

Crystalfontz America, Inc.

CUSTOMER		
MODEL	CFAX12864AP1-NFH	
APPROVAL	BY:	DATA:

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

Contents

- 1.Module Classification Information
- 2.Precautions in use of LCD Modules
- 3.General Specification
- 4.Absolute Maximum Ratings
- 5.Electrical Characteristics
- 6.Optical Characteristics
- 7.Interface Description
- 8.Contour Drawing & Block Diagram
9. Display Control Instruction
- 10.Backlight Information

1.Module Classification Information

CFA X 1 2 8 6 4 AP1 - N F H

① ② ③ ④⑧ ⑤⑥⑦

①	Brand : CRYSTALFONTZ AMERICA, INCORPORATED	
②	Display Type : H→Character Type, G→Graphic Type, X→TAB Type	
③	Display's logical dimensions: 128 pixels by 64 pixels	
④	Model serials no.: A	
⑤	Backlight Type :	<p>N→Without backlight</p> <p>B→EL, Blue green</p> <p>D→EL, Green</p> <p>W→EL, White</p> <p>F→CCFL, White</p> <p>Y→LED, Yellow Green</p> <p>P→LED, Bule</p> <p>A→LED, Amber</p> <p>R→LED, Red</p> <p>O→LED, Orange</p> <p>G→LED, Green</p> <p>T→LED, White</p>
⑥	LCD Mode :	<p>B→TN Positive, Gray</p> <p>N→TN Negative,</p> <p>G→STN Positive, Gray</p> <p>Y→STN Positive, Yellow Green</p> <p>M→STN Negative, Blue</p> <p>F→FSTN Positive</p> <p>T→FSTN Negative</p>
⑦	LCD Polarizer Type/ Temperature range/ View direction	<p>A→Reflective, N.T, 6:00</p> <p>D→Reflective, N.T, 12:00</p> <p>G→Reflective, W. T, 6:00</p> <p>J→Reflective, W. T, 12:00</p> <p>B→Transflective, N.T,6:00</p> <p>E→Transflective, N.T,12:00</p> <p>H→Transflective, W.T,6:00</p> <p>K→Transflective, W.T,12:00</p> <p>C→Transmissive, N.T,6:00</p> <p>F→Transmissive, N.T,12:00</p> <p>I→Transmissive, W. T, 6:00</p> <p>L→Transmissive, W.T,12:00</p>
⑧	Special Code	P1/P : "A" module with ZIF tail

2.Precautions in use of LCD Modules

- (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	Dimension	Unit
Number of Characters	128 x 64	-
Module dimension	66.1 x 34.0 x 1.9(MAX)	mm
View area	29.58x 17.98	mm
Active area	25.58x15.98	mm
Dot size	0.18 x 0.23	mm
Dot pitch	0.2 x 0.25	mm
LCD type	FSTN, Positive, Transflective,	
Duty	1/64	
View direction	6 o'clock	
Backlight Type		

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	V_{SS}	-	V_{DD}	V
Supply Voltage For Logic	$V_{DD}-V_{SS}$	2.4	-	3.6	V
Supply Voltage For LCD	V_O-V_{SS}	4.0	-	15.0	V

5. Electrical Characteristics

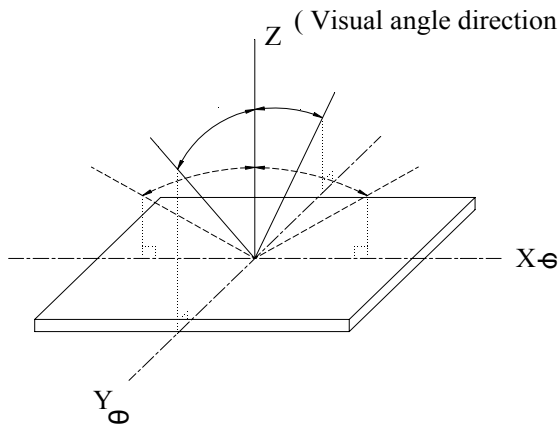
Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	$V_{DD}-V_{SS}$	-	2.4	-	5.5	V
Supply Voltage For LCD	$V_{DD}-V_0$	$T_a=-20^{\circ}\text{C}$	-	-	9.2	V
		$T_a=25^{\circ}\text{C}$	-	-	-	V
		$T_a=+70^{\circ}\text{C}$	-	8.2	-	V
			7.2	-	-	
Input High Volt.	V_{IH}	-	$0.8 V_{DD}$	-	V_{DD}	V
Input Low Volt.	V_{IL}	-	-	-	$0.2 V_{DD}$	V
Output High Volt.	V_{OH}	-	$V_{DD}-0.4$	-	-	V
Output Low Volt.	V_{OL}	-	-	-	0.4	V
Supply Current	I_{DD}	$V_{DD}=5V$	-	1	-	mA

6. Optical Characteristics

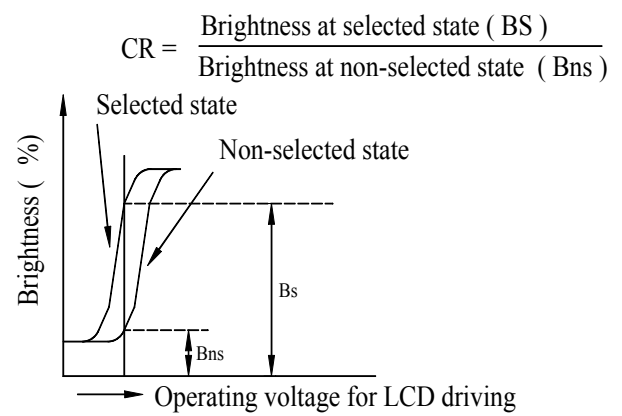
Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	(V) θ	$CR \geq 5$	30	-	60	deg
	(H) ϕ	$CR \geq 5$	-45	-	45	deg
Contrast Ratio	CR	-	-	5	-	-
Response Time	T rise	-	-	110	220	ms
	T fall	-	-	260	520	ms

6.1 Definitions

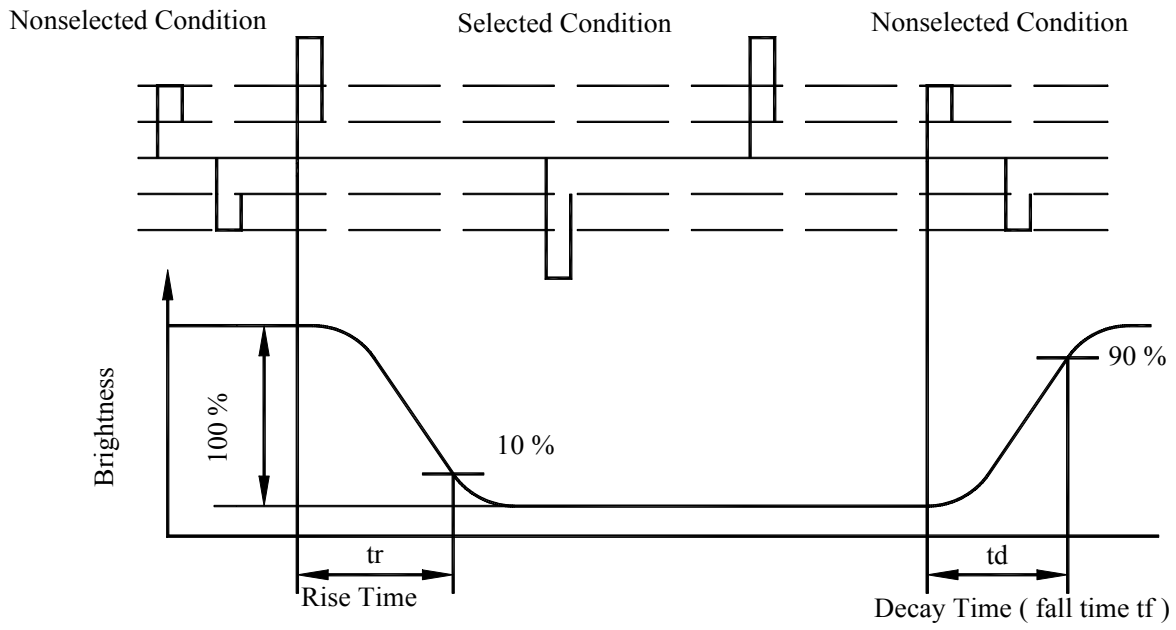
■ View Angles



■ Contrast Ratio



■ Response Time



7.Interface Description

Pin No.	Symbol	I/O	Description
1	VDD	-	Power supply pin for logic.
2	VSS	-	Ground pin, connected to 0V
3	CS1B	I	Chip select input pins Data/instruction i/o is enabled only when CS1Bis”L”and CS2”H”. When chip select is non-active,DB0 TO DB7 may be high impedance.
4	CS2	I	Chip select input pins Data/instruction i/o is enabled only when CS1Bis”L”and CS2”H”. When chip select is non-active,DB0 TO DB7 may be high impedance.
5	RES	I	Reset input pin When RESETB is “L”, initialization is executed.
6	RS	I	Register select input pin -RS = “H”:DB0 to DB7 are display data -RS = “L” :DB0 to DB7 are control data
7	R/W	I	When connected to 80-family MPU: Write enable clock input pin. The data ON DB0~DB7 are latched at the rising edge of the /WR signal. When connected to 68-family MPU: RW = ”H”: read RW = “L”: write
8	E	I	When connected to 80-family MPU: Read enable clock input pin. When /RD is “L”, DB0~DB7 are in an output status When connected to 68-family MPU: RW = ”H”: When E is “H”, DB0~DB7 are in an output status RW = “L”: The data on DB0~DB7 are latched at the falling edge of the E signal
9~16	DB0~DB7	I/O	8-bit bi-directional data bus that is connected to the standard 8-bit microprocessor data bus. When the serial interface selected(PS=”L”) DB0~DB5: high impedance DB6: serial input clock (SCLK) DB7: serial input data (SID) When chip select is not active, DB0~DB7 may be high impedance.
17	MI	I	Microprocessor interface selects pin. MI=”H”: 6800-series MPU interface MI=”L”: 8080-series MPU interface
18	PS	I	Parallel/Serial data input select pin. Interface Data Read/Write Serial clock PS=”H”: Parallel DB0~DB7 E_RD,RW_WR - PS=”L”: Serial SID(DB7) Write only SCLK(DB6) In serial mode, it is impossible to read data from the on-chip RAM. And DB0 to DB5 are high impedance and E_RD and RW_WR must be fixed to either “H” or “L”.

9.Display Control Instruction

PLEASE CONSULT KS0713 DATA SHEET