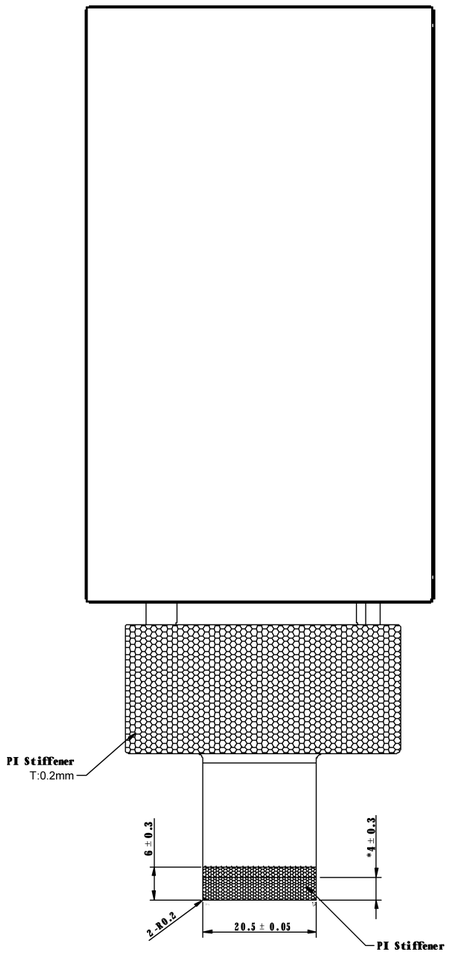
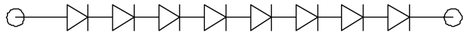




#	Signal
1	GND
2	GND
3	XR
4	YD
5	XL
6	YU
7	GND
8	R5
9	R4
10	R3
11	R2
12	R1
13	R0
14	G5
15	G4
16	G3
17	G2
18	G1
19	G0
20	B5
21	B4
22	B3
23	B2
24	B1
25	B0
26	GND
27	DE
28	PCLK
29	HSYNC
30	VSYNC
31	GND
32	LEDON
33	LEDPWM
34	GND
35	VBL/5V
36	VBL/5V
37	GND
38	VCC/3.3V
39	VCC/3.3V
40	GND

Series connected White LED backlight.



(On-board switcher. Supply is +5v to Pin 35,36)

CONFORM TO ROHS STANDARD	
ITEM	
LCD TYPE	4.3" TFT
Viewing direction	Free View
Drive method	T.B.D
Display mode	Transmissive
Operating TEMP.	**-20°C ~ +70°C**
Storage TEMP.	**-30°C ~ +80°C**
Drive IC	NT35510

REV	DESCRIPTION	DATE	REVISER
①			

SCALE	1:1	TOLERANCE	± 0.2
UNIT	mm	ORG DATE	
MATERIAL		DRAWN BY	
		CHECKED BY	
FINISH		CONCURRED BY	
		APPROVED BY	

Crystalfontz America, Incorporated

PROJECT NAME	**CFAF480800T07-043T-TS**		
MODULE NAME	**CFAF480800T07-043T-TS**		
DWG.NO	DCN	PAGE	EDITION
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