

Crystalfontz America, Inc.

CUSTOMER : _____
MODULE NO.: CFAX12864CP1-NGH

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
ISSUED DATE:			

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1.Module Classification Information

CFA X 12864 CP1 - N G H

① ② ③ ④⑧ ⑤⑥⑦

①	Brand : CRYSTALFONTZ AMERICA, INCORPORATED	
②	Display Type : H→Character Type, G→Graphic Type	
③	Display's logical dimensions: 128 pixels by 64 pixels	
④	Model serials no.: C	
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 : "C" 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	83.9 x 56.0 x 1.9(MAX)	mm
View area	52.0x 33.5	mm
Active area	47.34x 26.86	mm
Dot size	0.35 x 0.4	mm
Dot pitch	0.37 x 0.42	mm
LCD type	STN Positive, Transflective, Gray	
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

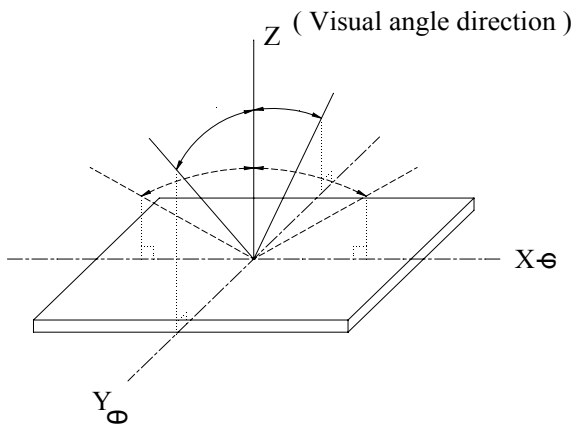
Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	$V_{DD}-V_{SS}$	-	2.4	-	3.6	V
Supply Voltage For LCD	$V_{DD}-V_0$	$T_a=-20^{\circ}\text{C}$	-	-	9.2	V
		$T_a=25^{\circ}\text{C}$	-	-	-	V
		$T_a=+70^{\circ}\text{C}$	-	8.2	-	V
			7.2	-	-	
Input High Volt.	V_{IH}	-	$0.8 V_{DD}$	-	V_{DD}	V
Input Low Volt.	V_{IL}	-	-	-	$0.2V_{DD}$	V
Output High Volt.	V_{OH}	-	$V_{DD}-0.4$	-	-	V
Output Low Volt.	V_{OL}	-	-	-	0.4	V
Supply Current	I_{DD}	$V_{DD}=3.6$	-	80	-	mA

6. Optical Characteristics

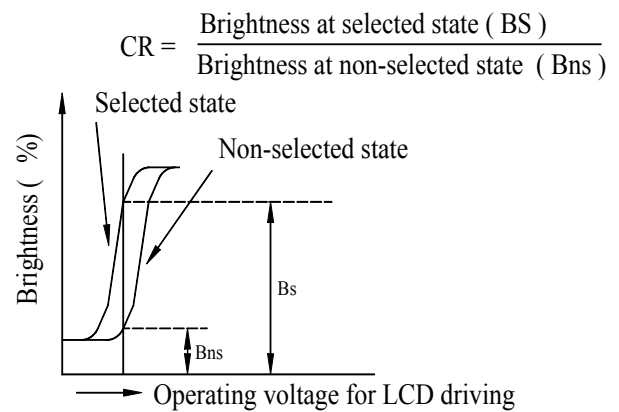
Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	(V) θ	CR \geq 3	15	-	105	deg
	(H) ϕ	CR \geq 3	-30	-	30	deg
Contrast Ratio	CR	-	-	3	-	-
Response Time	T rise	-	-	110	220	ms
	T fall	-	-	260	520	ms

6.1 Definitions

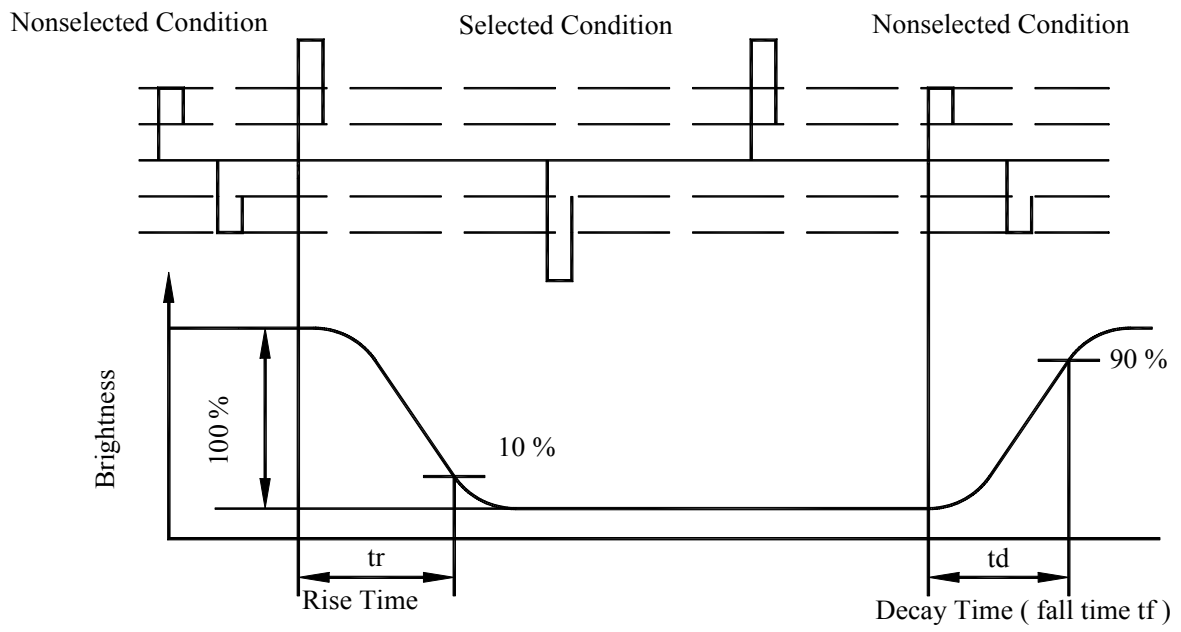
■View Angles



■Contrast Ratio



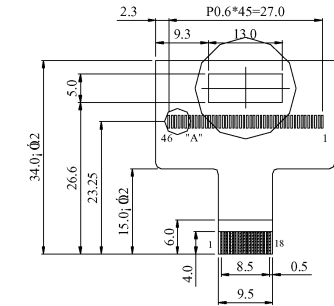
■ Response Time



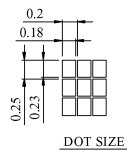
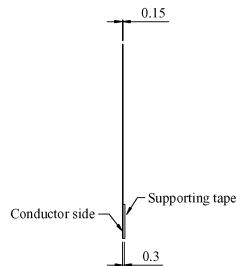
7.Interface Description

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".

8. Contour Drawing & Block Diagram

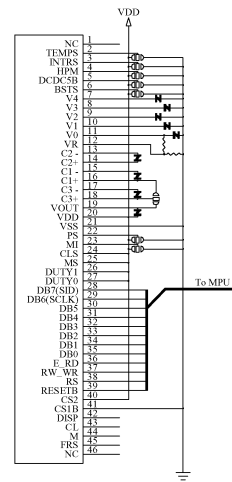


PIN NO.	SYMBOL
1	VCC
2	GND
3	CS1B
4	CS2
5	RESET
6	RS
7	R/W
8	ERD
9	DB0
10	DB1
11	DB2
12	DB3
13	DB4
14	DB5
15	DB6
16	DB7
17	MI
18	P/S



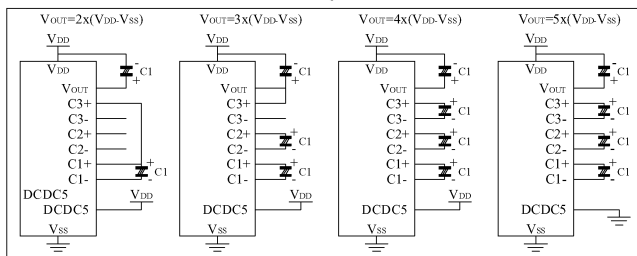
Display Data RAM

Page Address P3,P2,P1,P0	Data	RAM address	Line Address (HEX)	Com Output
0,0,0,0	DB0		00	COM1
	DB1		01	COM2
	DB2		02	COM3
	DB3		03	COM4
	DB4		04	COM5
	DB5		05	COM6
	DB6		06	COM7
	DB7		07	COM8
?			?	?
0,1,1,1	DB0		38	COM57
	DB1		39	COM58
	DB2		3A	COM59
	DB3		3B	COM60
	DB4		3C	COM61
	DB5		3D	COM62
	DB6		3E	COM63
	DB7		3F	COM64
0,1,1,1	DB0		40	COM65
Column	ADC=0	83 82 81 80 7F 7E 7D 7C 7B 7A	5 4 3 2 1 0	
Address	ADC=1	0 1 2 3 4 5 6 7 8 9	7E 7F 80 81 82 83	
Segment Output		132 131 130 129 128 127 126 125 124 123	6 5 4 3 2 1	

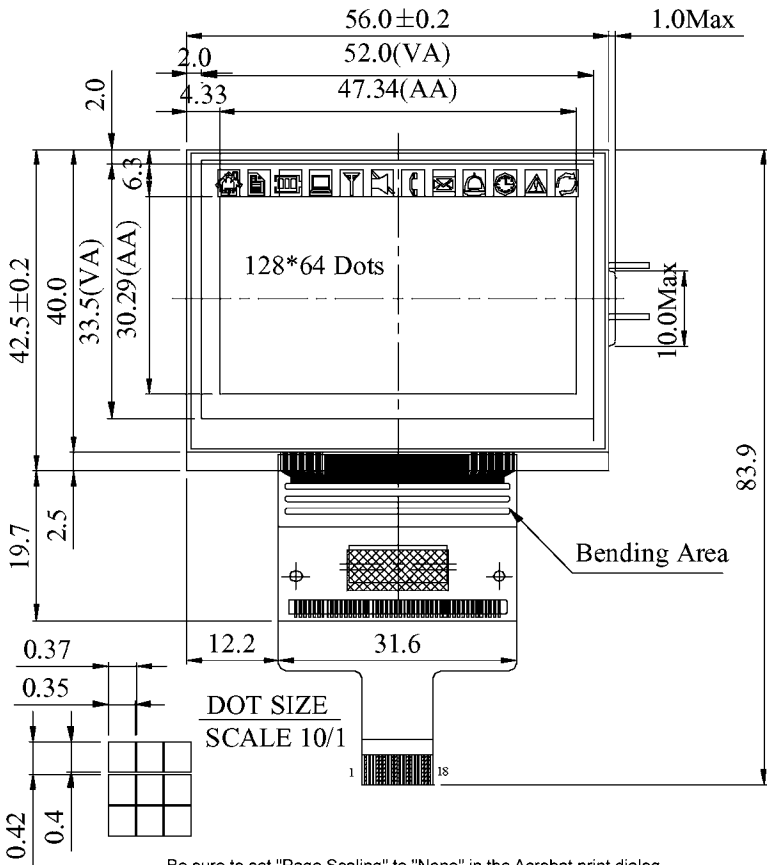


Application Circuit

Boosting Circuit



1:1 Outline Drawing CFAx12864CP1-NGH



Be sure to set "Page Scaling" to "None" in the Acrobat print dialog.
 Always verify print accuracy with physical part, or by measuring the printout.

9.Display Control Instruction

PLEASE CONSULT KS0713 DATA SHEET.