

Crystalfontz America, Inc.

CUSTOMER : _____
MODULE NO.: CFAG320240C-YMI-VZ

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
ISSUED DATE:			

Crystalfontz America, Inc.

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.Module Classification Information

CFA G 3 2 0 2 4 0 C - Y M I - V Z

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Brand : CRYSTALFONTZ AMERICA, INCORPORATED															
②	Display Type : H→Character Type, G→Graphic Type															
③	Display's logical dimensions : 320 pixels by 240 pixels															
④	Model serials number															
⑤	Backlight Type :	<table border="0"> <tr> <td>N→Without backlight</td> <td>A→LED, Amber</td> </tr> <tr> <td>B→EL, Blue green</td> <td>R→LED, Red</td> </tr> <tr> <td>D→EL, Green</td> <td>O→LED, Orange</td> </tr> <tr> <td>W→EL, White</td> <td>G→LED, Green</td> </tr> <tr> <td>F→CCFL, White</td> <td>T→LED, White</td> </tr> <tr> <td>Y→LED, Yellow Green</td> <td></td> </tr> </table>	N→Without backlight	A→LED, Amber	B→EL, Blue green	R→LED, Red	D→EL, Green	O→LED, Orange	W→EL, White	G→LED, Green	F→CCFL, White	T→LED, White	Y→LED, Yellow Green			
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⑥	LCD Mode :	<table border="0"> <tr> <td>B→TN Positive, Gray</td> <td>T→FSTN Negative</td> </tr> <tr> <td>N→TN Negative,</td> <td></td> </tr> <tr> <td>G→STN Positive, Gray</td> <td></td> </tr> <tr> <td>Y→STN Positive, Yellow Green</td> <td></td> </tr> <tr> <td>M→STN Negative, Blue</td> <td></td> </tr> <tr> <td>F→FSTN Positive</td> <td></td> </tr> </table>	B→TN Positive, Gray	T→FSTN Negative	N→TN Negative,		G→STN Positive, Gray		Y→STN Positive, Yellow Green		M→STN Negative, Blue		F→FSTN Positive			
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⑦	LCD Polarize Type/ Temperature range/ View direction	<table border="0"> <tr> <td>A→Reflective, N.T, 6:00</td> <td>H→Transflective, W.T,6:00</td> </tr> <tr> <td>D→Reflective, N.T, 12:00</td> <td>K→Transflective,</td> </tr> <tr> <td>G→Reflective, W. T, 6:00</td> <td>W.T,12:00</td> </tr> <tr> <td>J→Reflective, W. T, 12:00</td> <td>C→Transmissive, N.T,6:00</td> </tr> <tr> <td>B→Transflective, N.T,6:00</td> <td>F→Transmissive, N.T,12:00</td> </tr> <tr> <td>E→Transflective, N.T.12:00</td> <td>I→Transmissive, W.T.6:00</td> </tr> <tr> <td></td> <td>L→Transmissive, W.T,12:00</td> </tr> </table>	A→Reflective, N.T, 6:00	H→Transflective, W.T,6:00	D→Reflective, N.T, 12:00	K→Transflective,	G→Reflective, W. T, 6:00	W.T,12:00	J→Reflective, W. T, 12:00	C→Transmissive, N.T,6:00	B→Transflective, N.T,6:00	F→Transmissive, N.T,12:00	E→Transflective, N.T.12:00	I→Transmissive, W.T.6:00		L→Transmissive, W.T,12:00
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	L→Transmissive, W.T,12:00															
⑧	Special Code	V : Build in Negative Voltage 68XX MPU Interface														

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	148.02(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 , Negative , transmissive , Blue	
View direction	6 o'clock	
Backlight	LED , Yellow Green	

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

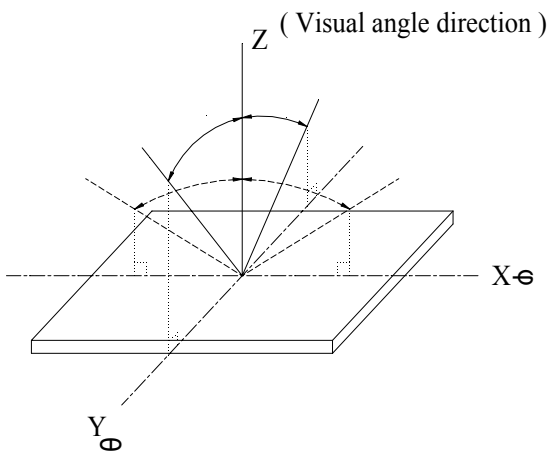
ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Logic Voltage	$V_{DD}-V_{SS}$	-	-	5.0	5.5	V
Supply Voltage For LCD	$V_{DD}-V_O$	$T_a=-20^{\circ}\text{C}$	-	-	26.0	V
		$T_a=25^{\circ}\text{C}$	-	24.0	-	V
		$T_a=+70^{\circ}\text{C}$	22.0	-	-	V
Input High Volt.	V_{IH}	-	$0.8V_{DD}$	-	V_{DD}	V
Input Low Volt.	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	110	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

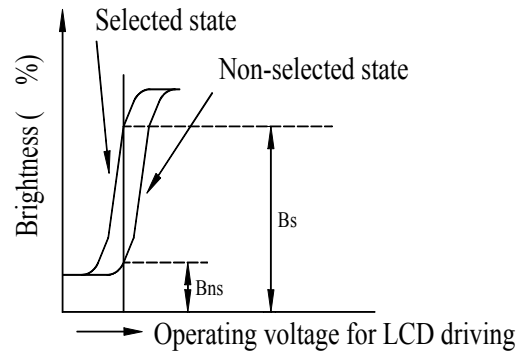
6.1 Definitions

■View Angles

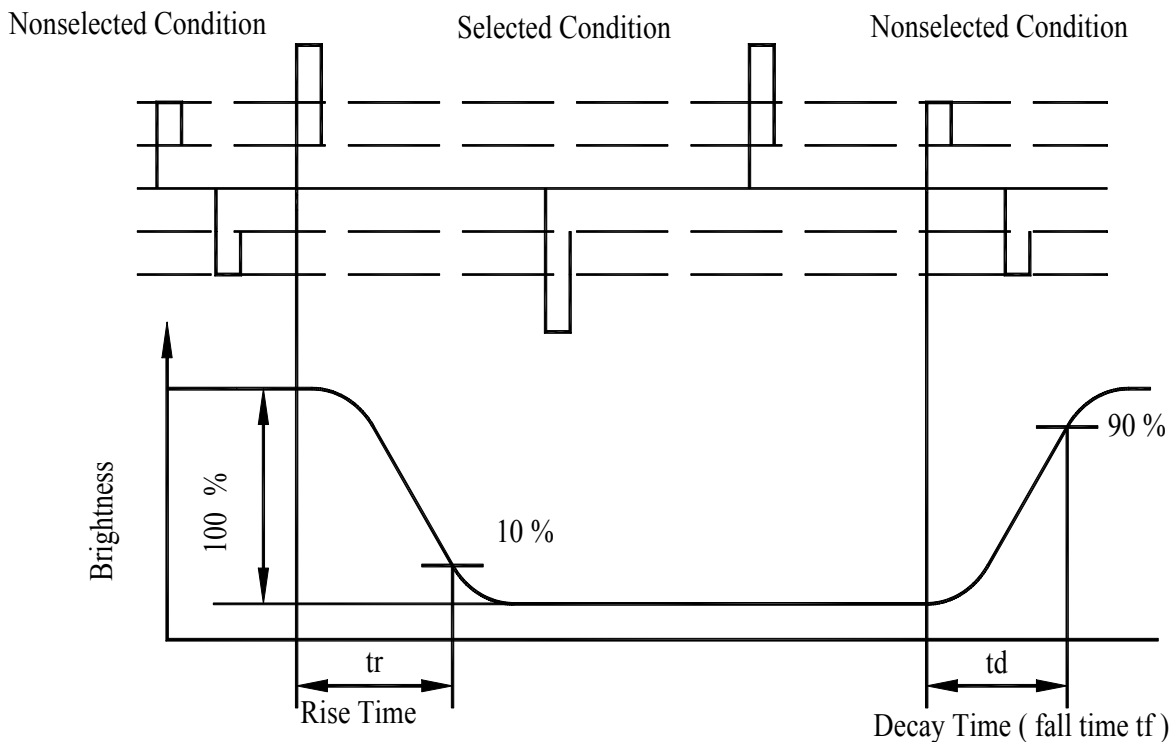


■Contrast Ratio

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



■Response time

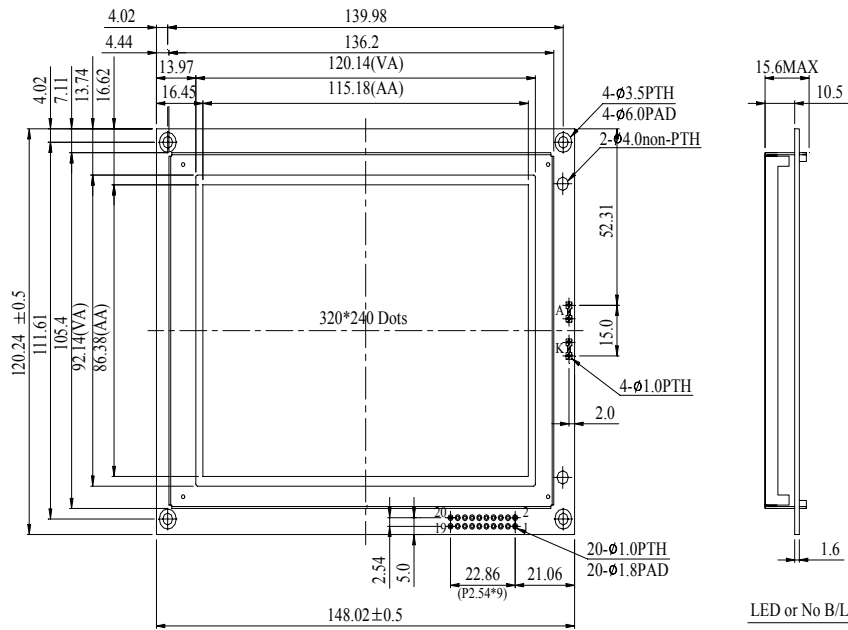


7.Interface Description

JM (right) short , for 6800 MPU family

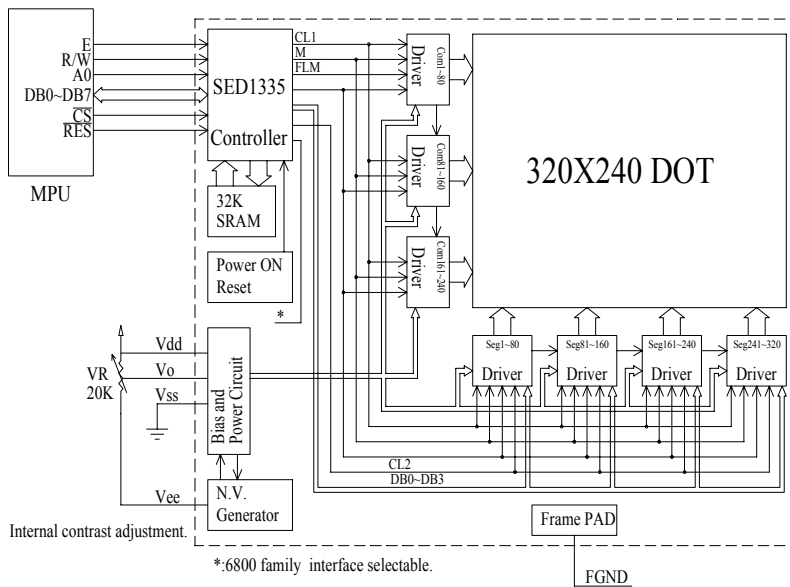
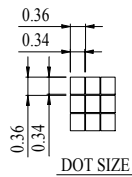
Pin No.	Symbol	Level	Description
1	V _{SS}	0V	Ground
2	V _{DD}	5.0V	Power supply for Logic
3	V _O	(Variable)	Driving voltage for LCD
4	E	H/L	Start enable signal to read or write the data
5	R/W	H/L	R/W signal input is used to select the read/write mode High = Read mode , Low = Write mode
6	A0	H/L	R/W=L, 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

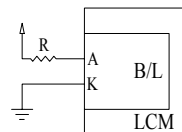


PIN NO.	SYMBOL
1	Vss
2	Vdd
3	Vo
4	E
5	R/W
6	A0
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	CS
16	RES
17	Vee
18	FGND
19	NC
20	NC

The non-specified tolerance of dimension is $\pm 0.3\text{mm}$.



LED B/L drive directly from A,K.



Recommended Value
 $V_{LED} = 4.2\text{V}$, $I_{LED} = 130\text{mA}$
 $R = 4.7\Omega$ (1/2 Watt)

*:6800 family interface selectable.

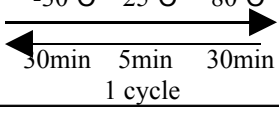
9. Quality Assurance

◆ Screen Cosmetic Criteria

No.	Defect	Judgement Criterion	Partition
1	Spots	<p>A)Clear</p> <p>Size: d mm <u>Acceptable Qty in active area</u></p> <p>$d \leq 0.1$ Disregard</p> <p>$0.1 < d \leq 0.2$ 6</p> <p>$0.2 < d \leq 0.3$ 2</p> <p>$0.3 < d$ 0</p> <p>Note: Including pin holes and defective dots which must be within one pixel size.</p> <p>B)Unclear</p> <p>Size: d mm <u>Acceptable Qty in active area</u></p> <p>$d \leq 0.2$ Disregard</p> <p>$0.2 < d \leq 0.5$ 6</p> <p>$0.5 < d \leq 0.7$ 2</p> <p>$0.7 < d$ 0</p>	Minor
2	Bubbles in Polarize	<p>Size: d mm <u>Acceptable Qty in active area</u></p> <p>$d \leq 0.3$ Disregard</p> <p>$0.3 < d \leq 1.0$ 3</p> <p>$1.0 < d \leq 1.5$ 1</p> <p>$1.5 < d$ 0</p>	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. Back-light type should be judged with back-light 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	Endurance test applying the low and high temperature cycle. 	-30°C/80°C 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 sign wave 11 msdc 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

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Supply Current	I _{LED}	—	180		mA	V=4.2V
Supply Voltage	V	-	4.2	4.6	V	-
Reverse Voltage	V _R	-	-	10	V	-
Luminous Intensity	I _V	-	23	-	CD/M ²	I _{LED} =180mA
Wave Length	λ _p	—	571	-	nm	I _{LED} =180mA
Life Time	-	-	100000	-	Hr.	V ≤ 4.6V
Color	Yellow Green					