

# SPECIFICATION FOR LCD MODULE

**MODULE NO.: BG-12864B-SBYA-I-B-B00**

**Doc.Version: 00**

Filled in by customer:

Check list item:

- 1.Viewing area:
- 2.Module dimension:
- 3.Module thickness:
- 4.Appearance:
- 5.Viewing angle:
- 6.Background color:
- 7.Backlight brightness:
- 8.Backlight color:
- 9.Backlight electronic characteristic
- 10.Pattern:
- 11.Contrast:
- 12.Function:
- 13.Characteristic:
- 14.Vlcd:
- 15.Module operation current:
- 16.Reliability Test:
- 17.Test Result:
- 18.Others

<input type="checkbox"/>	<input type="checkbox"/>
OK	NG
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OK	NG

Customer Approval:

<input type="checkbox"/> Accept	<input type="checkbox"/> Reject
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Prepare	Engineer		
Check	Mechanical Engineer		
Check	Electronic Engineer		
Verify			
Approval			

WIMRD005-02-B

## DOCUMENT REVISION HISTORY

Sample Version	Doc. Version	DATE	DESCRIPTION	CHANGED BY
A00	00	2004-11-17	First issue	
	01	2005-07-06	Difference from 00 is as below: 1. Added the power supply (page 3) 2. Added AC Characteristics (8-3-1) 3. Changed the characteristics of BL 4. Changed the Quality Specifications.	
B00	00	2005-07-14	First issue NOTE: 1) AVR Chip Jumper 00HM 2) J7 Short 3) R1 Chip 18K	



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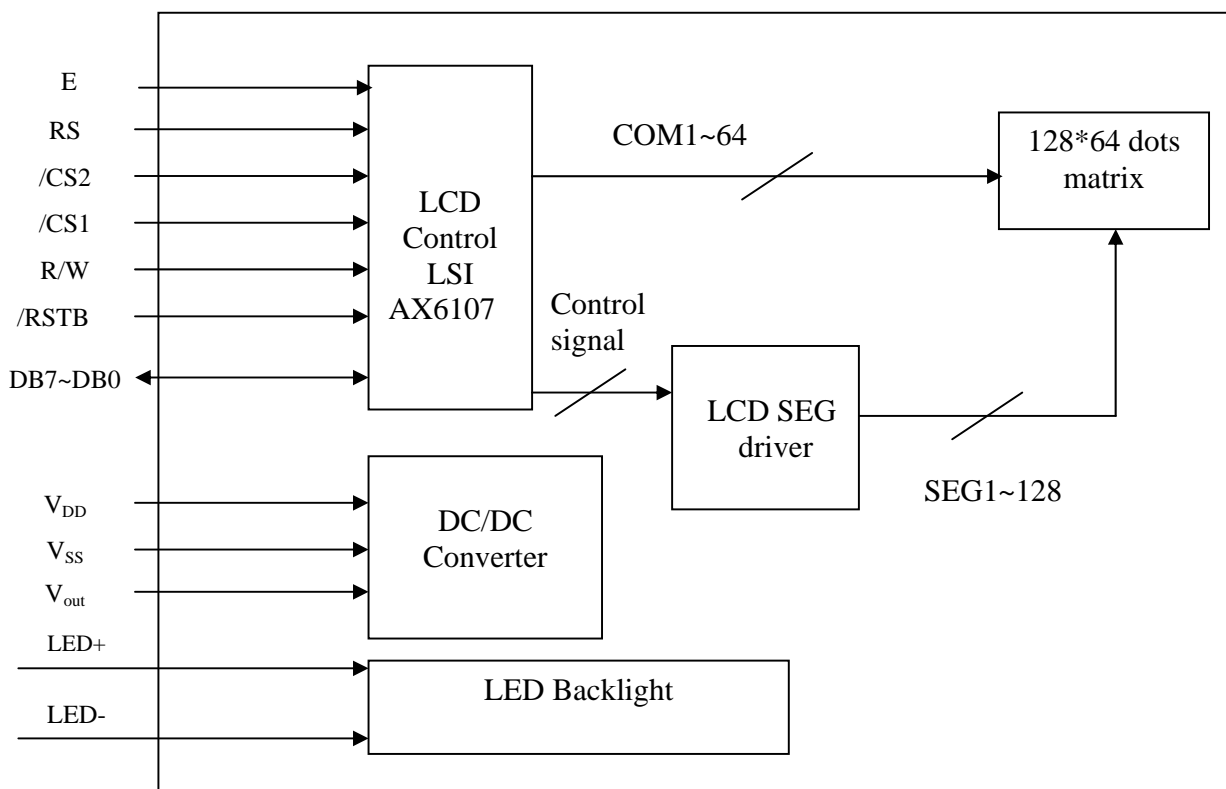
## 1.FUNCTIONS & FEATURES

1-1. Format	: 128*64 Dots Graphic
1-2. LCD mode	: STN/Yellow-Green/Positive/Transflective
1-3. Viewing direction	: 6 o'clock
1-4. Driving scheme	: 1/64 duty, 1/9 bias, V <sub>LCD</sub> 8.7V

## 2.MECHANICAL SPECIFICATIONS

2-1. Module size	: 93(W)*70(H)*14MAX (T)
2-2. Viewing area	: 70.7(W)* 38.8(H)
2-3. Dot pitch	: 0.52(W)*0.52(H)
2-4. Dot size	: 0.48(W) * 0.48(H)

## 3.BLOCK DIAGRAM



## 4. DIMENSIONAL OUTLINE

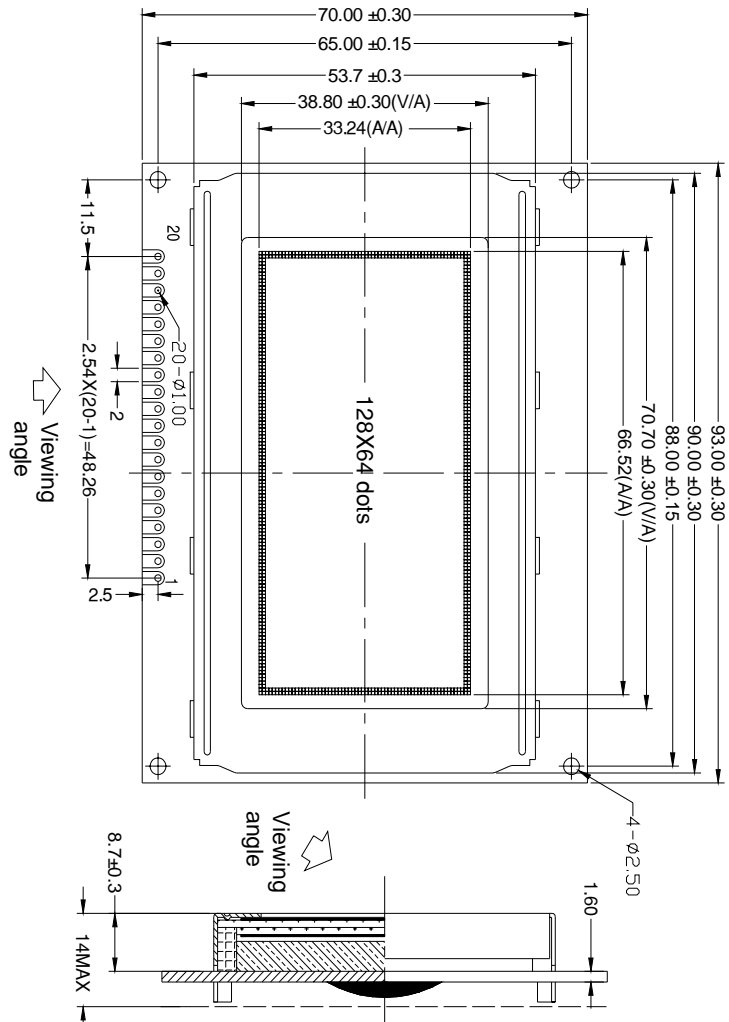
Count drawing & Spec:revision record during discussion with customer	
Rec.	Date
#1	2005-07-14
Revision content description	
FIRST ISSUE	

Count drawing & Spec. revision record during discussion with customer

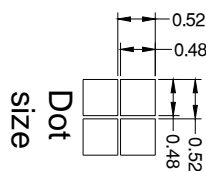
Revision content description	ac.
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#1	FIRST ISSUE
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2005-07-14



Pin	Name
1	VSS
2	VDD
3	V <sub>0</sub>
4	RS
5	R/W
6	E
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	/CS1
16	/CS2
17	/RST/E
18	Vout
19	LED+
20	LED-



Dot  
size

*Specification:*

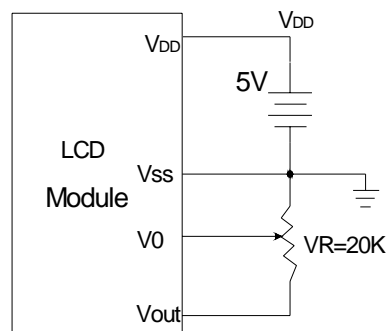
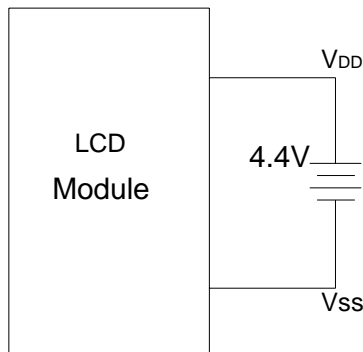
1. Display mode: STN/V-G/Positive/Transflective
2. Driving condition: 1/64 Duty, 1/9 Bias, Vlcd: 8.7V
3. Viewing angle: 6 O'clock
4. Operating temp.: 0--+50°C
5. Storage temp.: -20--+70°C
6. Using Yellow-Green LED backlight if necessary
7. Unspecified tolerance is  $\pm 0.3\text{mm}$
- 7.ROHS Request

	UNIT	SIZE	SCALE					
	mm	A4	FIT					
	DESIGNED	CHECKED	VERIFIED	APPROVED				
					MATERIAL	WEIGHT		
					B NUMBER	TOTAL		
Count Dwg.								

## 5. POWER SUPPLY

(1)internal supply LCD drive voltage

(2)External input LCD drive voltage



Note:1 When LCD drive voltage is obtained from inner, the module must short J8.

LCD drive voltage= $V_{DD}-V_0$  (AVR=0 OHM)

2. When LCD drive voltage is obtained from exterior, the module must short,J7 .

LCD drive voltage= $V_{SS}-V_0$

## 6. PIN DESCRIPTION

Pin no.	Symbol	Function
1	VSS	Power Ground
2	VDD	Power supply for Logic circuit and LCD
3	V0	1.When LCD drive voltage is obtained from inner, V0 no connect. 2.When LCD drive voltage is obtained from exterior,V0 is LCD drive voltage.
4	RS	Data input/output pin of internal shift register
5	R/W	Read/writer select signal
6	E	Read/write Enable signal
7	DB0	Display data signal
8	DB1	
9	DB2	
10	DB3	
11	DB4	
12	DB5	
13	DB6	
14	DB7	
15	/CS1	Chip select signal IC 1
16	/CS2	Chip select signal IC 2
17	/RSTB	Reset signal
18	Vout	Power supply voltage for LCD
19	LED+	Anode of LED backlight
20	LED-	Cathode of LED Backlight

## 7.MAXIMUM ABSOUTE LIMIT (T=25°C)

Item	Symbol	Standard value	Unit
Power supply voltage	V <sub>DD</sub>	-0.3~+7.0	V
Operating temperature	Topr	0~+50	°C
Storage temperature	Tstg	-20~+70	°C

Note: Voltage greater than above may damage the module

All voltage are specified relative to Vss=0V.

## 8.ELECTRICAL CHARACTERISTICS

### 8-1 DC Characteristics (V<sub>SS</sub>=0V, Ta=0~+50°C)

Item	Symbol	Min	Typ	Max	Unit	Applicable terminal	Test condition
Operating voltage	V <sub>DD</sub> (Note 1)	4.5	5.0	5.5	V		-
	V <sub>DD</sub> (Note 2)	4.2	4.4	4.6	V		
Supply current	I <sub>DD</sub> (Note 1)			4.2	mA	VDD	During display
	I <sub>DD</sub> (Note 2)			9	mA	VDD	During display
Input current	I <sub>0</sub>	-	0.07	0.1	mA	V <sub>0</sub>	-
Output voltage	V <sub>OUT</sub>	-	-3.5	-5V	V	V <sub>OUT</sub>	V <sub>DD</sub> =5V
Input voltage	V <sub>IL</sub>	0	-	0.8	V	R/W,RS,CS1, CS2,E,DB0~D B7	-
	V <sub>IH</sub>	2.0	-	V <sub>DD</sub>	V		
Output voltage	V <sub>OL</sub>	-	-	0.4	V	DB0~DB7	I <sub>OL</sub> =1.6mA
	V <sub>OH</sub>	2.4	-	-	V		I <sub>OH</sub> =-200mA
Input leakage current	I <sub>LKG</sub>	-1	-	1	uA	R/W,RS,CS1, CS2,E	V <sub>IN</sub> =0 or V <sub>DD</sub>
LCD driving voltage	V <sub>LCD</sub>	8.4	8.7	9	V		-

Note:(1): External input LCD drive voltage

Note:(2): Internal supply LCD drive voltage and AVR=0 OHM

### 8-2.Backlight Specifications Absolute maximum rating(Ta=25°C)

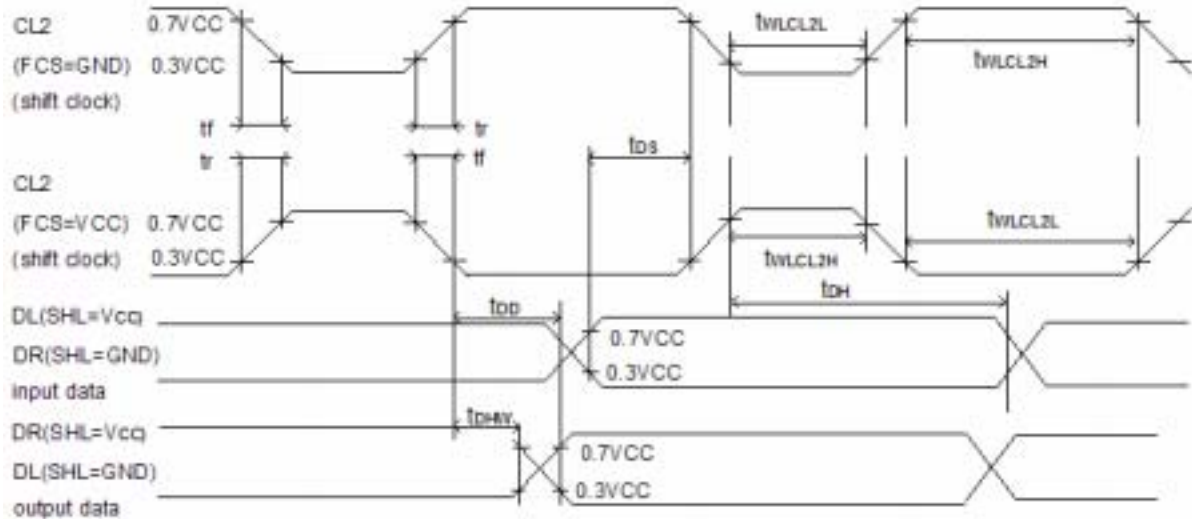
Item	Symbol	Min	Typ	Max	Unit	Condition
Forward voltage	Vf	3.8	4.1	4.4	V	If=330mA
Power Dissipation	Pd			3300	mW	If=330mA
Peak forward current	Ifp			1980	mA	-
Peak wave length	λp	565	568	572	nm	If=330mA
Spectral Line half width	λ		30		nm	If=330mA
Luminance	Lv	158	190		cd/m2	If=330mA
Module luminance	Lv	24.5	26		cd/m2	If=330m
Color	Y-G					



### 8-3 AC Characteristics (VDD=+5V, VSS=0V, Ta=0~+50°C)

8-3-1:

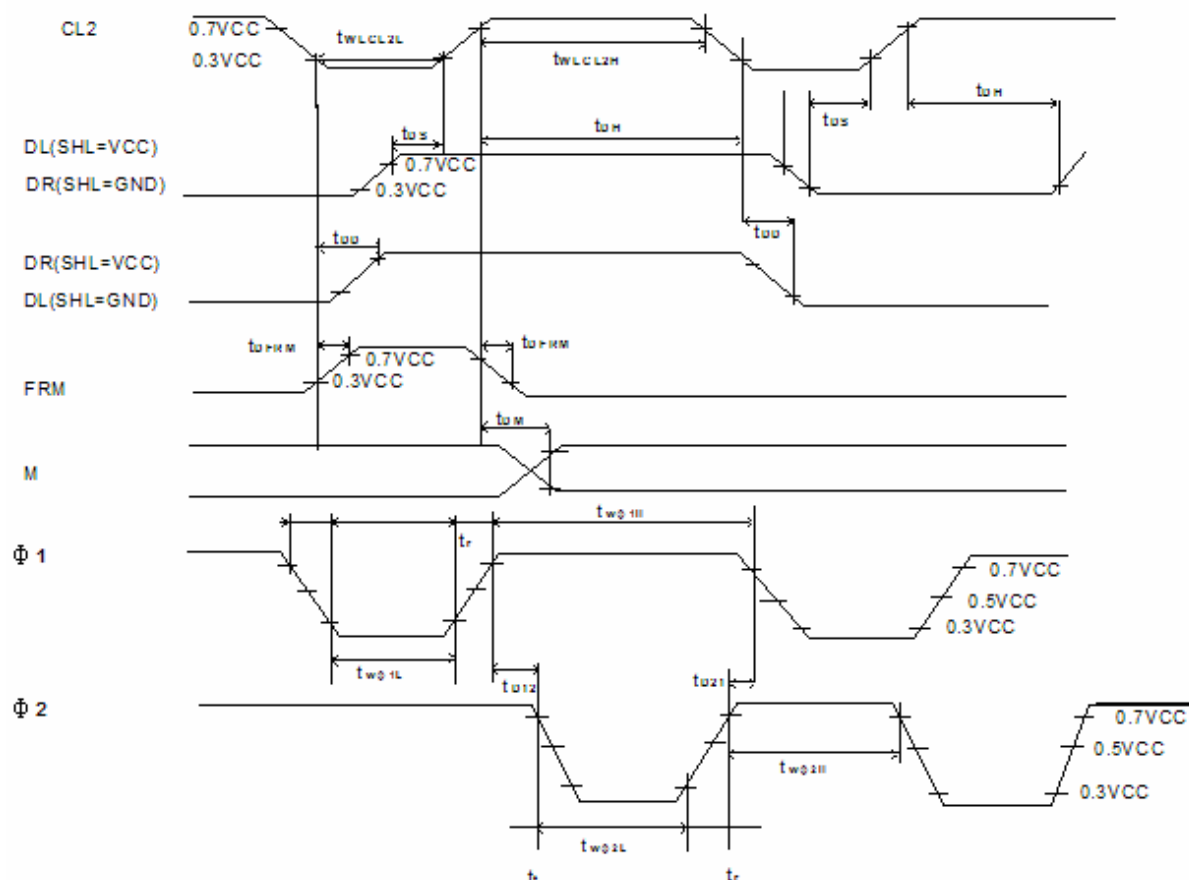
In the slave mode



Item	Sytem	Min	Typ	Max	Unit	Note
CL2 low level width(FCS=GND)	$t_{WLCL2L}$	450	-	-	ns	
CL2 high level width(FCS=GND)	$t_{WLCL2H}$	150	-	-	ns	
CL2 low level width(FCS=VCC)	$t_{WHCL2L}$	150	-	-	ns	
CL2 high level width(FCS=VCC)	$t_{WHCL2H}$	150	-	-	ns	
Data setup time	$t_{DS}$	100	-	-	ns	
Data hold time	$t_{DH}$	100	-	-	ns	
Data delay time	$t_{DD}$	-	-	200	ns	
Output data hold time	$t_{DHW}$	10	-	-	ns	
CL2 rise time	$t_r$	-	-	30	NS	
CL2 fall time	$t_f$	-	-	30	NS	



### In the master mode

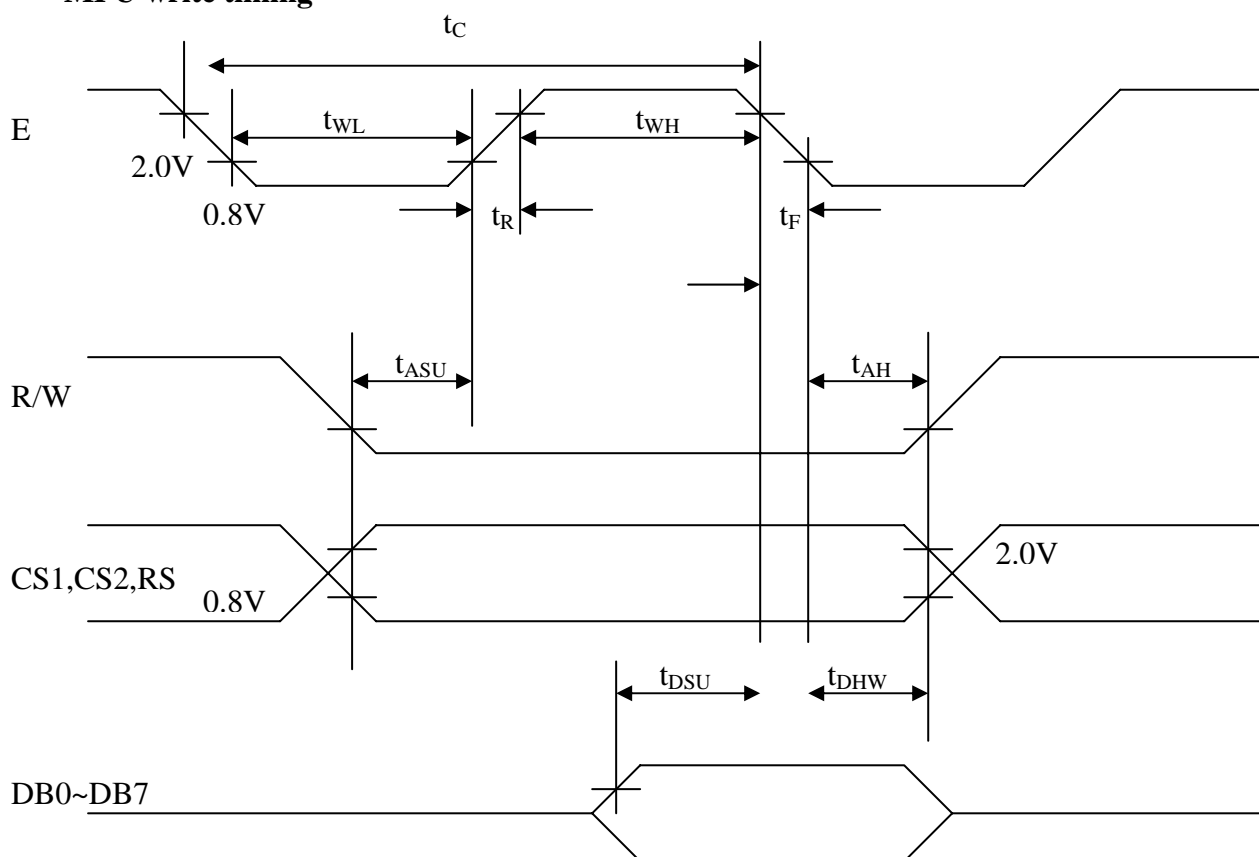


Item	Symtem	Min	Typ	Max	Unit
Data setup time	$t_{DS}$	20	-	-	us
Data hold time	$t_{DH}$	40	-	-	us
Data delay time	$t_{DD}$	5	-	-	us
FRM delay time	$t_{DFRM}$	-2	-	2	us
M delay time	$t_{DM}$	-2	-	2	us
CL2 low level time	$t_{wCL2L}$	35	-	-	us
CL2 high level time	$t_{wCL2H}$	35	-	-	us
1 low level time	$t_{w1L}$	700	-	-	ns
1 high level time	$t_{w1H}$	700	-	-	ns
2 low level time	$t_{w2L}$	2100	-	-	ns
2 high level time	$t_{w2H}$	2100	-	-	ns
1- 2 phase difference	$t_{D12}$	700	-	-	ns
2- 1 phase difference	$t_{D21}$	700	-	-	ns
1, 2 rise time	$t_r$	-	-	150	ns
1, 2 fall time	$t_f$	-	-	150	ns

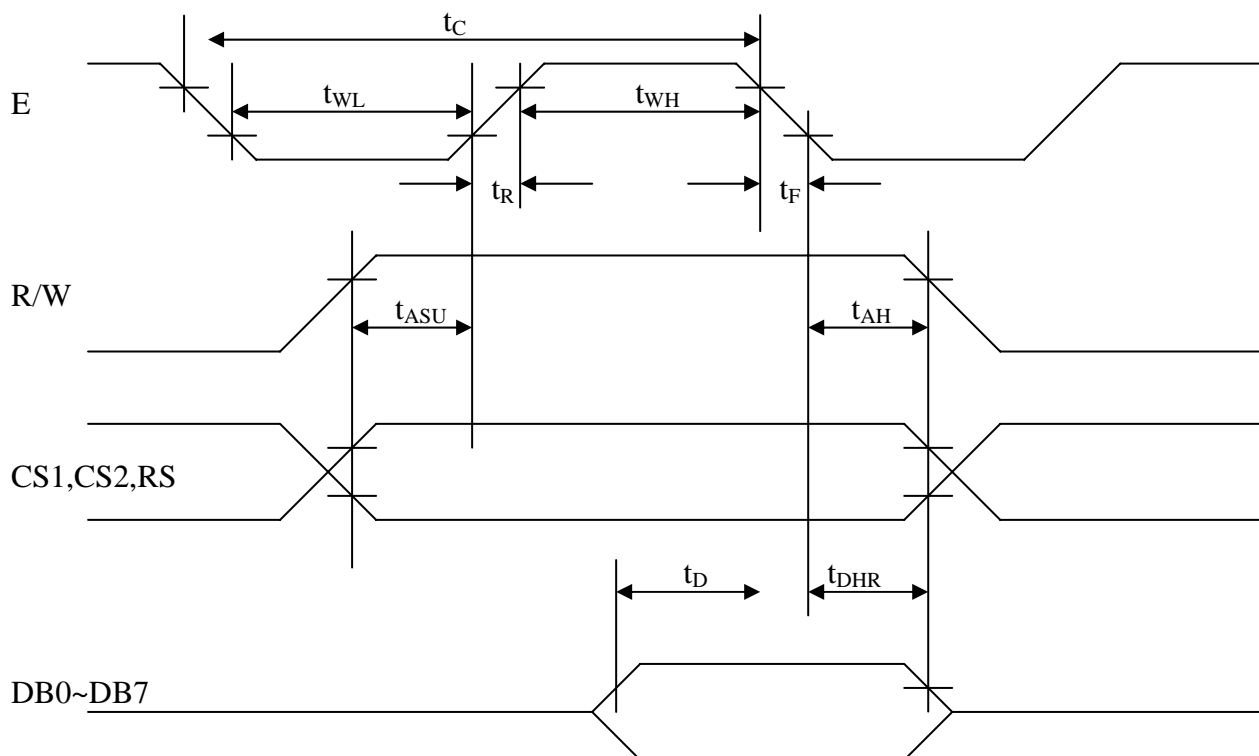
### 8-3-2:Write and Read timing

Characteristic	Symbol	Min	Typ	Max	Unit	Test Pin
E cycle time	$t_C$	1000	-	-	ns	E
E high level width	$t_{WH}$	450	-	-		
E low level width	$t_{WL}$	450	-	-		
E rise time	$t_R$	-	-	25		
E fall time	$t_F$	-	-	25		
Address set-up time	$t_{ASU}$	140	-	-		R/W,RS
Address hold time	$t_{AH}$	10	-	-		
Data setup time	$t_{DSU}$	200	-	-		DB0~DB7
Data delay time	$t_D$	-	-	320		
Data hold time (Write)	$t_{DHW}$	10	-	-		
Data hold time (Read)	$t_{DHR}$	20	-	-		

#### • MPU write timing



• MPU read timing

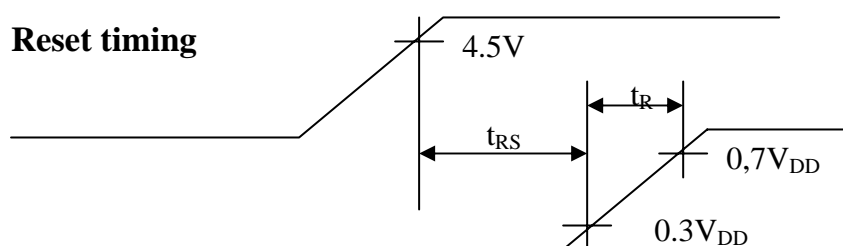


### 8-3-3:RESET

#### Power supply initial conditions

Item	Symbol	Min	Typ	Max	Unit
Reset time	$t_{RS}$	1.0	-	-	$\mu s$
Rise time	$t_R$	-	-	200	ns

#### Reset timing



**Note:** The LCD Module can be initialized by setting RSTB terminal at low level when turning power on, receiving instruction from MPU. When RSTB becomes lows, following procedure is occurred.

1. Display off
2. Display start line register become set by 0. (Z-address 0)

## 9. CONTROL AND DISPLAY COMMAND

Instruction	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Function
Display on/off	L	L	L	L	H	H	H	H	H	L/H	Controls the display on or off. Internal status and display RAM data is not affected. L: OFF, H: ON
Set address (Y address)	L	L	L	H	Y address (0 - 63)						Sets the Y address in the Y address counter.
Set page (X address)	L	L	H	L	H	H	H	Page (0 - 7)			Sets the X address at the X address register.
Display start line (Z address)	L	L	H	H	Display start line (0 - 63)						Indicates the display data RAM displayed at the top of the screen.
Status read	L	H	Busy	L	On / Off	Reset	L	L	L	L	Read status. BUSY L: Ready H: In operation ON/OFF L: Display ON H: Display OFF RESET L: Normal H: Reset
Write display data	H	L	Write data								Writes data (DB0:7) into display data RAM. After writing instruction, Y address is increased by 1 automatically.
Read display data	H	H	Read data								Reads data (DB0: 7) from display data RAM to the data bus.

## 10.Package Specifications

REV	DESCRIPTION	DATE (Remark)
00	FIRST ISSUE	2005-07-04(#1)

Name	Unit	Qty per	Spec	Material	Remark
1 carton	pcs	1	400*300*285	paper	"A" type
2 sub-carton	pcs	1	375*270*280	paper	"A" type
3 long separator	pcs	27	360*70	paper	"A" type
4 short separator	pcs	12	255*70	paper	"A" type
5 bubble bag	pcs	72	160*160*80	PE	"B" type
6 module	pcs	72	93*70*14 MAX		be careful in put
7 paper board	pcs	4	360*255*6	paper	"A" type
8 Adhesive-tape	m	3	1.0	PE	ESD 10 <sup>-6</sup> ~10 <sup>-11</sup>

### Specification:

One carton contains 3 layers, 24 modules put in each layer, One  
一箱裝三層力卡 每層力卡里放24(PCS) 模組。  
the bottom and top side a reinforcement board is added , then using  
每一箱頂面和底面各放一層紙板,且兩層力卡之間放一層紙板,並用包裝  
adhesive tape for entailing.  
帶捆住.

One carton can contain 24X3=72modules.  
一箱裝24X3=72(PCS) 模組

PART NO.	BG-12864B-PK-I-B-A	MATERIAL		WEIGHT	
		NUMBER		TOTAL	
DESIGNED	CHECKED	VERIFIED	APPROVED	FILE NAME	
PACKAGE					

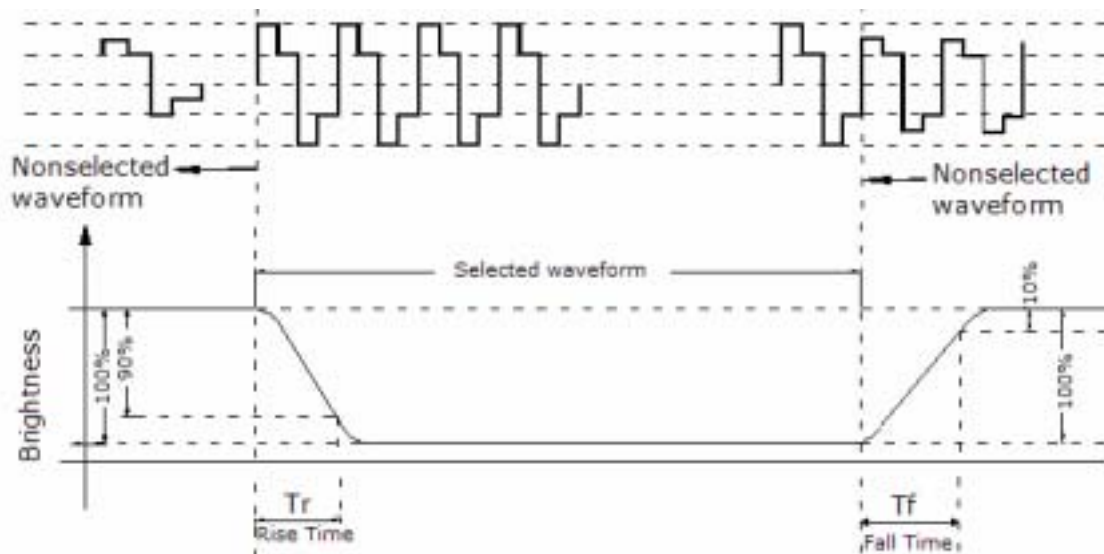
UNIT	SIZE	SCALE
mm	A4	1:1

## 11.Quality Specifications

### 11-1.Electro-Optic Characteristics

NO	ITEM		Symbol	Temp	Rating			Unit
					Min	Typ	Max	
1	Response time	Rise time	Tr	25	N/A	32.6		Ms
		Fall time	Tf	25	N/A	148.8		
2	Operating Frequency		Ff	25		64		Hz
3	Contrast Rate		Cr	25		4.5		
4	Viewing Direction		6 0 ' CLOCK					
5	Viewing Angle Cr 2	12H =90 °	1	25		42		Deg
		6H =270 °	2			35		
		3H =0 °	3			37		
		9H =180 °	4			30		
6	Current consumption		Is	25		24.0	40	uA
7	Capacitance		C	25		8.2		nF

#### Response Time

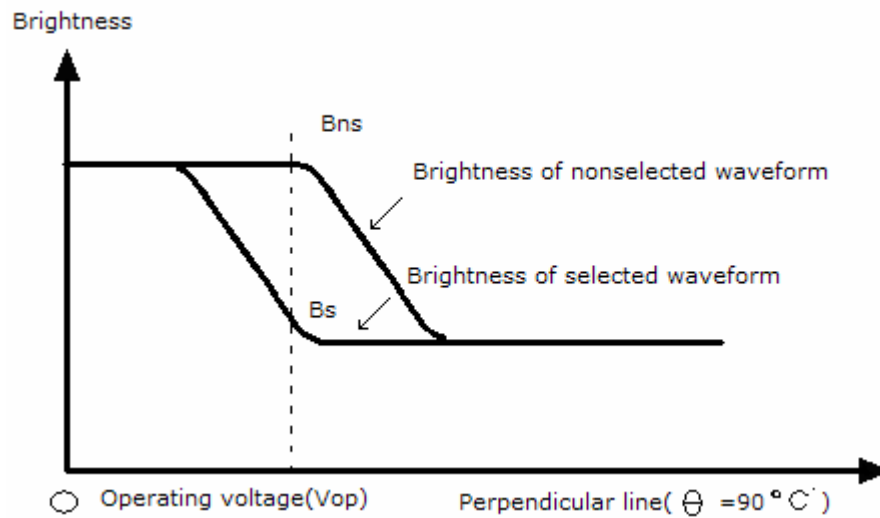


#### Measuring Condition:

1. Driving waveform: 1/N Duty,1/a Bias selected waveform.
2. Driving Frequency: Typical value in Individual specification.
3. Operating Voltage: LCD driving voltage getting maximum contrast rate.
4. Measuring Angle: See Individual Specification.
5. Measuring Temperature: See Individual Specification .



## Contrast Ratio Definition



$$\text{Contrast Ratio (Cr)} = \frac{\text{Brightness of non-selected waveform (Bns)}}{\text{Brightness of selected waveform (Bs)}}$$

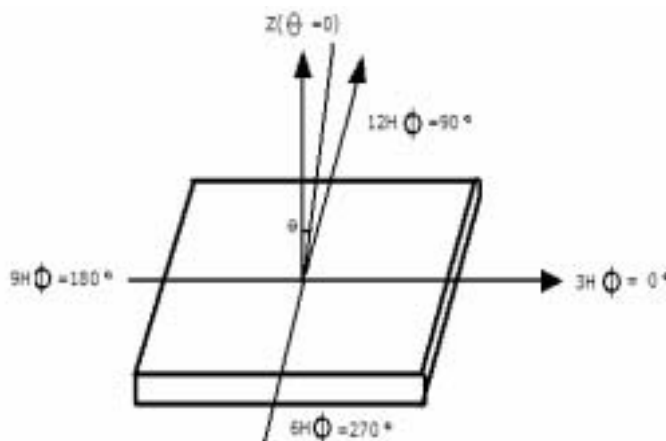
## Viewing Angle

$\theta$ : Angle between Viewer Direction and Normal.

( $-90^\circ$        $90^\circ$ )

$\phi$ : Angle between Projection of Viewer Direction to X-Y plane and Y axis.

( $0^\circ$     $\phi$     $360^\circ$ )



## Measuring Condition

1. Driving Voltage: Same as Vlcd.
2. Driving Frequency: Same as Frame Frequency

## 11-2. Specification of quality assurance

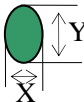
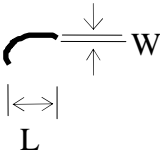
AQL inspection standard

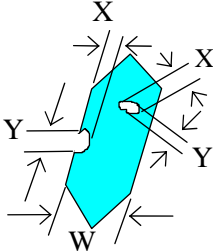
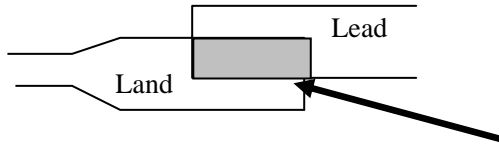
Sampling method: MIL-STD-105E, Level II, single sampling

### Defect classification

Classify	Item		Note	AQL
Major	Display  state	Short or open circuit	1	0.65
		Contrast defect (dim, ghost)		
		LC leakage		
		Flickering		
		No display		
		Wrong viewing direction	2	
		Wrong Back-light	7	
	Non-display	Flat cable or pin reverse	9	
		Wrong or missing component	10	
Minor	Display  state	Background color deviation	2	1.5
		Black spot and dust	3	
		Line defect	4	
		Scratch		
		Rainbow	5	
		Pin hole	6	
	Polarizer	Bubble and foreign material	3	
		Scratch	4	
	PCB	Scratch	4	
	Soldering	Poor connection	8	
	Wire	Poor connection	9	

## Note on defect classification

No.	Item	Criterion																				
1	Short or open circuit	Not allow																				
	LC leakage																					
	Flickering																					
	No display																					
	Wrong viewing direction																					
	Wrong Back-light																					
2	Contrast defect	Refer to approval sample																				
	Background color deviation																					
3	Point defect, Black spot, dust (incl. Polarizer)	<div></div> <table><tr><th>Point Size</th><th>Acceptable Qty.</th></tr><tr><td><math>\phi \leq 0.10</math></td><td>Disregard</td></tr><tr><td><math>0.10 &lt; \phi \leq 0.20</math></td><td>3</td></tr><tr><td><math>0.20 &lt; \phi \leq 0.25</math></td><td>2</td></tr><tr><td><math>0.25 &lt; \phi \leq 0.30</math></td><td>1</td></tr><tr><td><math>\phi &gt; 0.30</math></td><td>0</td></tr></table> <div>Unit : mm</div>	Point Size	Acceptable Qty.	$\phi \leq 0.10$	Disregard	$0.10 < \phi \leq 0.20$	3	$0.20 < \phi \leq 0.25$	2	$0.25 < \phi \leq 0.30$	1	$\phi > 0.30$	0								
	Point Size		Acceptable Qty.																			
	$\phi \leq 0.10$		Disregard																			
	$0.10 < \phi \leq 0.20$		3																			
	$0.20 < \phi \leq 0.25$		2																			
	$0.25 < \phi \leq 0.30$		1																			
$\phi > 0.30$	0																					
$\phi = (X+Y)/2$																						
4	Line defect	<div></div> <table><tr><th colspan="2">Line</th><th>Acceptable Qty.</th></tr><tr><th>L</th><th>W</th><th></th></tr><tr><td>---</td><td><math>0.015 \leq W</math></td><td>Disregard</td></tr><tr><td>3.0 L</td><td><math>0.03 \leq W</math></td><td rowspan="2">2</td></tr><tr><td>2.0 L</td><td><math>0.05 \leq W</math></td></tr><tr><td>1.0 L</td><td><math>0.1 &gt; W</math></td><td>1</td></tr><tr><td>---</td><td><math>0.05 &lt; W</math></td><td>Applied as point defect</td></tr></table> <div>Unit: mm</div>	Line		Acceptable Qty.	L	W		---	$0.015 \leq W$	Disregard	3.0 L	$0.03 \leq W$	2	2.0 L	$0.05 \leq W$	1.0 L	$0.1 > W$	1	---	$0.05 < W$	Applied as point defect
	Line		Acceptable Qty.																			
	L		W																			
	---		$0.015 \leq W$	Disregard																		
	3.0 L		$0.03 \leq W$	2																		
	2.0 L		$0.05 \leq W$																			
1.0 L	$0.1 > W$	1																				
---	$0.05 < W$	Applied as point defect																				
5	Rainbow	Not more than two color changes across the viewing area.																				

No.	Item	Criterion								
6	Segment pattern W = Segment width $\phi = (X+Y)/2$	<div>(1) Pin hole <math>\phi &lt; 0.10\text{mm}</math> is acceptable.</div> <div></div> <div><table><tr><th>Point Size</th><th>Acceptable Qty</th></tr><tr><td><math>\phi &lt; 1/4W</math></td><td>Disregard</td></tr><tr><td><math>1/4W &lt; \phi &lt; 1/2W</math></td><td>1</td></tr><tr><td><math>\phi &gt; 1/2W</math></td><td>0</td></tr></table><div>Unit: mm</div></div>	Point Size	Acceptable Qty	$\phi < 1/4W$	Disregard	$1/4W < \phi < 1/2W$	1	$\phi > 1/2W$	0
Point Size	Acceptable Qty									
$\phi < 1/4W$	Disregard									
$1/4W < \phi < 1/2W$	1									
$\phi > 1/2W$	0									
7	Back-light	<div>(1) The color of backlight should correspond its specification.</div> <div>(2) Not allow flickering</div>								
8	Soldering	<div>(1) Not allow heavy dirty and solder ball on PCB. (The size of dirty refer to point and dust defect)</div> <div>(2) Over 50% of lead should be soldered on Land.</div> <div></div>								
9	Wire	<div>(1) Copper wire should not be rusted</div> <div>(2) Not allow crack on copper wire connection.</div> <div>(3) Not allow reversing the position of the flat cable.</div> <div>(4) Not allow exposed copper wire inside the flat cable.</div>								
10	PCB	<div>(1) Not allow screw rust or damage.</div> <div>(2) Not allow missing or wrong putting of component.</div>								

### 11-3. Reliability of LCM

Reliability test condition:

Item	Condition	Time (hrs)	Assessment
High temp. Storage	70°C	240	No abnormalities in functions and appearance
High temp. Operating	50°C	240	
Low temp. Storage	-20°C	240	
Low temp. Operating	0°C	240	
Humidity	40°C/ 90%RH	240	
Temp. Cycle	<div style="text-align: center;"> -20°C → 25°C → 70°C → 25°C  (1 hour → 5 min → 1 hour → 5 min) </div>	10cycles	

Recovery time should be 24 hours minimum. Moreover, functions, performance and appearance shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature ( $20\pm 8^{\circ}\text{C}$ ), normal humidity (below 65% RH), and in the area not exposed to direct sun light.

### 11-4. Precaution for using LCM

LCM is assembled and adjusted with a high degree of precision. Do not attempt to make any alteration or modification. The followings should be noted.

#### General Precautions:

1. LCD panel is made of glass. Avoid excessive mechanical shock or applying strong pressure onto the surface of display area.
2. The polarizer used on the display surface is easily scratched and damaged. Extreme care should be taken when handling. To clean dust or dirt off the display surface, wipe gently with cotton, or other soft material soaked with isopropyl alcohol, ethyl alcohol or trichloroethylene or isobutane, do not use water, ketone or aromatics and never scrub hard.
3. Do not tamper in any way with the tabs on the metal frame.
4. Do not make any modification on the PCB without consulting YB.
5. When mounting a LCM, make sure that the PCB is not under any stress such as bending or twisting. Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.
6. Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels and also cause rainbow on the display.
7. Be careful not to touch or swallow liquid crystal that might leak from a damaged cell. Any liquid crystal adheres to skin or clothes, wash it off immediately with soap and water.

**Static Electricity Precautions:**

1. CMOS-LSI is used for the module circuit; therefore operators should be grounded whenever he/she comes into contact with the module.
2. Do not touch any of the conductive parts such as the LSI pads; the copper leads on the PCB and the interface terminals with any parts of the human body.
3. Do not touch the connection terminals of the display with bare hand; it will cause disconnection or defective insulation of terminals.
4. The modules should be kept in anti-static bags or other containers resistant to static for storage.
5. Only properly grounded soldering irons should be used.
6. If an electric screwdriver is used, it should be grounded and shielded to prevent sparks.
7. The normal static prevention measures should be observed for work clothes and working benches.
8. Since dry air is inductive to static, a relative humidity of 50-60% is recommended.

**Soldering Precautions:**

1. Soldering should be performed only on the I/O terminals.
2. Use soldering irons with proper grounding and no leakage.
3. Soldering temperature:  $300^{\circ}\text{C} \pm 10^{\circ}\text{C}$
4. Soldering time: 3 to 4 second.
5. Use eutectic solder with resin flux filling.
6. If flux is used, the LCD surface should be protected to avoid spattering flux.
7. Flux residue should be removed.

**Operation Precautions:**

1. The viewing angle can be adjusted by varying the LCD driving voltage  $V_o$ .
2. Since applied DC voltage causes electro-chemical reactions, which deteriorate the display, the applied pulse waveform should be a symmetric waveform such that no DC component remains. Be sure to use the specified operating voltage.
3. Driving voltage should be kept within specified range; excess voltage will shorten display life.
4. Response time increases with decrease in temperature.
5. Display color may be affected at temperatures above its operational range.

**Operation Precautions:**

1. Keep the temperature within the specified range usage and storage. Excessive temperature and humidity could cause polarization degradation, polarizer peel-off or generate bubbles.
2. For long-term storage over  $40^{\circ}\text{C}$  is required, the relative humidity should be kept below 60%. Avoid direct sunlight.

**Limited Warranty**

YB LCDs and modules are not consumer products, but may be incorporated by YB's customers into consumer products or components thereof, YB does not warrant that its LCDs and components are fit for any such particular purpose.

1. The liability of YB is limited to repair or replacement on the terms set forth below. YB will not be responsible for any subsequent or consequential events or injury or damage to any personnel or user including third party personnel and/or user. Unless otherwise agreed in writing between YB and the customer, YB will only replace or repair any of its



LCD which is found defective electrically or visually when inspected in accordance with YB GENERAL LCD INSPECTION STANDARD. (Copies available on request)

2. No warranty can be granted if any of the precautions state in handling liquid crystal display above has been disregarded. Broken glass, scratches on polarizer mechanical damages as well as defects that are caused accelerated environment tests are excluded from warranty.
3. In returning the LCD/LCM, they must be properly packaged; there should be detailed description of the failures or defect.

## 12.DESCRIBE TO THE PART NO:

