

# Product Specification

## KSEGB19264-03 SERIES

<b>Customer:</b>
Approved by:

Approved by	Checked by	Prepared by



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**1. FUNCTIONS & FEATURES**

- KSEGB19264-03 SERIES TYPE:

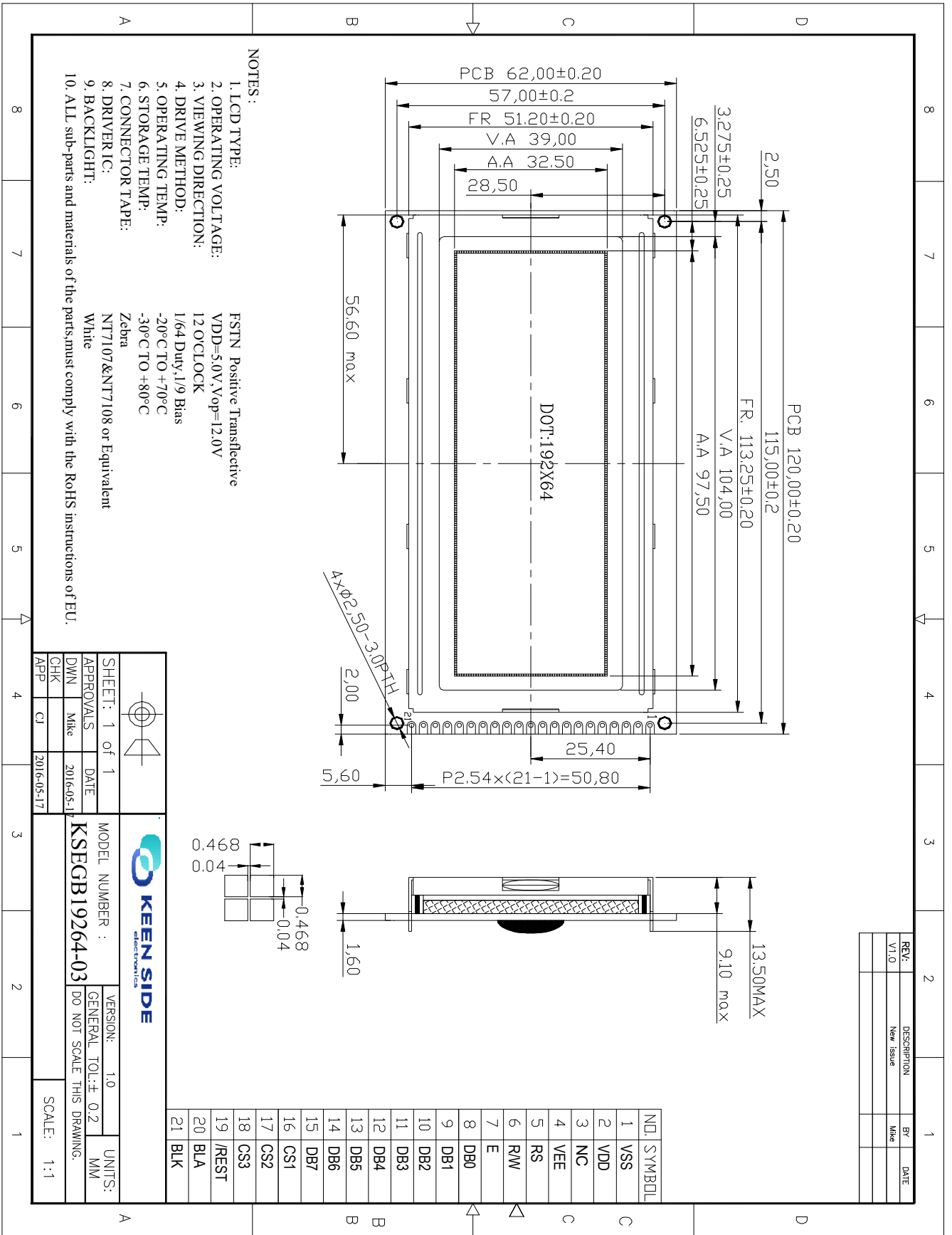
Module Model	LCD Type	Remark
KSEGB19264-03	FSTN Positive Transflective Mode	Backlight: White

- Viewing Direction : 12 O'clock
- Driving Scheme : 1/64Duty, 1/9Bias
- Power Supply for logic : 5.0V
- Display Content : 192\*64 Dots
- $V_{LCD}$  : 12.0V
- Operation temperature : -20°C to +70°C
- Storage temperature : -30°C to +80°C

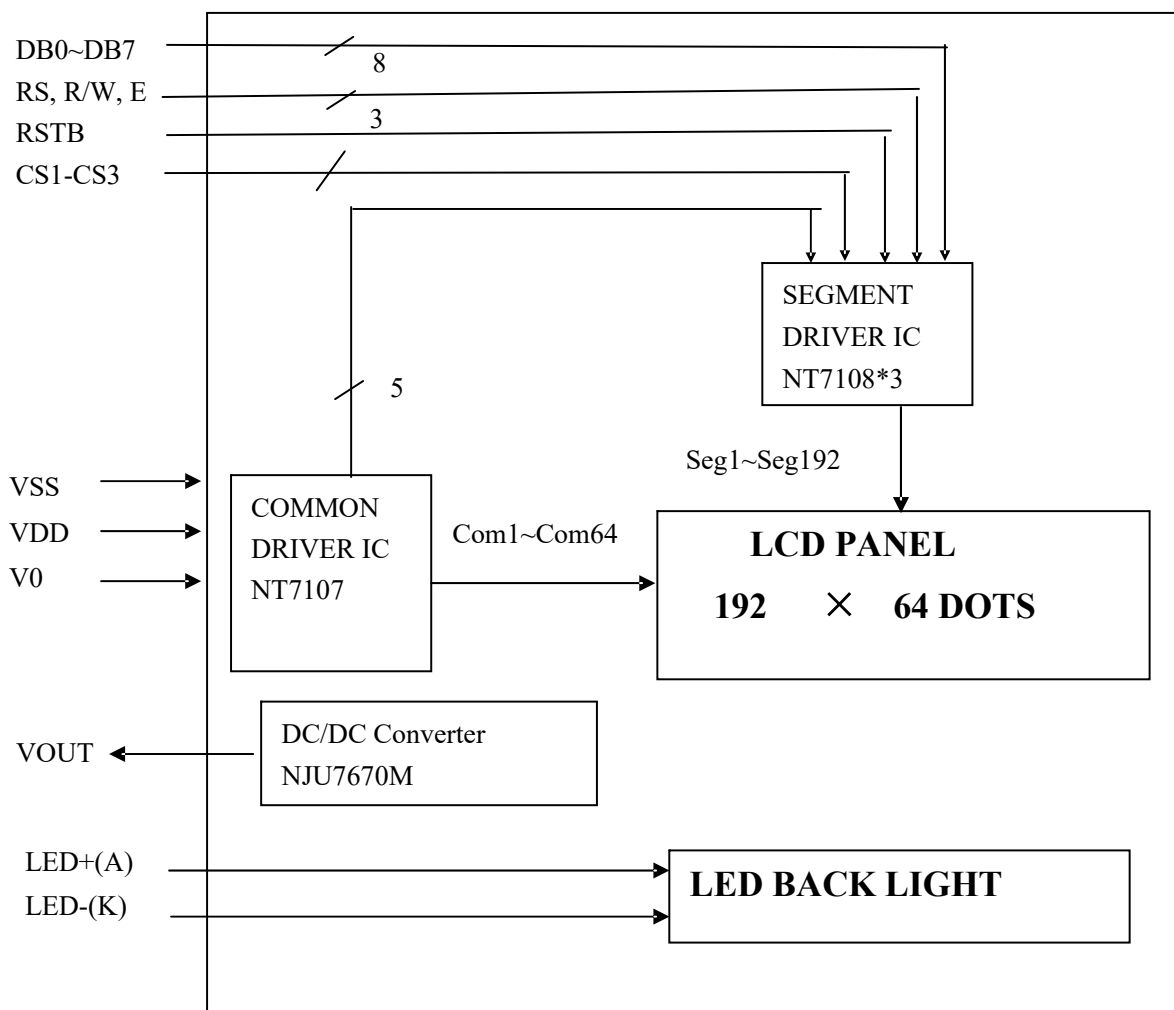
**2. MODULE ARTWORK**

- Module Size : 120.00(L)\*62.00 (W)\*13.50(H)mm
- Viewing Area : 104.00(L)mm\*39.00 (W)mm
- Active Area : 97.50(L)mm\*32.50(W)mm
- Dot Pitch : 0.508 (W)mm\*0.508 (H)mm
- Dot Size : 0.468 (W)mm\*0.468 (H)mm
- Dot Gap : 0.04 mm

**3. EXTERNAL DIMENSIONS**



**4. BLOCK DIAGRAM**



## 5. PIN ASSIGNMENT

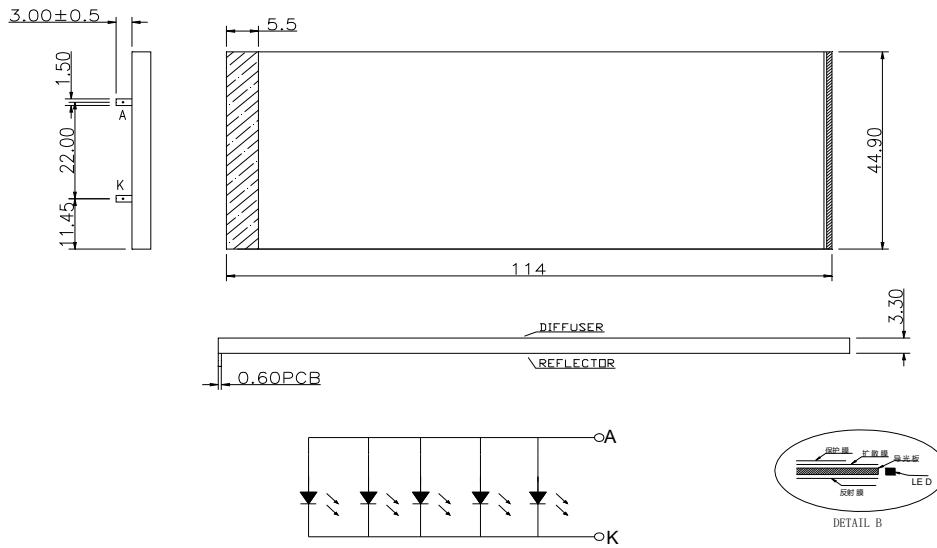
NO.	SYMBOL	FUNCTION
1	VSS	Ground (0V)
2	VDD	Power Supply(+5.0V)
3	NC	NO connector
4	VEE	Output voltage for LCD
5	/RS	Register select RS = 0...Instruction register      RS = 1...Data register
6	R/W	Read /Write R/W = 1...Read      R/W = 0...Write
7	E	Chip enable signal
8	DB0	Data input/output(LSB)
9	DB1	Data input/output
10	DB2	Data input/output
11	DB3	Data input/output
12	DB4	Data input/output
13	DB5	Data input/output
14	DB6	Data input/output
15	DB7	Data input/output(MSB)
16	/CS1	Chip selection In order to interface data for input or output; The terminals have to be CS1B=L, CS2B=L, and CS3=H..
17	/CS2	
18	/CS3	
19	/RST	Controller reset when "L"
20	LED+(A)	Anode of LED backlight(+5.0V)
21	LED-(K)	Cathode of LED backlight

6. ABSOLUTE MAXIMUM RATINGS( V<sub>SS</sub>=0V, T<sub>a</sub>=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage (Logic)	V <sub>DD</sub>	-0.3 to 7.0	V
Input voltage	V <sub>IN</sub>	-0.3 to VDD +0.3	V
Operating Temperature	T <sub>opr</sub>	-20 to +70	°C
Storage Temperature	T <sub>stg</sub>	-30 to +80	°C

## 7. BACKLIGHT ELECTRICAL/OPTICAL CHARACTERISTICS

	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Forward Voltage	V <sub>f</sub>	4.5	5.0	5.5	V	I <sub>f</sub> =15*5 mA
Forward Current	I <sub>f</sub>		75		mA	
Power Dissipation	P <sub>d</sub>	0.36			W	I <sub>f</sub> =15*5 mA
Reverse Voltage	V <sub>r</sub>		5.0		V	I <sub>f</sub> =15*5 mA
Luminous Intensity	L <sub>v</sub>		TBD		cd/m <sup>2</sup>	I <sub>f</sub> =15*5 mA
Luminous Uniformity	ΔL <sub>v</sub>	75			%	I <sub>f</sub> =15*5 mA
Emission Wavelength	X	0.22		0.26		I <sub>f</sub> =15mA T <sub>a</sub> =25° Each chip
	Y	0.22		0.26		



**8. ELECTRICAL CHARACTERISTICS**

**1). DC Characteristics**

Ta=25°C, VSS=0V

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
Supply Voltage (Logic)	V <sub>DD</sub> -V <sub>SS</sub>	-	4.5	5.0	5.5	V
High Level Input Voltage	V <sub>IH</sub>	V <sub>DD</sub> =5.0V±10%	V <sub>DD</sub> -2.2	-	V <sub>DD</sub>	V
Low Level Input Voltage	V <sub>IL</sub>	V <sub>DD</sub> =5.0V±10%	0	-	0.8	V
High Level Output Voltage	V <sub>OH</sub>	I <sub>OH</sub> =0.75Ma	V <sub>DD</sub> -0.3	-	V <sub>DD</sub>	V
Low Level Output Voltage	V <sub>OL</sub>	I <sub>OL</sub> =0.75Ma	0	-	0.3	V
Current Consumption(Operating)	I <sub>DD(1)</sub>	V <sub>DD</sub> =5.0V f <sub>OSC</sub> = 3.0 MHz	-	5.0	10.0	mA
LCD Drive Voltage	V <sub>lcd</sub>		11.80	12.00	12.20	V

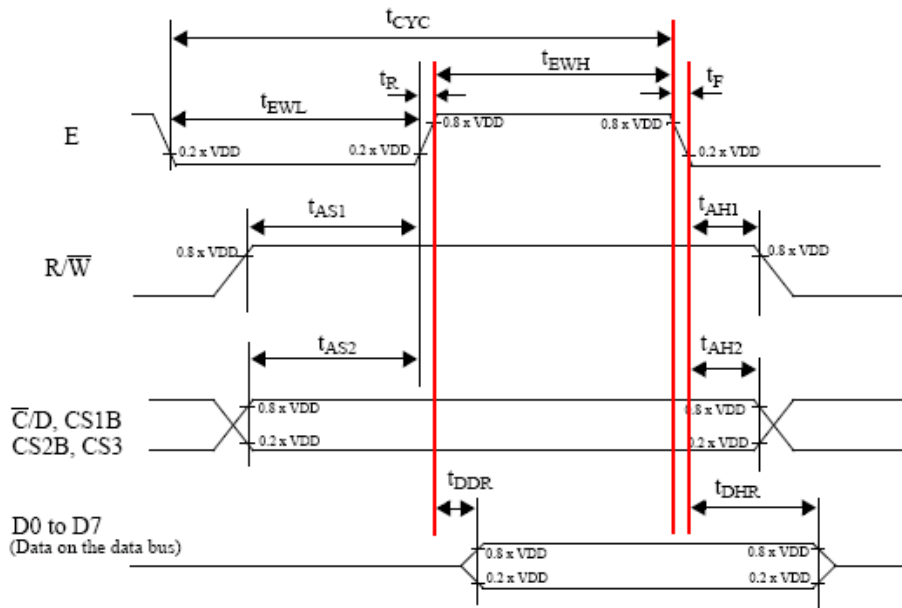
**2). AC Characteristics**

8-2-1. AC timing for writing to the NT7107

(VDD = 5 V ; VSS = 0 V; Tamb = 25° C.)

symbol	parameter	min.	max.	test conditions	unit
t <sub>CYC</sub>	Enable (E) cycle time	1000			ns
t <sub>EWL</sub>	Enable (E) LOW width	450			
t <sub>EWH</sub>	Enable (E) HIGH width	450			
t <sub>R</sub>	Enable (R) rise time		20		
t <sub>F</sub>	Enable (F) fall time		20		
t <sub>AS1</sub>	Write set-up time	140			
t <sub>AH1</sub>	Write hold time	10			
t <sub>AS2</sub>	C/D, CS1B, CS2B, CS3 set-up time	140			
t <sub>AH2</sub>	C/D, CS1B, CS2B, CS3 hold time	10			
t <sub>DSW</sub>	Data setup time (on the data bus)	200		The loading on the data bus is shown in Fig. 18.	
t <sub>DHW</sub>	Data hold time (on the data bus)	10			

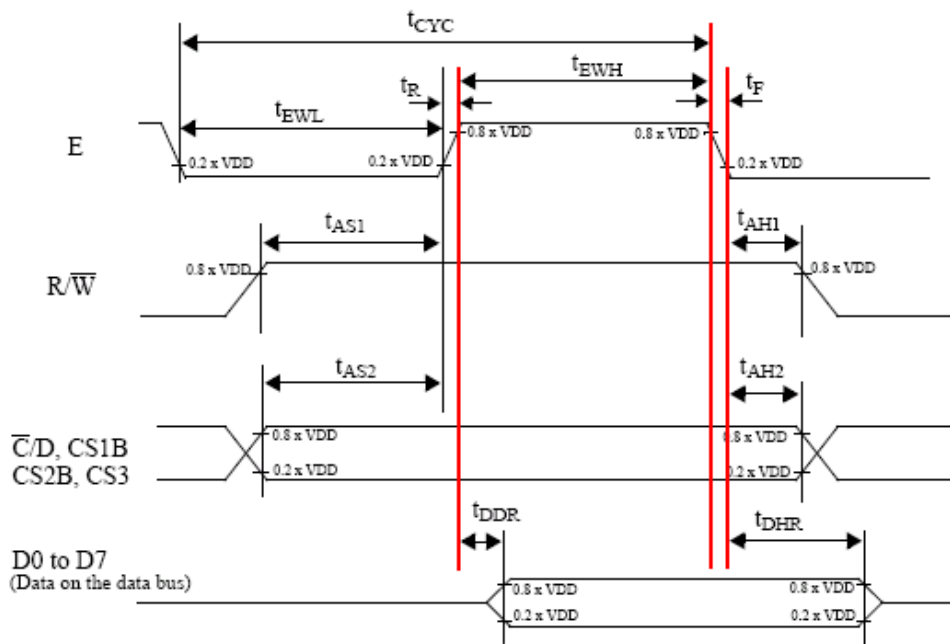




8-2-2. AC timing for reading from the NT7107

(VDD = 5 V; VSS = 0 V; Tamb = 25° C.)

symbol	parameter	min.	max.	test conditions	unit
t <sub>CYC</sub>	Enable (E) cycle time	1000			ns
t <sub>EWL</sub>	Enable (E) LOW width	450			
t <sub>EWH</sub>	Enable (E) HIGH width	450			
t <sub>R</sub>	Enable (R) rise time		20		
t <sub>F</sub>	Enable (F) fall time		20		
t <sub>AS1</sub>	READ set-up time	140			
t <sub>AH1</sub>	READ hold time	20			
t <sub>AS2</sub>	C/D, CS1B, CS2B, CS3 set-up time	140			
t <sub>AH2</sub>	C/D, CS1B, CS2B, CS3 hold time	10			
t <sub>DDR</sub>	Data delay time (on the data bus)	320		The loading on the data bus is shown in Fig. 18.	
t <sub>DHR</sub>	Data hold time (on the data bus)	20			



**9. DISPLAY CONTROL INSTRUCTION**

The display control instructions the internal state of the NT7107. Instruction is received from MPU to NT7107 for the display control. The following table shows various instructions.

Instruction	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Function	
Display ON/OFF	L	L	L	L	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 counter	
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	B U S Y	L	O N / O F F	R E S E T	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 Date									Writes data (DB0:7) into display data RAM . After writing instruction, Y address is increased by 1 automatically.
Read Display data	H	H	Read Date									Reads data (DB0:7) From display data RAM to the data bus.

**9-1. Display On/Off**

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	1	1	1	1	1	D0

The display data appears when D is 1 and disappears when D is 0.

Though the data is not on the screen with D=0, it remains display data RAM.

Therefore, you can make it appear by changing D=0 into D=1.

**9-2. Set Address (Y Address)**

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0

Y address (AC0~AC5) of the display data RAM is set in the Y address counter.

An address is set by instruction and increased by 1 automatically by read or write operations of display data.

**9-3. Set Page (X Address)**

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	0	1	1	1	AC2	AC1	AC0

X address (AC0~AC2) of the display data RAM is set in the X address register.

Writing or reading to or from MPU is executed in this specified page until the next page is set.

**9-4. Display Start Line (Z Address)**

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	1	AC5	AC4	AC3	AC2	AC1	AC0

Z address (AC0~AC5) of the display data RAM is set in the display start line register and display at the top of the screen.

When the display duty cycle is 1/64 or others (1/32~1/64), the data of total line number of LCD screen, from the line specified by display start line instruction, is displayed.

**9-5. Status Read**

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	BUSY	0	ON/OFF	RESET	0	0	0	0

■ **BUSY**

When BUSY is 1, the Chip is executing internal operation and no instructions are accepted.

When BUSY is 0, the Chip is ready to accept any instructions.

■ **ON/OFF**

When ON/OFF is 1, the display is on.

When ON/OFF is 0, the display is off.

■ **RESET**

When RESET is 1, the system is being initialized.

In this condition is 0, no instructions except status read can be accepted.

When RESET is 0, initialized has finished and the system is in the usual operation condition

**9-6. Write Display data**

R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	D7	D6	D5	D4	D3	D2	D1	D0

Writes data (D0~D7) into the display data RAM.

After writing instruction, Y addressed is increased 1 automatically.

**9-7. Read Display data**

R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	D7	D6	D5	D4	D3	D2	D1	D0

Reads data (D0~D7) from the display data RAM.

After reading instruction, Y addressed is increased 1 automatically.

**10. ELECTRONIC-OPTICAL CHARACTERISTICS**

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REF.
Rise Time	Tr	0°C	---	450	560	ms	Note(1)
		25°C		140	210		
Fall Time	Tf	0°C	----	680	800	ms	
		25°C		220	330		
Contrast	CR	25°C	---	2.7	---		Note(3)
View Angle	θ 1	25°C & CR ≥ 2	--	60	--		Note(2)
	θ 2		--	30	--		
	φ 1		--	30	--		
	φ 2		--	30	--		
Frame Frequency	Ff	25°C	--	64	--	Hz	

Note (1) & (2): See next page

Note (3): Contrast ratio is defined under the following condition: CR=

Brightness of no-selected condition

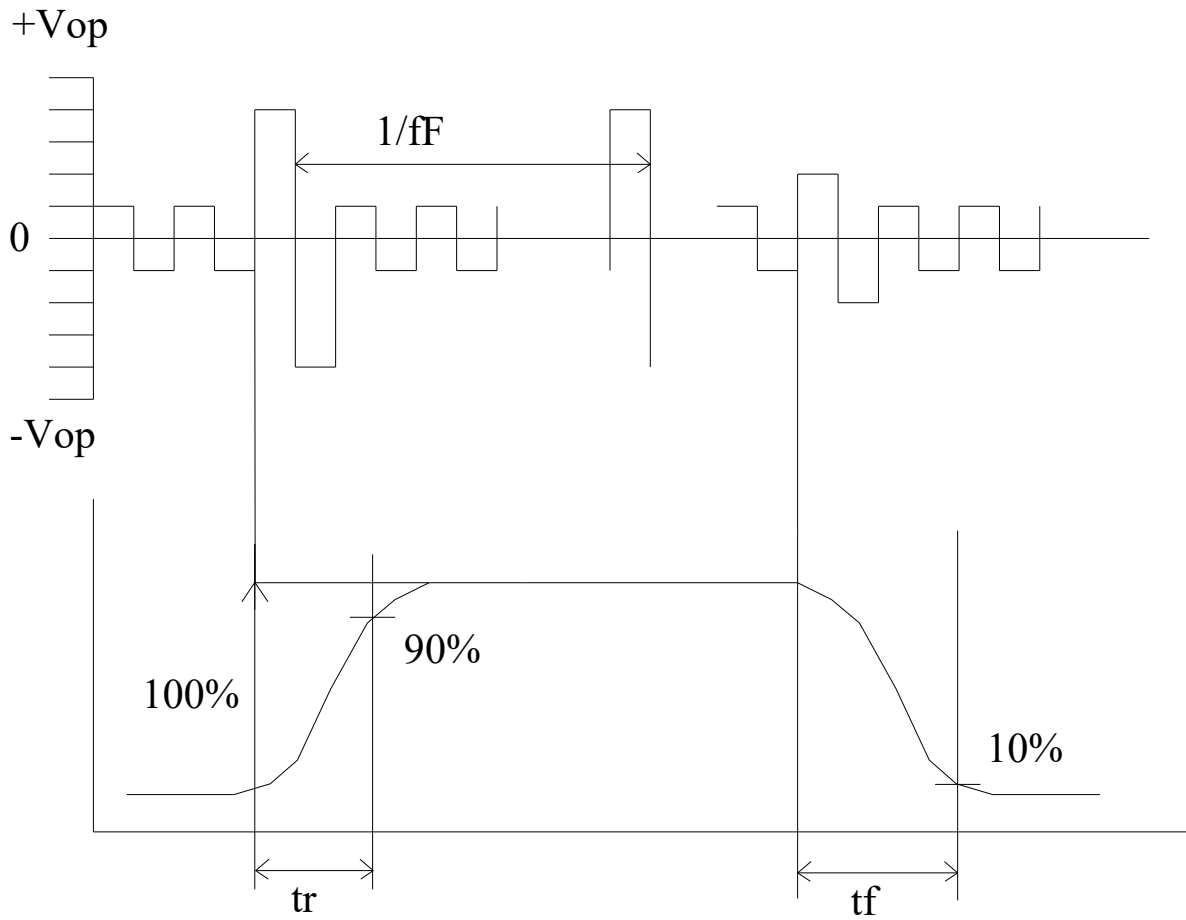
Brightness of selected condition

(a). Temperature -----25°C (b). Frame frequency -----64Hz

(c). viewing angle ----- θ =0° , φ =0°

(d). Operating voltage-----12V

**Note (1)** Response time is measured as the shortest period of time possible Between the changes is state of an LCD segment as demonstrated below: entire range.

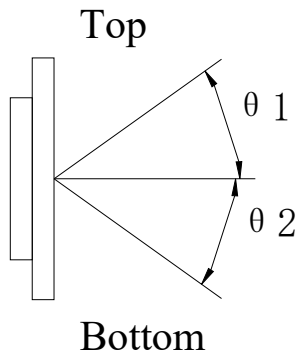


**Condition:**

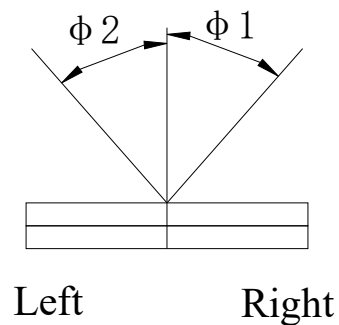
- (a) .Temperature-----25°C
- (b).Frame frequency-----64Hz
- (c). View Angle----- $\theta = 0^\circ$  ,  $\phi = 0^\circ$
- (d). Operating voltage-----12V

**Note(2)** definition of View Angle

Top --bottom direction



Right --left direction



**11. MODULE ACCEPT QUALITY LEVEL (AQL)**

**11.1 AQL Standard Value: Critical Defect =0.1, Major Defect=0.65; Minor Defect =2.5**

**11.2 Inspection Standard: MIL-STD-105E Table Normal Inspection Single Sampling Level II**

**12. RELIABILITY TEST**

Operating life time: Longer than 75,000 hours

(at room temperature without direct irradiation of sunlight; -20 °C(longer than 35, 000 hours); +70

°C(longer than 35,000hours) )

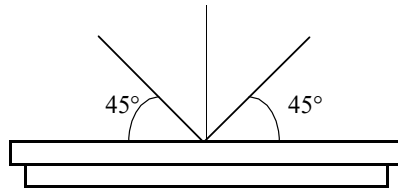
Reliability characteristics shall meet following requirements.

No.	Test Item	Content of Test	Test Condition
1	High Temperature Storage	Endurance test applying the high storage temperature for a long time	+80°C 96H
2	Low Temperature Storage	Endurance test applying the low storage temperature for a long time	-30°C 96H
3	High Temperature Operation	Endurance test applying the electric stress (voltage & current) and the thermal stress to the element for a long time	+70°C 96H
4	Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time	-20°C 96H
5	High Temperature/ Humidity Storage	Endurance test applying the high temperature and humidity storage for a long time	50°C 90%RH 96H
6	Temperature Cycle	Endurance test applying the low and high temperature cycle $  \begin{array}{ccccccc}  -20^{\circ}\text{C} & \longleftrightarrow & 25^{\circ}\text{C} & \longleftrightarrow & 70^{\circ}\text{C} & \longleftrightarrow & 25^{\circ}\text{C} \\  30\text{min} & & 5\text{min} & & 30\text{min} & & 5\text{min} \\  \longleftarrow & & & & & & \longrightarrow \\  & & & & & & \text{1 cycle}  \end{array}  $	-20°C/70°C 5 cycles
7	Vibration Test (Package State)	Endurance test applying the vibration during transportation	10Hz - 55Hz, 50m/s, 15min
8	Shock Test (Package State)	Endurance test applying the shock during transportation	Half-sinewave, 100m/s, 11ms
9	Atmospheric Pressure Test	Endurance test applying the atmospheric pressure during transportation by air	40 kPa 16 H

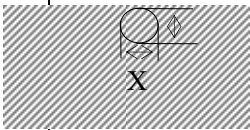
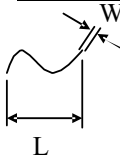
**13. Inspection specification**


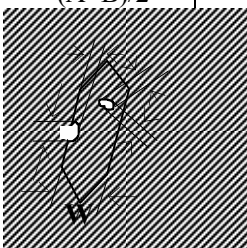
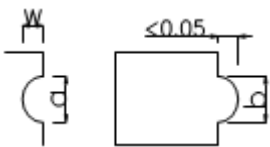
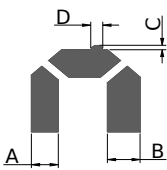
**13.1 Visual Inspection**

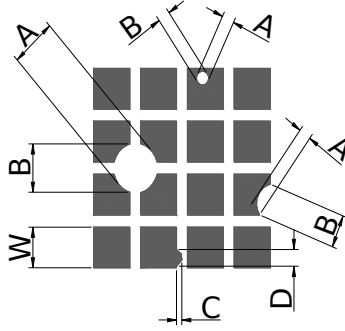
- 1) Inspect under 2x20W or 40W fluorescent lamp (approximately 3000 lux) leaving 25 to 30 cm between the module and the lamp and 30 cm between the module and the eye (measuring position).
- 2) Appearance is inspected at the best contrast voltage (best contrast is adjusted considering clearness and crosstalk on screen).
- 3) Inspect the module at 45° right and left, top and bottom.
- 4) Use the optimum viewing angle during the contrast inspection.



**13.2 Standard of Appearance Inspection**

No.	Item	Criteria																		
1	Black spot White spot Dust	Round type: as per following drawing $\Phi = (X+Y)/2$  <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="3">Acceptable quantity</th> </tr> <tr> <th>Size</th> <th>Zone A</th> <th>Zone B</th> </tr> </thead> <tbody> <tr> <td><math>\Phi &lt; 0.1</math></td> <td>Any number</td> <td rowspan="3">Any number</td> </tr> <tr> <td><math>0.1 &lt; \Phi &lt; 0.2</math></td> <td>2</td> </tr> <tr> <td><math>0.2 &lt; \Phi &lt; 0.25</math></td> <td>1</td> </tr> <tr> <td><math>0.25 &lt; \Phi</math></td> <td>0</td> <td></td> </tr> </tbody> </table>	Acceptable quantity			Size	Zone A	Zone B	$\Phi < 0.1$	Any number	Any number	$0.1 < \Phi < 0.2$	2	$0.2 < \Phi < 0.25$	1	$0.25 < \Phi$	0			
		Acceptable quantity																		
		Size	Zone A	Zone B																
$\Phi < 0.1$	Any number	Any number																		
$0.1 < \Phi < 0.2$	2																			
$0.2 < \Phi < 0.25$	1																			
$0.25 < \Phi$	0																			
Line type: as per following drawing <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="4">Acceptable quantity</th> </tr> <tr> <th>Length</th> <th>Width</th> <th>Zone A</th> <th>Zone B</th> </tr> </thead> <tbody> <tr> <td>—</td> <td><math>W \leq 0.02</math></td> <td>Any number</td> <td rowspan="3">Any number</td> </tr> <tr> <td><math>L \leq 3.0</math></td> <td><math>0.02 &lt; W \leq 0.03</math></td> <td rowspan="2">2</td> </tr> <tr> <td><math>L \leq 2.5</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> </tr> <tr> <td>—</td> <td><math>0.05 &lt; W</math></td> <td>As round type</td> </tr> </tbody> </table> 	Acceptable quantity				Length	Width	Zone A	Zone B	—	$W \leq 0.02$	Any number	Any number	$L \leq 3.0$	$0.02 < W \leq 0.03$	2	$L \leq 2.5$	$0.03 < W \leq 0.05$	—	$0.05 < W$	As round type
Acceptable quantity																				
Length	Width	Zone A	Zone B																	
—	$W \leq 0.02$	Any number	Any number																	
$L \leq 3.0$	$0.02 < W \leq 0.03$	2																		
$L \leq 2.5$	$0.03 < W \leq 0.05$																			
—	$0.05 < W$	As round type																		
Total acceptable quantity: 3																				
2	Polariser scratch	Scratch on protective film is permitted Scratch on polariser: same as No. 1																		
3	Polariser bubble	$\Phi = (X+Y)/2$																		

		 <p>X</p> <p>Total acceptable quantity: 3</p>	<table border="1"> <thead> <tr> <th colspan="3">Acceptable quantity</th> </tr> <tr> <th>Size</th> <th>Zone A</th> <th>Zone B</th> </tr> </thead> <tbody> <tr> <td><math>\Phi &lt; 0.2</math></td> <td>Any number</td> <td rowspan="4">Any number</td> </tr> <tr> <td><math>0.2 &lt; \Phi &lt; 0.5</math></td> <td>2</td> </tr> <tr> <td><math>0.5 &lt; \Phi &lt; 1.0</math></td> <td>1</td> </tr> <tr> <td><math>1.0 &lt; \Phi</math></td> <td>0</td> </tr> </tbody> </table>	Acceptable quantity			Size	Zone A	Zone B	$\Phi < 0.2$	Any number	Any number	$0.2 < \Phi < 0.5$	2	$0.5 < \Phi < 1.0$	1	$1.0 < \Phi$	0								
Acceptable quantity																										
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$1.0 < \Phi$	0																									
4	Segment deformation	<p>4.1 Pin hole on segmented display  W: segment width  <math>\Phi = (A+B)/2</math></p>  <p>4.2 Pin hole on dot matrix display</p>  <p>Total acceptable quantity: 7</p> <p>4.3 Segments / dots with different width</p>  <p>4.4 Alignment layer defect  <math>\Phi = (A+B)/2</math></p>	<table border="1"> <thead> <tr> <th colspan="2">Acceptable quantity</th> </tr> <tr> <th>Width</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td><math>W \leq 0.4</math></td> <td><math>\Phi \leq 0.2</math> and <math>\Phi \leq 1/2W</math></td> </tr> <tr> <td><math>W &gt; 0.4</math></td> <td><math>\Phi \leq 0.25</math> and <math>\Phi \leq 1/3W</math></td> </tr> </tbody> </table> <p>Total acceptable quantity: 1 defect per segment  Pin holes with <math>\Phi</math> under 0.10 mm are acceptable</p> <table border="1"> <thead> <tr> <th colspan="2">Acceptable quantity</th> </tr> <tr> <th>Size</th> <th>Any number</th> </tr> </thead> <tbody> <tr> <td><math>a, b &lt; 0.1</math></td> <td rowspan="2">Any number</td> </tr> <tr> <td><math>(a+b)/2 \leq 0.1</math></td> </tr> <tr> <td><math>0.5 &lt; \Phi &lt; 1.0</math></td> <td>3</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">Acceptable</th> </tr> </thead> <tbody> <tr> <td><math>a \geq b</math></td> <td><math>a/b \leq 4/3</math></td> </tr> <tr> <td><math>a &lt; b</math></td> <td><math>a/b &gt; 4/3</math></td> </tr> </tbody> </table>	Acceptable quantity		Width	Quantity	$W \leq 0.4$	$\Phi \leq 0.2$ and $\Phi \leq 1/2W$	$W > 0.4$	$\Phi \leq 0.25$ and $\Phi \leq 1/3W$	Acceptable quantity		Size	Any number	$a, b < 0.1$	Any number	$(a+b)/2 \leq 0.1$	$0.5 < \Phi < 1.0$	3	Acceptable		$a \geq b$	$a/b \leq 4/3$	$a < b$	$a/b > 4/3$
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5	Colour uniformity	Level of sample for approval set as limit sample																
6	Backlight	The backlight colour should correspond to the product specification Flashing and or unlit backlight is not allowed Dust larger than 0.25 mm is not allowed																
7	COB	Exposed wire bond pad is not allowed Insufficient covering with resin is not allowed (wire bond line exposed) Dust or bubble on the resin are not allowed																
8	PCB	No unmelted solder paste should be present on PCB Cold solder joints, missing solder connections, or oxidation are not allowed No residue or solder balls on PCB are allowed Short circuits on components are not allowed																
9	Tray particles	<table border="1" data-bbox="703 1211 1246 1682"> <thead> <tr> <th colspan="3">Acceptable quantity</th> </tr> <tr> <th></th> <th>Size</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td rowspan="2">On tray</td> <td><math>\Phi &lt; 0.2</math></td> <td>Any number</td> </tr> <tr> <td><math>\Phi &gt; 0.25</math></td> <td>4</td> </tr> <tr> <td rowspan="2">On display</td> <td><math>\Phi \geq 0.25</math></td> <td>2</td> </tr> <tr> <td><math>L = 3</math></td> <td>1</td> </tr> </tbody> </table>	Acceptable quantity				Size	Quantity	On tray	$\Phi < 0.2$	Any number	$\Phi > 0.25$	4	On display	$\Phi \geq 0.25$	2	$L = 3$	1
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## **14. LCD MODULES HANDLING PRECAUTIONS**

- Please remove the protection foil of polarizer before using.
- The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- If the display panel is damaged and the liquid crystal substance inside it leaks out, do not get any in your mouth. If the substance come into contact with your skin or clothes promptly wash it off using soap and water.
- Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarize carefully.
- To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
  - Be sure to ground the body when handling the LCD module.
  - Tools required for assembly, such as soldering irons, must be properly grounded.
  - To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
  - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
- Storage precautions  
When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps. Keep the modules in bags designed to prevent static electricity charging under low temperature / normal humidity conditions (avoid high temperature / high humidity and low temperatures below 0 °C). Whenever possible, the LCD modules should be stored in the same conditions in which they were shipped from our company.

## **15. OTHERS**

- Liquid crystals solidify at low temperature (below the storage temperature range) leading to defective orientation of liquid crystal or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subjected to a strong shock at a low temperature.
- If the LCD modules have been operating for a long time showing the same display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. Abnormal operating status can be resumed to be normal condition by suspending use for some time. It should be noted that this phenomena does not adversely affect performance reliability.
- To minimize the performance degradation of the LCD modules resulting from caused by static electricity, etc. exercise care to avoid holding the following sections when handling the modules:
  - Exposed area of the printed circuit board
  - Terminal electrode sections