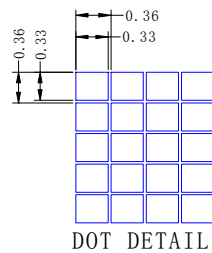
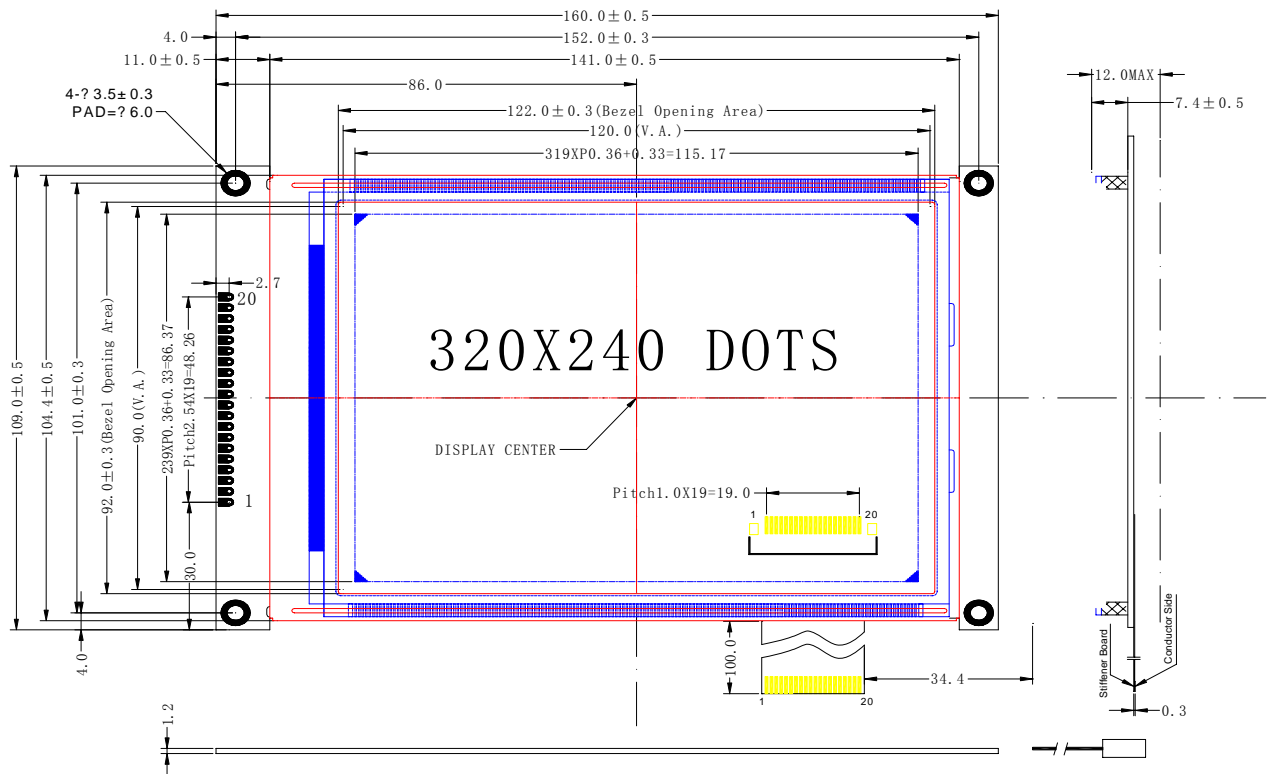


1. Mechanical Diagram



- NOTE: 1 TOLERANCES UNLESS OTHERWISE SPECIFIED: $\pm 0.25\text{mm}$
 2 ALL DIMENSION ARE IN mm
 3 VIEWING ANGLE: 6 O'CLOCK
 4 MULTIPLEX LEVEL: 1/240 DUTY, 1/16BIAS
 5 LCD TYPE: STN /FSTN /STN BLUE
 6 DISPLAY MODE: TRANSMISSIVE / POSITIVE (NEGATIVE)
 7 CONNECTORS: ZEBRA & HEATSEAL
 8 DATA TRANSFER: 8-BIT PARALLEL DATA TRANSFER
 9 BACKLIGHT: LED White
 10 COLOR OF BACKLIGHT: WHITE

2.Scope

This manual defines general provisions as well as inspection standards for standard LCD module. If the event of unforeseen problem or unspecified items may occur, please contact the nearest supplier or our company.

3.Warranty

If module is not stored or used as specified in this manual, it will be void the 12-month warranty.

4.Features

4-1. Features

- (1) Display mode: { Transmissive/positive
FSTN LCD
- (2) Display color: { Display dots: White
Background : Black
- (3) Display Format: 320(w)×240(h) full dots
- (4)Input data: 8-bit parallel data interfaced from a MPU
- (5) Multiplex ratio: 1/240 Duty, 1/16Bias
- (6) Viewing direction: 6 O'clock
- (7) Back light : White LED
- (8) Controller: SED1335/ RA8835AP3

4-2. Mechanical features

Item	Specifications	Unit
Outline dimensions	160.0(W)×109.0(H) ×12.0Max.(T)	mm
Viewing Area	120.0(W)×90.0(H)	mm
Image Area	115.17(W)×86.37(H)	mm
Number of Dots	320 (W)×240(H)	---
Dot Size	0.33(W)×0.33(H)	mm
Dot Pitch	0.36(W)×0.36(H)	mm
Weight	---	g

4-3.Absolute maximum ratings

Item	Symbol	Condition	Min	Max	Units
Power supply for logic	Vdd-Vss	25℃	-0.3	7.0	V
Operating voltage for LCD	Vdd-V0	25℃	-0.3	28.0	V
Input voltage	Vin	25℃	-0.3	Vdd+0.3	V
Operating temperature	Top	---	- 20	70	℃
Storage temperature	Tstg	---	- 25	80	℃

Note:

- 1) The modules may be destroyed if they are used beyond absolute maximum ratings. In ordinary operation, it is desirable to use them within recommended operation conditions. Using the modules beyond these conditions may cause malfunction and poor reliability.
- 2) All voltage values are referenced to GND=0V.

4-4 Electrical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	
Supply Voltage	Vdd	—	4.5	5.0	5.5	V	
Register data retention voltage	Voh	—	2.0	----	6.0		
Input leakage current	ILI	VI=Vdd	---	0.05	2.0	uA	
Output leakage current	ILO	VI=Vdd	---	0.10	5.0		
Quiescent supply current	IQ	Sleep mode Vosc1=V/cs=V/rd=Vdd	---	0.05	20.0	uA	
Oscillator frequency	Fosc	Measured at crystal 47.5% duty cycle	1.0	---	10.0	MHz	
External clock frequency	Fcl		1.0	----	10.0	MHz	
Oscillator feedback resistance	Rf		0.5	1.0	3.0	MΩ	
TTL							
Input Voltage	"H" Level	Vih	Note 1	0.5Vdd	—	Vdd	V
	"L" Level	Vil	Note 1	Vss	—	0.2Vdd	
Output Voltage	"H" Level	Vih	IOH=-5.0mA, Note 1	2.4	—	—	
	"L" Level	Vil	IOL=5.0mA, Note 1	—	—	Vss+0.4	
COMS							
Input Voltage	"H" Level	Vih	Note 2	0.8Vdd	—	Vdd	V
	"L" Level	Vil	Note 2	Vss	—	0.2Vdd	
Output Voltage	"H" Level	Vih	IOH=-2.0mA, Note 2	Vdd-0.4	—	—	
	"L" Level	Vil	IOL=1.6mA, Note 2	—	—	Vss+0.4	

Note: <1>D0 to D7,A0,/CS,/RD,/WR,VD0 to VD7,VA0 to VA15,/VRD,/VWRand/vce are ttl-level inputs
 <2>SEL1 and NT/PL are CMOS-level inputs.YD,XD0toXD3,XSCL,XECL,LP,WF,YSCL,YDIS and CLO are CMOS-level outputs.

4-5 Electro-optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	
LCD Driving Voltage (Recommended voltage)	Vop	-20℃	---	---	---	V	
		25℃	---	28.0	---		
		70℃	---	---	---		
Current consumption(N o B/L)	logic	Idd	Vdd=5V Ffilm=75Hz	—	20	----	mA
Power supply for logic	Vdd-Vss	25℃	2.7	—	5.5	V	

4-6 LED back light specifications

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Item	Unit	Standard Values			Condition
		Min.	Typ.	Max.	
Supply Voltage	V	—	4.1	---	—
Current	mA	---	100	---	---
Luminous Color	—	W hite			---
Operating Temp.	°C	-20 ~ +70			—
Storage Temp.	°C	-30 ~ +80			—

5.I/O Terminal

5-1 I/O Connection

Pin No.	Symbol	Function
1	Vss	Power supply (GND)
2	Vdd	Power supply (+)
3	V0	No connection
4	A0	Register select signal A0=1, Instruction register ,A0=0, Data register
5	/WR	8080: Write signal; 6800: W/R signal
6	/RD	8080: Read signal; 6800: Enable signal
7-14	DB0-DB7	Data bus line
15	/CS	Chip select
16	/RES	Controller reset signal
17	VEE	No connection
18	SEL1	H:6800; L:8080
19	FG	Frame ground
20	NC	No connection

5-2 Signal timing diagram

5-2-1 8080 family interface Timing

