



Crystalfontz America, Inc.
15611 East Washington

Phone: (509) 291-3514
Fax: (509) 291-3345

<http://www.crystalfontz.com>
email: sales@crystalfontz.com

Crystalfontz America, Inc.

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

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY

Crystalfontz America, Inc.

15611 East Washington Road

Valleyford, WA 99036-9747

Phone: (509) 291-3514

Fax: (509) 291-3345

e-mail: sales@crystalfontz.com

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1. Module Classification Information

CFA G 3 2 0 2 4 0 C - F M I - T
 ① ② ③ ④ ⑤ ⑥ ⑦ 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	°C
Storage Temperature	T_{ST}	-30	—	+80	°C
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	$V_{DD}-V_O$	$T_a=-20^{\circ}C$	—	—	26.0	V
		$T_a=25^{\circ}C$	—	24.0	—	V
		$T_a=+70^{\circ}C$	22.0	—	—	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

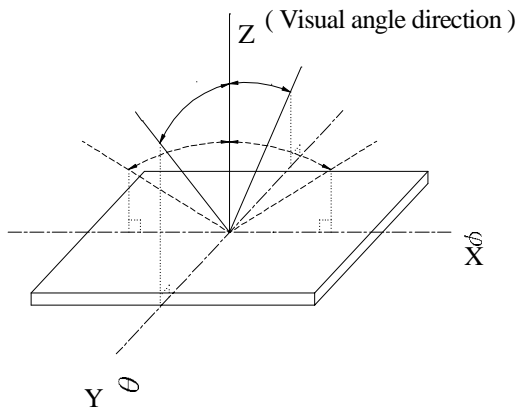


6. Optical Characteristics

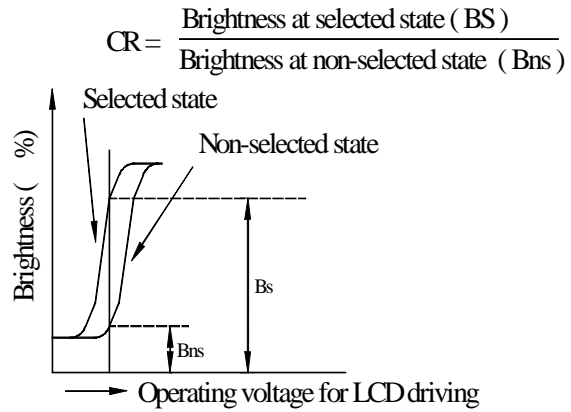
ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
View Angle	(V) θ	$CR \geq 2$	10	—	105	deg.
	(H) φ	$CR \geq 2$	-30	—	30	deg.
Contrast Ratio	CR	—	—	3	—	—
Response Time	T rise	—	—	200	300	ms
	T fall	—	—	150	200	ms

6.1 Definitions

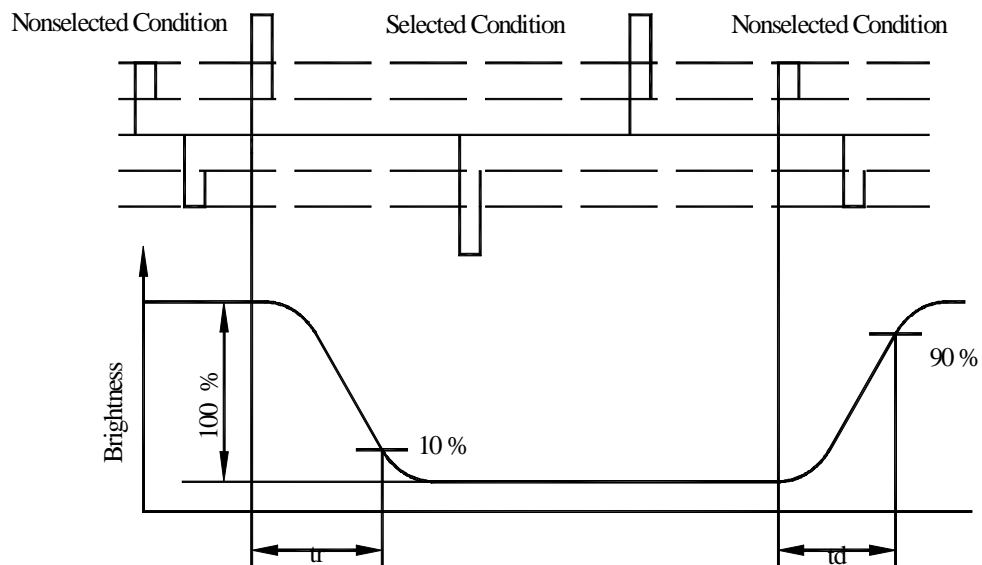
View Angles



Contrast Ratio



Response time





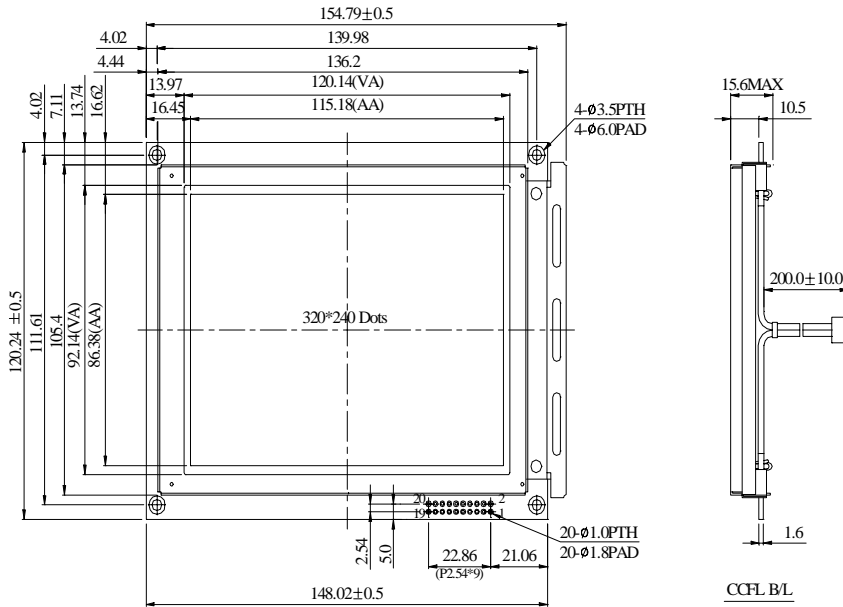
7. Interface Description

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	$\overline{\text{CS}}$	H/L	Chip select, Active L
16	$\overline{\text{RES}}$	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

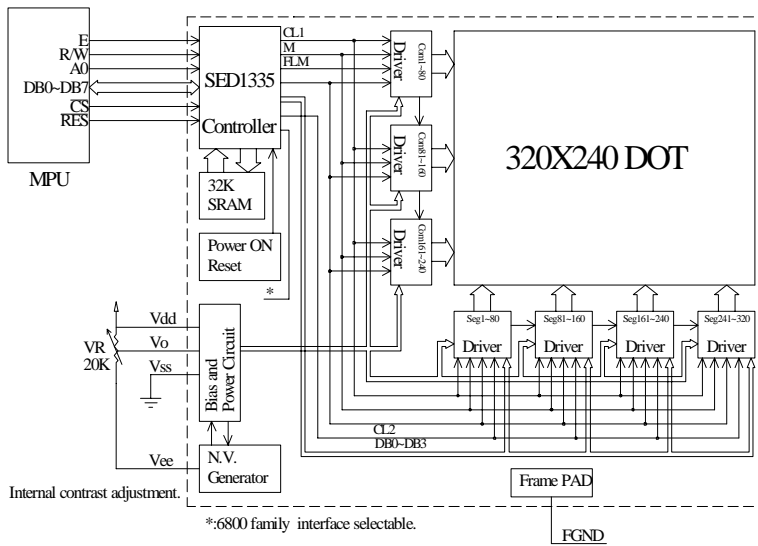
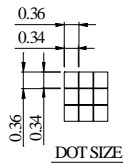


8. Contour Drawing & Block Diagram

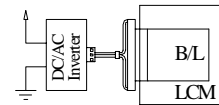


PIN NO.	SYMBOL
1	Vss
2	Vdd
3	Vo
4	E
5	R/W
6	A0
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	CS
16	RES
17	Vee
18	FGND
19	NC
20	NC

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



CCFL B/L drive directly from connector .





9. Quality Assurance

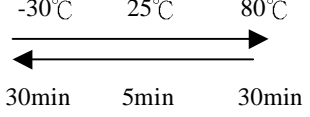
◆ Screen Cosmetic Criteria

No.	Defect	Judgement Criterion	Partition																				
1	Spots	<p>A) Clear</p> <table border="1"> <thead> <tr> <th>Size: d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.1$</td> <td>Disregard</td> </tr> <tr> <td>$0.1 < d \leq 0.2$</td> <td>6</td> </tr> <tr> <td>$0.2 < d \leq 0.3$</td> <td>2</td> </tr> <tr> <td>$0.3 < d$</td> <td>0</td> </tr> </tbody> </table> <p>Note: Including pinholes and defective dots, which must be within one pixel size.</p> <p>B) Unclear</p> <table border="1"> <thead> <tr> <th>Size: d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.2$</td> <td>Disregard</td> </tr> <tr> <td>$0.2 < d \leq 0.5$</td> <td>6</td> </tr> <tr> <td>$0.5 < d \leq 0.7$</td> <td>2</td> </tr> <tr> <td>$0.7 < d$</td> <td>0</td> </tr> </tbody> </table>	Size: d mm	Acceptable Qty in active area	$d \leq 0.1$	Disregard	$0.1 < d \leq 0.2$	6	$0.2 < d \leq 0.3$	2	$0.3 < d$	0	Size: d mm	Acceptable Qty in active area	$d \leq 0.2$	Disregard	$0.2 < d \leq 0.5$	6	$0.5 < d \leq 0.7$	2	$0.7 < d$	0	Minor
Size: d mm	Acceptable Qty in active area																						
$d \leq 0.1$	Disregard																						
$0.1 < d \leq 0.2$	6																						
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$d \leq 0.2$	Disregard																						
$0.2 < d \leq 0.5$	6																						
$0.5 < d \leq 0.7$	2																						
$0.7 < d$	0																						
2	Bubbles in Polarize	<table border="1"> <thead> <tr> <th>Size: d mm</th> <th>Acceptable Qty in active area</th> </tr> </thead> <tbody> <tr> <td>$d \leq 0.3$</td> <td>Disregard</td> </tr> <tr> <td>$0.3 < d \leq 1.0$</td> <td>3</td> </tr> <tr> <td>$1.0 < d \leq 1.5$</td> <td>1</td> </tr> <tr> <td>$1.5 < d$</td> <td>0</td> </tr> </tbody> </table>	Size: d mm	Acceptable Qty in active area	$d \leq 0.3$	Disregard	$0.3 < d \leq 1.0$	3	$1.0 < d \leq 1.5$	1	$1.5 < d$	0	Minor										
Size: d mm	Acceptable Qty in active area																						
$d \leq 0.3$	Disregard																						
$0.3 < d \leq 1.0$	3																						
$1.0 < d \leq 1.5$	1																						
$1.5 < d$	0																						
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°C 200hrs	—
2	Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-30°C 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°C 200hrs	—
4	Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	—
5	High Temperature/ Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	80°C, 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°C, 90%RH 96hrs	—
7	Temperature Cycle	<p>Endurance test applying the low and high temperature cycle.</p> <p style="text-align: center;"> -30°C 25°C 80°C  30min 5min 30min 1 cycle </p>	-30°C/80°C 10 cycles	—



Content of Reliability Test, Cont.

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°C



11. Backlight Information

CCFL backlight Specification

(Ta=25°C)

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	$\varphi, \theta = 0 \text{ deg}, I_{FL} = 5.0\text{mArms}$
Chromaticity	x	—	0.340	—	—	—
	y	—	0.370	—	—	—
Luminance Uniformity (Testing 9 point)	—	75%	—	—	%	$\varphi, \theta = 0 \text{ deg}, I_{FL} = 5.0\text{mArms}$
Life time	—	15000	—	—	hrs	