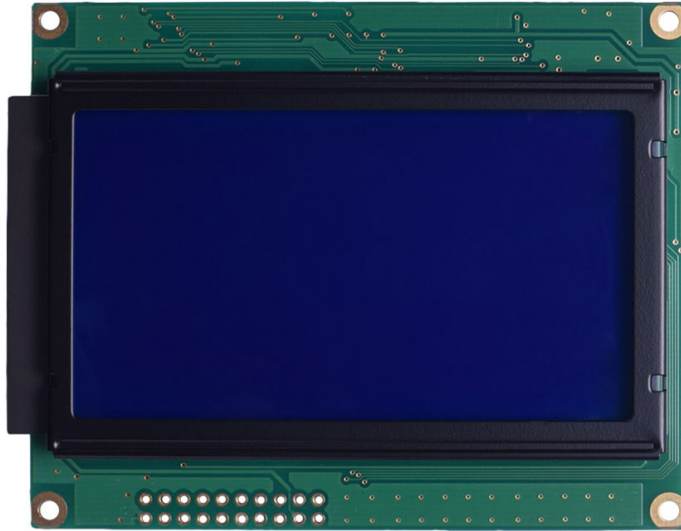


DisplayModule



DM-LCD12864-462
12864 STN(-) BLUE GRAPHIC LCD
WITH PARALLEL MPU INTERFACE

Contents

[Revision History](#)

[Main Features](#)

[Pin Description](#)

[Mechanical Drawing](#)

[Electrical Characteristics](#)

[Optical Characteristics](#)

[Block Diagram](#)

[Timing Characteristics](#)

[Commands](#)

[Built-in Font Table](#)

[Driver/Controller Information](#)

[Reliability](#)

[Warranty and Conditions](#)

1 Revision History

Date	Changes
2015-04-15	First release

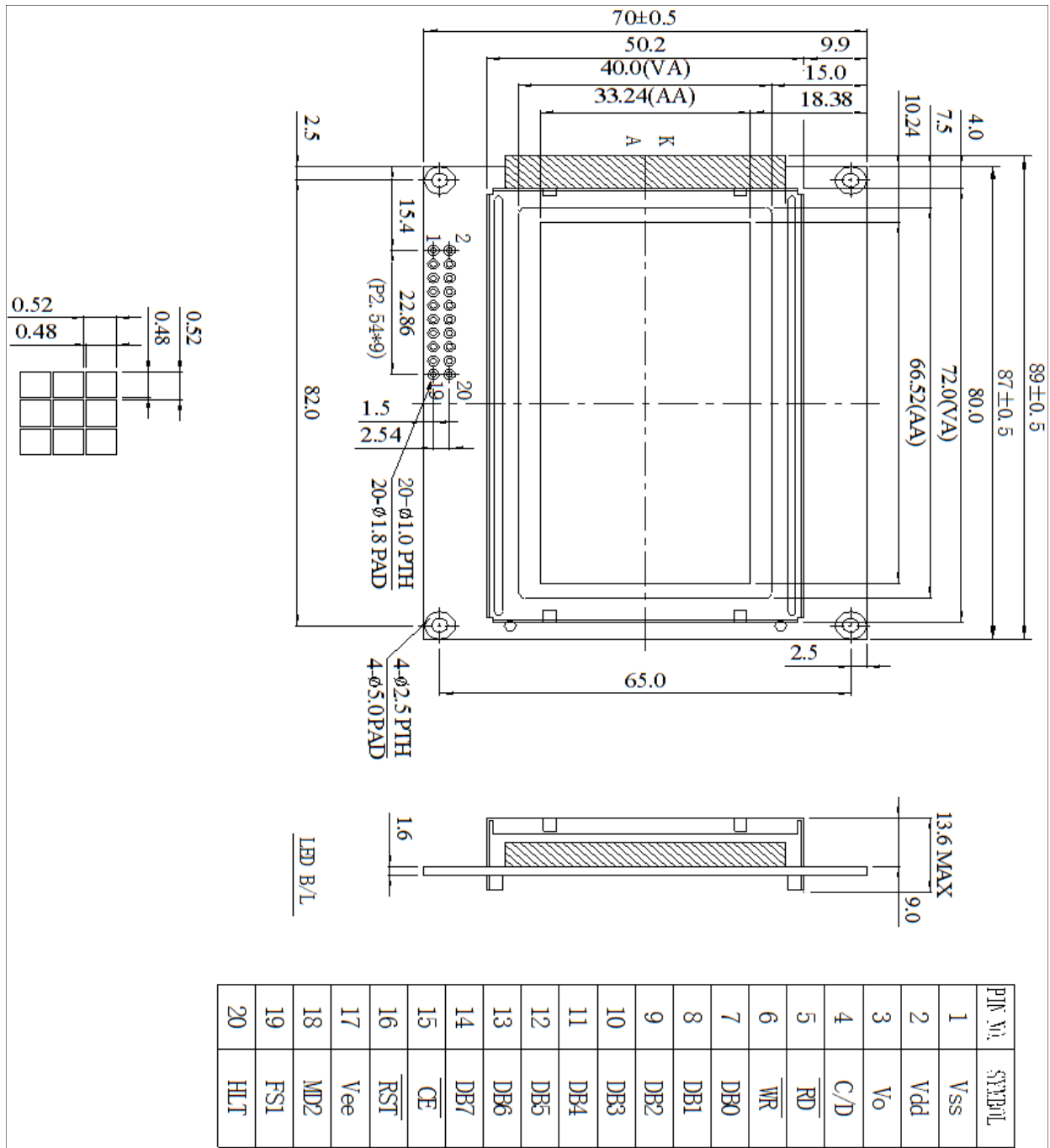
2 Main Features

Item	Specification	Unit
Resolution	128 x 64	dots
Display Mode	STN Negative, Blue , Transmissive	-
Module dimension	89.0 x 70.0 x 13.6(MAX)	mm
Controller IC	RA6963	-
Interface	Parallel MPU Interface	-
Power Supply	5.0	V
View Direction	6:00	-
Duty	1/64	
Backlight	White LED	-
Weight	75.3	g

3 Pin Description

Pin No.	Symbol	Description
1	Vss	GND
2	Vdd	Power supply
3	Vo	Power supply for LCD driver
4	C/D	WR=L,C/D=H:Command Write C/D=L:Data write RD=L, C/D=H:Status Read C/D=L:Data read
5	/RD	Data read. Read data from RA6963C when RD = L
6	/WR	Data write. Write data into RA6963C when WR = L
7	DB0	Data bus line
8	DB1	Data bus line
9	DB2	Data bus line
10	DB3	Data bus line
11	DB4	Data bus line
12	DB5	Data bus line
13	DB6	Data bus line
14	DB7	Data bus line
15	CE	L: Chip enable
16	/RST	H: Normal; L: Initialize RA6963
17	VEE	Negative Voltage Output
18	MD2	Column select; H:32 column; L: 40 column
19	FS1	Pins for selection of font ; H : 6 * 8 , L : 8 * 8
20	HLT	Clock operation stop signal

4 Mechanical Drawing



5 Electrical Characteristics

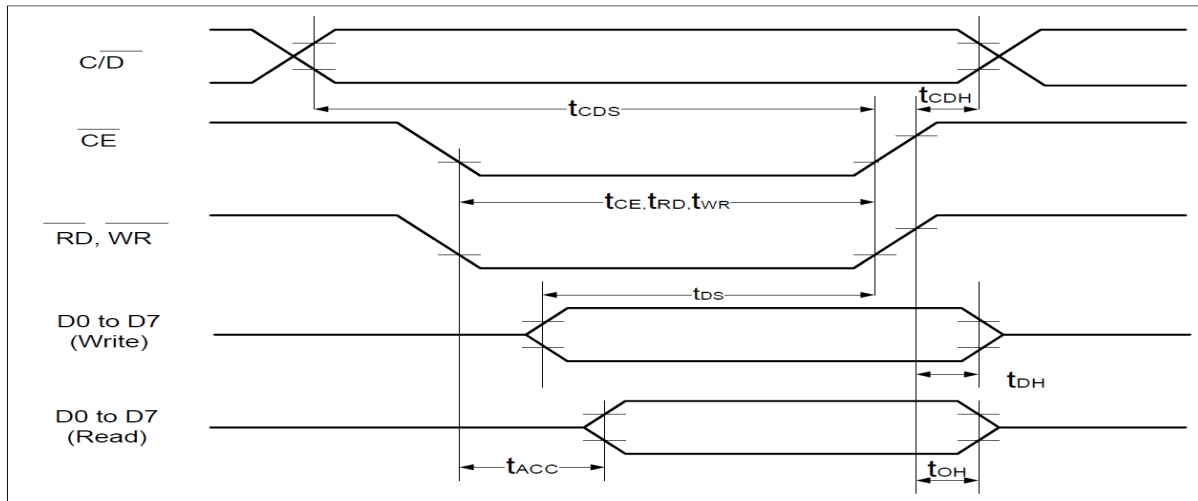
Item	Symbol	Condition	Min	Typ.	Max	Unit
Supply Voltage For Logic	VDD		3.0	-	5.5	V
Supply Current	IDD	VDD=5.0V	12.0	16.0	18.0	mA
Low Level Input Voltage	V _{IL}		0	-	0.2VDD	V
High Level Input Voltage	V _{IH}		0.8VDD	-	VDD	V
Low Level Output Voltage	V _{OL}		0		0.3	V
High Level Output Voltage	V _{OH}		VDD-0.3		VDD	V
Backlight Supply Voltage	V		3.4	3.5	3.6	V
Backlight Supply Current	I _{LED}			64	80	mA
Operating Temperature	TOP	Absolute Max	-20	-	+70	°C
Storage Temperature	TST	Absolute Max	-30	-	+80	°C

6 Optical Characteristics

Item	Symbol	Min	Typ	Max	Unit	Note
View Angles Top	AV		20		°	
View Angles Bottom	AV		40		°	
View Angles Left	AH		30		°	
View Angles Right	AH		30		°	
Response Time (25°C)	Tr + Tf		450	650	ms	
Contrast Ratio	CR		3			
Luminance (Without LCD)	L _y	440	550		cd/m ²	

7 Block Diagram

8 Timing Characteristics



Symbol	Parameter	Min	Typ	Max	Unit
T_{CDS}	C/D Set Up Time	100	-	-	ns
T_{CDH}	C/D Hold Time	10	-	-	ns
T_{CE}, T_{RD}, T_{WR}	CE, RD, WR Pulse Width	80	-	-	ns
T_{DS}	Data Set Up Time	80	-	-	ns
T_{DH}	Data Hold Time	40	-	-	ns
T_{ACC}	Access Time	-	-	150	ns
T_{DOH}	Output Hold Time	10	-	50	ns

9 Commands

















Command	Code	D1	D2	
Registers Setting	00100001	X address	Y address	Set cursor
	00100010	Data	00h	Set Offset
	00100100	Low address	High address	Set Address
Set Control Word	01000000	Low address	High address	Set Text
	01000001	Columns	00h	Set Text
	01000010	Low address	High address	Set Graph
	01000011	Columns	00h	Set Graph
Mode Set	1000X000	--	--	OR mode
	1000X001	--	--	EXOR mode
	1000X011	--	--	AND mode
	1000X100	--	--	Text Attribute
	10000XXX	--	--	Internal Control
	10001XXX	--	--	External Control
Display Mode	10010000	--	--	Display cursor
	1001XX10	--	--	Cursor on
	1001XX11	--	--	Cursor off
	100101XX	--	--	Text on
	100110XX	--	--	Text off
	100111XX	--	--	Text on
Cursor Pattern Select	10100000	--	--	1-line cursor
	10100001	--	--	2-line cursor
	10100010	--	--	3-line cursor
	10100011	--	--	4-line cursor
	10100100	--	--	5-line cursor
	10100101	--	--	6-line cursor
	10100110	--	--	7-line cursor
	10100111	--	--	8-line cursor
Data Read/Write	11000000	Data	--	Data Write
	11000001	--	--	Data Read
	11000010	Data	--	Data Write
	11000011	--	--	Data Read
	11000100	Data	--	Data Write
	11000101	--	--	Data Read
Data auto Read/Write	10110000	--	--	Set Data
	10110001	--	--	Set Data
	10110010	--	--	Auto Read
Screen Peek	11100000	--	--	Screen Fetch
Screen Copy	11101000			Screen Copy
Bit Set/Reset	11110XXX	--	--	Bit Reset
	11111XXX	--	--	Bit Set
	1111X000	--	--	Bit 0 (LS)
	1111X001	--	--	Bit 1
	1111X010	--	--	Bit 2
	1111X011	--	--	Bit 3
	1111X100	--	--	Bit 4
	1111X101	--	--	Bit 5
	1111X110	--	--	Bit 6
	1111X111	--	--	Bit 7 (MS)
Screen Reverse	11010000	Data	--	Whole screen

				Data Bit 0 0 : Normal 1 : Reverse
Blink Time	01010000	Data	Don't care (Note)	If Frame = 60Hz Data Bit 2:0 000 : 0.066s 001 : 0.25s 010 : 0.5s (Default) 011 : 0.75s 100 : 1s 101 : 1.25s 110 : 1.5s 111 : 2s
Cursor Auto Moving	01100000	Data	Don't care (Note)	Data Bit 0 0 : Disable.(Default) 1 : Enable.
CGROM Font Select	01110000	Data	Don't care (Note)	Data Bit 1:0 00 : Do not care.(Default) 01 : Do not care. 10 : CGROM Font 01

Note:In these functions, it must be sent two data before sending the command, but the contents of the second datum (D2) can be any values.

10 Built-in Font Table

CGROM Font - 01

LSB MSB	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																

CGROM Font - 02

11 Driver/Controller Information

Built-in RA6963 IC

<https://drive.google.com/file/d/0B5IkVYnewKTGSHpZa2t2aIN6WFk/view?usp=sharing>

12 Reliability

Test Item	Content of Test	Test Condition	Note
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	1,2
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	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20 °C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max, for 96hrs under no-load condition excluding the polarizer. Then taking it out and drying it at normal temperature.	60°C,90%RH 96hrs	1,2
Thermal Shock Resistance	The sample should be allowed stand the following 10 cycles of operation.	-20°C/70°C 10 cycles	-
Vibration Test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude: 15mm; Vibration: 10~55Hz; One cycle 60 seconds to 3 directions of X, Y, Z, for each 16 minutes.	3
Static Electricity Test	Endurance test apply the electric stress to the terminal.	VS=800V, RS=1.5kΩ, CS=100pF, 1 time.	-

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal. Temperature and humidity after remove from the rest chamber.

Note3: Test performed on product itself, not inside a container

13 Warranty and Conditions

<http://www.displaymodule.com/pages/faq>