

Bolymin, Inc.

LCD MODULE SPECIFICATION

MODEL NO.

BG320240B series

FOR MESSRS:

ON DATE OF:

APPROVED BY:



Bolymin, Inc.

Revision Record

1. 1/3/2005

To modify metal frame size as BG320240A's.

C O N T E N T S

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1. Numbering System

<u>B</u>	<u>C</u>	<u>2004</u>	<u>A</u>	<u>G</u>	<u>P</u>	<u>L</u>	<u>E</u>	<u>B</u>	<u>xxx</u>
0	1	2	3	4	5	6	7	8	9

0	Brand		Bolymin
1	Module Type		C= character type G= graphic type P= TAB/TCP type O= COG type F= COF type
2	Format		2002=20 characters, 4 lines 12232= 122 x 32 dots
3	Version No.		A type
4	LCD Color		G=STN/gray Y=STN/yellow-green C=color STN B=STN/blue F=FSTN T=TN
5	LCD Type		R=positive/reflective P=positive/transflective M=positive/transmissive N=negative/transmissive
6	Backlight type/color		L=LED array/ yellow-green H=LED edge/white R=LED array/red G=LED edge/yellow-green D=LED edge/blue E=EL/white B=EL/blue C=CCFL/white
7	CGRAM Font (applied only on character type)		J=English/Japanese Font E=English/European Font C=English/Cyrillic Font H=English/Hebrew Font
8	View Angle/ Operating Temperature		B=Bottom/Normal Temperature H=Bottom/Wide Temperature U=Bottom/Ultra wide Temperature T=Top/Normal Temperature W=Top/Wide Temperature C=9H/Normal Temperature
9	Special Code		3=3 volt logic power supply n=negative voltage for LCD c=cable/connector xxx=to be assigned on data sheet t=temperature compensation for LCD p=touch panel

2. General Specification

(1) Mechanical Dimension

Item	Standard Value	Unit
Number of dots	320x240	dots
Outline dimension	154.79(W)x 120.24(H)x 15.6max(T)	mm
View area	120.14(W)x 92.14(H)	mm
Active area	115.18(W)x 86.38(H)	mm
Dot size	0.34(W)x 0.34(H)	mm
Dot pitch	0.36(W)x 0.36(H)	mm

(2) Controller IC: SED1335

(3) Temperature Range

	Normal	Wide
Operating	0 ~+50	-20 ~+70
Storage	-10 ~+ 60	-30 ~+80

3. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T _{OP}	-20	-	+70	
Storage Temperature	T _{ST}	-30	-	+80	
Input Voltage	V _I	-0.3	-	V _{DD}	V
Supply Voltage For Logic	V _{DD}	0	-	6.5	V
Supply Voltage For LCD	V _{DD} -V _{EE}	0	-	32	V

4. Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage For Logic	$V_{DD}-V_{SS}$	-	-	5.0	5.25	V
Supply Voltage For LCD * Wide Temp、 Type	$V_{DD}-V_o$	* Ta=-20	-	-	26.0	V
		Ta=25	-	24.0	-	V
		* Ta=+70	22.0	-	-	V
Input High Vol.	V_{IH}	-	$0.8V_{DD}$	-	V_{DD}	V
Input Low Vol.	V_{IL}	-	0	-	$0.2V_{DD}$	V
Output High Vol.	V_{OH}	-	$V_{DD}-0.4$	-	-	V
Output Low Vol.	V_{OL}	-	-	-	0.4	V
Supply Current	I_{DD}	$V_{DD}=5V$	95	100	110	mA

5. Optical Characteristics

a. STN

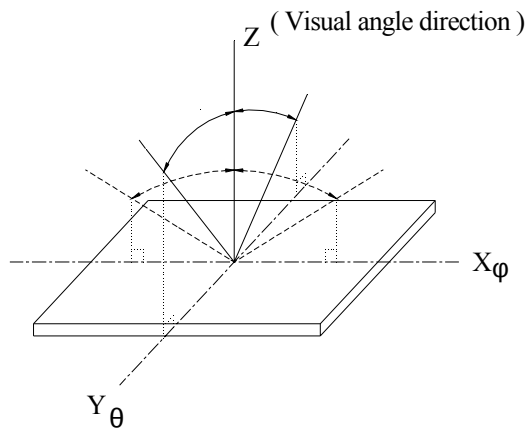
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
View Angle	(V) θ	CR 2	10		45	deg
	(H) ϕ	CR 2	-30		30	deg
Contrast Ratio	CR	-		3		-
Response Time 25	T rise	-		100	150	ms
	T fall	-		150	200	ms

b. FSTN

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
View Angle	(V) θ	CR 3	10		60	deg
	(H) ϕ	CR 3	-45		45	deg
Contrast Ratio	CR	-		5		-
Response Time 25	T rise	-		100	150	ms
	T fall	-		150	200	ms

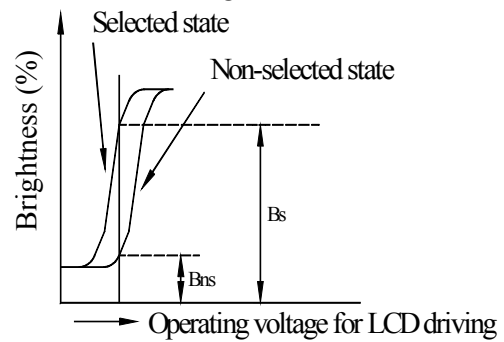
5.1 Definitions

■ View Angles

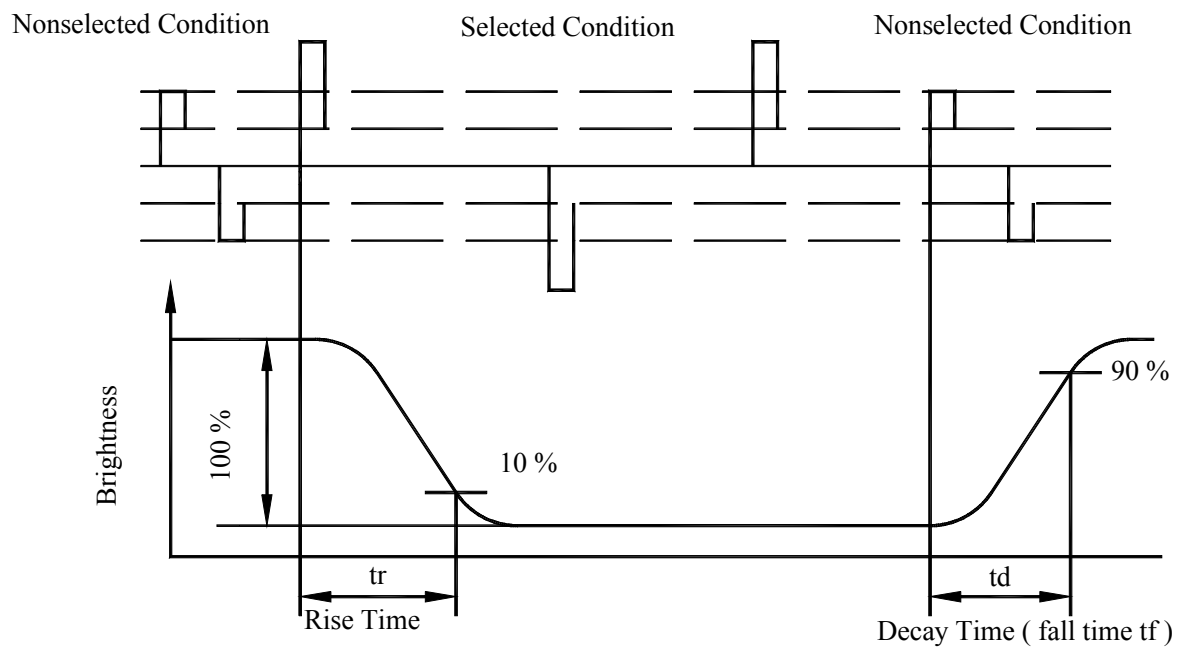


■ Contrast Ratio

$$CR = \frac{\text{Brightness at selected state (BS)}}{\text{Brightness at non-selected state (Bns)}}$$



■ Response time

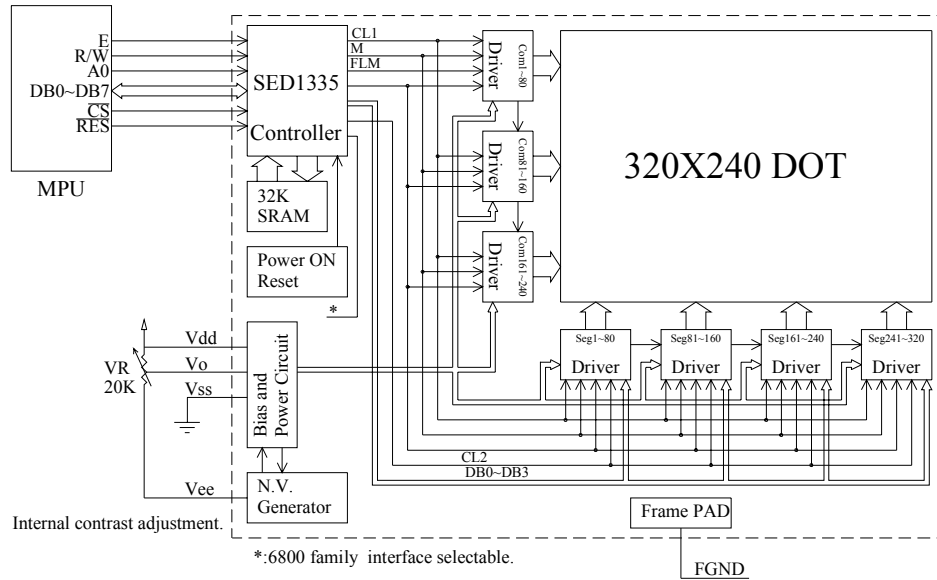


6. Interface Description

Pin No.	Symbol	Level	Description
1	V _{SS}	0V	Ground
2	V _{DD}	5.0V	Power supply for Logic (Optional +3V)
3	V _O	(Variable)	Driving voltage for LCD
4	$\overline{\text{RD}}$	H/L	8080 family: Read signal
5	$\overline{\text{WR}}$	H/L	8080 family: Write signal
6	A0	H/L	Data type select
7~14	DB0~DB7	H/L	Data bus
15	$\overline{\text{CS}}$	H/L	Chip select , Active L
16	$\overline{\text{RES}}$	H/L	Controller reset signal, Active L
17	V _{EE}		Negative voltage output (Optional) -25V
18	FGND		Frame Ground
19	NC		No connection
20	NC		No connection

* 68 Series option

7. Block Diagram



8. Timing Characteristics

8080 Family Interface Timing

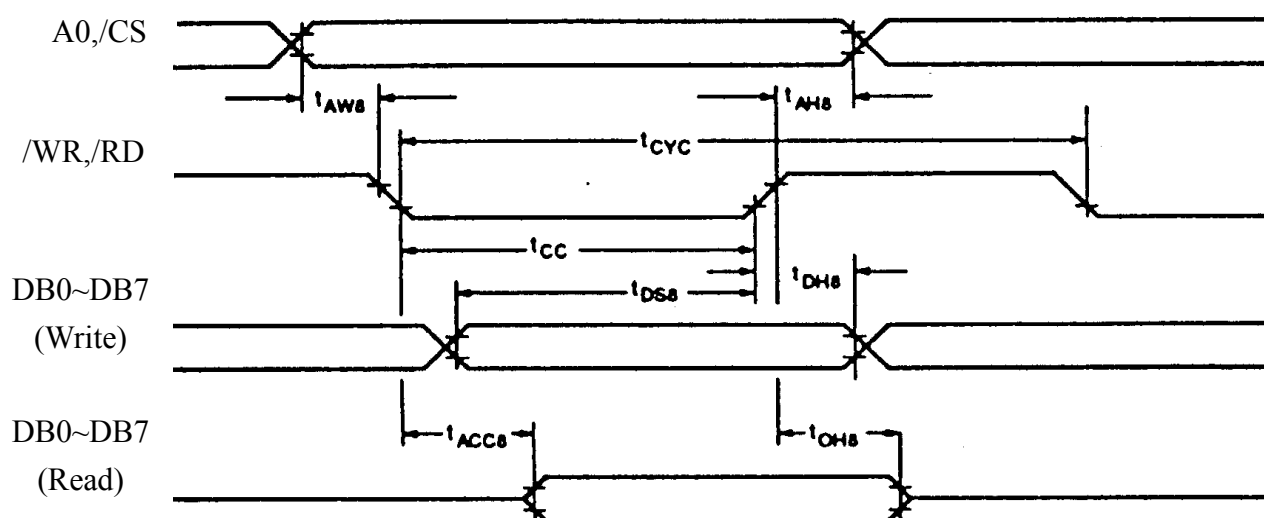
Parameter	Condition	Symbol	Min	Max	Unit	Remark
Address Hold Time	CL=100 pF VDD=2.7~4.5	tAH8	10		ns	A0,/CS
Address Setup Time		tAW8	0		ns	
System Cycle Time		tCYC	Note		ns	/WR,/RD
Strobe Pulse Width		tOC	150		ns	
Data Setup Time		tDS8	120		ns	DB0~DB7
Data Hold Time		tDH8	5		ns	
/RD Access Time		tACC8	-	80	ns	
Output Disable Time		tOH8	10	55	ns	

Note: For memory control and system control commands:

$$t_{CYC8} = 2t_C + t_{OC} + t_{CEA} + 75 > t_{ACV} + 245$$

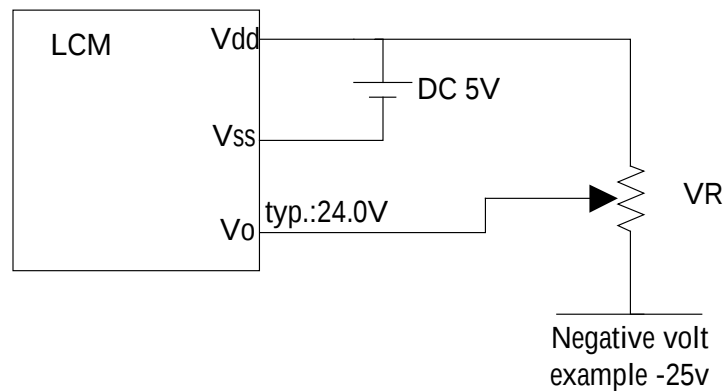
For all other commands:

$$t_{CYC8} = 4t_C + t_{OC} + 30$$

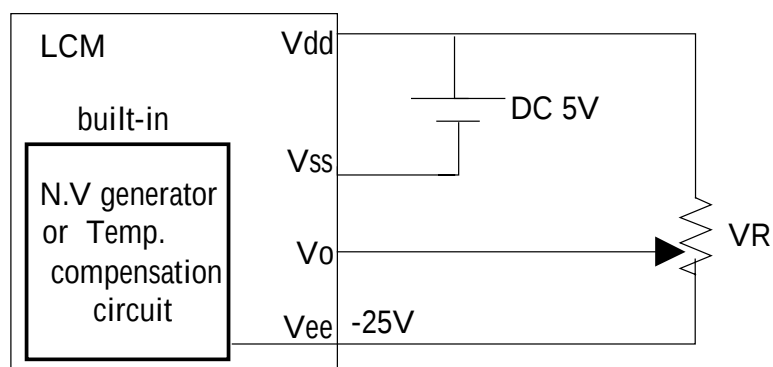


9. Power Supply for LCD Module and LCD Operating Voltage a Adjustment

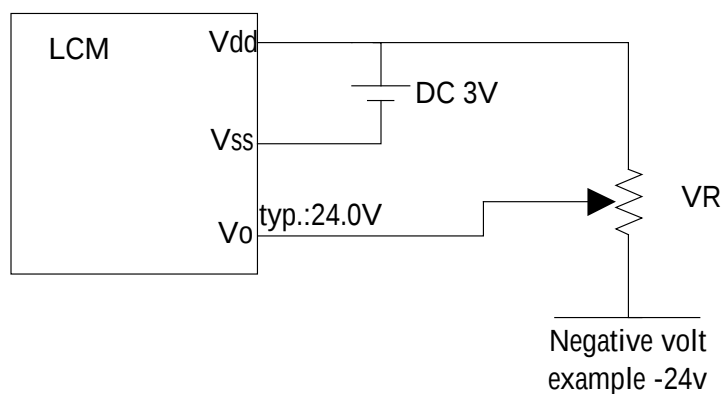
* (Optional) LCM operating on " DC 5V " input with external negative voltage



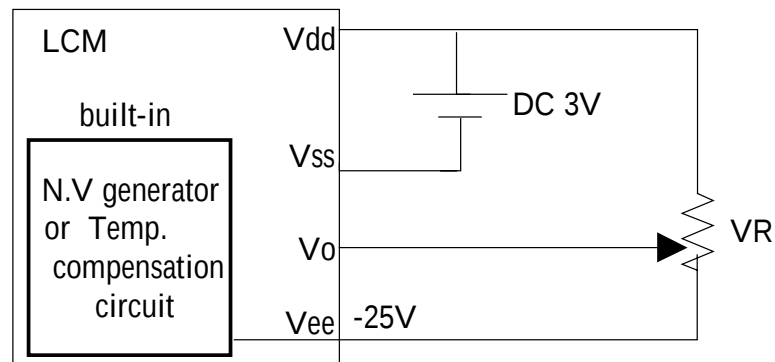
* (Optional) LCM operating on "DC 5V" input with built-in negative voltage



* (Optional) LCM operating on " DC 3V " input with external negative voltage



* (Optional) LCM operating on "DC 3V" input with built-in negative voltage



10. Backlight Information

10.1 Specification

(1) LED edge / white

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Supply Current	I _{LED}	—	160		mA	V=3.5V
Supply Voltage	V	-	3.5	3.6	V	-
Reverse Voltage	V _R	-	-	10	V	-
Luminous Intensity	I _V	-	23	-	cd/m ²	I _{LED} =160mA
Wave Length	λ _p	—		-	nm	I _{LED} =160mA
Life Time	-	-	70000	-	Hr.	V 3.5V
Color	White					

(2)EL white

Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Drive Voltage	V _{max}	—	110	170	V _{rms}	25°C
Drive Wave	F _{max}	-	400	1000	Hz	25°C
Brightness		35	-	-	cd/m ²	110V/400Hz
Power Consumption		-	280.6	-	mW	110V/400Hz
Chromaticity	X	-	0.330	-	-	110V/400Hz
	Y	-	0.365	-	-	110V/400Hz
Life time		5000			hour	110V/400Hz
Color		White			-	Light on 110V/400Hz

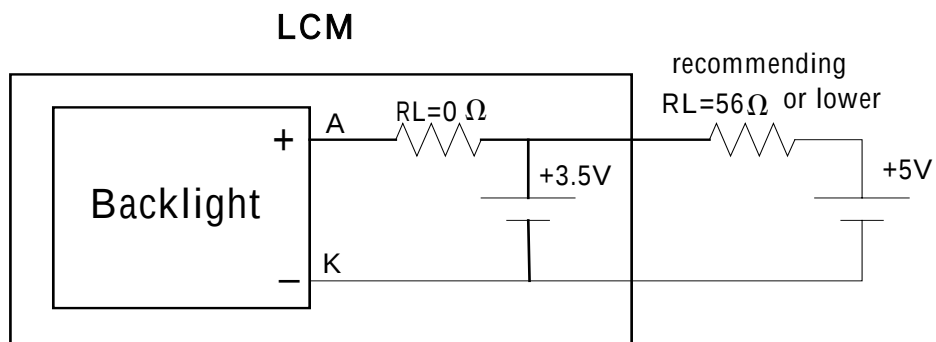
(3) CCFL / white

(Ta=25)

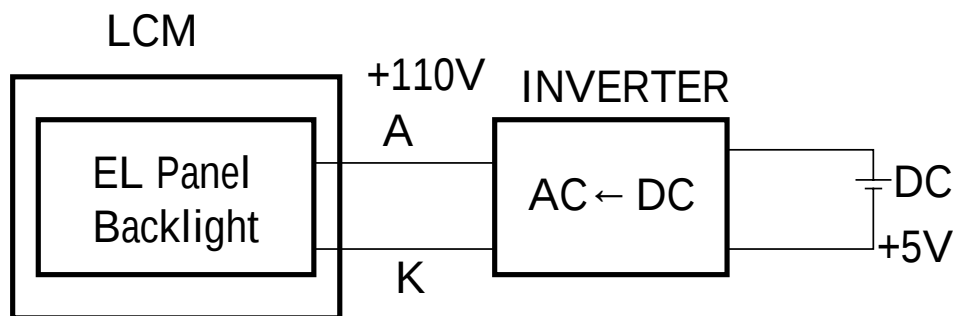
Item	Symbol	Specification			Unit	Condition
		Min	Typ	Max		
Driving Voltage	V _{FL}	-	278	-	V _{rms}	-
Input current	I _{FL}	3.0	5.0	6.0	mArms	-
Power consumption	W	-	1.35	-	W	-
Starting Voltage	V _{FLS}	-	530	-	V _{rms}	-
Luminance	L	-	550	-	Cd/m ²	φ, θ=0 deg, I _{FL} =5.0mArms
Chromaticity	x	-	0.340	-	-	-
	y	-	0.370	-	-	-
Luminance Uniformity (Testing 9 point)	-	75%	-	-	%	φ, θ=0 deg, I _{FL} =5.0mArms
Life time	-	15000	-	-	hrs	

10.2 Backlight driving methods

a. LED white B/L driven from A.K cable directly

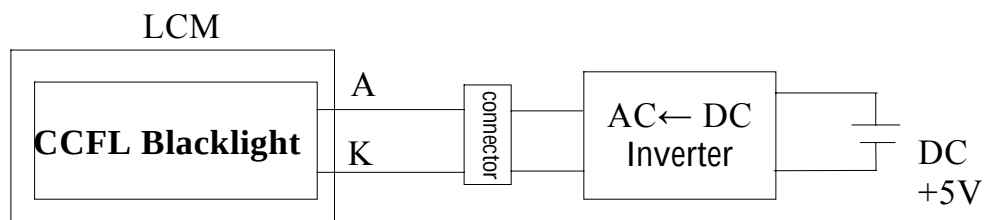


b. EL B/L drive from A.K directly

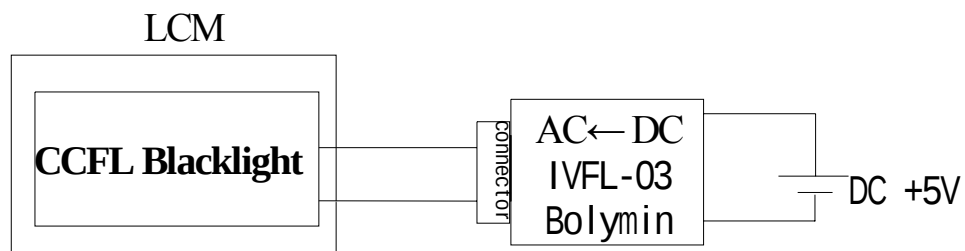


c. CCFL B/L driven from A.K cable directly

type1:



type2:



10.3 CCFL INVENTER DATA (P/N:IVFL-03)

As shown on next page



1. GENERAL

This specification is applied to driver for CCFT.

2. INPET CHARACTERISTICS

Parameter	Symbol	Min	Nom	Max	Unit	Remark
Input Voltage	V _{in}	4.5	5.0	5.5	V	
Input Current	I _{in}	360	410	460	mA	V _{in} =5V
Input Power	P _{in}	—	2.1	—	W	V _{in} =5V

3. Output Characteristics

Parameter	Symbol	Min	Nom	Max	Unit	Remark
Output Voltage	V _o	210	260	310	V _{rms}	V _{in} =5.0V
Start Voltage	V _v		510			
Tube Current	I _L	5.1	5.6	6.1	mA	V _{in} =5.0V
Working Frequency	f	38.2	43.2	48.2	KHz	

NOTE: All conditions are at 25°C ambient unless otherwise specified.

4. General Specification

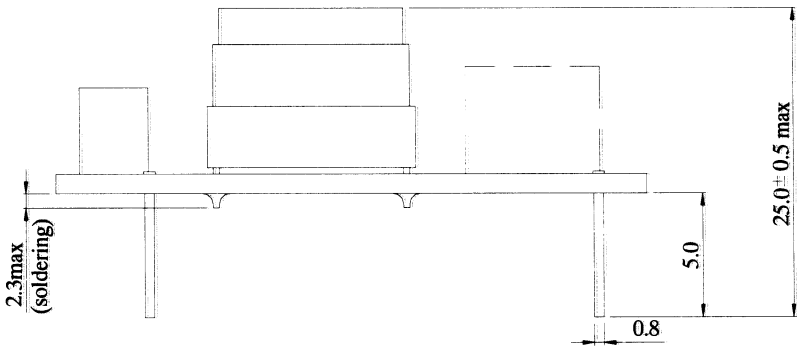
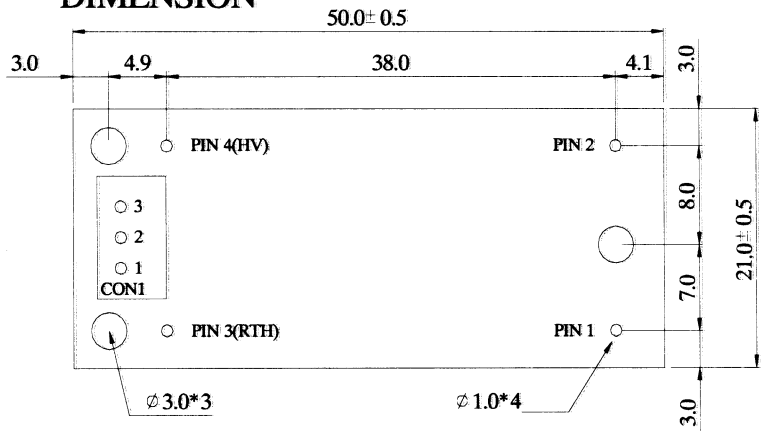
a. Temperature operating : -10~85°C

b. Temperature operating : -20~85°C

C. Humidity operating : -10~95%RH

D. Humidity operating : -20~95%RH

DIMENSION



PIN ASSIGNMENT

UNIT: mm

INPUT CONNECTOR

PIN NUMBER	FUNCTION
PIN 1	VIN
PIN 2	GND

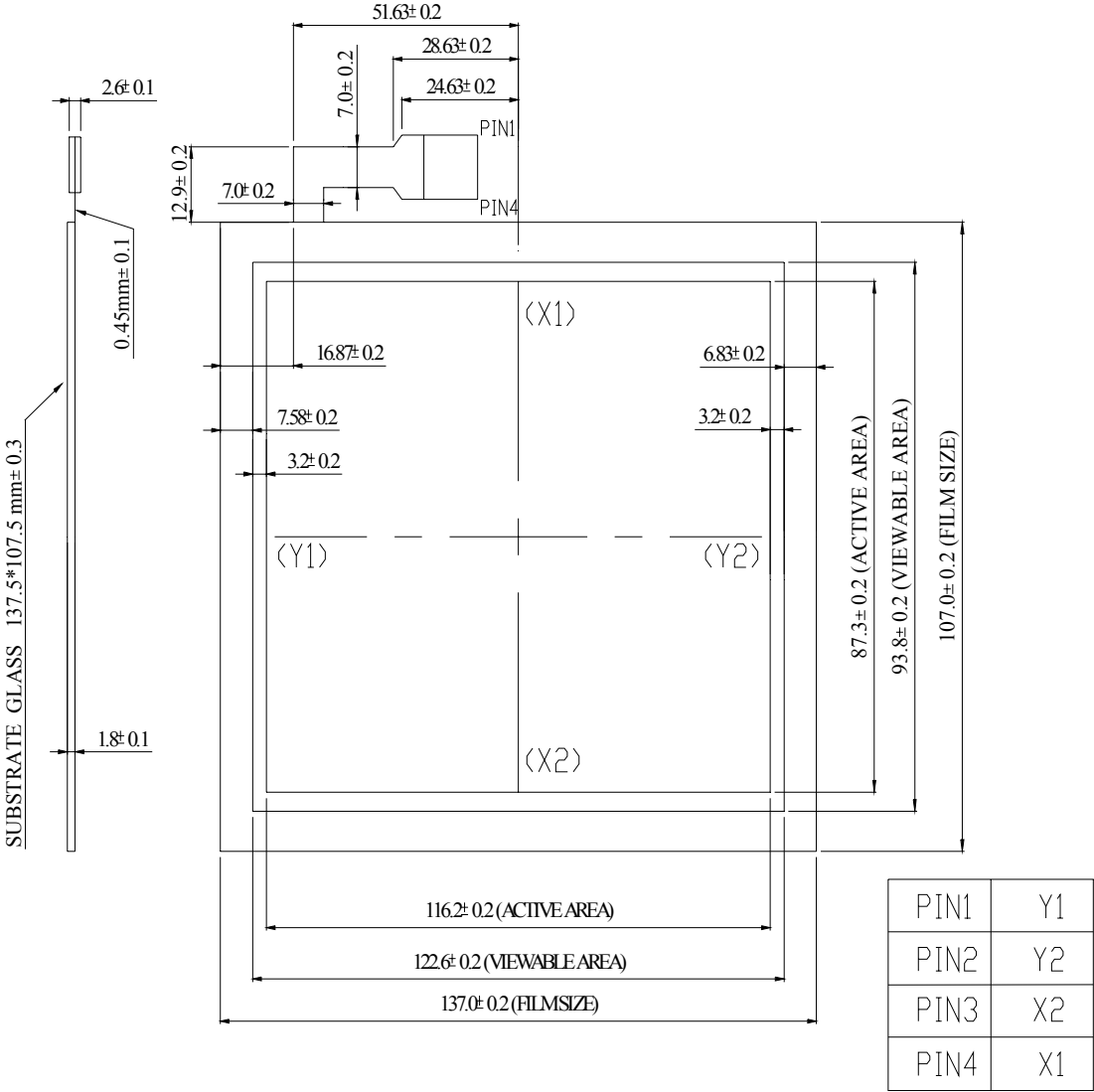
OUTPUT(CON1) CONNECTOR 2532-03

PIN NUMBER	FUNCTION
1	RTH
2	NC
3	HV

The non-specified tolerance of dimension is $\pm 0.3\text{mm}$



11.Touch panel Information



11.1 Electrical Specifications

Item	Specification	Condition
On Resistance	250 Ω ~ 750 Ω	Direction :X
	250 Ω ~ 800 Ω	Direction :Y
Insulation Resistance	More Than 20M Ω	DC 25V
Chattering Time	Less Than 10 msec	100K Ω Pull-Up
Linearity	$\pm 1.0\%$	X AXIS
	$\pm 1.0\%$	Y AXIS

11.2 Machine Specifications

Item	Specification	Condition
Operating Force	Less Than 80g	R8.0 HS 40 ° Silicon Rubber Or R0.8 POLYACETAL PEN
Surface Hardness	More Than 2H	Pencil Test
Light Transmission	More Than 80 %	@550nm HITACHI U3300
Durability For Pen Selections	More Than 1,200,000 Times	Force:250g Speed:2cm/sec

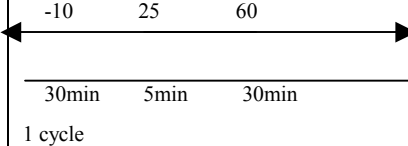
12. Quality Assurance

Screen Cosmetic Criteria

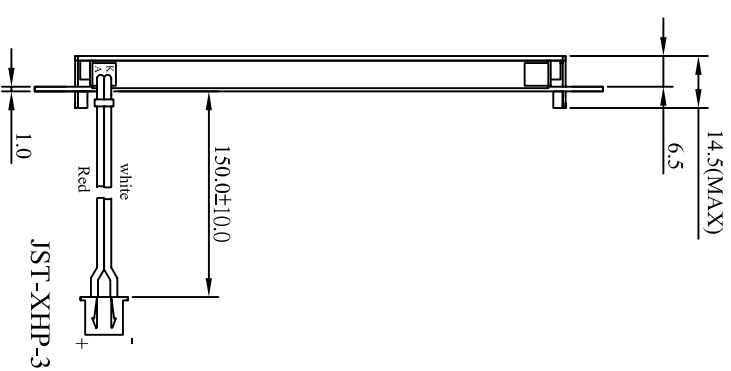
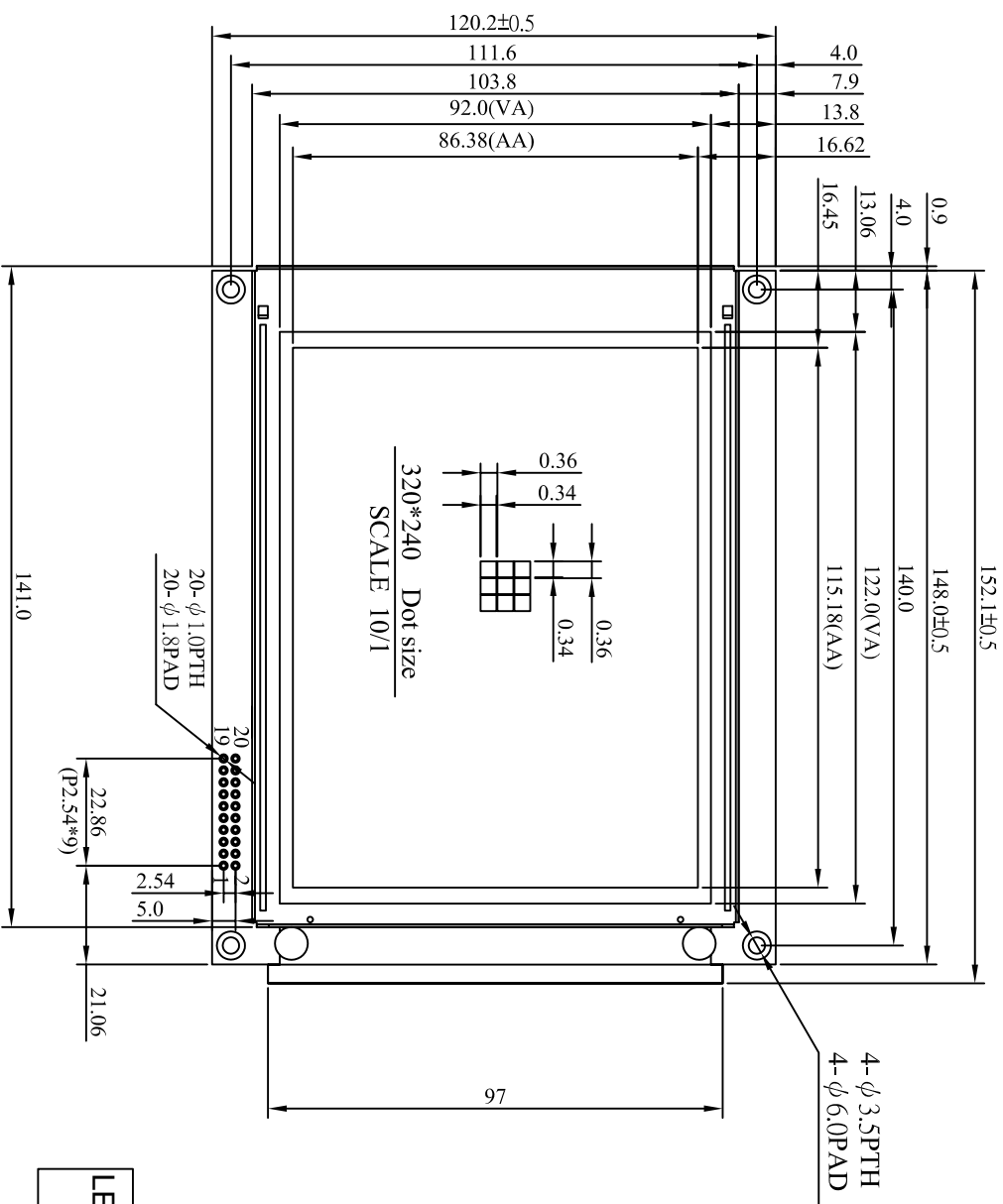
No.	Defect	Judgement Criterion	Partition																
1	Spots	A)Clear Size: d mm Acceptable Qty in active area <table><tr><td>d 0.1</td><td>Disregard</td></tr><tr><td>0.1<d 0.2</td><td>6</td></tr><tr><td>0.2<d 0.3</td><td>2</td></tr><tr><td>0.3<d</td><td>0</td></tr></table> Note: Including pin holes and defective dots which must be within one pixel size. B)Unclear Size: d mm Acceptable Qty in active area <table><tr><td>d 0.2</td><td>Disregard</td></tr><tr><td>0.2<d 0.5</td><td>6</td></tr><tr><td>0.5<d 0.7</td><td>2</td></tr><tr><td>0.7<d</td><td>0</td></tr></table>	d 0.1	Disregard	0.1<d 0.2	6	0.2<d 0.3	2	0.3<d	0	d 0.2	Disregard	0.2<d 0.5	6	0.5<d 0.7	2	0.7<d	0	Minor
d 0.1	Disregard																		
0.1<d 0.2	6																		
0.2<d 0.3	2																		
0.3<d	0																		
d 0.2	Disregard																		
0.2<d 0.5	6																		
0.5<d 0.7	2																		
0.7<d	0																		
2	Bubbles in Polarize	Size: d mm Acceptable Qty in active area <table><tr><td>d 0.3</td><td>Disregard</td></tr><tr><td>0.3<d 1.0</td><td>3</td></tr><tr><td>1.0<d 1.5</td><td>1</td></tr><tr><td>1.5<d</td><td>0</td></tr></table>	d 0.3	Disregard	0.3<d 1.0	3	1.0<d 1.5	1	1.5<d	0	Minor								
d 0.3	Disregard																		
0.3<d 1.0	3																		
1.0<d 1.5	1																		
1.5<d	0																		
3	Scratch	In accordance with spots cosmetic criteria. When the light reflects on the panel surface, the scratches are not to be remarkable.	Minor																
4	Allowable Density	Above defects should be separated more than 30mm each other.	Minor																
5	Coloration	Not to be noticeable coloration in the viewing area of the LCD panels. Back-light type should be judged with back-light on state only.	Minor																

13. Reliability

■ Content of Reliability Test

Environmental Test				
No.	Test Item	Content of Test	Test Condition	Applicable Standard
1	High Temperature storage	Endurance test applying the high storage temperature for a long time.	60 200hrs	—
2	Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-10 200hrs	—
3	High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	50 200hrs	—
4	Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	0 200hrs	—
5	High Temperature/ Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	60 ,90%RH 96hrs	—
6	High Temperature/ Humidity Operation	Endurance test applying the electric stress (Voltage & Current) and temperature / humidity stress to the element for a long time.	50 ,90%RH 96hrs	—
7	Temperature Cycle	Endurance test applying the low and high temperature cycle.  -10 25 60 30min 5min 30min 1 cycle	-10 /60 10 cycles	—
Mechanical Test				
8	Vibration test	Endurance test applying the vibration during transportation and using.	10~22Hz → 1.5mmp-p 22~500Hz → 1.5G Total 0.5hrs	—
9	Shock test	Constructional and mechanical endurance test applying the shock during transportation.	50G Half sign wave 11 msdc 3 times of each direction	—
10	Atmospheric pressure test	Endurance test applying the atmospheric pressure during transportation by air.	115mbar 40hrs	—
Others				
11	Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V,RS=1.5kΩ CS=100pF 1 time	—

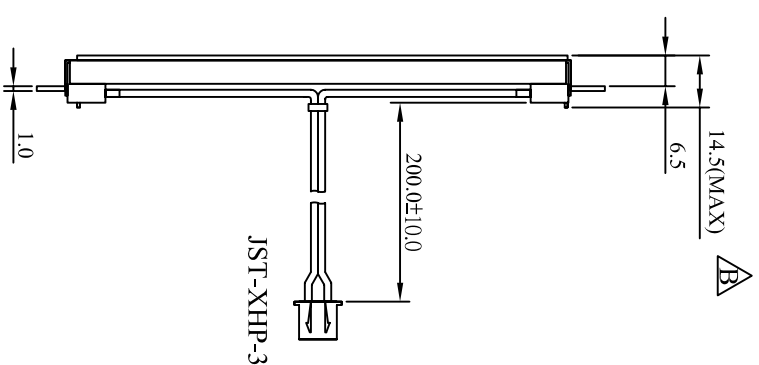
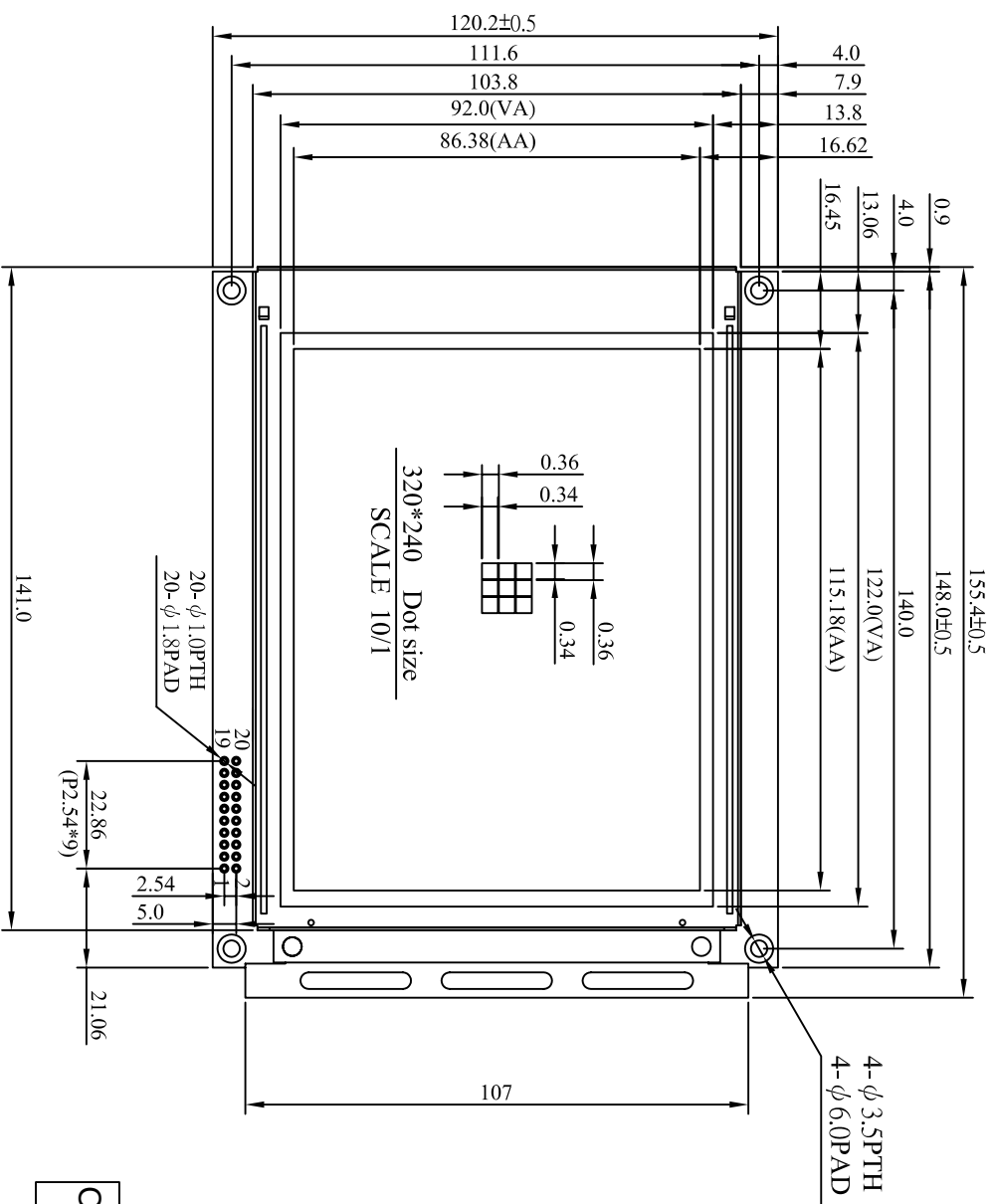
***Supply voltage for logic system=5V. Supply voltage for LCD system =Operating voltage at 25



LED edge white backlight

NOTE: 未標註之公差為 ±0.2 mm

寶麗明有限公司 BOLYMIN, INC.		SCALE:	5/8	REV:	0
MODEL BG320240B (LED)		UNIT:	mm	PAGE:	1/1
TITLE MODULE DRAWING		APPROVE			
DWG NO		CHECK			
		DRAW	KEVEN 01/ 06/ 05		



CCFL white backlight

NOTE: 未標註之公差為 ±0.2 mm

寶麗明有限公司 BOLYMIN, INC.		SCALE:	5/8	REV:	B
MODEL BG320240B (CCFL)		UNIT:	mm	PAGE:	1/1
TITLE MODULE DRAWING		APPROVE			
DWG NO		CHECK			
		DRAW	KEVEN 01/ 06/ 05		