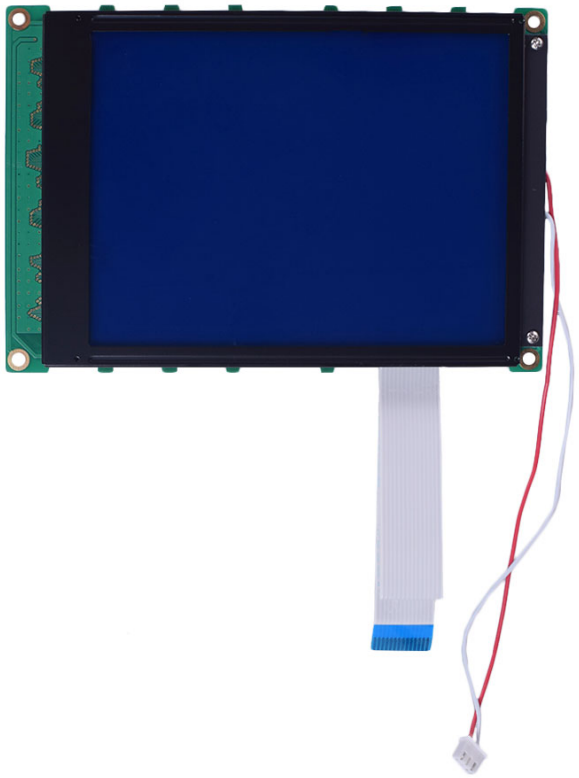
DisplayModule



DM-LCD320240-475

320240 STN(-) BLUE GRAPHIC LCD WITH PARALLEL MPU INTERFACE

Contents

1 Revision History

Date	Changes
2015-04-15	First release

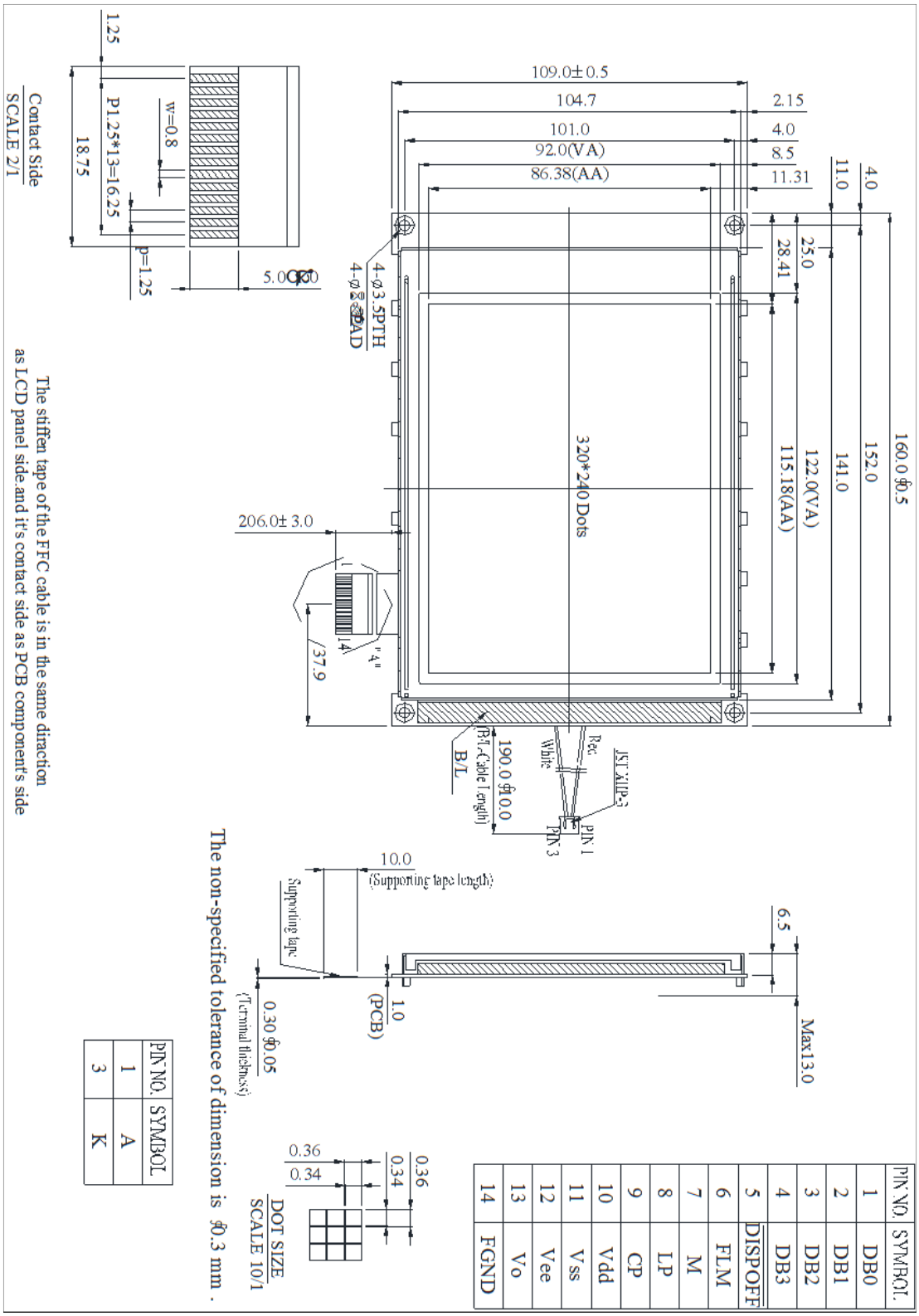
2 Main Features

Item	Specification	Unit
Resolution	320 x 240	dots
Display Mode	STN Negative, Blue, Transmissive	-
Module dimension	160.0 x 109.0 x 13.0(MAX)	mm
Controller IC	Controller	-
Interface	Parallel MPU Interface	-
Power Supply	5.0	V
View Direction	6:00	-
Duty	1/240	
Backlight	White LED	-
Weight	183.4	g

3 Pin Description

Pin No.	Symbol	Description
1	DB0	Data bus line
2	DB1	Data bus line
3	DB2	Data bus line
4	DB3	Data bus line
5	DISPOFF	H:Display ON, L:Display OFF
6	FLM	Scan start-up signal
7	M	Frame reverse signal(alternate signal)
8	LP	Data latch pulse
9	CP	Data shift pulse
10	VDD	Power supply for logic
11	VSS	Ground
12	VEE	Negative voltage output
13	Vo	Driving voltage for LCD(Variable)
14	FGND	Frame Ground

4 Mechanical Drawing



PIN NO.	SYMBOL
1	A
3	K

PIN NO.	SYMBOL
1	DB0
2	DB1
3	DB2
4	DB3
5	DISPOFF
6	FLM
7	M
8	LP
9	CP
10	Vdd
11	Vss
12	Vee
13	Vo
14	FGND

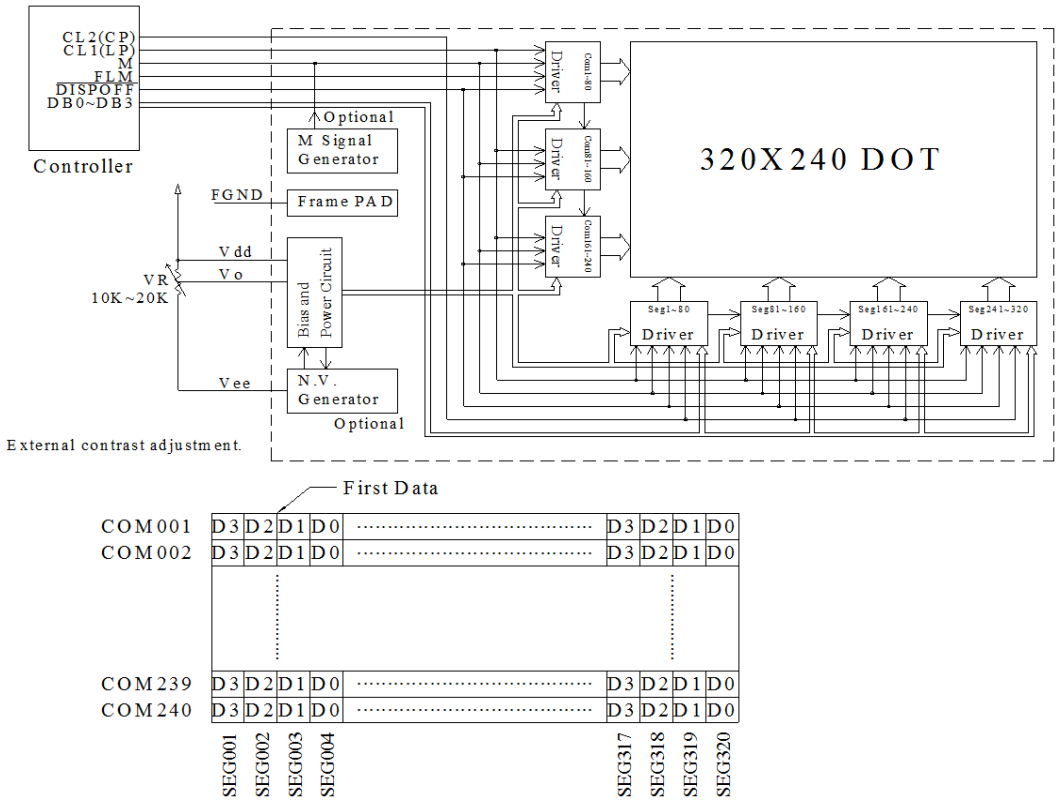
5 Electrical Characteristics

Item	Symbol	Condition	Min	Typ.	Max	Unit
Supply Voltage For Logic	VDD		2.7	-	5.5	V
Supply Current	IDD	VDD=5.0V	60.0	75.0	80.0	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		0.4	V
High Level Output Voltage	V_{OH}		VDD-0.4		-	V
Backlight Supply Voltage	V		3.4	3.5	3.6	V
Backlight Supply Current	I_{LED}			128	160	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		300	400	ms	
Contrast Ratio	CR		3			
Luminance (Without LCD)	L_V	380	420		cd/m²	

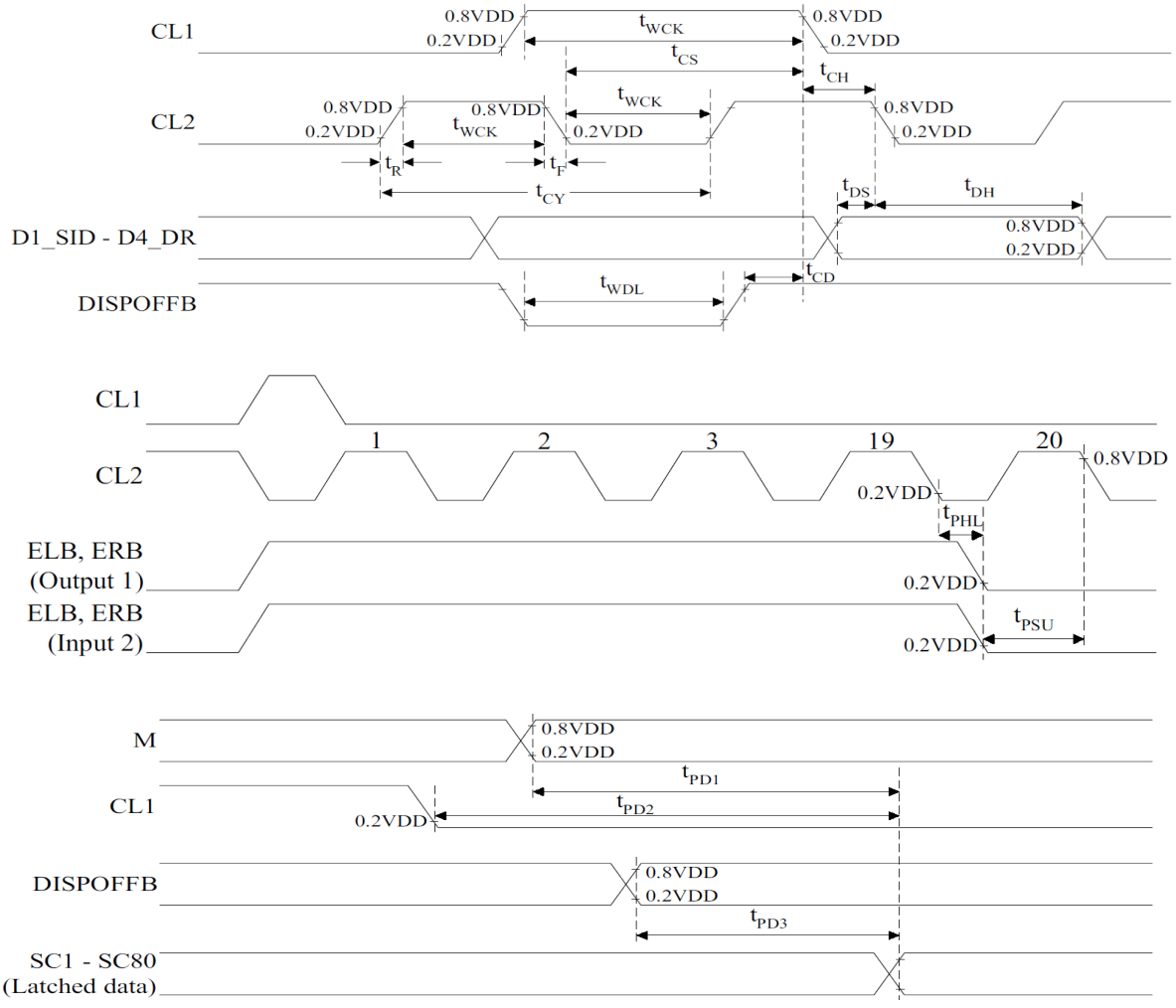
7 Block Diagram



8 Timing Character

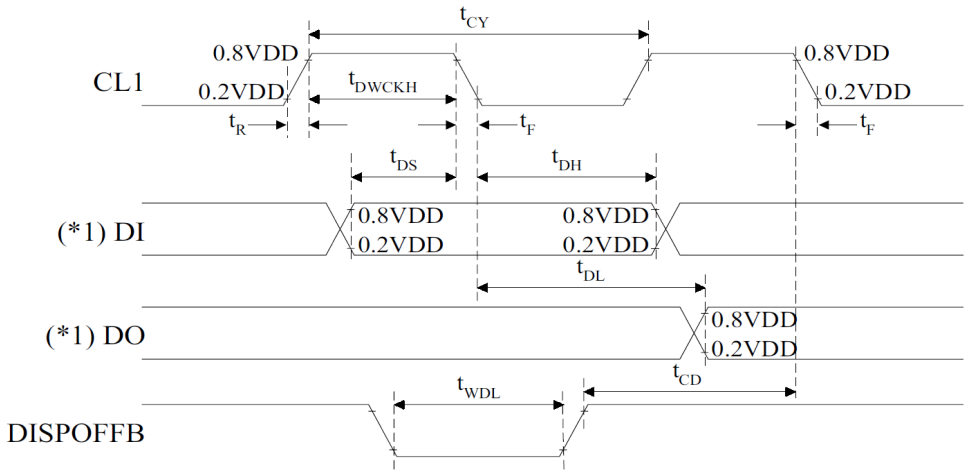
8.1 Segment Driver Application

Symbol	Parameter	Min	Typ	Max	Unit
T_{CY}	Clock cycle time	125	-	-	ns
T_{WCK}	Clock pulse width	45	-	-	ns
T_R/T_F	Clock rise/fall time	-	-	-	ns
T_{DS}	Data set-up time	30	-		ns
T_{DH}	Data hold time	30	-		ns
T_{CS}	Clock set-up time	80	-		ns
T_{CH}	Clock hold time	80	-		ns
T_{PHL}	Propagation delay time	-	-	60	ns
				60	
T_{PSU}	ELB, ERB set-up time	30	-	-	ns
		30			
T_{WDL}	DISPOFFB low pulse width	1.2	-	-	ns
T_{CD}	DISPOFFB clear time	100	-	-	ns
T_{PD1}	M-OUT propagation delay time	-	-	1.0	ns
T_{PD2}	CL1-OUT propagation delay time	-	-	1.0	ns
T_{PD3}	DISPOFFB-OUT propagation delay time	-	-	1.0	ns

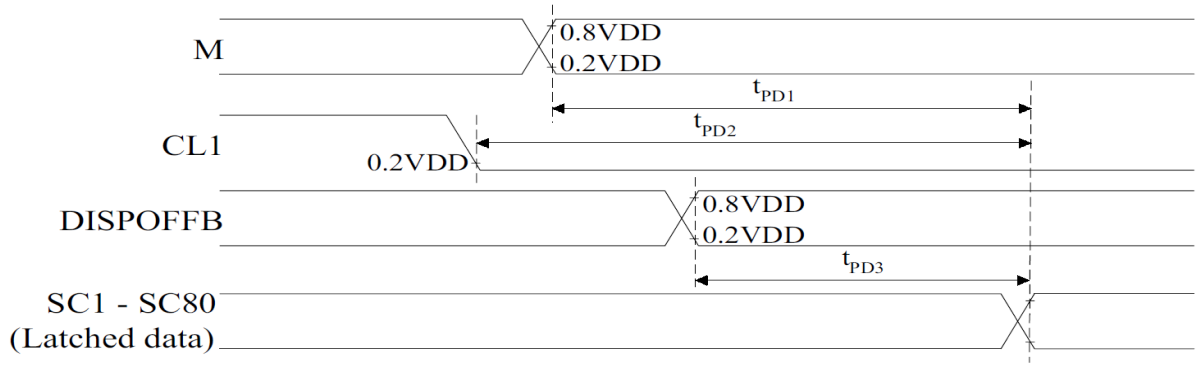


8.2 Common Driver Application

Symbol	Parameter	Min	Typ	Max	Unit
T_{CY}	Clock cycle time	250	-	-	ns
T_{WCK}	Clock pulse width	45	-	-	ns
T_R/T_F	Clock rise/fall time	-	-	50	ns
T_{DS}	Data set-up time	30	-	-	ns
T_{DH}	Data hold time	30	-	-	ns
T_{WDL}	DISPOFFB low pulse width	1.2	-	-	ns
T_{CD}	DISPOFFB clear time	100	-	-	ns
T_{DL}	Output delay time	-	-	200	ns
T_{PD1}	M-OUT propagation delay time	-	-	1.0	ns
T_{PD2}	CL1-OUT propagation delay time	-	-	1.0	ns
T_{PD3}	DISPOFFB-OUT propagation delay time	-	-	1.0	ns



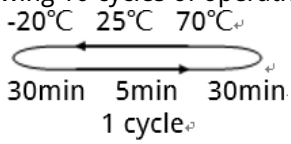
When in single-type interface mode
DI⇒DDL(SHL=L),D4_DR(SHL=H)
DO⇒D4_DR(SHL=L),D2_DL(SHL=H)
When in dual-type interface mode
DI⇒D2_DL and D3_DM(SHL=L),D4_DR and D3_DM(SHL=H)
DO⇒D4_DR(SHL=L),D2_DL(SHL=H)



9 Driver/Controller Information

Built-in NT7086:
https://drive.google.com/file/d/0B5lkVYnewKTGVlV1LXI0UmVSc1U/view?usp=sharing

10 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

11 Warranty and Conditions

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