Crystalfontz America, Inc.

CUSTOMER		
MODEL	**CFAG320240C-FMI-T**	
APPROVAL	**BY:**	**DATA:**

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY

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Contents

1.Module Classification Information

CFA G 320240 C - F M I - T

① ② ③ ④ ⑤⑥⑦ ⑧

①	Brand：CRYSTALFONTZ AMERICA, INCORPORATED		
②	Display Type：H→Character Type, **G→Graphic Type**		
③	Display Font：**320 * 240 Dots**		
④	Model serials number		
⑤	Backlight Type：	N→Without backlight B→EL, Blue green D→EL, Green W→EL, White **F→CCFL, White** Y→LED, Yellow Green	A→LED, Amber R→LED, Red O→LED, Orange G→LED, Green
⑥	LCD Mode：	B→TN Positive, Gray N→TN Negative, G→STN Positive, Gray Y→STN Positive, Yellow Green **M→STN Negative, Blue** F→FSTN Positive	T→FSTN Negative
⑦	LCD Polarize Type/ Temperature range/ View direction	A→Reflective, N.T, 6:00 D→Reflective, N.T, 12:00 G→Reflective, W. T, 6:00 J→Reflective, W. T, 12:00 B→Transflective, N.T,6:00 E→Transflective, N.T.12:00	H→Transflective, W.T,6:00 K→Transflective,W.T,12:00 C→Transmissive, N.T,6:00 F→Transmissive, N.T,12:00 **I→Transmissive, W.T.6:00** L→Transmissive, W.T,12:00
⑧	Special Code	**T: Built in Negative Voltage&Temperature Compensation**	

2.Precautions in Use of LCD Module

(1) Avoid applying excessive shocks to the module or making any alterations or modifications to it.
(2) Don't make extra holes on the printed circuit board, modify its shape or change the components of LCD Module.
(3) Don't disassemble the LCM.
(4) Don't operate it above the absolute maximum rating.
(5) Don't drop, bend or twist LCM.
(6) Soldering: only to the I/O terminals.
(7) Storage: please storage in anti-static electricity container and clean environment.

3.General Specification

ITEM	STANDARD VALUE	UNIT
Number of dots	320x240	dots
Outline dimension	154.79(W) x 120.24(H)x 15.6max(T)	mm
View area	120.14(W) x 92.14(H)	mm
Active area	115.18(W) x 86.38(H)	mm
Dot size	0.34(W) x 0.34(H)	mm
Dot pitch	0.36(W) x 0.36(H)	mm
LCD type	STN, Blue, Negative, Transmissive	
View direction	6 o'clock	
Backlight	CCFL, White	

4.Absolute Maximum Ratings

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Temperature	T_{OP}	-20	-	+70	℃
Storage Temperature	T_{ST}	-30	-	+80	℃
Input Voltage	V_I	0	-	V_{dd}	V
Supply Voltage For Logic	V_{DD}	0	-	6.5	V
Supply Voltage For LCD	V_{DD}-V_{EE}	0	-	32	V

5.Electrical Characteristics

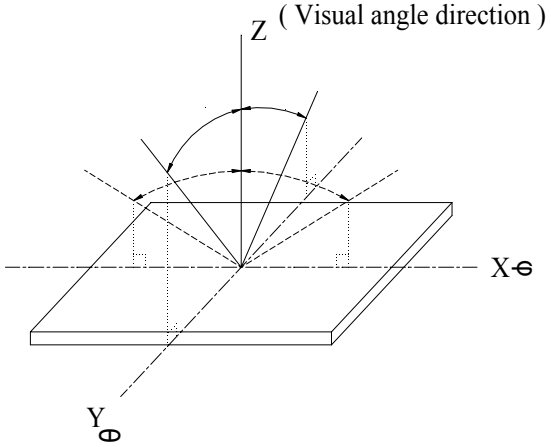
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Logic Voltage	V_{DD}-V_{SS}	-	-	5.0	5.5	V
Supply Voltage For LCD	V_{DD}-V_O	Ta=-20℃ Ta=25℃ Ta=+70℃	- - 22.0	- 24.0 -	26.0 - -	V V V
Input High Volt.	V_{IH}	-	0.8V_{DD}	-	V_{DD}	V
Input Low Volt.	V_{IL}	-	0	-	0.2V_{DD}	V
Output High Volt.	V_{OH}	-	V_{DD} -0.4	-	-	V
Output Low Volt.	V_{OL}	-	-	-	0.4	V
Supply Current	I_{DD}	-	95	100	105	mA

6.Optical Characteristics

ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
View Angle	(V)θ	CR≧2	10	-	105	deg.
	(H)φ	CR≧2	-30	-	30	deg.
Contrast Ratio	CR	-	-	3	-	-
Response Time	T rise	-	-	200	300	ms
	T fall	-	-	150	200	ms

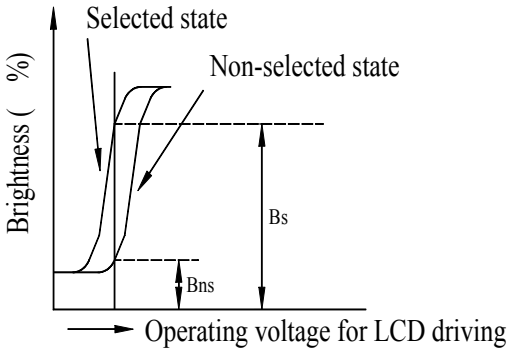
6.1 Definitions

■View Angles

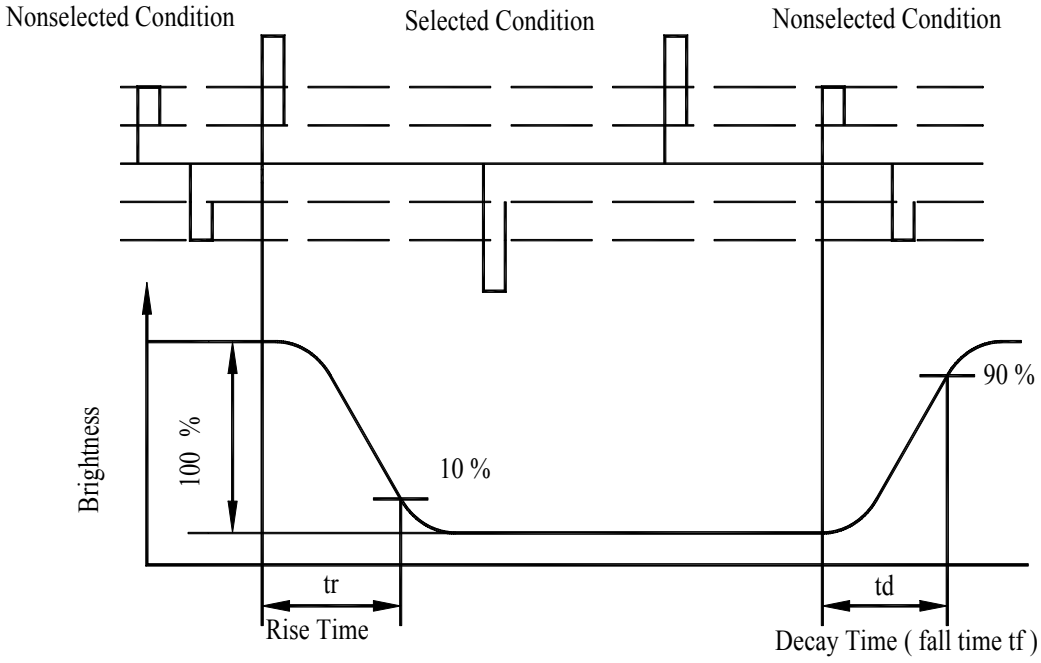


■Contrast Ratio

$$CR = \frac{\text{Brightness at selected state (BS)}}{\text{Brightness at non-selected state (Bns)}}$$



■Response time

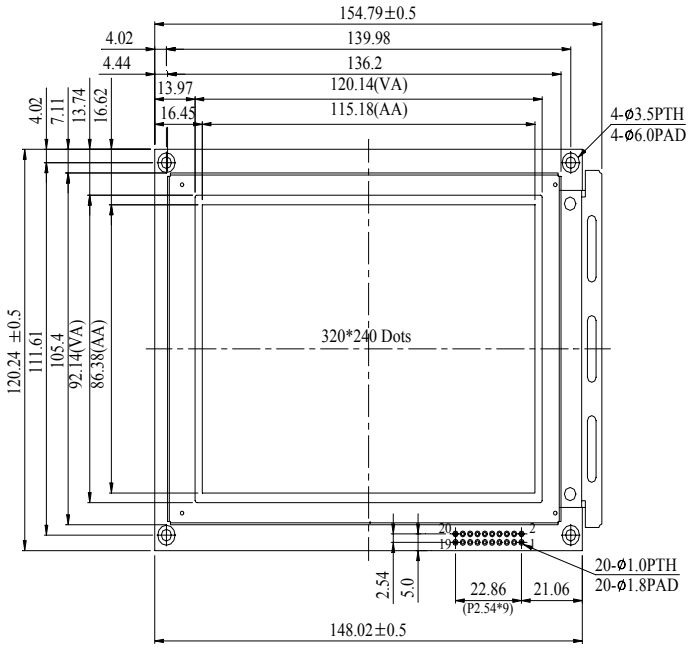


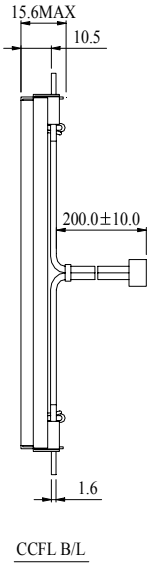
7.Interface Description

JM (right) short , for 6800 MPU family

Pin No.	Symbol	Level	Description
1	V_{SS}	0V	Ground
2	V_{DD}	5.0V	Power supply for Logic
3	V_O	(Variable)	Driving voltage for LCD
4	E	H/L	6800 family: Enable clock
5	R/W	H/L	6800 family: R/W signal
6	A0	H/L	R/W=L, A0=H: Command Write A0=L: Data Write R/W=H, A0=H: Status Read A0=L: Data Read
7~14	DB0~DB7	H/L	Data bus
15	$\overline{CS}$	H/L	Chip select, Active L
16	$\overline{RES}$	H/L	Controller reset signal, Active L
17	V_{EE}	-25V	Negative voltage output (Optional)
18	FGND		Frame Ground
19	NC		No connection
20	NC		No connection

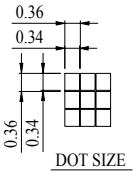
8.Contour Drawing & Block Diagram

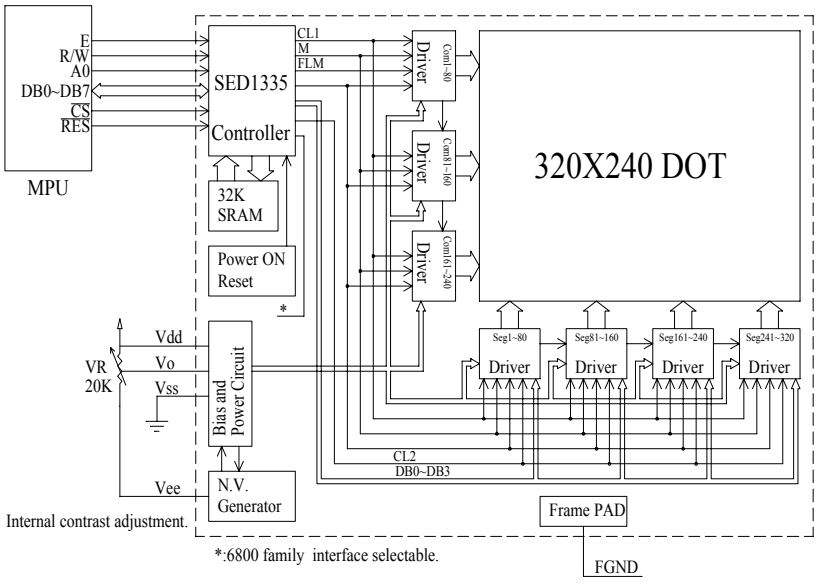




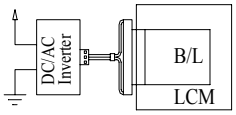
PIN NO.	SYMBOL
1	Vss
2	Vdd
3	Vo
4	E
5	R/W
6	A0
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	$\overline{CS}$
16	$\overline{RES}$
17	Vee
18	FGND
19	NC
20	NC

The non-specified tolerance of dimension is ±0.3mm.





CCFL B/L drive directly from connector .



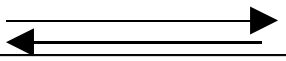
9.Quality Assurance

- **Screen Cosmetic Criteria**

No.	Defect	Judgement Criterion	Partition
1	Spots	A) Clear Size: d mm — Acceptable Qty in active area d ≦ 0.1 — Disregard 0.1<d≦ 0.2 — 6 0.2<d≦ 0.3 — 2 0.3<d — 0 Note: Including pinholes and defective dots, which must be within one pixel size. B) Unclear Size: d mm — Acceptable Qty in active area d ≦ 0.2 — Disregard 0.2<d≦ 0.5 — 6 0.5<d≦ 0.7 — 2 0.7<d — 0	Minor
2	Bubbles in Polarize	Size: d mm — Acceptable Qty in active area d≦ 0.3 — Disregard 0.3<d≦ 1.0 — 3 1.0<d≦ 1.5 — 1 1.5<d — 0	Minor
3	Scratch	In accordance with spots cosmetic criteria. When the light reflects on the panel surface, the scratches are not to be remarkable.	Minor
4	Allowable Density	Above defects should be separated more than 30mm each other.	Minor
5	Coloration	Not to be noticeable coloration in the viewing area of the LCD panels. Backlight type should be judged with backlight on state only.	Minor

10.Reliability

Content of Reliability Test

Environmental Test				
No.	**Test Item**	**Content of Test**	**Test Condition**	**Applicable Standard**
1	High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	——
2	Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-30℃ 200hrs	——
3	High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 200hrs	——
4	Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20℃ 200hrs	——
5	High Temperature/ Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	80℃,90%RH 96hrs	——
6	High Temperature/ Humidity Operation	Endurance test applying the electric stress (Voltage & Current) and temperature / humidity stress to the element for a long time.	70℃,90%RH 96hrs	——
7	Temperature Cycle	Endurance test applying the low and high temperature cycle. -30℃ 25℃ 80℃ 30min 5min 30min 1 cycle 	-30℃/80℃ 10 cycles	——
Mechanical Test				
8	Vibration test	Endurance test applying the vibration during transportation and using.	10~22Hz→1.5mmp-p 22~500Hz→1.5G Total 0.5hrs	——
9	Shock test	Constructional and mechanical endurance test applying the shock during transportation.	50G Half sin wave, 11 msec 3 times of each direction	——
10	Atmospheric pressure test	Endurance test applying the atmospheric pressure during transportation by air.	115mbar 40hrs	——
Others				
11	Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V,RS=1.5kΩ CS=100pF 1 time	——

***Supply voltage for logic system=5V. Supply voltage for LCD system =Operating voltage at 25℃

11. Backlight Information

CCFL Backlight Specification **(Ta=25℃)**

Item	Symbol	Specification			Unit	Condition
		Min	Typ	Max		
Driving Voltage	V_{FL}	-	278	-	Vrms	-
Input current	I_{FL}	3.0	5.0	6.0	mArms	-
Power consumption	W	-	1.35	-	W	-
Starting Voltage	V_{FLS}	-	530	-	Vrms	-
Luminance	L	-	550	-	Cd/m^2	φ,θ=0 deg, I_{FL} =5.0mArms
Chromaticity	x	-	0.340	-	-	-
	y	-	0.370	-	-	-
Luminance Uniformity (Testing 9 point)	-	75%	-	-	%	φ,θ=0 deg, I_{FL} =5.0mArms
Life time	-	15000	-	-	hrs	