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

Bolymin, Inc.

1. Numbering System

	B	C	2004	A	G	P	L	E	B	xxx
	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}	—	VDD	V
Input Low Vol.	V_{IL}	—	0	—	0.2VDD	V
Output High Vol.	V_{OH}	—	V_{DD}-0.4	—	—	V
Output Low Vol.	V_{OL}	—	—	—	0.4	V
Supply Current	I_{DD}	VDD=5V	95	100	110	mA

5.Optical Characteristics

a. STN

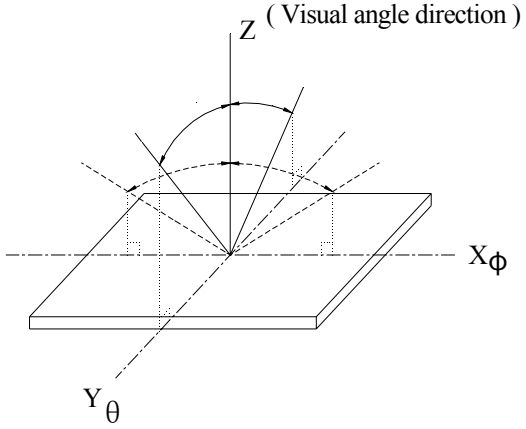
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
View Angle	(V) θ	CR≧2	10		45	deg
	(H) ϕ	CR≧2	-30		30	deg
Contrast Ratio	CR	—		3		—
Response Time 25℃	T rise	—		100	150	ms
	T fall	—		150	200	ms

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

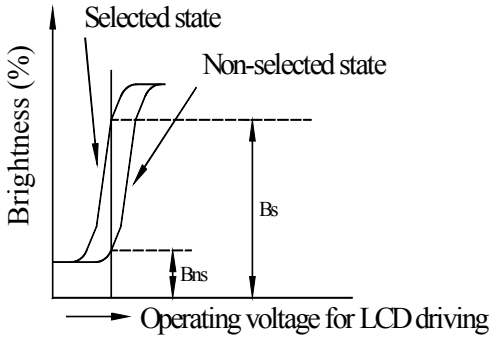
5.1 Definitions

■View Angles

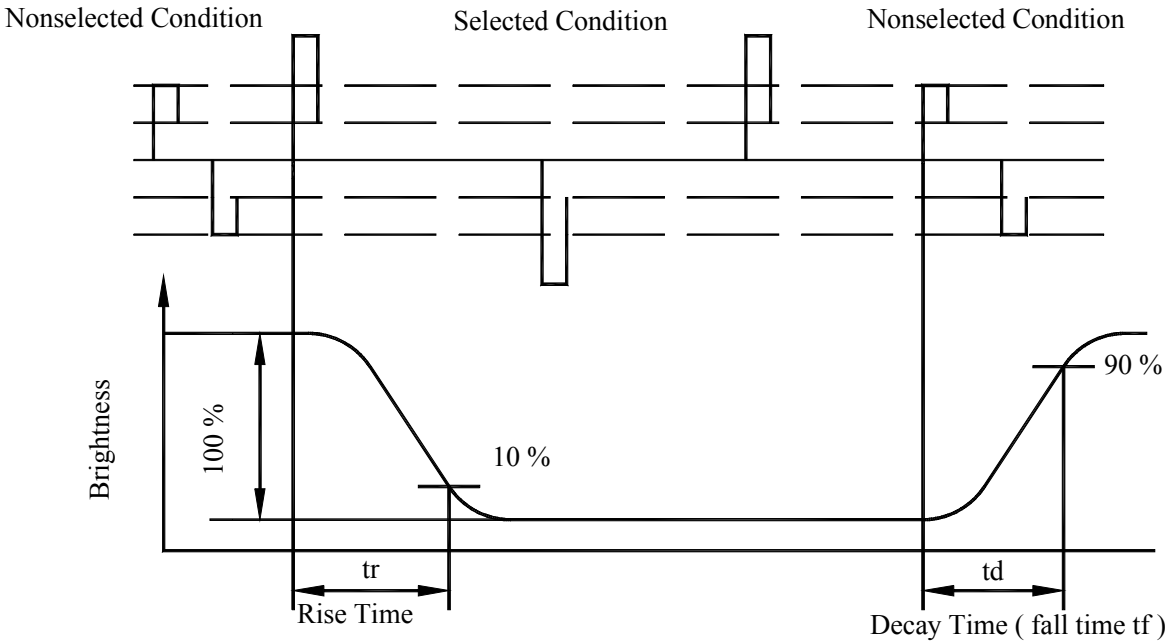


■Contrast Ratio

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



■Response time



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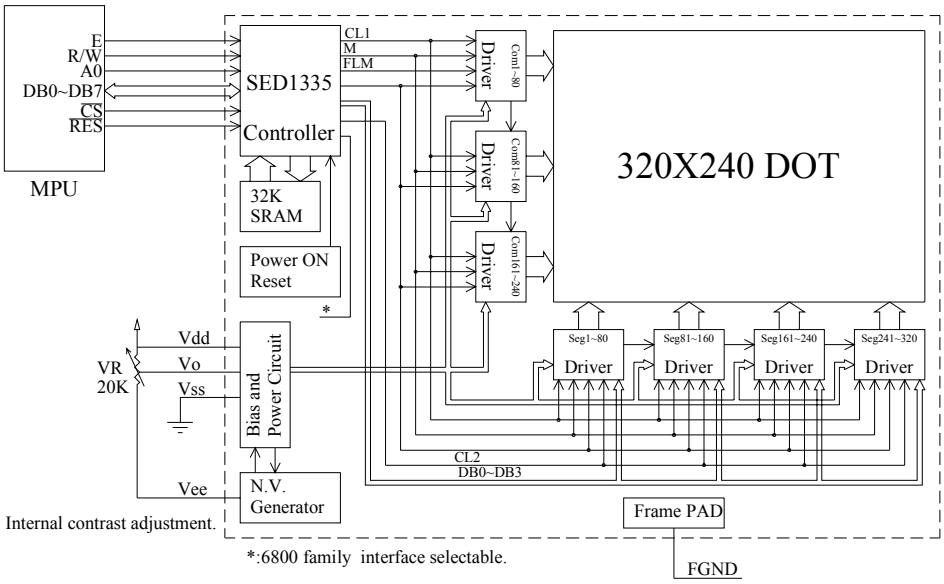
6. Interface Description

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	$\overline{RD}$	H/L	8080 family: Read signal
5	$\overline{WR}$	H/L	8080 family: Write signal
6	A0	H/L	Data type select
7~14	DB0~DB7	H/L	Data bus
15	$\overline{CS}$	H/L	Chip select , Active L
16	$\overline{RES}$	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

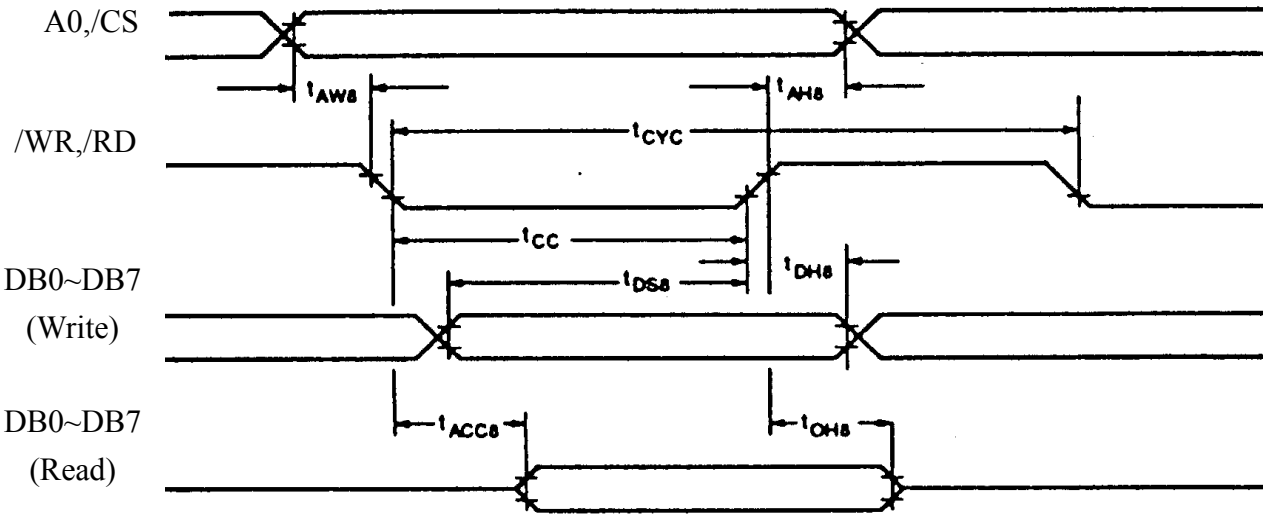
Parameter	Condition	Symbol	Min	Max	Unit	Remark
Address Hold Time	CL=100 pF VDD=2.7~4.5	tAH8	10		ns	A0,/CS
Address Setup Time		tAW8	0		ns	
System Cycle Time		tCYC	Note		ns	/WR,/RD
Strobe Pulse Width		tOC	150		ns	
Data Setup Time		tDS8	120		ns	DB0~DB7
Data Hold Time		tDH8	5		ns	
/RD Access Time		tACC8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

Note: For memory control and system control commands:

tCYC8=2tC+tOC+tCEA+75 > tACV +245

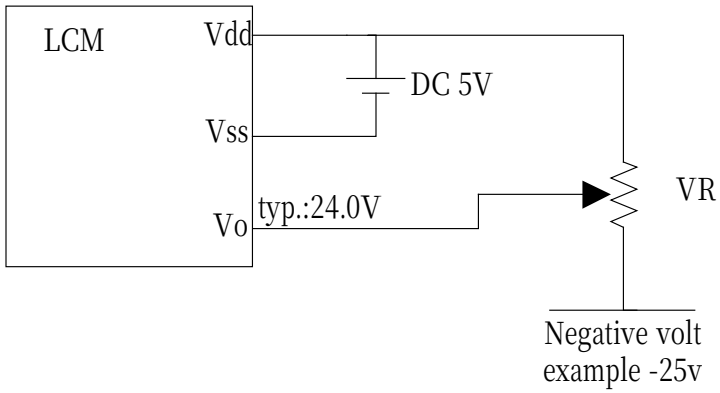
For all other commands:

tCYC8=4tC+tOC+30

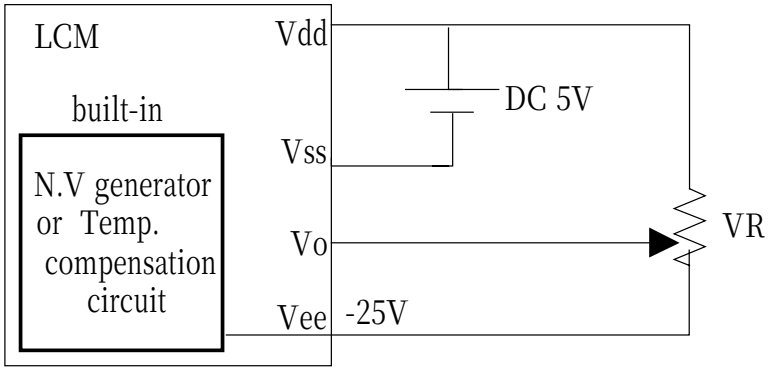


9. Power Supply for LCD Module and LCD Operating Voltage a Adjustment

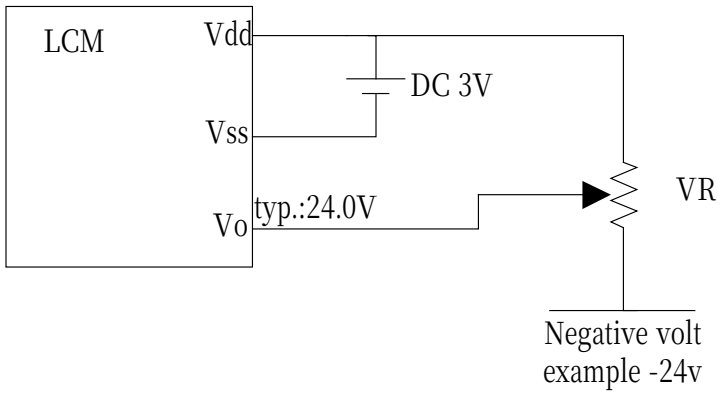
＊(Optional) LCM operating on " DC 5V " input with external negative voltage



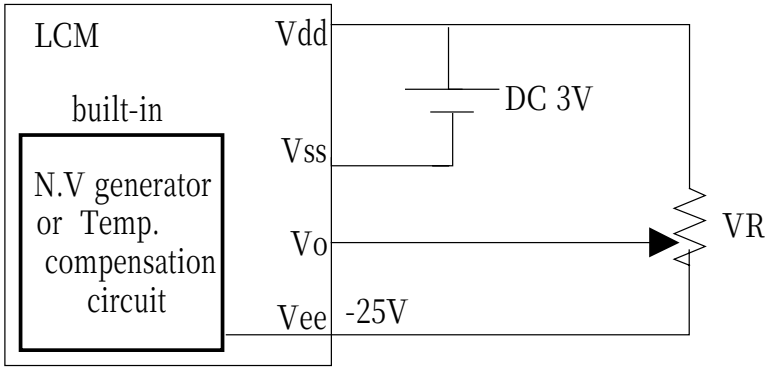
＊(Optional) LCM operating on "DC 5V" input with built-in negative voltage



＊(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	ILED	—	160		mA	V=3.5V
Supply Voltage	V	—	3.5	3.6	V	—
Reverse Voltage	VR	—	—	10	V	—
Luminous Intensity	IV	—	23	—	cd/m^2	ILED=160mA
Wave Length	λp	—		—	nm	ILED=160mA
Life Time	—	—	70000	—	Hr.	V≦3.5V
Color	White					

(2)EL white

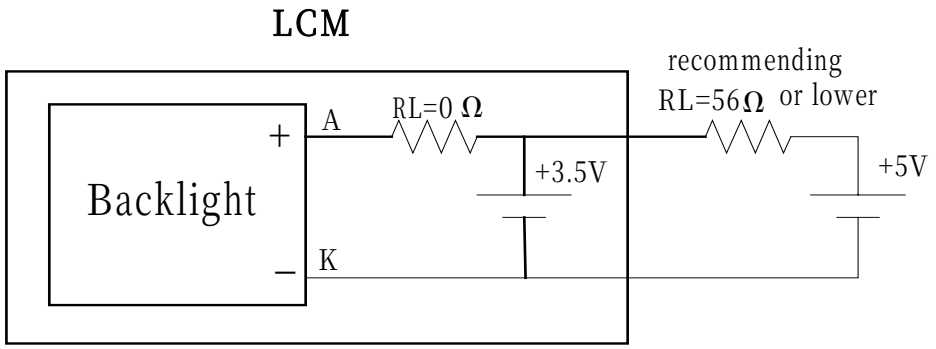
Parameter	Symbol	Min	Typ	Max	Unit	Test Condition
Drive Voltage	Vmax	—	110	170	Vrms	25°C
Drive Wave	Fmax	—	400	1000	Hz	25°C
Brightness		35	—	—	cd/m^2	110V/400Hz
Power Consumption		—	280.6	—	mW	110V/400Hz
Chromaticity	X	—	0.330	—	—	110V/400Hz
	Y	—	0.365	—	—	110V/400Hz
Life time		5000			hour	110V/400Hz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

(3) CCFL / white (Ta=25°C)

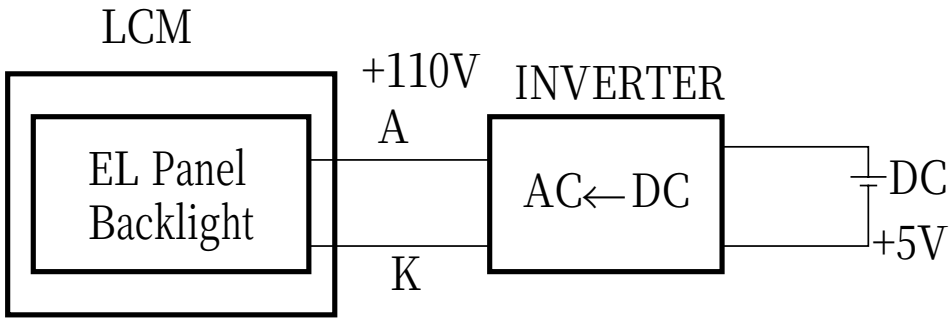
Item	Symbol	Specification			Unit	Condition
		Min	Typ	Max		
Driving Voltage	V_{FL}	—	278	—	Vrms	—
Input current	I_{FL}	3.0	5.0	6.0	mArms	—
Power consumption	W	—	1.35	—	W	—
Starting Voltage	V_{FLS}	—	530	—	Vrms	—
Luminance	L	—	550	—	Cd/m^2	ϕ, θ =0 deg, I_{FL} =5.0mArms
Chromaticity	x	—	0.340	—	—	—
	y	—	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

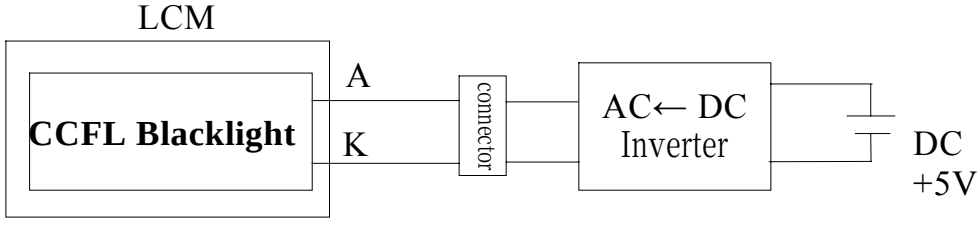


b.EL B/L drive from A.K directly

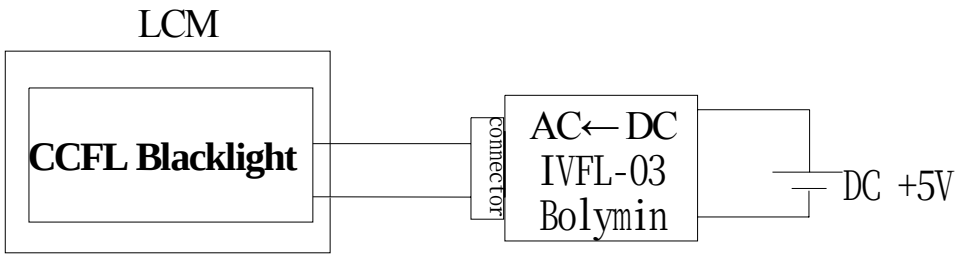


c. CCFL B/L driven from A.K cable directly

type1:



type2:



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

As shown on next page

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1. GENERAL

This specification is applied to driver for CCFT.

2. INPET CHARACTERISTICS

Parameter	Symbol	Min	Nom	Max	Unit	Remark
Input Voltage	Vin	4.5	5.0	5.5	V	
Input Current	Iin	360	410	460	mA	Vin=5V
Input Power	Pin	—	2.1	—	W	Vin=5V

3. Output Characteristics

Parameter	Symbol	Min	Nom	Max	Unit	Remark
Output Voltage	Vo	210	260	310	Vrms	Vin=5.0V
Start Voltage	Vv		510			
Tube Current	IL	5.1	5.6	6.1	mA	Vin=5.0V
Working Frequency	f	38.2	43.2	48.2	KHz	

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

4. General Specification

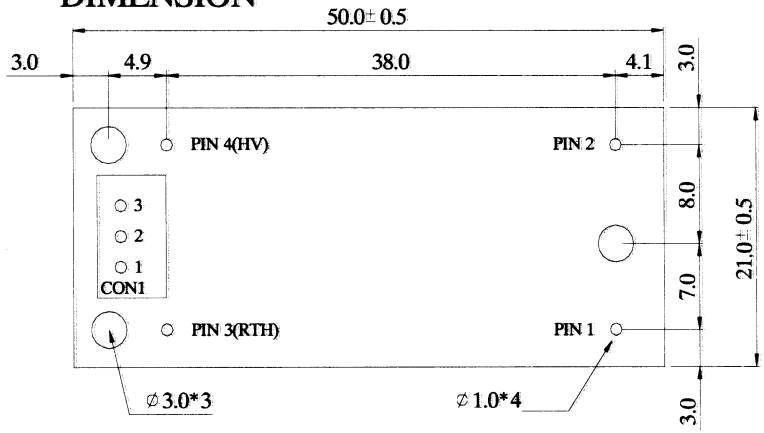
a. Temperature operating : -10~85℃

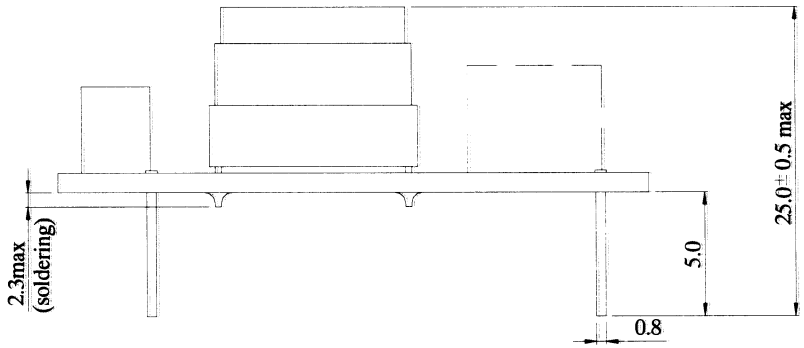
b. Temperature operating : -20~85℃

C. Humidity operating : -10~95%RH

D. Humidity operating : -20~95%RH

DIMENSION





PIN ASSIGNMENT

UNIT: mm

INTPUT CONNECTOR

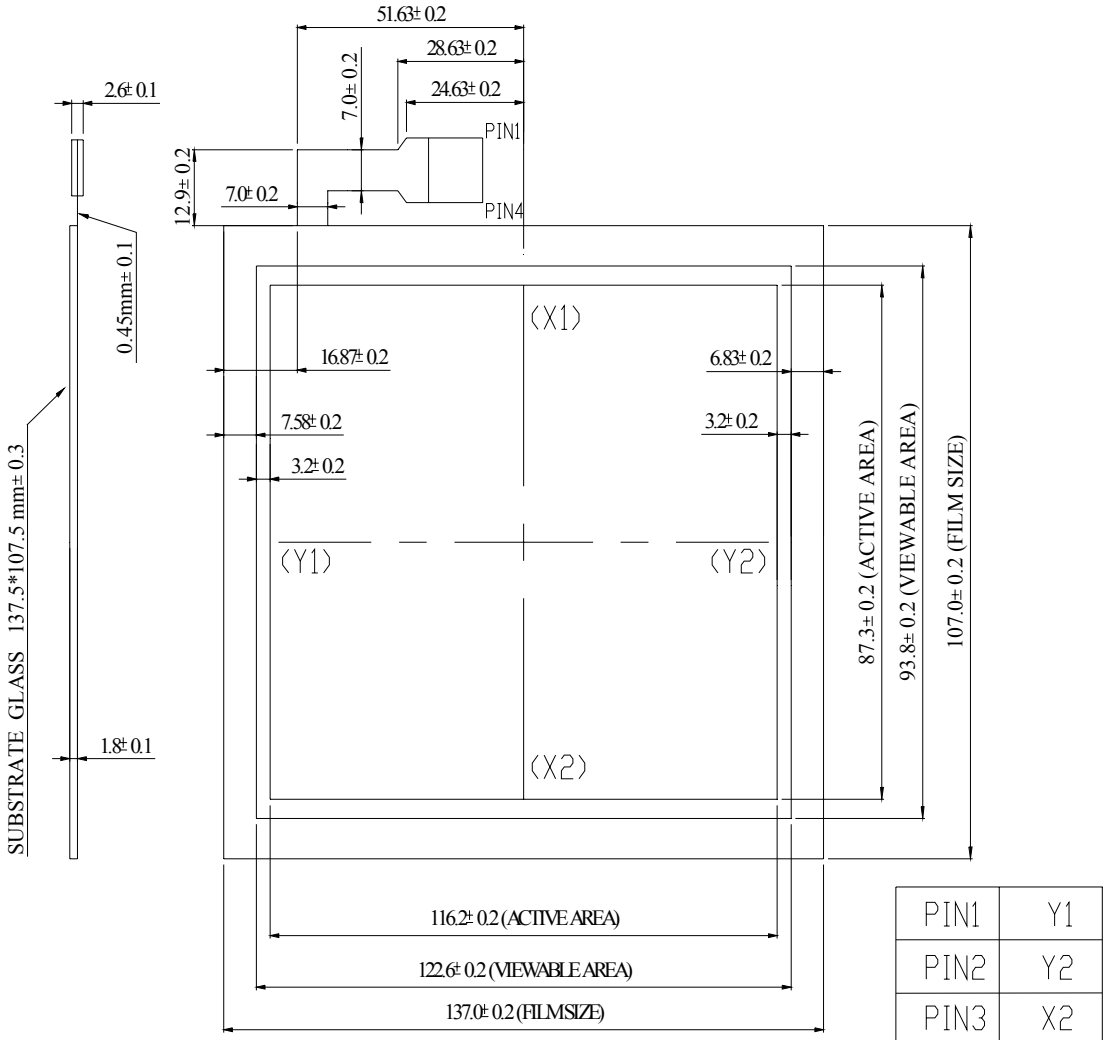
PIN NUMBER	FUNCTION
PIN 1	VIN
PIN 2	GND

OUTPUT(CON1) CONNECTOR 2532-03

PIN NUMBER	FUNCTION
1	RTH
2	NC
3	HV

The non-specified tolerance of dimension is ± 0.3mm

11.Touch panel Information



PIN1	Y1
PIN2	Y2
PIN3	X2
PIN4	X1

11.1Electrical Specifications

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

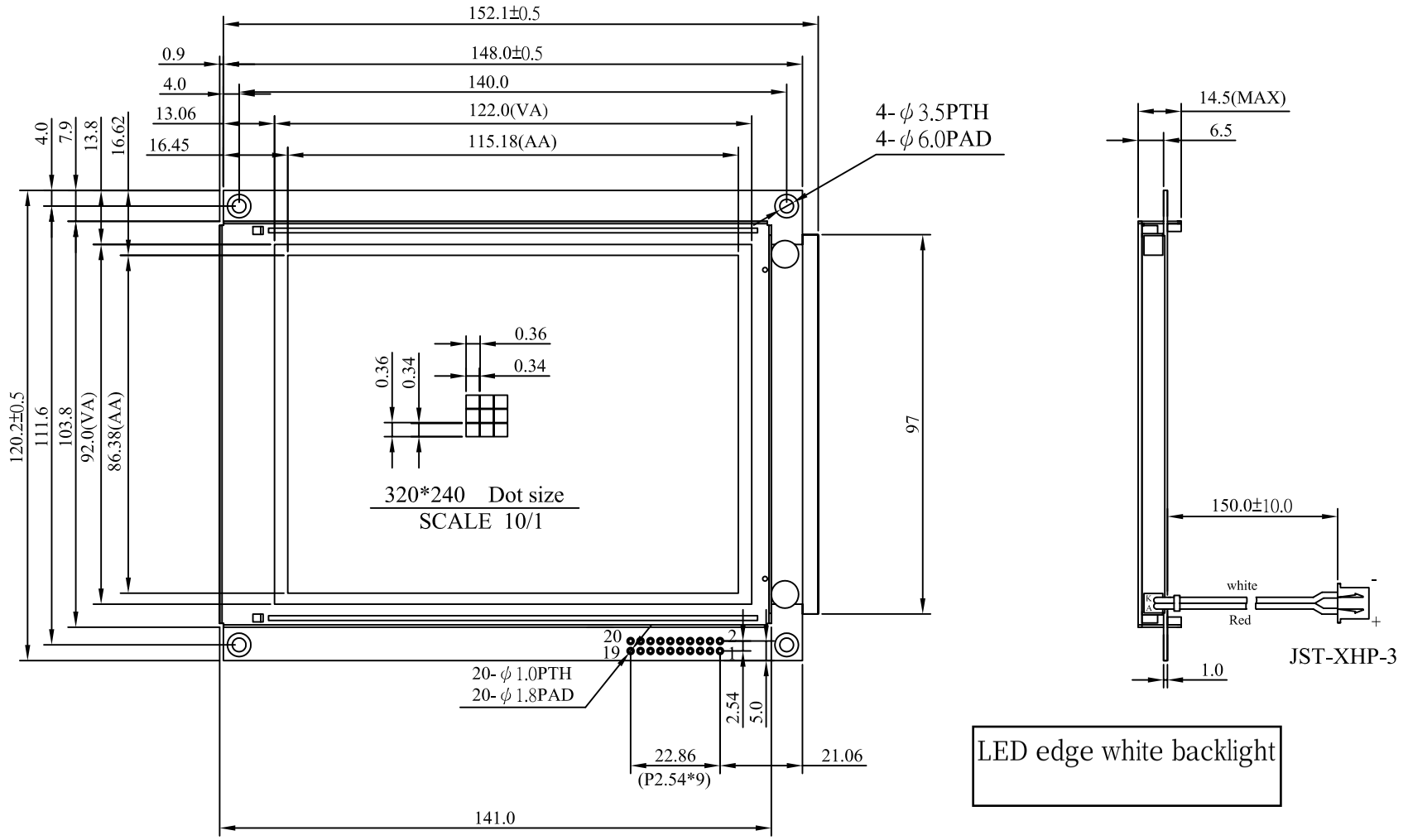
No.	Defect	Judgement Criterion	Partition
1	Spots	A)Clear Size: d mm — Acceptable Qty in active area d ≦0.1 — Disregard 0.1<d≦0.2 — 6 0.2<d≦0.3 — 2 0.3<d — 0 Note: Including pin holes and defective dots which must be within one pixel size. B)Unclear Size: d mm — Acceptable Qty in active area d ≦0.2 — Disregard 0.2<d≦0.5 — 6 0.5<d≦0.7 — 2 0.7<d — 0	Minor
2	Bubbles in Polarize	Size: d mm — Acceptable Qty in active area d≦0.3 — Disregard 0.3<d≦1.0 — 3 1.0<d≦1.5 — 1 1.5<d — 0	Minor
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 msedc 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	——

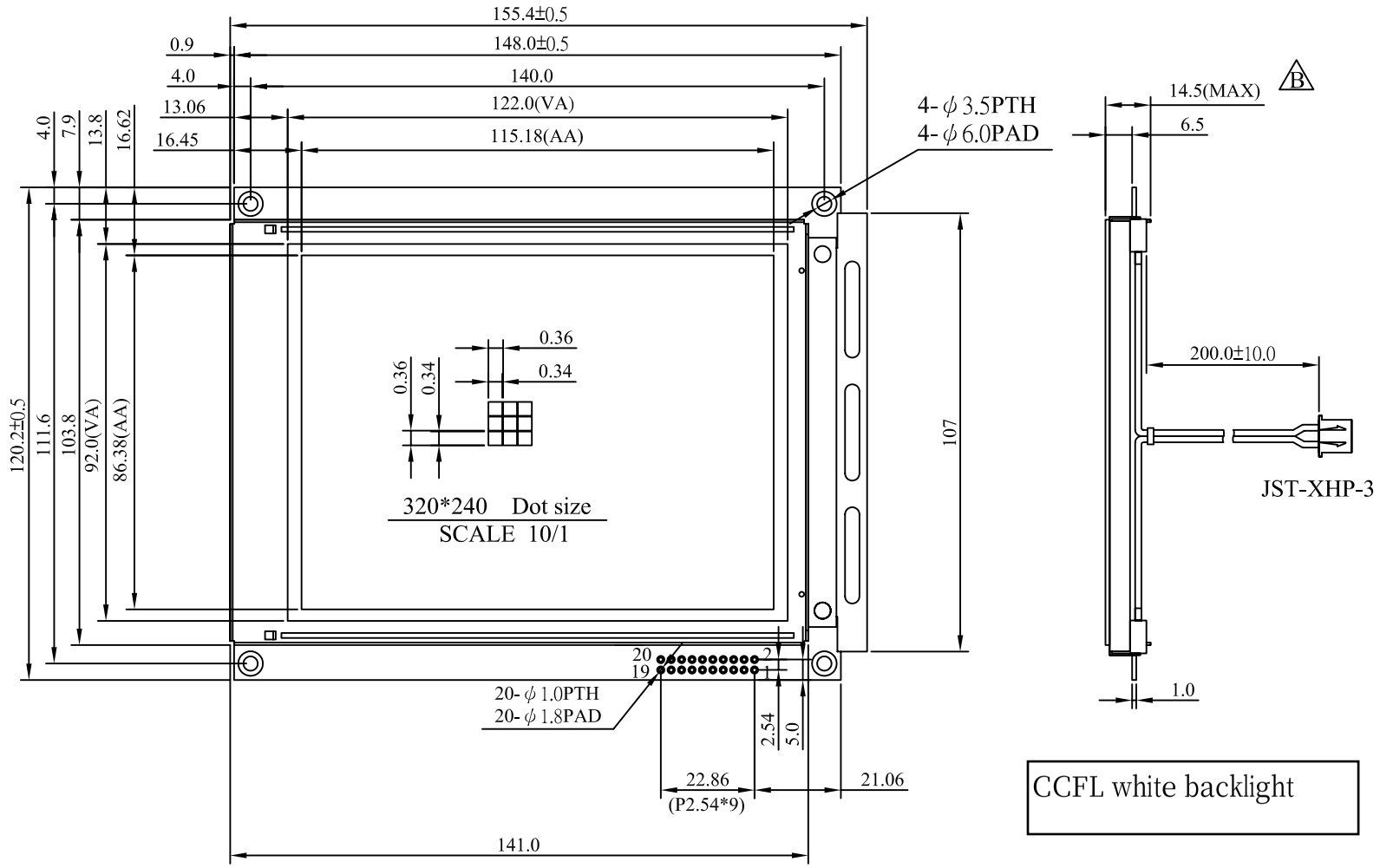
***Supply voltage for logic system=5V. Supply voltage for LCD system =Operating voltage at 25℃



LED edge white backlight

NOTE: 未標註之公差爲 ±0.2 mm

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



NOTE: 未標註之公差爲 ±0.2 mm

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